DRAFT

Coal Combustion Waste Impoundment
Round 5 - Dam Assessment Report

Winyah Generating Station (Site #004)

Santee Cooper
Georgetown, South Carolina

Prepared for:

United States Environmental Protection Agency
Office of Resource Conservation and Recovery

Prepared by:

Dewberry & Davis, LLC
Fairfax, Virginia

Under Contract Number: EP-09W001727
August 2010

INTRODUCTION, SUMMARY, CONCLUSION AND RECOMMENDATIONS

The release of over five million cubic yards of coal ash from the Tennessee Valley Authority's Kingston, Tennessee facility in December 2008, which flooded more than 300 acres of land, damaging homes and property, is a wake-up call for diligence on coal combustion waste disposal units. A first step to prevent such catastrophic failure and damage is to assess the stability and functionality of ash impoundments and other units, then quickly take any needed corrective measures.

This assessment of the stability and functionality of the Winyah Generating Station coal combustion waste (CCW) management units is based on a review of available documents and on the site assessment conducted by Dewberry personnel on June 29 and 30, 2010. We found the supporting technical information to be limited (Section 1.1.3). As detailed in Section 1.2 there are several recommendations that may help to maintain a safe and trouble-free operation.

In summary, the Winyah Generating Station Ash Ponds and Slurry Ponds are FAIR for Ash Pond A, Ash Pond B, and the Unit 2 Slurry Pond and POOR for the South Ash Pond, West Ash Pond, and the Unit 3 & 4 Slurry Pond for continued safe and reliable operation. These ratings are strongly influenced by the lack of critical engineering data for the dams that impound these CCW ponds.

PURPOSE AND SCOPE

The U. S. Environmental Protection Agency (EPA) is investigating the potential for catastrophic failure of Coal Combustion Surface Impoundments (i.e. management units) at electric utilities in an effort to protect lives and property from the consequences of a dam failure or the improper release of impoundment contents. The EPA initiative is intended to identify conditions that may adversely affect the structural stability and functionality of a management unit and its appurtenant structures (if present); to note the extent of deterioration (if present); status of maintenance and/or a need for immediate repair; to evaluate conformity with current design and construction practices, and to determine the hazard potential classification for units not currently classified by the management unit owner or by a state or federal agency. The initiative addresses management units that are classified as Less-than-Low, Low, Significant or High Hazard Potential ranking. (For Classification, see pp. 3-8 of the 2004 Federal Guidelines for Dam Safety.)

In March 2009, the EPA sent letters to coal-fired electric utilities seeking information on the safety of surface impoundments and similar facilities that receive liquid-borne material that store or dispose of coal combustion waste. This letter was issued under the authority of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 104(e), to assist the Agency in assessing the structural stability and functionality of such management units, including which facilities should be visited to perform a safety assessment of the berms, dikes, and dams used in the construction of these impoundments.

EPA asked utility companies to identify all management units, such as surface impoundments or similar diked or bermed structures and landfills receiving liquid-borne materials, that store or dispose of coal-combustion residuals or by-products, including, but not limited to, fly ash, bottom ash, boiler slag, and flue gas emission control residuals. Utility companies responded with information on the size, design, age, and the amount of material placed in the units so that EPA could gauge which management units had or potentially could rank as having High Hazard Potential. The USEPA and its contractors used the following definitions for this study:

> "Surface Impoundment or impoundment means a facility or part of a facility which is a natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials (although it may be lined with man-made materials), which is designed to hold an accumulation of liquid wastes or wastes containing free liquids, and which is not an injection well. Examples of surface impoundments are holding, storage, settling and aeration pits, ponds, and lagoons."
>
> For this study, the earthen materials could include coal combustion residuals. EPA did not provide an exclusion for small units based on whether the placement was temporary or permanent. Furthermore, the study covers not only waste units designated as surface impoundments, but also other units designated as landfills which receive free liquids.
>
> EPA is addressing any land-based units that receive fly ash, bottom ash, boiler slag, or flue gas emission control wastes along with free liquids. If the landfill is receiving coal combustion wastes with liquids limited to that for proper compaction, then there should not be free liquids present and the EPA did not seek information on such units which are appropriately designated a landfill.
>
> In some cases coal combustion wastes are separated from the water, and the water containing de minimus levels of fly ash, bottom ash, boiler slag, or flue gas emission control wastes are sent to an impoundment. EPA is including such impoundments in this study, because chemicals of concern may have leached from the solid coal combustion wastes into the waster waters, and the suspended solids from the coal combustion wastes remain.

The purpose of this report is to evaluate the condition and potential of waste release from **management units that have not been rated for hazard potential classification**. A two-person team reviewed the information submitted to EPA, reviewed any relevant publicly available information from state or federal agencies regarding the unit potential hazard classification (if any) and accepted information provided via telephone communication with a management unit representative.

This evaluation included a site visit. EPA sent two engineers, one licensed in the State of South Carolina, for a two-day visit. The two-person team met with the technical and management representatives of the management unit(s) to discuss the engineering characteristics of the unit as part of the site visit. During the site visit the team collected additional information about the management unit(s) to be used in determining the hazard potential classifications of the management unit(s). Subsequent to the site visit the management unit owner provided additional engineering data pertaining to the management unit(s).

Factors considered in determining the hazard potential classification of the management unit(s) included the age and size of the impoundment, that quantity of coal combustion residuals or by-products that were stored or disposed in the these impoundments, its past operating history, and its geographic location relative to down gradient population centers and/or sensitive environmental systems.

This report presents the opinion of the assessment team as to the potential of catastrophic failure and reports on the condition of the management unit(s). The team considered criteria in evaluating the dams under the National Inventory of Dams in making these determinations.

LIMITATIONS

The assessment of dam safety reported herein is based on field observations and review of readily available information provided by the owner/operator of the subject coal combustion waste management unit(s). Qualified Dewberry engineering personnel performed the field observations and review and made the assessment in conformance with the required scope of work and in accordance with reasonable and acceptable engineering practices. No other warranty, either written or implied, is made with regard to our assessment of dam safety.

TABLE OF CONTENTS

DRAFT

DRAFT

TEXT PHOTOS

APPENDICES

1.0 CONCLUSIONS AND RECOMMENDATIONS

1.1 CONCLUSIONS

Conclusions are based on visual observations from a two-day site visit and review of technical and historical documentation provided by Santee Cooper.

1.1.1 Conclusions Regarding the Structural Soundness of the Management Unit(s)

No stability analyses of the embankment dams were provided for review, though requested by EPA; presumably such analyses were not available in Santee Cooper's files. On the basis of Dewberry engineers' visual observations and review of limited available information, the embankment dams probably have adequate stability e under static loading conditions. See Dewberry's assessment in Section 7.3. Nevertheless, because of the more significant consequences of failure of the South Ash Pond perimeter dike and the West Ash Pond/Unit 3 & 4 Slurry Pond perimeter dike, Santee Cooper should verify static stability of these dikes in the near future with documented analyses, if none currently exist. Although not as critical, it would be advisable for Santee Cooper to also verify static stability of perimeter dikes impounding Ash Pond A/ Ash Pond B and the Unit 2 Slurry Pond with documented analyses.

A strong earthquake is possible in the area. The stability of the Winyah GS CCW pond dams during strong earthquake is unknown and cannot be assessed from visual observation. Limited subsurface information indicates the presence of loose fine sands and very loose silty fine sands in foundation soils under the Ash Pond B perimeter dike, and based on NRCS soil survey data, fine sands and silty fine sands commonly exist in the area of the CCW ponds; thus, loose or very loose sands could exist under other CCW pond dikes at the Winyah GS. The apparent presence of loose and very loose sandy soils in the foundation suggests that liquefaction could potentially occur during strong earthquake shaking, but the actual liquefaction potential and its effect on the dikes at the Winyah GS cannot be known without performing a liquefaction study. For the more critical South Ash Pond perimeter dike and the West Ash Pond/Unit 3 & 4 Slurry Pond perimeter dike Santee Cooper should perform an engineering review of foundation soil conditions at those locations in greater detail in the near future and determine what, if any, limited or detailed analyses of seismic stability and liquefaction potential should be performed. Although not as critical, due to reduced impact, it would be advisable for Santee Cooper to also perform a similar engineering review for the perimeter dikes impounding Ash Pond A/ Ash Pond B and the Unit 2 Slurry Pond.

With exception of the RCP discharge conduit at Ash Pond B, the principal outlet structures, located at Ash Pond B (riser intake only) and the South Ash Pond, appear to be in sound and stable condition. The Ash Pond B RCP, which has separated joints and soil loss over the pipe, poses a potential threat to the stability of the perimeter dike. The abandoned outlet pipe through the Ash Pond A perimeter dike may also pose a threat to the stability of the perimeter dike, if the severely corroded CMP section observed at the outfall continues all the way back through the dike to the riser structure. Santee Cooper should investigate both of these penetrations and implement appropriate remedial actions, as needed.

The furnished drawings for the South Ash Pond indicate that a 30-inch diameter pipe through the perimeter dike was used for drainage during construction. Unless this pipe was fully plugged with non-shrink grout or concrete, this penetration could pose a potential threat to the stability of the South Ash Pond perimeter dike. Santee Cooper should also investigate this penetration and implement appropriate remedial actions, if needed.

There is no indication that the dikes consist of, or are modified with, wet fly ash, slag, or other unsuitable materials.

1.1.2 Conclusions Regarding the Hydrologic/Hydraulic Safety of the Management Unit(s)

No hydrologic/hydraulic analyses of the Winyah GS CCW ponds were provided for review, though requested by the EPA; presumably such analyses were not available in Santee Cooper’s files. Thus, the ability of the ash ponds and slurry ponds to safely store and pass the appropriate design flood has not been demonstrated through documented analysis. However, on the basis of a rudimentary review of flood storage capacity (see Section 6.2), the ponds are believed to have the capability to store100 percent of precipitation from the design storm over their areas without overtopping ,except possibly at the ring-dike system containing the Unit 3 & 4 Slurry Pond and the West Ash Pond. The hydrologic/hydraulic safety of the Unit 3 & 4 Slurry Pond and the West Ash Pond should be verified in the near future by documented analysis.

1.1.3 Conclusions Regarding the Adequacy of Supporting Technical Documentation

Supporting technical documents are limited. The original design documentation is limited to design drawings, some of which are not very legible, and a design report for a dike raise at Ash Pond B in 1997. No other technical documentation about the design of the existing facilities is available.

Technical documents to verify the adequacy of the pond storage, outlet structures and structural stability of the embankments are not available. However, the hydrologic/hydraulic documentation is considered non-critical for the ring-dike systems containing Ash Pond A and Ash Pond B, the South Ash Pond, and the Unit 2 Slurry Pond because these basins appear to have sufficient flood storage capacity. Therefore, the lack of supporting hydrologic/hydraulic documentation for these ponds is a concern until studies can be performed. However, hydrologic/hydraulic capacity of the ring-dike system containing the Unit 3 & 4 Slurry Pond and the West Ash Pond is not obvious, due to the relatively low available freeboard above normal operating level, the internal drainage from the high filled-in areas of the basins to the low areas, and the fact that pumping is relied upon to remove water from the basins. Therefore, supporting hydrologic/hydraulic documentation for the Unit 3 & 4 Slurry Pond and the West Ash Pond is considered to be inadequate at this time. This report recommends that Santee Cooper review and document hydrologic safety of the Unit 3 & 4 Slurry Pond and the West Ash Pond.

The lack of supporting structural stability documentation for the Ash Pond A/Ash Pond B perimeter dike and the Unit 2 Slurry Pond perimeter dike is a concern until studies can be performed for reasons discussed in Section 7.2. The lack of supporting structural stability documentation for the South Ash Pond perimeter dike and the West Ash Pond/Unit 3 & 4 Slurry Pond perimeter dike is considered to be inadequate at this time, since the consequences of failure of these dikes appear to be significant with respect to property damage and environmental damage. The structural stability of the South Ash Pond perimeter dike and the West Ash Pond/Unit 3 & 4 Slurry Pond perimeter dike should be verified in the near future by documented analyses of static stability and documented review of seismic stability and liquefaction potential.

1.1.4 Conclusions Regarding the Description of the Management Unit(s)

Descriptions provided for the CCW pond dams and basins are appropriate and sufficient. Descriptions provided for the outlet works were generally limited and insufficient for a complete understanding of essential features, e.g., types and diameters of outlet pipes.

1.1.5 Conclusions Regarding the Field Observations

Ash Pond A and Ash Pond B Dams – A perimeter dam embankment encloses Ash Pond A and Ash Pond B. A cross dike embankment separates Ash Pond A from Ash Pond B. The embankments appeared to be structurally sound. The visible parts of the perimeter dam and cross dike were observed to have no signs of overstress, significant settlement, shear failure, or other signs of instability.

Minor wet areas with some ponding water were observed along the toe of the perimeter dam. These conditions do not threaten the stability of the perimeter dam at this time but should be visually monitored during routine inspections for any change in condition.

Depressions (“dropouts”) along the abandoned discharge pipe of Ash Pond A through the perimeter dam were observed. The depressions are possibly associated with structural failure of the pipe due to corrosion of a CMP section of the abandoned discharge pipe between the toe of the dam and the Discharge Canal and/or due to joint separations. (It is not known if the CMP section continues through the perimeter dike to the intake riser.) Depressions with some exposed gravel along the Ash Pond B discharge pipe (RCP) through the perimeter dam were observed in the section between the toe of the dam and the Discharge Canal. The depressions were observed to be due to loss of overburden soil into separations at joints in the discharge pipe. As previously noted in Subsection 1.1.1, Santee Cooper should investigate both of these penetrations and implement appropriate remedial actions, as needed.

With exception of the conditions noted along the pipe penetrations, the dam embankments appeared to be adequately maintained. There were no other apparent indications of potential unsafe conditions.

South Ash Pond Dam – The perimeter dam embankment appeared to be structurally sound. Visible parts of the embankment dam and outlet structure were observed to have no signs of overstress, significant settlement, significant shear failure, or other signs of instability.

Wet soils and small seeps were observed along the outside toe of the embankment and at the toe drains; the wetness and small seeps appear to be associated with drainage of water collected in the toe drain and gradual seepage through the generally sandy foundation soils. These conditions do not threaten the stability of the perimeter dam at this time but should be visually monitored during routine inspections for any change in condition.

Some areas of poor grass cover were noted, particularly in toe areas where recent work on the toe drain outlets had been conducted. These areas should be reseeded as part of routine maintenance or otherwise protected with an inverted filter in the wet toe areas if grass cannot be established and maintained.

The dam embankment appeared to be adequately maintained. There were no apparent indications of potential unsafe conditions.

West Ash Pond and Unit 3 & 4 Slurry Pond Dams – The perimeter dam embankment encloses the West Ash Pond and the Unit 3 & 4 Ash Slurry Pond. A cross dike embankment separates the West Ash Pond from the Unit 3 & 4 Slurry Pond. The embankments appeared to be structurally sound. The visible parts of the embankment dam and cross dike were observed to have no signs of overstress, significant settlement, shear failure, or other signs of instability. The area of the perimeter dam on the northwest side of the Unit 3 & 4 Ash Slurry Pond where previous repairs were done to stop leakage through an abandoned construction drain through the dam appeared to be in sound condition; the section of the perimeter dam at the southwest corner of the West Ash Pond where another abandoned construction drain had been filled with concrete also appeared to be in sound condition.

Minor wet areas with little ponding water were observed along the toe of the perimeter dam on the west side of the West Ash Pond. These conditions do not threaten the stability of the perimeter dam at this time but should be visually monitored during routine inspections for any change in condition.

The dam embankments appeared to be adequately maintained. There were no apparent indications of potential unsafe conditions.

Unit 2 Slurry Pond Dam – A perimeter dam embankment encloses the Unit 2 Slurry Pond and a cross dike embankment divides the basin. The embankments appeared to be sound. The visible parts of the embankment dams and pump structure were observed to have no signs of overstress, significant settlement, significant shear failure, or other signs of instability. No seepage was observed; the basin had little water in it at the time of the site visit.

The dam embankments appeared to be adequately maintained. There were no apparent indications of potential unsafe conditions.

1.1.6 Conclusions Regarding the Adequacy of Maintenance and Methods of Operation

Maintenance of the impounding embankments of the ash ponds and the slurry ponds appears to be generally adequate; reseeding of some bare soil areas, particularly at the South Ash Pond perimeter dike, should be done as part of routine maintenance. Consideration should be given to using an inverted filter in bare soil areas along the wet toe of the dike, if it is not possible to establish and maintain a good grass cover in the wet areas.

Maintenance or repair is needed at the active outlet pipe penetration through the perimeter dike at Ash Pond B and possibly at the abandoned outlet pipe penetration through the perimeter dike at Ash Pond A and potentially at the abandoned construction drainage pipe through the perimeter dike at the South Ash Pond (see Subsection 1.1.1).

Operational procedures appear to be appropriate and adequate, as long as pumping operations at the West Ash Basin, Unit 3 & 4 Slurry Pond, and Unit 2 Slurry Pond are closely monitored and back-up pumps are available and can be quickly pulled into service, if needed.

1.1.7 Conclusions Regarding the Adequacy of the Surveillance and Monitoring Program

The surveillance program is generally adequate. The daily inspections by plant personnel and quarterly internal inspections by Santee Cooper engineers are of sufficient frequency and should continue. Santee Cooper's written inspection procedures are generally adequate but could be improved in execution. The daily and quarterly inspections apparently did not note or pick-up on the potentially significant issues at the abandoned outlet pipe at Ash Pond A and the active outlet pipe at Ash Pond B.

There are no dam performance monitoring instruments such as observation wells/piezometers, settlement monitoring points, inclinometers, seepage monitoring points, etc. at the CCW pond dams, and none appear to be warranted at this time. A program of groundwater quality monitoring and pond discharge monitoring is in place and will continue in accordance with SCDHEC Bureau of Water/Compliance Assurance Division permit requirements.

1.1.8 Classification Regarding Suitability for Continued Safe and Reliable Operation

In accordance with EPA criteria Ash Pond A, Ash Pond B, and the Unit 2 Slurry Pond are rated FAIR for continued safe and reliable operation . The South Ash Pond, West Ash Pond, and the Unit 3 & 4 Slurry Pond are rated POOR for continued safe and reliable operation. These ratings are strongly influenced by the lack of critical engineering data for the dams that impound these CCW ponds. Implementation of recommendations as presented below would help improve the rating.

1.2 RECOMMENDATIONS

1.2.1 Recommendations Regarding the Structural Stability

It is recommended that Santee Cooper verify static stability of the South Ash Pond perimeter dike and the West Ash Pond/Unit 3 & 4 Slurry Pond perimeter dike with documented analyses.

It is recommended that Santee Cooper perform an engineering review of foundation soil conditions at the South Ash Pond perimeter dike and the West Ash Pond/Unit 3 & 4 Slurry Pond perimeter dike in greater detail and determine what, if any, limited or detailed analyses of seismic stability and liquefaction potential should be performed.

It is recommended that Santee Cooper investigate the apparent problem conditions along the active (RCP) outlet penetration through the Ash Pond B perimeter dike and along the abandoned (apparent CMP) outlet penetration through Ash Pond A perimeter dike and implement appropriate remedial actions, as needed. It is further recommended that Santee Cooper review the status of the abandoned CMP construction drain through the South Ash Pond perimeter dike and implement appropriate remedial actions.

1.2.2 Recommendations Regarding the Hydrologic/Hydraulic Safety

It is recommended that Santee Cooper verify the hydrologic/hydraulic safety of the Unit 3 & 4 Slurry Pond and the West Ash Pond with documented analyses.

1.2.3 Recommendations Regarding the Supporting Technical Documentation

As recommended above in Subsection 1.2.1, the structural stability of the South Ash Pond perimeter dike and the West Ash Pond/Unit 3 & 4 Slurry Pond perimeter dike should be verified by documented analyses of static stability and documented review of seismic stability and liquefaction potential.

As recommended above in Subsection 1.2.2, the hydrologic/hydraulic safety of the Unit 3 & 4 Slurry Pond and the West Ash Pond should be verified by documented analysis.

1.2.4 Recommendations Regarding the Description of the Management Unit(s)

It is recommended that Santee Cooper ensure that project records contain accurate, legible records of the as-built features of all CCW pond outlet works, as well as information on abandoned works and how they were abandoned.

1.2.5 Recommendations Regarding the Field Observations

Ash Pond A and Ash Pond B Dams – Perform investigations and any needed repairs as recommended in Subsection 1.2.1 with respect to problem conditions noted along the two pipe penetrations. No other recommendations appear warranted at this time. Santee Cooper should continue to maintain vegetation on the crest and outside slopes and perform visual monitoring of wet soil areas along the toe of the perimeter dam as recommended in Subsections 1.2.6 and 1.2.7, below.

South Ash Pond Dam – None appear warranted at this time, other than to continue maintaining vegetation on the crest and outside slopes, and particularly along the toe, and perform visual monitoring of the areas of wet soil and seepage along the toe of the dam as recommended in Subsections 1.2.6 and 1.2.7, below.

Unit 3 & 4 Slurry Pond and West Ash Pond Dams – None appear to be warranted at this time, other than to continue maintaining vegetation on the crest and outside slopes and perform visual monitoring of the wet soil areas along the toe of the perimeter dam as recommended in Subsections 1.2.6 and 1.2.7, below.

Unit 2 Slurry Pond Dam – None appear to be warranted at this time, other than to continue maintaining vegetation on the crest and outside slopes as a part of routine maintenance as recommended in Subsection 1.2.6, below.

1.2.6 Recommendations Regarding the Maintenance and Methods of Operation

Maintain or repair active and abandoned pipe penetrations through the Ash Pond A/Ash Pond B perimeter dike and the South Ash Pond perimeter dike as recommended above in Subsection 1.2.1.

It is recommended that bare soil areas on the dikes, particularly the South Ash Pond perimeter dike be reseeded or otherwise protected against erosion as part of routine maintenance.

No recommendations regarding operational procedures appear to be warranted at this time, but ensure that pumping operations at the West Ash Basin, Unit 3 & 4 Slurry Pond, and Unit 2 Slurry Pond are closely monitored and have back-up pumps in reserve that can be quickly placed into service, if needed.

1.2.7 Recommendations Regarding the Surveillance and Monitoring Program

It is recommended that all the CCW pond dikes be walked at least once per year, with close scrutiny in critical outside toe areas, such as at penetrations (conduits, including abandoned ones) or areas of known seepage or wet areas to check for changed conditions. These conditions cannot be viewed properly from the crest.

It is recommended that the principal outlet structures, which are those located at Ash Pond B and the South Ash Pond, be inspected internally with a remote camera on a frequency of at least once every 5 years.

1.2.8 Recommendations Regarding Continued Safe and Reliable Operation

No additional recommendations for continued safe and reliable operation appear warranted at this time.

1.3 PARTICIPANTS AND ACKNOWLEDGEMENT

1.3.1 List of Participants

*Fred Tucker, Dewberry
*Anne Lee, Dewberry
Mitch Mitchum, Santee Cooper
*Denise Bunte-Bisnett, Santee Cooper
*Jane Hood, Santee Cooper
*Arthur Ford, Santee Cooper
*Aundry Evans, Santee Cooper

*Participated in field dam inspections.

1.3.2 Acknowledgement and Signature

We acknowledge that the management units referenced herein have been assessed on June 29 and June 30, 2010.

Frederic C. Tucker, PE
Registered, SC 6836

Anne Lee, Civil Engineer

2.0 DESCRIPTION OF THE COAL COMBUSTION WASTE MANAGEMENT UNIT(S)

2.1 LOCATION AND GENERAL DESCRIPTION

The Winyah Generation Station (Winyah GS) is physically located between Pennyroyal Creek and Turkey Creek, south of the Sampit River in Georgetown County, South Carolina, approximately 1.4 miles southwest of Georgetown, South Carolina. The Winyah GS is located on Steamplant Drive, Georgetown, South Carolina 29440-5035. Winyah Bay is East of Winyah Generating Station. See Appendix A – Doc 1.1 for location of the Winyah GS on an aerial map.

The Winyah GS has six ponds or basins designated for disposal of coal combustion waste (CCW), including:

- Ash Pond A
- Ash Pond B
- South Ash Pond
- West Ash Pond
- Unit 3 & 4 Slurry Pond
- Unit 2 Slurry Pond

See Appendix A – Doc 1.2 for relative locations of the basins on an aerial view map of the Winyah GS. (Note: The terms “dike” and “dam” are used interchangeably in this report, as are the terms “pond” and “basin.”)

All of the basins were manmade primarily by excavating the interior areas of the basins and building a perimeter dike (dam) around the excavated areas. The principal impounding structures are the perimeter dike that encompasses Ash Pond A and Ash Pond B, the perimeter dike that surrounds the South Ash Pond, the perimeter dike that encompasses the West Ash Pond and Unit 3 & 4 Slurry Pond, and the perimeter dike that surrounds the Unit 2 Slurry Pond. A diagonal cross dike separates the northern Ash Pond A from the southern Ash Pond B within the perimeter dike system. Likewise, a cross dike separates the southern West Ash Pond from the northern Unit 3 & 4 Slurry Pond within the perimeter dike system. Similarly, the Unit 2 Slurry Pond was recently separated into two (east and west) cells by extending the original “finger” dike in the middle of the basin to the perimeter dike on the north side of the basin. There is no indication that any of the dikes consist of, or are modified with, wet fly ash, slag, or other unsuitable materials.

Ash Pond A has a surface area of approximately 88 acres. According to a furnished drawing (Appendix A – Doc 1.3), the design top elevation of the perimeter dike is 41.5 feet. The maximum height of the perimeter dike is 24.5 feet above the outside toe. It is an unlined basin that is designated to receive fly ash, bottom ash and boiler slag. The basin is currently active but nearly filled to capacity; remaining storage volume varies due to the excavation of ash for retail. There is practically no free-standing water in this basin. Drainage trenches are excavated in the ash surface to direct sluice water and storm water to the southeast side of the basin, where an outlet conduit through the cross dike discharges into Ash Pond B. (Data on conduit type and size not provided; conduit not seen in the field.) Formerly, drainage from Ash Pond A to Ash Pond B was through a decant tower with bottom discharge conduit ("18" conc. O-ring pipe" according to furnished drawing) through the cross dike near its southwest end; that drainage structure has been abandoned in-place. The original outlet structure (decant tower) on the southwest side of the basin with bottom discharge into a conduit through the perimeter dike is bladder plugged and abandoned. A furnished drawing indicates the conduit was to be 24-inch diameter "conc. o-ring pipe," but badly corroded corrugated metal pipe (CMP) was observed in the field at the outlet end. Ash Pond A wastewater discharge is regulated by SCDHEC Bureau of Water/Compliance Assurance Division, but the dam structure is not regulated by state or federal agencies.

Ash Pond B has a surface area of approximately 63 acres. It is an unlined basin that receives CCW water from Ash Pond A. The maximum height of the perimeter dam is 31 feet above the outside toe. It is an unlined basin that is designated to contain fly ash, bottom ash, and boiler slag. The basin is filled to approximately 60 percent capacity, but is currently active as a clarifying cell with a relatively small pool of free-standing water in the southern one-third of the basin. The outlet structure (decant tower) near the south end on the west side discharges into a conduit through the perimeter dike to the Discharge Canal. Type and size of the conduit are not readable on the furnished drawing, but in the field the shallow-submerged outlet end of the conduit appeared to be reinforced concrete pipe (RCP) on the order of 24 inches in diameter.

The capacity of Ash Pond B was expanded in 1997. The height of the perimeter dike embankment along Ash Pond B was raised approximately 7.0 feet to match the elevation of the Ash Pond A dike embankment crest. Appendix A – Doc 1.4 is a report of the raised dike design prepared by Paul C. Rizzo Associates, Inc. (Rizzo). The decant tower structure was raised 7 feet. Ash Pond B wastewater discharge is regulated by the SCDHEC Bureau of Water/Compliance Assurance Division, but the dam structure is not regulated by state or federal agencies.

The South Ash Pond has a surface area of approximately 61 acres. According to representative sections (Exhibit 1), the design top elevation of the perimeter dike is 37 feet (37.31 feet at centerline). The design of the perimeter dike included a toe drain for seepage control (see Exhibit 2 for details); locations of PVC pipe drain outlets for the toe drain are shown in Appendix A – Doc 1.5, along with the design layout and features of the South Ash Pond perimeter dike. The maximum height of the perimeter dike is 22 feet above the outside toe. The South Ash Pond is an unlined basin designated to receive fly ash, bottom ash and boiler slag; it is currently active and filled to approximately 50 percent of capacity. The South Ash Pond receives water pumped from the West Ash Pond; it also receives water pumped from an outside toe ditch on the perimeter of the basin. Drainage trenches are excavated in the ash surface to direct sluice water, pass-through water, and storm water to the east end of the basin, where there is a relatively small pool of free-standing water. The outlet structure (decant tower) at the east end discharges into a conduit through the perimeter dike and ultimately to the Discharge Canal. (Data on conduit type and size not provided.) The South Ash Pond wastewater discharge is regulated by the SCDHEC Bureau of Water/Compliance Assurance Division, but the dam is not regulated by state or federal agencies.

The West Ash Pond (also known as Ash Pond 3 & 4) has a surface area of approximately 62 acres. Design layout and features of the West Ash Pond dikes are shown in Appendix A – Doc 1.6. According to representative sections (Exhibit 3), the design top elevation of the perimeter dike is 37 feet (37.31 feet at centerline). The maximum height of the perimeter dam is 32 feet above the outside toe. It is an unlined basin designated to contain fly ash, bottom ash, and boiler slag; it is filled to approximately 90 percent of capacity, and it currently does not receive ash, and the in-place ash is not mined. The West Ash Basin contains very little free-standing water. Water is pumped into the West Ash Pond from the Unit 3 & 4 Slurry Pond and channeled along the west and southwest sides to the southeast corner, where it is pumped from the former decant tower to the South Ash Pond. The former outlet conduit through the perimeter dike at the southeast corner of the basin apparently has been sealed; therefore, there is no gravity flow outlet from the West Ash Pond. The West Ash Pond wastewater discharge is regulated by the SCDHEC Bureau of Water/Compliance Assurance Division, but the dam is not regulated by state or federal agencies.

The Unit 3 & 4 Slurry Pond has a surface area of approximately 100 acres. Design layout and features of the Unit 3 & 4 Slurry Pond dikes are shown in Appendix A – Doc 1.6. According to representative sections (Exhibit 3), the design top elevation of the perimeter dike is 37 feet (37.31 feet at centerline). The maximum height of the perimeter dike is 30 feet above the outside toe. It is an unlined basin designated to receive flue gas emission control residuals (calcium sulfate) from the scrubbers; it is filled to approximately 70 percent of capacity. Although the basin is active, it receives sluiced material only during startup of a unit, until the calcium sulfate meets specifications for use at an adjacent gypsum wallboard plant. Once the material meets specifications, it is dried and sent by conveyor to the wallboard plant. The Unit 3 & 4 Slurry Pond has the largest pool of free-standing water of the six basins at the Winyah GS; it occupies approximately one-half of the basin surface area. The Unit 3 & 4 Slurry Pond receives water pumped from an outside toe ditch on the perimeter of the basin. There is no gravity outflow structure at the basin. Water is pumped from the Unit 3 & 4 Slurry Pond over the northwest end of the cross dike into the West Ash Pond. The Unit 3 & 4 Slurry Pond wastewater discharge is regulated by the SCDHEC Bureau of Water/Compliance Assurance Division, but the dam is not regulated by state or federal agencies.

The Unit 2 Slurry Pond has a surface area of approximately 32 acres. Design layout and features of the Unit 2 Slurry Pond dikes are shown in Appendix A – Doc 1.7. According to the representative sections (Exhibit 4), the design top elevation of the perimeter dike is 37.0 feet. The maximum height of the perimeter dam is 12 feet above the outside toe. It is an unlined basin designated to receive flue gas emission control residuals (scrubber waste); at the time of the assessment it was filled to approximately 65 percent of capacity. However, it no longer receives scrubber waste but is not closed. A finger dike was extended to complete a north-south cross dike across the middle of the basin (see Appendix A – Doc 1.7); a HDPE pipe was installed for pass-through flow of storm water run-off. The concrete pump (sump) structure has an open side that formerly was fitted with wooden slide-gate sections to impound water and form a sump or well from which water was pumped. Currently, all the bottom gates have been removed and the bottom gate is raised to allow water to flow under it. A pump placed inside the structure discharges storm water through a drainage pipe to the Intake Canal and maintains the basin generally free of a pool of water, except for temporary pools during significant rainfalls. The Unit 2 Slurry Pond wastewater is regulated by the SCDHEC Bureau of Water/Compliance Assurance Division, but the dam is not regulated by state or federal agencies.

2.2 SIZE AND HAZARD CLASSIFICATION

The Winyah GS impoundment dams are not regulated by a federal or state agency and currently do not have federal or state hazard classifications. Dams owned by the South Carolina Public Service Authority (Santee Cooper) are specifically exempted from state regulation in Section 72-2 Dam Classifications and Exemptions of the South Carolina Dams and Reservoirs Safety Act Regulations. Santee Cooper created an internal multi-disciplined team composed of professional engineers with backgrounds specializing in dam safety, environmental services, plan operations, and facility maintenance to evaluate the structural integrity and safety of the impoundments. This task force will also establish hazard ratings for each impoundment using nationally recognized criteria.

In the following paragraphs a hazard potential determination is given on the basis of the Federal Emergency Management Agency (FEMA) hazard potential classification, which has been adopted by USEPA; this classification system and the hazard potential determination and basis are presented on the field observation checklists for the Winyah GS CCW ponds included in Appendix B.

Ash Pond A Dam - Maximum dam height is 24.5 feet, according to furnished information. The total storage capacity is 807 acre-feet. Other physical data are summarized in Table 2.1. The dam currently has an undetermined hazard potential rating. For reference the SCDHEC criteria for Size Classification and Hazard Potential Classification are presented in Table 2.2 and Table 2.3, respectively. Based on storage capacity, the Ash Pond A Dam has a Small Size Classification. Failure of the dam would discharge CCW into the Cooling Pond. The failure would not likely cause loss of life but would cause some onsite environmental damage and potential disruption of generation station operations. Therefore, per the USEPA classification the Ash Pond A Dam should be given a Low (Class III) Hazard Potential Classification.

Ash Pond B Dam - Maximum dam height is 31 feet, according to furnished information. The total storage capacity is 537 acre-feet. Other physical data are summarized in Table 2.1. The dam currently has an undetermined hazard potential rating. Based on storage capacity and SCDHEC criteria (Table 2.2), the Ash Pond B Dam has a Small Size Classification. Failure of the dam would discharge CCW into the Cooling Pond. The failure would not likely cause loss of life but would cause some onsite environmental damage and potential disruption of generation station operations. Therefore, per the USEPA classification the Ash Pond B Dam should be given a Low (Class III) Hazard Potential Classification.

South Ash Pond Dam - Maximum dam height is 22 feet, according to furnished information. The total storage capacity is 1,129 acre-feet. Other physical data are summarized in Table 2.1. The dam currently has an undetermined hazard potential rating. Based on storage capacity and

SCDHEC criteria (Table 2.2), the South Ash Pond Dam has an Intermediate Size Classification. Failure of the dam would discharge CCW into a perimeter ditch bounded by existing railroad tracks. If the tracks were to be overtopped, CCW could potentially damage the tracks and adjacent private property and/or enter Pennyroyal Creek. The failure would not likely cause loss of life but would cause environmental damage, potential private property damage, and potential disruption of railroad operations and generation station operations. Therefore, per the USEPA classification the South Ash Pond Dam should be given a Significant (Class II) Hazard Potential Classification.

West Ash Pond Dam - Maximum dam height is 32 feet, according to furnished information. The total storage capacity is 1,178 acre-feet. Other physical data are summarized in Table 2.1. The dam currently has an undetermined hazard potential rating. Based on storage capacity and SCDHEC criteria (Table 2.2), the West Ash Pond Dam has an Intermediate Size Classification. Failure of the dam could potentially damage adjacent private property and/or enter Pennyroyal Creek; if failure occurs on the southwest side, the adjacent railroad tracks could potentially be overtopped with CCW. The failure would not likely cause loss of life but would cause environmental damage, potential private property damage, and potential disruption of railroad operations and generation station operations. Therefore, per the USEPA classification the West Ash Pond Dam should be given a Significant (Class II) Hazard Potential Classification.

Unit 3 & 4 Slurry Pond Dam - Maximum dam height is 30 feet, according to furnished information. The total storage capacity is 1,700 acre-feet. Other physical data are summarized in Table 2.1. The dam currently has an undetermined hazard potential rating. Based on storage capacity and SCDHEC criteria (Table 2.2), the Unit 3 & 4 Slurry Pond Dam has an Intermediate Size Classification. Failure of the dam could potentially damage adjacent private property and/or release CCW into Pennyroyal Creek with potential impact on the nearby Pennyroyal Road. The failure would not likely cause loss of life, but would cause environmental damage and potential private and public property damage. Therefore, per the USEPA classification the Unit 3 & 4 Slurry Pond Dam should be given a Significant (Class II) Hazard Potential Classification.

Unit 2 Slurry Pond Dam - Maximum dam height is 12 feet, according to furnished information. The total storage capacity is 416 acre-feet. Other physical data are summarized in Table 2.1. The dam currently has an undetermined hazard potential rating. Based on storage capacity and SCDHEC criteria (Table 2.2), the Unit 2 Slurry Pond Dam has a Small Size Classification. Failure of the dam would discharge CCW into a perimeter ditch. If the perimeter ditch were to be overtopped, CCW could potentially damage adjacent property (gypsum wallboard plant) and/or enter the Intake Canal. The failure would not likely cause loss of life but would cause on-site environmental damage, potential property damage, and potential disruption of generation station operations. Therefore, per the USEPA classification the Unit 2 Slurry Pond Dam should be given a Significant (Class II) Hazard Potential Classification.

DRAFT

Pertinent physical data are presented in the following Table 2.1.

Table 2.1: Summary of Dam Dimensions and Size*

	Ash Pond A Dam	Ash Pond B Dam	South Ash Pond Dam	West Ash Pond Dam	Unit 3 & 4 Slurry Pond Dam	Unit 2 Slurry Pond Dam
Dam Height	24.5’	31.0’	22.0’	32.0’	30.0’	12.0’
Crest Width	12’	12’	15’	15’	15’	10’
Length	~8,854’**	~6,243’	~8,663’	~6,950’**	~5,937’	~6,491’ **
Side Slopes (inside)	2:1	2:1	3:1 & 4:1	2:1 & 3:1	2:1 & 3:1	2:1
Side Slopes (outside)	3:1	2:1	3:1 & 4:1	2:1 & 3:1	2:1 & 3:1	2:1
Hazard Classification***	Class III	Class III	Class II	Class II	Class II	Class II

*Based on data in Santee Cooper’s response to EPA’s RFI dated March 9, 2009 and furnished information
**Includes cross dike
***Based on available information and USEPA classification
Class II = Significant Hazard
Class III = Low Hazard

The SCDHEC Classification System is presented below.

Table 2.2: Size Classification*

Category	**Impoundment Storage (Acre-Feet)**	**Dam Height (Feet)**
Very Small	Less than 50	Less than 25
Small	Less than 1,000 but equal to or greater than 50	Less than 40 but equal to or greater than 25
Intermediate	Less than 50,000 but equal to or greater than 1,000	Less than 100 but equal to or greater than 40
Large	Equal to or less than 50,000	Equal to or less than 100

*Note: Size classification may be determined by either storage or height of structure, whichever gives the higher category.

Table 2.3: SC Hazard Potential Classification	
Category	**Hazard Potential**
High Hazard (Class I)	Dams located where failure will likely cause loss of life or serious damage to home(s), industrial and commercial facilities, important public utilities, main highway(s) or railroad(s).
Significant Hazard (Class II)	Dams located where failure will not likely cause loss of life but may damage home(s), industrial and commercial facilities, secondary highway(s) or railroad(s) or cause interruption of use or service of relatively important public utilities.
Low Hazard (Class III)	Dams located where failure may cause minimal property damage to others. Loss of life is not expected.

2.3 AMOUNT AND TYPE OF RESIDUALS CURRENTLY CONTAINED IN THE UNIT(S) AND MAXIMUM CAPACITY

The amount of CCW residuals currently stored in the units and maximum capacities are summarized in Table 2.4.

Ash Pond A - Based on information from Santee Cooper, this basin contains fly ash, bottom ash and boiler slag deposited over 35 years. As previously mentioned, this basin is currently active and remaining storage volume varies due to the excavation of fly ash for retail. A total of 726 acre-feet of CCW material is contained within Ash Pond A, recorded 2009. The amount of ash produced and removed from 2005 to 2009 is provided, see Appendix A – Doc 1.8. As of 2009, Ash Pond A had an estimated 10 percent remaining in total storage capacity. A normal pool of water is not maintained in this basin other than locally along drainage ditches excavated in the ash surface.

Ash Pond B - Based on information from Santee Cooper, this basin is currently active as a clarifying cell and contains fly ash and bottom ash deposited over 35 years. The storage capacity of Ash Pond B was increased in 1997 with the expansion of the embankment. The height of the dam was raised to approximately meet the existing top of dam elevation of Ash Pond A. A normal pool of water is maintained at approximately 35.0 feet or 6.0 feet below the design top elevation of 41.0 feet indicated in Rizzo's design report (Appendix A – Doc 1.4); the pool level at the time of the site visit was at elevation 34.8 feet. A total of 322 acre-feet of CCW material is contained within Ash Pond A, recorded 2009. Ash Pond B has an estimated 40 percent remaining in total storage capacity. The pool of free-standing water covers approximately one-third of the surface area in the lower (southern) part of the basin.

South Ash Pond - Based on information from Santee Cooper, this basin contains fly ash, bottom ash and boiler slag deposited over 30 years. As previously mentioned, this basin is currently active. A total of 565 acre-feet of CCW material is contained within the South Ash Pond, recorded 2009. The South Ash Pond has an estimated 50 percent remaining in total storage capacity. The design maximum water level is at elevation 34.0 feet, which would leave at least 3.3 feet of freeboard below the design crest centerline elevation of 37.31 feet. The staff gage reading at the time of the site visit was 17.1 feet, but no reference elevation was given to relate this reading to an elevation that can be compared to the dam crest elevation. Visually the pool level appeared to be at least 6.0 feet below the crest at the time of the site visit.

West Ash Pond - Based on information from Santee Cooper, this basin contains fly ash, bottom ash and boiler slag deposited over 30 years. As previously mentioned, this basin no longer receives CCW. A total of 1060 acre-feet of CCW material is contained within the West Ash Pond, recorded 2009. The West Ash Pond has an estimated 10 percent remaining in total storage capacity, but currently the basin is used only for pass-through of water pumped into it from the Unit 3 & 4 Slurry Pond. A normal pool of water is not maintained in this basin other than locally along drainage ditches excavated in the ash surface. The original design maximum pool elevation was 34.0 feet, which was about 3.3 feet below the design crest centerline elevation.

Unit 3 & 4 Slurry Pond - Based on information from Santee Cooper, this basin contains flue gas emission control residuals deposited over 30 years. As previously mentioned, this basin is currently active but receives calcium sulfate slurry only during unit start-up operations, until the material meets specifications for use at the gypsum board manufacturing plant located adjacent to the generating station. A total of 1190 acre-feet of CCW material is contained within Unit 3 & 4 Slurry Pond, recorded 2009. Unit 3 & 4 Slurry Pond has an estimated 30 percent remaining in total storage capacity. The design maximum pool elevation is 34.0 feet, which is about 3.3 feet below the design crest centerline elevation. A staff gage reading at the time of the site visit indicated that the pool level was at elevation 34.9 feet, which was above the design maximum pool elevation. The pool of free-standing water covers approximately one-half of the surface area in the northern part of the basin.

Unit 2 Slurry Pond - Based on information from Santee Cooper, this basin contains flue gas emission control residuals deposited over 33 years. The basin is currently not active but not closed. A total of 270 acre-feet of CCW material is contained within Unit 2 Slurry Pond, recorded 2009. The Unit 2 Slurry Pond has an estimated 35 percent remaining in total storage capacity. A normal pool of water is not maintained in this basin; storm water runoff within the basin is pumped out (to Intake Canal) as it accumulates. The amount of water in the basin at the time of the site visit was minimal.

Table 2.4: Amount of Residuals and Maximum Capacity of Unit*

	Ash Pond A	Ash Pond B	South Ash Pond	West Ash Pond	Unit 3 & 4 Slurry Pond	Unit 2 Slurry Pond
Surface Area (acre)	88	63	61	62	100	34
Current Storage Volume (acre-feet)	726	322	565	1060	1190	270
Total Storage Capacity (acre-feet)	807	537	1129	1178	1700	416

*Based on data in Santee Cooper's response to EPA's RFI dated March 9, 2009

2.4 PRINCIPAL PROJECT STRUCTURES

2.4.1 Earth Embankment Dams

Ash Pond A and Ash Pond B Dams - The material used in the construction of the perimeter dam along Ash Pond A and the cross dike embankment is unknown but presumed to be similar to that described below for the original perimeter dam along Ash Pond B. The basins are not lined. The top of Ash Pond A dam elevation from original design plans is 41.5 feet; the original design top of dam elevation for Ash Pond B was 34.5 feet. The original design geometry of the perimeter dam consists of 2 horizontal (H) to 1 vertical (V) inside slopes (upstream slope of cross dike) 3 H to 1 V outside slopes (downstream slope of cross dike), and 12-foot crest width (minimum). From test borings made by Rizzo as part of design studies to raise the Ash Pond B dam, the materials used in the construction of the original perimeter dam embankment along Ash Pond B were revealed to consist of predominantly clayey-silty fine sand and silty fine sand. The perimeter embankment along Ash Pond B was expanded in 1997. The top of dam was raised approximately 6.8 feet to match the top of dam elevation of Ash Pond A (see Appendix A – Doc 1.4). The design geometry of the dam raise consisted of 2 H to 1 V side slopes both inside and outside and crest width of 12 feet. Borrow soil composed of clayey sands was obtained from a property near Winyah GS for use in construction of the embankment raise. No internal drainage blankets or toe drains for seepage control were included in the original design of the perimeter dams or in the design of the dam raise for Ash Pond B. The length of the embankment raised was 5,200 feet. The raised embankment outside toe encroached slightly into the adjacent Cooling Pond. In these areas the design called for the foundation of the embankment toe to be constructed of riprap to above the water level and placement of a filter on top of the riprap before constructing the soil embankment on top of it. The total length of the perimeter dam is approximately 12,875 feet. The total length of the cross dike is approximately 2,222 feet.

South Ash Pond Dam - The soil used in the construction of the dam embankment is unknown but probably locally obtained. The basin is not lined. Original design called for gravel surfacing on part of the crest, from the access road on the north side around to a turn-around located just past the location of decant tower at the east end. The total length of the dam is approximately 8,663 feet. The design geometry of the dam consists of 3 H to 1 V inside and outside slopes for approximately 6,600 feet, 4 H to 1 V inside and outside slopes for approximately 1,750 feet along the west and southwest portions of the embankment, and crest width of 15 feet. A toe drain is used for seepage control. Seepage water collected in the drain discharges through 4-inch diameter solid-wall PVC pipes extending from the internal drain to daylight at the toe; the design spacing of these seepage drainage pipes is 200 feet. A representative section of the embankment dam is shown in Exhibit 1. The toe drain details are shown in Exhibit 2. The design drawings (Appendix A – Doc 1.5) show that a 30-inch diameter CMP through a southwest section of the perimeter dike was used for drainage from the basin area during construction. This CMP presumably was plugged and left in-place at completion of construction. The manner of plugging the pipe is unknown but may be similar to the way construction drainage pipes through the Unit 3 & 4 Slurry Pond and West Ash Pond dams were plugged; as subsequently discussed, emergency repairs had to be made at the Unit 3 & 4 Slurry Pond dam when a leak through the dam developed at the sealed CMP, and preventative repairs were made at the sealed CMP through the West Ash Pond dam to preclude a similar leak from developing there.

Unit 3 & 4 Slurry Pond and West Ash Pond Dams - The material used in the construction of the dam embankments is unknown but probably locally obtained. The basins are not lined. The total length of the perimeter dam is approximately 11,357 feet. The total length of the cross dike is approximately 1,530 feet. The design geometry of the cross dike consists of 3 H to 1 V side slopes and 15-foot crest width. A finger dike that partially divides the Unit 3 & 4 Slurry Pond has like design geometry. The perimeter dam consists of 2 H to 1 V inside and outside slopes along 3 sides, and 3 H to 1 V inside and outside slopes along the west sides of the basins, and crest width of 15 feet. No internal drainage blankets or formal toe drains for seepage control were used. A representative section of the embankment dam is shown in Exhibit 3. The embankment dam on the northwest side of the Unit 3 & 4 Slurry Pond required emergency repair when leakage developed at an abandoned CMP construction drain through the perimeter dam; apparently the pipe seal had failed, allowing leakage from the basin. After constructing a cofferdam around the leak area, the outside portion of the embankment was excavated to remove a portion of the CMP. The remaining portion of pipe was filled with concrete and a bentonite slurry cut-off trench was constructed across the former drain pipe alignment, presumably just outside (downstream) of the section of pipe that was filled with concrete. The area enclosed by the cofferdam was backfilled and the outside slope restored to original design. A similar abandoned CMP construction drain pipe through the perimeter dam at the southwest corner of the West Ash Pond was located and filled with concrete.

Unit 2 Slurry Pond Dam - The material used in the construction of the dam embankment is unknown but probably locally obtained. The basin is not lined. Total length of the perimeter dam is approximately 4,867 feet. The original finger dike was extended to complete a cross dike within the basin, dividing the basin into east and west cells, although gravity drainage of storm water runoff from the east cell to the west cell is provided with a corrugated HDPE pipe under the closure section of the cross dike. Total length of the cross dike is approximately 1,624 feet. The design geometry of the dam embankments consists of 2 H to 1 V side slopes and typical 10-foot crest width, except along the south side, which is 25.33 feet. No internal drainage blankets or formal toe drains for seepage control were used. A representative section of the embankment dam is shown in Exhibit 4.

2.4.2 Outlet Structures

Ash Pond A – Two abandoned outlet structures are located near the southwest corner of the basin. One of these outlet structures discharged in a westerly direction through the perimeter dike to outfall into the Discharge Canal; it has been bladder plugged. The other outlet structure discharged in a southerly direction through the cross dike and into Ash Pond B; this outlet structure was not plugged but abandoned in-place. Both of the abandoned outlet works consisted of intake risers with bottom discharge through conduits that passed through the dikes. The furnished design drawings indicate that the discharge conduits were to be concrete o-ring pipes with 24-inch diameter through the perimeter dike and 18-inch diameter through the cross dike. However, a badly corroded 24-inch diameter CMP was observed at the outfall of the conduit through the perimeter dike. The outfall for the abandoned conduit through the cross dike is buried in ash and could not be observed. Both risers are accessed with a steel catwalk but are currently buried in ash.

The current outlet structure discharges into Ash Pond B through the cross dike near the northeast end of the cross dike. Furnished design drawings do not show information on this outlet structure; the structure was not seen in the field. There is no other outlet from Ash Pond B. The original design drawings show that an emergency overflow was to be constructed on the crest of the perimeter dike on the west side of the basin; the overflow section was to have 10-foot bottom width at elevation 39.25 feet (2.25 feet lower than dike crest elevation) with gradual side slopes of 10 H to 1 V. However, this overflow section (low spot) in the crest was not apparent during the site visit.

Ash Pond B - The outlet works consist of a rectangular reinforced concrete decant tower (intake structure) with bottom discharge into a RCP that extends through the bottom of the perimeter dike to the Discharge Canal. The decant tower is located near the south end on the west side of the basin, and the outlet pipe extends through the embankment dam in a westerly direction. As previously noted, the type and size of the conduit are not readable on the furnished drawing, but in the field the shallow-submerged outlet end of the conduit appeared to be reinforced concrete pipe (RCP) on the order of 24 inches in diameter. The top of the decant tower is accessed from the top of the dam with a steel catwalk (footbridge).

South Ash Pond - The outlet works are located at the east end of the basin and consist of a rectangular reinforced concrete decant tower with bottom discharge into a conduit that extends easterly through the bottom of the perimeter dike; the discharge ultimately outfalls into the Discharge Canal. As previously noted, data on conduit type and size were not provided; the outfall could not be seen from site visit vantage points in the field. The top of the decant tower is accessed from the top of the dam with a steel catwalk (footbridge).

West Ash Pond – The outlet works are located at the southeast corner of the basin. No detailed information was provided on the original outlet structure at this location. From furnished plans it appears that originally there was gravity flow from the West Ash Pond to the South Ash Pond through an intake tower with bottom discharge into a conduit that extended through the West Ash Pond perimeter dike, through the intervening space between the West Ash Pond and the South Ash Pond, and through the South Ash Pond perimeter dike to the interior of South Ash Pond. However, it appears that gravity flow was no longer possible when ash buildup in the South Ash Pond covered the outfall from the West Ash Pond.

Currently, water is pumped from the West Ash Pond to the South Ash Pond through a flexible conduit that is supported on a bridge over a drainage ditch to the South Ash Pond. The old drainage tower is used as a pump structure or well from which to pump the water. The bottom discharge conduit apparently was sealed; no details were provided. The top of the drainage tower is accessed from the top of the dam with a steel catwalk (footbridge).

Unit 3 & 4 Slurry Pond – There is no gravity flow outlet structure at the Unit 3 & 4 Slurry Pond and apparently never has been, other than the temporary drainage pipe (30-inch CMP) that was used for drainage during construction. Water is pumped from the Unit 3 & 4 Slurry Pond to the West Ash Pond over the cross dike at the southwest corner of the basin (northwest end of cross dike). Two pumps were being used at the time of the site visit.

Unit 2 Slurry Pond - The outlet works consist of a pump structure made of a rectangular reinforced concrete box with an open side that can be fitted with sectional wooden slide gates for maintaining a pool in the basin. Currently, only one gate section is in place, but it is lifted to allow water to flow under it into the pump (sump) structure, where a pump is in place to remove storm water runoff as it drains into the structure. The storm water is discharged through a flexible HDPE line to the Intake Canal, and the basin currently is maintained free of a pool of water.

2.5 CRITICAL INFRASTRUCTURE WITHIN FIVE MILES DOWN GRADIENT

A regional map showing Winyah GS and the ash ponds and slurry ponds in relationship to “critical” infrastructure within a 5-mile radius was provided by Santee Cooper and included in Appendix A – Doc 1.9 in of this report. “Critical” infrastructure includes facilities such as schools and hospitals. There are 7 schools and 1 hospital located within the 5-mile radius, as shown on the map. Three of the schools are located to the east and east northeast on topography that is higher than the ponds. The remaining critical infrastructure (4 schools and 1 hospital) are all located in Georgetown near the 5-mile limit to the northeast and across the Sampit River from the generating station and thus do not lie directly down gradient from Winyah GS. In general, land use downstream from the ponds is conservation/preservation area, forested/agricultural, planned development, and some residential.

Based on USGS quadrangles, flood impacts from postulated failure of the ash pond and slurry pond dams at the Winyah GS would primarily impact the areas along the Pennyroyal Creek and possibly Turkey Creek and/or potentially areas along the Sampit River.

3.0 SUMMARY OF RELEVANT REPORTS, PERMITS AND INCIDENTS

3.1 SUMMARY OF REPORTS ON THE SAFETY OF THE MANAGEMENT UNIT(S)

Furnished reports of quarterly inspections, conducted by Santee Cooper, for the period July 2009 through June 2010 indicated no major structural or operational problems. No significant deterioration was indicated in the documentation reviewed. No other reports on the safety of the management units were provided. The furnished design report prepared by Rizzo for the Ash Pond B dike raising does not include stability analysis of the raised embankment.

3.2 SUMMARY OF LOCAL, STATE AND FEDERAL ENVIRONMENTAL PERMITS

The Winyah GS is currently regulated under NPDES Permit No. SC-0022471 (see Appendix A – Doc 1.10). This permit became effective March 2008 and will expire on July 2011, according to the furnished documentation.

The ash ponds and slurry ponds at the Winyah GS are regulated for water quality by the South Carolina Department of Health and Environmental Control (SCDHEC) Bureau of Water/Compliance Assurance Division. Groundwater monitoring/sampling is conducted at a number of points (water-quality wells) around the ash and slurry ponds. Surface water sampling is conducted to monitor the quality of discharge.

3.3 SUMMARY OF SPILL/RELEASE INCIDENTS (IF ANY)

Ash Pond A - There have been no reported spill/release incidents at this basin.

Ash Pond B - There have been no reported spill/release incidents at this basin.

South Ash Pond - There have been no reported spill/release incidents at this basin.

West Ash Pond Dam - There have been no reported spill/release incidents at this basin. As previously mentioned, an abandoned CMP construction drain pipe through the perimeter dam at the southwest corner of the West Ash Pond was located and filled with concrete, to preclude a leakage problem occurring there, as happened at a similar abandoned construction drain through the Unit 3 & 4 Slurry Pond perimeter dike.

Unit 3 & 4 Slurry Pond – On February 14, 2008, the Unit 3 & 4 Slurry Pond had a release of CCW water into plant property. The cause of this release was determined to be a failure of a seal in an abandoned 30-inch diameter CMP through the dike embankment on the northwest side of the basin; the CMP had been used for drainage from the basin during original construction, dating back to 1980 (see Appendix A – Doc 1.6 for location of the old construction drain).

As previously described, the old construction drain pipe was partially removed with the remainder (upstream part) filled with concrete and a bentonite slurry cut-off trench constructed across the former drain pipe alignment. The embankment was restored to original design geometry at the repair location.

Unit 2 Slurry Pond Dam - There have been no reported spill/release incidents at this basin.

4.0 SUMMARY OF HISTORY OF CONSTRUCTION AND OPERATION

4.1 SUMMARY OF CONSTRUCTION HISTORY

4.1.1 Original Construction

No construction records are available. Therefore, little is known of original construction other than the year the ponds were completed.

Ash Pond A and Ash Pond B – Ash Pond A and Ash Pond B were built within a perimeter dike system and separated by a diagonal cross dike with Ash Pond A situated on the north side of the cross dike and Ash Pond B on the south side. It appears that the dikes were somewhat field-fitted using minimal design information. The ponds were completed and commissioned in 1975.

Ash Pond A is bounded on the north side by the perimeter dike adjacent to the Intake Canal, on the west side by the perimeter dike adjacent to the Discharge Canal, on the east side by the perimeter dike adjacent to the Cooling Pond, and on the south side by the cross dike. The lowest elevation on the basin's floor is unknown. The basin was not lined. The original outlet structures, now abandoned, were as described in Subsection 2.4.2.

Ash Pond B is bounded on the north side by the cross dike, on the west side by the perimeter dike adjacent to the Discharge Canal, and on the east side by the perimeter dike adjacent to the Cooling Pond. The crest of the of the original section of perimeter dike around Ash Pond B was approximately 7.0 feet lower than the section around Ash Pond A. The lowest elevation on the basin's floor is unknown. The basin was not lined. The original outlet structure was as described in Subsection 2.4.2 but the intake riser was approximately 7.0 feet lower.

South Ash Pond – The perimeter dike was constructed in an east-west elongated loop to form the basin. It is the only dike at the station that includes a toe drain for seepage control. It also has some of the flattest slopes (as flat as 4 H to 1 V around the west and southwest sides, suggesting that weaker foundation soils and/or lower ground may exist in that area. The basin is bounded along its perimeter by railroad spurs that supply coal to the station. The lowest elevation on the basin's floor is unknown. The basin was not lined. The original outlet structure is the same as the current outlet structure as described in Subsection 2.4.2. The South Ash Pond was completed and commissioned in 1980.

West Ash Pond and Unit 3 & 4 Slurry Pond – The West Ash Pond and Unit 3 & 4 Slurry Pond were built within a perimeter dike system and separated by a cross dike with the West Ash Pond situated on the south side of the cross dike and the

Unit 3 & 4 Slurry Pond on the north side. The ponds were completed and commissioned in 1980.

The West Ash Pond is bounded on the northeast side by the cross dike, and on the west, southwest, and east sides by the perimeter dike; a railroad spur borders the southwest side. The lowest elevation on the basin's floor is unknown. The basin was not lined. The original outlet structure appears to have included an intake riser at the southeast corner with bottom discharge into a conduit extending to the South Ash Pond, as described in Subsection 2.4.2.

The Unit 3 & 4 Slurry Pond is bounded along the east, southeast, northeast, northwest, and west sides by the perimeter dike, and on the southwest side by the cross dike. A finger dike was constructed north of and generally parallel to the cross dike (northwesterly) from the east side, partially dividing the basin. The lowest elevation on the basin's floor is unknown. The basin was not lined. There appears to have never been a gravity flow outlet from the operational basin; water has always been pumped from the Unit 3 & 4 Slurry Pond to the West Ash Pond, as described in Subsection 2.4.2.

Unit 2 Slurry Pond – The perimeter dike was constructed in a rectangular loop, longer in the north-south direction, to form the basin. The basin is bounded on the south side by the Intake Canal. A finger dike, from the original design, begins at the midpoint of the south side perimeter dike and extends to the north. The lowest elevation on the basin's floor is unknown. The basin was not lined. There appears to have never been gravity flow of water from this basin; water has always been pumped to the Intake Canal from the gated pump structure described in Subsection 2.4.2. The Unit 2 Slurry Pond was completed and commissioned in 1977.

4.1.2 Significant Changes/Modifications in Design since Original Construction

Ash Pond A – There have been no significant changes/modifications in design since the original construction of the basin, other than that the original discharge structures have been abandoned and a single outlet structure was installed through the cross dike near the northeast end of the cross dike (near southeast corner of the basin. The emergency overflow described on original design drawings was not observed in the field.

Ash Pond B – The perimeter embankment along Ash Pond B was raised approximately 7.0 feet to meet top of dam elevation of Ash Pond A in 1997. The expansion increased the storage capacity of Ash Pond B. The top of the discharge structure (intake riser) was also raised approximately 7.0 feet (see Appendix A – Doc. 1.4).

South Ash Pond – There have been no significant changes/modifications in design since the original construction of the basin.

West Ash Pond – There have been no significant changes/modifications in design since the original construction of the basin, other than abandonment of the apparent original gravity-flow discharge structure, so that water is now pumped from the West Ash Pond to the South Ash Pond, rather than flowing by gravity.

Unit 3 & 4 Slurry Pond – There have been no significant changes/modifications in design since the original construction of the basin. During the site visit there appeared to be gypsum-encrusted riprap along the waterline on the inside slope of the perimeter dike on the northeast side of the basin. Riprap is not indicated as a design feature in the original design plans.

Unit 2 Slurry Pond – The finger dike from the original design has been extended to create a cross dike.

4.1.3 Significant Repairs/Rehabilitation since Original Construction

Ash Pond A – There have been no significant repairs/rehabilitation made to this basin since the original construction.

Ash Pond B – There have been no significant repairs/rehabilitation made to this basin since the original construction.

South Ash Pond – There have been no significant repairs/rehabilitation made to this basin since the original construction.

West Ash Pond – The abandoned 30-inch CMP construction drain through the southwest corner of the basin was located and completely filled with concrete after a leak occurred through a seal plug at a similar abandoned construction drain through the Unit 3 & 4 Slurry Pond perimeter dike.

Unit 3 & 4 Slurry Pond – The abandoned 30-inch CMP construction drain through the northwest side of the basin was remediated after the seal failed and caused leakage from the basin. The CMP was partially removed (downstream part) and the remainder (upstream part) filled with concrete. The embankment at the location was excavated to access the CMP pipe after a cofferdam was constructed around the area. A bentonite slurry cut-off wall (trench) was constructed within the repaired embankment across the former alignment of the construction drain to provide further safeguard against seepage.

Unit 2 Slurry Pond – There have been no significant repairs/rehabilitation made to this basin since original construction.

4.2 SUMMARY OF OPERATIONAL HISTORY

4.2.1 Original Operational Procedures

The furnished documents do not include the original operational procedures. The ponds are man-made basins that were designed and operated primarily for the disposal of fly ash, bottom ash, and boiler slag, or for the disposal of flue gas emission control residuals (scrubber wastes). It is presumed that all of the basins were originally operated as wet basins wherein ash and scrubber wastes were transported and disposed by sluicing with water into the basins, where the suspended particles were allowed to settle out and the water detained temporarily in the basins for neutralization and equalization prior to discharge through the gravity-flow outlet structures or, in the case of the slurry ponds, removal by pumping. Through most of the operational history, there has been beneficial reuse of the fly ash, bottom ash, and gypsum from the scrubbers whenever a market was available.

4.2.2 Significant Changes in Operational Procedures since Original Startup

No documents were provided to indicate that basic operational procedures have significantly changed since original startup, except that sluicing of CCW into the West Ash Pond and the Unit 2 Slurry Pond has essentially ceased. Also, the removal of water from the West Ash Pond is now by pumping rather than by gravity flow through an outlet structure to the South Ash Pond.

4.2.3 Current Operational Procedures

The basins are operated and monitored for water quality under a SCDHEC approved NPDES permit. Fly ash is generally dry handled and trucked to Southeastern Fly Ash, where it is burned and used in cement; only when the Southeastern plant is down is fly ash sluiced to Ash Pond A or the South Ash Pond, depending on the unit source of the fly ash. Bottom ash is sluiced to Ash Pond A. Flue gas emission control residuals are occasionally sluiced into the Unit 3 & 4 Slurry Pond.

Ash Pond A currently receives primarily bottom ash. The CCW slurry is pumped into excavated channels within the basin and gravity settling separates the fine from the coarser materials. Once the channels become full, the ash is excavated to dry it out for beneficial reuse; some of the bottom ash is used in the manufacture of concrete blocks. The sluice water and storm runoff flow through channels excavated in the ash to a pond area at the south end of the basin. The water flows to Ash Pond B through an outlet structure located near the northeast end of the cross dike.

Ash Pond B currently is mainly used as a clearing basin for water that drains into it from Ash Pond A. Ash waste material from production operations is not currently placed in the basin, although it was directly sluiced into this basin in the past. Water flows into the decant tower near the southwest corner of the basin. Outflow from this pond discharges into the Discharge Canal, which leads to the Cooling Pond.

The South Ash Pond is currently used mainly for pass-through flow of water that is pumped into it from the West Ash Pond and water from yard drains at the station, as well as water pumped into it from the perimeter ditch. Ash waste material from production operations is typically not placed in the basin; however, fly ash is sluiced into the basin whenever the Southeastern Fly Ash plant has an outage. Water flows into the decant tower at the east end of the basin, and the outflow ultimately discharges into the Discharge Canal, which leads to the Cooling Pond.

The West Ash Pond is currently used for pass-through flow of water pumped into it from the Unit 3 & 4 Slurry Pond. Ash waste material from production operations is no longer placed in this basin. Water flows to the southeast corner of the basin, where it is pumped to the South Ash Pond.

The Unit 3 & 4 Slurry Pond receives sluiced flue gas emission control waste only during start-up of one of the units after an outage and only until the gypsum in the waste stream meets specifications for use at the adjacent American Gypsum wallboard manufacturing plant. Ordinarily, when the gypsum meets specifications, it is dried and sent by conveyor to the gypsum wallboard plant. Sluice water, storm water, and water pumped into the basin from the perimeter ditch drains to the southwest corner of the basin, where it is pumped over the cross dike to the West Ash Pond.

The Unit 2 Slurry Pond no longer receives sluiced flue gas emission control waste. The basin will receive scrubber waste in the future only when necessary. The Unit 2 Slurry Pond is currently maintained dry. Storm water collected in the basin is pumped into the Intake Canal.

4.2.4 Other Notable Events since Original Startup

Based on furnished information and discussions with Santee Cooper personnel, there are no other notable events since original startup of the ash and slurry ponds to report at this time.

5.0 FIELD OBSERVATIONS

5.1 PROJECT OVERVIEW AND SIGNIFICANT FINDINGS

Dewberry personnel Frederic C. Tucker, PE and Anne Lee collected available data and documents and made field observations during a site visit on June 29-30, 2010, in company with the participants listed in Section 1.3. The design engineer of record for Ash Pond A, Ash Pond B, South Ash Pond, West Ash Pond, Unit 3 & 4 Slurry Pond, and Unit 2 Slurry Pond was not present or available to assist with answering questions about these basins.

The site visit began in the early afternoon of June 29th and continued the following day till noon on June 30th, 2010. Weather conditions during the visit were partly sunny, humid, and generally hot with temperatures around 100 ºF at their peak. Photographs were taken of conditions observed. Photographs referenced below are contained at the end of this chapter.

The overall visual assessment is that the earthen embankments that impound Ash Pond A, Ash Pond B, South Ash Pond, West Ash Pond, Unit 3 & 4 Slurry Pond, and Unit 2 Slurry Pond are in good condition. No visual signs of imminent instability or serious inadequacy of the principal structures at these basins that would require emergency remedial action were observed.

5.2 ASH POND A

5.2.1 Embankment Dam and Basin Area

Crest

Typical views of the crest around the perimeter dam embankment are shown in Photos BA-1, BA-2, BA-3 and BA-4. The crest was observed to have coarse ash surfacing in fair condition. A moist area with some ruts was observed on the crest of the perimeter embankment where vehicles turn to access the ash basin for beneficial reuse operations. Typical views of the coarse ash-surfaced crest of the cross dike is shown in Photos BA-5 and BA-6. No major depressions, sags, tension cracks or other signs of significant settlement were observed in the crest. No tension cracks which might suggest soil shear failure were observed in the crest or along the edge of the crest.

Outside Slope and Toe

The typical outside slope of the perimeter dam embankment of Ash Pond A is visible in Photos BA-7, BA-8 and BA-9. As shown, the grass on the outside slope was typically observed to be maintained in relatively good condition. There are some minor areas with sparse grass cover or bare soil (Photo BA-9). No areas of significant erosion were observed. No obvious signs of slumps, slides, bulges, tension cracks, seepage, or animal holes were observed.

Some areas along the downstream toe were observed to have wet soils with some ponding water and other toe areas were observed to be in need of vegetation maintenance, as shown in Photos BA-10, BA-11, BA-12, and BA-13.

Inside Slope and Basin Area

The inside slope of the Ash Pond A embankment dam was observed to be generally buried with ash. A typical view of the inside slope of the perimeter embankment of the basin is shown in Photo BA-14. The slopes of the cross dike were observed to be buried with ash (see Photos BA-5 and BA-6). No slumps, slides, or other signs of shear failure were observed in the visible parts of the slopes above the ash. The surface of the exposed ash fill is generally covered with tall weeds (reeds) and low-growing bushes, except for the surface of the central area where ash is actively mined for beneficial reuse; sparse vegetation to no vegetation was observed in areas trafficked with construction equipment and other vehicles. The tall reeds are an invasive wetland species called Phragmites. No significant erosion was noted.

Ash sluice lines discharge CCW into the basin at the northwest corner. A view of the sluice lines located at the northwest corner outside of Ash Pond A is shown in Photo BA-15.

Abutments and Groin Areas

Not applicable; there are no abutments or groins in the perimeter ring-dam. However, no erosion or displacements were observed where the cross dike ties in to the perimeter dam.

5.2.2 Outlet Structures

Abandoned Outlet Structures

Two abandoned intake (decant) towers were observed near the southwest corner of the basin. One decant tower has a bottom discharge outlet pipe that extends through the cross dike into Ash Pond B. The tower and outlet pipe are buried in ash and abandoned; the former access footbridge to the tower is shown in Photo BA-5.

The other decant tower has a sealed bottom discharge outlet pipe that extends through the perimeter dam to the Discharge Canal. The pipe has been bladder plugged and abandoned. The decant tower is buried in ash, as shown in Photo BA-16, which also shows the former access footbridge to the tower. The outlet pipe that extends through the cross dike is completely buried and was not observed, except at the outfall. The outfall end of the pipe was observed to be a severely corroded CMP, as shown in Photo BA-17. Depressions or “drop-outs” were observed along the alignment of the buried pipe between the toe of the dam and the Discharge Canal, as shown in Photos BA-18 and Photo BA-19, suggesting that the pipe has failed. It is not known if the CMP actually extends through the dam, since design drawings indicate that the outlet pipe was to be 24-inch concrete o-ring pipe. As previously mentioned, the CMP may only be an extension between the dam toe and the Discharge Canal.

Current Outlet Structure

The current method of conveyance of water from Ash Pond A to Ash Pond B is through a drainage structure through the cross dike near the northeast end of the cross dike; this structure was not observed.

Emergency Spillway (If Present)

No emergency spillway was observed, although the design plans indicate that there was to be an emergency overflow on the perimeter dam on the west side of the basin.

Low Level Outlet

There is no low level outlet.

5.3 ASH POND B

5.3.1 Embankment Dam and Basin Area

Crest

Typical views of the crest around the perimeter dam embankment are shown in Photos BB-1 and BB-2. As at Ash Pond A the crest was observed to have coarse ash surfacing in fair condition. No major depressions, sags, tension cracks or other signs of significant settlement were observed in the crest. No tension cracks which might suggest soil shear failure were observed in the crest or along the edge of the crest.

Outside Slope and Toe

Typical views of the outside slope of the perimeter dam embankment of Ash Pond B are shown in Photos BB-3 through BB-6. As shown, the grass on the outside slope was typically observed to be maintained in relatively good condition along the majority of the outside slope. Some areas of bare soil and sparse grass cover were observed as shown in Photo BB-7 and BB-8. No areas of significant erosion were observed. No obvious signs of slumps, slides, bulges, tension cracks, seepage, or animal holes were observed.

Some areas along the downstream toe were observed to have wet soils with some ponding water as shown in Photos BB-6 through BB-8.

Areas along the downstream toe were observed to have ponding water and lack of vegetation maintenance, see Photo. Depressions or drop-outs were observed along the buried discharge pipe extending from the decant tower; one is shown in Photo BB-9. Much of outside toe along the Cooling was submerged Pond (see Photos BB- 4 and BB-5).

Inside Slope and Basin Area

The inside slope of the Ash Pond B embankment dam was observed to be generally buried with ash or submerged in water. Typical views of the inside slope of the perimeter dam embankment of the basin are shown in Photos BB-10 through BB-13. No slumps, slides, or other signs of shear failure were observed in the visible parts of the slopes above the ash and water levels. The surfaces of the inside slope and ash fill buildup in the northern part of the basin are generally covered with a tall growth of reeds (Phragmites). A pool of free-standing water was observed in the southern part of the basin. The water surface elevation at the time of the site visit was 34.8 feet (6.7 feet below design crest elevation). No significant erosion was noted.

Abutments and Groin Areas

Not applicable; there are no abutments or groins in the perimeter ring-dam. However, no erosion or displacements were observed where the cross dike ties in to the perimeter dam.

5.3.2 Outlet Structures

Overflow Structure

The overflow structure is a concrete drop-inlet box with an open side fitted with metal slide gate sections (panels); the top section serves as the overflow weir. The metal gate sections slide in angle-iron gate tracks and control the pond level. The original structure was raised 7 feet in 1997 when the dam was raised. Photo BB-14 provides an outside view of the overflow structure (decant tower), which is located at the southwest corner of Ash Pond B. A view of the inner chamber through the top walkway grate is shown in Photo BA-15. The structure was observed to be in overall good visual condition. At the bottom of the overflow structure water discharges through a RCP outlet to the Discharge Canal.

Outlet Conduit

As noted above, the decant tower has bottom discharge through a circular RCP that extends through the perimeter dam to the Discharge Canal. The outlet pipe is buried all along the majority of its length to its outfall end. Depressions or drop-outs were observed in the section of buried pipe between the dam toe and the Discharge Canal. A gravel layer above the RCP is exposed in a depression at the downstream toe of the embankment. A small amount of water was observed to project out from the gravel under the thatch in the depression shown in Photo BB-9, indicating a separation at a joint. As shown in Photo BB-16, the discharge from the submerged outlet end of the RCP creates a “blowing” or “boiling” effect. This may indicate air intake at separated joints along the pipe downstream of the dam toe. The outlet appeared to be flowing clear.

Emergency Spillway (If Present)

No emergency spillway was observed, although the design plans indicate that there was to be an emergency overflow on the original perimeter dam on the west side of the basin. The raising of the dike by approximately 7 feet in 1997 may have eliminated the low spot that was originally to serve as the emergency overflow; however, as previously mentioned no emergency overflow was observed on the Ash Pond A perimeter dike west side, even though original plans called for it and that dike has not been raised.

Low Level Outlet

There is no low level outlet.

5.4 SOUTH ASH POND

5.4.1 Embankment Dam and Basin Area

Crest

The surface of the crest was observed to be bare earth and grass, although gravel surfacing was observed along some segments. It was observed that potholes and shallow depressions in the crest of the embankment have been filled with coarse ash as shown in Photo BS-1. A minor ash wash out on the inside of the basin next to the crest of the embankment was observed where water from the toe ditch is pumped into the basin from a new pump structure located outside the west end of the basin; the washout is shown in Photo BS-2. The crest was observed to be in overall good condition. The embankment is enclosed by a perimeter ditch along the outside toe of the embankment. A railroad loop spur line encircles the basin on the outboard side of the perimeter toe ditch. Typical views of the dam crest are shown in Photos BS-3 through BS-5. No major depressions, sags, tension cracks or other signs of significant settlement were observed. No tension cracks which might suggest soil shear failure were observed in the crest or along the edge of the crest.

Outside Slope and Toe

The outside slope and toe of the South Ash Pond perimeter dam are shown in Photos BS-6 to BS-12. Areas of minor erosion, bare earth, and sparse vegetation were observed, particularly along the toe. Some areas with bare earth were caused by maintenance equipment used for toe drain outlet pipe maintenance and construction of a new pump station. A view of the newly constructed pump station located at the west end outside toe of the embankment is shown in Photo BS-13. The grass on the outside slope was observed to be maintained in generally fair condition. No areas of significant erosion were observed on the slope. No obvious signs of slumps, slides, bulges, tension cracks, seepage, or animal holes were observed on the slope.

Bare earth was observed at the location of the new pump construction. Views of the perimeter ditch along the outside toe of the embankment are shown in Photos BS-6, BS-13, BS-14, and BS-15. Tall vegetation (Phragmites) was observed along the perimeter ditch. Erosion was observed along the toe and perimeter ditch at the locations of toe drain maintenance, as shown in Photos BS-16, BS-17 and BS-18. Photo BS-17 shows the damaged end of one of the toe-drain outlet pipes, which design drawings indicate were to be on 200-foot spacing. Wet ground and minor seepage was observed at the toe drains and along the downstream toe as shown in Photo BS-15, BS-18, and BS-19.

Inside Slope and Basin Area

The inside slope of the South Ash Pond embankment dam was observed to be buried with ash in most of the basin and submerged in water where there is a pool of free-standing water at the east end. The water surface elevation at the time of the inspection was 17.1 feet (relative), which appeared to be on the order of 6.0 feet below the dam crest. A view of the inside of South Ash Pond where water is discharged into the basin from the West Ash Pond and from plant drains is shown in Photo BS-20 (near northwest corner) and where water discharges from the basin at the overflow tower is shown in Photo BS-21 (at east end). Views of the inside slope of the embankment dam or inside of the basin are shown in BS-22 through BS-26. No slumps, slides, or other signs of shear failure were observed in the visible parts of the slopes above the ash and water levels. No significant erosion was noted.

Abutments and Groin Areas

Not applicable; there are no abutments or groins in the perimeter ring-dam.

5.4.2 Outlet Structures

Overflow Structure

The overflow structure is a concrete drop-inlet box with an open side fitted with metal slide gate sections (panels); the top section serves as the overflow weir. The metal gate sections slide in angle-iron gate tracks and control the pond level. Photo BS-21 provides an outside view of the overflow structure (decant tower), which is located at the east end of the South Ash Pond. A view of the inner chamber through the top walkway grate is shown in Photo BS-27. The structure was observed to be in overall good visual condition.

Outlet Conduit

The decant tower has a bottom discharge pipe that extends through the embankment dam; the water ultimately discharges into the Discharge Canal to the east. The outside slope and intervening area to the Discharge Canal along the outlet pipe alignment is shown in Photo BS-28. The outlet conduit was not seen. However, no obvious problems, such as seepage or drop-outs, were observed along the apparent alignment of the buried pipe through the embankment dam.

Emergency Spillway (If Present)

There is no emergency spillway.

Low Level Outlet

There is no low level outlet.

5.5 WEST ASH POND

5.5.1 Embankment Dam and Basin Area

Crest

The surface of the crest is a combination of gravel, coarse ash, and bare ground. The surface of the crest was observed to be in good condition. Typical views of the embankment crest around the west, east and north sides are shown in Photos BW-1 to BW-5. Typical views of the crest of the cross dike are shown in Photos BW-6 and BW-7. No major depressions, sags, tension cracks or other signs of settlement were observed. No tension cracks which might suggest soil shear failure were observed in the crest or along the edge of the crest.

As a precaution after failure of the seal in the abandoned CMP construction drain through the Unit 3 & 4 Slurry Pond perimeter dam, the existing CMP construction drain through the West Ash Pond perimeter dike was filled with concrete.

Outside Slope and Toe
The outside slope of the West Ash Pond perimeter dam is shown in Photos BW-8 and BW-10 through BW-13. As shown, the grass on the outside slope and berm was observed to be maintained in generally good condition. Areas along the southeast side of the embankment were observed to be unmaintained. The outside slope of the cross dike (Unit 3 & 4 Slurry Pond side) is submerged by water and scrubber waste (calcium sulfate). No areas of significant erosion were observed on the outside slopes. No obvious signs of slumps, slides, bulges, tension cracks, seepage, or animal holes were observed.

The toe of the perimeter dam on the west side is shown in Photos BW-9. Areas of wet soil were observed at the toe along the west side of the perimeter dam as shown in Photos BW-9 and BW-14. The vegetation along the downstream toe in some areas was observed to have been avoided by mowers due to wet-soil conditions. No areas of significant erosion were observed. No scarps, sloughs, depressions or other indications of slope instability were observed.

Inside Slope and Basin Area

The inside slope of the West Ash Pond perimeter dam was observed to be submerged with ash and with water in drainage ditches excavated in ash next to the dam. The water surface elevation at the southeast corner (pump intake location) at the time of the site visit was not provided but appeared to be on the order of 2.5 feet below the crest of the perimeter dam. Views of the pond interior and inside slope at the north end, along the southwest side, and along the southeast corner of the basin are shown in Photos BW-15 through BW-17. No slumps, slides, or other signs of shear failure were observed in the visible parts of the slopes above the water level. No significant erosion was noted.

Abutments and Groin Areas

Not applicable; there are no abutments or groins in the perimeter ring-dam. However, no erosion or displacements were observed where the cross dike ties in to the perimeter dam.

5.5.2 Outlet Structures

Overflow Structure
The existing decant structure is submerged in water and ash. The former intake tower (overflow structure) is used as a well or sump for pumping water from the West Ash Pond into the South Ash Pond via discharge lines over a bridge; several

views of the pumping equipment and the intake and discharge lines are shown in Photos BW-4, BW-18, and BW-19.

Outlet Conduit

There is no active gravity flow outlet structure; water is pumped from the basin as described above.

Emergency Spillway (If Present)

There is no emergency spillway.

Low Level Outlet

There is no low level outlet.

5.6 UNIT 3 & 4 SLURRY POND

5.6.1 Embankment Dam and Basin Area

Crest

The surface of the crest is a combination of fine gravel/sand, coarse ash, and bare ground. The surface of the crest was observed to be in good condition. Typical views of the perimeter dam crest are shown in Photos B3-1 through B3-3 (also see BW-7). Typical views of the crest of the cross dike are as shown in previously referenced Photos BW-7 and BW-8. No major depressions, sags, tension cracks or other signs of settlement were observed. No tension cracks which might suggest soil shear failure were observed in the crest or along the edge of the crest.

Outside Slope and Toe

Due to failure of a seal in an abandoned CMP construction drain in 1998, a portion of the dike (outside slope) along the northwest side was excavated to access and remove a section of the pipe and fill the remaining (upstream) section of the pipe with concrete. The dike was rebuilt and a bentonite slurry cut-off trench was installed across the former pipe alignment. A pump station for pumping water from a perimeter ditch into the basin was also constructed at the downstream toe of the embankment in the repair area; the pump station is shown in Photo B3-4. Views of the perimeter dam outside slope and crest along the reconstructed portion of the embankment are shown in Photos B3-5 and B3-7. The repaired area appeared to be in good condition.

Typical views of the outside slope of the perimeter dam of Unit 3 & 4 Slurry Pond are shown in Photos B3-8, B3-9, B3-10, and B3-11. As shown, the grass on the

outside slope was observed to be maintained in generally good condition; areas of the slope along the northeast side were observed to be in need of mowing. The outside slope of the cross dike (West Ash Pond side) is generally buried with ash. No areas of significant erosion were observed. No obvious signs of slumps, slides, bulges, tension cracks, seepage, or animal holes were observed.
The toe of the perimeter dam on the southeast side is visible in Photo B3-8 adjacent to a toe ditch, and on the northeast side it is shown in Photos B3-12 and B3-13. The toe ditch on the northeast side was observed to be heavily overgrown with vegetation (Photo B3-13). No areas of significant erosion were observed. No scarps, sloughs, depressions or other indications of slope instability were observed.

Inside Slope and Basin Area

The lower part of the inside slope of the Unit 3 & 4 Slurry Pond embankment dam was observed to be submerged in water. The water surface elevation at the time of the inspection was 34.9 feet (2.4 feet below design centerline crest elevation). Views of the pond interior and inside slope are shown in Photos B3-6 and B3-14 through B3-17. No slumps, slides, or other signs of shear failure were observed in the visible parts of the slopes above the water level. No significant erosion was noted.

Abutments and Groin Areas

Not applicable; there are no abutments or groins in the perimeter ring-dam. However, no erosion or displacements were observed where the cross dike ties in to the perimeter dam.

5.6.2 Outlet Structures

Overflow Structure

There is no gravity overflow structure indicated on design plans and no overflow structure was observed. Water is pumped from the Unit 3 & 4 Slurry Pond to the West Ash Pond as shown in previously referenced see Photos BW-6 and BW-15. Two portable pumps were being used at the time of the site visit.

Outlet Conduit

There is no outlet conduit. As previously mentioned the old 30-inch CMP construction drain through the embankment has been partially removed, and the remaining pipe section was filled with concrete and abandoned.

Emergency Spillway (If Present)

There is no emergency spillway.

Low Level Outlet

There is no low level outlet.

5.7 UNIT 2 SLURRY POND

5.7.1 Embankment Dam and Basin Area

Crest

The surface of the crest was observed to be in generally good condition, consisting variously of fine gravel/sand, coarse ash, grass, and bare ground. Views of the perimeter dam crest are shown in Photos B2-1 through B2-6. Sparse grass cover was observed on some areas of the crest of the perimeter dam on the east side (see Photo B2-5). Typical views of the crest of the cross dike are shown in Photos B2-7 and B2-8. The cross dike originally was a finger dike extending from the south side partially across the middle of the basin. It appeared that the finger dike had recently been completed across the basin to the north side. A corrugated HDPE pipe had been installed through this dike extension to allow storm water to drain from the east cell of the basin to the west cell; views of this pipe at the inlet and outlet ends are shown in Photos B2-23 and B2-24. No major depressions, sags, tension cracks or other signs of settlement were observed in the crest. No tension cracks which might suggest soil shear failure were observed in the crest or along the edge of the crest.

Outside Slope and Toe

Views of the outside slope of the perimeter dam of the Unit 2 Slurry Pond are shown in Photos B2-9 through Photo B2-13; the outside toe along embankment dam is also visible. As shown, the grass along the east side of the embankment on the outside slope was observed to be maintained in generally good condition. A minor area of surface disturbance in the turf on the east side is shown in Photo B2-14. No areas of significant erosion were observed. No obvious signs of slumps, slides, bulges, tension cracks, seepage, or animal holes were observed.

Areas along the outside toe appeared to be overdue for cutting of woody vegetation, particularly on the north and south sides. No areas of significant erosion were observed along the outside toe. No scarps, sloughs, depressions or other indications of slope instability were observed.

Inside Slope and Basin Area

Portions of the inside slope and basin area are buried in scrubber waste (calcium sulfate). The basin was essentially pumped dry of water at the time of the site visit and the water surface elevation was minimal. The surface of the waste fill and the inside slope was observed to be generally covered with tall weeds, reeds, and low-growing bushes. Views of the inside slope of the perimeter dam and the interior basin area are shown in Photos B2-15 through B2-20. No slumps, slides, or other signs of shear failure were observed in the visible parts of the slopes above the waste surface. No significant erosion was noted.

Abutments and Groin Areas

Not applicable; there are no abutments or groins in the perimeter ring-dam. However, no erosion or displacements were observed where the cross dike ties in to the perimeter dam.

5.7.2 Outlet Structures

Overflow Structure

The outlet structure is a concrete chamber (pump structure) with an open side that can be fitted with wooden slide gates (panels) for impounding a pool; a view of the structure is shown in Photo B2-21. The wooden panels slide in gate tracks and control the pond level. At the time of the site visit only one gate panel was in place, and it was partially raised to allow water to flow under it into the pump structure. The Unit 2 Slurry Pond is not currently active. A pump has been placed at the bottom of the structure as shown in Photo B2-22; it pumps storm water to the Intake Canal.

Outlet Conduit

There is no outlet conduit. A pump (Photo B2-22) discharges storm water into the Intake Canal via an HDPE pipe through the top of the perimeter dike on the south side is shown in Photo B2-25.

Emergency Spillway (If Present)

There is no emergency spillway.

Low Level Outlet

There is no low level outlet.

Photo BA-1: Crest of Perimeter Dike West Side of Pond A near Northwest Corner– Viewed South.

Photo BA-2: Crest of Perimeter Dike at Ash Removal Equipment Access on Ash Pond A – Viewed South.

Photo BA-3: Crest of Perimeter Dike East Side of Pond A Near Cross Dike Intersection – Viewed North.

Photo BA-4: Crest of Perimeter Dike North Side of Ash Pond A near Northwest Corner – Viewed East.

[redacted]

Photo BA-5: Crest of Cross Dike and Walkway to Abandoned Decant Tower and Drainline from Ash Pond A to Ash Pond B – Viewed Northeast.

Photo BA-6: Crest of Cross Dike Between Ash Pond B and Ash Pond A – Viewed Southwest.

Photo BA-7: Outside Slope of Perimeter Dike at Northwest Corner of Ash Pond A – Viewed South.

Photo BA-8: Outside Slope of Perimeter Dike West Side of Ash Pond A near a Ash Removal Equipment Access on Ash Pond A – Viewed South.

DRAFT

[redacted] [redacted]

Photo BA-9: Outside Slope of Perimeter Dike at Cross Dike Intersection.

Photo BA-10: Outside Toe of Perimeter Dike at Cross Dike Intersection.

[redacted]

Photo BA-11: Outside Slope of Perimeter Dike North Side of Ash Pond A at Northeast Corner – Viewed West.

Photo BA-12: Toe of Perimeter Dike North Side of Ash Pond A.

DRAFT

Photo BA-13: Outside Slope of Perimeter Dike East Side of Ash Pond A Near Cross Dike Intersection – Viewed North (Cooling Pond to Right).

Photo BA-14: Tall Vegetation on Inside of Perimeter Dike North Side of Ash Pond A – Viewed South (Typical View Where Ash Is Not Being Placed or Mined.

Photo BA-15: Ash Sluice Lines Outside Ash Pond A at Northwest Corner

Photo BA-16: Location of Abandoned Decant Tower and CMP Outfall in Ash Pond A that Extends Through West Dike (See Associated Photos BA-13, - 14, and -15).

Photo BA-17: Failed CMP Outfall of Abandoned Decant Tower Drain Through West Dike of Ash Pond A – Viewed at Discharge Canal.

Photo BA-18: Depression in Ground Along Centerline of Failed CMP Outfall of Abandoned Decant Tower Drain Through West Dike of Ash Pond A.

Photo BA-19: Additional Depression in Ground Along Centerline of Failed CMP Outfall of Abandoned Decant Tower Drain Through West Dike of Ash Pond A.

Photo BB-1: Crest of Perimeter Dike at Cross Dike Intersection – Viewed South.

Photo BB-2: Crest of Perimeter Dike South Side of Pond B near South Corner – Viewed Northeast (Cooling Pond to the Right).

Photo BB-3: Outside Slope of Perimeter Dike West Side of Ash Pond B at Cross Dike Intersection – Viewed South.

Photo BB-4: Outside Slope of Perimeter Dike South Side of Ash Pond B near South Corner – View Northeast (Cooling Pond to Right).

Photo BB-5: Outside Slope of Perimeter Dike near Southeast Corner - Viewed Northeast (Cooling Pond to Right).

Photo BB-6: Outside Slope and Toe of Perimeter Dike West Side of Ash Pond B near South Corner –Viewed North (Note Wet Area At Toe).

Photo BB-7: Closer View of North Part of Wet Area Shown in Previous Photo.

Photo BB-8: Outside Toe of Perimeter Dike West Side of Ash Pond B Decant Tower North of Buried Outfall Drain Pipe – View North.

Photo BB-9: Depression and Exposed Gravel (Under Grass) Upstream of Ash Pond B Drain Outfall. (Apparent Separation at Last Joint in RCP).

Photo BB-10: Inside Slope of Perimeter Dike East Side of Ash Pond B Near Southeast Bend – Viewed Northeast. (Cooling Pond to Right)

[redacted]

[redacted]

Photo BB-11: Inside Slope of Perimeter Dike West Side of Ash Pond B at South Corner – View North.

Photo BB-12: Inside Slope of Perimeter Dike South Side of Ash Pond B at South Corner – Viewed Northeast.

Photo BB-13: Inside Slope of Perimeter Dike West Side of Ash Pond B South of Cross Dike Intersection – Viewed South.

Photo BB-14: View of North and East Side of Ash Pond B Decant Tower.

Photo BB-15: View Through Top Grate of Ash Pond B Decant Tower.

Photo BB-16: View Downstream Along RCP Outfall Pipe of Ash Pond B Decant Tower. (Note “blow” of discharge from partially submerged outlet due to entrapped air.).

Photo BS-1: Crest and Outside Slope of Perimeter Dike at Southwest Bend of South Ash Pond – Viewed West.

Photo BS-2: Ash Washout Adjacent to Crest of Perimeter Dike of South Ash Pond at Western End.

[redacted]

Photo BS-3: Crest of Perimeter Dike North Side of South Ash Pond Perimeter Dike at Access Road – Viewed West.

[redacted]

Photo BS-4: Crest of Perimeter Dike North Side of South Ash Pond – Viewed East.

[redacted]

Photo BS-5: Crest of Perimeter Dike on East Side of South Ash Pond Near Decant Tower – Viewed North.

DRAFT

Photo BS-6: Outside Slope and Toe of Perimeter Dike at Southwest Bend of South Ash – Viewed East.

Photo BS-7: Crest and Outside Slope of Perimeter Dike on West Side of South Ash Pond.

Photo BS-8: Area of Sparse Vegetation Outside Toe of Perimeter Dike South Side of Ash Pond Near Southeast Corner.

[redacted] [redacted] [redacted] [redacted] [redacted]

Photo BS-9: Outside Slope of Perimeter Dike East Side of South Ash Pond Near Decant Tower – Viewed North.

[redacted]

Photo BS-10: Outside Slope of Perimeter Dike North Side of South Ash Pond – Viewed East.

Photo BS-11: Outside Slope of Perimeter Dike South Side of South Ash Pond – Viewed East.

DRAFT

Photo BS-12: Outside Slope and Crest of Perimeter Dike on South Side of South Ash Pond – Viewed West from Southeast Corner.

Photo BS-13: New Pump Station at Outside Perimeter Toe Ditch Northeast Side of South Ash Pond (For Pumping \Water from Toe Ditch Through Buried Line Into South Ash Pond).

Photo BS-14: Ditch Along Outside Toe of Perimeter Dike North Side of South Ash Pond – Viewed East.

Photo BS-15: Small Seeps at Outside Toe Ditch North Side of South Ash Pond.

Photo BS-16: Outside Slope of Perimeter Dike and Toe Ditch South Side of South Ash Pond B – Viewed East.

Photo BS-17: Damaged End of Toe Drain PVC Pipe Outlet at Toe Ditch Exposed by Erosion – Viewed East.

Photo BS-18: Wet Ground and Seepage Along Outside Toe Ditch South Side of South Ash Pond.

Photo BS-19: Wet Ground and Seepage from Toe Drain PVC Pipe Outlet at Outside Toe of South Ash Pond Perimeter Dike at Southwest Bend End.

Photo BS-20: Photo BS-16: Inside South Ash Pond Where Water Pumped From West Ash Pond is Discharged Through Flexible Liner Over The North Perimeter Dike Near West End.

Photo BS-21: Decant Tower at East End of South Ash Pond.

Photo BS-22: Inside Slope and Crest Perimeter Dike South Side of South Ash Pond– Viewed East.

Photo BS-23: Inside Slope and Crest of Perimeter Dike of South Ash Pond at Southwest Bend – Viewed East.


[redacted]

Photo BS-24: Inside Slope of Perimeter Dike Southeast Corner of South Ash Pond– Viewed Northeast.


[redacted]

Photo BS-25: Tall Vegetation on Ash Surface and Inside Slope of Perimeter Dike of South Ash Pond at Western End – Viewed East.

Photo BS-26: Inside Slope of Perimeter Dike East Side of South Ash Pond Near Decant Tower – Viewed South.

Photo BS-27: View Through Top Grate of South Ash Pond Decant Tower.

Photo BS-28: Outside Toe of Perimeter Dike East Side of South Ash Pond

Photo BW-1: Crest along Southwest Perimeter Dike of West Ash Pond – Viewed Southeast.

DRAFT

Photo BW-2: Crest of Perimeter Dike Southwest Side of West Ash Pond – Viewed Southeast.

Photo BW-3: Crest of Perimeter Dike Along Southwest Corner of West Ash Pond – Viewed Northwest.

DRAFT

[redacted] [redacted]

Photo BW-4: Intake Line and Discharge Lines for Pumping Water from West Ash Pond to South Ash Pond. View of Pump Located on Crest Along Southeast Corner of West Ash Pond – Viewed East.

Photo BW-5: Crest of Perimeter Dike East Side of West Ash Pond– Viewed South.

[redacted] [redacted] [redacted]

Photo BW-6: Cross Dike between Unit 3 & 4 Slurry Pond and West Ash Pond– Viewed Southeast.

Photo BW-7: Cross Dike between West Ash Pond and Unit 3 & 4 Slurry Pond – Viewed Northwest.

DRAFT

Photo BW-8: Crest and Outside Slope of Perimeter Dike to Along West Side of West Ash Pond– Viewed South.

Photo BW-9: Outside Toe of Perimeter Dike West Side of West Ash Pond – Viewed South (Note Mower Ruts Due to Wet Soil).

DRAFT

Photo BW-10: Outside Slope Perimeter Dike Southwest Side of West Ash Pond – Viewed Southeast.

Photo BW-11: Outside Slope Perimeter Dike West Side of West Ash Pond – Viewed North.

DRAFT

Photo BW-12: Outside Slope of Perimeter Dike along East Side of West Ash Pond– Viewed South.

Photo BW-13: Outside Slope of Perimeter Dike near Southeast Corner – Viewed Southeast.

Photo BW-14: Wet Soil Area Outside Toe of Embankment Perimeter Dike West Side of West Ash Pond.

[redacted]

Photo BW-15: Inside View of West Ash Pond Where Unit 3 & 4 Slurry Pond Discharge into Pond at North End of West Perimeter Dike.

Photo BW-16: Inside Slope of Perimeter Dike at Bend to at Southwest Side of West Ash Pond – Viewed Southeast.

Photo BW-17: Inside Slope of Perimeter Dike along Southeast Corner of West Ash Pond – Viewed Northwest.

Photo BW-18: View of Pump Discharge Lines on Bridge from West Ash Pond Southeast Corner to South Ash Pond – Viewed East.

[redacted]

[redacted]

Photo BW-19: Existing Decant Towner in Southeast Corner of West Ash Basin (Note Suction Lines for Pumping Water from Decant Tower to South Ash Basin).

[redacted]

Photo B3-1: Crest of Perimeter Dike Southeast Side of Unit 3 & 4 Slurry Pond - Viewed North.

Photo B3-2: Crest of Perimeter Dike Northeast Side of Unit 3 & 4 Slurry Pond - Viewed Northwest.

DRAFT

Photo B3-3: Crest of Perimeter Dike West Side of Unit 3 & 4 Slurry Pond – Viewed South.

Photo B3-4: Pump Station at Outside Toe of Northwest Side of Unit 3 & 4 Slurry Pond (For Pumping Water from Toe Ditch through Buried Line into Unit 3 & 4 Slurry Pond).

Photo B3-5: Outside Slope of Perimeter Dike of Northwest Side of Unit 3 & 4 Slurry Pond at Repaired Location.

Photo B3-6: Inside Slope of Perimeter Dike at Northeast side of Unit 3 & 4 Slurry Pond – Viewed Northwest.

Photo B3-7: Crest of Perimeter Dike at Northwest side of Unit 3 & 4 Slurry Pond at Repaired Location – Viewed East.

[redacted]

Photo B3-8: Outside Slope of Perimeter Dike Southeast Side of Unit 3 & 4 Slurry Pond – Viewed North.

DRAFT

Photo B3-9: Outside Slope of Perimeter dike Northeast Side of Unit 3 & 4 Slurry Pond – Viewed Northwest.

Photo B3-10: Outside Slope of Perimeter Dike Northwest Side of Unit 3 & 4 Slurry Pond – Viewed East.

Photo B3-11: Outside Slope of Perimeter Dike West Side of Unit 3 & 4
Slurry Pond – Viewed North.

[redacted]

Photo B3-12: Outside Toe of Perimeter Dike Northeast Side of Unit 3 & 4
Slurry Pond – Viewed Southeast.

Photo B3-13: Outside Toe of Perimeter Dike Northeast Side of Unit 3 & 4 Slurry Pond (Note Overgrown Toe Ditch).

Photo B3-14: Unit 3 & 4 Slurry Pond Surface Inside Perimeter Dike on Southeast Side – Viewed Northwest.

[redacted]

Photo B3-15: Inside Slope of Perimeter Dike Southeast Side of Unit 3 & 4 Slurry Pond - Viewed South.

Photo B3-16: Inside Slope of Perimeter Dike West Side of Unit 3 & 4 Slurry Pond – Viewed North.

Photo B3-17: Inside Slope of Perimeter Dike at Northwest Side of Unit 3 & 4 Slurry Pond – Viewed West.

[redacted]

Photo B2-1: Crest of Perimeter Dike West Side of Unit 2 Slurry Pond– Viewed North.

Photo B2-2: Crest of Perimeter Dike North Side of Unit 2 Slurry Pond East of Cross Dike– Viewed East.

Photo B2-3: Crest of Perimeter Dike North Side of Unit 2 Slurry Pond East of Cross Dike – Viewed East.

Photo B2-4: Crest of Perimeter Dike South Side of Unit 2 Slurry Pond West of Cross Dike – Viewed East.

Photo B2-5: Crest of Perimeter Dike East Side of Unit 2 Slurry Pond– Viewed South (Note Sparse Grass Cover).

Photo B2-6: Crest of Perimeter Dike North Side of Unit 2 Slurry Pond West of Cross Dike – Viewed East.

Photo B2-7: Crest of Cross Dike in Unit 2 Slurry Pond– Viewed South (Original Middle "Finger Dike" Had Been Recently Extended Northerly To The North Perimeter Dike To Divide The Pond Into Two Cells).

Photo B2-8: Crest of Cross Dike in Unit 2 Slurry Pond– Viewed North.

[redacted]

Photo B2-9: Crest and Outside Slope of Perimeter Dike West Side of Unit 2 Slurry Pond– Viewed North.

DRAFT

Photo B2-10: Outside Slope of Perimeter Dike North Side of Unit 2 Slurry Pond West of Cross Dike – Viewed East.

Photo B2-11: Outside Slope of Perimeter Dike East Side of Unit 2 Slurry Pond– Viewed South.

Photo B2-12: Outside Slope of Perimeter Dike East Side near Southeast Corner of Unit 2 Slurry Pond – Viewed South.

[redacted] [redacted]

Photo B2-13: Outside Crest and Slope of Perimeter Dike South Side of Unit 2 Slurry Pond West of Cross

Photo B2-14: Outside Slope of Perimeter Dike East Side of Unit 2 Slurry Pond – Viewed South

[redacted]

Photo B2-15: Inside Slope of Perimeter Dike West Side of Unit 2 Slurry Pond– Viewed North.

Photo B2-16: Inside Slope of Perimeter Dike North Side of Unit 2 Slurry Pond West of Cross Dike – Viewed East.

Photo B2-17: Inside Slope of Perimeter Dike East Side of Unit 2 Slurry Pond– Viewed South.

[redacted] [redacted]

Photo B2-18: Inside Slope and Crest of Perimeter Dike South Side of Unit 2 Slurry Pond West of Cross Dike – Viewed West.

[redacted]

Photo B2-19: Inside Slope and Crest of Perimeter Dike South Side of Unit 2 Slurry Pond East of Cross Dike– Viewed West.

Photo B2-20: Inside Slope of Perimeter Dike North Side of Unit 2 Slurry Pond East of Cross Dike – Viewed East.

[redacted]

Photo B2-21: View of East Side of Pump Structure of Unit 2 Slurry Pond. (Open Side Formally was Fitted with Wooden Slide Gates to Impound Water in the Pond; Note Normal Water Level Stain on Concrete.)

Photo B2-22: View of Pump Placed Inside of Pump Structure of Unit 2 Slurry Pond. (Note Bottom Section of Slide Gate is Raised Slightly.)

Photo B2-23: Inlet of Corrugated HDPE Pipe Under the North (Extended) Portion of the Cross Dike in Unit

Photo B2-24: Outlet of Corrugated HDPE Pipe Under the North (Extended) Portion of the Cross Dike in Unit 2 Slurry Pond.

Photo B2-25: Plastic Pipe Conveying Stormwater Pumped Unit 2 Slurry Pond to Intake Channel Located at Outside Slope of South Perimeter Dike at Southwest Corner. (Note Large Diameter Casing Pipe within which Discharge Line – Smaller Pipe – Passes under Crest of Dike.)

6.0 HYDROLOGIC/HYDRAULIC SAFETY

6.1 SUPPORTING TECHNICAL DOCUMENTATION

6.1.1 Floods of Record

Flood record information was not provided for the CCW ponds. Hearsay evidence from Santee Cooper personnel is that a 15-inch (24-hour duration) rainfall occurred in 1988, which caused water to flow through the 25-foot wide emergency spillway at the Cooling Pond (not included in this assessment); it was reported that the emergency spillway was designed to flow beginning at a flood produced by the 25-year frequency, 24-hour duration rainfall event. No issues with the ash pond and slurry ponds were reported as a result of this storm, although no details were given, such as amount of freeboard at the ponds. The ash ponds have been in service for 30 to 35 years and have experienced many severe rainstorms and a number of hurricanes during that time. Santee Cooper indicated no unusual problems at the pond embankments as a result of such storms.

6.1.2 Inflow Design Flood

No hydrologic/hydraulic analyses were provided for the ash and slurry ponds; thus, no inflow design flood was available. Santee Cooper representatives stated that drainage structures at the station are designed for the 25-year frequency, 24-hour duration rainfall event. Presumably, the outlet structures at the ash ponds are designed for at least this event.

The issue of inflow design flood often is not significant for ash and slurry ponds formed with ring (perimeter) dikes. The basins are contained and isolated by the dike embankments, so that they do not receive off-site drainage. Usually during normal operations sufficient freeboard is available to contain 100 percent of rainfall over the basin area from significant storm events, even up to the probable maximum precipitation (PMP), which is a little over 44 inches at this location (based on HMR-51, all season PMP for 24-hour duration, 10 mi^2).

As previously mentioned, the SCDHEC Dams and Reservoirs Safety Act Regulations specifically exclude state regulation of dams owned and operated by the South Carolina Public Service Authority (Santee Cooper). The state recognizes Santee Cooper's jurisdiction over its own dams; therefore safety of those dams comes under Santee Cooper's purview, and Santee Cooper has the authority to set the safety standard. Santee Cooper has set up a task force to evaluate the structural integrity and safety of its impoundments and to establish hazard potential ratings for each impoundment using nationally recognized criteria. This task force is expected to set the safety standard for impounding structures such as those at the Winyah Generating Station. If Santee Cooper's hazard potential ratings and safety standards closely follow those given in the South Carolina dam safety regulations, the Winyah ash and slurry ponds would have spillway design floods as indicated below:

Ash Pond A – Based on Small Size Classification and Low Hazard Potential Classification, the spillway design flood (SDF) criterion is 50 to 100-year frequency.

Ash Pond B – Based on Small Size Classification and Low Hazard Potential Classification, the spillway design flood (SDF) criterion is 50 to 100-year frequency.

South Ash Pond – Based on Intermediate Size Classification and Significant Hazard Potential Classification, the spillway design flood (SDF) criterion is ½ probable maximum flood (1/2 PMF) to probable maximum flood (PMF).

West Ash Pond – Based on Intermediate Size Classification and Significant Hazard Potential Classification, the spillway design flood (SDF) criterion is ½ probable maximum flood (1/2 PMF) to probable maximum flood (PMF).

Unit 3 & 4 Slurry Pond – Based on Intermediate Size Classification and Significant Hazard Potential Classification, the spillway design flood (SDF) criterion is ½ probable maximum flood (1/2 PMF) to probable maximum flood (PMF).

Unit 2 Slurry Pond – Based on Small Size Classification and Significant Hazard Potential Classification, the spillway design flood (SDF) criterion is 100-year frequency to ½ probable maximum flood (1/2 PMF).

This report's assessment of size and hazard potential classifications is discussed in Section 2.2 of this report.

6.1.3 Spillway Rating

No spillway rating computations or information was provided for the ash and slurry ponds.

6.1.4 Downstream Flood Analysis

No downstream flood analysis has been provided for the ash and slurry ponds.

A qualitative analysis based on field observations and review of available data is as follows:

Ash Pond A Dam - Failure of the dam would discharge CCW into the Cooling Pond. The failure would not likely cause loss of life but would cause some onsite environmental damage and potential disruption of generating station operations. The influx of water and ash into the Cooling Pond would likely be relatively gradual. However, a sudden release of a large mass into the Cooling Pond, considered unlikely, could set up a wave that could travel down the Cooling Pond and impact its dam; any overspill through the emergency spillway or over the dam would go into Turkey Creek. Most of the ash (except some of the finest particles in any overspill at the Cooling Pond Dam) would likely remain in the Cooling Pond.

Ash Pond B Dam - Failure of the dam would be as described above for Ash Pond A Dam, except that a larger volume of water would be released, which would potentially activate the emergency spillway or add to the emergency spillway flow, particularly if the release occurred during a major flooding event. The failure would not likely cause loss of life but would cause some onsite environmental damage and potential disruption of generating station operations.

South Ash Pond Dam - Failure of the dam would discharge water and CCW into a perimeter ditch bounded by existing railroad tracks. If the tracks were to be overtopped, considered likely, the release could potentially damage the tracks and adjacent private property and/or enter Pennyroyal Creek. CCW that enters the creek would be carried downstream, with the finest particles likely reaching the Sampit River, which flows into Winyah Bay. The failure would not likely cause loss of life but would cause environmental damage, potential private property damage, and potential disruption of railroad operations and generating station operations.

West Ash Pond Dam - Failure of the dam would be much as described above for the South Ash Pond Dam. The release of water and CCW could potentially damage adjacent private property and/or enter Pennyroyal Creek; if failure occurs on the southwest side, the adjacent railroad tracks could potentially be overtopped with CCW. The failure would not likely cause loss of life but would cause environmental damage, potential private property damage, and potential disruption of railroad operations and generating station operations.

Unit 3 & 4 Slurry Pond Dam - Failure of the dam could potentially damage adjacent private property and/or release CCW and a large volume of water into Pennyroyal Creek with potential impact on the nearby Pennyroyal Road. The finer particles of CCW would likely reach the Sampit River. The failure would not likely cause loss of life, but would cause environmental damage and potential private and public property damage.

Unit 2 Slurry Pond Dam - Failure of the dam would discharge CCW (and water during flood) into a perimeter ditch. If the perimeter ditch were to be overtopped, CCW could potentially damage adjacent property (gypsum wallboard plant) and/or enter the Intake Canal. No off-site impacts are likely. The failure would not likely cause loss of life but would cause on-site environmental damage, potential property damage (wallboard plant), and potential disruption of generating station operations.

6.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

An analysis of the ability of the ash ponds and slurry ponds to safely store and pass the inflow design flood was not provided. Basin elevation-storage curves, spillway rating curves, and dam break analyses are not available for the ponds. However, it does not appear to be critical documentation that is needed at this time, except for the ring-dike system containing the Unit 3 & 4 Slurry Pond and the West Ash Pond. The hydrologic/hydraulic documentation is considered non-critical for the ring-dike system containing Ash Pond A and Ash Pond B, the South Ash Pond, and the Unit 2 Slurry Pond because these basins appear to have sufficient flood storage capacity between normal operating pool levels (or interior surface elevations) and the dike crest elevations to contain at least ½ Probable Maximum Precipitation (1/2 PMP); also, the consequences of failure of the Ash Pond A and Ash Pond B perimeter dike appear to be relatively low. Therefore, the lack of supporting hydrologic/hydraulic documentation for these ponds is a concern until studies can be performed. The ability of the ring-dike system containing the Unit 3 & 4 Slurry Pond and the West Ash Pond to store and pass (through pumping) runoff from a design storm of at least ½ PMP is not obvious, due to the relatively low available freeboard above normal operating level (2.4 feet at time of site visit), the internal drainage from the high filled-in areas of the basins to the low areas, and the fact that pumping is relied upon to remove water from the basins. Therefore, the lack of supporting hydrologic/hydraulic documentation for the Unit 3 & 4 Slurry Pond and the West Ash Pond is considered inadequate at this time. Santee Cooper should review and document hydrologic safety of the Unit 3 & 4 Slurry Pond and the West Ash Pond in the near future and perform analysis for any of the Winyah GS ponds as required by criteria and procedures that may arise from evaluations to be conducted by the internal task force.

6.3 ASSESSMENT OF HYDROLOGIC/HYDRAULIC SAFETY

As noted above, the ability of the ash ponds and slurry ponds to safely store and pass the appropriate design flood has not been demonstrated through documented analysis. However, on the basis of a preliminary review of flood storage capacity and the fact that the ponds do not have contributory drainage, the ponds are believed to have the capability to fully contain 100 percent of the precipitation from the design storm over their areas without overtopping, except possibly at the ring-dike system containing the Unit 3 & 4 Slurry Pond and the West Ash Pond. The hydrologic/hydraulic safety of the Unit 3 & 4 Slurry Pond and the West Ash Pond should be verified in the near future by documented analysis. One or more of the other Winyah GS ponds may also require analysis of hydrologic/hydraulic safety, as determined from evaluations to be conducted by Santee Cooper's internal task force.

7.0 STRUCTURAL STABILITY

7.1 SUPPORTING TECHNICAL DOCUMENTATION

7.1.1 Stability Analyses and Load Cases Analyzed

The designer of record for the original dams for all of the CCW ponds was Lockwood Greene (LG), Spartanburg, SC. As previously mentioned, Rizzo designed the Ash Pond B dike raise prior to its construction in 1997. No stability analyses of the embankment dams that impound the ash ponds were provided for review. Any such analyses that may have been performed by designers prior to construction are not available. The furnished design report prepared by Rizzo does not include a stability analysis (see Appendix A – Doc 1.4). From visual observations in the field the embankment dams probably have adequate stability, at least for static loading conditions.

7.1.2 Design Properties and Parameters of Materials

Soil design properties and parameters for the CCW pond dams were not provided for review.

7.1.3 Uplift and/or Phreatic Surface Assumptions

Phreatic surface assumptions for the embankment dams impounding the CCW ponds were not available for review. From visual observations in the field, the phreatic surface does not crop out on the outside slopes of the perimeter dikes, although some wet areas were observed at the toes of the Ash Pond B perimeter dike (west side), West Ash Pond perimeter dike (west side), and South Ash Pond perimeter dike (generally all-around, including small seeps). The wet areas and small seeps appeared to be associated primarily with very gradual underseepage through foundation soils, although some of the wet areas at the Ash Pond B dike toe may possibly be due to poor surface drainage. At the South Ash Pond perimeter Dike the wetness and small seeps may be associated with seepage from the toe drain; it is doubtful that the solid-wall PVC discharge pipes leading from the internal toe drain at 200-foot spacing collects and removes all the seepage intercepted by the toe drain, i.e., much of the water likely seeps directly from the drain toward the embankment toe in between the removal pipes. The wet areas and small seeps are not considered to be serious conditions that threaten the stability of the dikes, although they create some maintenance issues, since mowers cannot traverse the wet areas without creating ruts. Many of the seep areas along the toe of the South Ash Pond perimeter dike need to have a better grass cover established; alternatively, if grass is difficult to establish and maintain in the seep areas, an effective measure would be to install an inverted filter, consisting of a layer of filter fabric placed directly on the seep area overlaid with a layer of coarse gravel or small riprip (surge stone).

7.1.4 Factors of Safety and Base Stresses

No computed factors of safety from slope stability analyses of the embankment dams impounding the CCW ponds were available for review.

7.1.5 Liquefaction Potential

No liquefaction potential analyses appear to have been performed for the embankment dams that impound the CCW ponds. Limited available subsurface information, discussed below in Subsection 7.1.6, suggests that the foundation soils typically consist of fine sands and silty fine sands with some clayey sands and a little clay. Depending on their relative densities, the fine sands and possibly the silty fines sands could be susceptible to liquefaction.

7.1.6 Critical Geological Conditions and Seismicity

The reviewed documents did not include much information regarding the critical geological conditions and seismicity used in the original design of the embankment dams that impound the CCW ponds. Minimal subsurface information was provided by six boring logs included in Rizzo's design report for the Ash Pond B dike raise (see Appendix A – Doc 1.4). The borings had been made through the original dike and extended 13 to 22 feet into the foundation soils. The foundation soils revealed by the borings consist predominantly of fine sands, fine to medium sands, and silty fine sands with some clayey sand and a little clay. Soil survey information available from the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service's (NRCS) Web Soil Survey indicates similar soils are present in the areas around all the ponds. The Unified Soil Classifications (USCs) are predominantly SP, SP-SM, and SM and secondarily SC and CL. Standard penetration tests performed in the borings indicate typically loose to medium dense relative densities in the foundation soils, although one very loose zone of silty fine sand (SM) with standard penetration resistance (N) of 2 blows/foot was encountered immediately beneath the embankment in one boring (B-5). Soils such as this could potentially be susceptible to liquefaction, and any very loose fine sands (SP) that potentially exist in the foundation would be susceptible to liquefaction.

Seismicity – The site of the CCW basins is in an area of high seismic hazard. Based on USGS Seismic-Hazard Maps for Central and Eastern United States, dated 2008, the Winyah Generating Station, including the CCW basins, is located in an area anticipated to experience 0.50g or higher peak ground acceleration with a 2-percent probability of exceedance in 50-years.

7.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Structural stability documentation for the CCW pond dams is absent. However, for the Ash Pond A/Ash Pond B perimeter dike and the Unit 2 Slurry Pond perimeter dike, it does not appear to be critical documentation that is needed at this time. Structural stability documentation is considered non-critical for these dikes based on 1) the low height and generally low consequences of failure of the perimeter dikes, and 2) the generally good condition of the basins and embankments based on visual observation,. Therefore, the lack of supporting structural stability documentation for the Ash Pond A/Ash Pond B perimeter dike and the Unit 2 Slurry Pond perimeter dike is a concern until studies can be done. The lack of supporting structural stability documentation for the South Ash Pond perimeter dike and the West Ash Pond/Unit 3 & 4 Slurry Pond perimeter dike is considered inadequate at this time, since the consequences of failure of these dikes appear to be significant with respect to property damage and environmental damage. The structural stability of the South Ash Pond perimeter dike and the West Ash Pond/Unit 3 & 4 Slurry Pond perimeter dike should be verified in the near future by documented analyses of static stability and documented review of seismic stability and liquefaction potential. One or more of the other Winyah GS pond dikes may also require analysis of structural stability, as determined from evaluations to be conducted by Santee Cooper's internal task force.

7.3 ASSESSMENT OF STRUCTURAL STABILITY

The reviewed documents did not include any information regarding the design loads or the comparison of loads to potential credible loading conditions of the embankment dams that impound the CCW ponds. The available design data are impoundment drawings and boring logs for the Ash Pond B expansion.

Overall, the structural stability under static loading conditions of the embankment dams impounding the Winyah CCW ponds appears to be satisfactory based on the following observations during the June 29-30, 2010 field visit by Dewberry, available recent dam inspection reports, and the July 2009 to April 2010 dike quarterly inspection reports.

- There were no indications of scarps, sloughs, major depressions or bulging anywhere along the slopes of the dams;
- Boils, sinks or uncontrolled seepage was not observed along the slopes or toes; and
- The crest appeared free of major depressions and no significant vertical or horizontal alignment variations were observed.

Seismic stability of the embankment dams cannot be similarly assessed, because the dams were not experiencing seismic loading at the time of observations. However, the apparent presence of loose and very loose sandy soils in the foundation (based on the limited available subsurface information) suggests that liquefaction could potentially occur during strong earthquake shaking, but the actual liquefaction potential and its effect on the dikes at the Winyah GS cannot be known without performing a study of liquefaction potential and analysis of displacements that could occur as a result of liquefaction of the susceptible soils. For the more critical South Ash Pond perimeter dike and the West Ash Pond/Unit 3 & 4 Slurry Pond perimeter dike Santee Cooper should perform an engineering review of foundation soil conditions at those locations in some greater detail, perhaps by reviewing boring logs for the existing groundwater monitoring wells and any other boring information that may be available from previous subsurface investigations at the station. The furnished drawings for these basins show what appear to be borings that were made as part of design studies; therefore, there may be sufficient existing information available for review. If this review indicates a preponderance of data showing very loose sands in or near the dike foundations, seismic stability and liquefaction analyses should be performed as part of the verification and documentation of structural stability of the South Ash Pond perimeter dike and the West Ash Pond/Unit 3 & 4 Slurry Pond perimeter dike previously discussed.

The principal outlet structures, which are those at Ash Pond B and the South Ash Pond, appear to be in generally sound and stable condition with no visual evidence of significant deterioration, except along the RCP at Ash Pond B; joint separations occur in the section of pipe between the dike toe and the discharge end at the Discharge Canal. Santee Cooper should review the integrity of the entire length of outlet pipe and perform appropriate remedial measures.

8.0 ADEQUACY OF MAINTENANCE AND METHODS OF OPERATION

8.1 OPERATIONAL PROCEDURES

Ash Pond A – This basin is currently used for disposal and storage of CCW. Ash waste material (predominantly bottom ash) is sluiced into excavated trenches in the north part of the basin. Fly ash generally is dry-handled and trucked to Southeastern Fly Ash, where it is processed for use in cement. However, fly ash is sluiced into the ash pond whenever there is an outage at the Southeastern Fly Ash plant. Current on-going operations include mining bottom ash on the northwest portion of the basin for beneficial use (manufacture of concrete blocks). The ash is excavated and placed in windrowed stockpiles to allow the material to drain prior to loading and transport offsite. Sluice water and storm water are channeled through trenches excavated in the ash surface to direct flow to the southeast corner of the basin, where the water is discharged through the cross dike into Ash Pond B.

Ash Pond B – This basin is currently used as a clearing basin or “polishing” pond prior to discharge of water that drains into it from Ash Pond A. Ash waste material from production operations is not currently placed in the basin. The water is channeled through trenches excavated in the ash surface to a pond of free-standing water in the south approximately one-third of the basin. Water leaves the basin through the outlet structure located near the south end of the perimeter dike on the west side of the basin; the water discharges into the Discharge Canal from a RCP that penetrates the perimeter dike.

South Ash Pond – This basin is mainly used for disposal of CCW, primarily bottom ash; however, fly ash is sluiced into the South Ash Pond whenever there is an outage at the Southeastern Fly Ash plant. Water from the West Ash Pond is pumped into the South Ash Pond over the perimeter dike on the north side near the west end; water from station drains is discharged into the basin from HDPE lines through the top part of the perimeter dike at the same location, and water from the perimeter toe ditch is discharged into the basin through an HDPE line through the top part of the perimeter dike at the west end. Water sluiced or pumped into the basin and storm water are channeled through trenches excavated in the ash surface to a pond of free-standing water at the east end of the basin. Water leaves the basin through the outlet structure located at the east end of the basin; the water ultimately discharges into the Discharge Canal from a conduit that penetrates the perimeter dike.

West Ash Pond – Ash waste material from production operations is no longer placed in this basin. The basin is mainly used for pass-through of water pumped into it from the Unit 3 & 4 Slurry Pond. The water flows along an interior ditch excavated in ash along the west and southwest sides to the southeast corner of the basin, where the water is pumped from a former intake tower through flexible lines extending over to the South Ash Pond.

Unit 3 & 4 Slurry Pond – This basin receives flue gas emission control waste only when the material does not meet specifications for use in the manufacture of gypsum wallboards at the adjacent American Gypsum plant, which is usually during start-up of a generating unit after an outage. The scrubber waste is currently sluiced in with water from the southeast side of the basin on the northeast side of the finger dike. The water flows to the pond of free-standing water that occupies the north half of the basin and extends around the finger dike to the southwest corner of the basin, where water is pumped over the northeast end of the cross dike to the West Ash Pond. Water from the perimeter toe ditch is discharged into the basin through an HDPE line through the top part of the perimeter dike on the northwest side of the basin.

Unit 2 Slurry Pond – This basin no longer receives sluiced flue gas emission control waste. The basin will return to service only when/if necessary. The Unit 2 Slurry Pond is currently maintained dry. Storm water collected at the pump structure in the southwest corner of the basin is pumped through a flexible line to the Intake Canal.

8.2 MAINTENANCE OF THE DAM AND PROJECT FACILITIES

Maintenance of the impounding embankments and outlet works of the ash ponds and slurry ponds, and essential operating equipment, such as the pumps at the West Ash Pond, the Unit 3 & 4 Slurry Pond, and the Unit 2 Slurry Pond, are performed as needed, as determined by routine inspections performed by operating personnel. Vegetation on the embankment slopes and crest is generally mowed or cut twice a year or whenever it becomes necessary, when the work can be performed by maintenance personnel at the station. Slopes as steep as 2 H to 1 V are mowed on a rotation basis by an outside service that uses specialized equipment for operation on relatively steep slopes. Because of the workload, the rotation schedule is typically on the order of 18 months for the steeper slopes.

8.3 ASSESSMENT OF MAINTENANCE AND METHODS OF OPERATION

8.3.1 Adequacy of Operational Procedures

Operational procedures appear to be appropriate and adequate, as long as pumping operations at the West Ash Basin, Unit 3 & 4 Slurry Pond, and Unit 2 Slurry Pond are closely monitored and back-up pumps are available and can be quickly pulled into service, if needed.

8.3.2 Adequacy of Maintenance

No major maintenance issues were noted from review of dam inspection reports and checklists. Based on field observations, some minor maintenance of bare soil areas is needed, primarily on the South Ash Pond perimeter dike. Maintenance of the impounding embankments and outlet works of the ash ponds and the slurry ponds appears to be generally adequate.

One potentially significant maintenance issue observed during the site visit is the condition of the abandoned outlet pipe through the perimeter dike on the west side of Ash Pond A. The outlet end of the pipe at the outfall was observed to be severely corroded CMP in a failed state. Drop outs observed in areas along the CMP alignment between the outside toe of the dike and the outfall at the Discharge Canal suggest that the pipe has either collapsed or joints have opened (or both) to allow loss of soil through the pipe. The condition should be investigated and repairs made, if needed.

Another potentially significant maintenance issue observed during the site visit is the condition of the outlet works at Ash Pond B. The buried RCP of the outlet structure of Ash Pond B has become separated at one or more joints in the section between the outside toe of the dike and the outfall at the Discharge Canal; the top of the pipe has become exposed or nearly exposed in a couple of areas where there has been soil loss around the pipe, apparently through the joints that have opened up. Air is taken in at the exposed joints and causes the discharge to "boil" or "blow" at the discharge end, which is submerged.

9.0 SURVEILLANCE AND MONITORING PROGRAM

9.1 SURVEILLANCE PROCEDURES

Santee Cooper engineers inspect the CCW pond embankments in accordance with dike inspection procedures, which are presented in Appendix A – Doc 1.11. Santee Cooper operating personnel make daily observations and engineers conduct quarterly inspections. The inspections are documented on Inspection Checklists. The Inspection Checklists are included for reference in Appendix A – Doc 1.12.

Miscellaneous Inspections – Santee Cooper operating personnel and security guards are trained in making daily observations of the ash pond embankments. Operating personnel accompany the engineers during the quarterly inspections.

9.2 INSTRUMENTATION MONITORING

9.2.1 Instrumentation Plan

There is no dam performance monitoring instrumentation in place in the CCW impounding embankments. Groundwater monitoring wells are in place at various locations around the basins for compliance monitoring of groundwater quality. Staff gauges are in place at the active discharge structures in Ash Pond B the South Ash Pond (as well as the Cooling Pond) and in the Unit 3 & 4 Slurry Pond to measure the water surface elevations.

9.2.2 Instrumentation Monitoring Results

There are no dam performance monitoring instruments and, thus, no results of dam monitoring. Staff gauge results for the day of the site visit are included in Appendix A – Doc 1.13.

9.2.3 Dam Performance Data Evaluation

Not applicable, since there are no dam performance data to evaluate. In-depth evaluation of groundwater quality monitoring results is beyond the scope of this structural/stability assessment.

9.3 ASSESSMENT OF SURVEILLANCE AND MONITORING PROGRAM

9.3.1 Adequacy of Inspection Program

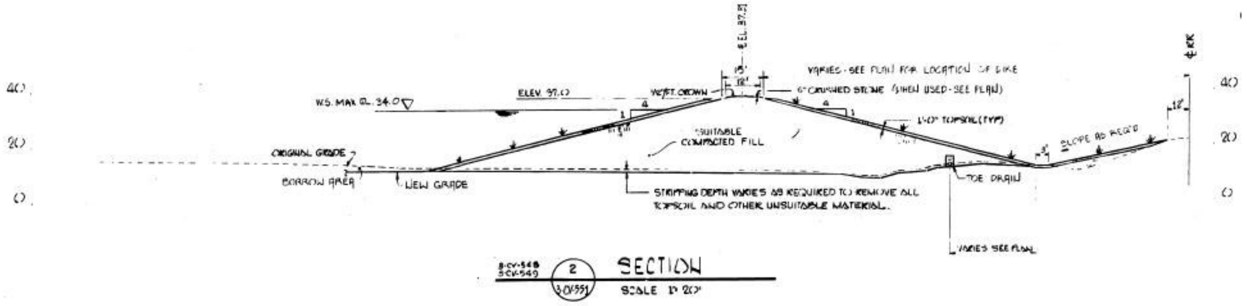
The inspection program is generally adequate, based on review of Santee Cooper's written inspection procedures, but could be improved in execution. The daily and quarterly inspections apparently did not note or pick-up on the potentially significant issues at the abandoned outlet pipe at Ash Pond A and the active outlet pipe at Ash Pond B. Although the dikes are quite long, they should be walked at least once per year, with close scrutiny in critical outside toe areas, such as at penetrations (conduits) or areas of known seepage or wet areas, to check for changed conditions. These conditions cannot be viewed properly from the crest. In addition, internal inspections of the outlet structures with a remote camera should be conducted on a frequency of at least once every 5 years.

9.3.2 Adequacy of Instrumentation Monitoring Program

There is no dam performance monitoring instrumentation in place. No problem or suspect condition, such as excessive settlement, major seepage, shear failure, or displacement was observed in the field that might be reason for installation of instrumentation. In the absence of stability problems or major seepage issues, there is no need for performance monitoring instrumentation at this time.

DRAFT

EXHIBIT 1: SOUTH ASH POND - REPRESENTATIVE SECTIONS OF EMBANKMENT



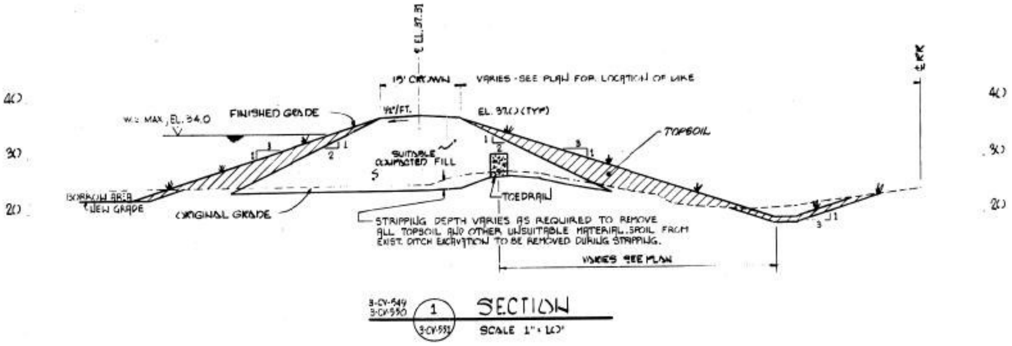
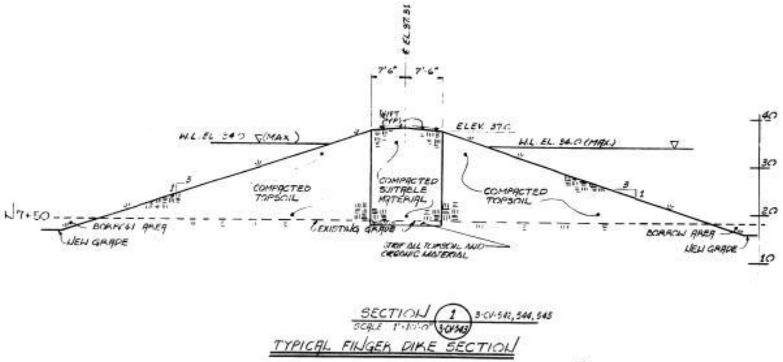
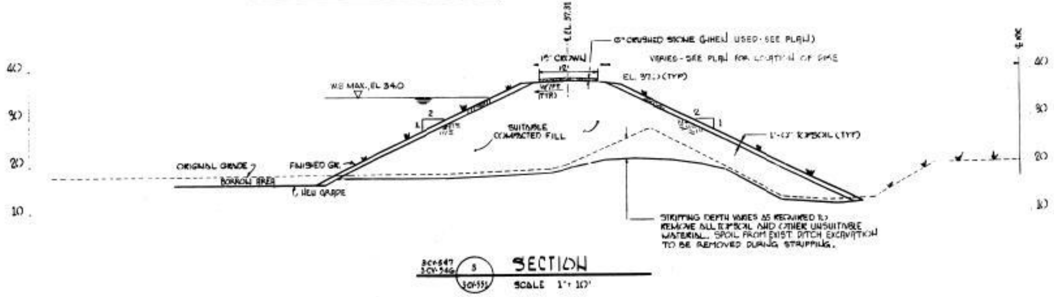
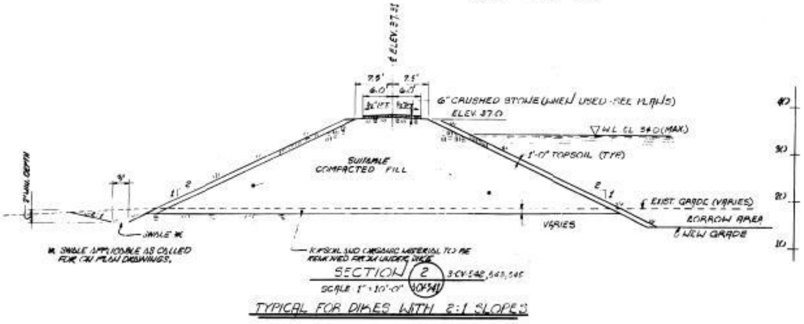
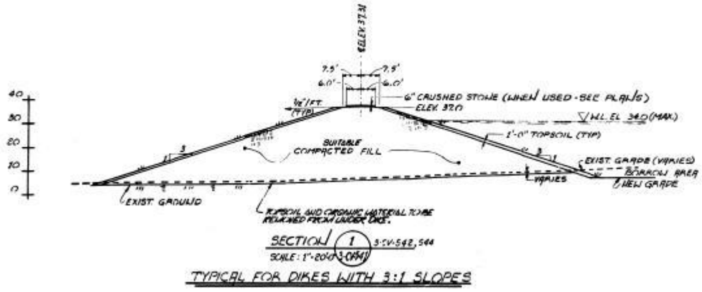


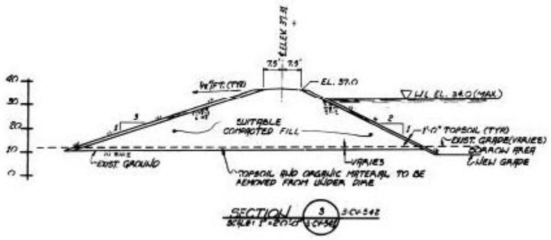
EXHIBIT 2: UNIT 3 & 4 SLURRY POND AND WEST ASH POND – REPRESENTATIVE SECTIONS OF EMBANKMENT











DRAFT

EXHIBIT 3: UNIT 2 SLURRY POND – REPRESENTATIVE SECTIONS OF EMBANKMENT

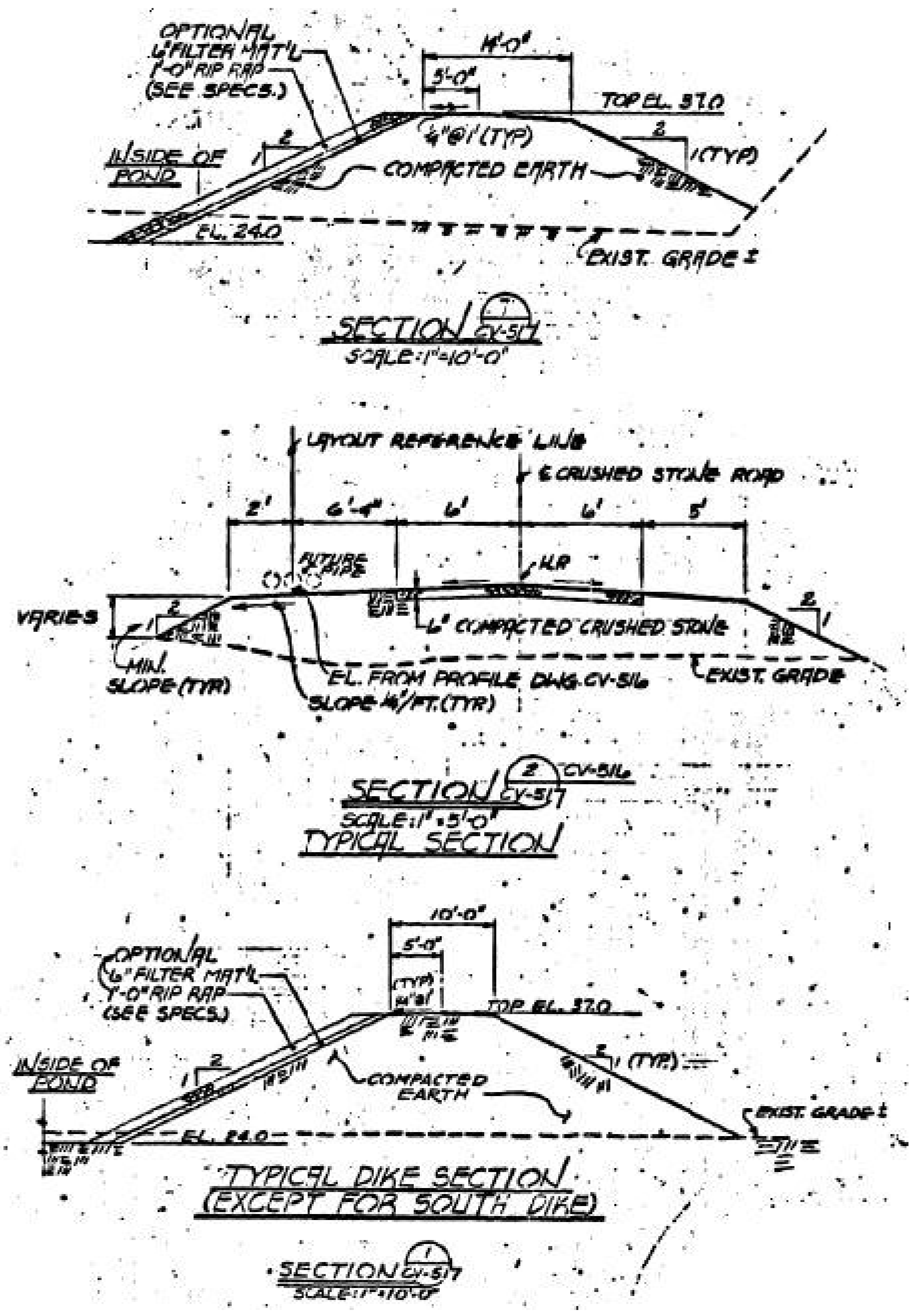
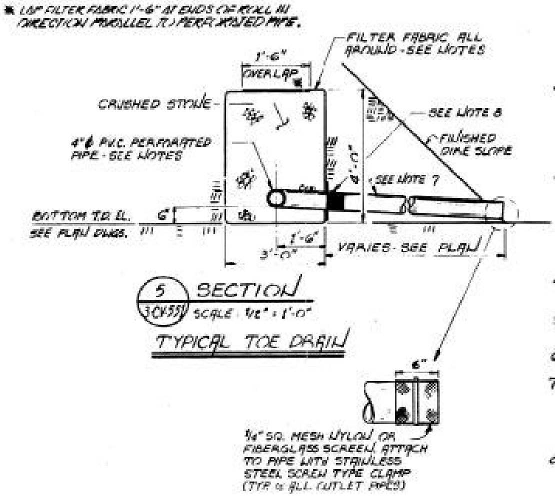


EXHIBIT 4: SOUTH ASH POND – TOE DRAIN DETAILS

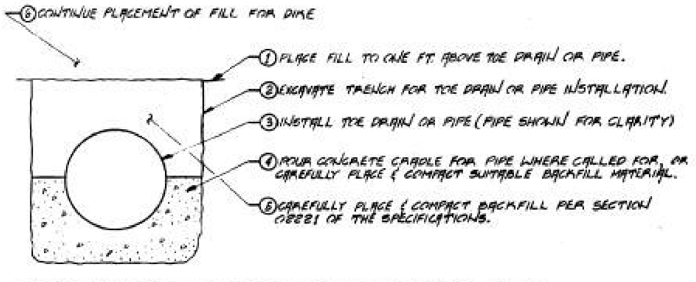


TOE DRAIN NOTES

1. THE CRUSHED STONE SHALL BE GRADATION #57 ACCORDING TO SOUTH CAROLINA STATE HIGHWAY DEPT. STD. SPECIFICATIONS. CRUSHED STONE SHALL BE GRANITE.
2. FILTER FABRIC SHALL BE WOVEN OR SPUNBONDED POLYESTER OR POLYPROPYLENE FABRIC. APPROVED MANUFACTURERS:
   - DUPONT "TYPAR" STYLE 3401
   - ADVANCE CONST. SPECIALTIES "LAUREL EROSION CLOTH, TYPE I."
   - CARTHAGE MILLS, INC. "FILTER-X"
   - MONSANTO TEXTILES "BIDIM C-38"
3. PERFORATED PIPE SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:

ASTM	TITLE
D1754	RIGID POLY (VINYL CHLORIDE) COMPOUNDS AND CHLORINATED POLY (VINYL CHLORIDE) COMPOUNDS
D 3034	TYPE PSM POLY (VINYL CHLORIDE)(PVC) SEWER PIPE AND FITTINGS

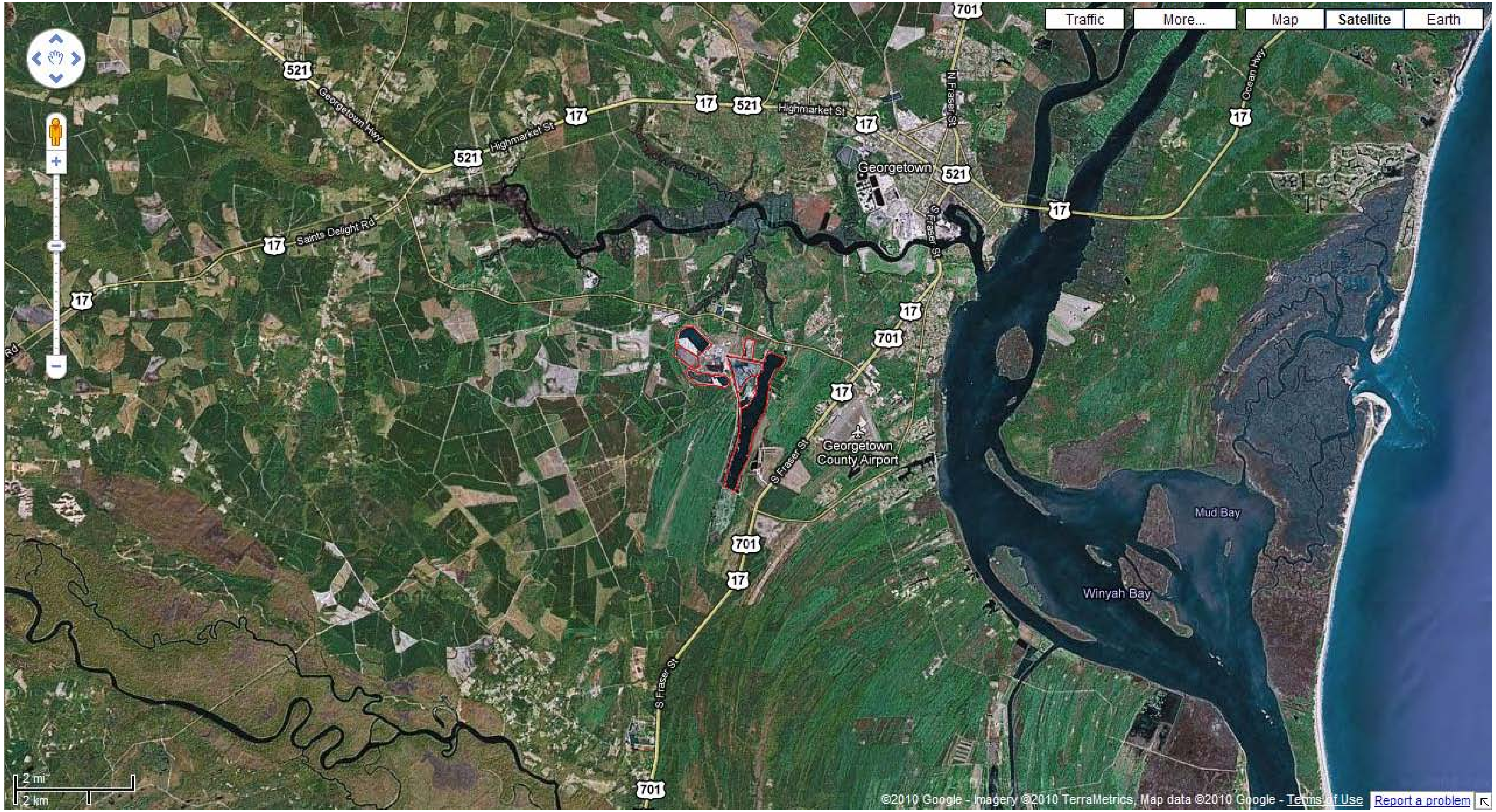
4. THE PIPE SHALL BE MADE OF PVC PLASTIC HAVING A CELL CLASSIFICATION OF 12454-B AND THE SDR SHALL NOT BE GREATER THAN 35.
5. PERFORATIONS SHALL BE IN ACCORDANCE WITH ASTM C 700 "VITRIFIED CLAY PIPE, EXTRA STRENGTH, STANDARD STRENGTH AND PERFORATED."
6. PERFORATED PIPE SHALL BE LAID WITH PERFORATIONS DOWN.
7. OUTLET PIPE, 4"ϕ NON-PERFORATED P.V.C., SPACED AT 200' ON CENTER MAXIMUM. FIELD ADJUST WHERE NECESSARY SO THAT OUTLET PIPE IS INSTALLED AT ALL LOW POINTS ON TOE DRAIN. SLOPE OUTLET PIPE @ 0.5% MIN.
   GRADE AREA AT TOE OF DIKES SO THAT NO PONDING OF WATER CAN OCCUR AND SO THAT OUTLET PIPES ARE FREE TO DRAIN.
8. CONTRACTOR SHALL WRAP ANY PIPE PENETRATION THRU FILTER FABRIC WITH 12" WIDE BY 4'-0" LONG PIECE OF FILTER FABRIC TO INSURE THAT NO AGGREGATE IS EXPOSED TO EARTH.



INSTALLATION OF PIPES OR TOE DRAINS UNDER DIKES

6
3-CV-551
DETAIL
N.T.S.

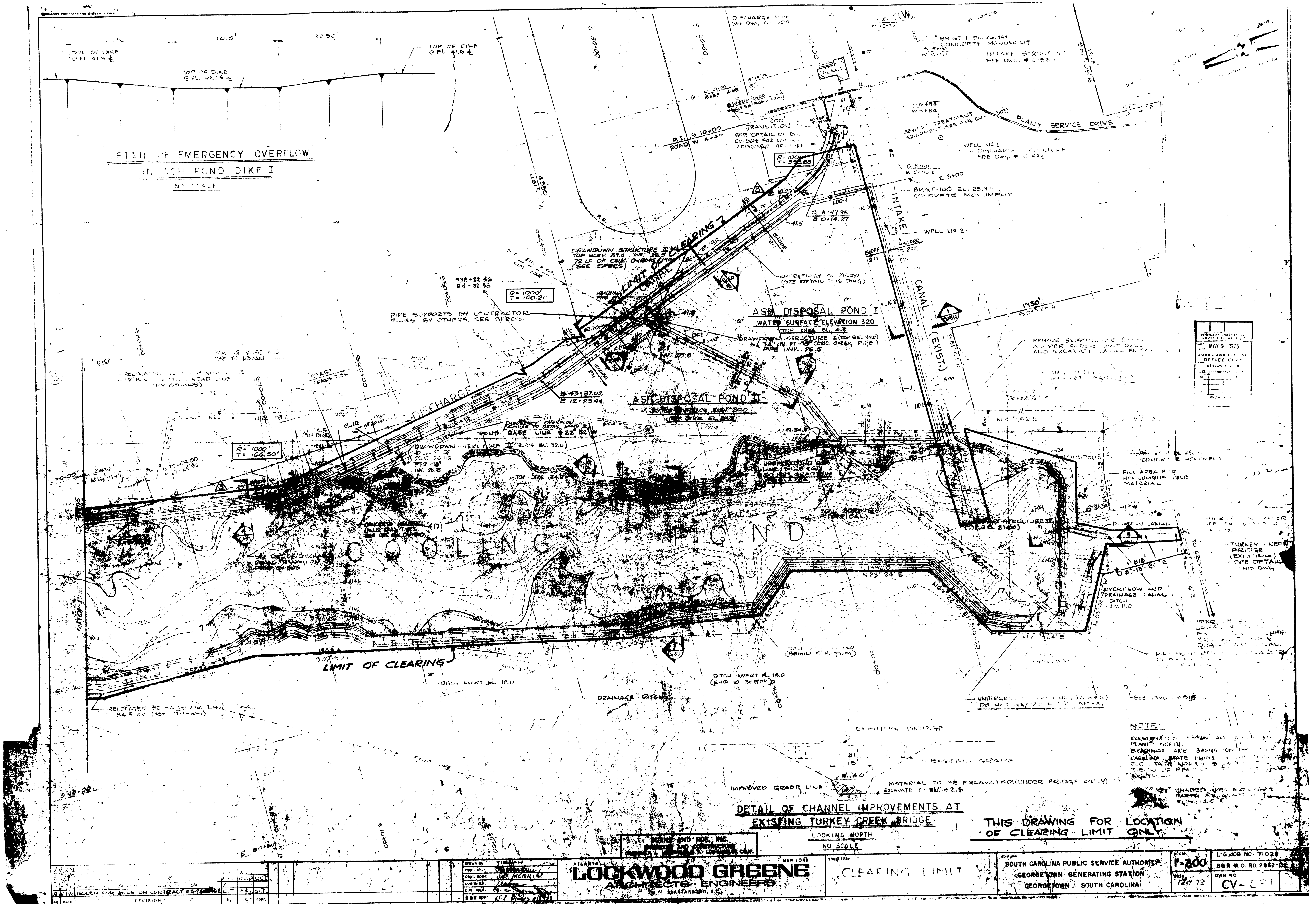
Appendix A - Doc 1.1 Winyah Generating Station Google Maps Vicinity Map


Traffic
More...
Map
Satellite
Earth
701
521
Georgetown Hwy
17
521
Highmarket St
17
521
Highmarket St
17
N Fraser St
Ocean Hwy
17
Georgetown
521
17
S Fraser St
17
Saints Delight Rd
17
Rd
17
701
17
Georgetown County Airport
S Fraser St
Mud Bay
701
17
Winyah Bay
S Fraser St
701
2 mi
2 km
©2010 Google - Imagery ©2010 TerraMetrics, Map data ©2010 Google - Terms of Use
Report a problem

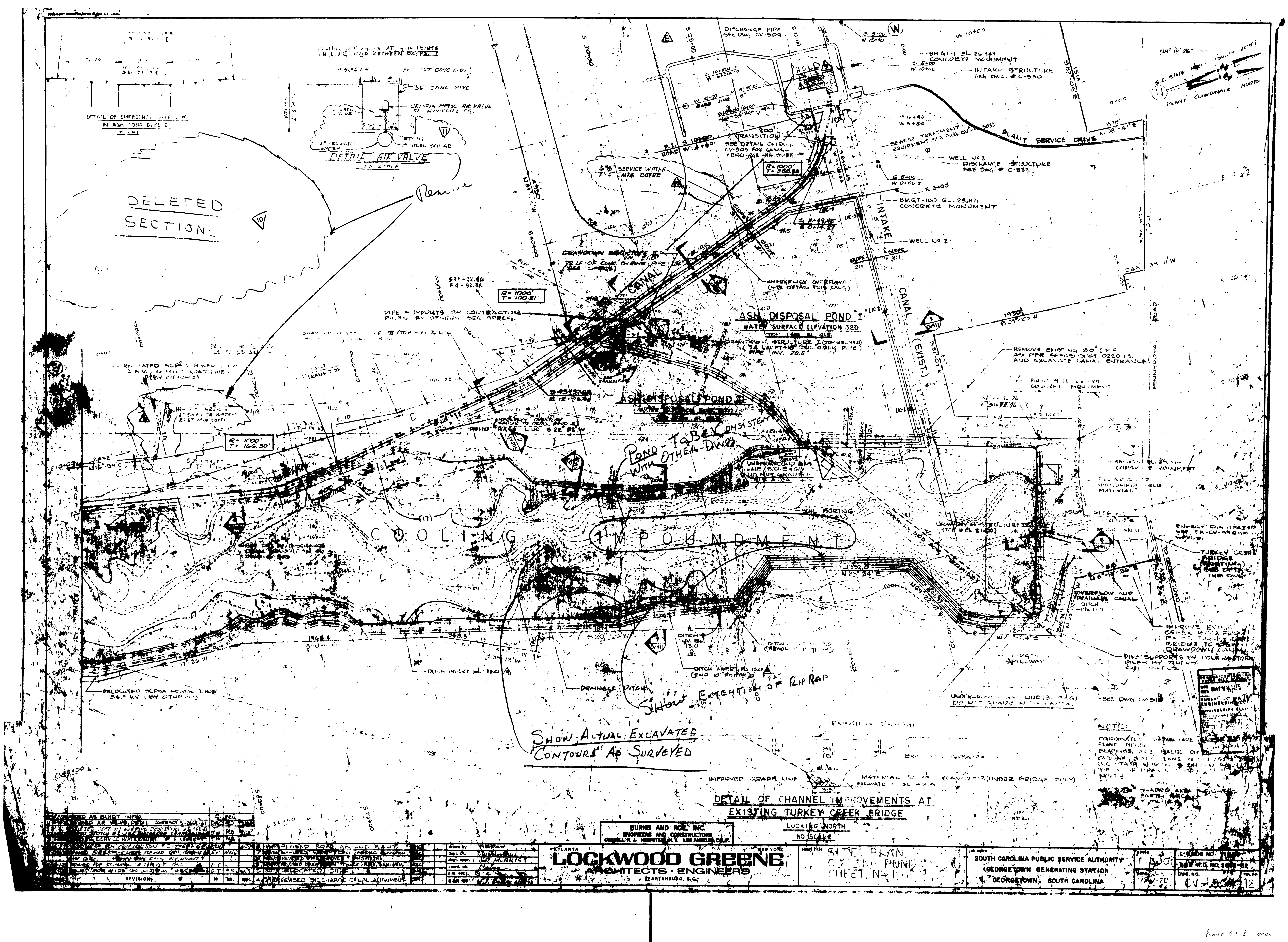
Appendix A - Doc 1.2 Winyah Generating Station Georgetown GIS 2006 Aerial


Unit 3&4
Slurry Pond
Unit 2
Slurry
Pond
West Ash
Pond
Ash Pond A
South Ash Pond
Ash
Pond B

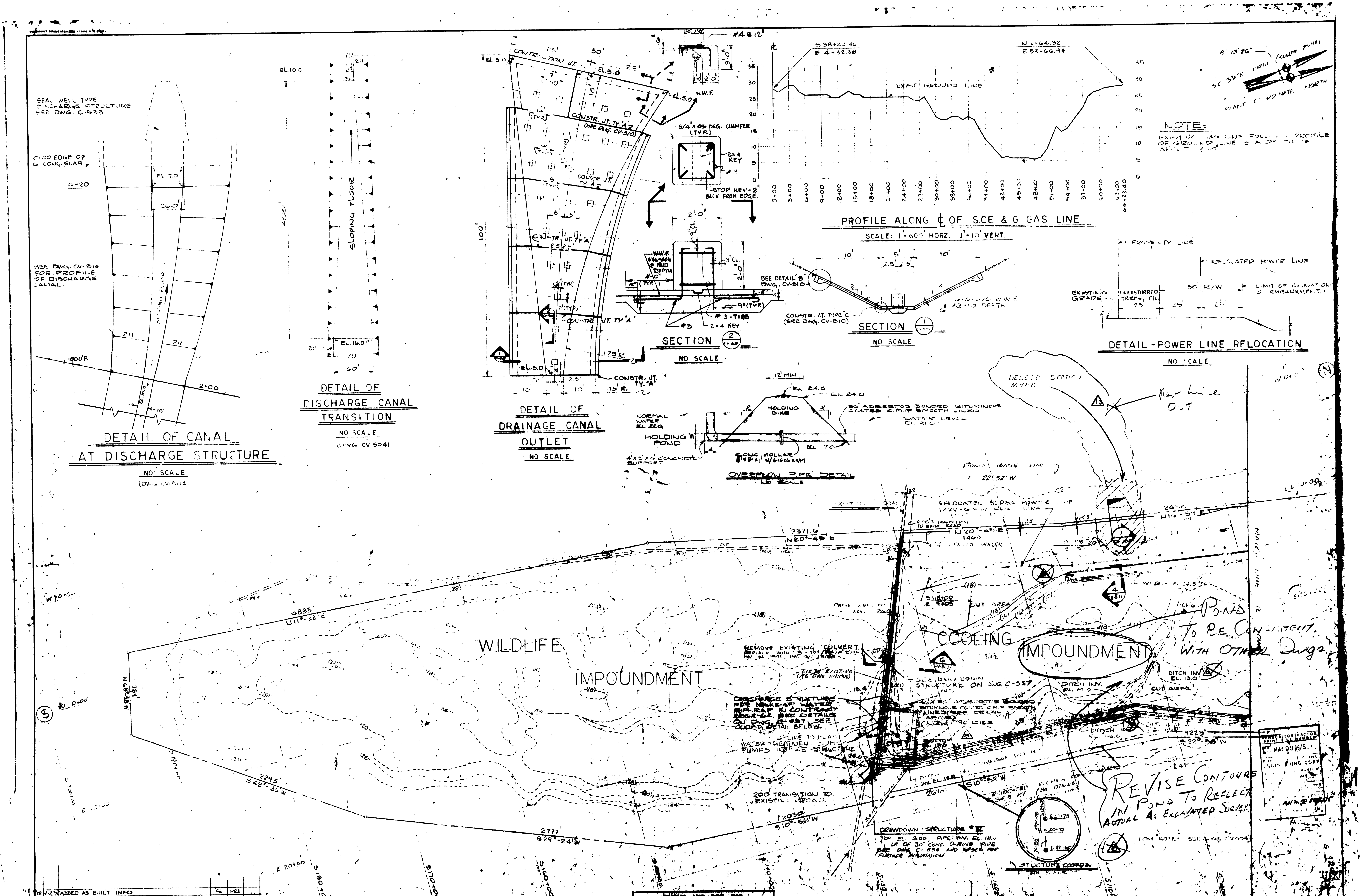
Appendix A - Doc 1.3 Ash Pond A and Ash Pond B Impoundment Drawings



Ash Ponds A & B
+ Cooling Pond
(Similar to previous)



Ponds A & B area
+ Cooling Pond area in part (Site Plan)



12	4-22-?	ADDED AS BUILT INFO	G	PRD	
11	5-9-11	REVISED LOCATION OF PUMP INTAKE STRUCTURE	EFA		
10	3/8/94	DELETED SECTION MARK #S2862-61	TW	PRD	
9	2-22-?	ADDED 6" SERVICE WATER DETAIL #S2862-61	T.W.	PRD	
4	5-6-?	ISSUED FOR CONSTRUCTION #5-2862-6?			
3		REVISED VELOCITY BREAKER	S.N.		
2		ISSUED FOR GRADING OF ... ONLY	E.K.	W.K.D.	
1		ISSUED ... SURVEY ONLY	E.K.		
0		ISSUED FOR BIDS ON ... #5-2862-61	L.T.	E.K.	
	date	REVISION	by	ck.	appr.

8		ADDED ... STRUCTURE, & REVISED CONTOURS	
8		ADDED DISCHARGE STRUCTURE DETAIL	
8		REMOVED WEST ... & ADDED NEW ... DIKE	
7		ADDED DRAWDOWN & DISCHARGE STRUCTURE	
6		ADDED DRAWDOWN STRUCTURE	
5	3/4/73	REVISED DISCHARE CANAL	S.N.

drawn by TIBPAK
dept. ck.
dept. appr. J.R. MORRIS
coord. ck.
p.m. appr.
B&R appr.

BURNS AND ROE, INC.
ENGINEERS AND CONSTRUCTORS
ORADELL, N.J. HEMPSTEAD, N.Y. LOS ANGELES, CALIF.

LOCKWOOD GREENE
ARCHITECTS · ENGINEERS
SPARTANBURG, S.C.
NEW YORK

sheet title: SITE PLAN COOLING POND SHEET Nº 2

job name: SOUTH CAROLINA PUBLIC SERVICE AUTHORITY
GEORGETOWN GENERATING STATION
GEORGETOWN SOUTH CAROLINA

scale 1"=300'
date 12-7-72
L-G JOB NO. 71032
B&R W.O. NO. 2866-02
DWG. NO. CV-505
rev. no. 12

Cooling Pond
Site Plans (In Part)

Appendix A - Doc 1.4 Ash Pond B Dike Elevation Report

Project No. 93-1356
December 1993

Paul C. Rizzo Associates, Inc.
CONSULTANTS

Report

Ash Pond B Dike Elevation

Winyah Generating Station

South Carolina Public Service Authority (Santee Cooper)
Moncks Corner, South Carolina

TABLE OF CONTENTS

LIST OF FIGURES

ASH POND B
DIKE ELEVATION
WINYAH GENERATING STATION

1.0 INTRODUCTION

Paul C. Rizzo Associates was initially retained by South Carolina Public Service Authority (Santee Cooper) to evaluate the feasibility of raising the Ash Pond B earth embankment at the Winyah Generating Station in order to increase storage capacity. Tim Onstott and Jeff Holchin of our firm met Ms. Joan Cahill and Mr. Henry Stevens of Santee Cooper at the site on August 30, 1993. A reconnaissance of the site and a nearby potential soil borrow source was performed. Photographs of the site and associated facilities were taken. A plan drawing of the site and an aerial photograph were obtained from Santee Cooper.

After careful evaluation of the field observations and the requirements of Santee Cooper for storage of fly ash, it was concluded that elevation of the earth embankment at Ash Pond B to increase storage capacity of the pond is feasible.

Subsequently, Paul C. Rizzo Associates was retained by Santee Cooper to perform a geotechnical investigation of the site and to provide plans and specifications for raising the embankment.

This report provides a description of the geotechnical investigation and the results obtained, and it also provides plans and specifications for the raising of the Ash Pond B impounding dike.

2.0 GEOTECHNICAL INVESTIGATION

Six borings were drilled at the site on October 21 and 22, 1993. The borings were drilled from the crest of the Ash Pond B dike (Figure 1) to an approximate depth of 30 feet. The borings were drilled with hollow-stem augers, and Standard Penetration Test (SPT) samples were obtained at five-foot intervals. Logs for each of the borings drilled are provided in Appendix A to this report. A plan view of the boring locations is provided on Figure 1.

Both the embankment and foundation soils were found to be competent. The embankment soils are generally clayey or silty fine sand with SPT blow counts generally exceeding 30 except near the surface. The foundation soil is a silty fine sand with SPT blow counts generally averaging 10 or higher.

No piezometers were installed at the site, but water levels observed in the boreholes during the drilling indicate that the phreatic surface is well below the impoundment water level. Approximate phreatic surfaces based on the field observations are shown on the embankment cross sections presented on Figures 2 through 7. The cross sections also show the stratigraphy, as determined from the borings, the variation of SPT blow count with depth, the geometry of the embankment, and the levels of upstream and downstream water. Note that the water levels shown are those when the cross sections were surveyed and will vary somewhat.

The cross section geometry and top of boring elevation at each boring location was determined from survey data provided by Santee Cooper personnel. Because there was no stationing system for the Ash Pond B embankment, a temporary system was established by Paul C. Rizzo Associates (Figure 1) to aid in locating in the field the cross sections shown on Figures 2 through 7 and to facilitate field construction activities.

As part of the field investigation, samples of potential borrow soil were obtained with a tractor-mounted backhoe from the nearby property of Mr. Orrin Harrelson. Samples for laboratory testing were obtained from two locations.

3.0 LABORATORY TESTING

Two samples of potential borrow soil were obtained from property near the Winyah Generating Station owned by Mr. Orrin Harrelson. The samples were taken to a geotechnical testing laboratory where the following tests were run:

- Grain-size
- Atterberg limits
- Standard Proctor Compaction

The grain-size analyses indicated that the soil samples are very uniform fine sands with fines contents (portion passing the No. 200 sieve) of nearly 20 percent. Based on the Unified Soil Classification System, the soil samples can be classified as clayey sands, which are very suitable for constructing the addition to the embankment.

Standard Proctor Compaction tests were performed in order to establish the compaction characteristics of the two soil samples. The optimum moisture content for compaction averaged 17 percent and the average maximum dry density of the samples was 109 pcf. Results of the laboratory testing are provided in Appendix B.

4.0 DESIGN OF DIKE ELEVATION

The perimeter dike of Ash Pond B will be raised by approximately seven feet to increase the storage capacity. The portion of the dike between Ash Pond A and Ash Pond B is already at an adequate elevation. The existing pond discharge structure for Ash Pond B will also be raised by about seven feet.

The existing dike for Ash Pond B consists of a competent fine sand with silt or clay fines. Grass is the primary vegetation, with some marsh vegetation present at the toe of the upstream slope and small shrubs and on the downstream slope along with marsh vegetation at the toe. The existing crest width ranges from approximately 12 to 17 feet, and side slopes range between approximately 2 horizontal to 1 vertical (2:1) and 4 horizontal to 1 vertical (4:1), as shown on Figures 2 through 7. Some riprap protection is present on the lower portion of the upstream face of the existing dike.

The dike elevation is shown on the cross sections presented on Figures 2 through 7. The top of the existing dike will be raised to Elevation 41.0 feet (NGVD). The embankment slopes for the reconstructed dike will be 2 horizontal to 1 vertical (2:1). The design width of the crest is 12 feet. This is approximately the minimum width of the existing dike, and will not restrict vehicle or equipment travel. Note that the centerline of the reconstructed dike will be shifted outward from that of the existing dike. A longitudinal profile of the dike elevation is presented on Figure 8.

The existing dike surface will be cleared of vegetation, and any top soil will be removed and stored for later use. The existing side slopes will be notched so that the imported backfill can be tied into the existing surface, as shown on the cross sections presented on Figures 2 through 7. In some cases, the toe of the downstream slope of the reconstructed dike will extend into the existing waterway for a short distance. In areas where this occurs, soft soil or muck will be removed and riprap will be placed to provide a dry, solid base upon which to construct the new dike. Geotextile will be placed between the riprap and the embankment soil to minimize movement of embankment soil particles into the riprap. Riprap will also be placed, as needed, on the upstream slope of the reconstructed dike to minimize the potential for erosion. The completed dike will be seeded. Complete specifications for the embankment reconstruction are provided in Appendix D.

The existing pond discharge structure is shown on Figures 9 and 10. This structure is essentially a concrete drop-inlet box in which the water drops down a shaft and out a lateral discharge pipe under the dike and into the discharge canal. The ash pond level is controlled by a metal overflow gate which slides in angle-iron gate tracks. To accommodate the new pond level, the existing structure will simply be raised by approximately seven feet, as shown on Figure 11. Reinforced concrete will be placed as shown, and the overflow gate can be extended to the elevation desired by Santee Cooper. The existing walkway, railing, grating, and gate hoist will be reattached to the rebuilt structure.

A calculation of the estimated volume of borrow soil required for the dike reconstruction is provided in Appendix C. Two calculation methods were employed and survey data provided by Santee Cooper were utilized. The average volume of borrow soil required is approximately 80,000 cubic yards based on this analysis.

Complete construction specifications are provided in Appendix D. The construction specifications are basically those used by Santee Cooper for previous projects with some minor modifications or additions to meet the requirements of this project. The changes to the specifications are provided in an addendum at the beginning of Appendix D.

5.0 SUMMARY

Paul C. Rizzo Associates has been retained by Santee Cooper to investigate the feasibility of raising the elevation of the impounding dike at Ash Pond B at the Winyah Generating Station and to provide plans and specifications for the work.

It has been determined that elevation of the dike is feasible, as indicated to Santee Cooper in our letter report of September 7, 1993

As part of the present investigation, six borings were drilled from the crest of the existing embankment to an approximate depth of 30 feet. The borings indicate that the existing embankment is well compacted. The underlying foundation soils are also in generally good condition.

Cross sections of the reconstructed dike have been provided at each of the six locations where drilling was performed. A longitudinal profile of the reconstruction has also been provided. Design drawings are also provided for modification of the outlet structure. Specifications for the work are presented in Appendix D to this report.

Respectfully submitted,
Paul C. Rizzo Associates

Jeffrey D. Holchin

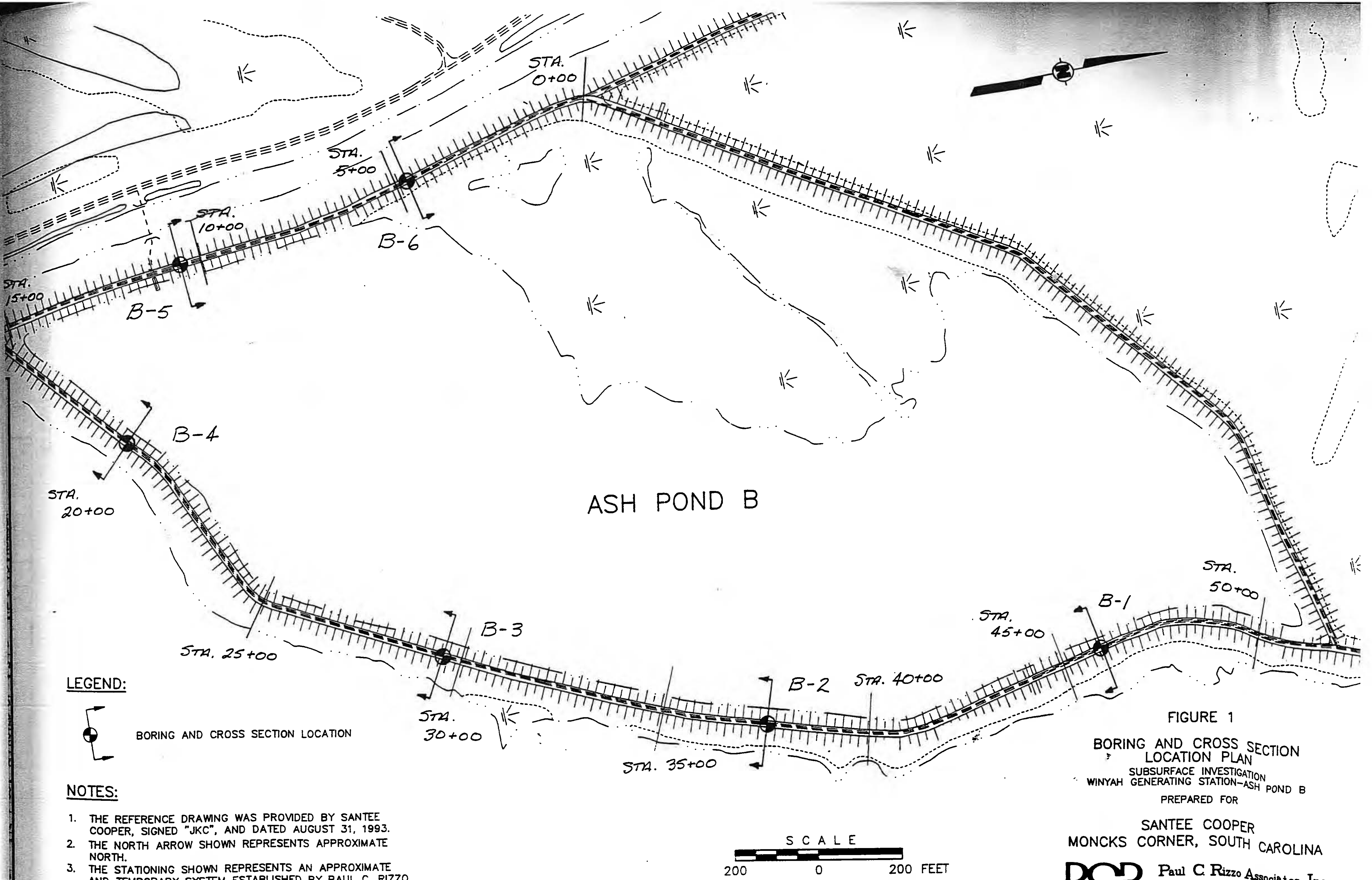
Jeffrey D. Holchin, P.E.
Project Engineer

Tim Onstott

J. Timothy Onstott
Project Manager

JDH/JTO/rcr

FIGURES



LEGEND:

⊕ BORING AND CROSS SECTION LOCATION

NOTES:

1. THE REFERENCE DRAWING WAS PROVIDED BY SANTEE COOPER, SIGNED "JKC", AND DATED AUGUST 31, 1993.
2. THE NORTH ARROW SHOWN REPRESENTS APPROXIMATE NORTH.
3. THE STATIONING SHOWN REPRESENTS AN APPROXIMATE AND TEMPORARY SYSTEM ESTABLISHED BY PAUL C. RIZZO ASSOCIATES FOR CONSTRUCTION PURPOSES ONLY.

FIGURE 1

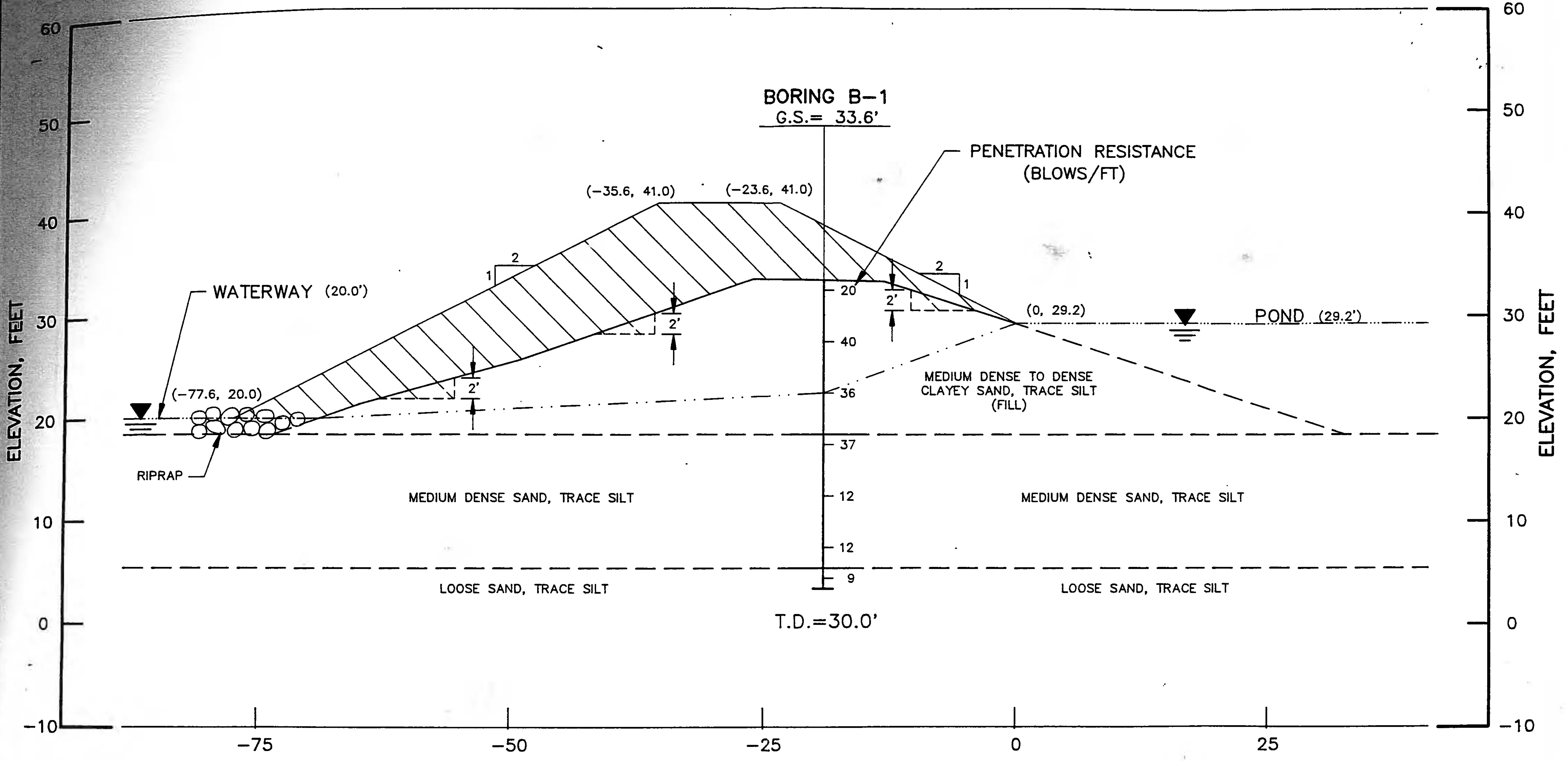
BORING AND CROSS SECTION
LOCATION PLAN
SUBSURFACE INVESTIGATION
WINYAH GENERATING STATION–ASH POND B

PREPARED FOR

SANTEE COOPER
MONCKS CORNER, SOUTH CAROLINA

Paul C. Rizzo Associates, Inc.
CONSULTANTS

PLOT 1:10
DRAWN BY T.Meskel 12-7-93
CHECKED BY J.D.H. 12-7-93
APPROVED BY JJO 12-8-93
CAD FILE NUMBER 93-1356-B1



NOTES:

1. ALL ELEVATIONS ARE FROM NGVD.
2. SOME RIPRAP MAY BE REQUIRED TO PROVIDE A SOLID BASE IF THE DOWNSTREAM TOE OF THE DIKE ADDITION EXTENDS INTO THE WATERWAY.
3. NOTCH THE EXISTING DIKE SLOPES AS SHOWN TO TIE IN ADDITIONAL DIKE SOIL.

SCALE
10 0 10 FEET

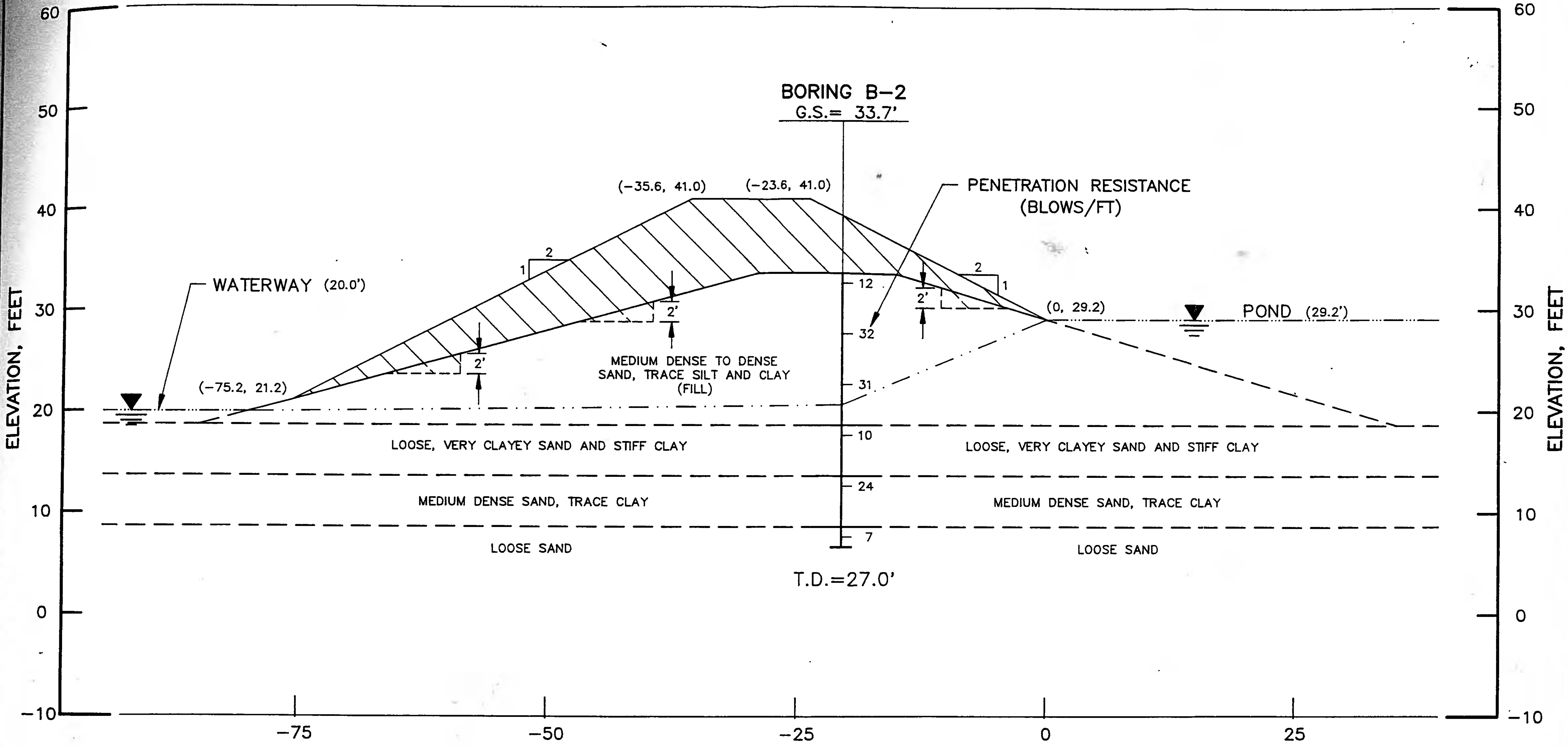
FIGURE 2

CROSS SECTION B-1
SUBSURFACE INVESTIGATION
WINYAH GENERATING STATION-ASH POND B

PREPARED FOR

SANTEE COOPER
MONCKS CORNER, SOUTH CAROLINA

Paul C Rizzo Associates, Inc.
CONSULTANTS



NOTES:

1. ALL ELEVATIONS ARE FROM NGVD.
2. SOME RIPRAP MAY BE REQUIRED TO PROVIDE A SOLID BASE IF THE DOWNSTREAM TOE OF THE DIKE ADDITION EXTENDS INTO THE WATERWAY.
3. NOTCH THE EXISTING DIKE SLOPES AS SHOWN TO TIE IN ADDITIONAL DIKE SOIL.

SCALE
10 0 10 FEET

FIGURE 3

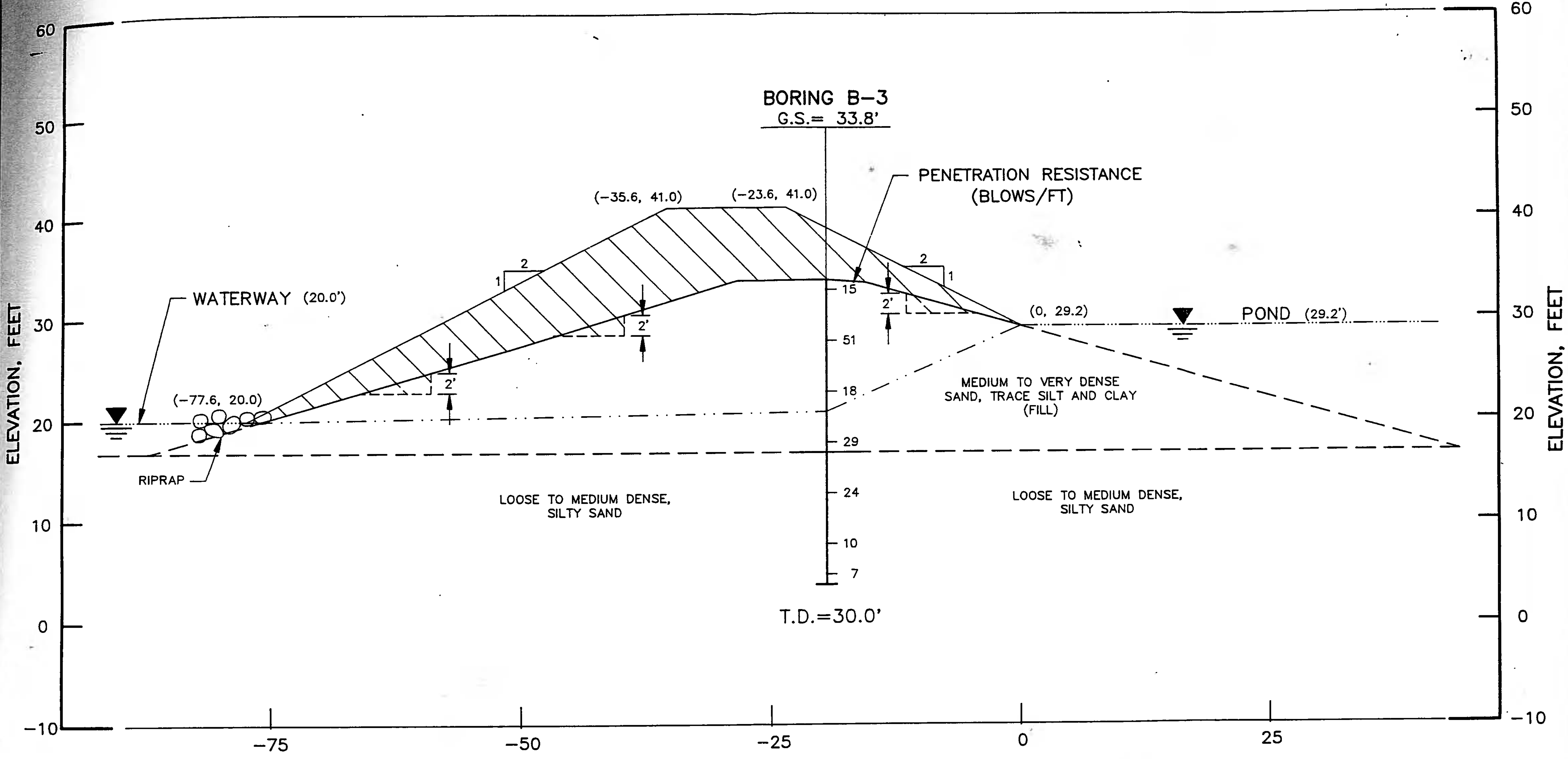
CROSS SECTION B-2
SUBSURFACE INVESTIGATION
WINYAH GENERATING STATION-ASH POND B
PREPARED FOR

SANTEE COOPER
MONCKS CORNER, SOUTH CAROLINA

Paul C. Rizzo Associates, Inc.
CONSULTANTS

1:10
DRAWN BY 12-7-93
CHECKED BY
APPROVED BY 12-8-93
CAD FILE NUMBER 93-1356-B2

PLOT 1:10	DRAWN BY	T.Meskel 12-7-93	CHECKED BY APPROVED BY	J.D.H. 12-7-93 JTO 12-8-93	CAD FILE NUMBER 93-1356-B3



NOTES:

1. ALL ELEVATIONS ARE FROM NGVD.
2. SOME RIPRAP MAY BE REQUIRED TO PROVIDE A SOLID BASE IF THE DOWNSTREAM TOE OF THE DIKE ADDITION EXTENDS INTO THE WATERWAY.
3. NOTCH THE EXISTING DIKE SLOPES AS SHOWN TO TIE IN ADDITIONAL DIKE SOIL.

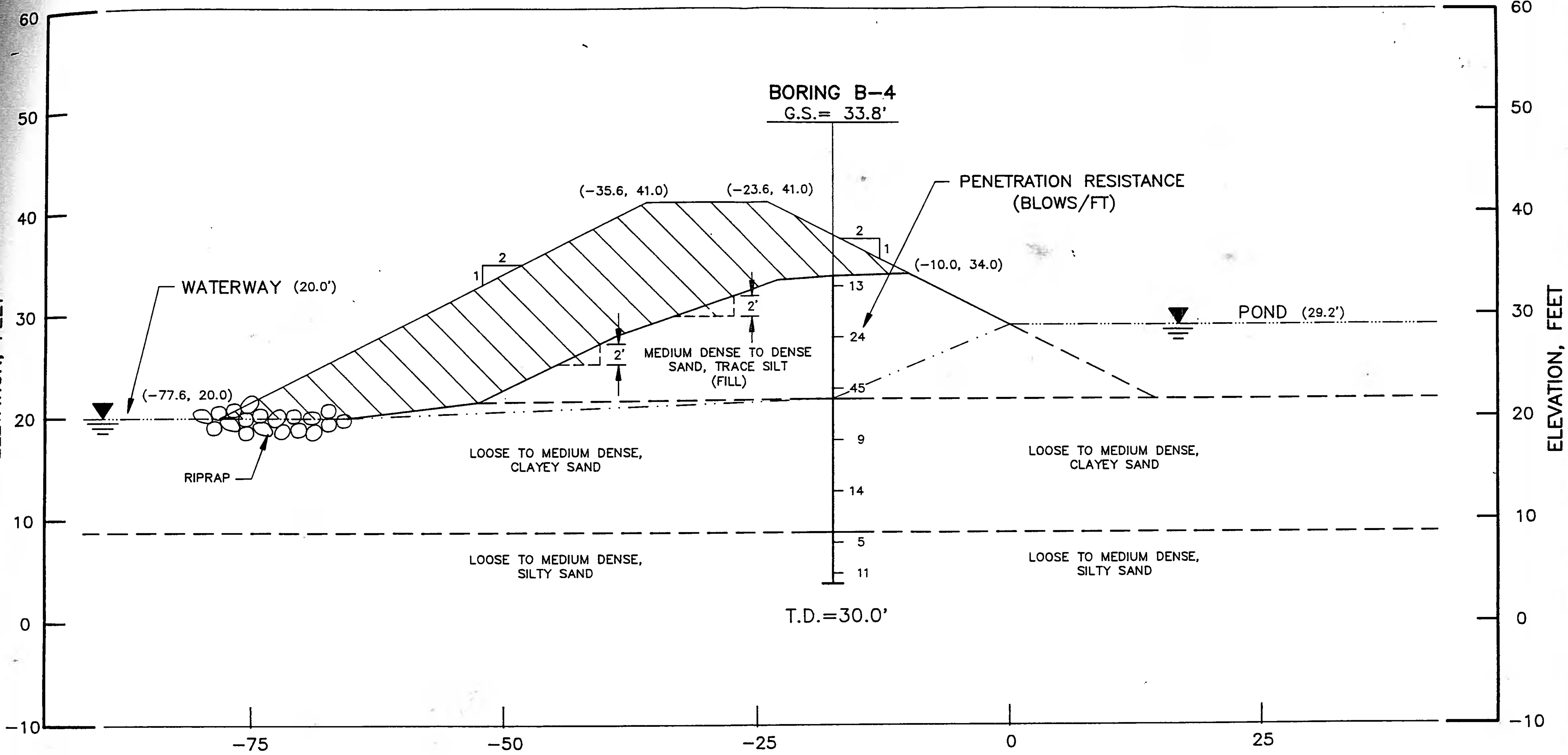
SCALE
10 0 10 FEET

FIGURE 4

CROSS SECTION B-3
SUBSURFACE INVESTIGATION
WINYAH GENERATING STATION-ASH POND B
PREPARED FOR

SANTEE COOPER
MONCKS CORNER, SOUTH CAROLINA

Paul C. Rizzo Associates, Inc.
CONSULTANTS



NOTES:

1. ALL ELEVATIONS ARE FROM NGVD.
2. SOME RIPRAP MAY BE REQUIRED TO PROVIDE A SOLID BASE IF THE DOWNSTREAM TOE OF THE DIKE ADDITION EXTENDS INTO THE WATERWAY.
3. NOTCH THE EXISTING DIKE SLOPES AS SHOWN TO TIE IN ADDITIONAL DIKE SOIL.

SCALE
10 0 10 FEET

FIGURE 5

CROSS SECTION B–4
SUBSURFACE INVESTIGATION
WINYAH GENERATING STATION–ASH POND B

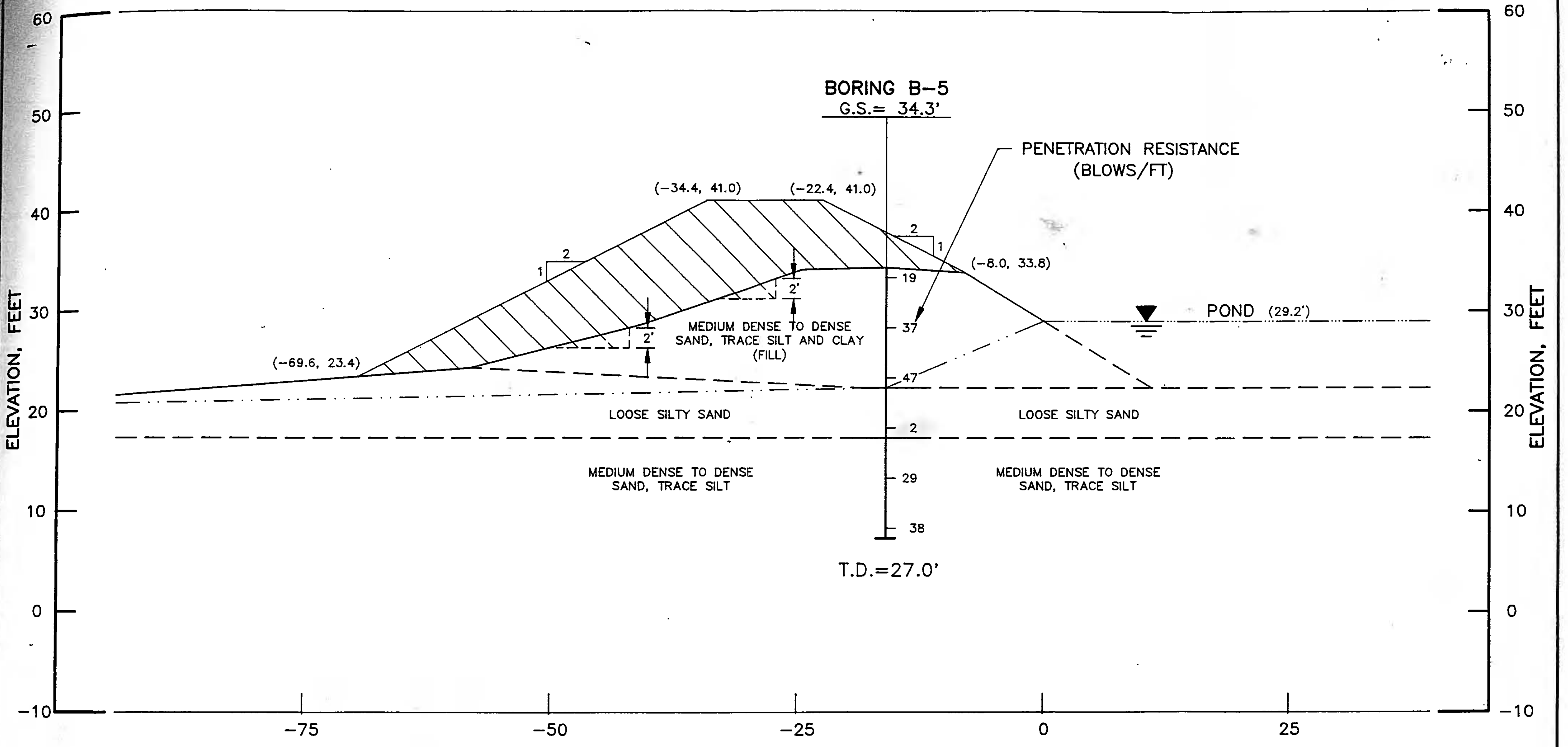
PREPARED FOR

SANTEE COOPER
MONCKS CORNER, SOUTH CAROLINA

Paul C. Rizzo Associates, Inc.
CONSULTANTS

DRAWN BY	T.Meskel	12-7-93
CHECKED BY	J.D.H.	12-7-93
APPROVED BY	J.T.D	12-8-93
CAD FILE NUMBER	93-1356-B4	
PLOT	1:10	

PLOT	DRAWN BY	T.Meskel	CHECKED BY	J.D.H.	12-7-93	CAD FILE NUMBER
1:10		12-7-93	APPROVED BY	JTO	12-8-93	93-1356-B5



NOTES:

1. ALL ELEVATIONS ARE FROM NGVD.
2. SOME RIPRAP MAY BE REQUIRED TO PROVIDE A SOLID BASE IF THE DOWNSTREAM TOE OF THE DIKE ADDITION EXTENDS INTO THE WATERWAY.
3. NOTCH THE EXISTING DIKE SLOPES AS SHOWN TO TIE IN ADDITIONAL DIKE SOIL.

SCALE

10 0 10 FEET

FIGURE 6

CROSS SECTION B-5

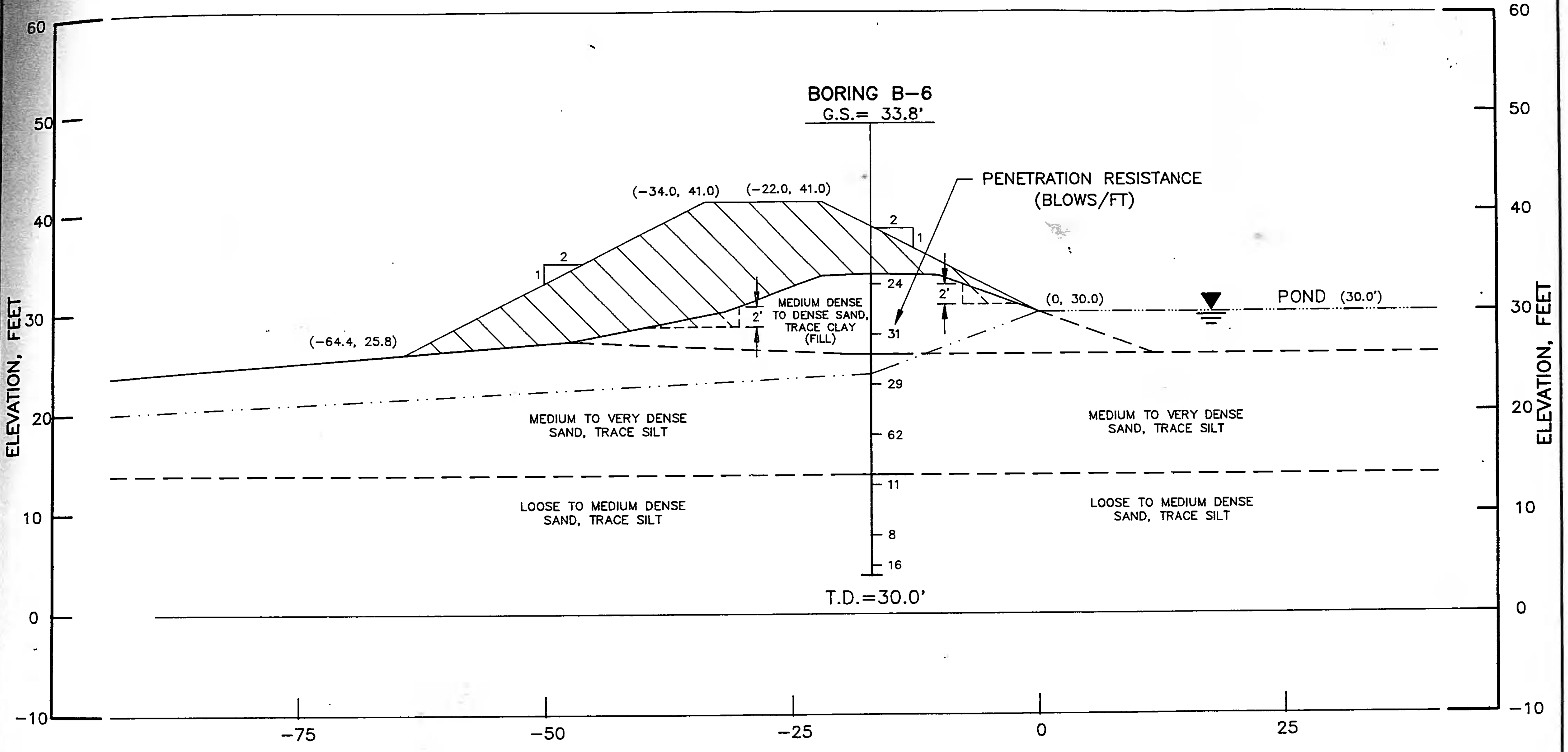
SUBSURFACE INVESTIGATION
WINYAH GENERATING STATION-ASH POND B

PREPARED FOR

SANTEE COOPER
MONCKS CORNER, SOUTH CAROLINA

Paul C. Rizzo Associates, Inc.
CONSULTANTS

PLOT 1:10
DRAWN BY T.Meskel 12-7-93
CHECKED BY J.D.H. 12-7-93
APPROVED BY JTO 12-8-93
CAD FILE NUMBER 93-1356-B6



NOTES:

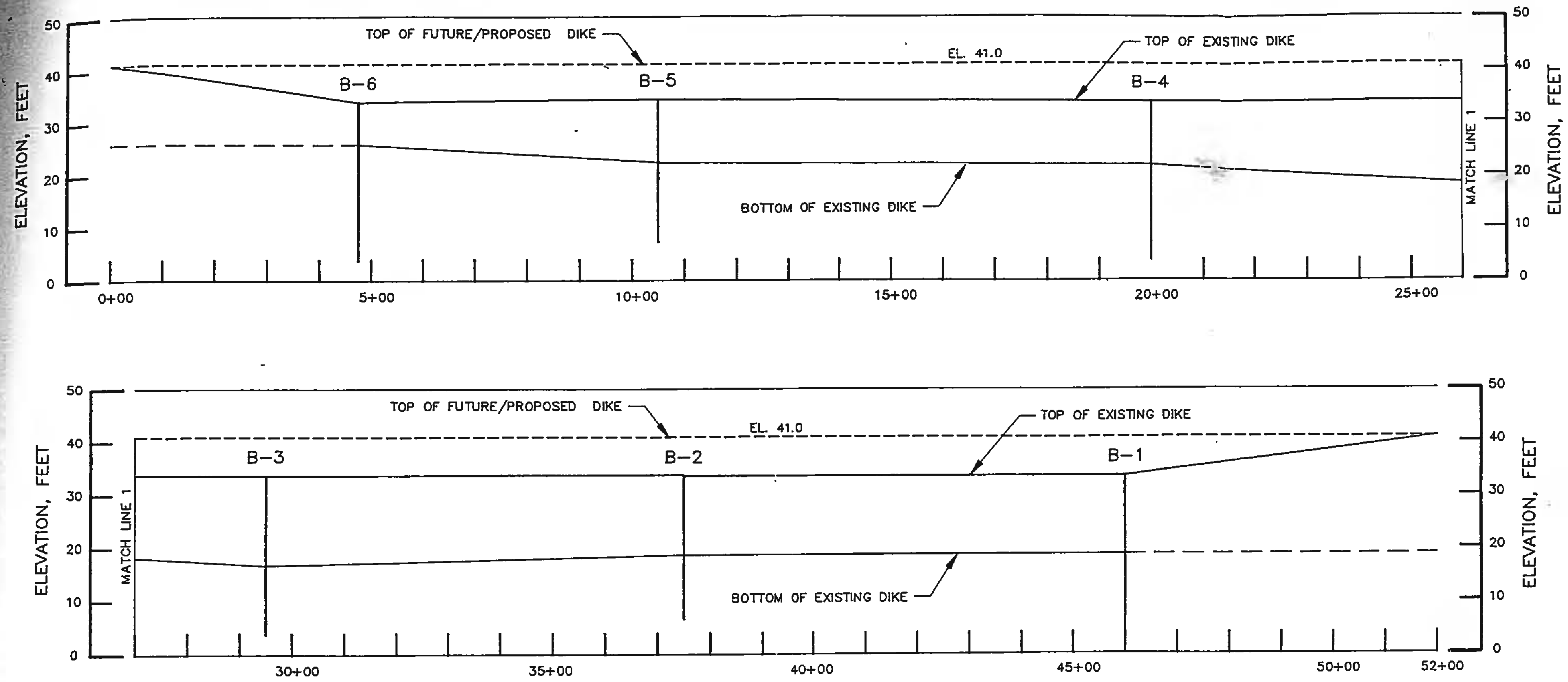
1. ALL ELEVATIONS ARE FROM NGVD.
2. SOME RIPRAP MAY BE REQUIRED TO PROVIDE A SOLID BASE IF THE DOWNSTREAM TOE OF THE DIKE ADDITION EXTENDS INTO THE WATERWAY.
3. NOTCH THE EXISTING DIKE SLOPES AS SHOWN TO TIE IN ADDITIONAL DIKE SOIL.

FIGURE 7

CROSS SECTION B-6
SUBSURFACE INVESTIGATION
WINYAH GENERATING STATION-ASH POND B
PREPARED FOR

SANTEE COOPER
MONCKS CORNER, SOUTH CAROLINA

Paul C. Rizzo Associates, Inc.
CONSULTANTS



PLOT 1:10
DRAWN BY T.Meskel 12-6-93
CHECKED BY [illegible] 12-8-93
APPROVED BY J.T.O. 12-8-93
CAD FILE NUMBER 93-1388-B10

NOTES:

1. ALL ELEVATIONS ARE FROM NGVD.
2. TIE TOP OF FUTURE DIKE INTO EXISTING GROUND SURFACE AT ENDS OF DIKE.

10X VERTICAL EXAGGERATION

HORIZONTAL SCALE
SCALE
200 0 200 FEET

VERTICAL SCALE
SCALE
20 0 20 FEET

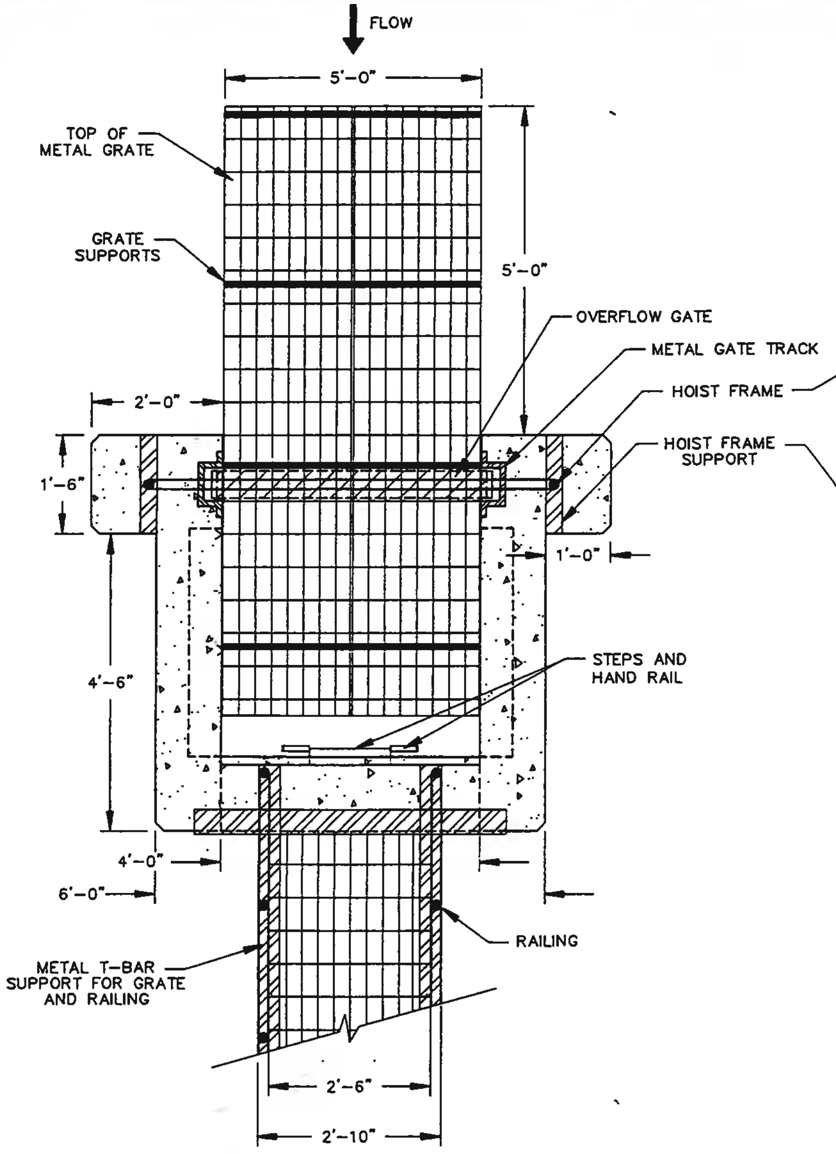
FIGURE 8

LONGITUDINAL PROFILE
OF DIKE RECONSTRUCTION
SUBSURFACE INVESTIGATION
WINYAH GENERATING STATION-ASH POND B
PREPARED FOR

SANTEE COOPER
MONCKS CORNER, SOUTH CAROLINA

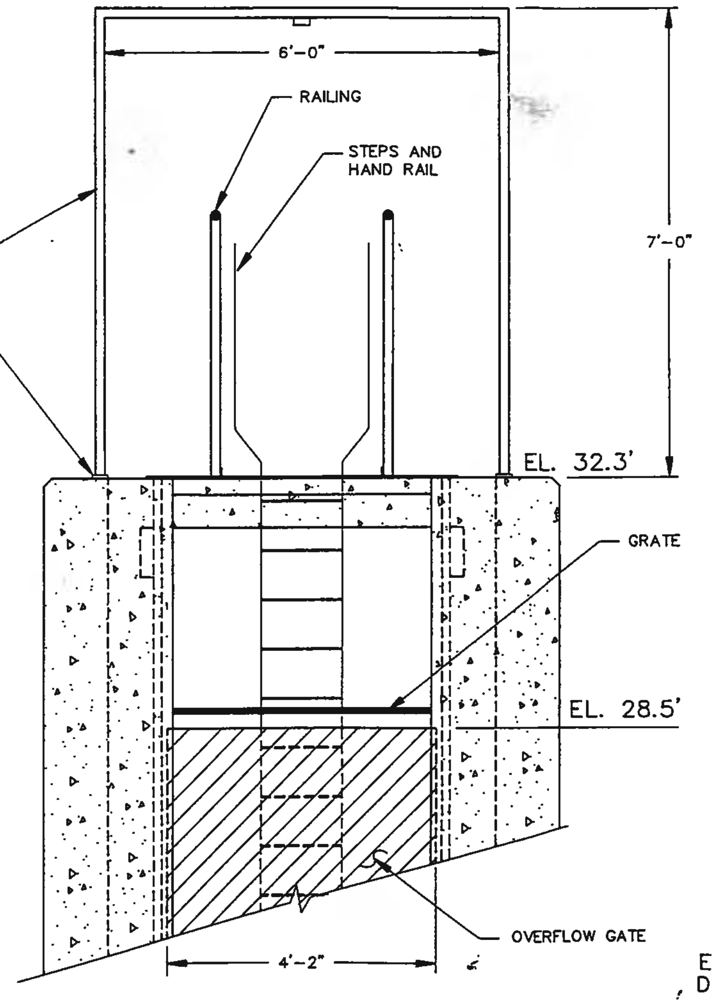
Paul C. Rizzo Associates, Inc.
CONSULTANTS

PLOT 1:1
DRAWN BY T.Meskel 12-7-93
CHECKED BY J.D.H. 12-7-93
APPROVED BY JJO 12-8-93
CAD FILE NUMBER 93-1356-B7



PLAN VIEW

SCALE: 1" = 2'



ELEVATION

SCALE: 1" = 2'

NOTE:

1. ALL ELEVATIONS ARE FROM NGVD.

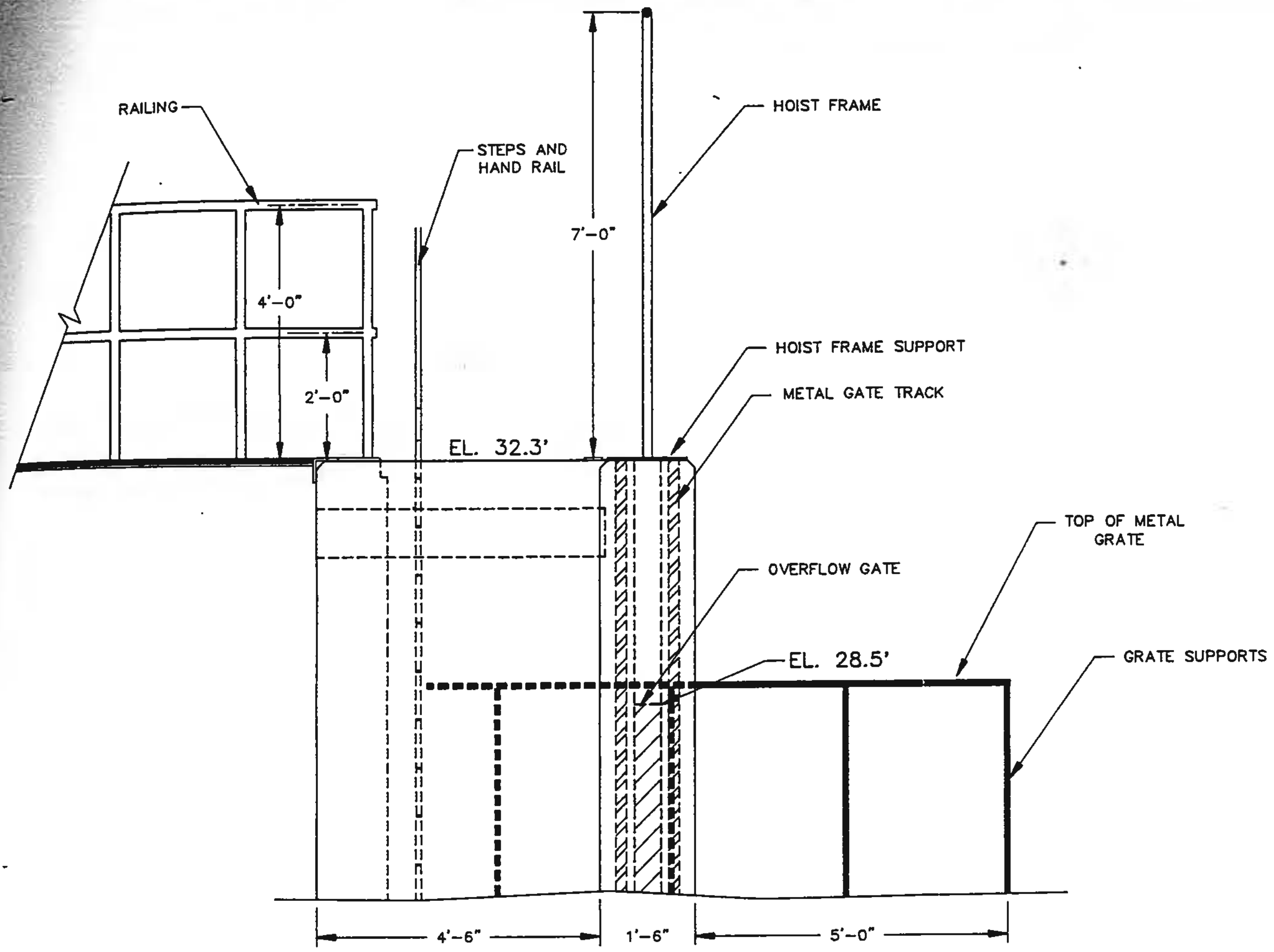
FIGURE 9

EXISTING ASH POND B
DISCHARGE STRUCTURE
SHEET 1 OF 2
SUBSURFACE INVESTIGATION
WINYAH GENERATING STATION–ASH POND B
PREPARED FOR

SANTEE COOPER
MONCKS CORNER, SOUTH CAROLINA

Paul C. Rizzo Associates, Inc.
CONSULTANTS

PLOT	DRAWN BY	CHECKED BY	APPROVED BY	CAD FILE NUMBER
1:1	T.Mdakel 12-6-93	D.DNH 12-7-93	JTP 12-9-93	93-1358-B8



SIDE VIEW

1" = 2'

NOTE:

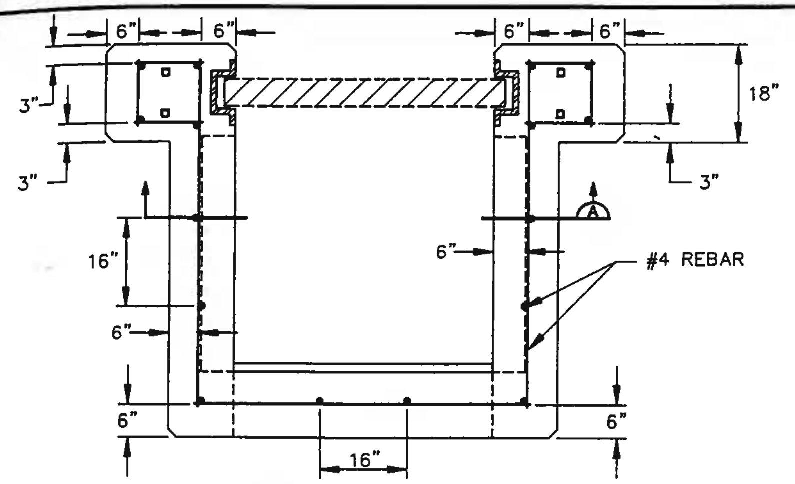
1. ALL ELEVATIONS ARE FROM NGVD.

FIGURE 10

EXISTING ASH POND B
DISCHARGE STRUCTURE
SHEET 2 OF 2
SUBSURFACE INVESTIGATION
WINYAH GENERATING STATION–ASH POND B
PREPARED FOR

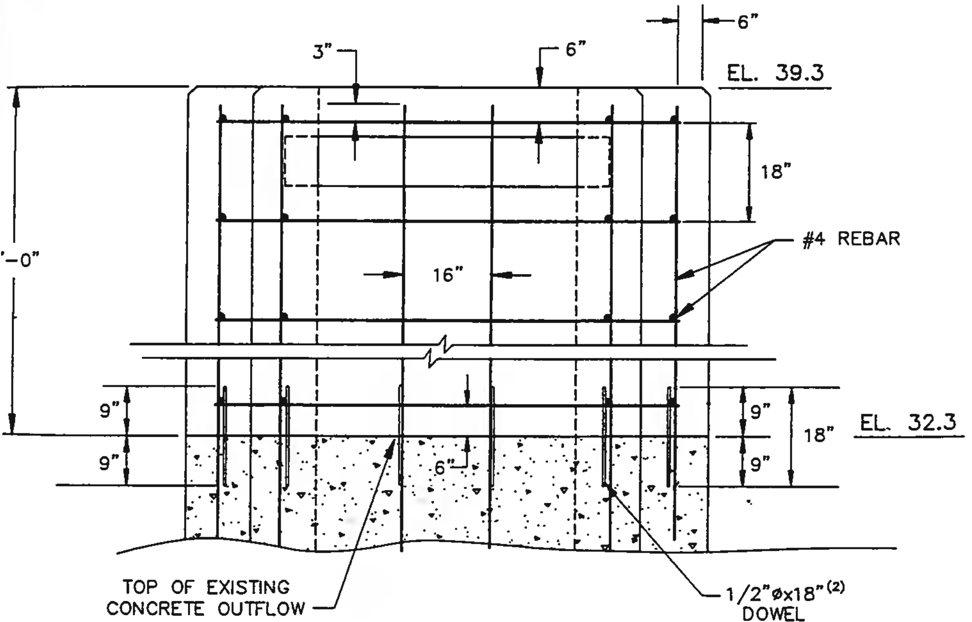
SANTEE COOPER
MONCKS CORNER, SOUTH CAROLINA

PCR Paul C. Rizzo Associates, Inc.
CONSULTANTS



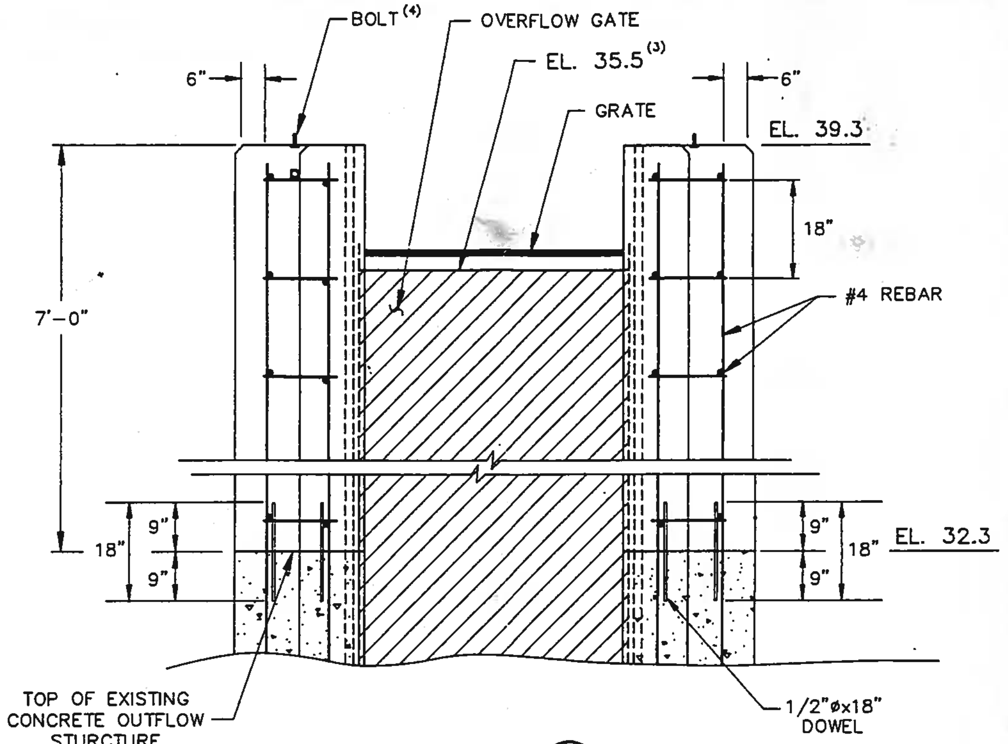
PLAN VIEW

SCALE: 1" = 2'



END VIEW

SCALE: 1" = 2'



SECTION (A)

SCALE: 1" = 2'

NOTES:

1. ALL ELEVATIONS ARE FROM NGVD.
2. OPENINGS IN THE TOP OF THE EXISTING CONCRETE CAN BE USED FOR PLACING THE DOWEL BARS.
3. THE ELEVATION OF THE OVERFLOW GATE IS TO BE DETERMINED BY SANTEE COOPER.
4. BOLTS ARE FOR ATTACHMENT OF HOIST FRAME.
5. THE MODIFIED ASH POND DISCHARGE STRUCTURE SHOULD BE BUILT TO THE SPECIFIED ELEVATION, AND MATCH THE EXISTING STRUCTURE IN CONFIGURATION, OPENINGS, AND ATTACHMENTS, SUCH AS RAILING, GRATING AND HOIST FRAME.

FIGURE 11

EXTENSION OF EXISTING ASH
POND B DISCHARGE STURCTURE
SUBSURFACE INVESTIGATION
WINYAH GENERATING STATION–ASH POND B
PREPARED FOR
SANTEE COOPER
MONCKS CORNER, SOUTH CAROLINA

Paul C. Rizzo Associates, Inc.
CONSULTANTS

PLOT 1:2
DRAWN BY T.Meskel 12-7-93
CHECKED BY JDH 12-7-93
APPROVED BY JTO 12-16-93
CAD FILE NUMBER 93-1358-B9

APPENDIX A

BORING LOGS

GUIDE FOR SOIL DESCRIPTIONS:

1. SOIL DENSITY/CONSISTENCY.
2. COLOR (INCL. DARK, LIGHT, MED.).
3. SECONDARY SOIL TYPE (SILTY, ETC.) 30–40% BY WEIGHT.
4. PRIMARY SOIL TYPE (CLAY, ETC.).
5. DESCRIPTIVE TERMS, SUCH AS:
   - SOME (12–30% BY WEIGHT)
   - TRACE (5–12% BY WEIGHT)
   - LENS (≤ 1" IN THICKNESS)
   - LAYER (> 1" IN THICKNESS)
   - INTERBEDDED
   - SLICKENSIDED
   - POCKETS, ETC.
6. MOISTURE (DRY, MOIST, OR WET COMPARED TO OPTIMUM M/C).

MEASURED CONSISTENCY

MEASURED CONSISTENCY= UNCONFINED COMPRESSIVE STRENGTH FROM POCKET PENETROMETER TEST; RESULTS OF TORVANE TESTS ARE IDENTIFIED AS SUCH ON THE LOGS.

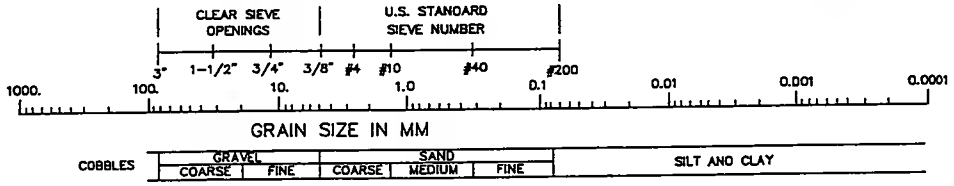
DENSITY OF GRANULAR SOILS

DENSITY	STANDARD PENETRATION RESISTANCE(1)
VERY LOOSE	0–4
LOOSE	5–10
MEDIUM DENSE	11–30
DENSE	31–50
VERY DENSE	OVER 50

(1) STANDARD PENETRATION RESISTANCE IS THE NUMBER OF BLOWS REQUIRED TO DRIVE A 2–INCH O.D. SPLIT BARREL SAMPLER 12 INCHES USING A 140–POUND HAMMER FALLING FREELY THROUGH 30 INCHES. THE SAMPLER IS DRIVEN 18 OR 24 INCHES AND THE NUMBER OF BLOWS RECORDED FOR EACH 6–INCH INTERVAL. THE SUMMATION OF THE SECOND AND THIRD INTERVALS IS THE STANDARD PENETRATION RESISTANCE.

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (TONS PER SQUARE FOOT)	FIELD IDENTIFICATION
VERY SOFT	LESS THAN 0.25	EASILY PENETRATED SEVERAL INCHES WITH FIST
SOFT	0.25 TO 0.50	EASILY PENETRATED SEVERAL INCHES WITH THUMB
MEDIUM STIFF	0.50 TO 1.0	PENETRATED SEVERAL INCHES WITH THUMB UNDER MODERATE PRESSURE
STIFF	1.0 TO 2.0	READILY IDENTED WITH THUMB, BUT PENETRATED WITH GREAT EFFORT
VERY STIFF	2.0 TO 4.0	READILY IDENTED WITH THUMBNAIL
HARD	MORE THAN 4.0	INDENTED WITH DIFFICULTY WITH THUMBNAIL



COARSE–GRAINED SOILS

CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL–GRADED GRAVELS, GRAVEL–SAND MIXTURES, LITTLE OR NO FINES
	GP	POORLY–GRADED GRAVELS, GRAVEL–SAND MIXTURES, LITTLE OR NO FINES
GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL–SAND–SILT MIXTURE
	GC	CLAYEY GRAVELS
CLEAN SANDS (LITTLE OR NO FINES)	SW	WELL–GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	SP	POORLY–GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND–CLAY MIXTURES
	SC	CLAYEY SANDS, SAND–CLAY MIXTURES

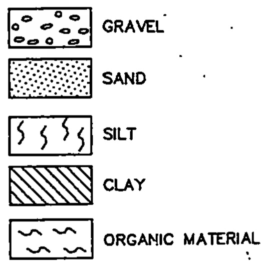
FINE–GRAINED/HIGHLY ORGANIC SOILS

SILTS AND CLAYS (LIQUID LIMIT LESS THAN 50)	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASICITY
SILTS AND CLAYS (LIQUID LIMIT GREATER THAN 50)	MH	INORGANIC SILTS, MICACEOUS DIATOMACEOUS FINE SANDY OR SILTY SOILS
	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS	PT	PEAT, HUMUS, SWAMP SOILS WITH ORGANIC CONTENTS

FOR USCS (UNIFIED SOIL CLASSIFICATION SYSTEM) CLASSIFICATIONS ON BORING LOGS, UPPER CASE LETTERS INDICATE LAB TEST CLASSIFICATION, LOWER CASE LETTERS INDICATE VISUAL FIELD CLASSIFICATION.

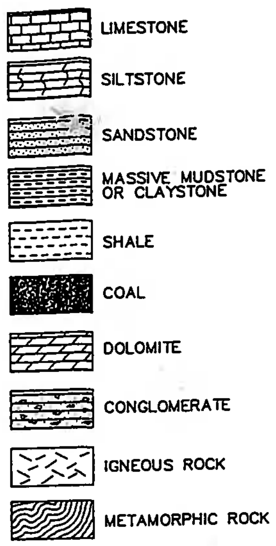
SYMBOLS TO BE USED FOR DESIGNATION OF SUBSURFACE MATERIALS ON ALL BORING LOGS AND SUBSURFACE SECTIONS

SOILS

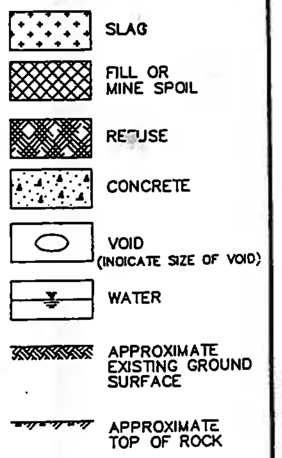


GRAIN SIZE DESIGNATIONS FOR BOTH GRANULAR SOILS AND GRANULAR ROCKS FOLLOW USCS NOMENCLATURE

ROCKS



MISCELLANEOUS

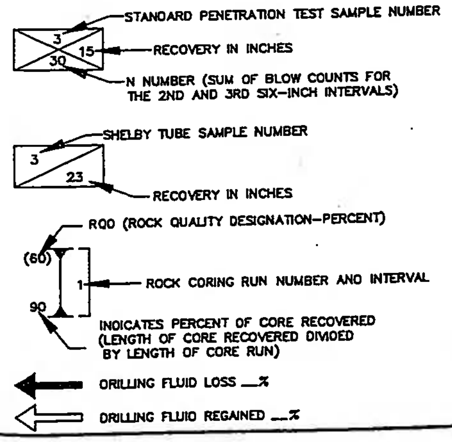


THE SPACING OF THE DISCONTINUITIES IN THE ROCK MAY BE DESCRIBED BY ONE OF THE FOLLOWING TERMS

DESCRIPTIVE TERMS	SPACING
VERY BROKEN	LESS THAN 1 IN.
BROKEN	1 IN. TO 3 IN.
SLIGHTLY BROKEN	3 IN. TO 6 IN.
UNBROKEN	6 IN. AND GREATER

TERMS USED TO DESCRIBE THE RELATIVE DEGREES OF ROCK CORE HARDNESS

DESCRIPTIVE TERMS	DEFINING CHARACTERISTICS
VERY SOFT	CRUSHES UNDER PRESSURE OF FINGERS AND/OR THUMB
SOFT	CRUSHES UNDER PRESSURE OF PRESSED HAMMER
MEDIUM HARD	BREAKS EASILY UNDER SINGLE HAMMER BLOW BUT WITH CRUMBLY EDGES
HARD	BREAKS UNDER ONE OR TWO STRONG HAMMER BLOWS BUT WITH RESISTANT SHARP EDGES
VERY HARD	BREAKS UNDER SEVERAL STRONG HAMMER BLOWS BUT WITH VERY RESISTANT SHARP EDGES AND MAY SPALL LEAVING CONCHOIDAL FRACTURES



NOTES

1. THE BORING LOGS AND RELATED INFORMATION DEPICT SUBSURFACE CONDITIONS ONLY AT THE SPECIFIC LOCATIONS AND DATES INDICATED. SOIL AND ROCK CONDITIONS AT OTHER LOCATIONS MAY DIFFER FROM CONDITIONS OCCURRING AT THESE BORING LOCATIONS.
2. THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDRY LINES BETWEEN SOIL TYPES. IN SITU, THE TRANSITION MAY BE GRADUAL.

GENERAL NOTES AND LEGEND – BORINGS IN SOIL AND ROCK

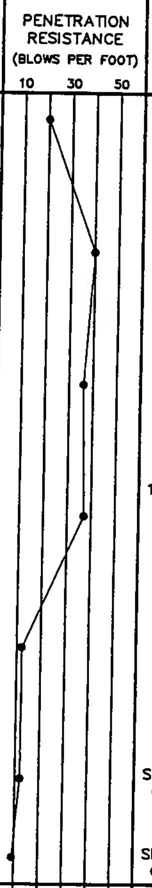
Paul C. Rizzo Associates, Inc.
CONSULTANTS

Paul C. Rizzo Associates, Inc.
CONSULTANTS

WINYAH GENERATING STATION–ASH POND B
LOG OF BORING NO. B–1

LOCATION
STATION: ~46+00 DISTANCE: 19'
SURFACE EL: 33.6'

ELEV. (FEET M.S.L.)	DEPTH (FEET)	SAMPLE NO. AND TYPE	DESCRIPTION	USCS SYMBOL	REMARKS
	0	1 16 20	MEDIUM DENSE, REDDISH BROWN TO DARK GRAY, FINE, CLAYEY SAND, MOIST	sc	0'–15' FILL
30					
	5		5.5'	sc	
		2 19 40		sp	
	10	3 20 36	DENSE, LIGHT TO DARK GRAY, FINE SAND, TRACE SILT, WET	sp	
20					
	15		15.0'		
		4 18 37		sp	15.0'–30.0' FOUNDATION SOILS
			MEDIUM DENSE, BROWNISH GRAY TO DARK BLACKISH BROWN, FINE SAND, TRACE TO SOME SILT, WET		
	20	5 22 12		sp	
10					
	25	6 20 12		sp	SLIGHT ORGANIC ODOR
			28.0'		
		7 24 9	LOOSE, DARK BROWNISH GRAY, FINE SAND, TRACE SILT, WET 30.0'	sp	SLIGHT ORGANIC ODOR
3.6	30		BOTTOM OF BORING 30.0'		
	35				



PROJECT NO.: 93–1356
DATE STARTED: 10–21–93
DATE COMPLETED: 10–21–93
FIELD GEOLOGIST: JDH
CHECKED BY: JTO

GWL: DEPTH ~11' DATE/TIME 0820 10–21–93
GWL: DEPTH ______ DATE/TIME ______
DRILLING METHOD: 4 1/4" I.D. H.S.A., SPT SAMPLING (140 lb HAMMER, 30" DROP, 2 WRAPS ON CATHEAD)

NOTES:
CONTRACTOR: S&ME
RIG: CME 55
DRILLER: Chris Simril
Distance under location is from ash pond water edge.
All elevations are from NGVD.

F–237
ADM 12/3/93

BORING NO. B–1
SHEET 1 OF 1

WINYAH GENERATING STATION—ASH POND B
LOG OF BORING NO. B-2

LOCATION
STATION: ~37+50 DISTANCE: 20.5'
SURFACE EL: 33.7'

ELEV. (FEET M.S.L.)	DEPTH (FEET)	SAMPLE NO. AND TYPE	PROFILE	DESCRIPTION	USCS SYMBOL	PENETRATION RESISTANCE (BLOWS PER FOOT) 10 30 50	REMARKS
	0	1 18 12		MEDIUM DENSE, REDDISH BROWN AND GRAY, FINE TO MEDIUM CLAYEY SAND, SOME CLAY LENSES, MOIST 2.0'	sc		0'-15' FILL
30							
	5	2 24 32		DENSE, GRAY, FINE TO MEDIUM SAND, TRACE SILT, MOIST TO WET	sp		
	10	3 20 31			sp		
20				15.0'			
	15	4 17 10		LOOSE, TANNISH GRAY, FINE TO MEDIUM, CLAYEY TO VERY CLAYEY SAND AND STIFF CLAY, WET 20.0'	sc/cl		15.0'-27.0' FOUNDATION SOILS
	20	5 24 24		MEDIUM DENSE, TANNISH TO PALE GRAY, FINE TO MEDIUM SAND, TRACE CLAY, WET 25.0'	sp		
10							
	25	6 24 7		LOOSE, GRAY TO DARK GRAY, FINE TO MEDIUM SAND, WET 27.0'	sp		
6.7				BOTTOM OF BORING 27.0'			
	30						
	35						

PROJECT NO.: 93-1356
DATE STARTED: 10-21-93
DATE COMPLETED: 10-21-93
FIELD GEOLOGIST: JDH
CHECKED BY: JTO

GWL: DEPTH ~13' DATE/TIME 1100 10-21-93
GWL: DEPTH ____ DATE/TIME ____
DRILLING METHOD: 4 1/4" I.D. H.S.A., SPT SAMPLING (140 lb HAMMER, 30" DROP, 2 WRAPS ON CATHEAD)

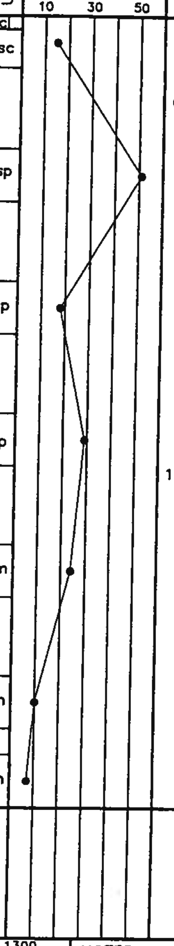
NOTES:
CONTRACTOR: S&ME
RIG: CME 55
DRILLER: Chris Simril
Distance under location is from ash pond water edge.
All elevations are from NGVD.

Paul C. Rizzo Associates, Inc.
CONSULTANTS

WINYAH GENERATING STATION—ASH POND B
LOG OF BORING NO. B-3

LOCATION
STATION: ~29+50 DISTANCE: 19'
SURFACE EL: 33.8'

ELEV. (FEET M.S.L.)	DEPTH (FEET)	SAMPLE NO. AND TYPE	DESCRIPTION	USCS SYMBOL	REMARKS
	0	1 16 15	MEDIUM STIFF, REDDISH BROWN, SANDY CLAY, MOIST 0.5'	cl	0'-17' FILL
30			MEDIUM DENSE, GRAYISH BROWN, MEDIUM SAND, MOIST 3.0'	sc	CUTTINGS TURNING BLACK
	5	2 20 51	VERY DENSE, DARK GRAY TO BLACK, FINE TO MEDIUM SAND, TRACE CLAY LENSES, MOIST 10.0'	sp	
	10	3 18 18	MEDIUM DENSE, TAN, LIGHT TO DARK GRAY AND BLACK, FINE SAND, TRACE SILT, MOIST TO WET	sp	
20	15	4 17 29	17.0'	sp	17.0'-30.0' FOUNDATION SOILS
	20	5 20 24	LOOSE TO MEDIUM DENSE, DARK GRAY TO DARK GRAYISH BROWN AND BLACK, FINE, SILTY SAND, WET	sm	
10	25	6 24 10		sm	
3.8	30	7 24 7	30.0'	sm	
	35		BOTTOM OF BORING 30.0'		



PROJECT NO.: 93-1356
DATE STARTED: 10-21-93
DATE COMPLETED: 10-21-93
FIELD GEOLOGIST: JDH
CHECKED BY: JTO

GWL: DEPTH ~13' DATE/TIME 1300 10-21-93
GWL: DEPTH ______ DATE/TIME ______
DRILLING METHOD: 4 1/4" I.D. H.S.A., SPT SAMPLING (140 lb HAMMER, 30" DROP, 2 WRAPS ON CATHEAD)

NOTES:
CONTRACTOR: S&ME
RIG: CME 55
DRILLER: Chris Simril
Distance under location is from ash pond water edge.
All elevations are from NGVD.

F-237
AOM 12/3/93

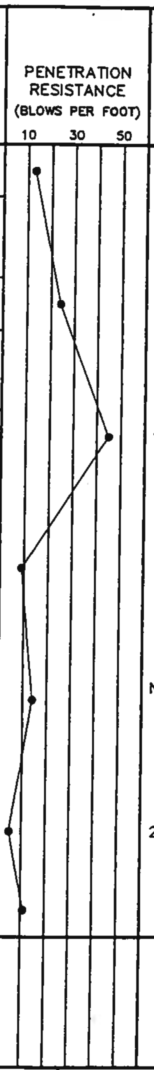
BORING NO. B-3
SHEET 1 OF 1

Paul C. Rizzo Associates, Inc.
CONSULTANTS

WINYAH GENERATING STATION–ASH POND B
LOG OF BORING NO. B-4

LOCATION
STATION: ~20+00 DISTANCE: 17.5'
SURFACE EL: 33.8'

ELEV. (FEET M.S.L.)	DEPTH (FEET)	SAMPLE NO. AND TYPE	PROFILE	DESCRIPTION	USCS SYMBOL	REMARKS
	0	1 18 13		MEDIUM DENSE TO DENSE, DARK GRAY, TAN, AND BROWNISH GRAY, FINE SAND, TRACE SILT, MOIST	sp	0'-12' FILL
30						
	5	2 18 24			sp	TRACE CLAY LENSES WOOD FRAGMENTS
	10	3 20 45		12.0'	sp	WOOD FRAGMENTS
						12.0'-30.0' FOUNDATION SOILS
20				LOOSE TO MEDIUM DENSE, DARK GRAY TO BLACK, FINE TO MEDIUM, CLAYEY SAND, WET		
	15	4 16 9			sc	
	20	5 0 14			–	NO SAMPLE WOOD FRAGMENT BLOCKING SPOON
10						
	25			25.0'		
		6 16 5		LOOSE TO MEDIUM DENSE, DARK GRAY TO BLACK, FINE SILTY SAND, WET	sm	2" WOOD FRAGMENTS
		7 16 11			sm	
3.8	30			30.0'		
				BOTTOM OF BORING 30.0'		
	35					



PROJECT NO.: 93-1356
DATE STARTED: 10-21-93
DATE COMPLETED: 10-21-93
FIELD GEOLOGIST: JDH
CHECKED BY: JTO

GWL: DEPTH ~12' DATE/TIME 1410 10-21-93
GWL: DEPTH ____ DATE/TIME ____
DRILLING METHOD: 4 1/4" I.D. H.S.A.,
SPT SAMPLING (140 lb HAMMER, 30"
DROP, 2 WRAPS ON CATHEAD)

NOTES:
CONTRACTOR: S&ME
RIG: CME 55
DRILLER: Chris Simril
Distance under location is from ash pond water edge.
All elevations are from NGVD.

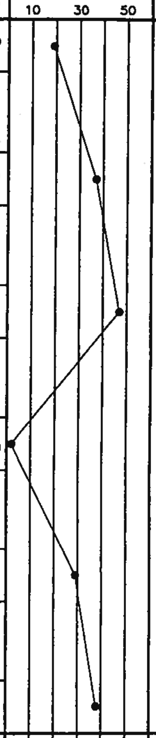
F-237
ADM 12/3/93

BORING NO. B-4
SHEET 1 OF 1

Paul C. Rizzo Associates, Inc.
CONSULTANTS

WINYAH GENERATING STATION–ASH POND B
LOG OF BORING NO. B–5

LOCATION
STATION: ~10+50 DISTANCE: 16'
SURFACE EL: 34.3'



ELEV. (FEET M.S.L.)	DEPTH (FEET)	SAMPLE NO. AND TYPE	PROFILE	DESCRIPTION	USCS SYMBOL	REMARKS
30	0 5	1 17 19		MEDIUM DENSE, BROWN TO GRAY BROWN, FINE SAND, TRACE CLAY LENSES, MOIST 5.0'	sp	0'–12' FILL 1/2" CLAY LENS
	10	2 24 37 3 15 47		DENSE, BROWN TO BLACK, FINE SAND, TRACE SILT, MOIST TO WET 12.0'	sp sp	WOOD FRAGMENTS WOOD FRAGMENTS 12.0'–27.0' FOUNDATION SOILS
20	15	4 24 2		LOOSE, DARK BROWN TO BLACK, SILTY SAND, WET 17.0'	sm	TRACE ROOTS IRON STAINING
10 7.3	20 25	5 24 29 6 24 38		MEDIUM DENSE TO DENSE, BROWN, GRAYISH BROWN, AND BLACK, FINE SAND, TRACE SILT, WET 27.0'	sp sp	WOOD FRAGMENTS SAND HEAVING INTO AUGER SAND HEAVING INTO AUGER
	30 35			BOTTOM OF BORING 27.0'		

PROJECT NO.: 93–1356
DATE STARTED: 10–22–93
DATE COMPLETED: 10–22–93
FIELD GEOLOGIST: JDH/ADM
CHECKED BY: JTO

GWL: DEPTH ~12' DATE/TIME 1100 10–22–93
GWL: DEPTH ____ DATE/TIME ____
DRILLING METHOD: 4 1/4" I.D. H.S.A., SPT SAMPLING (140 lb HAMMER, 30" DROP, 2 WRAPS ON CATHEAD)

NOTES:
CONTRACTOR: S&ME
RIG: CME 55
DRILLER: Chris Simril
Distance under location is from ash pond water edge.
All elevations are from NGVD.

F–237
ADM 12/3/93

Paul C. Rizzo Associates, Inc.
CONSULTANTS

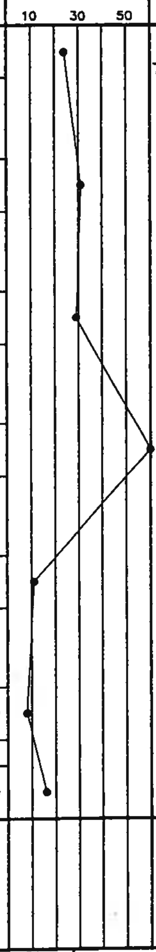
WINYAH GENERATING STATION—ASH POND B
LOG OF BORING NO. B—6

LOCATION

STATION: ~4+75 DISTANCE: 17'

SURFACE EL: 33.8'

ELEV. (FEET M.S.L.)	DEPTH (FEET)	SAMPLE NO. AND TYPE	PROFILE	DESCRIPTION	USCS SYMBOL	PENETRATION RESISTANCE (BLOWS PER FOOT)	REMARKS
	0	1 20 24		MEDIUM DENSE TO DENSE, BROWNISH GRAY, DARK GRAY, AND BLACK, FINE SAND, TRACE CLAY, MOIST TO WET	sp		0'-8' FILL TRACE CLAY LENSES
30							
	5	2 19 31			sp		
				8.0'			8.0'-30.0' FOUNDATION SOILS
	10	3 17 29		MEDIUM TO VERY DENSE, DARK GRAY TO BLACK, FINE SAND, TRACE SILT, WET	sp		WOOD FRAGMENTS AND ROOTS
20							
	15	4 19 62			sp	62	IRON STAINING
				20.0'			
	20	5 24 11		LOOSE TO MEDIUM DENSE, DARK GRAYISH BLACK, FINE SAND, TRACE SILT, WET	sp		
10							
	25	6 24 8			sp		SAND HEAVING INTO AUGER
		7 24 16		30.0'	sp		
3.8	30			BOTTOM OF BORING 30.0'			
	35						



PROJECT NO.: 93-1356
DATE STARTED: 10-22-93
DATE COMPLETED: 10-22-93
FIELD GEOLOGIST: JOH/ADM
CHECKED BY: JTO

GWL: DEPTH ~10' DATE/TIME 0950 10-22-93
GWL: DEPTH ____ DATE/TIME ____
DRILLING METHOD: 4 1/4" I.D. H.S.A., SPT SAMPLING (140 lb HAMMER, 30" DROP, 2 WRAPS ON CATHEAD)

NOTES:
CONTRACTOR: S&ME
RIG: CME 55
DRILLER: Chris Simril
Distance under location is from ash pond water edge.
All elevations are from NGVD.

F-237
ADM 12/3/93

BORING NO. B-6
SHEET 1 OF 1

APPENDIX B

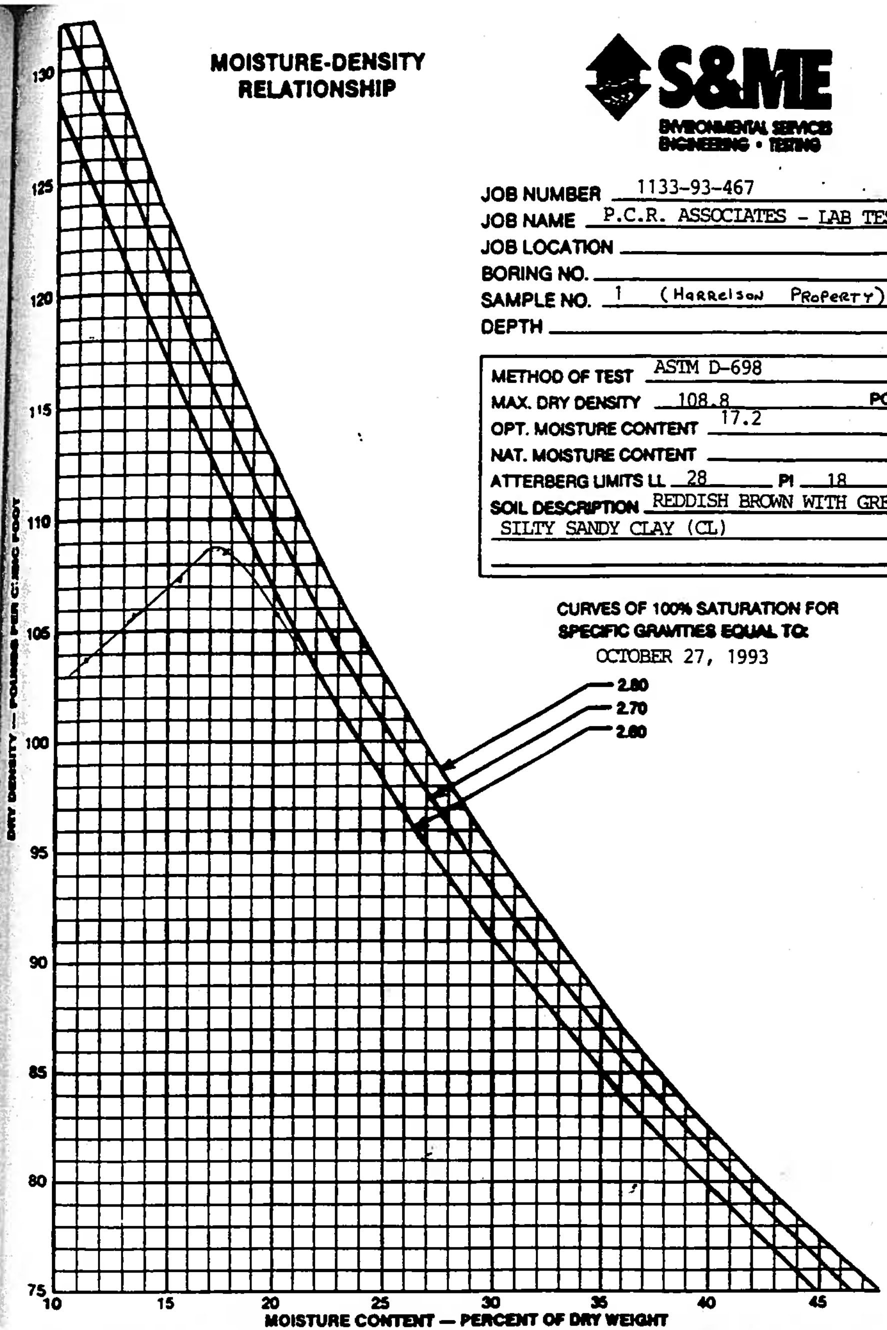
LABORATORY TEST RESULTS

MOISTURE-DENSITY RELATIONSHIP

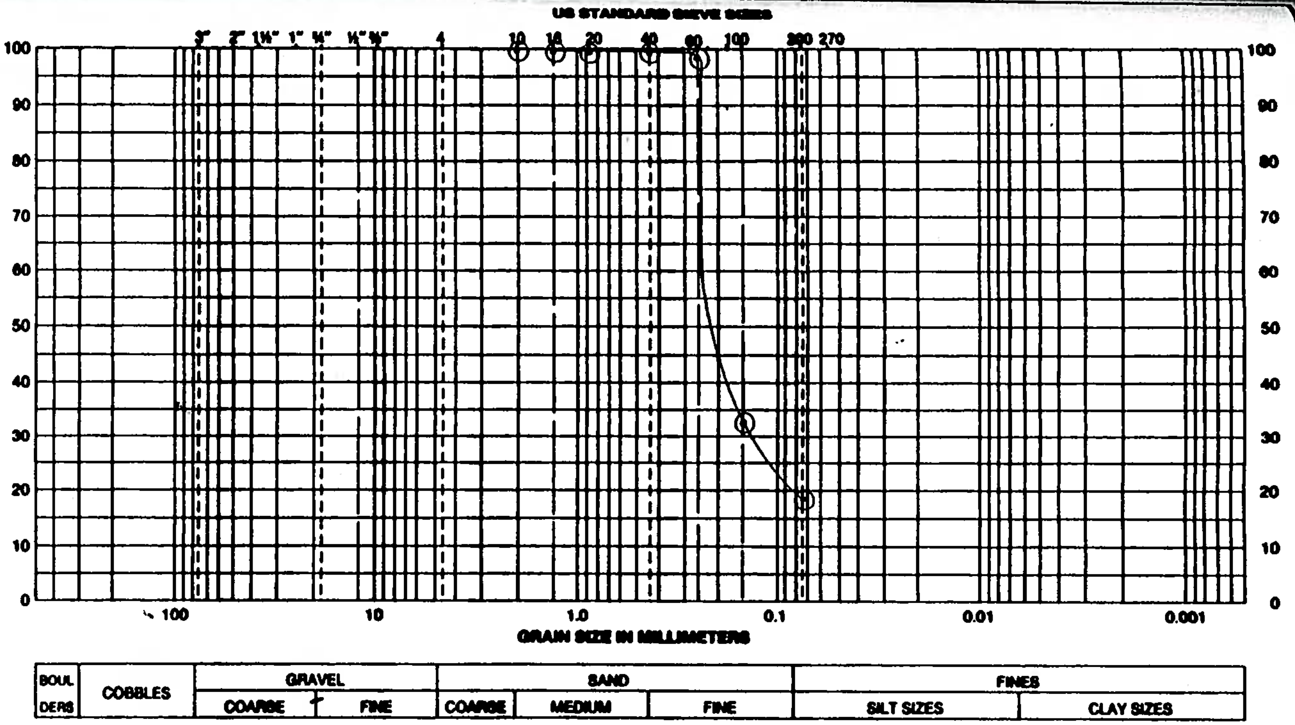
S&ME
ENVIRONMENTAL SERVICES
ENGINEERING • TESTING

JOB NUMBER 1133-93-467
JOB NAME P.C.R. ASSOCIATES - LAB TESTING
JOB LOCATION
BORING NO.
SAMPLE NO. 1 (Harrelson Property)
DEPTH

METHOD OF TEST ASTM D-698
MAX. DRY DENSITY 108.8 PCF
OPT. MOISTURE CONTENT 17.2 %
NAT. MOISTURE CONTENT %
ATTERBERG LIMITS LL 28 PI 18
SOIL DESCRIPTION REDDISH BROWN WITH GREY SILTY SANDY CLAY (CL)



OCTOBER 27, 1993



BORING NO.	ELEV./DEPTH	NAT. WC	LL	PL	PI	DESCRIPTION OR CLASSIFICATION
SAMPLE 1			28	18	10	CL - SANDY LEAN CLAY

JOB NO 1133-93-467

GRAIN SIZE DISTRIBUTION

S&ME
ENVIRONMENTAL SERVICES
ENGINEERING • TESTING

S&ME SFL-008
(REV 6/88)

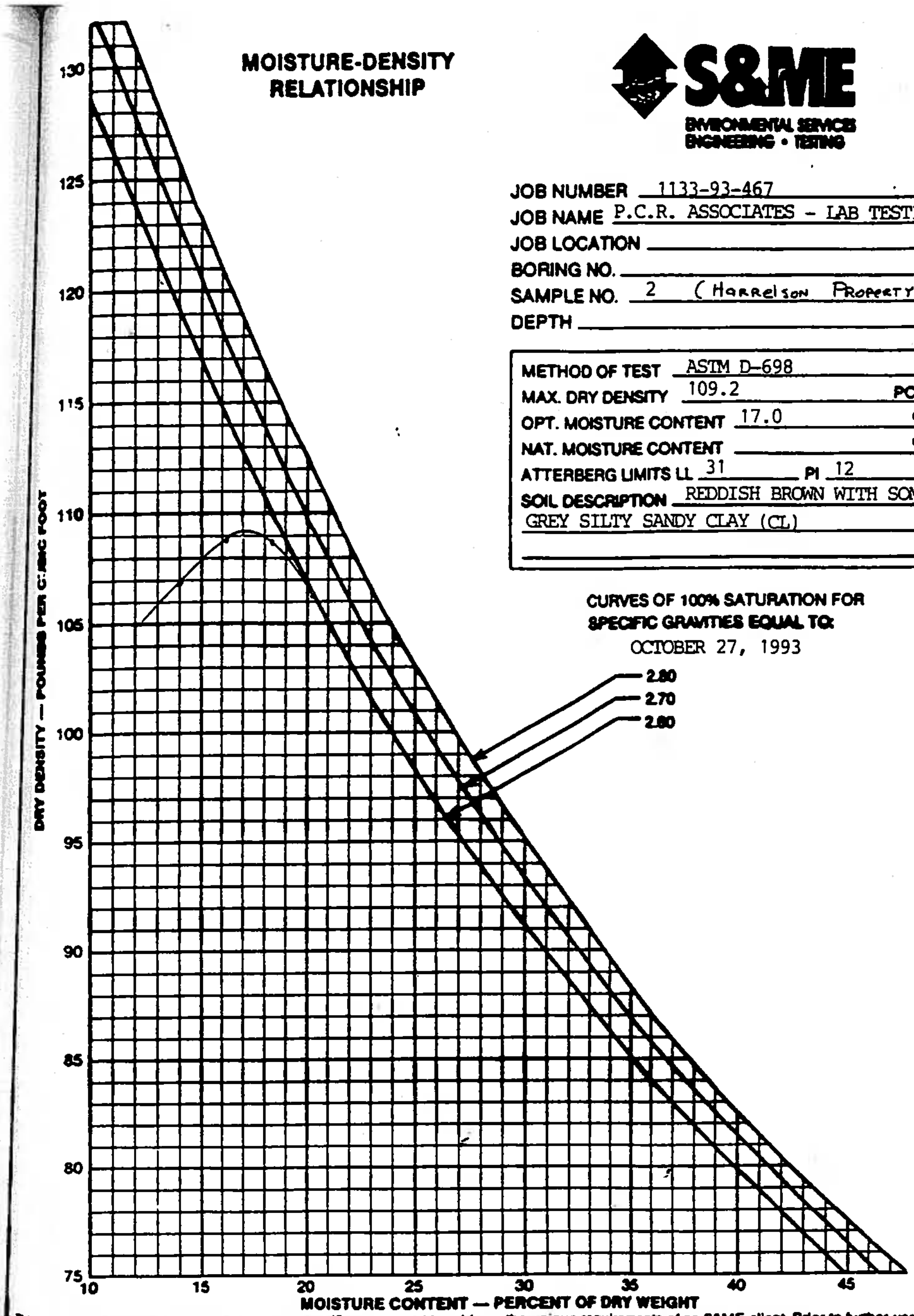
CLAY??

MOISTURE-DENSITY RELATIONSHIP

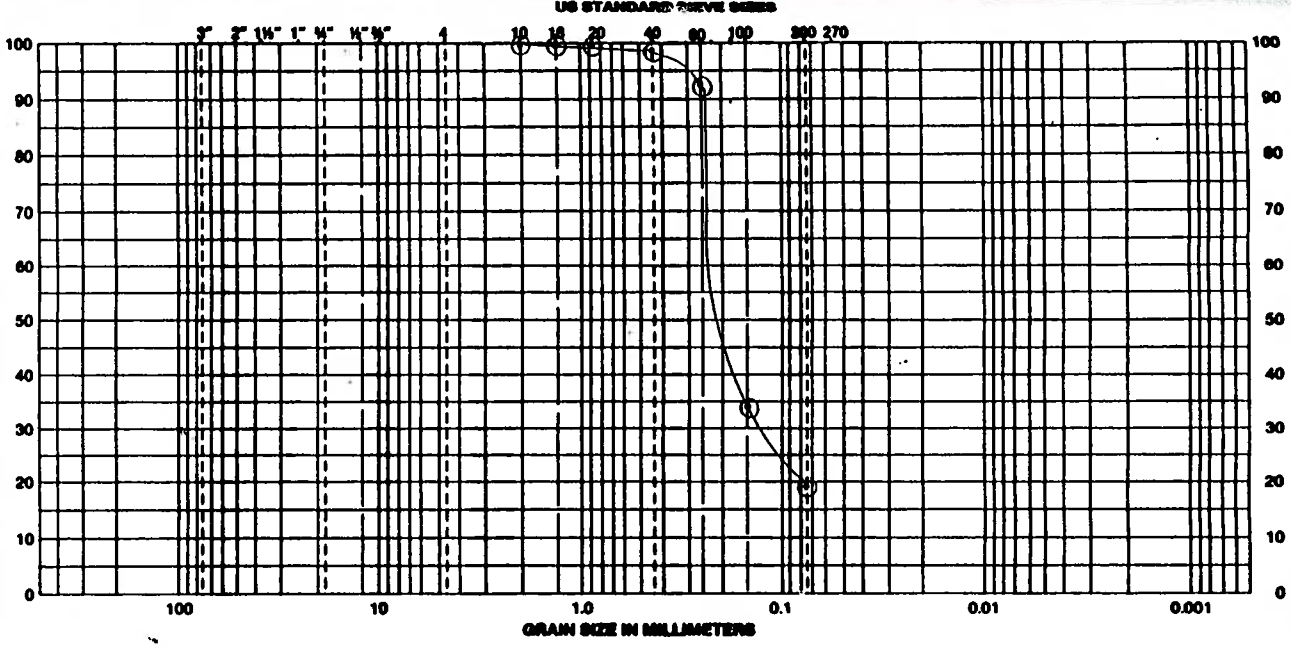
S&ME
ENVIRONMENTAL SERVICES
ENGINEERING • TESTING

JOB NUMBER 1133-93-467
JOB NAME P.C.R. ASSOCIATES - LAB TESTING
JOB LOCATION
BORING NO.
SAMPLE NO. 2 (Harrelson Property)
DEPTH

METHOD OF TEST ASTM D-698
MAX. DRY DENSITY 109.2 PCF
OPT. MOISTURE CONTENT 17.0 %
NAT. MOISTURE CONTENT %
ATTERBERG LIMITS LL 31 PI 12
SOIL DESCRIPTION REDDISH BROWN WITH SOME GREY SILTY SANDY CLAY (CL)



OCTOBER 27, 1993



BOUL DERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV./DEPTH	NAT. WC	LL	PL	PI	DESCRIPTION OR CLASSIFICATION
SAMPLE 2			31	19	12	CL - SANDY LEAN CLAY

JOB NO 1133-93-467

GRAIN SIZE DISTRIBUTION

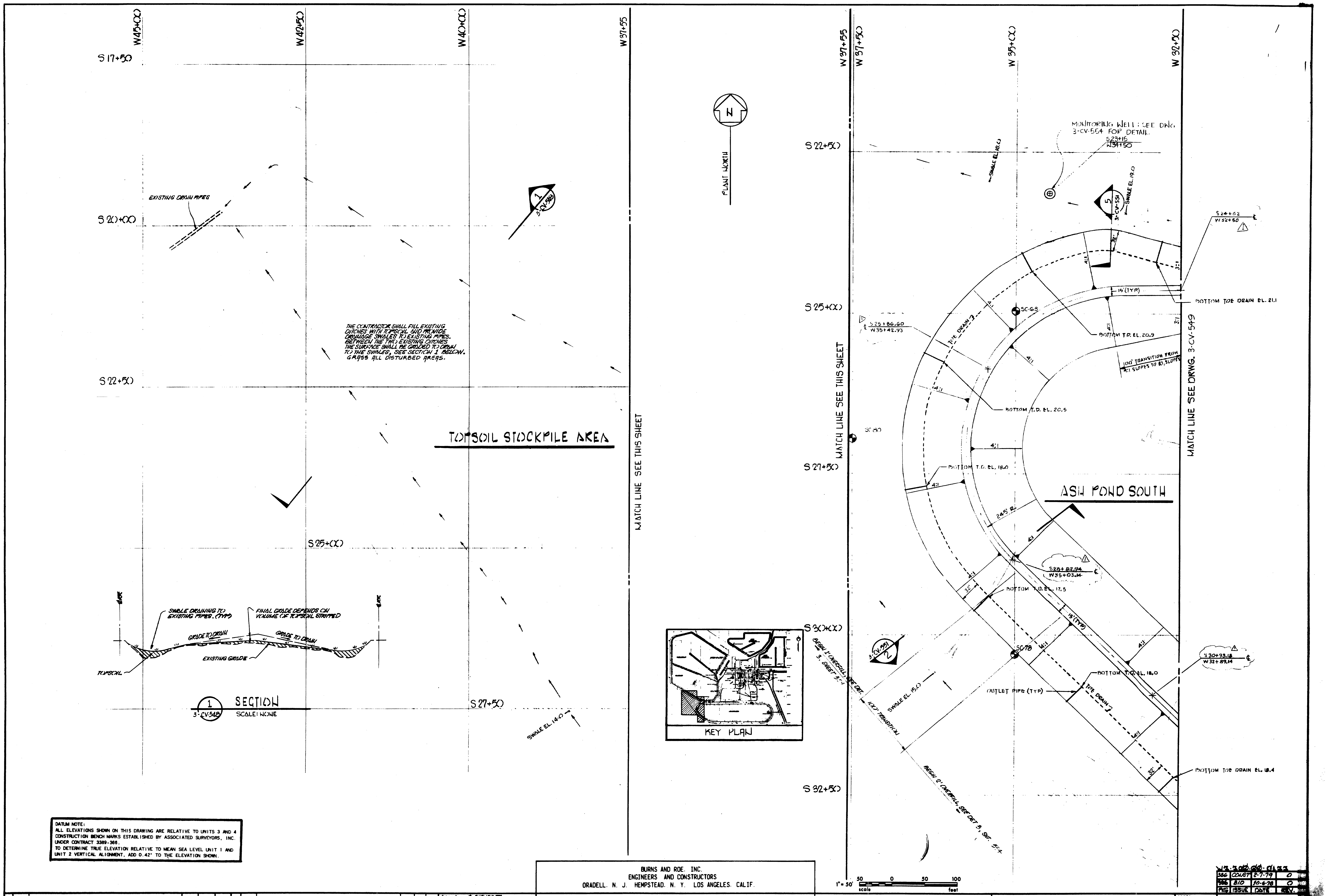
S&ME

ENVIRONMENTAL SERVICES
ENGINEERING • TESTING

S&ME SFL-[illegible]
(REV. [illegible])

clay?
?.

Appendix A - Doc 1.5 South Ash Pond Impoundment Drawings



THE CONTRACTOR SHALL FILL EXISTING DITCHES WITH TOPSOIL AND PROVIDE DRAINAGE SWALES TO EXISTING PIPES. BETWEEN THE TWO EXISTING DITCHES THE SURFACE SHALL BE GRADED TO DRAIN TO THE SWALES, SEE SECTION 1 BELOW. GRASS ALL DISTURBED AREAS.

DATUM NOTE:
ALL ELEVATIONS SHOWN ON THIS DRAWING ARE RELATIVE TO UNITS 3 AND 4 CONSTRUCTION BENCH MARKS ESTABLISHED BY ASSOCIATED SURVEYORS, INC. UNDER CONTRACT 3389-366.
TO DETERMINE TRUE ELEVATION RELATIVE TO MEAN SEA LEVEL UNIT 1 AND UNIT 2 VERTICAL ALIGNMENT, ADD 0.42' TO THE ELEVATION SHOWN.

W3.300.00.0433

PKG	ISSUE	DATE	REV.
386	CONST	2-7-79	0
386	BID	10-6-78	0

no	date	REVISION	by	ck.	appr.	no	date	REVISION	by	ck	appr
1	12-12-79	REVISED AS PER AS BUILT DRAWINGS	BKB								
0	10-6-78	ISSUED FOR BIDS-CONTR. 386	G	PRD							
B		ISSUED FOR OWNER'S REVIEW	G								
A		B&R REVIEW									

drawn by B TURNER III
dept. ck. PR. Durala
dept. appr.
coord. ck.
p.m. appr. WX
B&R appr. M. J. Bri 1/29/80

BURNS AND ROE. INC.
ENGINEERS AND CONSTRUCTORS
ORADELL. N. J. HEMPSTEAD. N. Y. LOS ANGELES. CALIF.

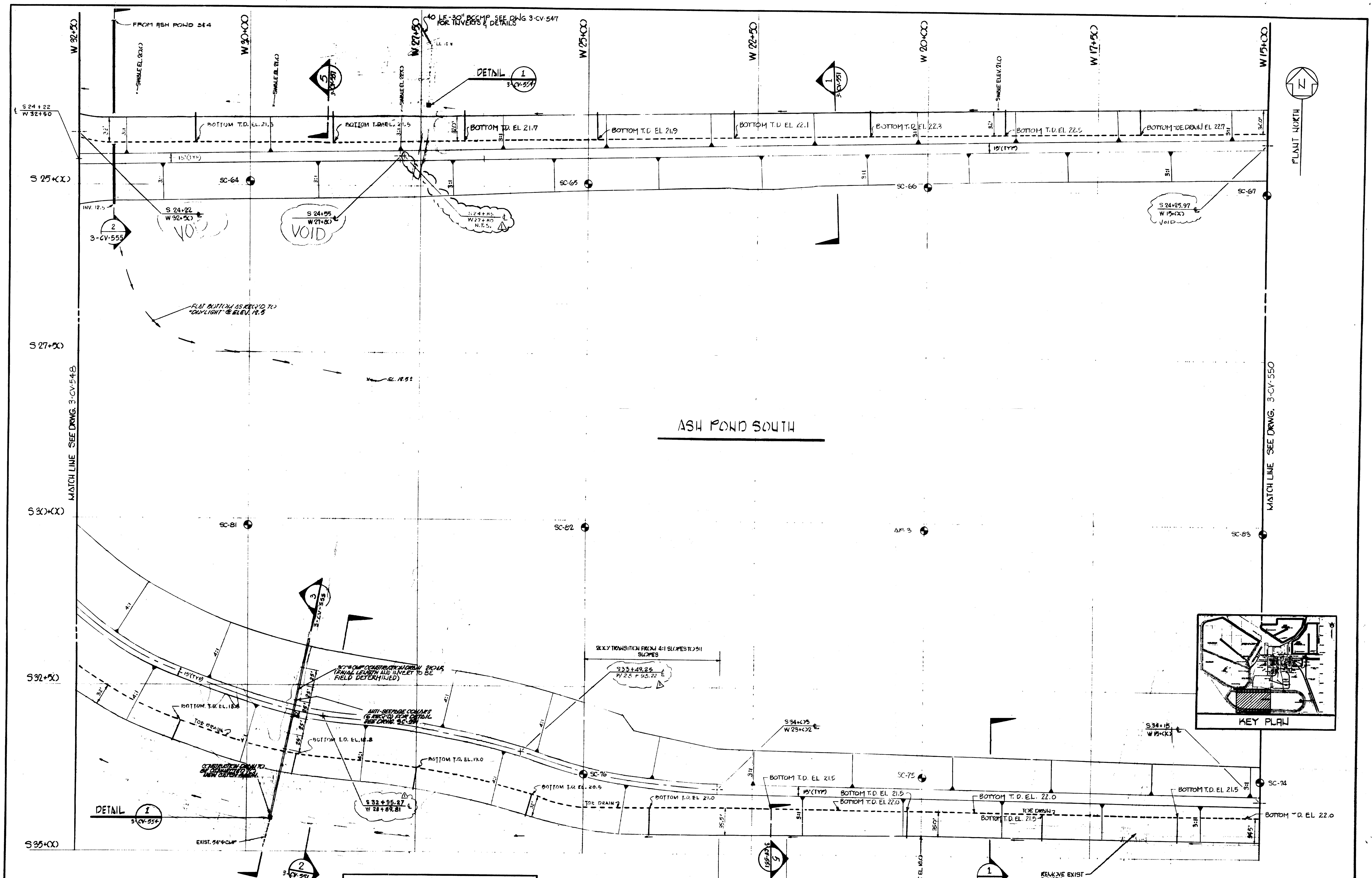
ATLANTA DALLAS NEW YORK
LOCKWOOD GREENE
ARCHITECTS · ENGINEERS
SPARTANBURG, S.C.

job name
SANTEE COOPER
WINYAH GENERATING STATION UNIT 3
GEORGETOWN. SOUTH CAROLINA

sheet title
PLAN - ASH POND SOUTH
SHEET 1

scale 1" = 50'
date 5.1.78
L-G JOB NO. 77043.01
B&R W.O. NO. 3389
dwg. no. 3-CV-548
rev. 1

South Ash Pond



DATUM NOTE:
ALL ELEVATIONS SHOWN ON THIS DRAWING ARE RELATIVE TO UNITS 3 AND 4 CONSTRUCTION BENCH MARKS ESTABLISHED BY ASSOCIATED SURVEYORS, INC. UNDER CONTRACT 3389-366.
TO DETERMINE TRUE ELEVATION RELATIVE TO MEAN SEA LEVEL UNIT 1 AND UNIT 2 VERTICAL ALIGNMENT, ADD 0.42' TO THE ELEVATION SHOWN

1" = 50'
50 0 50 100
scale feet

no	date	REVISION	by	ck.	appr.	no	date	REVISION	by	ck	appr
1	12-12-79	REVISED AS PER AS BUILT DRAWINGS	AKB								
0	10-6-78	ISSUED FOR BIDS CONTR. 386	CW	PRD							
B	[illegible]	ISSUE FOR OWNER'S REVIEW	BT III								
A	[illegible]	B&R REVIEW									

drawn by B TURNER III
dept. ck. I K DURALIA
dept. appr. Fred Islew
coord. ck.
p.m. appr. WK
B&R appr. M. J. Peri 1/29/80

BURNS AND ROE. INC.
ENGINEERS AND CONSTRUCTORS
ORADELL. N. J. HEMPSTEAD. N. Y. LOS ANGELES. CALIF.

ATLANTA DALLAS NEW YORK
LOCKWOOD GREENE
ARCHITECTS · ENGINEERS
SPARTANBURG, S.C.

job name
SANTEE COOPER
WINYAH GENERATING STATION UNIT 3
GEORGETOWN. SOUTH CAROLINA

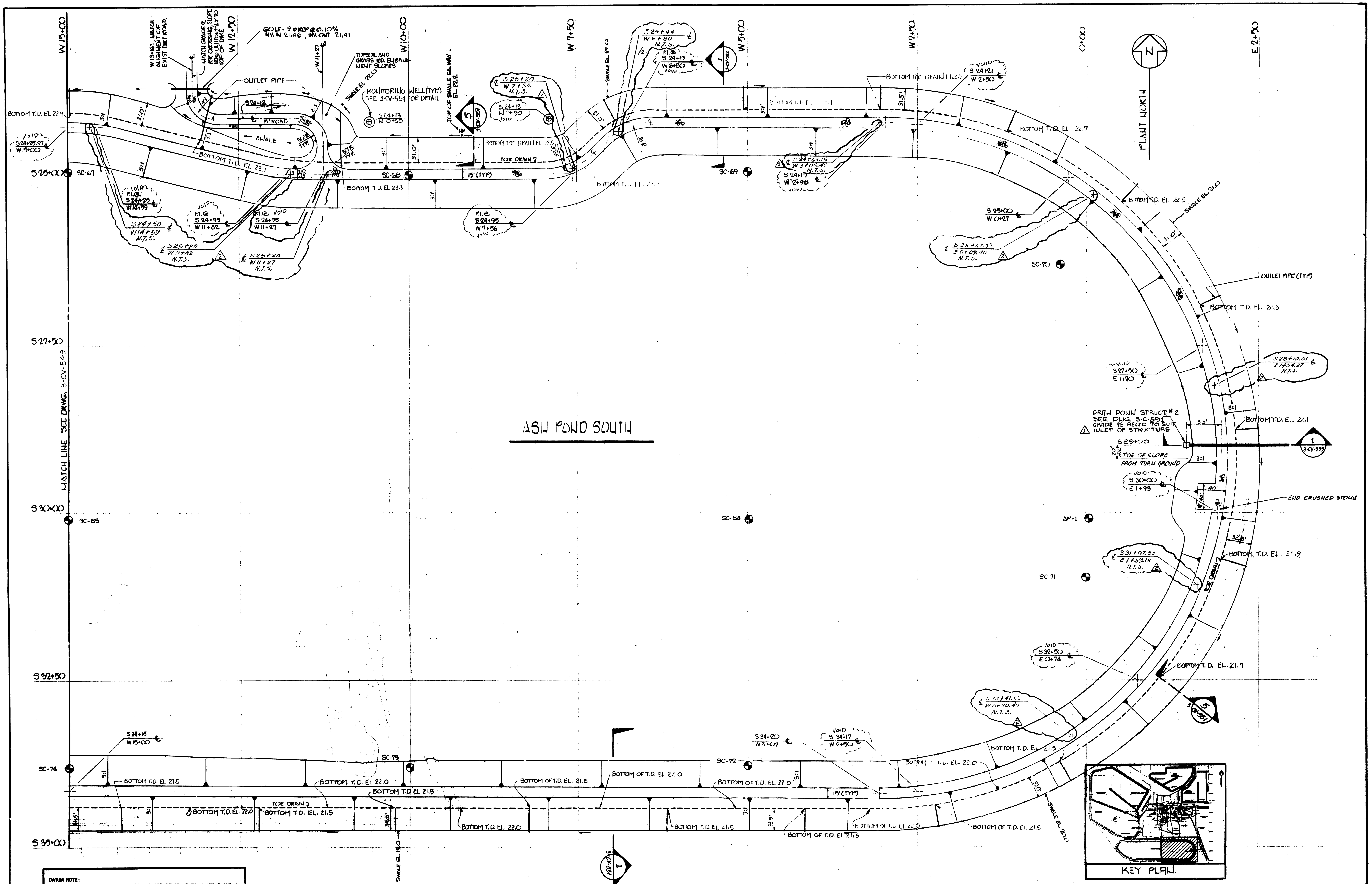
sheet title
PLAN - ASH POND SOUTH
SHEET 2

scale 1" = 50'
date 5·1·78
L-G JOB NO. 77043.01
B&R W.O. NO. 3389
dwg. no. 3-CV-549
rev. 1

W3-300-60-0134

PKG.	ISSUE	DATE	REV.
386	CONST.	2-7-79	0
386	BID	10-6-78	0

South Ash Pond



DATUM NOTE:
ALL ELEVATIONS SHOWN ON THIS DRAWING ARE RELATIVE TO UNITS 3 AND 4 CONSTRUCTION BENCH MARKS ESTABLISHED BY ASSOCIATED SURVEYORS, INC. UNDER CONTRACT 3389-386.
TO DETERMINE TRUE ELEVATION RELATIVE TO MEAN SEA LEVEL UNIT 1 AND UNIT 2 VERTICAL ALIGNMENT, ADD 0.42' TO THE ELEVATION SHOWN.

no	date	REVISION	by	ck.	appr.	no	date	REVISION	by	ck	appr
2	2-8-79	ADDED AS BUILT COORDINATES TO ℄ DIKE	BKS								
1	2-7-79	REVISED NOTE - FOR CONST. CONTR. 386	G	PRD							
0	10-6-78	ISSUED FOR BIDS - CONTR. 386	CW	PRD							
B		ISSUED FOR OWNER'S REVIEW	G								
A	5-5-78	B&R REVIEW									

drawn by B TUCKER III
dept. ck. PR. DURALIA
dept. appr. Ned Glen
coord. ck.
p.m. appr. WJK
B&R appr. M. J. Pinn 1/29/81

BURNS AND ROE, INC.
ENGINEERS AND CONSTRUCTORS
ORADELL, N. J. HEMPSTEAD, N. Y. LOS ANGELES, CALIF.

ATLANTA DALLAS NEW YORK
LOCKWOOD GREENE
ARCHITECTS · ENGINEERS
SPARTANBURG, S.C.

1" = 50' 50 0 50 100
scale feet

job name
SANTEE COOPER
WINYAH GENERATING STATION UNIT 3
GEORGETOWN, SOUTH CAROLINA

sheet title
PLAN - ASH POND SOUTH
SHEET 3

scale
1" = 50'

date
5-1-78

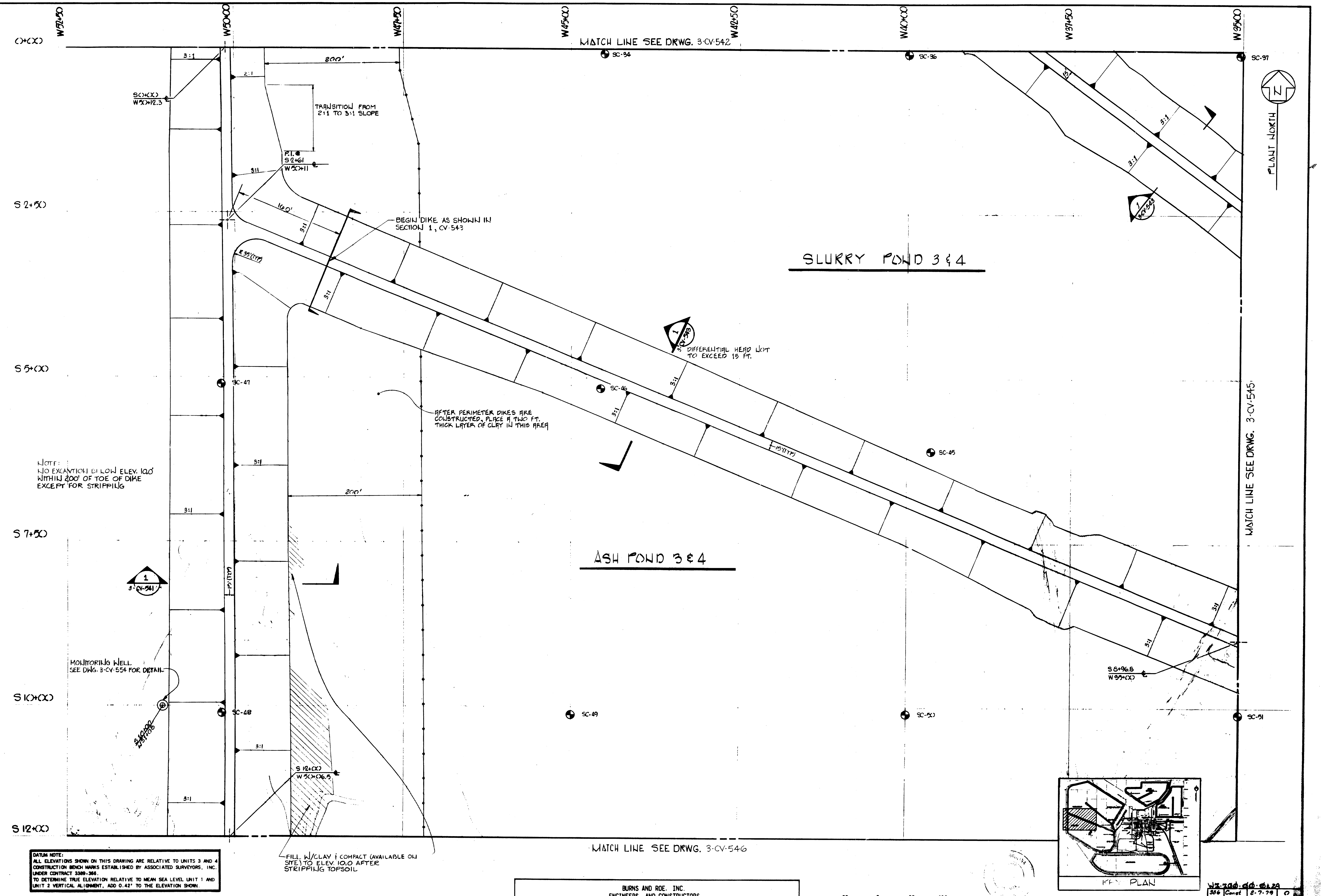
W3-300-00-0135

PKG.	ISSUE	DATE	REV
386	CONST	2-7-79	1
386	BID	10-6-78	0

L-G JOB NO. 77043.01
B&R W.O. NO. 3389
dwg. no. 3-CV-550
rev 2

South Ash Pond

Appendix A - Doc 1.6 Ash Pond 3&4 and Slurry Pond 3&4 Impoundment Drawings



DATUM NOTE:
ALL ELEVATIONS SHOWN ON THIS DRAWING ARE RELATIVE TO UNITS 3 AND 4 CONSTRUCTION BENCH MARKS ESTABLISHED BY ASSOCIATED SURVEYORS, INC. UNDER CONTRACT 3389-366.
TO DETERMINE TRUE ELEVATION RELATIVE TO MEAN SEA LEVEL UNIT 1 AND UNIT 2 VERTICAL ALIGNMENT, ADD 0.42' TO THE ELEVATION SHOWN.

no	date	REVISION	by	ck.	appr.	no	date	REVISION	by	ck	appr
0	[illegible]	ISSUED FOR BIDS - CONTR 386	G	PRD							
	[illegible]	ISSUED FOR OWNER'S REVIEW	CW								
	[illegible]	B&R REVIEW									

drawn by B TUCKER III
dept. ck. PR Duncan
dept. appr.
coord. ck.
p.m. appr.
B&R appr. 1/29/80

BURNS AND ROE. INC.
ENGINEERS AND CONSTRUCTORS
ORADELL. N. J. HEMPSTEAD. N. Y. LOS ANGELES. CALIF.

ATLANTA DALLAS NEW YORK
LOCKWOOD GREENE
ARCHITECTS · ENGINEERS
SPARTANBURG, S. C.

1" = 50' 50 0 50 100 scale feet

job name
SANTEE COOPER
WINYAH GENERATING STATION UNIT 3
GEORGETOWN. SOUTH CAROLINA

sheet title
PLAN - ASH POND 3 & 4
SHEET 1

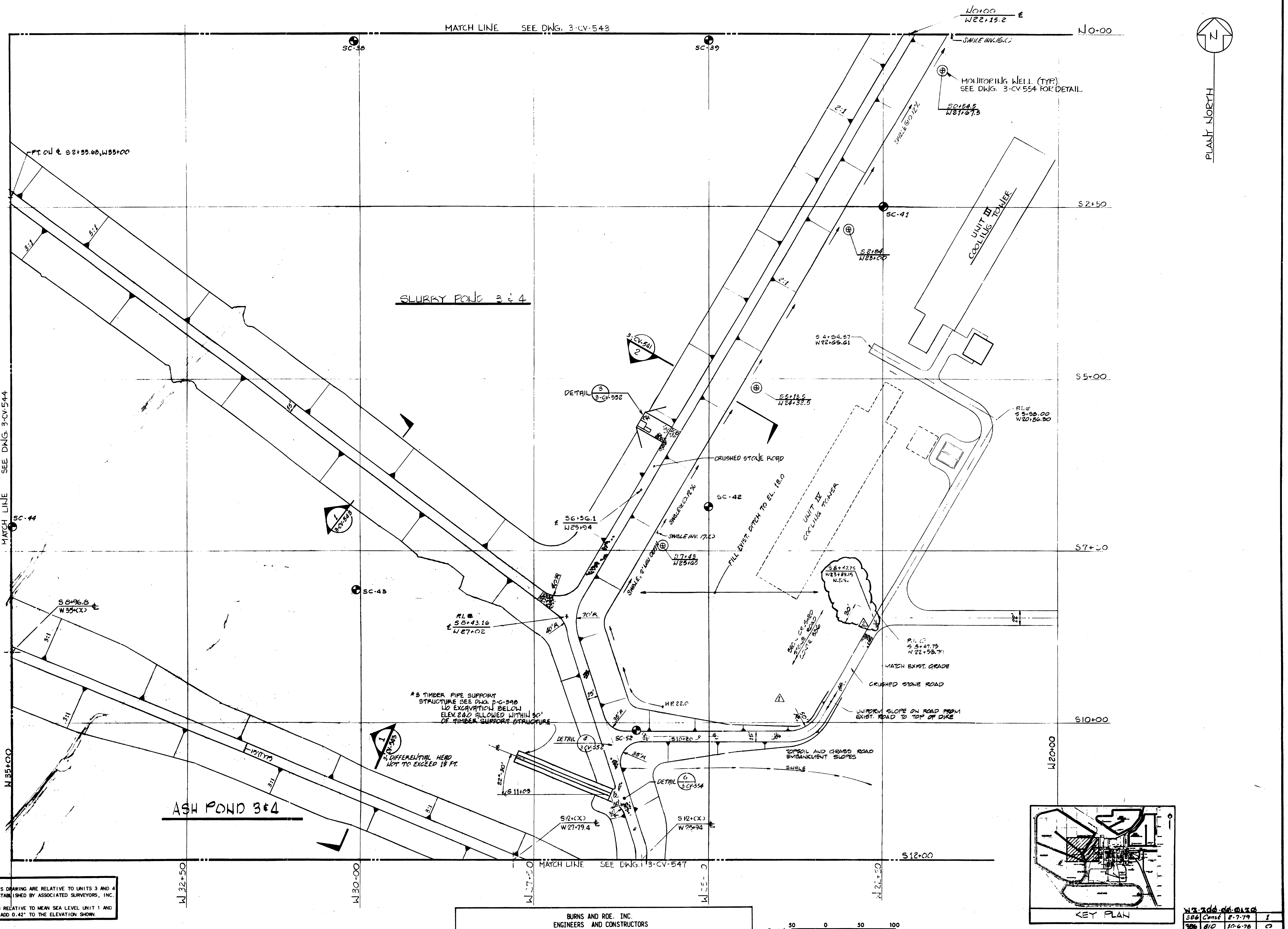
scale AS NOTED
date 5-1-78

WI-700-00-0L2A

386	Const	2-7-79	0
386	BID	10-6-78	0
PKG	ISSUE	DATE	REV

L-G JOB NO. 77043.01
B&R W.O. NO. 3389
dwg. no. 3-CV-544
rev. 0

Unit Ash Pond + 3-4 Slurry Pond



DATUM NOTE:
ALL ELEVATIONS SHOWN ON THIS DRAWING ARE RELATIVE TO UNITS 3 AND 4 CONSTRUCTION BENCH MARKS ESTABLISHED BY ASSOCIATED SURVEYORS, INC. UNDER CONTRACT 3389-366.
TO DETERMINE TRUE ELEVATION RELATIVE TO MEAN SEA LEVEL UNIT 1 AND UNIT 2 VERTICAL ALIGNMENT, ADD 0.42' TO THE ELEVATION SHOWN.

no	date	REVISION	by	ck.	appr.	no	date	REVISION	by	ck	appr.
2	12-18-79	ADDED AS BUILT COORDINATE	BKB								
1	8-7-79	Revised road - issued for Const. contr. 386	G	PRD							
0	10-6-78	ISSUED FOR BIDS - CONTR 386	G	PRD							
B	6-23-78	ISSUED FOR OWNER'S REVIEW									
A	5-5-78	B&R REVIEW									

drawn by TURNER, WALKER, CALDIS
dept. ck. PK DURALIA
dept. appr.
coord. ck.
p.m. appr. WS
B&R appr. 1/24/80

BURNS AND ROE, INC.
ENGINEERS AND CONSTRUCTORS
ORADELL, N. J. HEMPSTEAD, N. Y. LOS ANGELES, CALIF.

ATLANTA DALLAS NEW YORK
LOCKWOOD GREENE
ARCHITECTS · ENGINEERS
SPARTANBURG, S.C.

1" = 50' 50 0 50 100
scale feet

job name
SANTEE COOPER
WINYAH GENERATING STATION UNIT 3
GEORGETOWN, SOUTH CAROLINA

sheet title
PLAN - ASH POND 3 & 4
SHEET 2

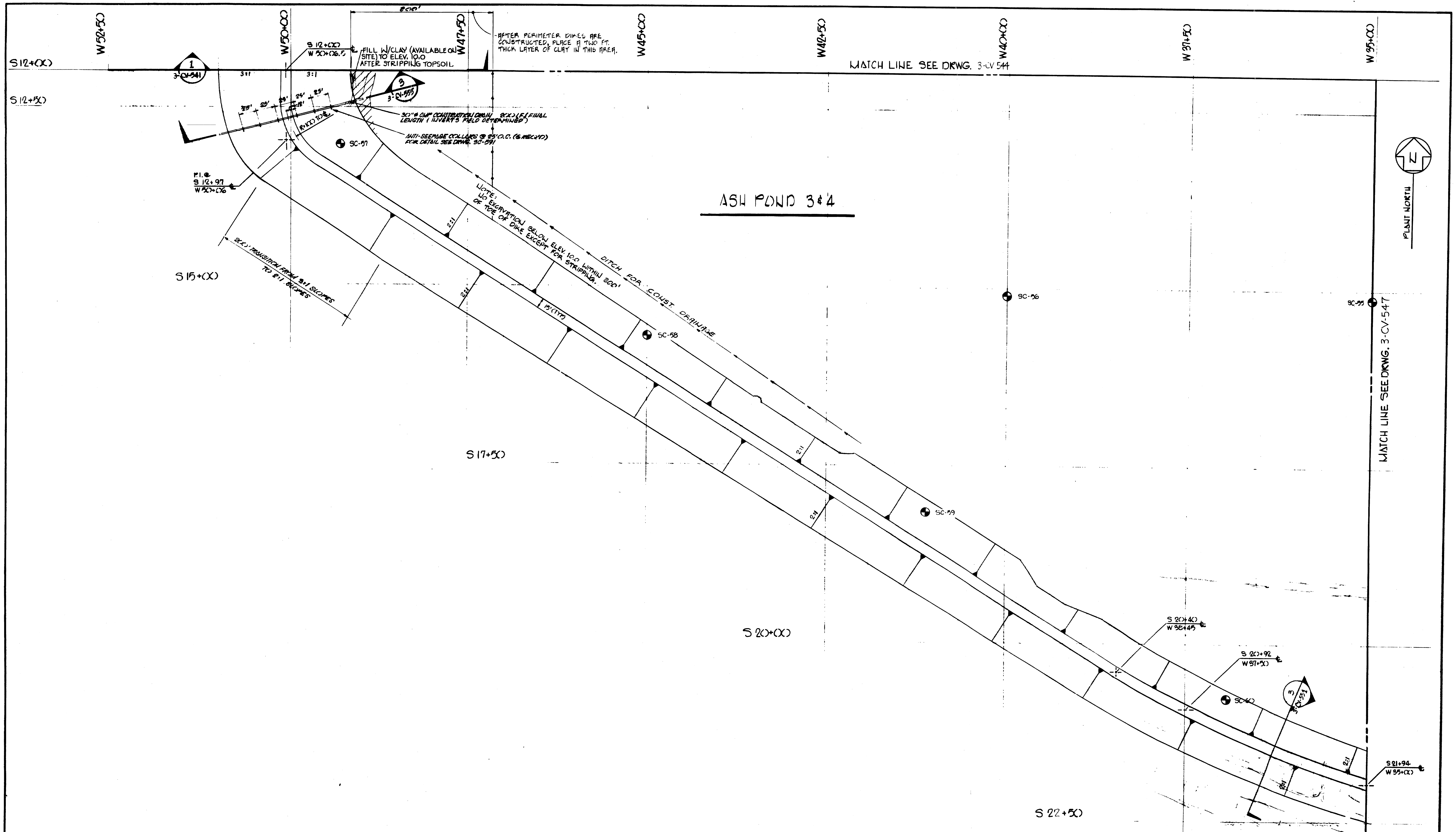
scale AS NOTED
date 5-1-78

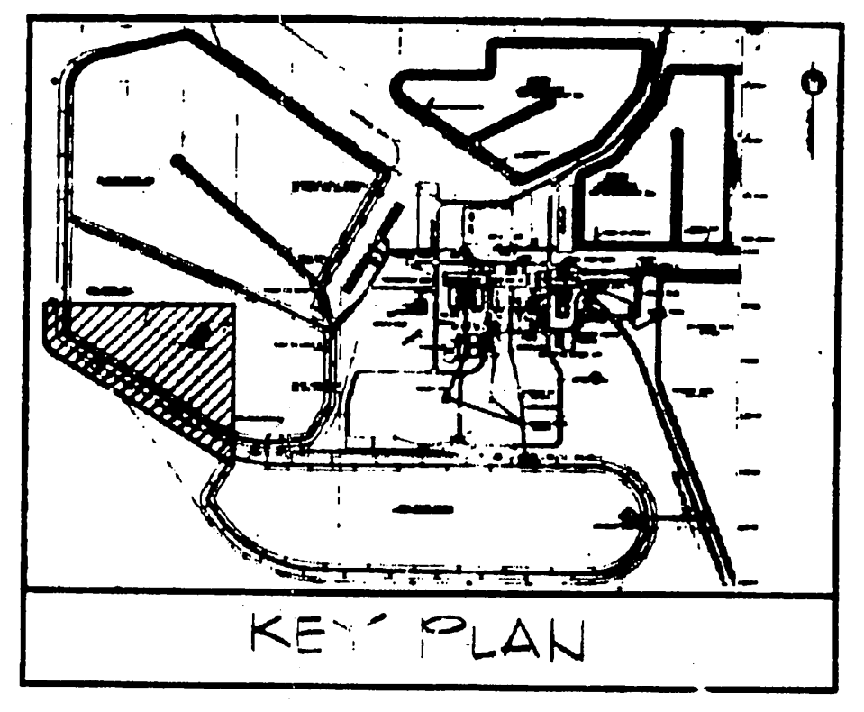
W3·300·00·0130

386	Const	8-7-79	1
386	BID	10-6-78	0
PKG	ISSUE	DATE	REV

L-G JOB NO. 77043.01
B&R W.O. NO. 3389
dwg. no. 3-CV-545
rev. 2

3·4 Slurry Pond




KEY PLAN

1" = 50'

DATUM NOTE:
ALL ELEVATIONS SHOWN ON THIS DRAWING ARE RELATIVE TO UNITS 3 AND 4 CONSTRUCTION BENCH MARKS ESTABLISHED BY ASSOCIATED SURVEYORS, INC. UNDER CONTRACT 3389-366.
TO DETERMINE TRUE ELEVATION RELATIVE TO MEAN SEA LEVEL UNIT 1 AND UNIT 2 VERTICAL ALIGNMENT, ADD 0.42' TO THE ELEVATION SHOWN.

SOUTH CAROLINA
REGISTERED
444
ENGINEER
R. DURALIA

PKG	ISSUE	DATE	REV
386	Const	2-7-79	0
386	BID	10-6-78	0

no	date	REVISION	by	ck.	appr.	no	date	REVISION	by	ck	appr.
0	10-6-78	ISSUED FOR BIDS - CONTR 386	G	PRD							
B	[illegible]	ISSUED FOR OWNER'S REVIEW									
A	[illegible]	B&R REVIEW									

drawn by B. TURNER III
dept. ck. PR. Duralia
dept. appr. Fred Glenn
coord. ck.
p.m. appr.
B&R appr. M. J. Lui 1-7-80

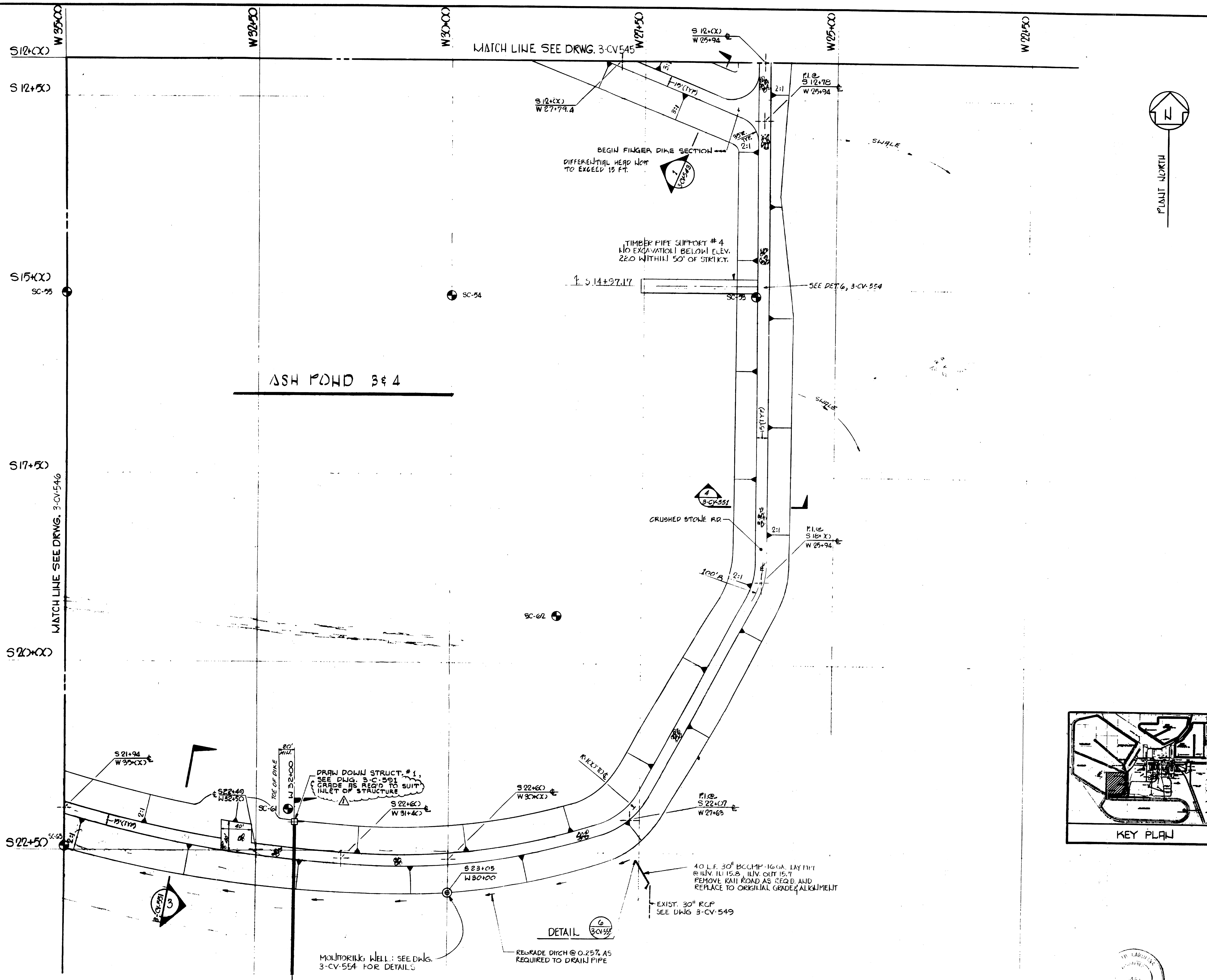
BURNS AND ROE. INC.
ENGINEERS AND CONSTRUCTORS
ORADELL. N. J. HEMPSTEAD. N. Y. LOS ANGELES. CALIF.

ATLANTA DALLAS NEW YORK
LOCKWOOD GREENE
ARCHITECTS · ENGINEERS
SPARTANBURG, S.C.

job name
SANTEE COOPER
WINYAH GENERATING STATION UNIT 3
GEORGETOWN, SOUTH CAROLINA

sheet title
PLAN - ASH POND 3 & 4
SHEET 3

scale
AS NOTED
date
5-1-78
L-G JOB NO. 77043.01
B&R W.O. NO. 3389
dwg. no.
3-CV-546
rev.
0



2
3-CV-555

DATUM NOTE:
ALL ELEVATIONS SHOWN ON THIS DRAWING ARE RELATIVE TO UNITS 3 AND 4 CONSTRUCTION BENCH MARKS ESTABLISHED BY ASSOCIATED SURVEYORS, INC. UNDER CONTRACT 3389-366.
TO DETERMINE TRUE ELEVATION RELATIVE TO MEAN SEA LEVEL UNIT 1 AND UNIT 2 VERTICAL ALIGNMENT, ADD 0.42' TO THE ELEVATION SHOWN.

no	date	REVISION	by	ck.	appr.	no	date	REVISION	by	ck	appr.
1	2-7-79	REVISED NOTE - FOR CONST. CONTR. 386	G	PRD							
0	10-6-78	ISSUED FOR BIDS - CONTR. 386	G	PRD							
B	[illegible]	ISSUED FOR OWNER'S REVIEW	G								
A	[illegible]	B & R REVIEW									

drawn by B TUCKER III
dept. ck. P.K. DURALIA
dept. appr. Ted Allen
coord. ck.
p.m. appr. WS
B&R appr. M. J. Pane 1/29/80

BURNS AND ROE, INC.
ENGINEERS AND CONSTRUCTORS
ORADELL, N. J. HEMPSTEAD, N. Y. LOS ANGELES, CALIF.

ATLANTA DALLAS NEW YORK
LOCKWOOD GREENE
ARCHITECTS · ENGINEERS
SPARTANBURG, S.C.

1" = 50' 50 0 50 100
scale feet

job name
SANTEE COOPER
WINYAH GENERATING STATION UNIT 3
GEORGETOWN, SOUTH CAROLINA

sheet title
PLAN - ASH POND 3 & 4
SHEET 4

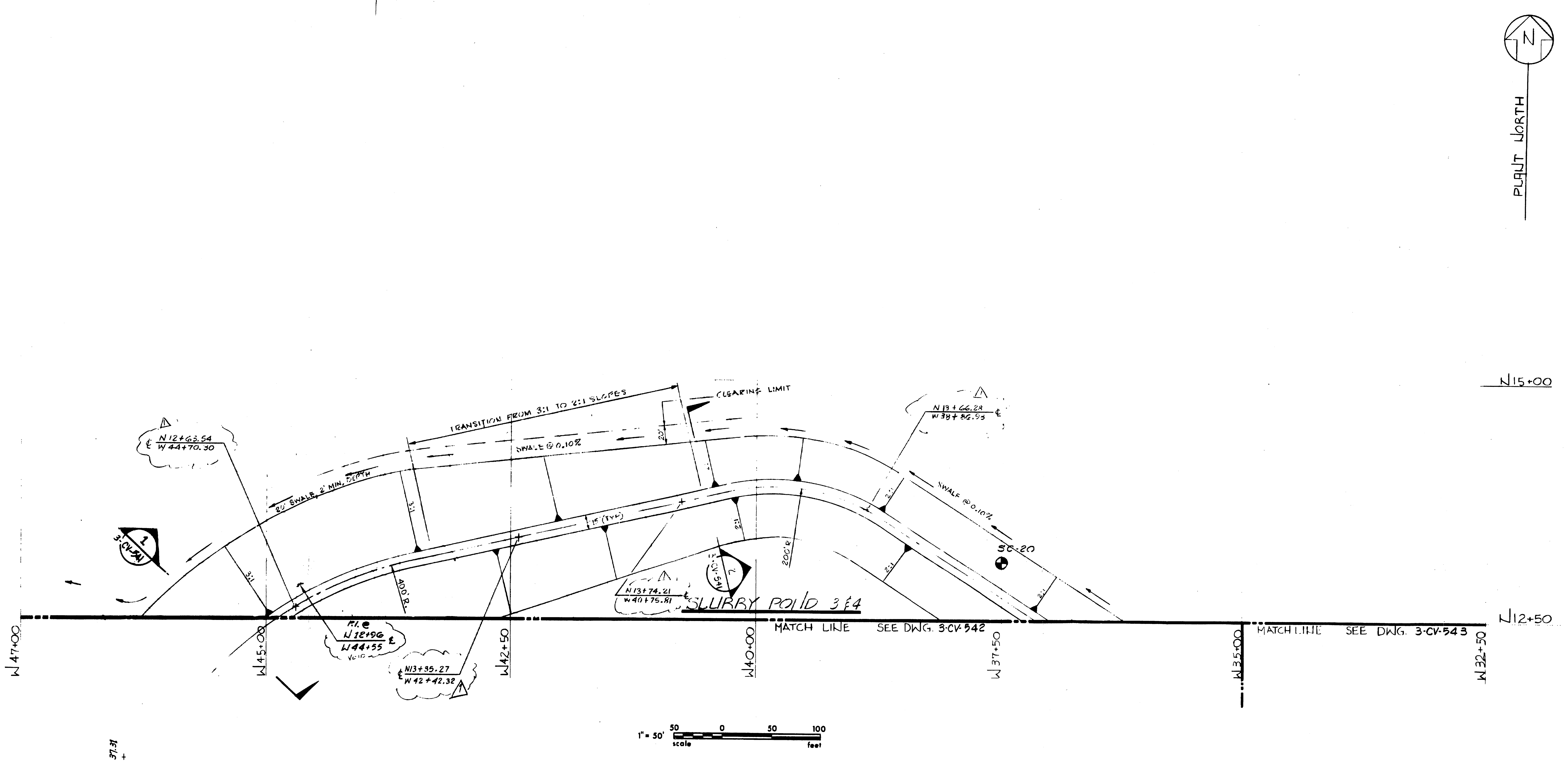
scale 1"=50'
date 5-1-78

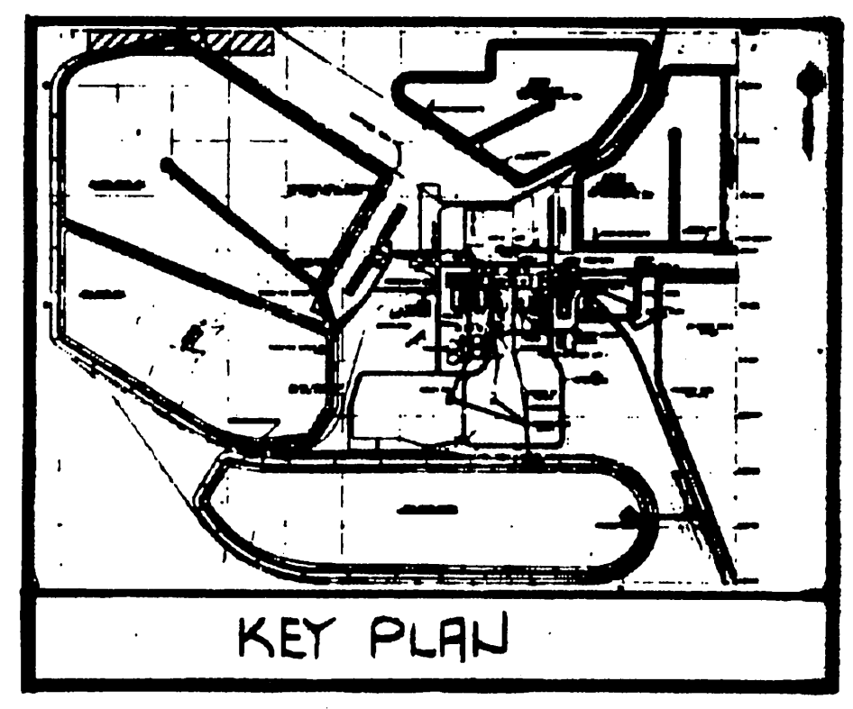
W3-300.00-0432

PKG	ISSUE	DATE	REV
386	Const	2-7-79	1
386	BID	10-6-78	0

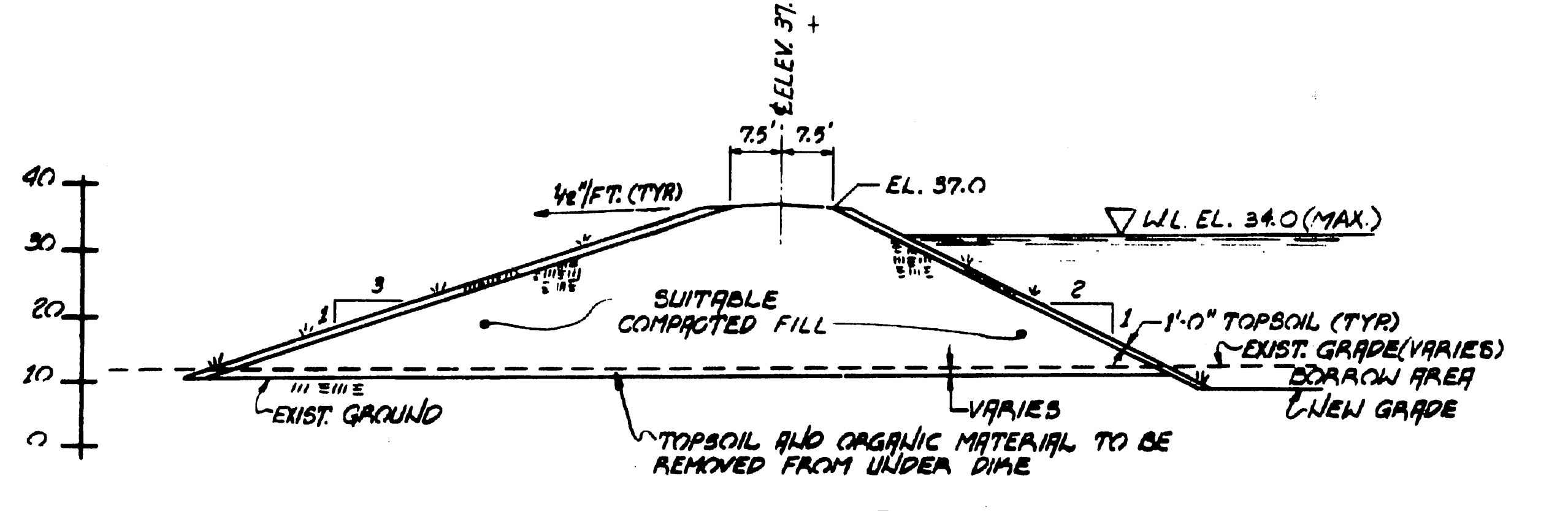
L-G JOB NO. 77043.01
B&R W.O. NO. 3389
dwg. no. 3-CV-547

West Ash Pond

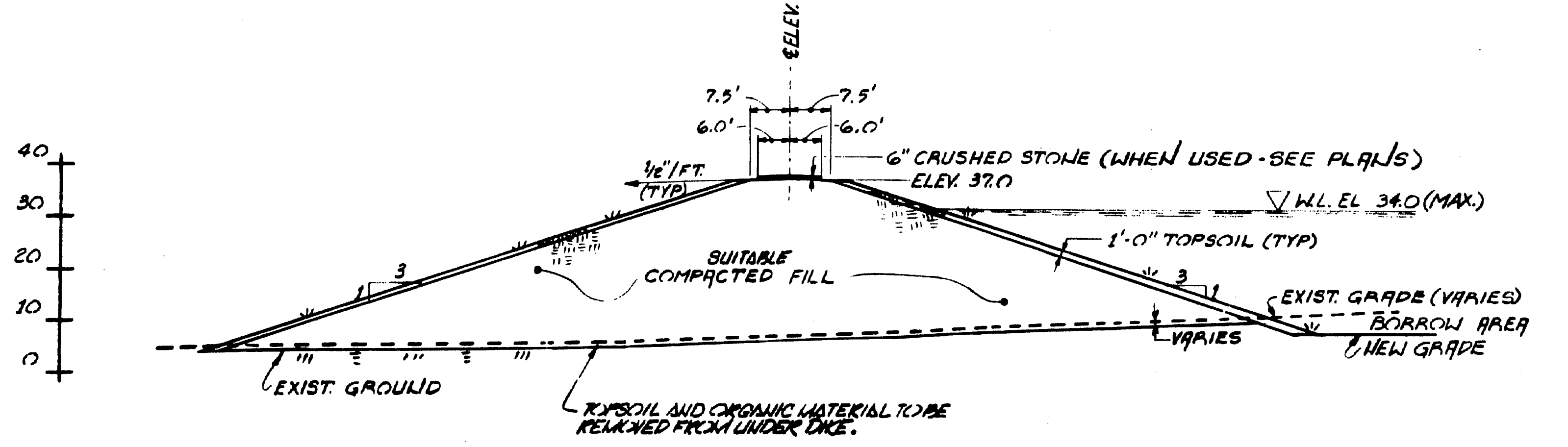




KEY PLAN

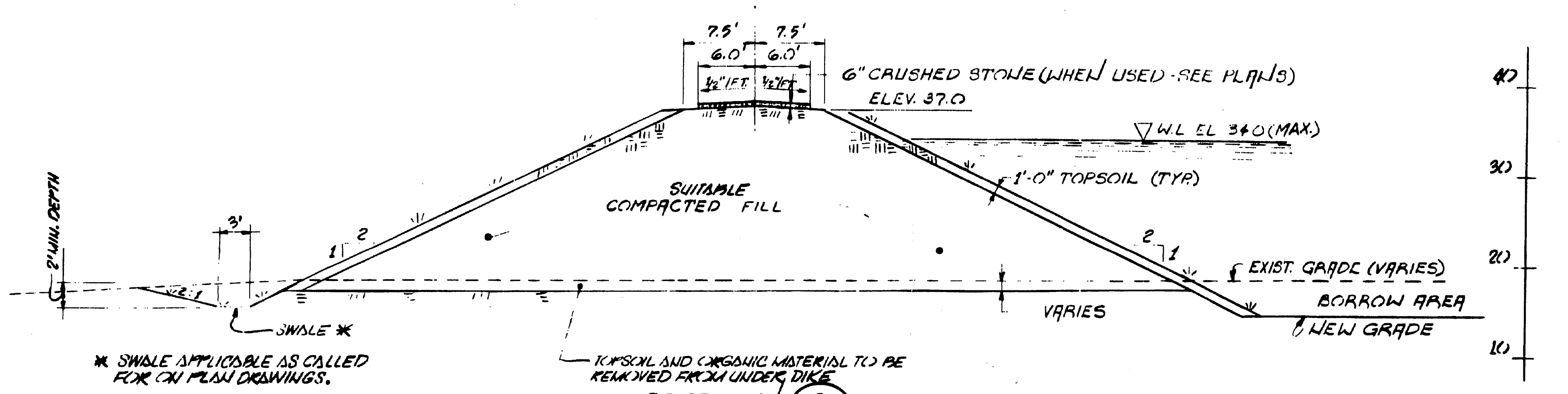


SECTION 3 3-CV-542
SCALE: 1" = 20'-0" 3-CV-541



SECTION 1 3-CV-542, 544
SCALE: 1" = 20'-0" 3-CV-541

TYPICAL FOR DIKES WITH 3:1 SLOPES



SECTION 2 3-CV-542, 543, 545
SCALE 1" = 10'-0" 3-CV-541

TYPICAL FOR DIKES WITH 2:1 SLOPES

DATUM NOTE:
ALL ELEVATIONS SHOWN ON THIS DRAWING ARE RELATIVE TO UNITS 3 AND 4 CONSTRUCTION BENCH MARKS ESTABLISHED BY ASSOCIATED SURVEYORS, INC. UNDER CONTRACT 3389-366.
TO DETERMINE TRUE ELEVATION RELATIVE TO MEAN SEA LEVEL UNIT 1 AND UNIT 2 VERTICAL ALIGNMENT, ADD 0.42' TO THE ELEVATION SHOWN.

N3·300·00·01.26

PKG	ISSUE	DATE	REV.
386	Const	2-7-79	0
386	BID	10-6-78	0

no	date	REVISION	by	ck.	appr.
1	12-14-79	REVISED AS PER AS BUILT DRAWINGS	BKB		
0	10-6-78	ISSUED FOR BIDS-CONTR. 386	G	PRD	
B	5-23-78	ISSUED FOR OWNER'S REVIEW	G		
A	5-?-78	B&R REVIEW			

drawn by Calaio
dept. ck. PR Dukalia
dept. appr. Nel Blu
coord. ck.
p.m. appr. WJ
B&R appr. M. J. Peri 1/29/80

BURNS AND ROE, INC.
ENGINEERS AND CONSTRUCTORS
ORADELL, N. J. HEMPSTEAD, N. Y. LOS ANGELES, CALIF.

ATLANTA DALLAS NEW YORK
LOCKWOOD GREENE
ARCHITECTS · ENGINEERS
SPARTANBURG, S.C.

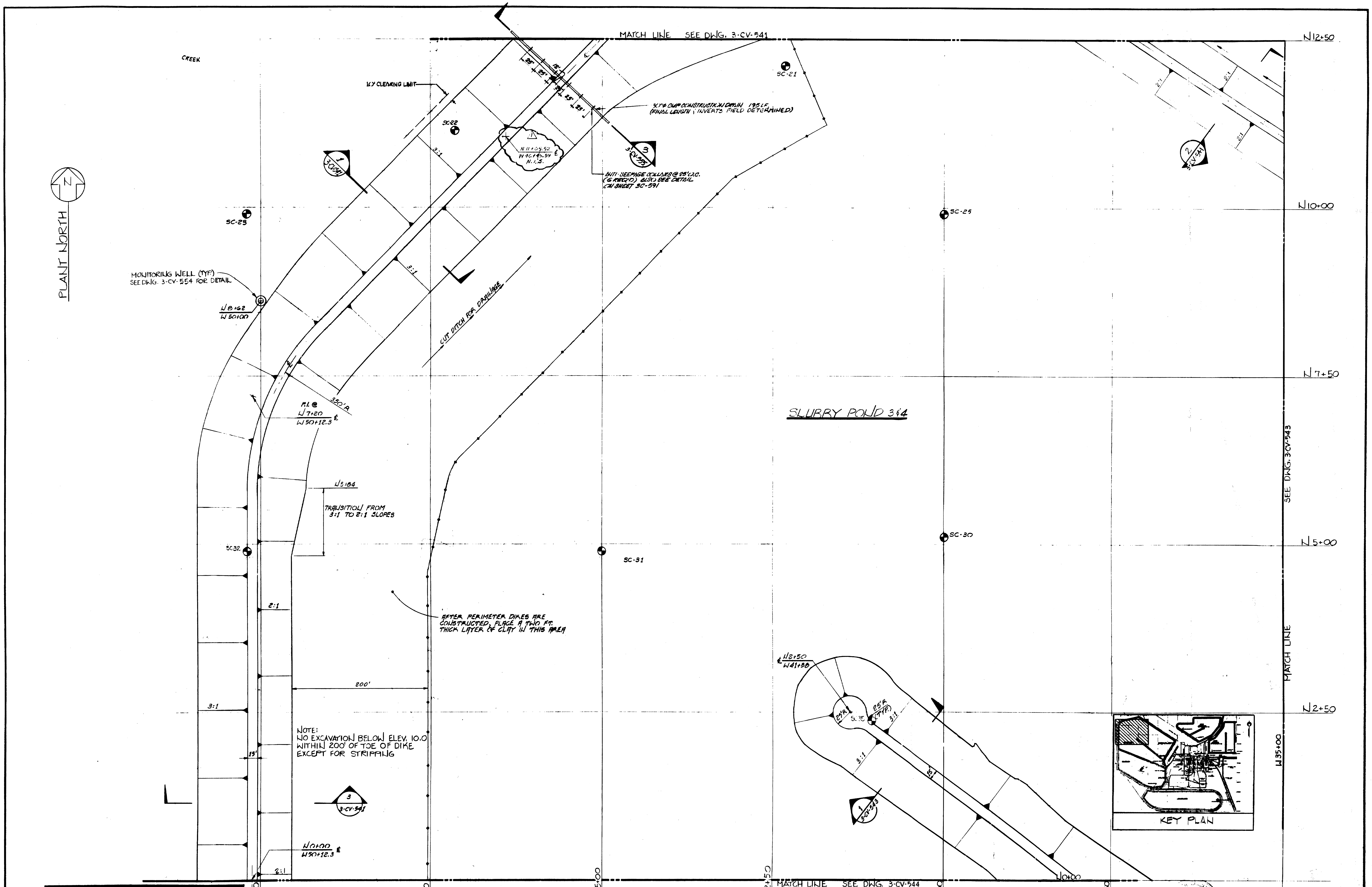
job name
SANTEE COOPER
WINYAH GENERATING STATION UNIT 3
GEORGETOWN, SOUTH CAROLINA

sheet title
PLAN - SLURRY POND 3 & 4
SHEET 1

scale AS NOTED
date 5-1-78
L-G JOB NO. 77043.01
B&R W.O. NO. 3389
dwg. no. 3-CV-541
rev. 1

CAROLINA

3-4 Slurry Pond 2-3



DATUM NOTE:
ALL ELEVATIONS SHOWN ON THIS DRAWING ARE RELATIVE TO UNITS 3 AND 4 CONSTRUCTION BENCH MARKS ESTABLISHED BY ASSOCIATED SURVEYORS, INC. UNDER CONTRACT 3389-366.
TO DETERMINE TRUE ELEVATION RELATIVE TO MEAN SEA LEVEL UNIT 1 AND UNIT 2 VERTICAL ALIGNMENT, ADD 0.42' TO THE ELEVATION SHOWN.

no	date	REVISION	by	ck.	appr.
1.	[illegible]	ADDED AS BUILT COORDINATES TO ℄ DIKE	BKB		
0	10-6-78	ISSUED FOR BIDS-CONTR. 386	G	PRD	
B	[illegible]	ISSUED FOR OWNER'S REVIEW	CWG		
A	[illegible]	B&R REVIEW			

drawn by G
dept. ck. F.R. DURALIA
dept. appr. [illegible]
coord. ck.
p.m. appr. [illegible]
B&R appr. M.J. Perin 1/29/80

BURNS AND ROE, INC.
ENGINEERS AND CONSTRUCTORS
ORADELL, N. J. HEMPSTEAD, N. Y. LOS ANGELES, CALIF.

ATLANTA DALLAS NEW YORK
LOCKWOOD GREENE
ARCHITECTS · ENGINEERS
SPARTANBURG, S.C.

job name
SANTEE COOPER
WINYAH GENERATING STATION UNIT 3
GEORGETOWN, SOUTH CAROLINA

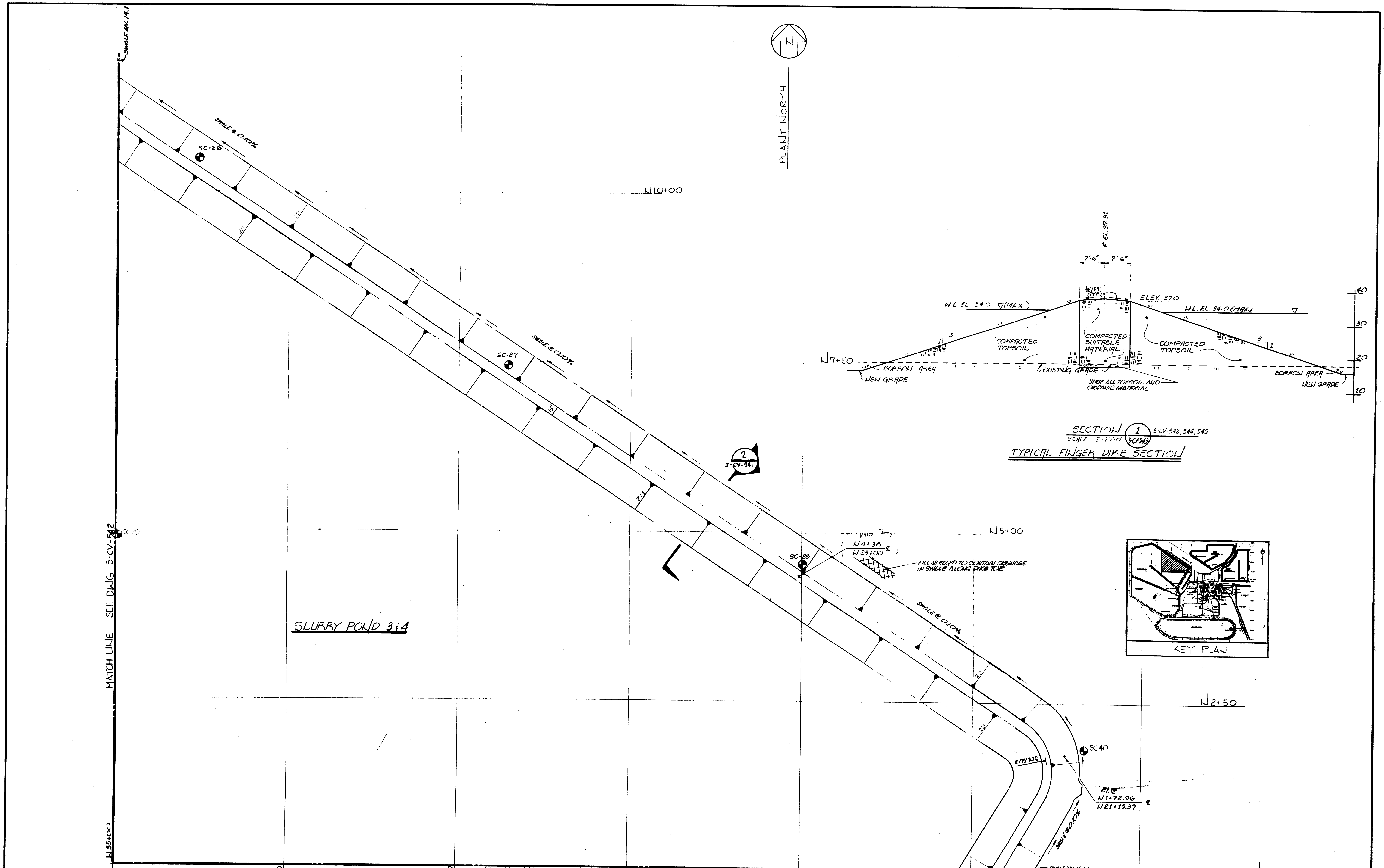
sheet title
PLAN - SLURRY POND 3 & 4
SHEET 2

scale AS NOTED
date 5-1-78
L-G JOB NO. 77043.01
B&R W.O. NO. 3389
dwg. no. 3-CV-542
rev. 1

W3-300-00-0127

PKG	ISSUE	DATE	REV
386	Const	2-7-79	0
386	BID	10-6-78	0

3-4 Slurry Pond



SECTION ① 3-CV-542, 544, 545
SCALE 1"=10'-0" 3-CV-543

TYPICAL FINGER DIKE SECTION

DATUM NOTE:
ALL ELEVATIONS SHOWN ON THIS DRAWING ARE RELATIVE TO UNITS 3 AND 4 CONSTRUCTION BENCH MARKS ESTABLISHED BY ASSOCIATED SURVEYORS, INC. UNDER CONTRACT 3369-366.
TO DETERMINE TRUE ELEVATION RELATIVE TO MEAN SEA LEVEL UNIT 1 AND UNIT 2 VERTICAL ALIGNMENT, ADD 0.42' TO THE ELEVATION SHOWN.

no	date	REVISION	by	ck.	appr.	no	date	REVISION	by	ck	appr.
1	12-14-79	REVISED AS PER AS BUILT DRAWINGS	BKB								
0	10-6-78	ISSUED FOR BIDS - CONTR. 3BG	Co	PRD							
B	6-23-78	ISSUED FOR OWNER'S REVIEW	CW/Co								
A	5-5-78	B&R REVIEW									

drawn by Co
dept. ck. PK Quraltia
dept. appr. Fred Allen
coord. ck.
p.m. appr. WS
B&R appr. M. J. Bm 1/29/80

BURNS AND ROE, INC.
ENGINEERS AND CONSTRUCTORS
ORADELL, N. J. HEMPSTEAD, N. Y. LOS ANGELES, CALIF.

ATLANTA DALLAS NEW YORK
LOCKWOOD GREENE
ARCHITECTS · ENGINEERS
SPARTANBURG, S.C.

1" = 50' scale 50 0 50 100 feet

job name
SANTEE COOPER
WINYAH GENERATING STATION UNIT 3
GEORGETOWN, SOUTH CAROLINA

sheet title
PLAN - SLURRY POND 3 & 4
SHEET 3

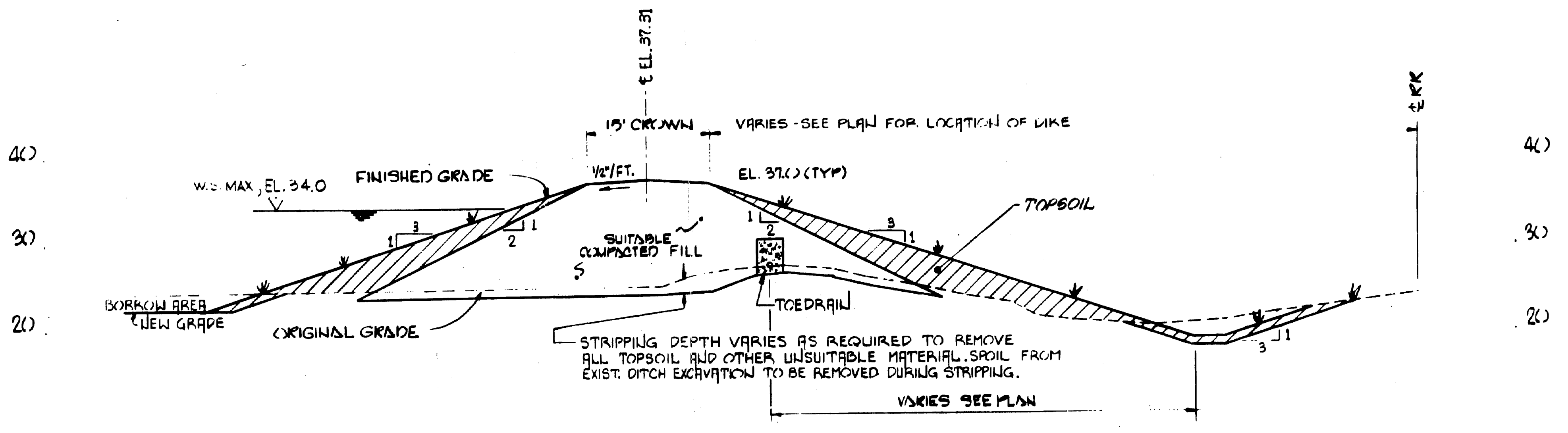
scale AS NOTED
date 5-1-78

W3.300.00.0128

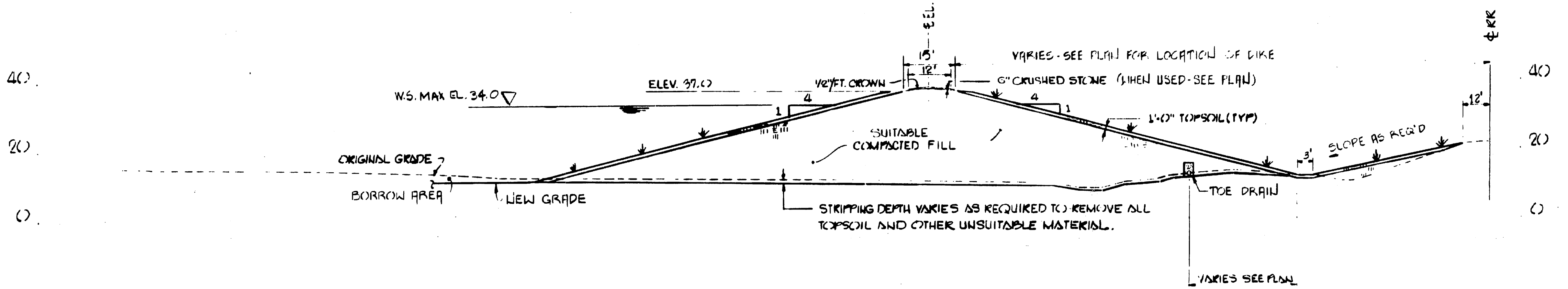
PKG	ISSUE	DATE	REV
386	Const	8-7-79	0
386	BID	10-6-78	0

L-G JOB NO. 77043.01
B&R W.O. NO. 3389
dwg. no. 3-CV-543
rev. 1

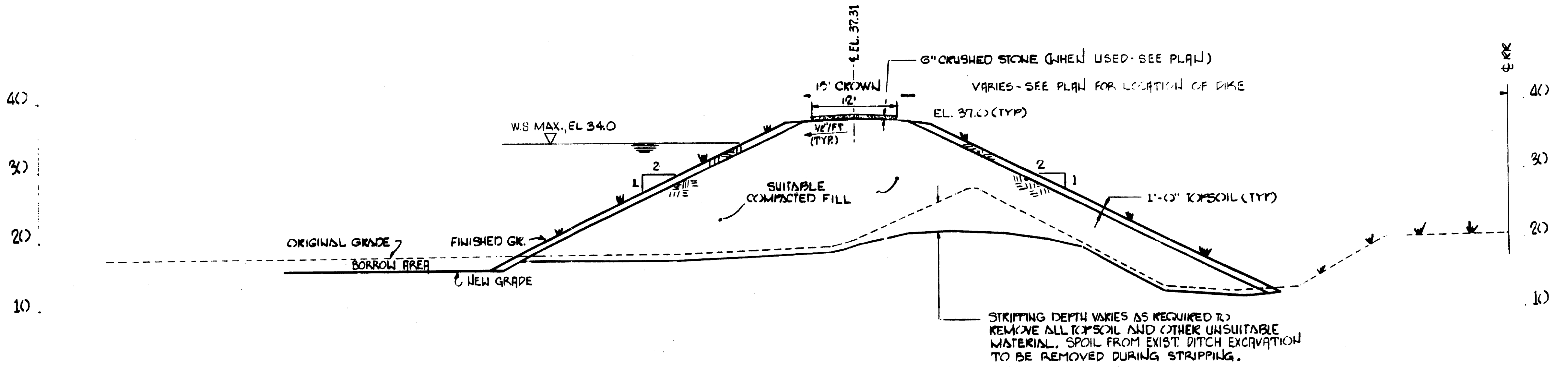
3-4 Slurry Pond



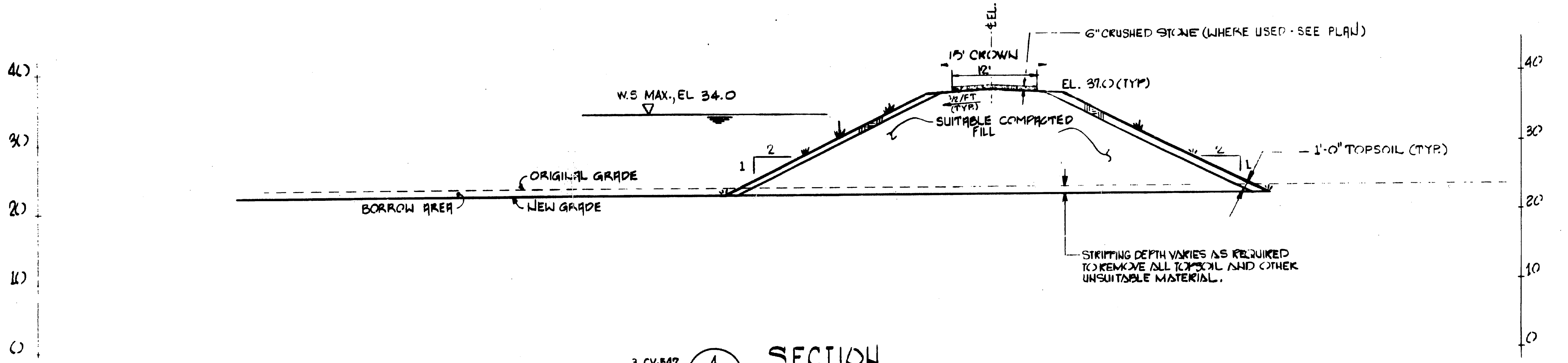
3-CV-549
3-CV-550
① 3-CV-551 SECTION
SCALE 1" = 10'



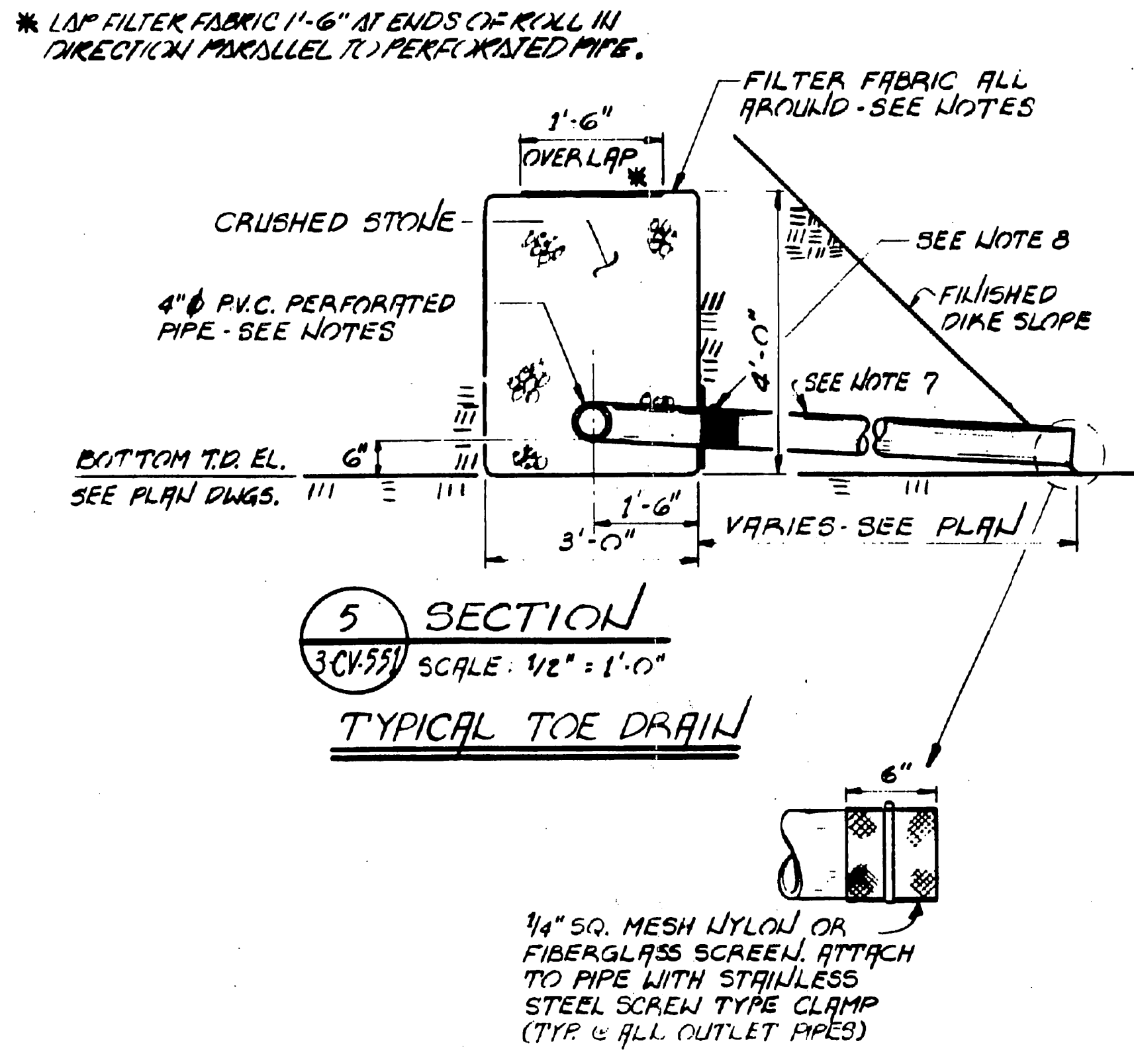
3-CV-548
3-CV-549
② 3-CV-551 SECTION
SCALE 1" = 20'



3-CV-547
3-CV-546
③ 3-CV-551 SECTION
SCALE 1" = 10'



3 CV-547
④ 3-CV-551 SECTION
SCALE 1" = 10'



⑤ 3-CV-551 SECTION
SCALE: 1/2" = 1'-0"

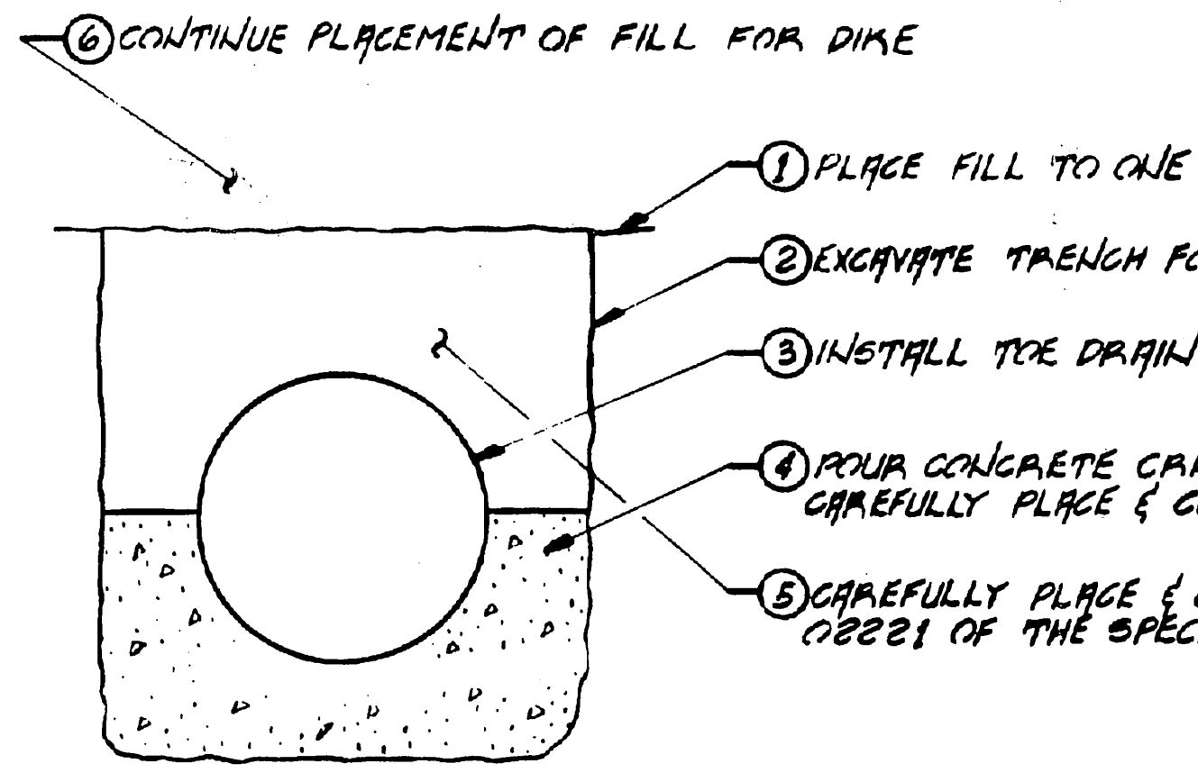
TYPICAL TOE DRAIN

TOE DRAIN NOTES

1. THE CRUSHED STONE SHALL BE GRADATION #57 ACCORDING TO SOUTH CAROLINA STATE HIGHWAY DEPT. STD. SPECIFICATIONS. CRUSHED STONE SHALL BE GRANITE.
2. FILTER FABRIC SHALL BE WOVEN OR SPUNBONDED POLYESTER OR POLYPROPYLENE FABRIC. APPROVED MANUFACTURERS:
   - DUPONT "TYPAR" STYLE 3401
   - ADVANCE CONST. SPECIALTIES "LAUREL EROSION CLOTH, TYPE I."
   - CARTHAGE MILLS, INC. "FILTER-X"
   - MONSANTO TEXTILES "BIDIM C-38"
3. PERFORATED PIPE SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:

ASTM	TITLE
D1754	RIGID POLY (VINYL CHLORIDE) COMPOUNDS AND CHLORINATED POLY (VINYL CHLORIDE) COMPOUNDS
D 3034	TYPE PSM POLY (VINYL CHLORIDE)(PVC) SEWER PIPE AND FITTINGS

4. THE PIPE SHALL BE MADE OF PVC PLASTIC HAVING A CELL CLASSIFICATION OF 12454-B AND THE SDR SHALL NOT BE GREATER THAN 35.
5. PERFORATIONS SHALL BE IN ACCORDANCE WITH ASTM C 700 "VITRIFIED CLAY PIPE, EXTRA STRENGTH, STANDARD STRENGTH AND PERFORATED."
6. PERFORATED PIPE SHALL BE LAID WITH PERFORATIONS DOWN.
7. OUTLET PIPE, 4"ϕ NON-PERFORATED P.V.C., SPACED AT 200' ON CENTER MAXIMUM. FIELD ADJUST WHERE NECESSARY SO THAT OUTLET PIPE IS INSTALLED AT ALL LOW POINTS ON TOE DRAIN. SLOPE OUTLET PIPE @ 0.5% MIN.
   GRADE AREA AT TOE OF DIKES SO THAT NO PONDING OF WATER CAN OCCUR AND SO THAT OUTLET PIPES ARE FREE TO DRAIN.
8. CONTRACTOR SHALL WRAP ANY PIPE PENETRATION THRU FILTER FABRIC WITH 12" WIDE BY 4'-0" LONG PIECE OF FILTER FABRIC TO INSURE THAT NO AGGREGATE IS EXPOSED TO EARTH.



⑥ CONTINUE PLACEMENT OF FILL FOR DIKE

① PLACE FILL TO ONE FT. ABOVE TOE DRAIN OR PIPE.

② EXCAVATE TRENCH FOR TOE DRAIN OR PIPE INSTALLATION.

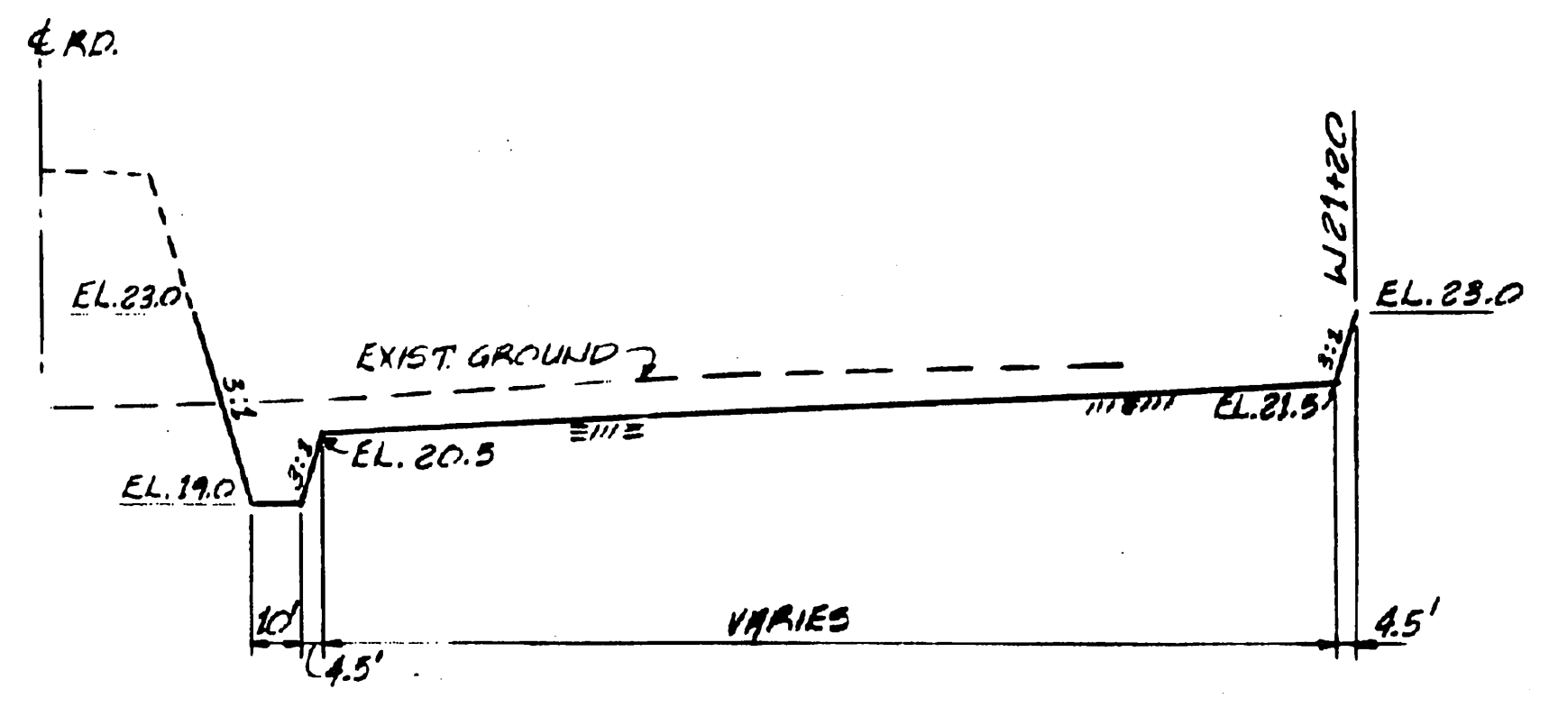
③ INSTALL TOE DRAIN OR PIPE (PIPE SHOWN FOR CLARITY)

④ POUR CONCRETE CRADLE FOR PIPE WHERE CALLED FOR, OR CAREFULLY PLACE & COMPACT SUITABLE BACKFILL MATERIAL.

⑤ CAREFULLY PLACE & COMPACT BACKFILL PER SECTION 02221 OF THE SPECIFICATIONS.

INSTALLATION OF PIPES OR TOE DRAINS UNDER DIKES

⑥ 3-CV-551 DETAIL
N.T.S.



SECTION ⑦ 3-CV-551
3-CV-516, 517
SCALE: 1" = 40' HORZ.
1" = 4' VERT.

DATUM NOTE:
ALL ELEVATIONS SHOWN ON THIS DRAWING ARE RELATIVE TO UNITS 3 AND 4 CONSTRUCTION BENCH MARKS ESTABLISHED BY ASSOCIATED SURVEYORS, INC. UNDER CONTRACT 3389-366.
TO DETERMINE TRUE ELEVATION RELATIVE TO MEAN SEA LEVEL UNIT 1 AND UNIT 2 VERTICAL ALIGNMENT, ADD 0.42' TO THE ELEVATION SHOWN.

5444
ENGINEER
P. R. DURALIA

W3-300-00-0136

386	CONST	2-7-79	0
386	BID	10-6-78	0
PKG	ISSUE	DATE	REV

BURNS AND ROE, INC.
ENGINEERS AND CONSTRUCTORS
ORADELL, N. J. HEMPSTEAD, N. Y. LOS ANGELES, CALIF.

ATLANTA DALLAS NEW YORK
LOCKWOOD GREENE
ARCHITECTS · ENGINEERS
SPARTANBURG, S.C.

job name
SANTEE COOPER
WINYAH GENERATING STATION UNIT 3
GEORGETOWN, SOUTH CAROLINA

sheet title
MISCELLANEOUS SECTIONS
SHEET 1

scale
AS NOTED

L-G JOB NO. 77043.01
B&R W.O. NO. 3389

date
5-1-78

dwg. no.
3-CV-551

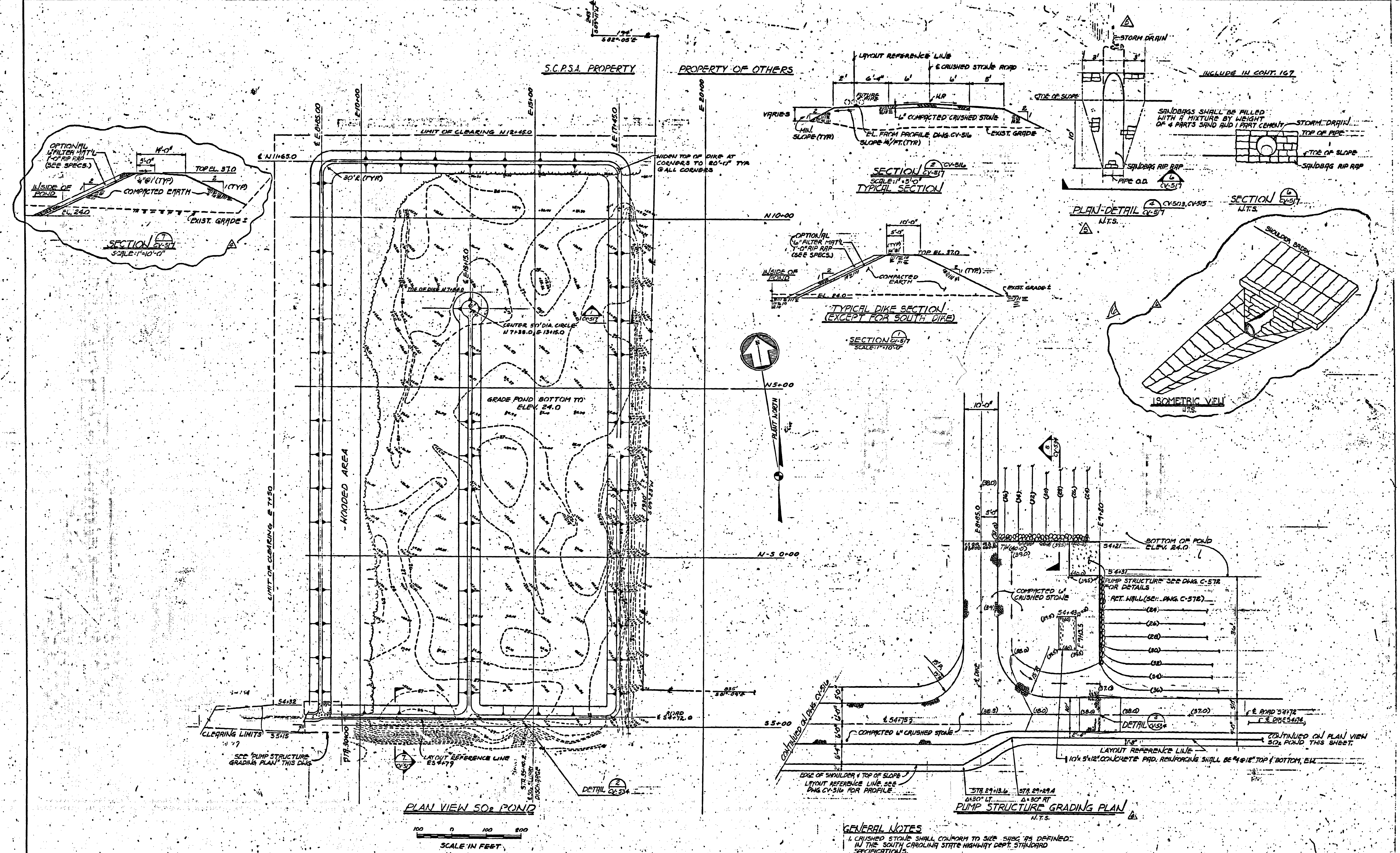
rev.
0

no	date	REVISION	by	ck.	appr.
0	10-6-78	ISSUED FOR BIDS - CONTR. 386	G	PRD	
B	[illegible]	ISSUED FOR OWNER'S REVIEW	G		
A	[illegible]	B&R REVIEW			

drawn by B TUCKER III
dept. ck. P.R. DURALIA
dept. appr.
coord. ck.
p.m. appr.
B&R appr. M. J. Peri 1/29/8

South Ind
Sect-1

Appendix A - Doc 1.7 Unit 2 Slurry Pond Impoundment Drawing



GENERAL NOTES

1. CRUSHED STONE SHALL CONFORM TO SIZE SABC AS DEFINED IN THE SOUTH CAROLINA STATE HIGHWAY DEPT. STANDARD SPECIFICATIONS.
2. ALONG SOUTH DIKE OF POND THE CONTRACTOR SHALL SHAPE EXISTING EARTHEN DIKE TO CONFORM TO 2(H):1(V) SLOPE ONLY ON INSIDE OF POND. TOP WIDTH SHALL BE AS SHOWN IN "PUMP STRUCTURE GRADING PLAN." VOID

SOUTH CAROLINA REGISTERED 5444 ENGINEER P. R. DURALIA

BURNS AND ROE, INC.
ENGINEERS AND CONSTRUCTORS
ORADELL, N. J. HEMPSTEAD, N. Y. LOS ANGELES, CALIF.

no	date	REVISION	by	ck.	appr.						
4	11-29-76	ADDED SECTION-REVISE PLAN CONT. 3197-186	Co	RGG	LF						
3	11-5-76	REVISED DIKE COORDS.-CONTRACT 3197-186	Co	PRD	LF						
2	10-7-76	ISSUED FOR CONSTRUCTION-CONTRACT 3197-186	Co	RGG	LF						
1	8-11-76	ISSUED FOR BIDS CONTRACT NO 186	Co	RGG	LF	6	9-28-77	ISSUED FOR CONSTRUCTION · CONTR. 167	G	RAH	LF
0	4-7-76	ISSUED FOR B&R APPROVAL	Co	PRD	LF	5	8-22-77	ISSUED FOR BIDS CONTRACT 167	RAH	PRD	LF

drawn by Co
dept. ck. P.R. DURALIA
dept. appr. Fred Glenn
coord. ck.
p.m. appr. L. Fowler
B&R appr.

ATLANTA DALLAS NEW YORK
LOCKWOOD GREENE
ARCHITECTS · ENGINEERS
SPARTANBURG, S.C.

sheet title
SO2 SLURRY POND
PLAN AND SECTIONS

job name
SOUTH CAROLINA PUBLIC SERVICE AUTHORITY
GEORGETOWN GENERATING STATION
GEORGETOWN SOUTH CAROLINA

scale AS NOTED
date 4-7-76
L-G JOB NO. 74090.02
B&R W.O. NO. 3197.02
DWG. NO. CV-517
rev. 6

W2- CV517

WSP-104

Unit 2 Slurry Pond

Appendix A - Doc 1.8 2005-2009 Ash Management and Sales

Ash Management and Sales

Winyah Generating Station

	Ash Produced (T)	Ash Removed (T)	% Sold
2005	338,384	328,560	97%
2006	362,713	328,490	91%
2007	341,900	296,680	87%
2008	326,497	225,190	69%
2009	264,294	144,840	55%
5-yr total	**1,633,787**	**1,323,760**	**81%**

Bottom Ash: Normally wet sluiced to the ash ponds.
Some is sold after dewatering in the pond.

Fly Ash: Normally handled dry to the carbon burn out facility.
Some is sluiced to the ash pond.

Appendix A - Doc 1.9 Winyah Generating Station Regional Map Showing the Management Unit(s) in Relationship to Critical Infrastructure

Winyah Generating Station

Appendix A - Doc 1.10 NPDES Permit

D H E C

PROMOTE PROTECT PROSPER

South Carolina Department of Health
and Environmental Control

National Pollutant Discharge Elimination System Permit

for Discharge to Surface Waters

This Permit Certifies That

South Carolina Public Service Authority
Winyah Generating Station

has been granted permission to discharge from a facility located at

661 Steam Plant Drive
Georgetown, SC
Georgetown County

to receiving waters named

001 - Turkey Creek to Sampit River
002 - North Santee River

in accordance with limitations, monitoring requirements and other conditions set forth herein. This permit is issued in accordance with the provisions of the Pollution Control Act of South Carolina (S.C. Code Sections 48-1-10 *et seq*., 1976), Regulation 61-9 and with the provisions of the Federal Clean Water Act (PL 92-500), as amended, 33 U.S.C. 1251 *et seq*., the "Act."

Jeffrey P. deBessonet, P.E., Director
Water Facilities Permitting Division

Issue Date: **January 7, 2008**

Expiration Date: **July 31, 2011**

Effective Date: **March 1, 2008**

Permit No.: **SC0022471**

Modification Issue Date: **March 4, 2009**

Modification Effective Date: **April 1, 2009**

Appendix A - Doc 1.11 Dike Inspection Procedure

4.9. Dike Inspection Procedure

4.9.1. Inspections are to be performed annually on the cooling ponds, and quarterly on the ash, slurry, and special waste ponds and documented on the Dike Inspection Report, found in Appendix E - FORMS.

4.9.2. The individual inspecting the dike(s) should inspect the crest, the slopes, and the area downstream, and complete the form, noting issues as follows:

Leaks
Any leaks on the dry side of the dike should be described such as the approximate quantity of flow, whether the water is discolored and the exact location of the leak. If a leak is found, Generation Technical Services should be notified immediately so that the appropriate steps to control the situation, and notify agencies if necessary, can be taken.

Seepage
Seepage on the dry side of the dike can be an indication of changes or shifts in the dike structure and possible future leaks. Any seepage should be described in the report.

Wet Spots
The dikes should be inspected when it has been dry for a period of time. Any areas on the dikes where the soil appears damp compared to the surrounding soil should be noted. This could be evidence of seepage.

Aquatic Weed Growth
Any aquatic weeds or wetland weeds, such as cattails, mosses, and algae, seen around the dry side of dikes could signify seepage from the ponds. If wetlands are downstream of the toe on the dry side of the dike, then the aquatic weed growth will not necessarily be a sign of dike seepage and does not need to be included in the report.

Trees and Woody Vegetation
Trees and woody vegetation can obscure problems, provide habitat for burrowing animals, and prevent growth of a protective grass cover. Trees growing along the downstream slope and near the toe of the downstream slope are a special concern and should be noted so maintenance or repair can be made.

Erosion
Any signs of erosion should be included in the report.

Depressions or Ruts
Depressions and ruts can hold water and make maintenance mowing more difficult or can weaken the soil and cause localized sloughing of the

Appendix A - Doc 1.12 Dike Inspection Reports

file: WG 51229

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

SOUTH ASH POND (Unit 3 & 4)

DATE: June 29th and 30th 2010
INSPECTOR: Arthur W. Ford
REVIEWED BY: Mitch Mitchum

SIGNATURE: Arthur Wm. KE
SIGNATURE: D. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	Freeboard > 3 feet required.
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	Visible surfaces of concrete and metal in good condition.
5. Overall Condition		
Note any other issues	√	Overall good condition.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
S I M P L E - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

Revised 4/15/2009

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

ASH POND A (Unit 1 & 2)

DATE: June 29th and 30th 2010
INSPECTOR: Arthur W. Ford
REVIEWED BY: Mitch Mitchum

SIGNATURE: Arthur Wm. AE
SIGNATURE: D. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good condition. Mowing - an ongoing process.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

ASH POND B (Unit 1 & 2)

DATE: June 29th and 30th 2010
INSPECTOR: Arthur W. Ford
REVIEWED BY: Mitch Mitchum

SIGNATURE: Arthur W. Ford /AE
SIGNATURE: D. C. Mitchum

FEATURE	OK √	LOCATION & COMMENTS - Quarterly Inspection
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	Visible surfaces of concrete and metal in good condition.
5. Overall Condition		
Note any other issues	√	

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
S I M P L E - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

DATE: June 29th and 30th 2010
INSPECTOR: Arthur W. Ford
REVIEWED BY: Mitch Mitchum

SIGNATURE: Arthur Wm. Ford AE
SIGNATURE: D. C. Mitchum

WEST ASH POND (Unit 3 & 4)

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

SLURRY POND (Unit 3 & 4)

DATE: June 29th and 30th 2010
INSPECTOR: Arthur W. Ford
REVIEWED BY: Mitch Mitchum

SIGNATURE: Arthur Wm.
AE
SIGNATURE: D.C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	Freeboard required is 3ft as shown on design drawings
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	Ditches clean and well graded.
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good condition.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

Revised 4/15/2009

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

SLURRY POND (Unit 2)

DATE: June 29th and 30th 2010
INSPECTOR: Arthur W. Ford
REVIEWED BY: Mitch Mitchum

SIGNATURE: Arthur Wm. Ford
SIGNATURE:

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good condition

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

Revised 4/15/2009

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION
SLURRY POND (Unit 2)

DATE: 13-Apr-10
INSPECTOR: Arthur W. Ford
REVIEWED BY: Mitch Mitchum

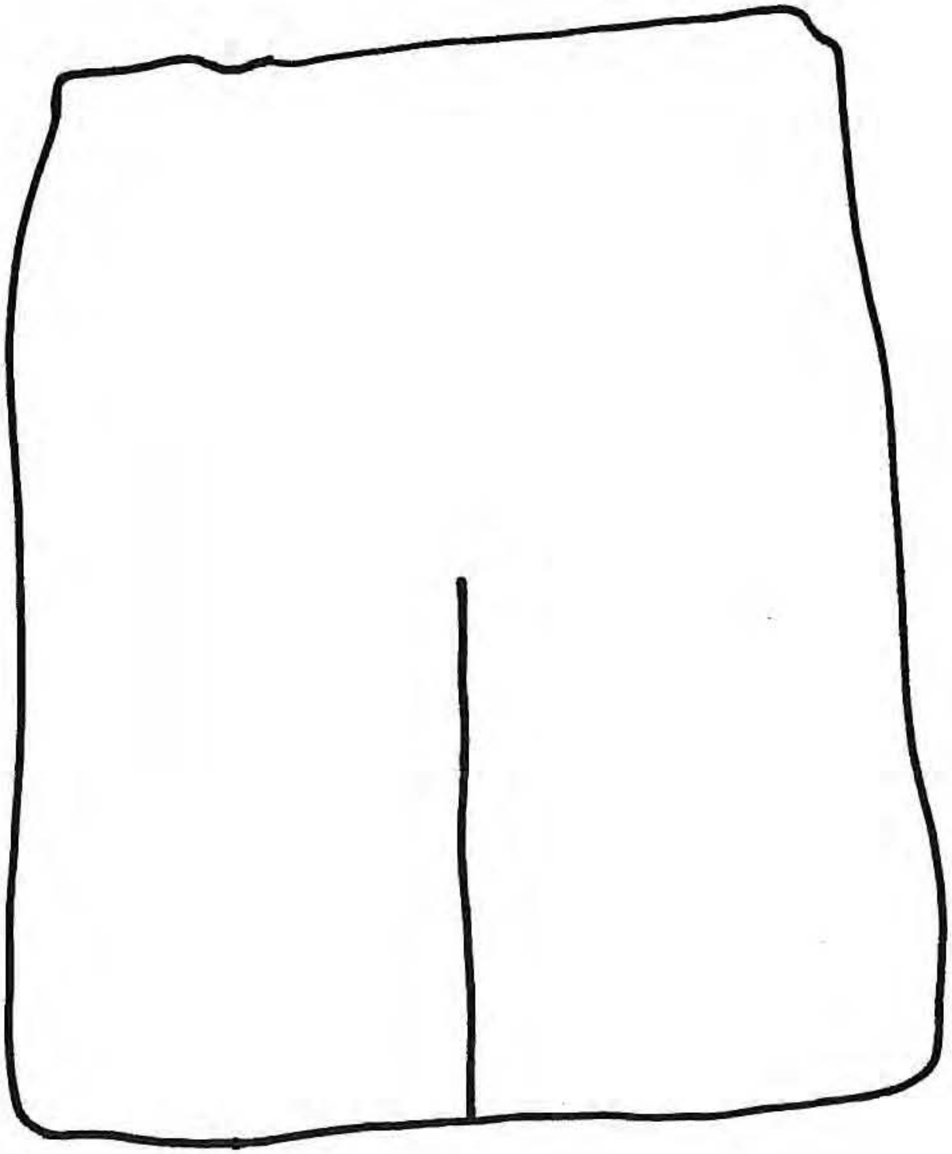
SIGNATURE: Arthur Wm.
SIGNATURE: D. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
6. Overall Condition		
Note any other issues	√	Overall good condition

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
S I M P L E - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

#2 Slurry Pond



FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

SLURRY POND (Unit 3 & 4)

DATE: 13-Apr-10
INSPECTOR: Arthur W. Ford
REVIEWED BY: Mitch Mitchum

SIGNATURE:
SIGNATURE:

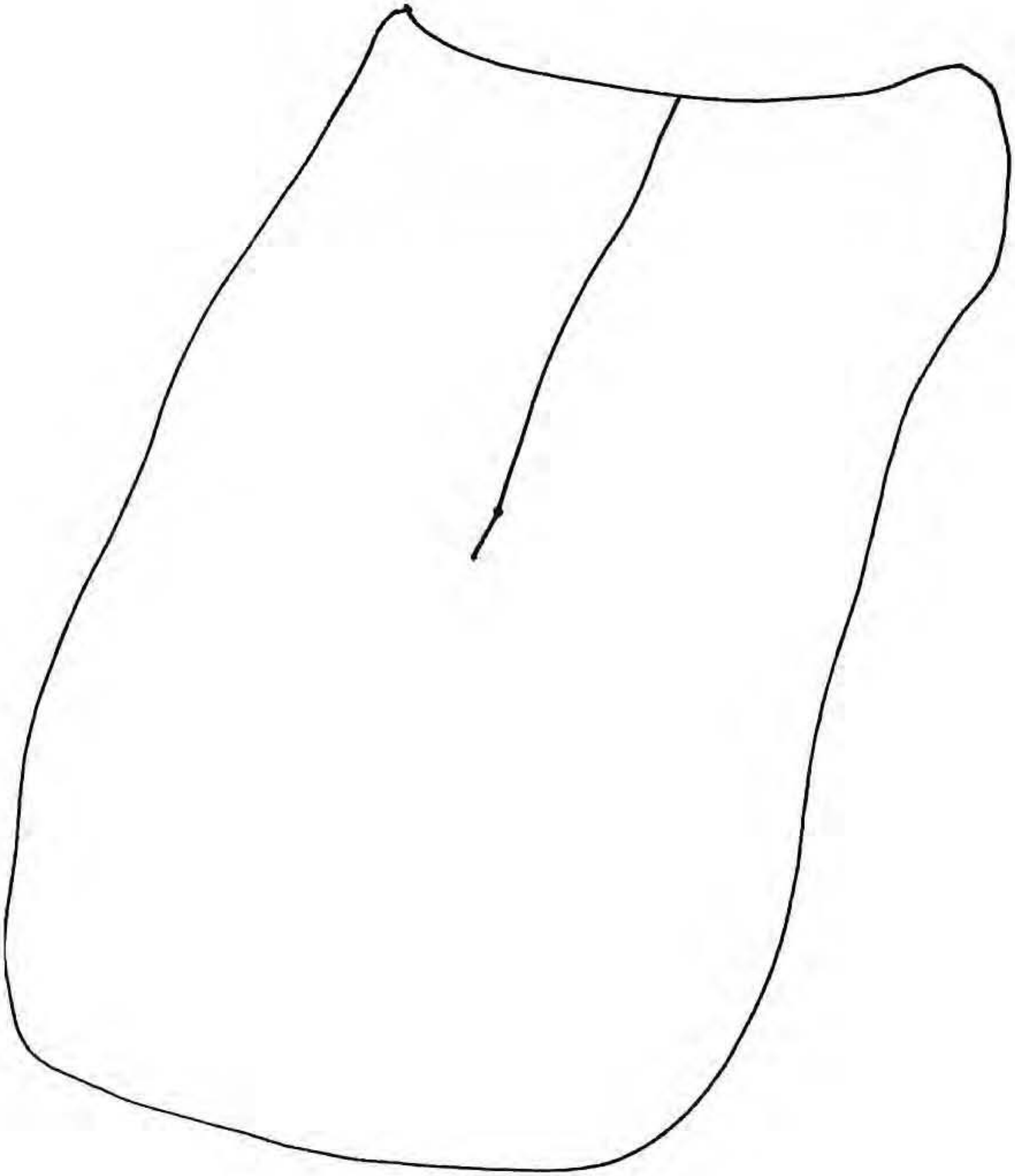
FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	Freeboard required is 3ft as shown on design drawings
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	Ditches clean and well graded.
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good condition.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
S I M P L E - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

Revised 4/15/2009

3+4 Slurry Pond



FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

WEST ASH POND (Unit 3 & 4)

DATE: 13-Apr-10
INSPECTOR: Arthur W. Ford
REVIEWED BY: Mitch Mitchum

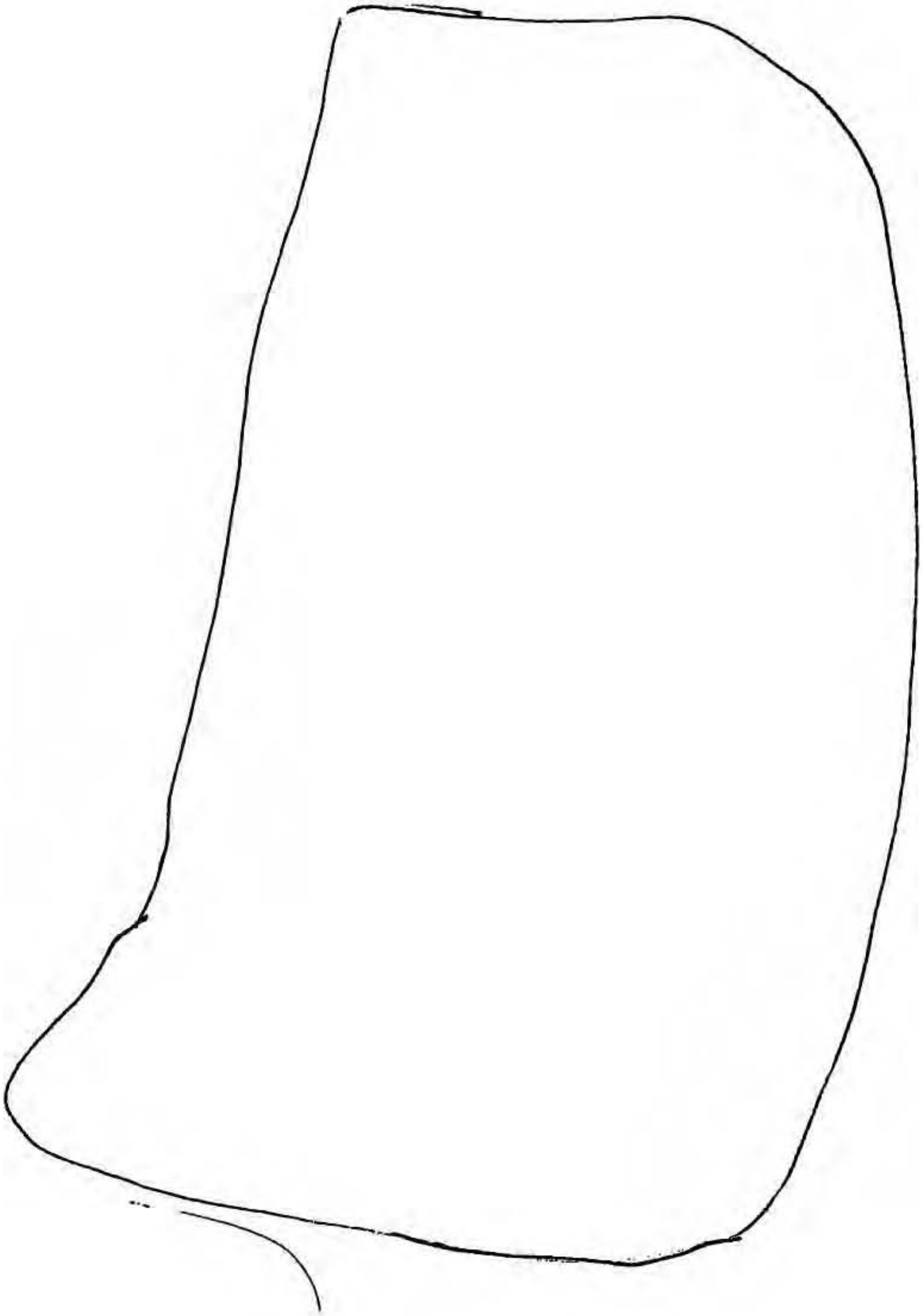
SIGNATURE: Arthur Wm. Ford
SIGNATURE: D.C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good. Mowing completed.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

West Fish Pond



FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

SOUTH ASH POND (Unit 3 & 4)

DATE: 13-Apr-10
INSPECTOR: Arthur W. Ford
REVIEWED BY: Mitch Mitchum

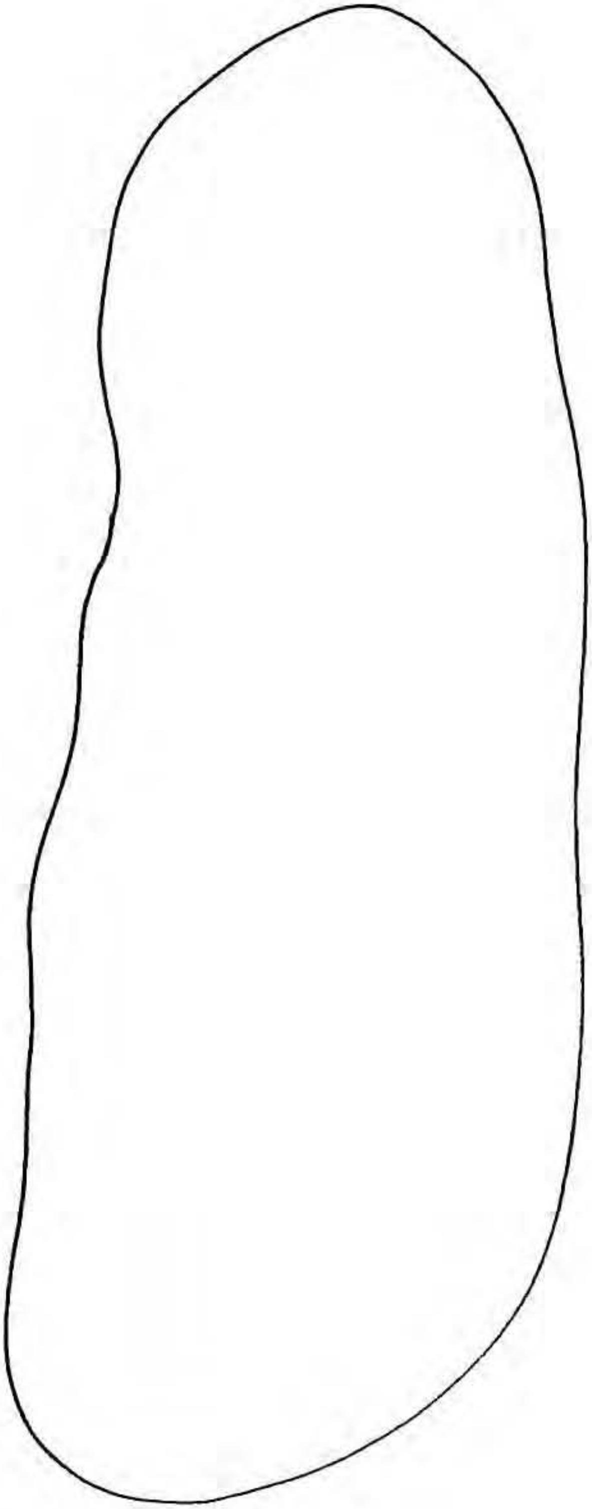
SIGNATURE: Arthur Wm.
SIGNATURE: D. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	Freeboard > 3 feet required.
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	Maintenance on drainage ditches is completed.
Drainage Pipes	√	Maintenance on outlets to toe drains is completed.
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	Visible surfaces of concrete and metal in good condition.
5. Overall Condition		
Note any other issues	√	Overall good condition. Mowing completed.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

South HSh 1 ond



FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

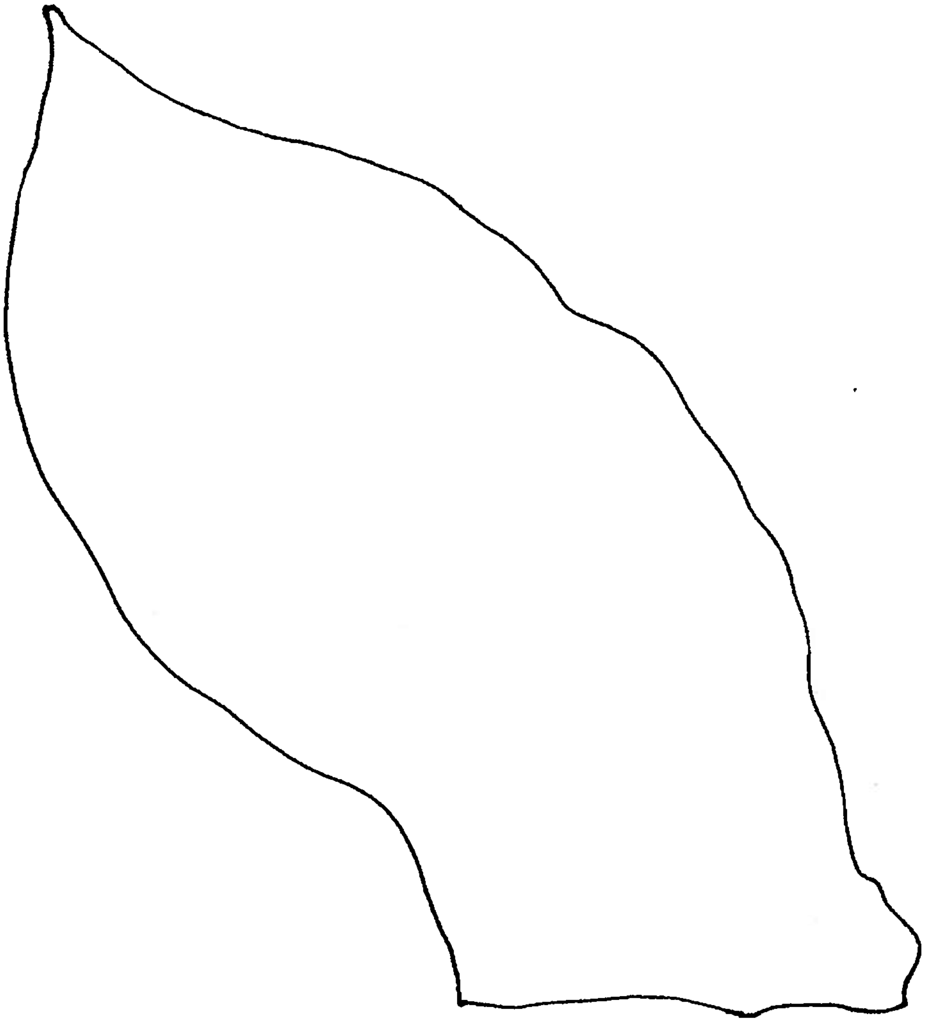
ASH POND B (Unit 1 & 2)

DATE: 13-Apr-10
INSPECTOR: Arthur W. Ford
SIGNATURE: Arthur Wm.
REVIEWED BY: Mitch Mitchum
SIGNATURE: R. C.

FEATURE	OK √	LOCATION & COMMENTS - Quarterly Inspection
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	Visible surfaces of concrete and metal in good condition.
5. Overall Condition		
Note any other issues	√	Overall condition adequate and improving due to vegetation management. Mowing completed. There is no evidence of air entrainment occuring within drop inlet structure - this action is interminent

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
S I M P L E - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood



B Ash Pond

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

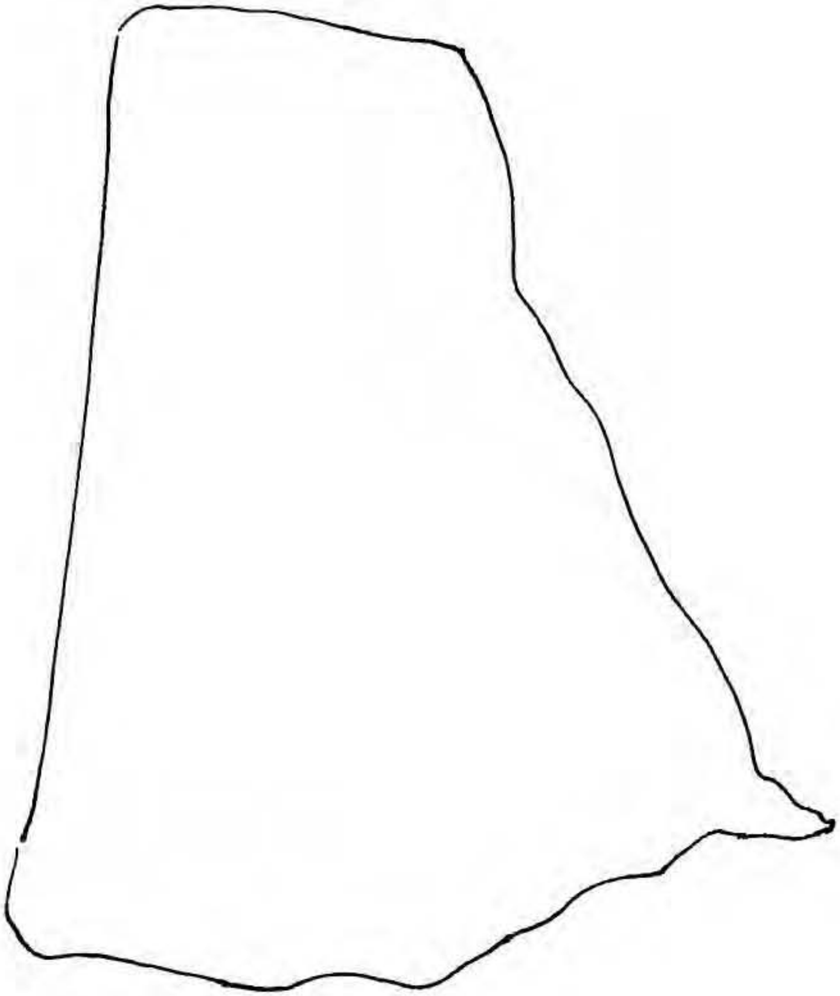
ASH POND A (Unit 1 & 2)

DATE: 13-Apr-10
INSPECTOR: Arthur W. Ford
REVIEWED BY: Mitch Mitchum
SIGNATURE:
SIGNATURE:

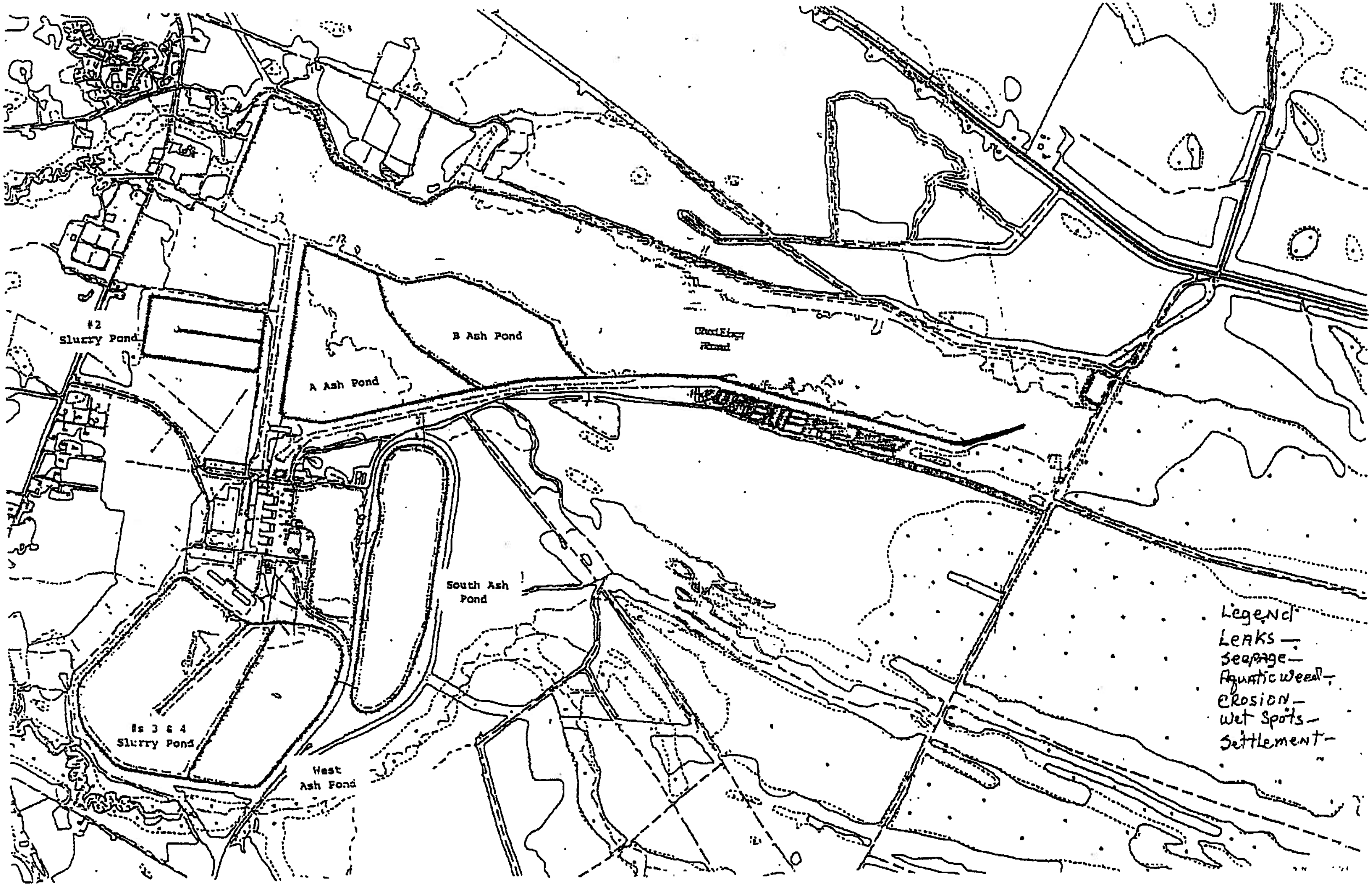
FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good condition. Mowing - an ongoing process.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood



A Ash Pond


#2 Slurry Pond
A Ash Pond
B Ash Pond
[illegible] Pond
South Ash Pond
#s 3 & 4 Slurry Pond
West Ash Pond
Legend
Leaks—
Seepage—
Aquatic weed—
Erosion—
Wet Spots—
Settlement—

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

COOLING POND

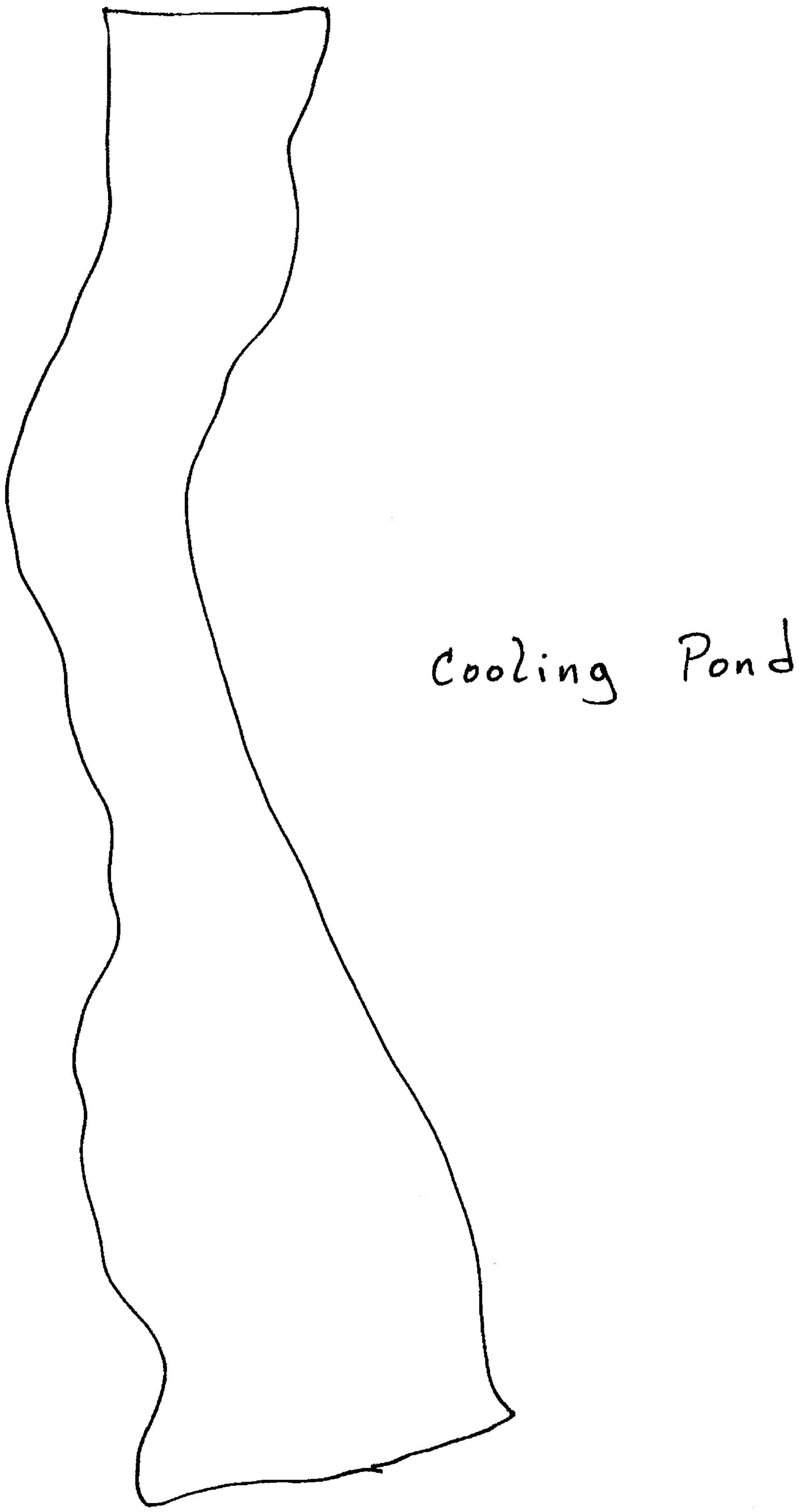
DATE: 19-Jan-10
INSPECTOR: Arthur W. Ford
REVIEWED BY: Station Manager

SIGNATURE: Arthur Wm. KE
SIGNATURE:

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	Rip-rap is scheduled to be upgraded during the first quarter of 2010
Freeboard Adequate	√	Freeboard was >1.8 feet and meets 25 yr-24 hr capacity
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	Spillway and outlet discharge structure in good condition.
5. Overall Condition		
Note any other issues	√	Overall good condition

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood


Cooling Pond

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

ASH POND A (Unit 1 & 2)

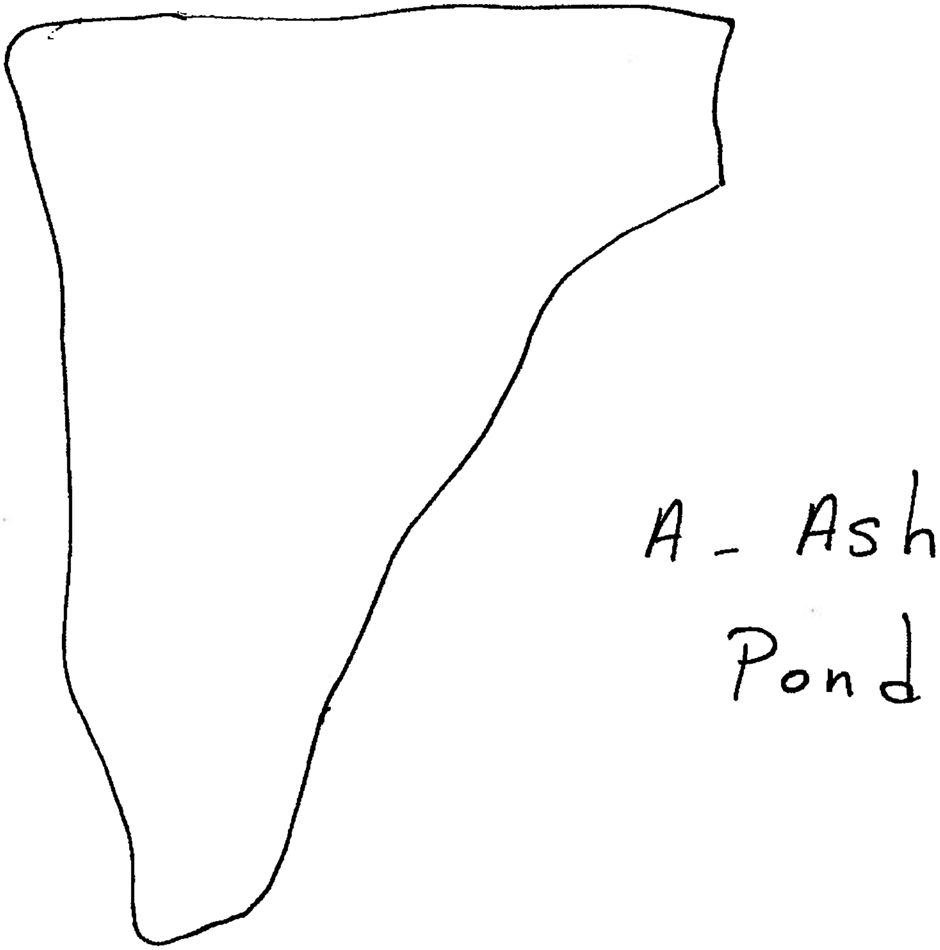
DATE: 19-Jan-10
INSPECTOR: Arthur W. Ford
REVIEWED BY: Station Manager

SIGNATURE: Arthur Wm. Ford AF
SIGNATURE: P. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good condition. Mowing - an ongoing process.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood


A- Ash
Pond

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

ASH POND B (Unit 1 & 2)

DATE: 19-Jan-10
INSPECTOR: Arthur W. Ford
REVIEWED BY: Station Manager

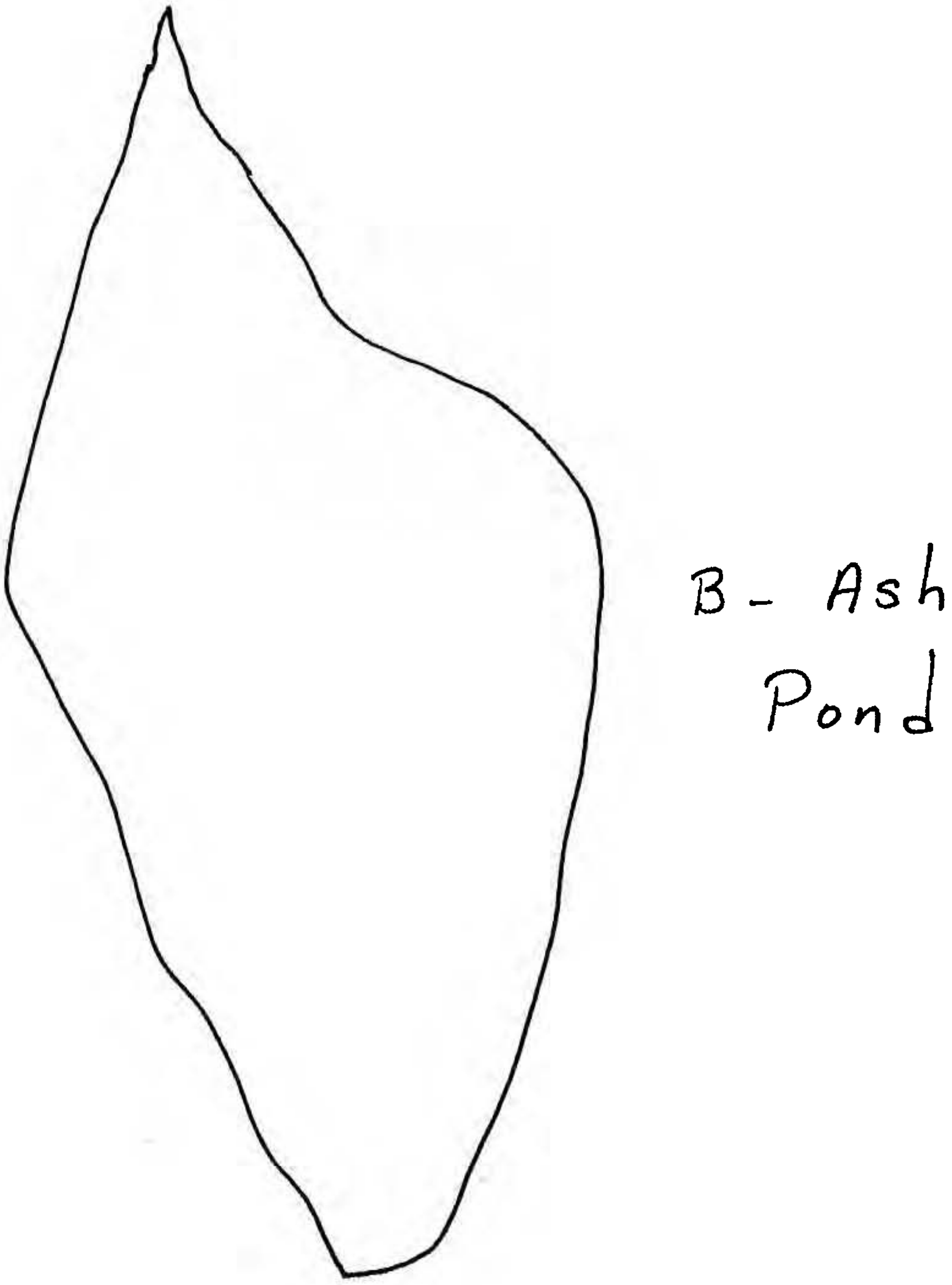
SIGNATURE: Arthur Wm Ford AE
SIGNATURE: P. C. [illegible]

FEATURE	OK √	LOCATION & COMMENTS - Quarterly Inspection
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	Visible surfaces of concrete and metal in good condition.
5. Overall Condition		
Note any other issues	√	Overall condition is good.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

Revised 4/15/2009


B- Ash
Pond

AE

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

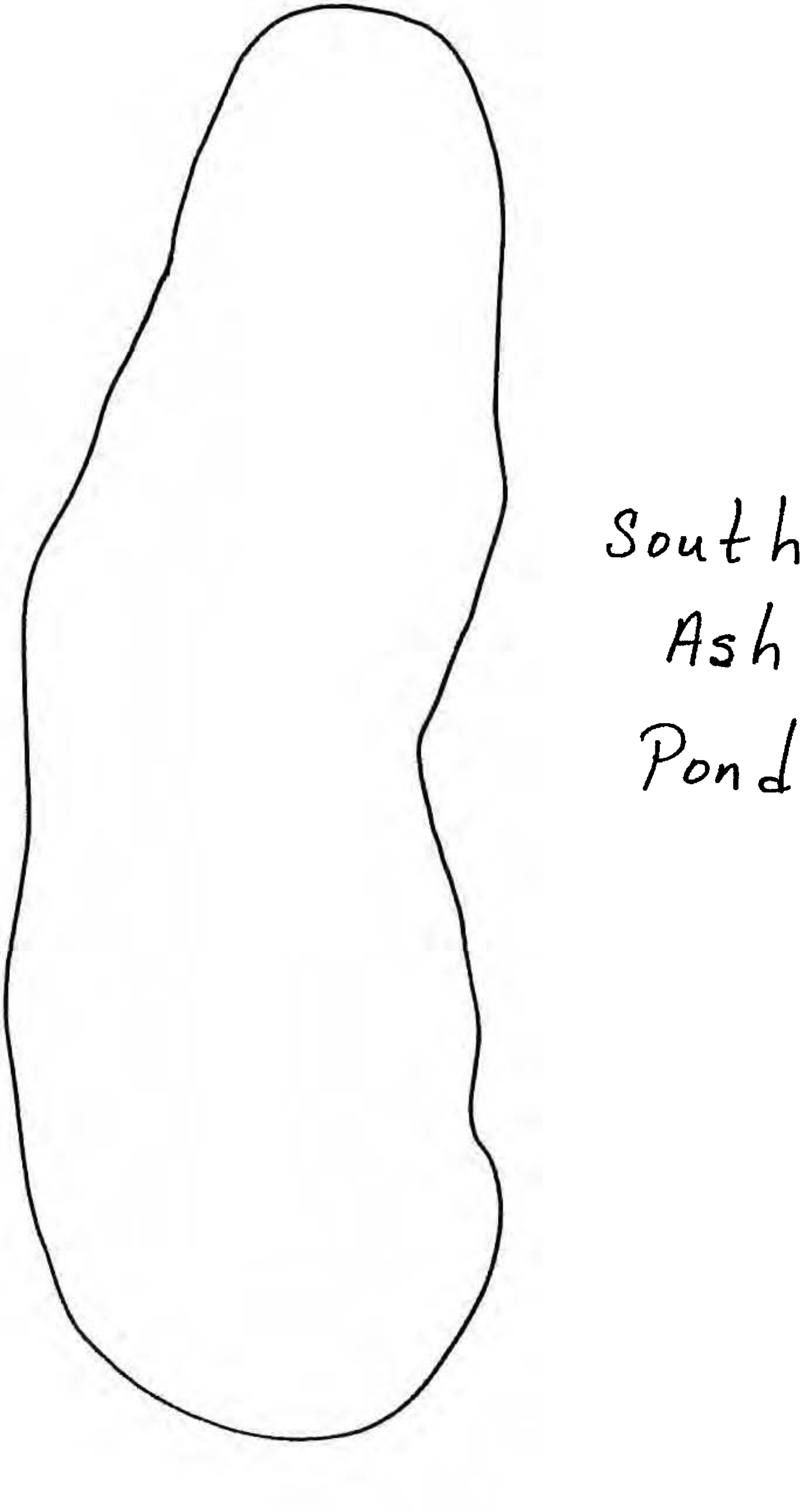
SOUTH ASH POND (Unit 3 & 4)

DATE: 19-Jan-10
INSPECTOR: Arthur W. Ford **SIGNATURE:** Arthur Wm.
REVIEWED BY: Station Manager **SIGNATURE:** D.C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	Freeboard > 3 feet required.
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	Maintenance on drainage ditches is completed.
Drainage Pipes	√	Maintenance on outlets to toe drains is completed.
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	Visible surfaces of concrete and metal in good condition.
5. Overall Condition		
Note any other issues	√	Overall good condition. Mowing completed.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood


South
Ash
Pond

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

WEST ASH POND (Unit 3 & 4)

DATE: 19-Jan-10
INSPECTOR: Arthur W. Ford
REVIEWED BY: Station Manager

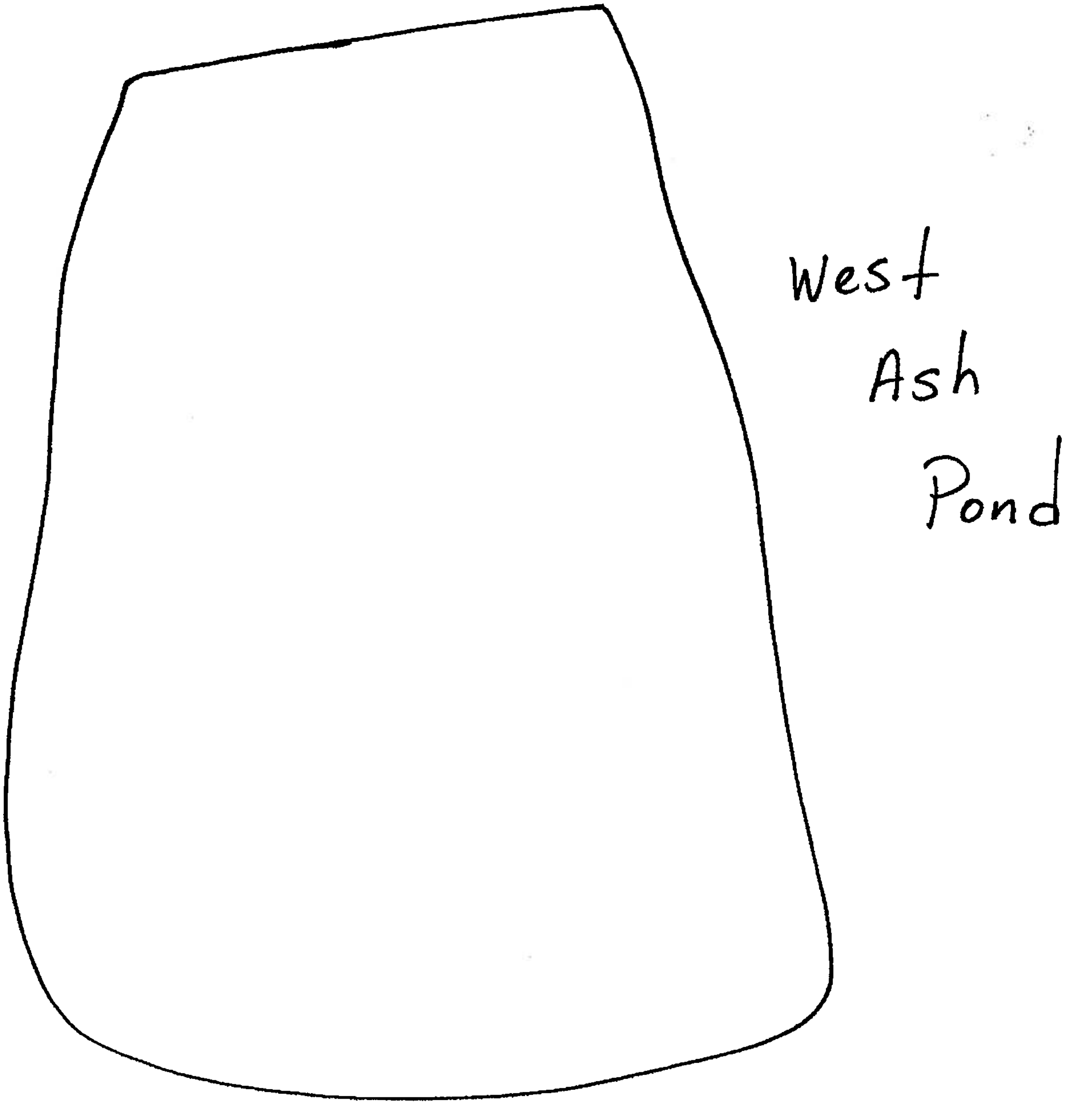
SIGNATURE: Arthur Wm. Ford
AE
SIGNATURE: D. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good. Mowing completed. Continue with program to remove woody growth.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

Revised 4/15/2009


West Ash Pond

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

SLURRY POND (Unit 2)

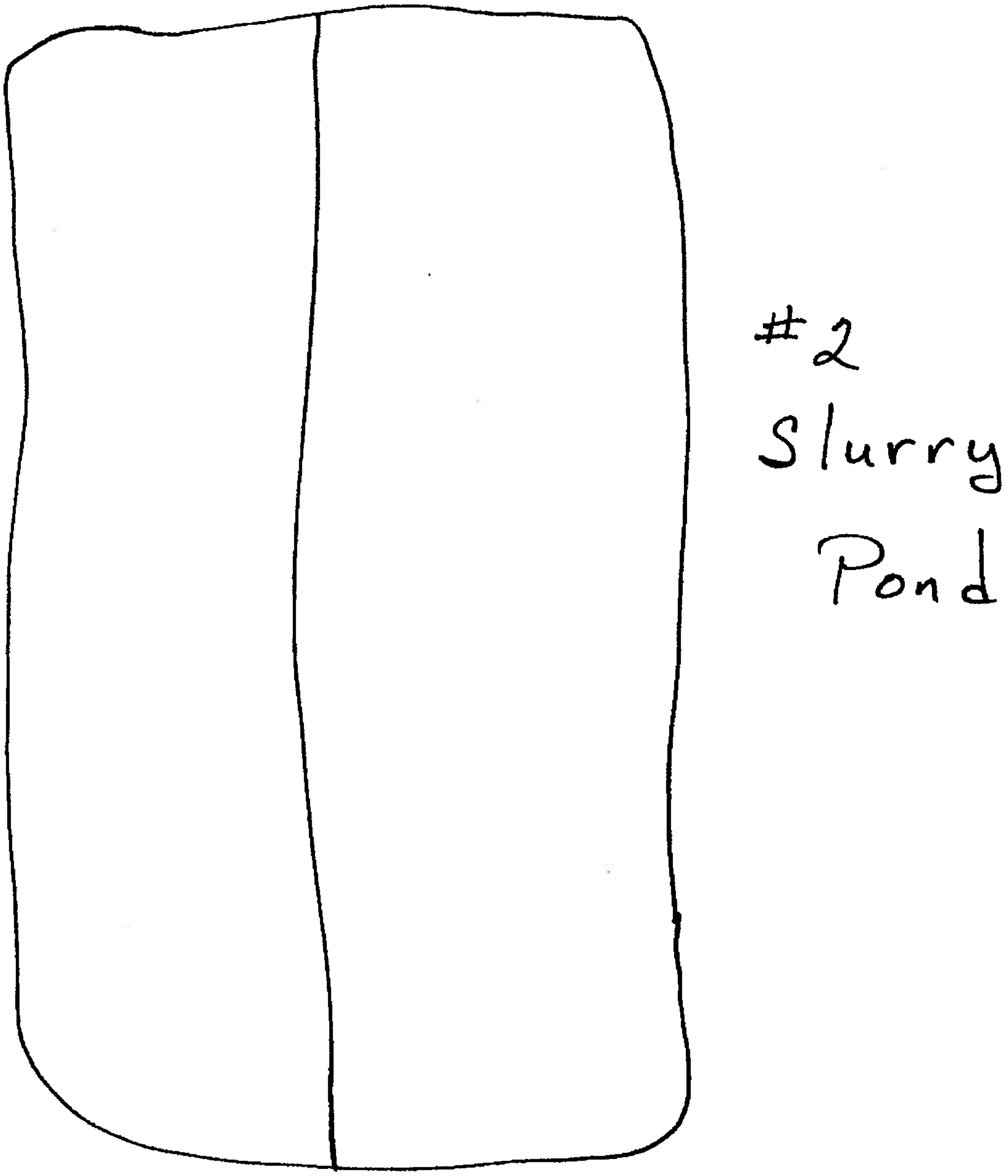
DATE: 19-Jan-10
INSPECTOR: Arthur W. Ford
REVIEWED BY: Station Manager

SIGNATURE: Arthur Wm. Ford AF
SIGNATURE: P. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good condition

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood


#2
Slurry
Pond

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

SLURRY POND (Unit 3 & 4)

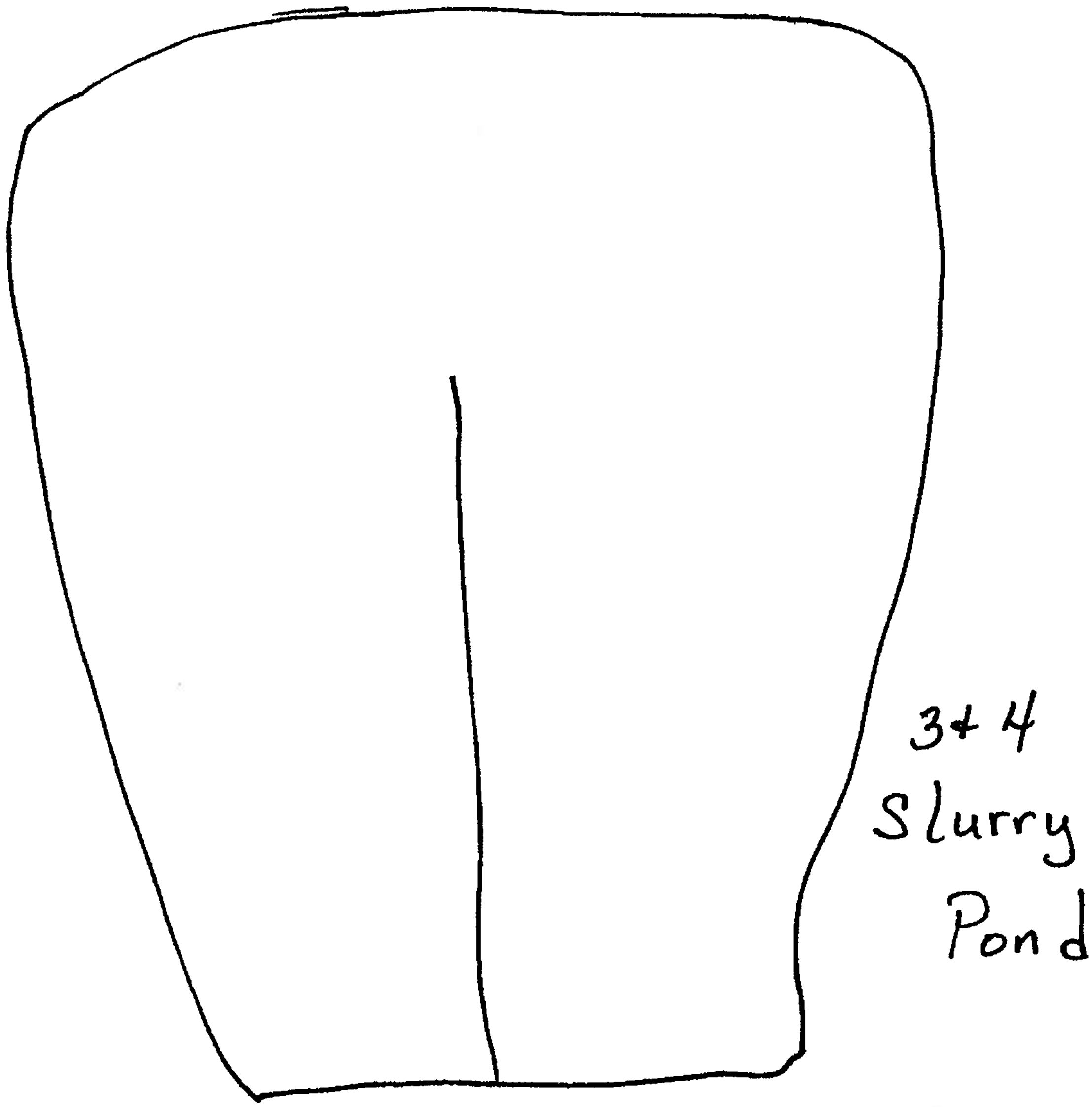
DATE: 19-Jan-10
INSPECTOR: Arthur W. Ford
REVIEWED BY: Station Manager

SIGNATURE: Arthur Wm. Ford AE
SIGNATURE: D. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	Freeboard required is 3ft as shown on design drawings --
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	Ditches clean and well graded.
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good condition.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood


3+4
Slurry
Pond

AE

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

INTAKE CANAL

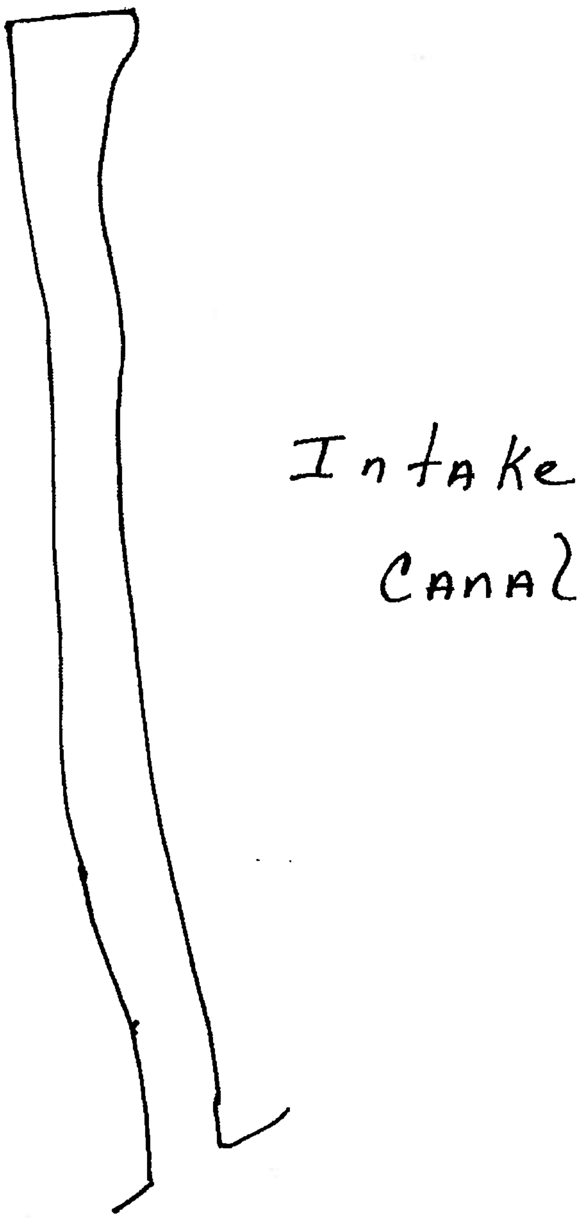
DATE: 19-Jan-10
INSPECTOR: Arthur W. Ford
REVIEWED BY: Station Manager

SIGNATURE: Arthur Wm. Ford
SIGNATURE: D. a.

FEATURE	OK √	LOCATION & COMMENTS
1. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
S I M P L E - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood


Intake
Canal

AF

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

DISCHARGE CANAL

DATE: 19-Jan-10
INSPECTOR: Arthur W. Ford
REVIEWED BY: Station Manager

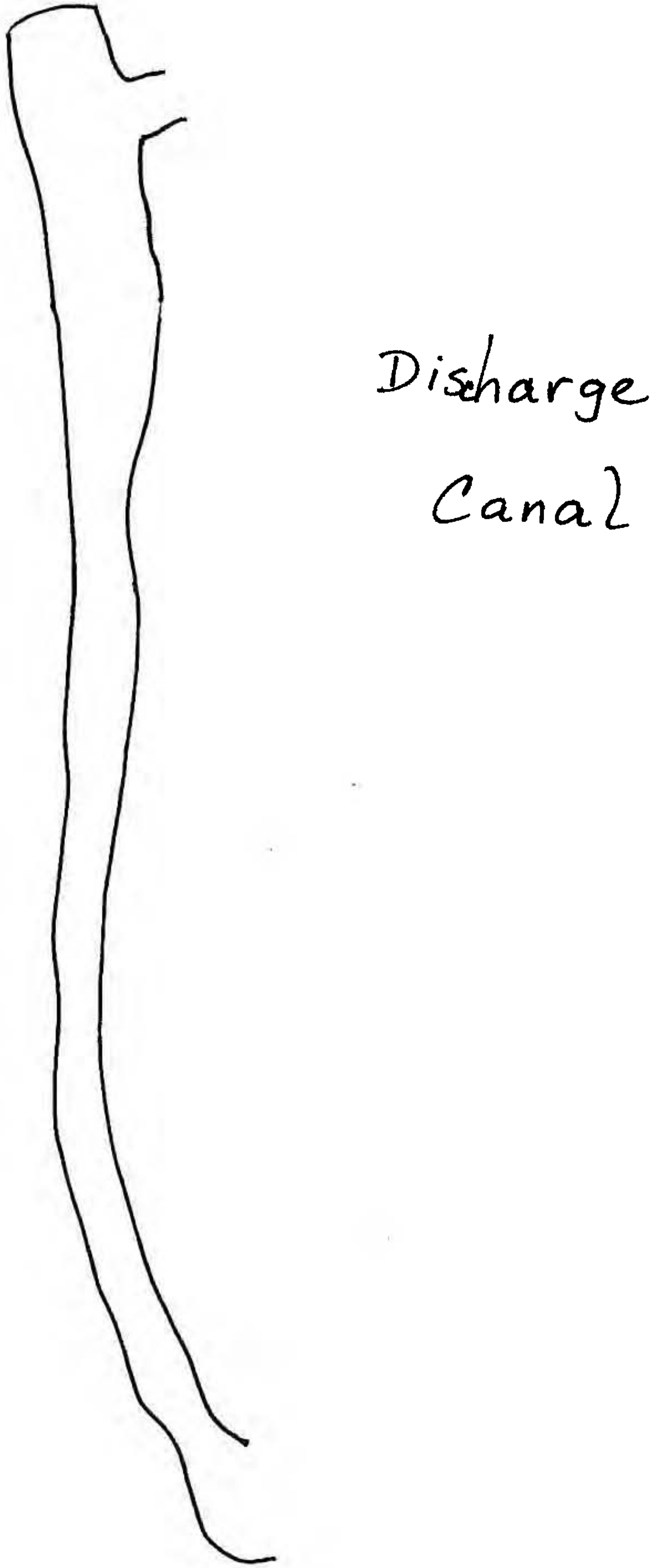
SIGNATURE: Arthur Wm. Ford
SIGNATURE: D. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

Revised 4/15/2009


Discharge
Canal

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

SLURRY POND (Unit 2)

DATE: 15-Oct-09
INSPECTOR: Arthur W. Ford
REVIEWED BY: Station Manager

SIGNATURE: Arthur Wm. Ford
SIGNATURE: D. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good condition

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

Revised 4/15/2009

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

SLURRY POND (Unit 3 & 4)

DATE: 15-Oct-09
INSPECTOR: Arthur W. Ford
REVIEWED BY: Station Manager

SIGNATURE: Arthur Wm.
SIGNATURE: D. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	Freeboard required is 3ft as shown on design drawings
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	Ditches clean and well graded.
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good condition.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

ASH POND A (Unit 1 & 2)

DATE: 15-Oct-09
INSPECTOR: Arthur W. Ford
REVIEWED BY: Station Manager

SIGNATURE: Arthur Wm.
SIGNATURE: D. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good condition. Mowing - an ongoing process.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

Revised 4/15/2009

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

ASH POND B (Unit 1 & 2)

DATE: 15-Oct-09
INSPECTOR: Arthur W. Ford
REVIEWED BY: Station Manager

SIGNATURE: Arthur Wm. Ford
SIGNATURE: D. C.

FEATURE	OK √	LOCATION & COMMENTS - Quarterly Inspection
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	Visible surfaces of concrete and metal in good condition.
5. Overall Condition		
Note any other issues	√	Overall condition adequate and improving due to vegetation management. Mowing completed. There is no evidence of air entrainment occuring within drop inlet structure - this action is interminent

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

Revised 4/15/2009

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

SOUTH ASH POND (Unit 3 & 4)

DATE: 15-Oct-09
INSPECTOR: Arthur W. Ford
REVIEWED BY: Station Manager

SIGNATURE: Arthur Wm.
SIGNATURE: D. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	Freeboard > 3 feet required.
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	Maintenance on drainage ditches is completed.
Drainage Pipes	√	Maintenance on outlets to toe drains is completed.
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	Visible surfaces of concrete and metal in good condition.
5. Overall Condition		
Note any other issues	√	Overall good condition. Mowing completed.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
S I M P L E - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

Revised 4/15/2009

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

WEST ASH POND (Unit 3 & 4)

DATE: 15-Oct-09
INSPECTOR: Arthur W. Ford
REVIEWED BY: Station Manager

SIGNATURE: Arthur Wm. Ford
SIGNATURE: P. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good. Mowing completed. Continue with program to remove woody growth.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
S I M P L E - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

Revised 4/15/2009

File: WGS-

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

COOLING POND

DATE: 22-Jul-09
INSPECTOR: Bisnett, Ford
REVIEWED BY: Station Manager

SIGNATURE: Bisnett
SIGNATURE: D. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)		Did not inspect this quarter
Settlement (V)		
Cracks (Measure Dimensions)		
Excessive Vegetation		
Burrows or Ruts		
2. Slopes		
Seepage (Flow, lush grass, clarity)		Did not inspect this quarter
Erosion gullies		
Slides (cracks, bulges, scarps)		
Vegetation (trees present, no grass)		
Animal burrows		
Rip-rap displacement	√	Evidence of rip-rap displacement is being assessed.
Freeboard Adequate	√	Freeboard was >1.8 feet and meets 25 yr-24 hr capacity
Settlement/Depression		
3. Area Downstream		
Seepage (Flow, lush grass, clarity)		Did not inspect this quarter
Boils		
Drainage Ditches		
Drainage Pipes		
Vegetation (trees present, no grass)		
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	Spillway and outlet discharge structure in good condition.
5. Overall Condition		
Note any other issues		

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
S I M P L E - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

Revised 4/15/2009

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

SLURRY POND (Unit 2)

DATE: 22-Jul-09
INSPECTOR: Bisnett, Ford
REVIEWED BY: Station Manager

SIGNATURE: D Bisnett ANE
SIGNATURE: P. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	No evidence of dead grass during growing season.
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good condition

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

SLURRY POND (Unit 3 & 4)

DATE: 22-Jul-09
INSPECTOR: Bisnett, Ford
REVIEWED BY: Station Manager

SIGNATURE: KBisnett
SIGNATURE: D. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	Freeboard required is 3ft as shown on design drawings
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	Ditches clean and well graded.
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good condition.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
S I M P L E - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

ANE

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

DATE: 22-Jul-09
INSPECTOR: Bisnett, Ford
REVIEWED BY: Station Manager

SIGNATURE: Bisnett
SIGNATURE: D. C.

WEST ASH POND (Unit 3 & 4)

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	X	Regrade and establish grass. Redirect surface runoff from crest road until grass is well established
Slides (cracks, bulges, scarps)	√	Small scarp at depression was repaired.
Vegetation (trees present, no grass)	X	Small woody vegetation along S and E slopes
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	Depression was inspected and regraded.
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good. Mowing completed. Continue with program to remove woody growth.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

Revised 4/15/2009

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

SOUTH ASH POND (Unit 3 & 4)

DATE: 22-Jul-09
INSPECTOR: Bisnett, Ford
REVIEWED BY: Station Manager

SIGNATURE: Bisnett ANE
SIGNATURE: D. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	Grading completed and crest road in good condition.
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	Drain maintenance completed.
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	X	Vegetation management and removal of woody growth completed except for NW section.
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	Freeboard > 3 feet required.
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	Maintenance on outlet drains is completed and ground cover is being established.
Boils	√	
Drainage Ditches	√	Maintenance on drainage ditches is completed.
Drainage Pipes	√	Maintenance on outlets to toe drains is completed.
Vegetation (trees present, no grass)	X	Vegetation management and removal of woody growth completed except for NW section.
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	Visible surfaces of concrete and metal in good condition.
5. Overall Condition		
Note any other issues	√	Overall good condition. Mowing completed. Continue with removal of woody vegetation.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
S I M P L E - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

AN

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

ASH POND B (Unit 1 & 2)

DATE: 22-Jul-09
INSPECTOR: Bisnett, Ford
REVIEWED BY: Station Manager

SIGNATURE: D Bisnett
SIGNATURE: D.C.

FEATURE	OK √	LOCATION & COMMENTS - Quarterly Inspection
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	X	Monitor lush vegetation and possible seepage in vicinity of discharge structure
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	Vegetation Control underway, woody growth removal complete adjacent to discharge canal
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	X	Monitor lush vegetation and possible seepage in vicinity of discharge structure
Boils	√	
Drainage Ditches	√	
Drainage Pipes	X	Follow-up on sinkhole over discharge pipe at a possible pipe joint adjacent to discharge canal
Vegetation (trees present, no grass)	√	Vegetation Control underway, woody growth removal complete adjacent to discharge canal.
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	Visible surfaces of concrete and metal in good condition. Note comment on discharge pipe in section 3 above.
5. Overall Condition		
Note any other issues	√	Overall condition adequate and improving due to vegetation management. Mowing completed. Evidence of air entrainment occuring within drop inlet structure

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
S I M P L E - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies: Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

Revised 4/15/2009

ANC

FOSSIL & HYDRO GENERATION - TECHNICAL SERVICES
DIKE INSPECTION REPORT
WINYAH STATION

ASH POND A (Unit 1 & 2)

DATE: 22-Jul-09
INSPECTOR: Bisnett, Ford
REVIEWED BY: Station Manager

SIGNATURE: DBisnett
SIGNATURE: D. C.

FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	Control of woody vegetation growth underway
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush grass, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	Control of woody vegetation growth underway
4. Outlet Works		
Inspect Concrete, Metal, and Wood	√	
5. Overall Condition		
Note any other issues	√	Overall good condition. Mowing completed. Continue with removal of woody vegetation.

NOTE: SHOW LOCATION OF PROBLEM AREAS ON AN ATTACHED DRAWING and DESCRIBE DEFICIENCY
SIMPLE - Sketch, Inspect, Measure, Photograph, Locate, Engage a Qualified Engineer if necessary

Copies Station Files (original)
Fossil and Hydro Generation Technical Services - Jane Hood

Daily Dike Inspection
Bulk Material Handling - WGS
Date6/28/2010
Inspector J.J. EADDY

	ASH POND A (U1 & U2)	
FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	

Daily Dike Inspection
Bulk Material Handling - WGS
Date 6/28/2010
Inspector J.J. EADDY

	ASH POND B (U1 & U2)	
FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	
		Discharge area has wet spots and caves ir

Daily Dike Inspection
Bulk Material Handling - WGS
Date 6/28/2010
Inspector J.J. EADDY

	INTAKE CANAL	
FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	

Daily Dike Inspection
Bulk Material Handling - WGS

Date6/28/2010
InspectorJ.J. EADDY

	DISCHARGE CANAL	
FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	

Daily Dike Inspection
Bulk Material Handling - WGS
Date 6/28/2010
Inspector J.J. EADDY

	COOLING POND	
FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	

Daily Dike Inspection
Bulk Material Handling - WGS
Date6/28/2010
Inspector J.J. EADDY

	WEST ASH POND (U3 & U4)	
FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	√	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush, clarity)	√	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	

Daily Dike Inspection
Bulk Material Handling - WGS
Date6/28/2010
Inspector J.J. EADDY

	SLURRY POND (U3 & U4)	
FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	v	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush, clarity)	v	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	

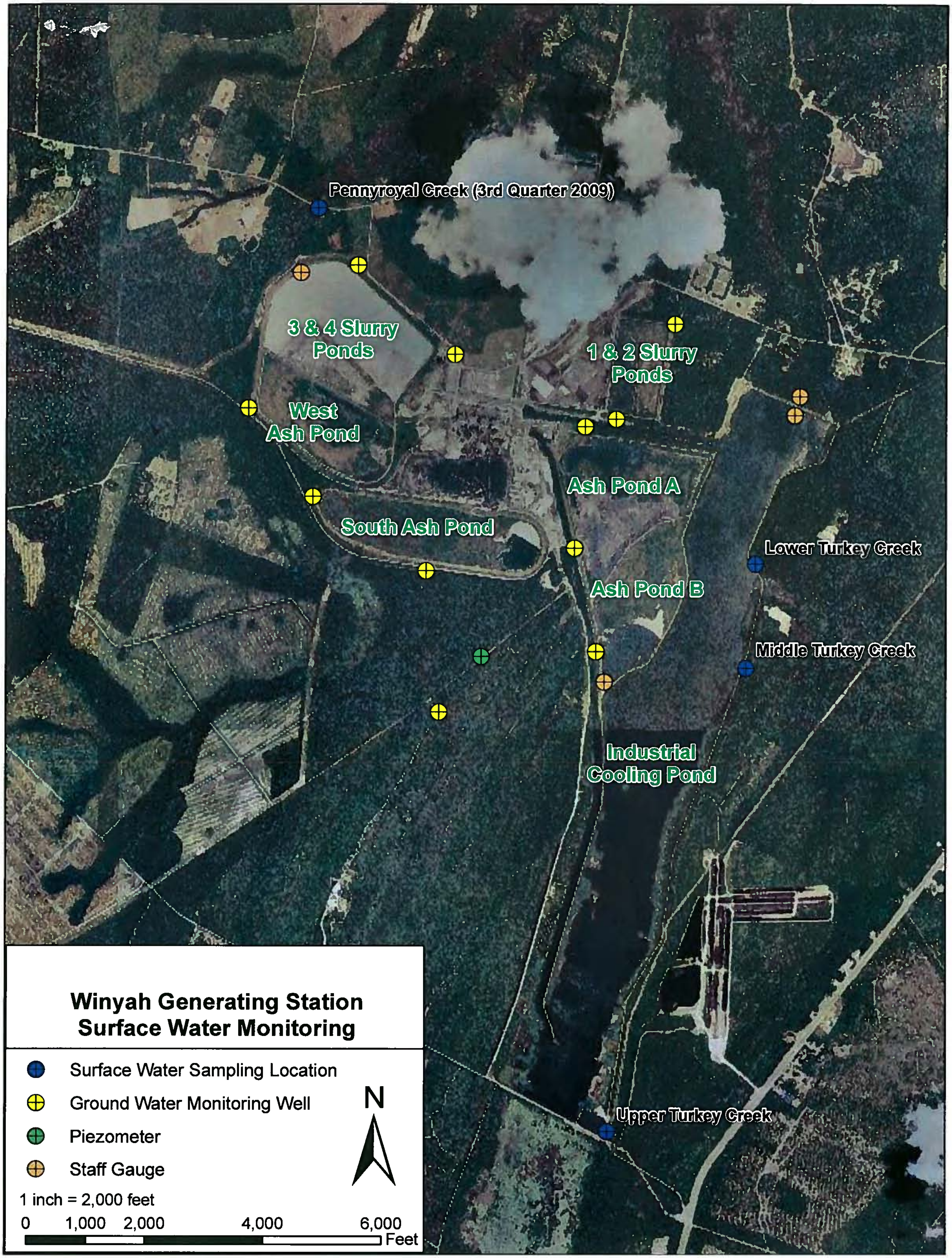
Daily Dike Inspection
Bulk Material Handling - WGS
Date 6/28/2010
Inspector J.J. EADDY

	SLURRY POND (U2)	
FEATURE	OK √	LOCATION & COMMENTS
1. Crest		
Alignment (H)	√	
Settlement (V)	√	
Cracks (Measure Dimensions)	√	
Excessive Vegetation	√	
Burrows or Ruts	√	
2. Slopes		
Seepage (Flow, lush grass, clarity)	√	
Erosion gullies	√	
Slides (cracks, bulges, scarps)	v	
Vegetation (trees present, no grass)	√	
Animal burrows	√	
Rip-rap displacement	√	
Freeboard Adequate	√	
Settlement/Depression	√	
3. Area Downstream		
Seepage (Flow, lush, clarity)	v	
Boils	√	
Drainage Ditches	√	
Drainage Pipes	√	
Vegetation (trees present, no grass)	√	

Appendix A - Doc 1.13 Staff Gauge and Rain Gauge Readings

Winyah Generating Station (W)
Surface Water Staff Gauges (SW)

Date	Label	Enter Staff Gauge Reading (nearest 0.1')	+	Ref Elev. (ft.)^1	=	Water Surface Elev (ft)		Location
Dec-09								
16-Dec	W-SW-WSP	2.1	+	33	=	35.1		West Slurry Pond near Pennyroyal Creek Stormwater pump station
16-Dec	W-SW-APB	2.86	+	32	=	34.86		Ash Pond B - Concrete outlet structure
16-Dec	W-SW-ICP	2.96	+	17.73	=	20.69		Industrial Cooling Pond - Outlet Structure (Flume)
16-Dec	W-SW-TC	4.02	+	0	=	4.02		Turkey Creek - Downstream of Flume
Jan-10								
13-Jan	W-SW-WSP	1.8	+	33	=	34.8		West Slurry Pond near Pennyroyal Creek Stormwater pump station
13-Jan	W-SW-APB	2.8	+	32	=	34.8		Ash Pond B - Concrete outlet structure
13-Jan	W-SW-IOP	3	+	17.73	=	20.73		Industrial Cooling Pond - Outlet Structure (Flume)
13-Jan	W-SW-TC	3.7	+	0	=	3.7		Turkey Creek - Downstream of Flume
Feb-10								
23-Feb	W-SW-WSP	1.56	+	33	=	34.56		West Slurry Pond near Pennyroyal Creek Stormwater pump station
23-Feb	W-SW-APB	2.88	+	32	=	34.88		Ash Pond B - Concrete outlet structure
23-Feb	W-SW-ICP	3.4	+	17.73	=	21.13		Industrial Cooling Pond - Outlet Structure (Flume)
23-Feb	W-SW-TC	4	+	0	=	4		Turkey Creek - Downstream of Flume
Mar-10								
16-Mar	W-SW-WSP	2.45	+	33	=	35.45		West Slurry Pond near Pennyroyal Creek Stormwater pump station
16-Mar	W-SW-APB	2.51	+	32	=	34.51		Ash Pond B - Concrete outlet structure
16-Mar	W-SW-ICP	3.22	+	17.73	=	20.95		Industrial Cooling Pond - Outlet Structure (Flume)
16-Mar	W-SW-TC	4.07	+	0	=	4.07		Turkey Creek - Downstream of Flume
Apr-10								
15-Apr	W-SW-WSP	1.83	+	33	=	34.83		West Slurry Pond near Pennyroyal Creek Stormwater pump station
15-Apr	W-SW-APB	2.58	+	32	=	34.58		Ash Pond B - Concrete outlet structure
15-Apr	W-SW-ICP	3	+	17.73	=	20.73		Industrial Cooling Pond - Outlet Structure (Flume)
15-Apr	W-SW-TC	3.55	+	0	=	3.55		Turkey Creek - Downstream of Flume
May-10								
17-May	W-SW-WSP	1.73	+	33	=	34.73		West Slurry Pond near Pennyroyal Creek Stormwater pump station
17-May	W-SW-APB	2.52	+	32	=	34.52		Ash Pond B - Concrete outlet structure
17-May	W-SW-ICP	2	+	17.73	=	19.73		Industrial Cooling Pond - Outlet Structure (Flume)
17-May	W-SW-TC	3	+	0	=	3		Turkey Creek - Downstream of Flume
Jun-10								
17-Jun	W-SW-WSP	2.13	+	33	=	35.13		West Slurry Pond near Pennyroyal Creek Stormwater pump station
17-Jun	W-SW-APB	2.77	+	32	=	34.77		Ash Pond B - Concrete outlet structure
17-Jun	W-SW-ICP	1.53	+	17.73	=	19.26		Industrial Cooling Pond - Outlet Structure (Flume)
17-Jun	W-SW-TC	3.45	+	0	=	3.45		Turkey Creek - Downstream of Flume



Winyah Generating Station Surface Water Monitoring

WGS POND LEVEL READINGS
6/30/2010

LOCATION	STAFF GAUGE READING (FT)	REFERENCE ELEVATION (FT).	WATER SURFACE ELEVATIONS (FT)
B ASH POND	2.82	32	34.82
SOUTH ASH POND	17.08	N/A	17.08
WEST FGD POND (3&4)	1.88	33	34.88
COOLING POND	1.9	17.73	19.63

Winyah Generating Station

Rainfall Gauge Readings

Date	Inches
6/24/2010	0
6/25/2010	0.4
6/26/2010	0
6/27/2010	2.4
6/28/2010	0
6/29/2010	1.625
Total	**4.425**

Appendix B - Winyah GS Ash Pond A Checklist

Site Name:	**Winyah Generating Station**	**Date:**	**30 June 2010**
Unit Name:	**Ash Pond A**	**Operator's Name:**	**Santee Cooper**
Unit I.D.:		**Hazard Potential Classification:**	**High** ☐ **Significant** ☐ **Low** ☒
	Inspector's Name:	**Frederic C. Tucker, PE; Anne Lee**	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Quarterly[1]		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?		n/a[2]	19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	TBP[3]		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?		n/a	Is water entering inlet, but not exiting outlet?		n/a[6]
5. Lowest dam crest elevation (operator records)?		n/a[4]	Is water exiting outlet, but not entering inlet?		n/a[6]
6. If instrumentation is present, are readings recorded (operator records)?	n/a[5]		Is water exiting outlet flowing clear?		n/a[6]
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?		n/a	From underdrain?		n/a
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?		n/a	From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		n/a	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		n/a	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		n/a[6]	23. Water against downstream toe?	X[7]	
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Issue #	Comments
	TBP – to be provided n/a – not applicable or not a feature
1	Santee Cooper conducts quarterly internal inspections by a registered engineer; also informal daily inspections take place over the course of the year by plant operating personnel and security personnel.
2	No actual pool. Pond filled with CCW. Water drains along ditches cut in ash surface. Water flows through discharge structure to Ash Pond B.
3	Discharge structure, from Ash Pond A into Ash Pond B, are to be provided by Santee Cooper personnel. An existing decant structure has been plugged and abandoned. Existing CMP condition is poor. Settlement of ground surface along the alignment of pipe may indicate CMP failure.

4	No formal survey or records of dam elevations. Design top of dam elevations to be provided by Santee Cooper personnel.
5	There is no geotechnical instrumentation. Staff gage monitored at Pond B outlet. Water quality wells monitored for groundwater contamination.
6	Discharge from Ash Pond A flows through a structure into Ash Pond B. Practically no water in Ash Pond A at time of visit.
7	A dividing dike separates Ash Pond A from Ash Pond B. The discharge channel to the Cooling Pond flows along the toe of the south western portion of Ash Pond A embankment. The intake channels from the Cooling Pond flows along the toe of the northern portion of Ash Pond A embankment.

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit # SC 0022471 **INSPECTOR** Frederic C. Tucker, PE; Anne Lee

Date

Impoundment Name Ash Pond A Winyah Generating Station

Impoundment Company Santee Cooper

EPA Region 4

State Agency South Carolina Department of Health and Environmental Control (DHEC)

(Field Office) Address 2600 Bull Street
Columbia, SC 29201

Name of Impoundment Ash Pond A

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New ☐ **Update** ☒

	Yes	**No**
Is impoundment currently under construction?	☐	☒
Is water or ccw currently being pumped into the impoundment? As needed but minor water on date of visit.	☒	☐

IMPOUNDMENT FUNCTION: The Ash Pond A functions as a settling basin for wastewater containing fly and bottom ash, and boiler slag. The wastewater flows to Ash Pond B in series prior to discharging into the Cooling Pond discharge channel.

Nearest Downstream Town Name: Georgetown, SC

Distance from the impoundment: 6.2 miles (along flow path to nearest town limit)

Location:

Latitude	33	Degrees	19	Minutes	31.89	Seconds	**N**
Longitude	-79	Degrees	20	Minutes	50.50	Seconds	**E**

State SC **County** Georgetown

	Yes	No
Does a state agency regulate this impoundment?	☒	☐

If So Which State Agency?	DHEC, Bureau of Water/Compliance Assurance Division. For water quality only.

HAZARD POTENTIAL *(In the event the impoundment should fail, the following would occur):*

☐ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

☒ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

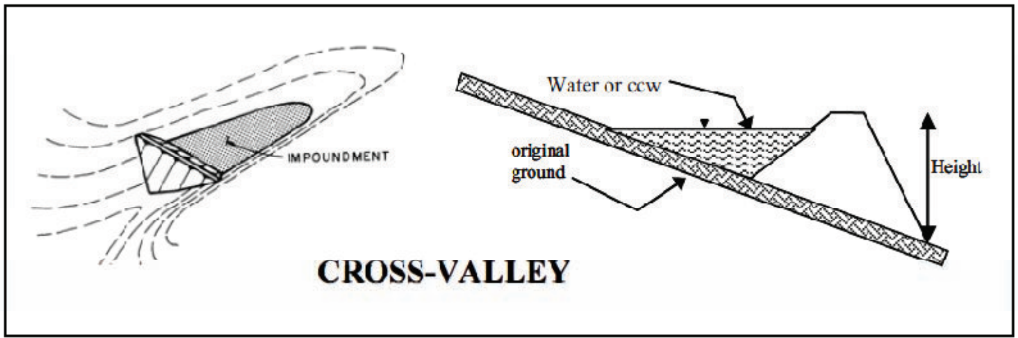
☐ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

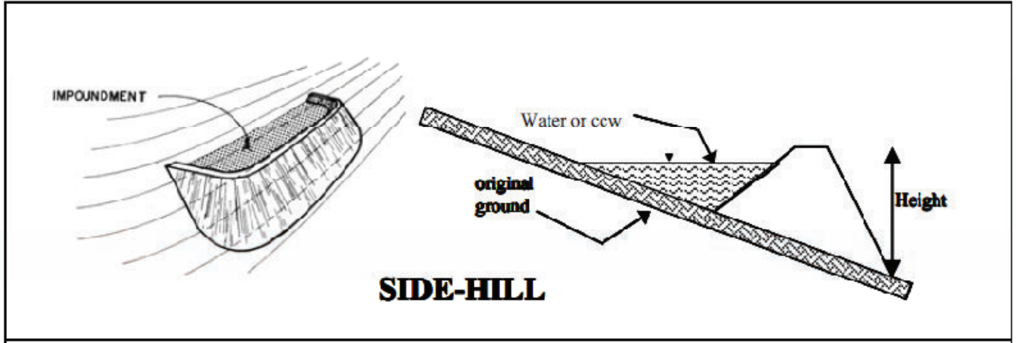
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

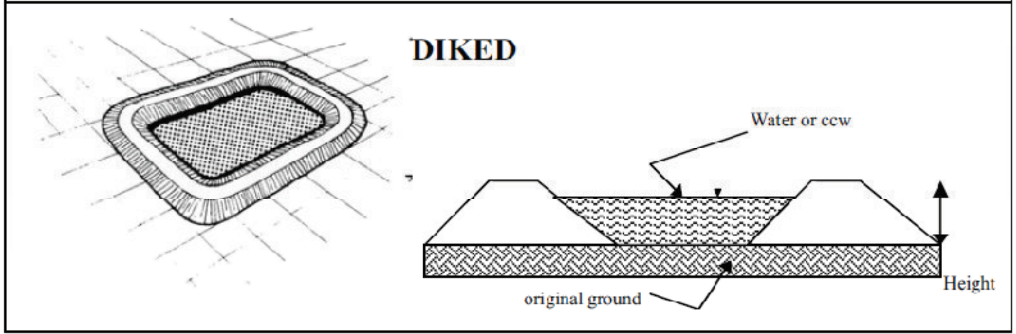
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

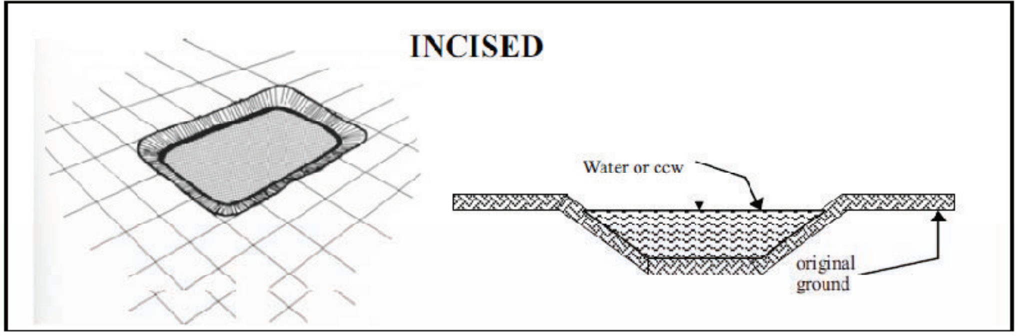
Failure of this structure would release directly into the Cooling Pond. A release would be contained within the Cooling Pond due to the extensive storage capacity in comparison to the capacity of the ponds. A release may disrupt power generation and cause minor environmental damage.

CONFIGURATION:









☐ Cross-Valley ☐ Side-Hill ☒ Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft) 24.5 **Embankment Material** Earth

Pool Area (ac) 88 **Liner** None

Current Freeboard (ft) TBP* **Liner Permeability** ---

*To be provided by plant personnel. Ash surface level varies across the pond area from above the perimeter dike on the upper end to approximately 5'-6' below crest of cross dike at the lower end. Practically no water was in the pond at the time of the site visit.

TYPE OF OUTLET (Mark all that apply)

☐ **Open Channel Spillway**

☐ Trapezoidal

☐ Triangular

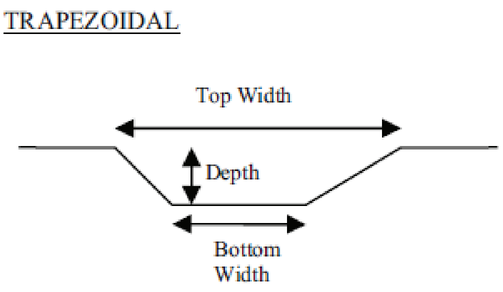
☐ Rectangular

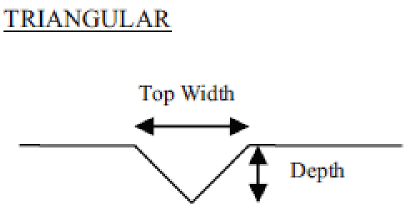
☐ Irregular

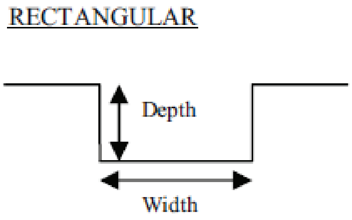
depth (ft)

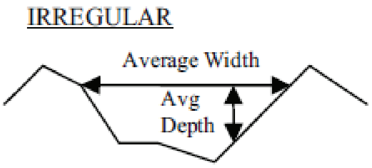
average bottom width (ft)

top width (ft)



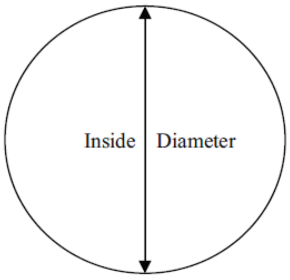






☒ **Outlet** (structure not seen)

TBP inside diameter



Material (TBP)

☐ corrugated metal

☐ welded steel

☐ concrete

☐ plastic (hdpe, pvc, etc.)

☐ other (specify):

	Yes	No
Is water flowing through the outlet?	☒ (Minor amount)	☐

☐ **No Outlet**

☐ **Other Type of Outlet** (specify):

The Impoundment was Designed By **Burns & Roe**

	Yes	No
Has there ever been a failure at this site?	☐	☒

If So When?

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	☒
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

Santee Cooper personnel report that the embankment was not constructed on wet ash, slag, or other unsuitable material. Design drawings are to be furnished.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

The design Engineer of Record was not present during the site visit.

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

The embankments seemed to be intact and undisturbed. It was reported by plant personnel that the embankment was in its original condition and has been undisturbed since its construction in 1975. Unit has never had a failure since its original construction.

Appendix B - Winyah GS Ash Pond B Checklist

Site Name:	**Winyah Generating Station**	**Date:**	**30 June 2010**
Unit Name:	**Ash Pond B**	**Operator's Name:**	**Santee Cooper**
Unit I.D.:		**Hazard Potential Classification:**	**High** ☐ **Significant** ☐ **Low** ☒
		Inspector's Name:	**Frederic C. Tucker, PE; Anne Lee**

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Quarterly[1]		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	34.82 ft		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	TBP[2]		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?		n/a	Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?		n/a[3]	Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?	n/a[4]		Is water exiting outlet flowing clear?	X[6]	
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?		n/a	From underdrain?		n/a
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?		n/a	From downstream foundation area?	X[7]	
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways~~, groin or diversion~~ ditches?		X	Around the outside of the decant pipe?		X
15. ~~Are~~ spillway or ~~ditch linings~~ deteriorated?		X[5]	22. Surface movements in valley bottom or on hillside?		n/a
16. Are outlets of decant or ~~underdrains~~ blocked?		X	23. Water against downstream toe?	X[8]	
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Issue #	Comments
	TBP – to be provided n/a – not applicable or not a feature
1	Santee Cooper conducts quarterly internal inspections by a registered engineer; also informal daily inspections take place over the course of the year by plant operating personnel and security personnel.
2	Decant structure, from Ash Pond B, is to be provided by Santee Cooper personnel.
3	No formal survey or records of dam elevations. Design top of dam elevations to be provided by plant personnel.
4	There is no geotechnical instrumentation. Staff gage monitored at Pond B outlet structure. Water quality wells monitored for groundwater contamination.

5	Sunken ground and dropouts beyond the downstream toe of the embankment along the length of the principal spillway may indicate separation of the joints of the RCP principal spillway. Separation of the last joint of the RCP principal spillway was observed. Water discharging from submerged end of outlet “boils” upward due to entrapped air in the spillway system.
6	Discharge from Ash Pond B flows directly into discharge channel of the Cooling Pond.
7	Areas observed to have moist soil conditions and water puddles at downstream toe of dam. Conditions may indicate minor seepage through embankment. It is noted that it rained two days prior to inspection.
8	A dividing dike separates Ash Pond A from Ash Pond B to the north. To the east of Ash Pond B, an embankment separates Ash Pond B from the Cooling Pond. The discharge channel to the Cooling Pond flows along the toe of the south western portion of Ash Pond B embankment.

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit # SC 0022471 **INSPECTOR** Frederic C. Tucker, PE; Anne Lee

Date

Impoundment Name Ash Pond B Winyah Generating Station

Impoundment Company Santee Cooper

EPA Region 4

State Agency South Carolina Department of Health and Environmental Control (DHEC)

(Field Office) Address 2600 Bull Street
Columbia, SC 29201

Name of Impoundment Ash Pond B

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New ☐ **Update** ☒

	Yes	No
Is impoundment currently under construction?	☐	☒
Is water or ccw currently being pumped into the impoundment? Minor amount of water draining by gravity into Ash Pond B from Ash Pond A.	☒	☐

IMPOUNDMENT FUNCTION: The Ash Pond B functions as a settling basin for wastewater containing fly and bottom ash, and boiler slag. The wastewater discharges into the Cooling Pond discharge channel.

Nearest Downstream Town Name: Georgetown, SC

Distance from the impoundment: 5.6 miles (along flow path to nearest town limit)

Location:

Latitude	33	Degrees	19	Minutes	07.40	Seconds	**N**
Longitude	-79	Degrees	21	Minutes	04.90	Seconds	**E**

State SC **County** Georgetown

	Yes	No
Does a state agency regulate this impoundment?	☒	☐

If So Which State Agency?	DHEC, Bureau of Water/Compliance Assurance Division. For water quality only.

HAZARD POTENTIAL *(In the event the impoundment should fail, the following would occur):*

☐ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

☒ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

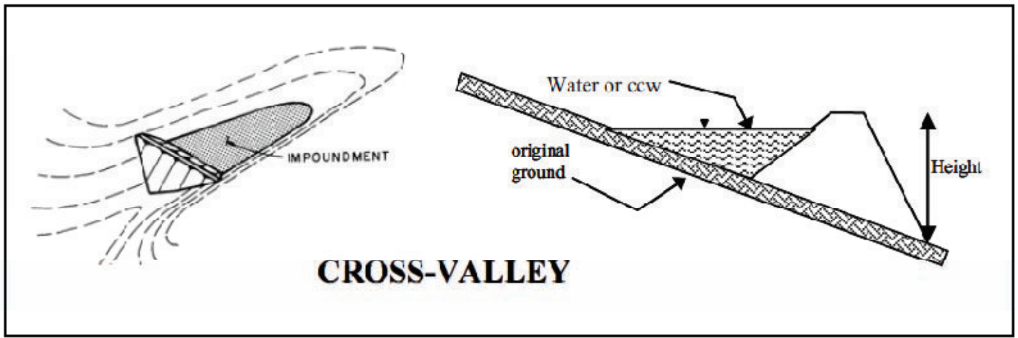
☐ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

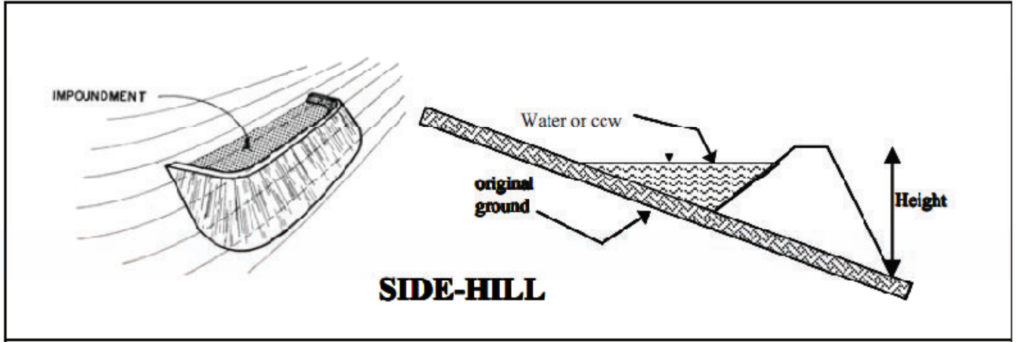
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

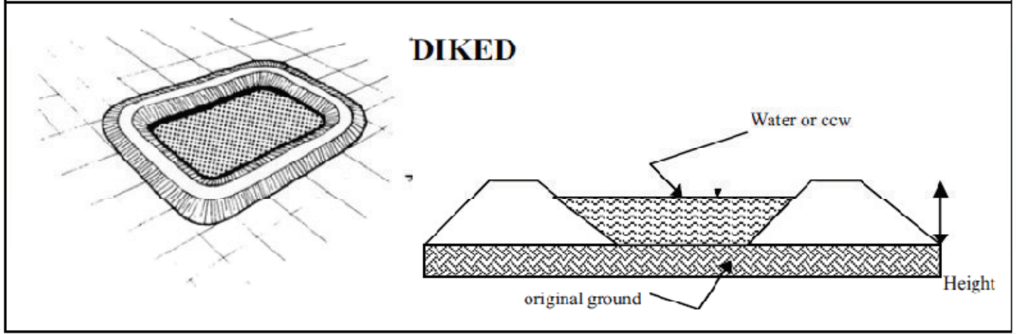
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

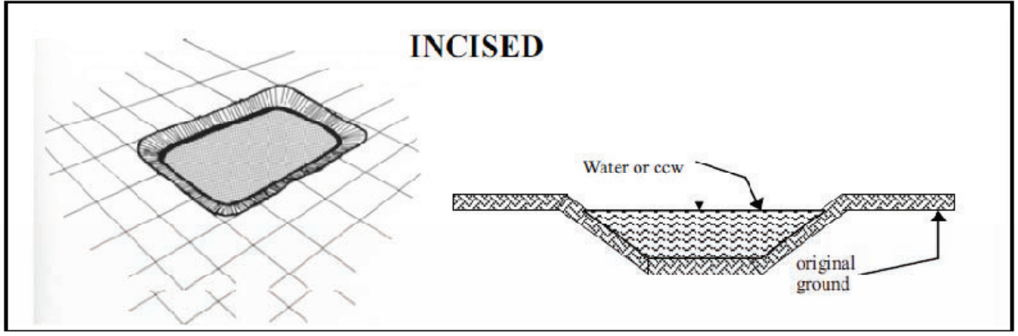
Failure of this structure would release directly into the Cooling Pond. A release would be contained within the Cooling Pond due to the extensive storage capacity in comparison to the capacity of the ponds. A release may disrupt power generation and cause minor environmental damage.

CONFIGURATION:


CROSS-VALLEY


SIDE-HILL


DIKED


INCISED

☐ Cross-Valley ☐ Side-Hill ☒ Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft)	31	**Embankment Material**	Earth
Pool Area (ac)	63	**Liner**	None

Current Freeboard (ft) TBP[*] **Liner Permeability** ---

*To be provided by Santee Cooper personnel. Water level in lower part of pond at discharge structure appeared to be approximately 5’-6’ below crest of west perimeter dike.

TYPE OF OUTLET (Mark all that apply)

☐ **Open Channel Spillway**

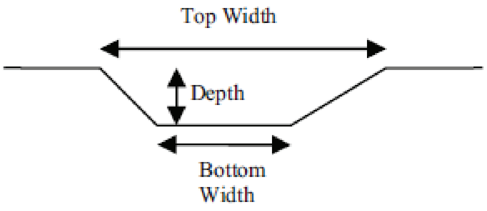
- ☐ Trapezoidal
- ☐ Triangular
- ☐ Rectangular
- ☐ Irregular

depth (ft)

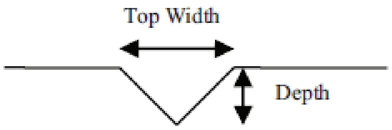
average bottom width (ft)

top width (ft)

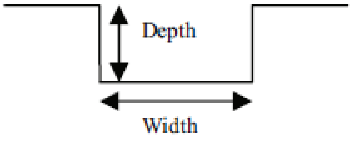
TRAPEZOIDAL



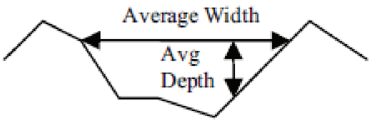
TRIANGULAR



RECTANGULAR

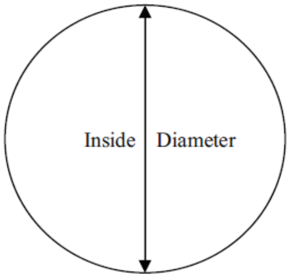


IRREGULAR



☒ **Outlet**

TBP inside diameter



Material

- ☐ corrugated metal
- ☐ welded steel
- ☒ concrete
- ☐ plastic (hdpe, pvc, etc.)
- ☐ other (specify):

	Yes	No
Is water flowing through the outlet?	☒	☐

☐ **No Outlet**

☐ **Other Type of Outlet** (specify):

The Impoundment was Designed By **Burns & Roe/Paul C. Rizzo Associates, Inc. (PCRA)**

	Yes	No
Has there ever been a failure at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	☒
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

Santee Cooper personnel report that the embankment was not constructed on wet ash, slag, or other unsuitable material. Design drawings are to be furnished. A stability evaluation was conducted for Ash Pond B in 1993.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

The design Engineer of Record was not present during the site visit.

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

The embankment seemed to be intact and undisturbed. It was reported by plant personnel that the embankment was evaluated for stability in 1993 and raised in 1997 as an expansion of the pond. Unit has never had a failure since its original construction.

Appendix B - Winyah GS South Ash Pond Checklist

Site Name:	**Winyah Generating Station**	**Date:**	**29 June 2010**
Unit Name:	**South Ash Pond**	**Operator's Name:**	**Santee Cooper**
Unit I.D.:		**Hazard Potential Classification:**	**High** ☐ **Significant** ☒ **Low** ☐
	Inspector's Name:	**Frederic C. Tucker, PE; Anne Lee**	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Quarterly[1]		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	17.08 ft [2]		19. Major erosion or slope deterioration?		X[6]
3. Decant inlet elevation (operator records)?	TBP[3]		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?		n/a	Is water entering inlet, but not exiting outlet?		n/a[7]
5. Lowest dam crest elevation (operator records)?		n/a[4]	Is water exiting outlet, but not entering inlet?		n/a[7]
6. If instrumentation is present, are readings recorded (operator records)?	n/a[5]		Is water exiting outlet flowing clear?		n/a[7]
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?		n/a	From underdrain?	X[8]	
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?		n/a	From downstream foundation area?	X[8]	
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways~~, groin or diversion~~ ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ~~ditch linings~~ deteriorated?		X	22. Surface movements in valley bottom or on hillside?		n/a
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?	X[9]	
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Issue #	Comments
	TBP – to be provided n/a – not applicable or not a feature
1	Santee Cooper conducts quarterly internal inspections by a registered engineer; also informal daily inspections take place over the course of the year by plant operating personnel and security personnel.
2	Relative elevation. Water flows through discharge structure to a channel that leads to the discharge channel to the Cooling Pond.
3	Decant structure, from South Ash Pond, is to be provided by Santee Cooper personnel.
4	No formal survey or records of dam elevations. Design top of dam elevation to be provided by plant personnel.

5	There is no geotechnical instrumentation. Staff gage monitored at South Ash Pond outlet structure. Water quality wells monitored for groundwater contamination.
6	Some areas with little grass cover observed with minor erosion along the downstream side of the embankment.
7	Discharge from South Ash Pond flows into a channel to the discharge channel into the Cooling Pond. Flow at the outlet end could not be observed due to submergence.
8	Recent maintenance of underdrains conducted. Minor erosion observed along the downstream toe of dam. Rust colored residual trailing from toe drain pipes and minor foundation soil seeps at various points along the downstream toe of embankment may indicate seepage with iron bacteria in seepage water.
9	A drainage channel runs along the toe of the South Ash pond and collects stormwater draining from the slopes of the South Ash Pond and the train tracks, as well as seepage from toe drain pipes and minor seepage from foundation soil.

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit # SC 0022471 **INSPECTOR** Frederic C. Tucker, PE; Anne Lee

Date

Impoundment Name South Ash Pond Winyah Generating Station

Impoundment Company Santee Cooper

EPA Region 4

State Agency South Carolina Department of Health and Environmental Control (DHEC)

(Field Office) Address 2600 Bull Street
Columbia, SC 29201

Name of Impoundment South Ash Pond

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New ☐ **Update** ☒

	Yes	**No**
Is impoundment currently under construction?	☐	☒
Is water or ccw currently being pumped into the impoundment?	☒	☐

IMPOUNDMENT FUNCTION: The South Ash Pond functions as a settling basin for wastewater containing fly and bottom ash, and boiler slag. Wastewater in the Unit 3&4 Slurry Pond, is pumped into the West Ash Pond and ultimately pumped into the South Ash Pond from the West Ash Pond. The water discharges from the South Ash Pond into the Cooling Pond discharge channel.

Nearest Downstream Town Name: Georgetown, SC

Distance from the impoundment: 6.4 miles (along flow path to nearest town limit)

Location:

Latitude	33	Degrees	19	Minutes	27.67	Seconds	**N**
Longitude	-79	Degrees	21	Minutes	16.28	Seconds	**E**

State SC **County** Georgetown

	Yes	No
Does a state agency regulate this impoundment?	☒	☐

If So Which State Agency?	DHEC, Bureau of Water/Compliance Assurance Division. For water quality only.

HAZARD POTENTIAL *(In the event the impoundment should fail, the following would occur):*

☐ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

☐ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

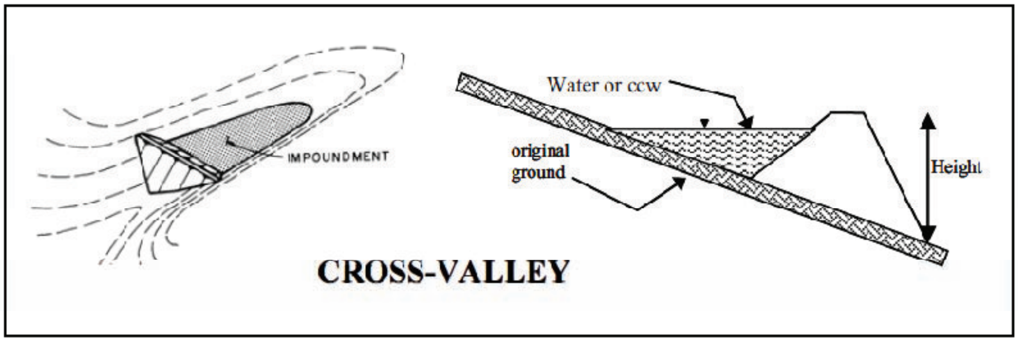
☒ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

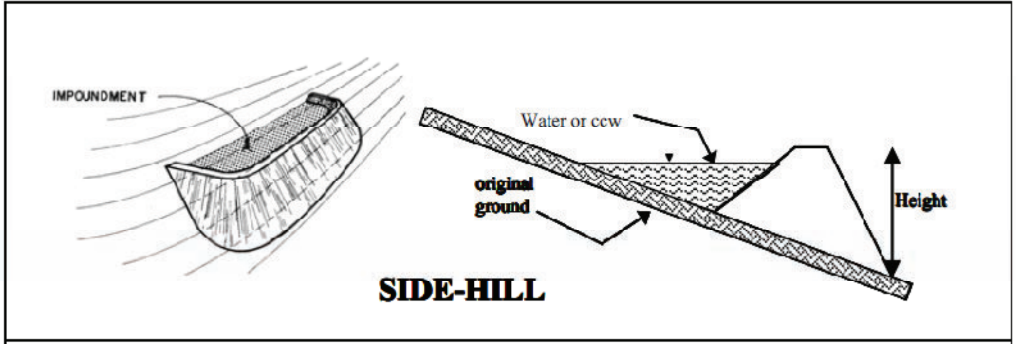
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

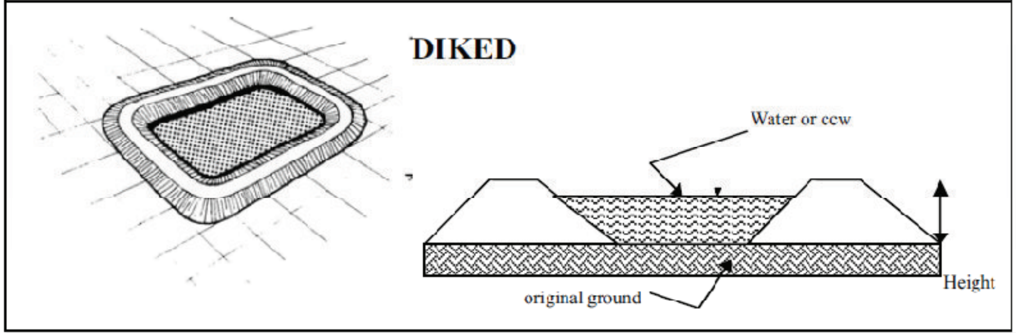
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

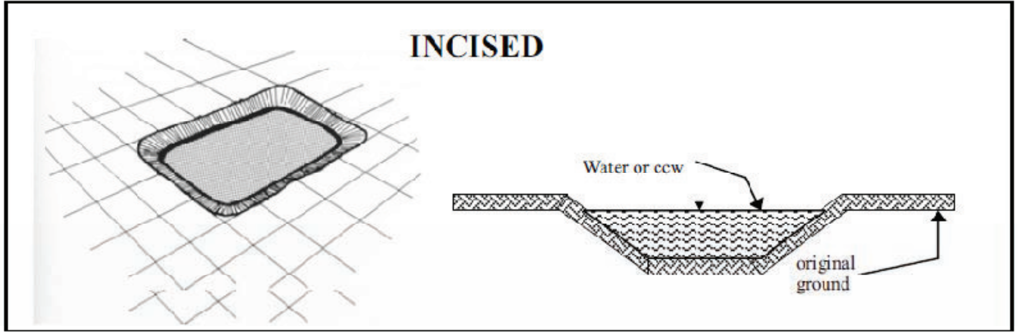
Failure of this structure would release directly into a perimeter ditch bounded by existing railroad tracks. If the tracks were to be overtopped, ccw could potentially damage adjacent private property and/or enter Pennyroyal Creek.

CONFIGURATION:









☐ Cross-Valley ☐ Side-Hill ☒ Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft) 22 **Embankment Material** Earth

Pool Area (ac) 61 **Liner** None

Current Freeboard (ft) TBP[*] **Liner Permeability** ---

*To be provided by Santee Cooper personnel. Water level in lower part of pond at discharge structure appeared to be approximately 5’-6’ below crest of east perimeter dike.

TYPE OF OUTLET (Mark all that apply)

☐ **Open Channel Spillway**

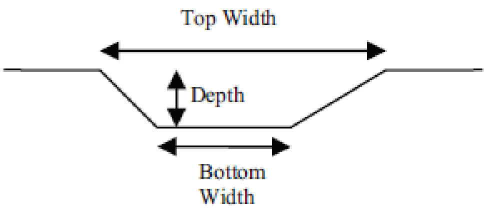
- ☐ Trapezoidal
- ☐ Triangular
- ☐ Rectangular
- ☐ Irregular

depth (ft)

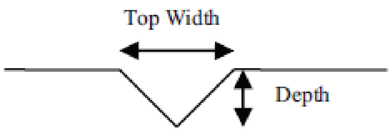
average bottom width (ft)

top width (ft)

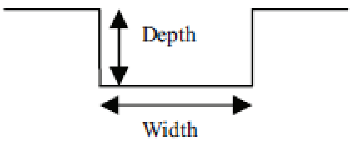
TRAPEZOIDAL



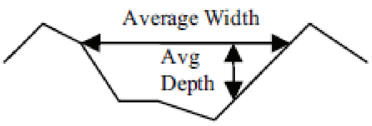
TRIANGULAR



RECTANGULAR

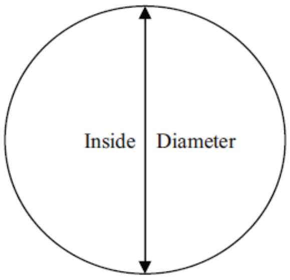


IRREGULAR



☒ **Outlet** (pipe not visible)

TBP inside diameter



Material (TBP)

- ☐ corrugated metal
- ☐ welded steel
- ☐ concrete
- ☐ plastic (hdpe, pvc, etc.)
- ☐ other (specify):

	Yes	No
Is water flowing through the outlet?	☒	☐

☐ **No Outlet**

☐ **Other Type of Outlet** (specify):

The Impoundment was Designed By **Burns & Roe/Lockwood Greene**

	Yes	No
Has there ever been a failure at this site?	☐	☒

If So When?

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	☒
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

Santee Cooper personnel report that the embankment was not constructed on wet ash, slag, or other unsuitable material. Design drawings are to be furnished.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

The design Engineer of Record was not present during the site visit.

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

The embankments seemed to be in tack and undisturbed. It was reported by plant personnel that the embankment was in its original condition and has been undisturbed since its construction in 1980. Unit has never had a failure since its original construction.

Appendix B - Winyah GS West Ash Pond Checklist

Site Name:	**Winyah Generating Station**	**Date:**	**30 June 2010**
Unit Name:	**West Ash Pond**	**Operator's Name:**	**Santee Cooper**
Unit I.D.:		**Hazard Potential Classification:**	**High** ☐ **Significant** ☒ **Low** ☐
	Inspector's Name:	**Frederic C. Tucker, PE; Anne Lee**	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Quarterly[1]		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	34.88 ft [2]		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?		n/a[3]	20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?		n/a	Is water entering inlet, but not exiting outlet?		n/a[3]
5. Lowest dam crest elevation (operator records)?		n/a[4]	Is water exiting outlet, but not entering inlet?		n/a[3]
6. If instrumentation is present, are readings recorded (operator records)?		n/a[5]	Is water exiting outlet flowing clear?		n/a[3]
7. Is the embankment currently under construction?		X[6]	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?		n/a	From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?		n/a	From downstream foundation area?	X[7]	
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		n/a	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		n/a	23. Water against downstream toe?	X[8]	
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Issue #	Comments
	TBP – to be provided n/a – not applicable or not a feature
1	Santee Cooper conducts quarterly internal inspections by a registered engineer; also informal daily inspections take place over the course of the year by plant operating personnel and security personnel.
2	Pool elevation in internal drainage ditch recorded by plant personnel for West Ash Pond. No actual pool. Pond filled with CCW. Water from the Unit 3&4 Slurry Pond is pumped into the West Ash Pond. Water drains along ditches cut in ash surface and is pumped into the South Ash Pond.
3	Water from the West Ash Pond is pumped into the South Ash Pond.

4	No formal survey or records of dam elevations. Design top of dam elevations to be provided by Santee Cooper personnel.
5	There is no geotechnical instrumentation. Water quality wells monitored for groundwater contamination.
6	Due to the failure of a seal of an existing drain pipe on Feb. 14, 2008, on the Unit 3&4 Slurry Pond, an existing CMP drain pipe was located and filled within the West Ash Pond embankment to preclude a similar failure in the West Pond embankment.
7	Areas observed to have moist soil conditions, minor erosion, and water puddles at downstream toe of dam. Conditions may indicate minor seepage through or under embankment. It is noted that it rained two days prior to inspection.
8	A dividing dike separates Unit 3&4 Slurry Pond from the West Ash Pond. A drainage channel runs along the toe of the Slurry and Ash ponds and collects stormwater draining from the slopes and the train tracks.

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit # SC 0022471 **INSPECTOR** Frederic C. Tucker, PE; Anne Lee

Date

Impoundment Name West Ash Pond Winyah Generating Station

Impoundment Company Santee Cooper

EPA Region 4

State Agency (Field Office) Address South Carolina Department of Health and Environmental Control (DHEC)
2600 Bull Street
Columbia, SC 29201

Name of Impoundment West Ash Pond

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New ☐ **Update** ☒

	Yes	**No**
Is impoundment currently under construction?	☐	☒
Is water or ccw currently being pumped into the impoundment?	☒	☐

IMPOUNDMENT FUNCTION: The West Ash Pond functions as a settling basin for wastewater containing fly ash, bottom ash, and boiler slag. It also collects wastewater from the Unit 3&4 Slurry Pond in series prior to being pumped into the South Ash Pond and ultimately into the discharge channel to the Cooling Pond.

Nearest Downstream Town Name: Georgetown, SC

Distance from the impoundment: 5.9 miles (along flow path to nearest town limit)

Location:

Latitude	33	Degrees	19	Minutes	54.81	Seconds	**N**
Longitude	-79	Degrees	22	Minutes	13.54	Seconds	**E**

State SC **County** Georgetown

	Yes	No
Does a state agency regulate this impoundment?	☒	☐

If So Which State Agency?	DHEC, Bureau of Water/Compliance Assurance Division. For water quality only.

HAZARD POTENTIAL *(In the event the impoundment should fail, the following would occur):*

☐ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

☐ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

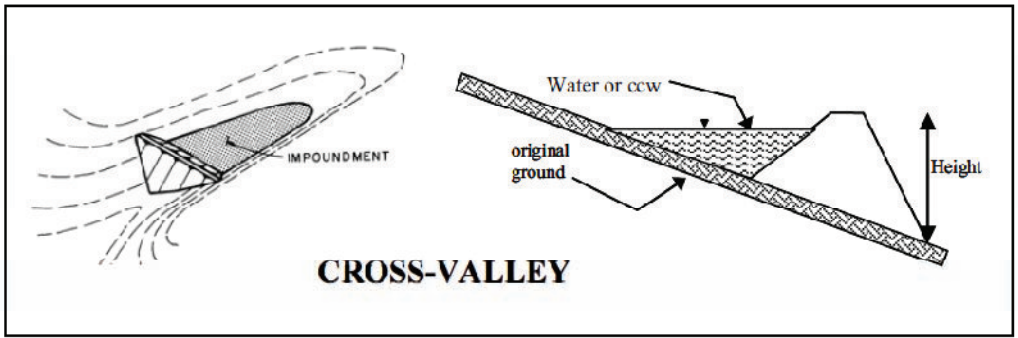
☒ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

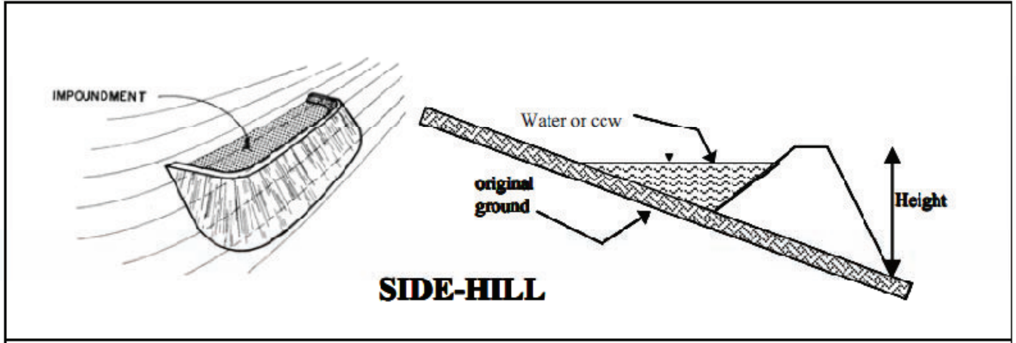
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

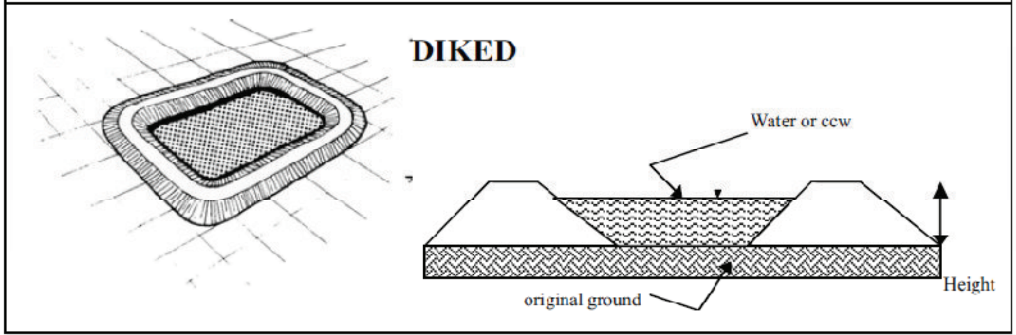
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

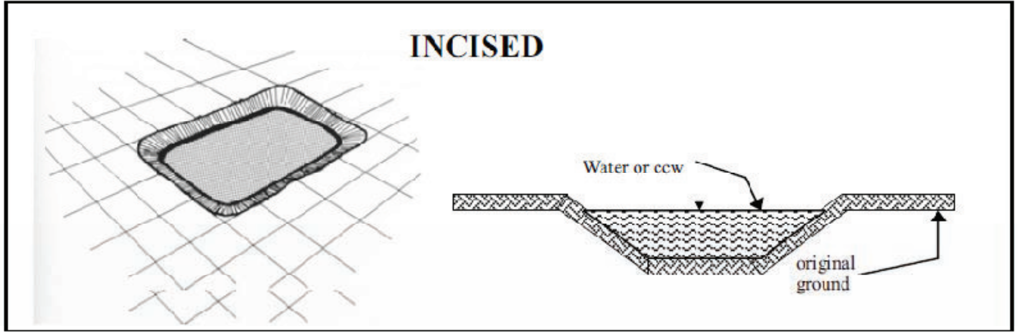
Failure of this structure would release directly into the Pennyroyal Creek and/or could potentially damage adjacent private property.

CONFIGURATION:









☐ Cross-Valley ☐ Side-Hill ☒ Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft) 32 **Embankment Material** Earth

Pool Area (ac) 62 **Liner** None

Current Freeboard (ft) TBP* **Liner Permeability** ---

*To be provided by Santee Cooper personnel. Water level in internal drainage ditch in lower part of pond at pump appeared to be approximately 3’-5’ below crest of south perimeter dike.

TYPE OF OUTLET (Mark all that apply)

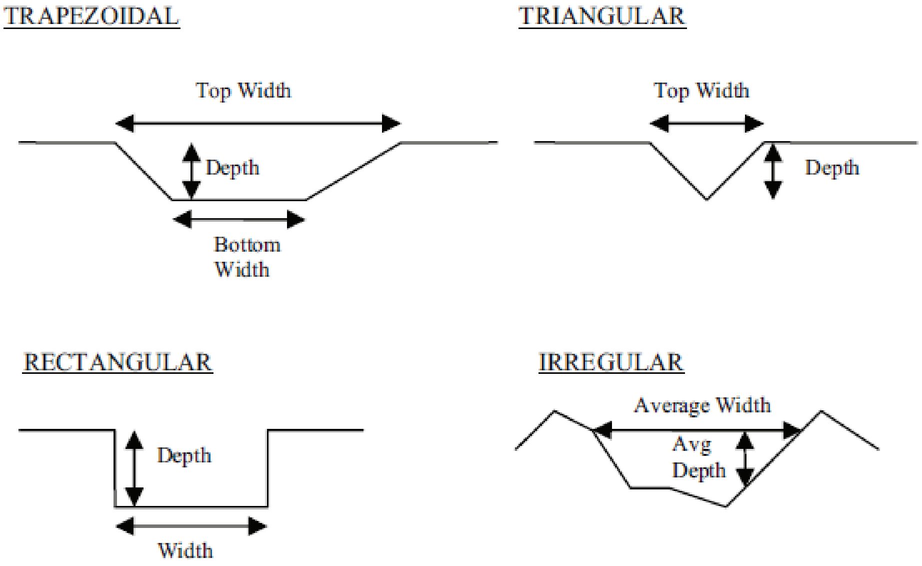
☐ **Open Channel Spillway**

- ☐ Trapezoidal
- ☐ Triangular
- ☐ Rectangular
- ☐ Irregular

depth (ft)

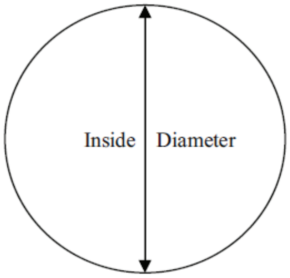
average bottom width (ft)

top width (ft)



☐ **Outlet**

inside diameter



Material

- ☐ corrugated metal
- ☐ welded steel
- ☐ concrete
- ☐ plastic (hdpe, pvc, etc.)
- ☐ other (specify):

	Yes	No
Is water flowing through the outlet?	☒	☐

☐ **No Outlet**

☒ **Other Type of Outlet** (specify): Water is pumped through HDPE piping to the South Ash Pond

The Impoundment was Designed By Burns & Roe/Lockwood Greene

	Yes	No
Has there ever been a failure at this site?	☐	☒

If So When?

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	☒
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

Santee Cooper personnel report that the embankment was not constructed on wet ash, slag, or other unsuitable material. Design drawings are to be furnished. A 1999 geotechnical investigation by Paul C. Rizzo Associates, Inc (PCRA) indicated the embankment was well constructed.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

The design Engineer of Record was not present during the site visit.

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

The embankments seemed to be intact. The embankment was constructed in 1980. An existing CMP drain pipe within the embankment was filled in 2008 as a precautionary measure due to the failure of a similar CMP drain pipe within the Unit 3&4 Slurry Pond.

Appendix B - Winyah GS Unit 3 & 4 Slurry Pond Checklist

Coal Combustion Dam Inspection Checklist Form

US Environmental
Protection Agency

Site Name:	**Winyah Generating Station**	**Date:**	**30 June 2010**
Unit Name:	**Unit 3&4 Slurry Pond**	**Operator's Name:**	**Santee Cooper**
Unit I.D.:		**Hazard Potential Classification:**	**High** ☐ **Significant** ☒ **Low** ☐
	Inspector's Name:	**Frederic C. Tucker, PE; Anne Lee**	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Quarterly [1]		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	34.88 ft [2]		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?		n/a[3]	20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?		n/a	Is water entering inlet, but not exiting outlet?		n/a[3]
5. Lowest dam crest elevation (operator records)?		n/a[4]	Is water exiting outlet, but not entering inlet?		n/a[3]
6. If instrumentation is present, are readings recorded (operator records)?	n/a[5]		Is water exiting outlet flowing clear?		n/a[3]
7. Is the embankment currently under construction?		X[6]	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?		n/a	From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?		n/a	From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged ~~spillways~~, ~~groin or diversion~~ ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		n/a	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		n/a	23. Water against downstream toe?	X[7]	
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Issue #	Comments
	TBP – to be provided n/a – not applicable or not a feature
1	Santee Cooper conducts quarterly internal inspections by a registered engineer; also informal daily inspections take place over the course of the year by plant operating personnel and security personnel.
2	Pool elevation recorded by plant personnel for West Ash Pond.
3	Water is pumped from the Unit 3&4 Slurry Pond into the West Pond.

4	No formal survey or records of dam elevations. Design top of dam elevations to be provided by Santee Cooper personnel.
5	There is no geotechnical instrumentation. Staff gage monitored at Unit 3&4 Slurry Pond. Water quality wells monitored for groundwater contamination.
6	Due to the failure of a seal of an existing drain pipe on Feb. 14, 2008, a portion of the embankment was excavated and repaired after a portion of the existing pipe was removed and filled.
7	A dividing dike separates Unit 3&4 Slurry Pond from the West Ash Pond. A drainage channel runs along the toe of the Slurry and Ash ponds and collects stormwater draining from the slopes and the train tracks.

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit # SC 0022471 **INSPECTOR** Frederic C. Tucker, PE; Anne Lee

Date

Impoundment Name Unit 3&4 Slurry Pond Winyah Generating Station

Impoundment Company Santee Cooper

EPA Region 4

State Agency South Carolina Department of Health and Environmental Control (DHEC)

(Field Office) Address 2600 Bull Street
Columbia, SC 29201

Name of Impoundment Unit 3&4 Slurry Pond

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New ☐ **Update** ☒

	Yes	**No**
Is impoundment currently under construction?	☐	☒
Is water or ccw currently being pumped into the impoundment?	☒	☐

IMPOUNDMENT FUNCTION: The Unit 3&4 Slurry Pond functions as a settling basin for wastewater containing fuel gas emission control residuals. The wastewater flows to the West Ash Pond in series prior to being pumped into the South Ash Pond and ultimately into the discharge channel to the Cooling Pond.

Nearest Downstream Town Name: Georgetown, SC

Distance from the impoundment: 5.8 miles (along flow path to nearest town limit)

Location:

Latitude	33	Degrees	20	Minutes	14.81	Seconds	**N**
Longitude	-79	Degrees	22	Minutes	06.28	Seconds	**E**

State SC **County** Georgetown

	Yes	No
Does a state agency regulate this impoundment?	☒	☐

If So Which State Agency? DHEC, Bureau of Water/Compliance Assurance Division. For water quality only.

HAZARD POTENTIAL *(In the event the impoundment should fail, the following would occur):*

☐ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

☐ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

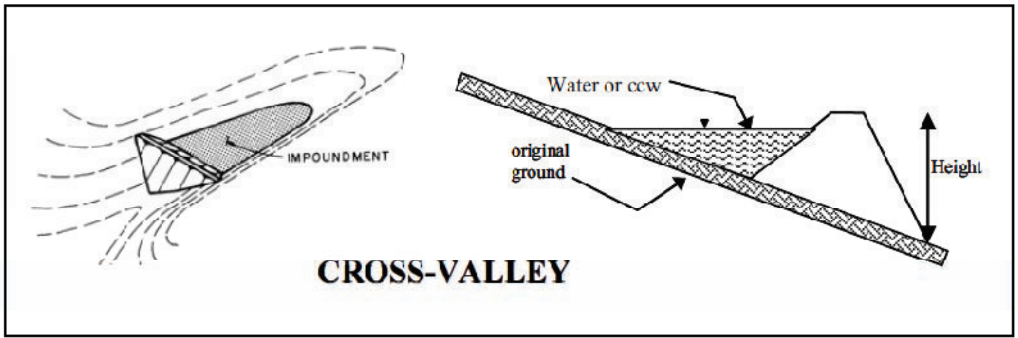
☒ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

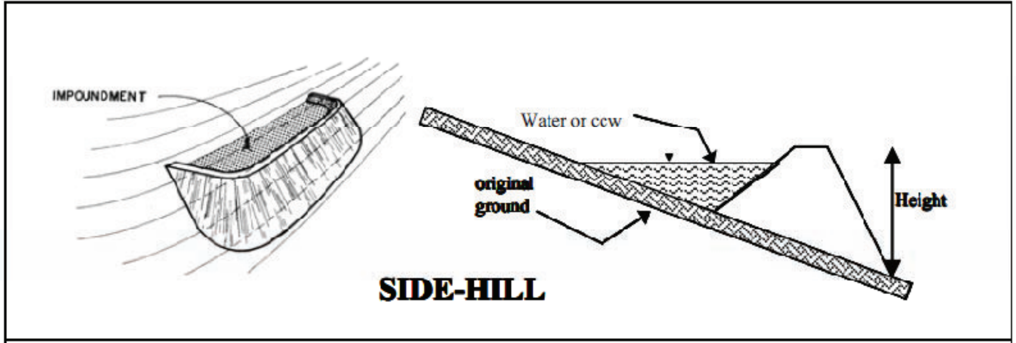
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

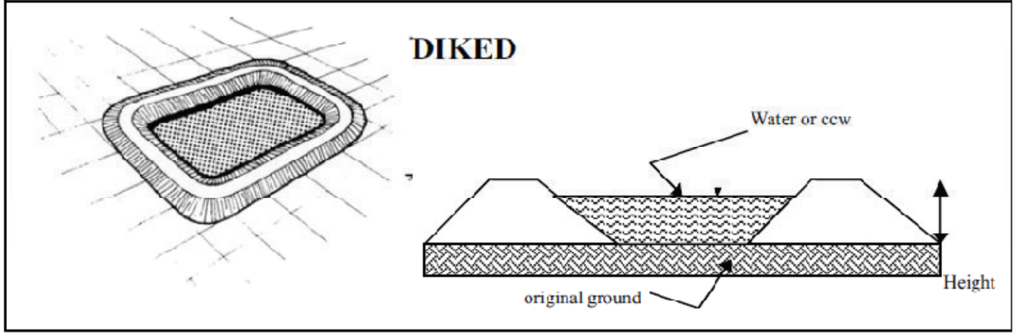
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

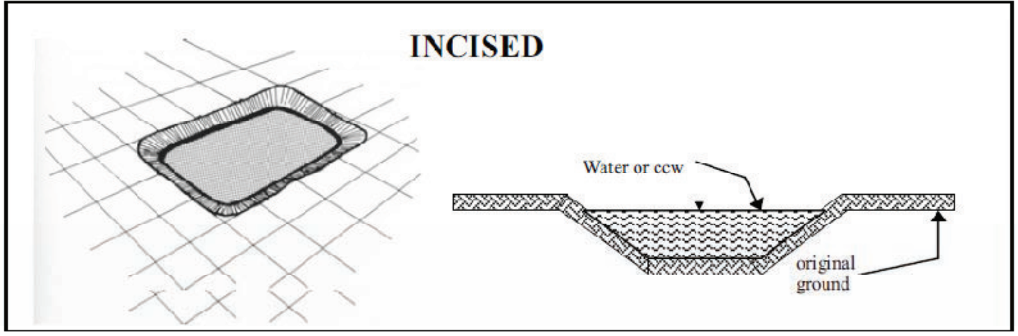
Failure of this structure would release directly into the Pennyroyal Creek and/or could potentially damage adjacent private property.

CONFIGURATION:









☐ Cross-Valley ☐ Side-Hill ☒ Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft)	30	**Embankment Material**	Earth
Pool Area (ac)	100	**Liner**	None
Current Freeboard (ft)	TBP[*]	**Liner Permeability**	---

*To be provided by Santee Cooper personnel. Water level in internal drainage channel near west corner of pond at pump structure appeared to be approximately 5’-6’ below crest of west perimeter dike.

TYPE OF OUTLET (Mark all that apply)

☐ **Open Channel Spillway**

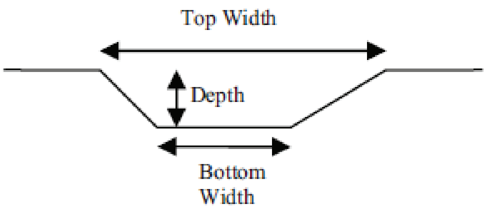
- ☐ Trapezoidal
- ☐ Triangular
- ☐ Rectangular
- ☐ Irregular

depth (ft)

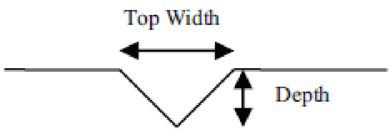
average bottom width (ft)

top width (ft)

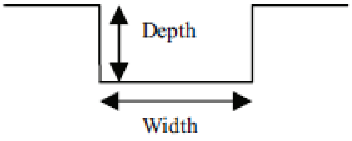
TRAPEZOIDAL



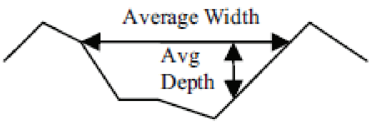
TRIANGULAR



RECTANGULAR

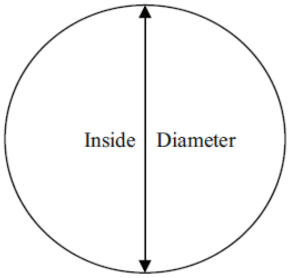


IRREGULAR



☐ **Outlet**

inside diameter



Material

- ☐ corrugated metal
- ☐ welded steel
- ☐ concrete
- ☐ plastic (hdpe, pvc, etc.)
- ☐ other (specify):

	Yes	No
Is water flowing through the outlet?	☒	☐

☐ **No Outlet**

☒ **Other Type of Outlet** (specify): Water is pumped through HDPE piping to the West Ash Pond

The Impoundment was Designed By **Burns & Roe/Lockwood Greene**

	Yes	No
Has there ever been a failure at this site?	☒	☐

If So When? February 14, 2008

If So Please Describe : Existing seal of a CMP drain pipe failed and released wastewater from Unit 3&4 Slurry Pond. A portion of the embankment was excavated to remove a portion of the pipe. The remaining portion of the pipe within the embankment was filled and the embankment was repaired.

	Yes	No
Has there ever been significant seepages at this site?	☒	☐

If So When? February 14, 2008

If So Please Describe : Existing seal of a CMP drain pipe failed and released wastewater from Unit 3&4 Slurry Pond. A portion of the embankment was excavated to remove a portion of the pipe. The remaining portion of the pipe within the embankment was filled and the embankment was repaired.

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	☒
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

Santee Cooper personnel report that the embankment was not constructed on wet ash, slag, or other unsuitable material. Design drawings are to be furnished. A 1999 geotechnical investigation by Paul C. Rizzo Associates, Inc (PCRA) indicated the embankment was well constructed.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

The design Engineer of Record was not present during the site visit.

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

The embankments seemed to be intact. The embankment was constructed in 1980 and repaired in 2008 due to a failure of an existing CMP drain pipe seal.

Appendix B - Winyah GS Unit 2 Slurry Pond Checklist

Coal Combustion Dam Inspection Checklist Form

US Environmental
Protection Agency

Site Name:	**Winyah Generating Station**	**Date:**	**29 June 2010**
Unit Name:	**Unit 2 Slurry Pond**	**Operator's Name:**	**Santee Cooper**
Unit I.D.:		**Hazard Potential Classification:**	**High** ☐ **Significant** ☒ **Low** ☐
	Inspector's Name:	**Frederic C. Tucker, PE; Anne Lee**	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Quarterly[1]		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?		n/a[2]	19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?		n/a[3]	20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?		n/a	Is water entering inlet, but not exiting outlet?		n/a[6]
5. Lowest dam crest elevation (operator records)?		n/a[4]	Is water exiting outlet, but not entering inlet?		n/a[6]
6. If instrumentation is present, are readings recorded (operator records)?		n/a[5]	Is water exiting outlet flowing clear?		n/a[6]
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?		n/a	From underdrain?		n/a
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?		n/a	From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		n/a	Around the outside of the decant pipe?		n/a
15. Are spillway or ditch linings deteriorated?		n/a	22. Surface movements in valley bottom or on hillside?		n/a
16. Are outlets of decant or underdrains blocked?		n/a	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Issue #	Comments
	TBP – to be provided n/a – not applicable or not a feature
1	Santee Cooper conducts quarterly internal inspections by a registered engineer; also informal daily inspections take place over the course of the year by plant operating personnel and security personnel.
2	Unit 2 Slurry Pond is not currently in use. Stormwater from the surface of the pond is pumped directly into the intake channel from the Cooling Pond. No pool is currently maintained although some stormwater ponds in low areas. Water level at pump appeared to be 8'-10' below dam crest.
3	Decant structure and pond are not currently in use. Stormwater is pumped from the pond into the intake channel from the Cooling Pond.

4	No formal survey or records of dam elevations. Design top elevation to be provided.
5	There is no geotechnical instrumentation. Water quality wells monitored for groundwater contamination.
6	Stormwater from the surface of the pond is the only source of water. The water is pumped from the pond to the intake channel from the Cooling Pond.

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit # SC 0022471 **INSPECTOR** Frederic C. Tucker, PE; Anne Lee

Date

Impoundment Name Unit 2 Slurry Pond Winyah Generating Station

Impoundment Company Santee Cooper

EPA Region 4

State Agency (Field Office) Address South Carolina Department of Health and Environmental Control (DHEC)
2600 Bull Street
Columbia, SC 29201

Name of Impoundment Unit 2 Slurry Pond

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New ☐ **Update** ☒

	Yes	**No**
Is impoundment currently under construction?	☐	☒
Is water or ccw currently being pumped into the impoundment? Only when needed. None on date of site visit.	☐	☒

IMPOUNDMENT FUNCTION: The Unit 2 Slurry Pond is not currently in use and does not receive any discharge. The only source of water within the pond is stormwater from the surface of the pond. The water is pumped into the intake channel of the Cooling Pond.

Nearest Downstream Town Name: Georgetown, SC

Distance from the impoundment: 4.6 miles (along flow path to nearest town limit)

Location:

Latitude	33	Degrees	19	Minutes	50.34	Seconds	**N**
Longitude	-79	Degrees	21	Minutes	03.12	Seconds	**E**

State SC **County** Georgetown

	Yes	No
Does a state agency regulate this impoundment?	☒	☐

If So Which State Agency?	DHEC, Bureau of Water/Compliance Assurance Division. For water quality only.

HAZARD POTENTIAL *(In the event the impoundment should fail, the following would occur):*

☐ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

☐ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

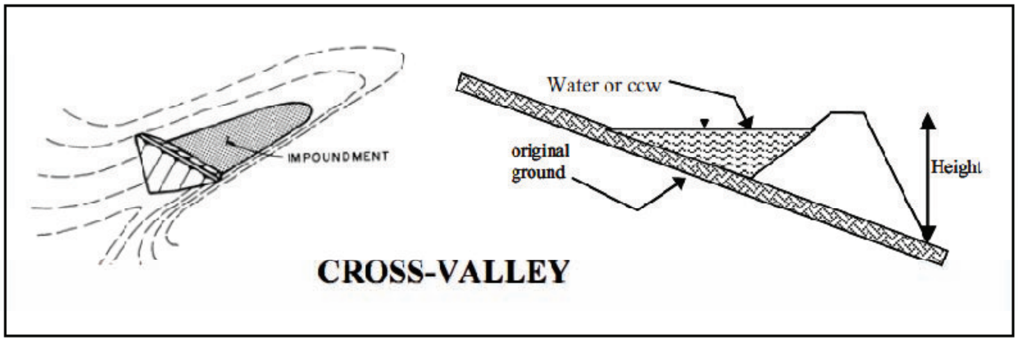
☒ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

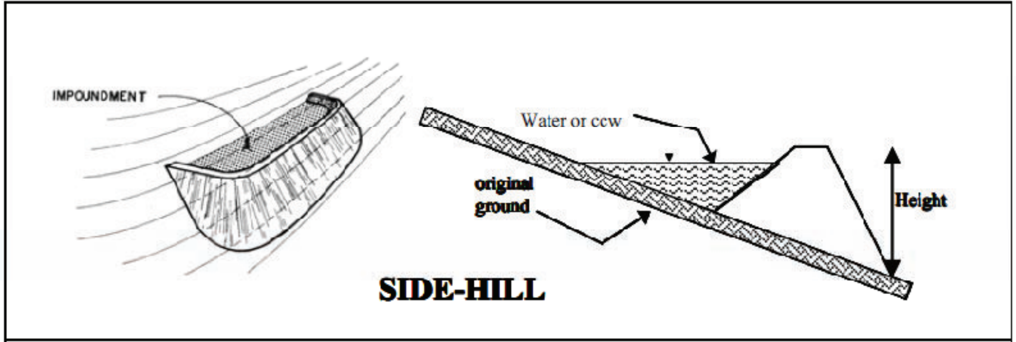
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Failure of this structure would release directly into a perimeter ditch. If the ditch were to be overtopped, ccw could potentially damage adjacent private property.

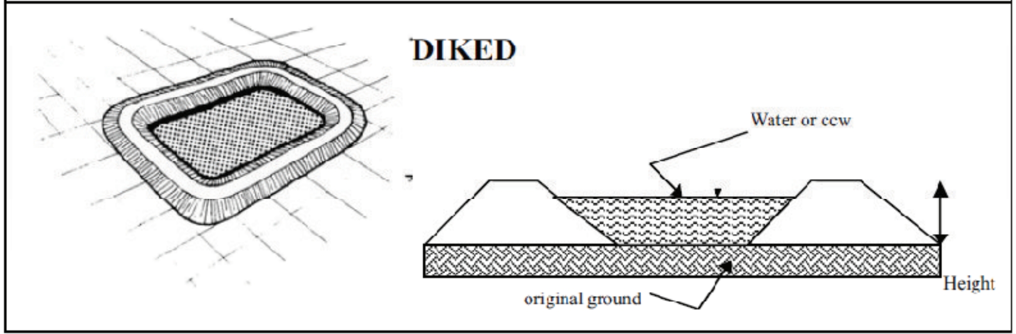
CONFIGURATION:



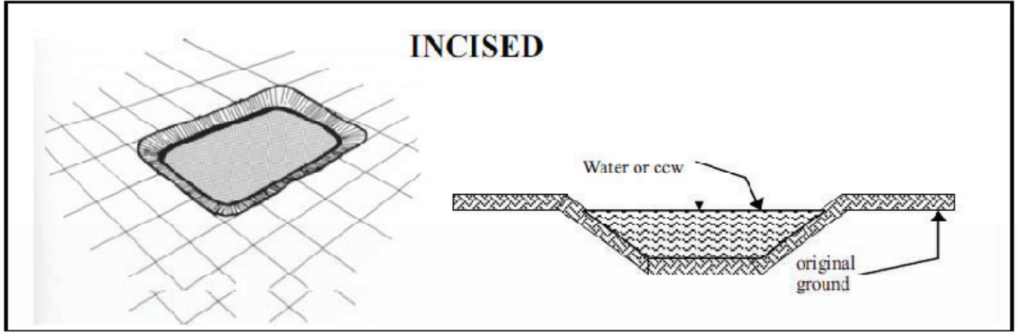
CROSS-VALLEY



SIDE-HILL



DIKED



INCISED

☐ Cross-Valley ☐ Side-Hill ☒ Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft) 12 **Embankment Material** Earth

Pool Area (ac) 34 **Liner** None

Current Freeboard (ft) TBP* **Liner Permeability** ---

*To be provided by Santee Cooper personnel. Water level in lower part of pond at discharge structure appeared to be approximately 8’-10’ below crest of perimeter dike.

TYPE OF OUTLET (Mark all that apply)

☐ **Open Channel Spillway**

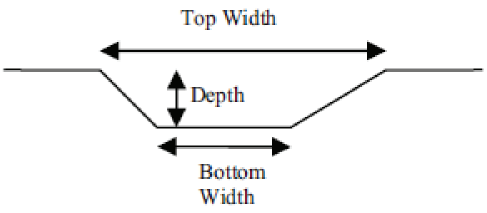
- ☐ Trapezoidal
- ☐ Triangular
- ☐ Rectangular
- ☐ Irregular

depth (ft)

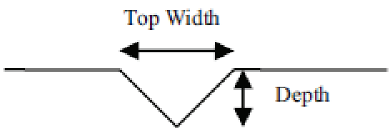
average bottom width (ft)

top width (ft)

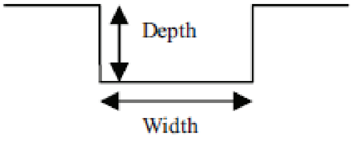
TRAPEZOIDAL



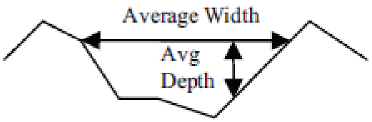
TRIANGULAR



RECTANGULAR

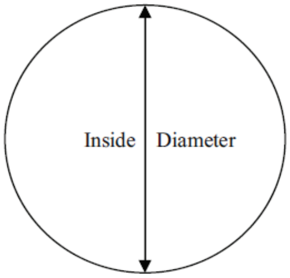


IRREGULAR



☐ **Outlet**

inside diameter



Material

- ☐ corrugated metal
- ☐ welded steel
- ☐ concrete
- ☐ plastic (hdpe, pvc, etc.)
- ☐ other (specify):

	Yes	No
Is water flowing through the outlet?	☐	☐

☐ **No Outlet**

☒ **Other Type of Outlet** (specify): Water is pumped through HDPE piping to the intake channel of the Cooling Pond

The Impoundment was Designed By Burns & Roe/Lockwood Greene

	Yes	No
Has there ever been a failure at this site?	☐	☒

If So When?

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	☒
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

Appendix C - Management of Change Procedure

5.6 Management of Change

"Describe a process for ensuring consideration of Environmental Requirements and environmental concerns in the planning, design, and operation of ongoing, new and/or changing processes, equipment, and maintenance activities." (CD Appendix ¶ 5.e.vi.)

Santee Cooper ensures consideration of environmental requirements and environmental concerns in the planning, design, and operation of ongoing, new and/or changing process, equipment, and maintenance activities through a combination of the following:

- An environmental review, which is governed by Santee Cooper's Management of Change process; and
- EMS training to educate Santee Cooper employees, contractors, and on-site service providers about environmental issues and requirements.

5.6.1 Triggering a Management of Change (MOC) Environmental Review

A formal environmental review is required for all "significant changes" with potential environmental requirements, impacts, or other concerns. Examples of significant changes or other events that would trigger a formal environmental review include, but are not limited to:

- Any project or activity requiring capital approval;
- Addition of new operations or processes that use equipment or materials whose environmental risks have not previously been assessed and environmental impacts and requirements determined;
- Installation of new equipment, replacement of equipment, or any construction activities that are not "replacement-in-kind" and which has not been assessed previously (e.g., re-routing of piping, emission points, water and wastewater conveyances, and significant earth moving);
- "Non-routine" maintenance activities which have not been assessed previously;
- Any activity that would require a permit modification, new permit, or contradict a condition in an existing permit;
- Any new or changing activity or process (including revising an SOP), where the resulting action will have an impact on the environment or be covered by an environmental requirement (i.e. changes that create a new waste stream, alters a permit condition); and
- Changes in regulatory requirements that will cause a physical modification at the facility, installation of new equipment, or changes in standard operating procedures.

5.6.2 Management of Change Environmental Review Process

Any originator of a potential change ("Originator") consults with the Station or Corporate EMS Coordinator to determine whether they must complete an environmental review, based on examples provided in this manual. Originators may include, but are not limited to, supervision/management in Generation Operations, Maintenance, and Technical Services, the Station Manager, Engineering & Construction Services (E&CS), General Construction Services, or Corporate Environmental Management. This list is not exclusive. Any Santee Cooper employee may originate a change requiring a MOC Environmental Review. Contact the Station or Corporate EMS Coordinator. The originator of the change completes the MOC Environmental Review form, per the instructions in the Appendix to this Manual, and forwards it to his or her supervision.

MOC reviews will require review and approval by the following:

- Originator's Supervision;
- Station EMS Coordinator;
- Generation Technical Services Superintendent; and
- Corporate EMS Coordinator.

After the environmental review is completed and approved, and before the changes are implemented, the Station EMS Coordinator ensures that the changes and any resulting requirements are communicated to appropriate employees, contractors, and on-site service providers. Training occurs for employees as necessary and as identified in the MOC, and all documentation, including SOPs, are updated.

Documentation of all MOC Environmental Reviews will be maintained at the station by the Station EMS Coordinator in the environmental files and by the change Originator with the project files. The Corporate EMS Coordinator will maintain a copy in the Corporate EMS files.

13.13 Policy

ENVIRONMENTAL MANAGEMENT OF CHANGE

MANAGEMENT OF CHANGE PROCESS

Change Identification

A change is identified by an individual. Table 1 Definition of a Change lists various types of changes and whether or not they are covered by the Management of Change (MOC) process.

Any employee can originate a change – although most changes will originate with planners, engineers, supervisors, superintendents, or construction personnel.

Change Initiation

Prior to beginning a project, the originating employee must decide if a project requires an MOC review. If a change requires an MOC, the originator completes the Management of Change Environmental Review Form (SC1039). Capital projects and O&M activities requiring an MOC review should not be approved until the MOC has been authorized.

The Management of Change Environmental Review Form includes:

- Description of the Change – including location, specifics on equipment, and planned implementation dates if known
- Identification of Temporary Changes – Any temporary changes require a removal date
- Potential Effect of the Change – Environmental impacts of the change, when known, should be identified here. Details of the effects and other information known should be provided.

Attach drawings, vendor information, or other instructive information if appropriate.
The MOC originator signs and dates the document.

Environmental Review

The Station EMS Coordinator coordinates a review of the change, and includes the originator and their supervisor, appropriate station personnel, the Generation Technical Services Superintendent, and the Corporate EMS Coordinator. These individuals determine any further actions necessary for the change to proceed.

Actions may include the following:

- Obtain or modify environmental permits
- Notify regulatory agencies
- Train employees, contractors and/or on-site service providers
- Edit Standard Operating Procedures or Operations and Maintenance Manuals
- Modify preventive maintenance (PM) tasks
- Modify Environmental Risk Assessment
- Develop job-specific work instructions
- Edit requirements matrix, training matrix, and other documents

The Station EMS Coordinator notifies the responsible persons of the required actions, and gains agreement on the Target Completion Date.

The originator/Supervisor, the Station EMS Coordinator, the Generation Technical Services Superintendent, and the Corporate EMS Coordinator sign and date the form indicating that the change has been reviewed to determine environmental impacts and all necessary Actions have been listed.

The Station EMS Coordinator or Corporate EMS Coordinator documents all actions in the MOC Tracking Spreadsheet.

Completion of Action List

Individuals who are assigned specific actions communicate with the Station EMS Coordinator indicating the status or completion of their assigned actions. As actions are completed, the Station EMS Coordinator or Corporate EMS Coordinator updates the MOC Tracking Spreadsheet with actual completion dates. The MOC Tracking Spreadsheet is used to track the status of all changes with uncompleted actions.

Authorization for Implementation

Prior to project or activity implementation, the change will be communicated to all affected employees, contractors, and on-site service providers.

The Station EMS Coordinator ensures that this communication has taken place and that all actions required in the Environmental Review are complete. The change is then authorized by the Station EMS Coordinator.

If it becomes necessary to implement a change prior to completion of some actions, the Station EMS Coordinator will determine if this is appropriate, and that this will not cause or have the potential to cause an environmental impact. All changes will be tracked to completion.

Documentation

The completed MOC form for each change, and any associated documentation, is maintained in the station EMS files. A copy of the completed form is sent to the Generation Technical Services Superintendent, the Corporate EMS Coordinator, and to the originator. If the change is associated with a project, a copy will be maintained in the project files. A copy of each completed MOC form will also be posted on the EMS iPort page.

TABLE 1

Definition of a Change

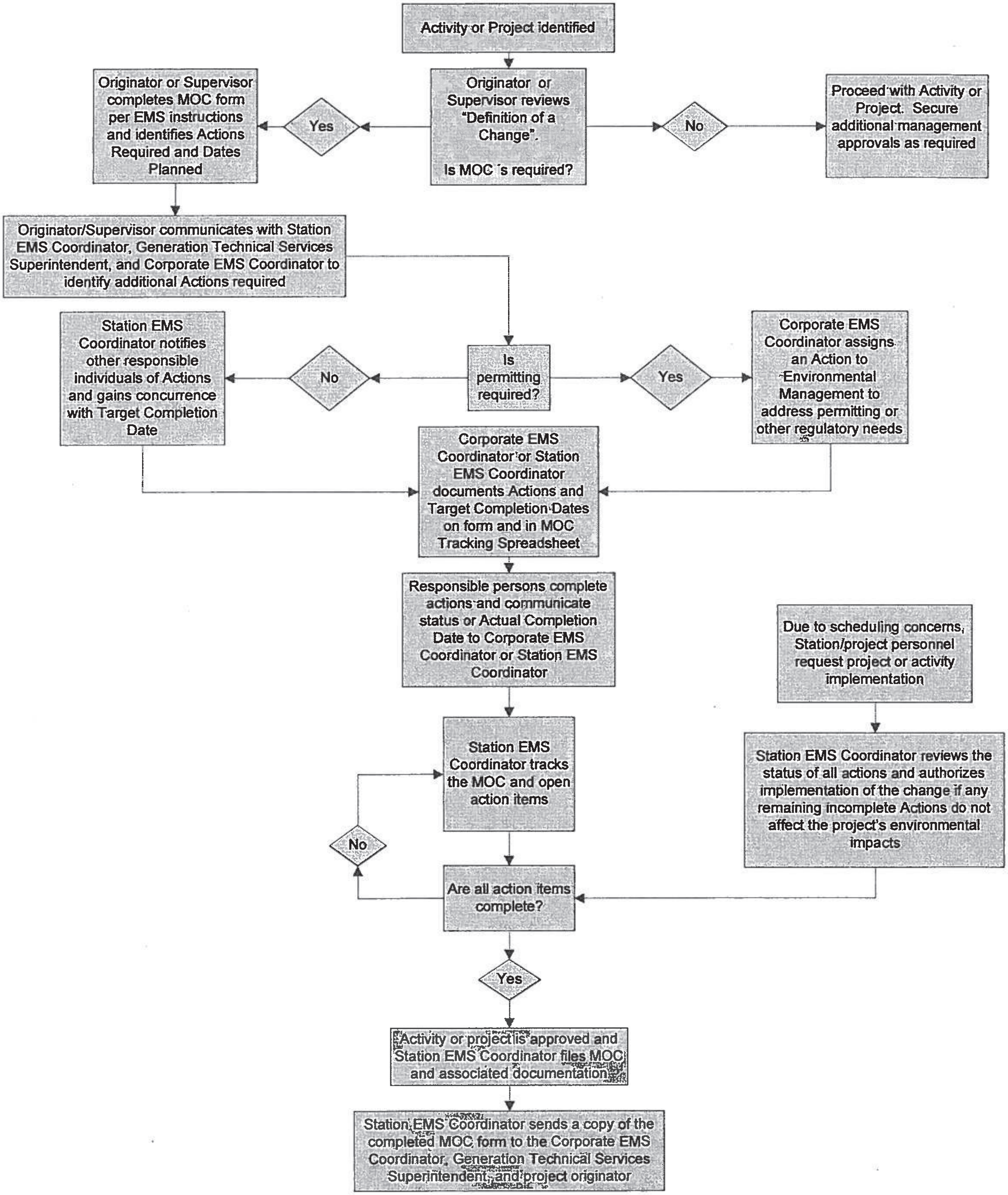
A formal environmental review using the Management of Change process is required for all "significant changes" with potential environmental requirements, impacts, or other concerns.

	Type of Change	MOC Required?
Processes A change to existing processes, work practices, or the use of existing equipment or structures	Activities or projects requiring capital approval	Yes
	Start up or shutdown of existing equipment	No
	Use of existing equipment for a purpose other than that for which it was originally intended	Yes
	Alteration to site, including: - Clearing or grading including road modifications - Modifications to stormwater collection - Change in location of material storage areas for oil, fuel, chemicals, by-products, etc.	Yes
	Activities generating new waste products	Yes
	Pond dredging – routine	No
	Pond dredging – non-routine, changing capacity	Yes
	Change of a pond use or change in inputs to a pond	Yes
	Changes in chemical suppliers	No
	Additions of chemicals not previously used	Yes
	Fuel Change to: – Fuel not currently permitted to burn, or – Fuel currently permitted but outside specifications	Yes
	Changes or additions to Standard Operating Procedures that are intended to improve clarity or format, and do not impact operating practices or have environmental issues	No
	Changes to a Standard Operating Procedure (Operations or Maintenance) that will have an impact on operating practices or has the potential to impact the environment	Yes
	Modifications (permanent or temporary) to controls or alarms in critical processes with impacts to the environment	Yes

	Type of Change	MOC Required?
Equipment Modifications to existing equipment – including rotating equipment, vessels, piping, tanks, containment areas, specialty items, instrumentation, and software – with potential environmental impacts	Identical replacement or replacement-in-kind (such as the same capacity, design conditions, materials of construction, speed, power, grade, internals, service, and operating theory)	No
	Equipment repairs and modifications to equipment that do not deviate from the original design specifications	No
	Equipment modifications not described above	Yes
	Modifications intended to extend the life of the station beyond original life expectancy	Yes
	Modifications that will increase the generating capacity/output of the station	Yes
	Temporary repairs or clamps on process equipment/piping with impacts to the environment	Yes
	Temporary changes to instrumentation or software with impacts to the environment	Yes
	Equipment temporarily out of service, pending return to service, abandonment, or demolition with impacts to the environment	Yes
New additions – including rotating equipment, vessels, piping, tanks, specialty items, instrumentation, software, and chemicals	New chemical being introduced into the process	Yes
	New facility installations (permanent or temporary)	Yes
	New equipment in parallel service	Yes
Maintenance Activities	Activities or projects requiring capital approval	Yes
	Piping or tubing replacement with like materials	No
	Piping changes other than normal repair or replacement-in-kind	Yes
	Repair of existing equipment to return it to its original design specifications	No
	Rerouting of existing piping	Yes
	Alterations or additions to potable water systems or sanitary systems	Yes
	A bypass to an alarm, shutdown, or interlock with impacts to the environment that is not described in existing operating procedures	Yes
	Changes to relief devices (relief valves, rupture disks, etc.) with impacts to the environment	Yes
	Changes to PM intervals on fuel burning or environmental compliance equipment	Yes
	Changes to PM intervals on equipment other than that described above	No
	Changes to or additions of lubricants not previously used	Yes

Santee Cooper Environmental Management System

Management of Change Process Flow



Santee Cooper.

MANAGEMENT OF CHANGE ENVIRONMENTAL REVIEW

Station:

WO#:

Description of Change:
(Include location, specifics on equipment, and planned implementation date if known)

Is this change Temporary? ☐ No

☐ Yes- Date of Removal:

Is a MOC review required? ☐ No - Indicate Reason:

☐ Yes

Select the potential effect(s) of the change on the environment:

Describe effects and any known details:

☐ Creates a new waste or pollutant emission

☐ Requires Environmental permits or permit modifications

☐ Involves the use of chemicals

☐ Results in a change to an SOP

☐ Extends the life of equipment

☐ Changes waste stream/air emission/wastewater levels or characteristics

☐ Has an environmental impact or potential environmental risk

☐ Requires pollution control equipment, measures, or procedures

☐ Increases station capacity

☐ Other environmental impacts

Originator: *(Print Name)*	Signature:	Date:

Environmental Review

List any further actions necessary before initiating the change:

Action	Responsible Person	Target Completion Date

Signatures below indicate changes have been reviewed to determine environmental impacts, and all actions have been listed:

Supervisor: *(Print Name)*	Signature:	Date:

Station EMS Coordinator: *(Print Name)*	Signature:	Date:

Generation Technical Services Superint.: *(Print Name)*	Signature:	Date:

Corporate EMS Coordinator: *(Print Name)*	Signature:	Date:

Authorization for Implementation

All actions listed above are complete. If not complete prior to Authorization, this will not cause or have the potential to cause environmental impact. All changes will be tracked to completion.

Station EMS Coordinator: *(Print Name)*	Signature:	Date:

Copies to:
Station EMS Coordinator - Original
Generation Technical Services Superintendent
Corporate EMS Coordinator
Originator
Project files, if applicable

Appendix C - BMP and EMS Manual Coversheets

santee cooper®

Environmental Management System Manual

April 2010

Pollution Prevention Plan
With Best Management Practices (BMPs)
South Carolina Public Service Authority

2010 Revision

Items Requested

- Descriptive Information
  - Impoundment Capacity (Normal & Max) **(included in Santee Cooper response to EPA's Request for Information)**
  - Impoundment Surface Area (Normal & Max) **(included in Santee Cooper response to EPA's Request for Information)**
  - Hazard Classification **(undetermined)**
  - Freeboard (Normal & Min) **(N/A)**
  - Maximum Dam Height **(included in Santee Cooper response to EPA's Request for Information)**
  - Dam Crest Elevation **(included in original design plans, but not surveyed elevations)**
  - Crest Width **(typical details included in original design plans)**
  - Upstream Slope Inclination **(typical details included in original design plans)**
  - Downstream Slope Inclination **(typical details included in original design plans)**
  - Spillway Type, Size, & Crest Elevation **(N/A)**
  - Outlet Conduit Type, Size, & Max Flow Capacity **(N/A)**
  - Historical Maximum Pond Elevation **(N/A)**
  - Year Built **(included in Santee Cooper response to EPA's Request for Information)**
  - Design Life **(N/A)**
  - Specific Wastes Permitted in Impoundment **(included in Santee Cooper response to EPA's Request for Information)**
  - Other (describe)
- Regional map including schools, hospitals, etc. **(received from Jay Hudson)**
- Management Unit Drawings
  - Plans **(received from Jay Hudson)**
  - Sections **(received from Jay Hudson)**
  - Elevations **(received from Jay Hudson)**
  - Other (describe)
- Design Information
  - Name of Designer of Record **(included in Santee Cooper response to EPA's Request for Information)**
  - Design Assumptions **(N/A)**
  - Design Analysis **(N/A)**
  - Spillway Design Flood or Design Basis **(N/A)**
  - Slope Stability Factor of Safety **(N/A)**
  - Design Soil Properties and Parameters **(N/A)**
  - Other (describe)
- Permits
  - NPDES SC0022471 **(received from Jay Hudson)**
  - Dam Safety – Operating Permit **(N/A)**
  - Other (describe)

- Subsurface Information
    - Geology **(N/A)**
    - Geotechnical Report **(N/A)**
    - Subsurface Profiles **(for Ash Pond B expansion only)**
    - Other (describe)
- Monitoring Information:
    - Observation Wells/Piezometer Readings **(N/A)**
    - Seepage Readings **(N/A)**
    - Settlement Readings **(N/A)**
    - Alignment Readings **(N/A)**
    - Inclinometer Readings **(N/A)**
    - Time vs Reading Graphs **(N/A)**
    - Other (describe)
        - Staff Gauge Readings **(received from Jay Hudson)**
- Instrumentation Drawings
    - Location Plan **(N/A)**
    - Section Views **(N/A)**
    - Other (describe)
- Operation, Maintenance, & Surveillance
    - Operating Procedures **(N/A)**
    - Maintenace Procedures **(N/A)**
    - Inspection Procedures **(received from Jay Hudson)**
    - Third Party Inspection Reports **(received from Jay Hudson)**
    - Other (describe)
        - Ash Management and Sales **(received from Jay Hudson)**
- Emergency Action Plan **(N/A)**
- Inundation Map **(N/A)**