LAKE CONESTEE DAM EVALUATION OF ALTERNATIVES REPORT

Prepared for:

The Conestee Foundation, Inc.
Greenville, South Carolina

Prepared by:

Kleinschmidt

Lexington, South Carolina
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Project 2001002
October 2019

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Lake Conestee Dam
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Acronyms

CoC – contaminants of concern

CFI – Conestee Foundation, Inc.

FERC – Federal Energy Regulatory Commission

GHG – Greenhouse gases

LCD – Lake Conestee Dam

NAVD88 - North America Vertical Datum of 1988

NGVD29 - National Geodetic Vertical Datum of 1929

PAH -Polycyclic aromatic hydrocarbons

PMF – Probable Maximum Flood

SCDHEC – South Carolina Department of Health and Environmental Control

TBA – Targeted Brownfields Assessment program

TNW – Traditional Navigable Waters

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EXECUTIVE SUMMARY

Lake Conestee Dam impounds the Reedy River to form Lake Conestee. This dam is a stone-masonry structure constructed in 1892 to provide power for Reedy River Factory (later re-named Conestee Mill). The former reservoir created by this dam, originally approximately 135 acres, is now filled with an estimated 2.3 million cubic yards of contaminated sediment, vastly reducing the capacity of the former lake.

The SCDHEC Dam Safety Program rated the Lake Conestee Dam in "Poor" condition in an inspection dated 12/1/2016 (per rating definitions used for reporting nationally to the U.S. Army Corps of Engineers' National Inventory of Dams). The Conestee Foundation, Inc. (CFI), owner of the dam, recognizes the dam is vulnerable to failure based on its age, construction, and deteriorating condition. A dam breach would result in a significant release of contaminants of concern with potential severe environmental impacts to the downstream Reedy River. Such a release could degrade recreation and natural resources, impact public and private economic resources, and elevate ecological and human health risks downstream.

This report discusses the feasibility of nine potential alternatives for rehabilitation, repair, or replacement of the existing dam to effectively contain contaminated sediment within Lake Conestee for an extended term. Dam removal was dismissed as a possibility because of the massive quantity of contaminated sediment impounded by the structure. Construction of an upstream dam was also reviewed and dismissed as a potential solution because of the significant additional cost involved in 1) the construction of a temporary coffer dam to allow upstream work and 2) sediment removal and disposal with increased risk of hazardous sediment transport downstream. Alternatives were evaluated for their ability to meet all current design standards, satisfy project-specific design and performance criteria, and minimize environmental impacts. Based on this process, this report identifies a single

Recommended Alternative, which meets all design objectives and is optimally protective of the surrounding community and downstream resources.

VOLUNTARY CLEANUP CONTRACT AND RESTRICTIVE COVENANT

The Conestee Foundation, Inc. (CFI) acquired the lake and dam in 2000. Because of anticipated contamination issues the lake site was administered by the South Carolina Department of Health and Environmental Control (SCDHEC) as a brownfields site. [The SCDHEC Brownfields Program is authorized under Title 44, Chapter 56 of the SC Code of Laws, South Carolina Hazardous Waste Management Act, Article 7 – Brownfields/Voluntary Cleanup Program]. The Conestee Foundation was qualified as a non-responsible party and engaged in a Voluntary Cleanup Contract (VCC 00-5393-NRP) in 2000. The terms of the VCC required extensive assessment of the lake to evaluate potential contamination levels in sediments, soils, water, groundwater, and biota. Several assessment activities confirmed extensive and significant contamination in both submerged sediments and exposed sediments accreted above the ambient water line throughout the lake area. The portfolio of contaminants documented at the site included a wide range of metals, organic compounds, and pesticides having known ecological and human health risk characteristics. [2012 BCRLF-ARRA Final Report- LCD Rehabilitation Feasibility Study].

In 2007 SCDHEC certified the VCC requirements as satisfied. At that time a Restrictive Covenant was signed defining the Conestee Foundation’s obligations in managing the Lake Conestee site going forward. These requirements include implementation of educational and institutional measures to protect users of recreational trails and amenities on the property from exposure to contaminated media.

Based on the findings of the assessment activities conducted under the VCC, the nature and extent of contaminants of concern present, and the large volume of affected sediment, CFI and its consultants recognized that a full remediation of the lake site would be extremely cost-prohibitive and would risk release of the contaminated media. Rather, the parties concluded the best approach for managing the extensive contamination in the lake was a “monitored natural recovery” strategy. Through this approach the protection of public health and the environment would be most effectively served by keeping the contaminated sediments in place, allowing progressively cleaner sediments to continue to naturally cap the contaminated lake sediments, and minimizing the disturbance and release of contaminants downstream. The parties also acknowledged that to effectively minimize the release of contaminated sediments long-term would require that the Lake Conestee Dam be kept in good condition, indefinitely, such that it continues to contain the legacy contaminants already deposited in the lake, to the extent practicable. These requirements were agreed to in the 2007 Restrictive Covenant signed by CFI and SCDHEC.

DAM INSPECTIONS

The condition of the dam was assessed by independent engineers and consultants in numerous previous studies or inspections conducted on behalf of the Conestee Foundation [2000 Inspection by US Army Corps of Engineers- Charleston District; 2008 Bunnell-Lammons Engineers and Caliber Engineering Inspection and Report; 2011 Inspection and informal report by Malcolm Schaeffer, PG; 2012 Inspection and verbal report by Paul Cyr, PE, Kleinschmidt Associates; 2018 Inspection and Letter Report by Paul Cyr, PE and Bill Remington, PE, Kleinschmidt Associates; 2014, 2016, 2018 SCDHEC Inspections and Reports.] These studies and inspections, although limited in scope, all confirmed that the 1892 structure does not meet current design stability standards for factor of safety and for overturning factor.

Historically a gated outlet structure connected through the dam to a penstock that extended to the mill downstream. At this time neither a serviceable gate nor penstock assembly exist. In 2001, to prevent an ongoing unchecked flow through the penstock orifice, as a temporary corrective action, a wooden plate was installed on the upstream side of the dam, against existing wooden timber seals framing the penstock orifice. These existing timbers, believed to be at least 110 years old, are in an undetermined condition. The flow of water around the temporary bulkhead will continue to erode the timber seals. Once these wooden seals fail, there will be an increase in flow. The volume of flow could transport sediment and contaminants downstream of the dam. If the flow is great enough or if the bulkhead were to fail or be displaced, then there could be a repeat of the loss of the impoundment and release of sediment that occurred from June 2000 to June 2001, when the lake reservoir drained, and the river eroded a “canyon” through the lakebed.

The dam condition currently presents extensive seepage through numerous mortar joints, cracks, crevices, and fissures of the now 127-year-old stone masonry structure. Sediment particles are clearly being translocated along with water through these cracks. The sediment accumulating at the toe of the dam at locations on both sides of the spillway has been tested and confirmed to contain high levels of contaminants of concern. CFI and its consultants acknowledged that these numerous seeps across the downstream face of the dam may constitute an unpermitted release of hazardous substances to waters of the U.S. As a result, CFI and its consultants have incorporated measures into any rehabilitation or replacement of the dam to stop such discharges to the technically practicable.

The Lake Conestee Dam is no longer utilized for power production or to provide a water supply for mill operations. Therefore, its primary purpose today, and going forward is to effectively contain contaminated sediments within the body of the former reservoir, minimizing the release of contaminants downstream to the extent practicable. Hence, the dam now functions as a waste containment structure.

ALTERNATIVE ANALYSES AND RESULTS

The Conestee Foundation contracted with Kleinschmidt Associates, Inc. to determine the single optimal Recommended Alternative for resolving the challenges of age, deterioration, and contaminant management associated with the aging Lake Conestee Dam structure.

The assessment of alternatives, and the selection of a single best Recommended Alternative carefully considered the unique requirement that this dam function as a waste containment structure. The engineering team also considered the appropriate and customary engineering design standards of care in terms of dam safety, structural design, constructability, and protection of public safety and the environment.

Nine alternatives were developed based on the following considerations: SCDHEC regulations, FERC and other appropriate engineering design guidelines, dam stability analyses, access, property acquisition, constructability, water conveyance, and short and long-term maintenance requirements. In addition, the SCDHEC Dam Safety Program and the SCDHEC Brownfields Program, the owner (CFI), and Kleinschmidt agreed that any rehabilitation or replacement of the existing dam must effectively minimize and mitigate the release of contaminants of concern, be constructed to exceed anticipated seismic and hydrologic stresses, and perform all requirements necessary to provide a 100-year design life. Kleinschmidt evaluated these alternatives (including a No-Action Alternative) for the replacement or rehabilitation of the Lake Conestee Dam. The eight action alternatives were screened using a two-tier review process: (1) the ability to meet the goals of the project (outlined in section 1.5 of this report) using the design criteria in section 2.2 of this report, and (2) their ability to avoid or minimize impacts to the environment. Alternatives that met all the goals and design criteria (Tier 1) were considered in the Tier 2 analysis. The alternatives that were not eliminated at Tier 1 or Tier 2 advanced for further consideration and were evaluated with an environmental review and an opinion of probable construction cost.

In addition to using the Tier 1 and Tier 2 criteria, the alternatives were assessed to determine the potential effect that each alternative may have on relevant resources. An initial environmental examination required by the National Environmental Policy Act (NEPA) was conducted for the alternatives identified as viable.

Elements of the natural and human environment that were evaluated because of potential impact of the Action Alternatives and the No Action Alternative included water resources, soils and geology, botanical resources, fishery resources, wildlife resources, threatened and endangered species, historic resources, recreational resources, aesthetic resources, hazardous materials, public health and safety, socioeconomics, and environmental justice. Elements of the natural and human environment that are unlikely to be affected by the Action Alternatives and the No Action Alternative were not further evaluated. These include cultural and tribal resources, navigation, land use, climate, traffic and transportation, air quality, and noise. Table 5 summarizes the scope of analysis for each resource area.

THE RECOMMENDED ALTERNATIVE

Based on the review of alternatives using the Tier 1 / Tier 2 screening process, the technical criteria for dam performance, and the impact analysis, Alternative 9 was identified as the single optimal solution for the rehabilitation / replacement of the Lake Conestee Dam. This Recommended Alternative is discussed in Section 6 of the report. This alternative specifies a new cast-in-place concrete dam structure on the downstream side of the existing dam, which remains as an integral component of the overall proposed solution. The existing dam would be utilized as a coffer dam throughout construction of the new downstream CIP structure, and the existing penstock orifice would be repurposed to allow a water level control structure to be installed for ongoing maintenance. Between the old and the new dams, a 10-ft wide low permeability engineered soil medium would be placed. This medium has four important functions: 1) it will be designed to attenuate contaminants leaking through the old dam; 2) it will contain sufficient expansive clay mineralogy to help seal any cracks that may naturally occur in the new CIP dam; 3) it will provide a serviceable top of spillway plane that will enable equipment to access the spillway area for routine maintenance, removal of large woody debris, and repairs; and 4) it will enable access to the upstream side of the new structure if repairs to the new CIP structure are ever necessary over its 100-yr design life.

DAM CLASSIFICATION STATUS

In 2006, SCDHEC's Dam Safety Program classified the Lake Conestee Dam as a Class 2 structure with a Significant Hazard Status, primarily because of the contaminated sediments impounded by the dam. However, certain proposed changes in use of former Conestee Mill buildings (owned by other parties), located within the floodplain and floodway, and within 150 ft downstream of the dam, to residential or commercial uses could potentially result in automatic re-classification of the dam structure to High Hazard status. Any change by SCDHEC to the current Lake Conestee Dam classification potentially impacts the design details and specifications for the alternative selected as well as the level and frequency of regulatory oversight. Considering the critical function of this dam, and the level of risk associated with the contaminants contained in the impounded sediments, it was assumed for purposes of preliminary design analysis, the dam will have to meet standards appropriate to a High Hazard structure.

ISSUES TO BE RESOLVED

There are three primary issues that must be resolved for this project to proceed. First is funding for the construction of the project and maintenance for the 100-year life of the project. A cost estimate has been developed for the Recommended Alternative 9, to aid in the evaluation process, and to provide a basis from which to justify funding requests. Included in this cost estimate is the purchase of approximately 1.6 acres of land required for the footprinting of the recommended alternative and access for construction, long-term maintenance, security, and public safety.

A second issue to be resolved is the location of the current and future FEMA floodplain and floodway locations. Figure 30 of this report shows an image of the current FEMA flood lines for the Lake Conestee Dam area, which appear to potentially be inaccurate based on actual flood levels. Regardless, once the Recommended Alternative is constructed, the FEMA flood lines will change and will need to be updated.

The third issue to be resolved is future ownership of the dam and the associated reservoir (Lake Conestee tract). The Conestee Foundation Inc. currently owns the dam and the lake tract, fee simple. This ownership is subject to the Restrictive Covenant (RC), discussed above. This RC restricts the management of the lake tract, including the dam, and stipulates that the existing dam, or some alternative means be sustained to prevent contaminated sediment from moving downstream. CFI plans to focus its future efforts on improving and growing the Lake Conestee Nature Park. To that end, the Foundation is exploring solutions for transfer of the lake tract, including the dam, to another party.

CONCLUSION

The Lake Conestee Dam situation is unique because of the potential negative human health and environmental impacts from a dam failure or breach scenario. Although the Lake Conestee reservoir originally contained on the order of 1,500 acre-feet of storage, the lake has evolved to near its sedimentation end point, and now stores less than 5 to 10 percent of that amount of water. Hence, the biggest threat to both people and the environment, in the case of failure of this unique dam, is the release of sediments, and the potential release of contaminants of concern. Under a failure scenario, the Reedy River and its environs, and associated downstream resources would be imperiled. It is likely that in the event of a dam breech, SCDHEC and USEPA would reassess the condition of Lake Conestee and the affected downstream Reedy River, and potentially elevate the regulatory profile and requirements of the lake and downstream areas. Post-failure contamination conditions could be quite significant for tens of miles downstream and could pose a variety of potential threats to human health and the environment.

Given the age and condition of the existing dam, it is imperative that Lake Conestee Dam be repaired, rehabilitated, or replaced. It is no longer merely an historic mill dam that provided power to an historic mill. This dam now functions as a critical contaminated sediment containment structure essential to protecting downstream reaches of the Reedy River and its associated reservoirs.

To resolve the issues developing from the aging infrastructure, Kleinschmidt has identified Recommended Alternative 9, the construction of a new cast in place concrete replacement dam ten feet downstream of the existing dam, for the protection of public health and the environment.

The capital cost for this Recommended Alternative is projected to be $29,810,772, (in 2022 costs). The costs associated with all conceivable long-term maintenance reporting, regulatory compliance, and repairs that may be expected over a 100-year design life were also analyzed. To provide an endowment to cover all of these costs over the 100-year projected service life of the structure would require an initial investment of approximately $12.78 million. These long-term cost estimates obviously require numerous assumptions, to include endowment income and inflation, as well as reasonable estimates of present (2022) value costs of activities, materials, and services. Many of the inputs are dynamic, and best reasonable estimates have been developed on all items in order to provide insights on extended facility costs.

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1.0 PROJECT PURPOSE AND NEED

1.1 INTRODUCTION

Lake Conestee Dam is a stone-masonry structure is located on the Reedy River near Greenville, South Carolina. The dam is approximately 543 feet long and 29 feet in height from the primary spillway elevation to the plunge pool. The dam previously provided waterpower to the downstream mill and site, known as Reedy River Factory until 1909, later as Conestee Mill. Lake Conestee Dam, owned and maintained by the Conestee Foundation, Inc. (CFI), impounds the Reedy River to form Lake Conestee. Fewer than 20 acres of open water remains of the original 135-acre reservoir which is now filled with an estimated 2.3 million cubic yards of contaminated sediment, vastly reducing the capacity of the former lake.

The Lake Conestee Dam is no longer utilized for power production or to provide a water supply for mill operations. Its primary purpose today and going forward is to effectively contain contaminated sediments within the body of the former 135-acre reservoir, minimizing the release of contaminants downstream to the extent practicable. Hence, the dam now functions as a waste containment structure.

The lake and the dam are subject to a Restrictive Covenant, a binding legal agreement between the owner, CFI, and SCDHEC. These parties acknowledged that to effectively minimize the release of contaminated sediments long-term would require that the Lake Conestee Dam be kept in good condition, indefinitely, such that it continues to contain the legacy contaminants already deposited in the lake, to the extent practicable.

Important to this study, in 2014, the dam and the entirety of historic Lake Conestee was listed on the National Register of Historic Places. Much of the original 135-acre reservoir has evolved into emergent wetlands and bottomland forests. Lake Conestee Nature Park (of which Lake Conestee is the keystone property) was declared as a state-sanctioned Wildlife Sanctuary (2014) and an Important Bird Area of Global Significance (2009). The lake area, but not the dam, is subject to a permanent Conservation Easement held by Upstate Forever.

1.2 PROJECT BACKGROUND/DESCRIPTION

CFI acquired the dam and lake in 2000 as a non-responsible party and engaged in a Voluntary Cleanup Contract (VCC 00-5393-NRP) with the South Carolina Department of Health and Environmental Control (SCDHEC). The VCC required a rigorous assessment of the nature and extent of contamination in the lake and lake sediments as well as downriver. In close coordination with SCDHEC's Bureau of Land and Waste Management, CFI facilitated studies from 2000-2008 to conduct extensive environmental testing, assess the site, and to conduct risk assessments. This work was performed under the Targeted Brownfields Assessment (TBA) program, administered by SCDHEC, under USEPA authority.

Since acquiring the dam in 2000, CFI has completed numerous activities related to the assessment and maintenance of the dam. These have included vegetation removal, access management, security fencing, safety signage, installation of a temporary gate (wooden plate) over the large diameter penstock orifice (previously used for delivery of water to the hydro turbine and mill), removal of flashboard supports, large woody debris removal, maintenance of the infrastructure, permanent closure of the south sluice gate, inspections, surveys, rock explorations, environmental testing, data collection, and feasibility studies.

The extensive testing of sediments, soils, surface water, groundwater, and biological tissues from Lake Conestee through the TBA work, from 2000-2008, as well as subsequent testing, confirmed the widespread presence of hazardous substances regarded as contaminants of concern (CoCs). These constituents include polycyclic aromatic hydrocarbons (PAHs), some of which are carcinogenic. The sediments also contain significant amounts of metals above natural concentrations, as well as pesticides and PCBs. These CoCs are situated primarily in the sediments of the old lake. These constituents are distributed through the lake area, and throughout the sediments with depth. The original lake area (ca. 1892) was approximately 135 acres. The bathymetric volume of the lake is estimated to be over 95 percent filled with sediments. As a result, the volume of media contaminated with hazardous CoCs, is extensive, estimated at approximately 2.3 million cubic yards.

1.3 PURPOSE OF PROJECT

Because of the extensive contamination of the lake sediments, and the nature and volume of CoCs present in the large volume of sediment, CFI and SCDHEC recognized that a full remediation of the lake site would be extremely cost-prohibitive. Rather, the parties agreed that the protection of public health and environmental protection would be most effectively served by keeping the contaminated sediments in place, allowing progressively cleaner sediments to naturally cap the site, and minimizing the disturbance and release of contaminated sediments downstream. To achieve this long-term site care objective requires that the Lake Conestee Dam be kept in good condition, such that it contains the contaminated sediments, indefinitely. This requirement was agreed to in a Restrictive Covenant signed by the parties (CFI and SCDHEC) in 2007.

Lake Conestee Dam was constructed in 1892. The dam has had several modifications over its life to include modification of the cap and spillways, re-construction of the penstock assembly, abandonment of sluicegates, and installation and subsequent removal of flashboards. The dam currently evidences deterioration and seepage through numerous mortar joints, cracks, crevices, and fissures of the now 127-year-old stone masonry structure. This seepage conveys CoCs through the dam, which at numerous locations accumulate as deposits at the downstream foot of the dam, except in the area of the primary spillway where they are flushed away continuously. The cap across the length of the dam except the primary spillway also presents deteriorating masonry, with spalling concrete repair areas. These conditions would be expected in a stone masonry structure of this age and construction.

The condition of the dam was assessed by independent engineers and consultants in numerous previous studies or inspections conducted on behalf of the Conestee Foundation [2000 Inspection by US Army Corps of Engineers- Charleston District; 2008 Bunnell-Lammons Engineers and Caliber Engineering Inspection and Report; 2011 Inspection and informal report by Malcolm Schaeffer, PG; 2012 Inspection and verbal report by Paul Cyr, PE, Kleinschmidt Associates; 2018 Inspection and Letter Report by Paul Cyr, PE and Bill

Remington, PE, Kleinschmidt Associates; 2014, 2016, 2018 SCDHEC Inspections and Reports.] These studies and inspections, although limited in scope, affirmed that the 1892 structure does not meet current design stability standards for factor of safety and for overturning factor.

Recent inspection reports by the SCDHEC Dam Safety Program classify the dam's condition as "POOR". The SCDHEC Dam Safety Program defines the "poor" classification as, *"A dam safety deficiency is recognized for loading conditions, which may realistically occur. Remedial action is necessary. A POOR condition is used when uncertainties exist as to critical analysis parameters, which identify a potential dam safety deficiency. Further investigations and studies are necessary."*

In addition to dam infrastructure concerns, the dam impounds about 2.3 million cubic yards of sediment, essentially all of which is contaminated, effectively making the impoundment a waste site subject to regulation under SCDHEC's authority. At the time CFI acquired the dam in 2000 the penstock orifice had failed and was allowing the entire flow of the Reedy River to pass through the dam. Over a period of 12 months until CFI was able to secure grants for temporary repair of the penstock gate, a canyon eroded through the lakebed, allowing release of contaminated sediment. The resultant canyon was surveyed with the assistance of the USDA-NRCS. The survey indicated a volume of approximately 95,000 cu.yd. (or 128,000 tons) of sediment had eroded from the lake, and with it all of the entrained CoCs. A temporary repair was installed in June 2001 with placement of a massive wooden plate on the upstream of the penstock orifice.

The massive release of sediment from 2000-2001 provides an example of what would occur with a catastrophic failure, or even a modest breach of the dam. Such a failure would release large quantities of contaminated sediments to the downstream Reedy River, resulting in significant impacts to natural resources, riparian properties, and downstream reservoirs. In terms of the regulatory response to such a failure, because of the nature and magnitude of COCs that would be released, it is possible that responding agencies and affected parties may consider the site eligible for emergency action and assessment under CERCLA. This contamination release could cause significant impacts to the downstream impoundment areas including Cedar Falls, Boyd's Mill Pond, and Lake Greenwood. Currently there is seepage of limited contaminants being passed downstream.

Because of the age of and condition of the dam the owner and the relevant agencies recognize it is imperative that the dam must undergo a major rehabilitation or replacement in order to prevent the massive release of contaminated sediments downstream. In addition, the seepage and release of contaminants of concern through the dam must be effectively stopped to the degree technically practicable. It is no longer merely a historic mill dam that provided power to a historic mill. The owner and relevant agencies acknowledge that this aging dam now functions to contain a large volume of significantly contaminated sediment. Construction of a new dam is critical in protecting downstream reaches of the Reedy River and its associated reservoirs.

This report discusses the feasibility of potential alternatives to effectively contain contaminated sediment within Lake Conestee and provides the preliminary design for a dam that conservatively meets all current design standards and provides for a long-lived and effective structure.

1.4 Proposed Project Objective

The objective is to determine the best-fit alternative to meet project goals, making a recommendation based on a thoughtful review of viable alternatives. Alternatives that are not viable will be identified with the explanation of shortcomings to meeting project goals.

Kleinschmidt Associates was tasked with recommending the best-fit solution as the Recommended Alternative based on the information available at this time. CFI will continue efforts to secure funding and advance the project into a final design phase to be followed by construction and long-term care.

1.5 Project Goals

The general project goals are to identify a solution for the rehabilitation or replacement of the Lake Conestee Dam that will achieve the following objectives:

- Prevent sediment leakage through dam to extent possible;

- Prevent, to the extent practicable, the movement of contaminated sediments as a result of construction activity or dam configuration modifications, unless there are proper removal and disposal methods for sediment;
- Size spillway to prevent increased upstream or downstream impacts for flood flow events;
- Dam must be stable for seismic stresses anticipated for this location and geologic conditions in the region;
- Dam must be stable for all flow conditions from normal pond and to include overtopping during a Probable Maximum Flood;
- Provide a solution to prevent flood flows from channeling around the ends of the dam;
- Provide a solution with a design life of 100 years or more;
- Design and construct the dam for reliability and to minimize maintenance cost;
- The basis of the alternative evaluation and best-fit recommendation will be design criteria developed from the above goals; and
- Identify all reasonably required routine and non-routine practices, repairs, and maintenance that may be anticipated for annual long-term care of the dam over a 100-year performance life.

1.6 REFERENCES AND REPORTS

The most comprehensive document completed to date appears to be *Final Report: Feasibility Study of Alternative for Rehabilitation of Lake Conestee Dam,* prepared by Hargett Resources, Inc. and Caliber Engineering Consultants, LLC, dated September 30, 2012. This 2012 document was the initial feasibility study that summarized the project information and proposed a number of alternatives.

There has been an extensive effort to collect data and evaluate infrastructure associated with Lake Conestee Dam. The dam has been inspected numerous times by professionals since 2000; available written reports are included in Appendix 2.

Recent dam inspection reports from SCDHEC's 2014 and 2016 inspections are included in Appendix 2. These inspection reports identify concerns with the condition of the dam structure, including excessive seepage, mortar cracking, minor vegetation growth, and the "POOR" condition that requires a consultation with a South Carolina Professional Engineer for evaluation and recommendation of corrective measures.

In response to the SCDHEC inspection requirement, principal engineers from Kleinschmidt Associates inspected the dam in 2018 and the report is also included in Appendix 2. Project Conditions

1.6.1 Historic Conditions of Dam

Dams were situated at the present site of Lake Conestee Dam or very close by, as early as the 1790s. The earliest dams were built on the Reedy River and were likely constructed of wood. A federal report on water power potential in the region, published in 1885, confirmed a dam at this location, identified as "Reedy River Factory" (Swain, 1885). This dam was reported as a wooden structure, five-feet high and 225 ft long, with a fall of 22 ft. This is believed to have been the last predecessor to the current structure. Immediately downstream of the dam, the Reedy River Mill was used to produce textiles, for which the dam previously provided power.

The present Lake Conestee Dam was constructed at this location in 1892. Photographs of the upstream face of the dam are shown in Figures 1 and 2, dated November 1933. The current dam is of stone masonry construction and measures approximately 543 feet long and 29 feet high. The dam created the resulting impoundment of about 135 acres, identified here as Lake Conestee. The original plat of the lake tract included two named islands in the upper portion of the lake, with a total area of roughly 6 acres. Over the past 80 years major infrastructure projects and intensive development of the 65 sq.mi. watershed upstream has resulted in rapid infilling of the lake with sediment. At this time only about 20 acres of the old lake area, plus the river channel, remains impounded at an elevation controlled by the primary spillway. Most of the lake area has accreted sediment above that elevation and is now a forested wetland. Areas of the upper lake area are impounded at a higher elevation by an extensive network of beaver dams, resulting in large emergent wetland areas. Figures 3 through12 show the change in size of Lake Conestee from 1943 to 2018. Figures 10 and 11 are aerial infrared photos taken in 2010 and 2016, respectively. A bathometric survey was completed in February of 2017 as show in Figure 13 below.

FIGURE 1 UPSTREAM FACE OF LAKE CONESTEE DAM

FIGURE 2 UPSTREAM FACE OF LAKE CONESTEE DAM

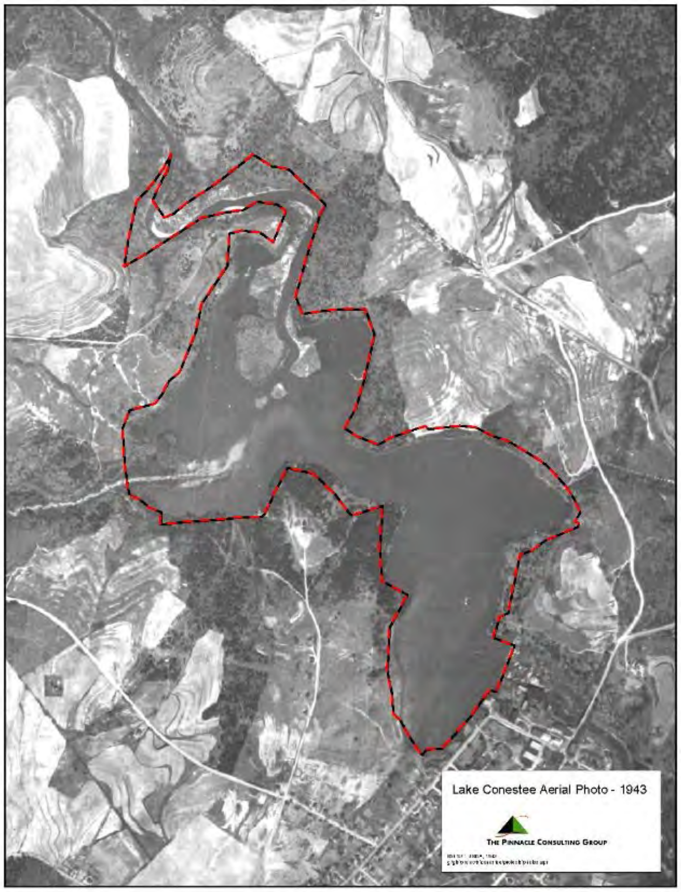

FIGURE 3 1943 AERIAL PHOTO OF LAKE CONESTEE

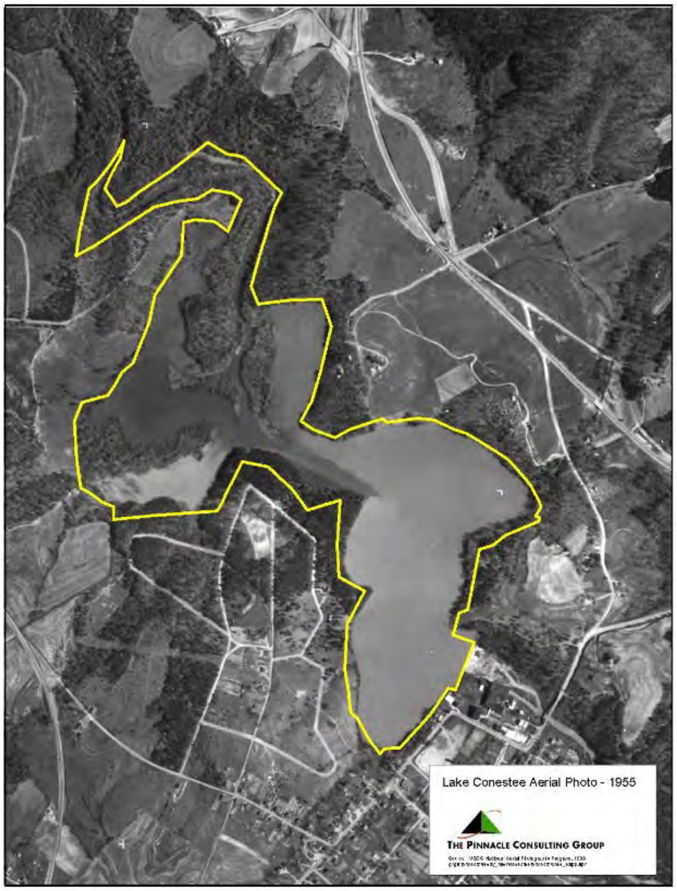

FIGURE 4 1955 AERIAL PHOTO OF LAKE CONESTEE

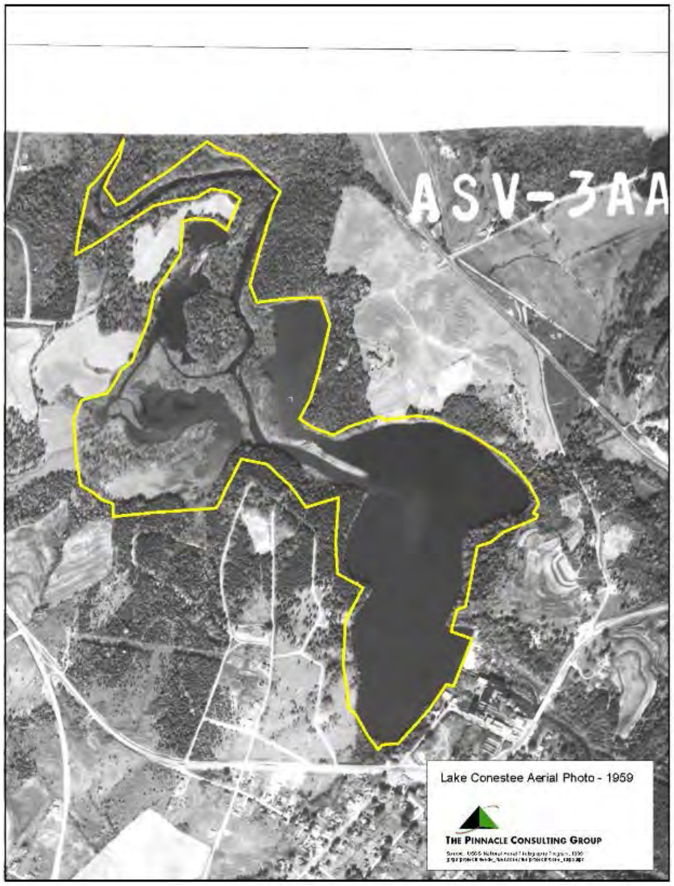

FIGURE 5 1959 AERIAL PHOTO OF LAKE CONESTEE

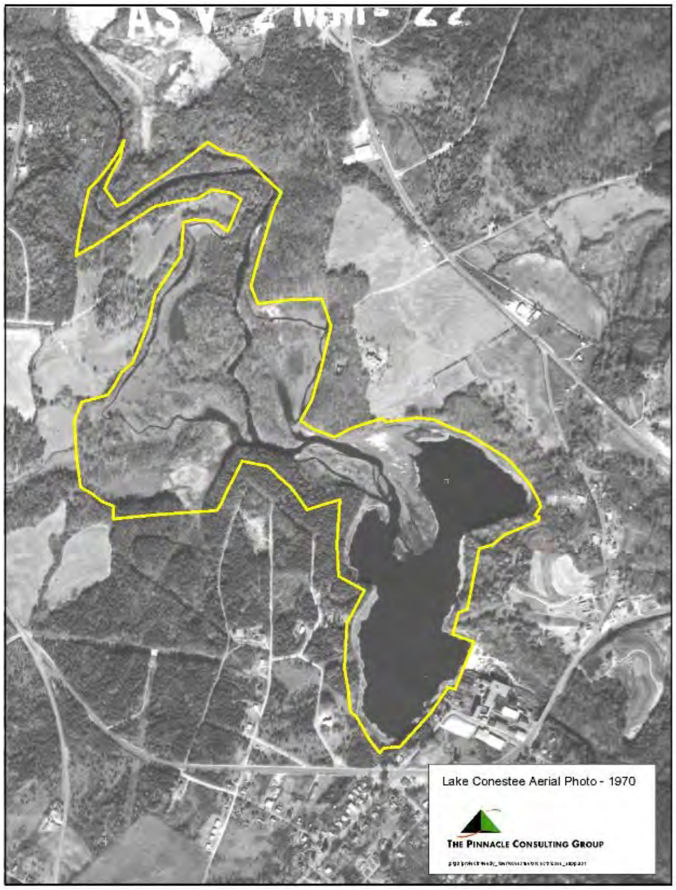

FIGURE 6 1970 AERIAL PHOTO OF LAKE CONESTEE

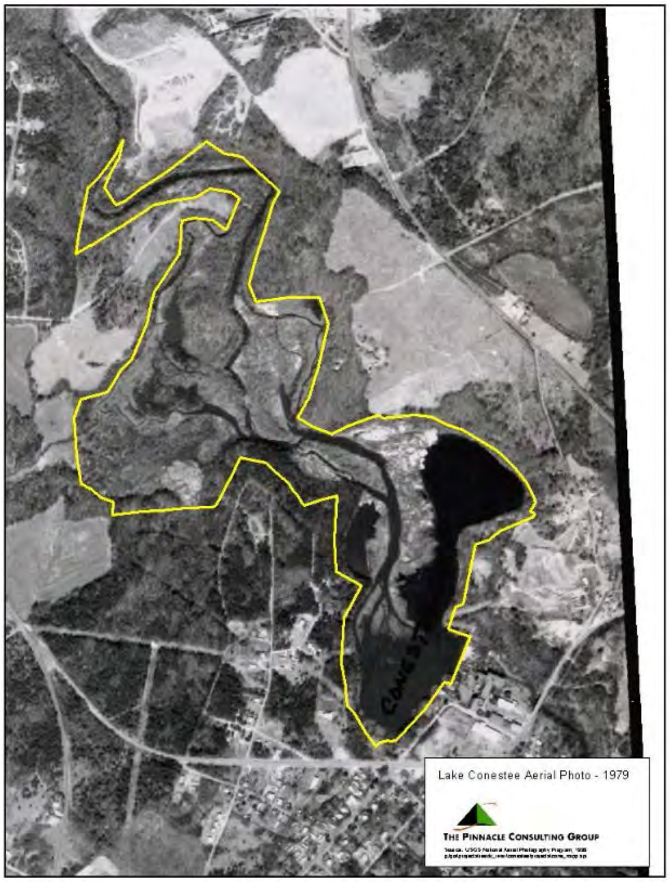

FIGURE 7 1979 AERIAL PHOTO OF LAKE CONESTEE

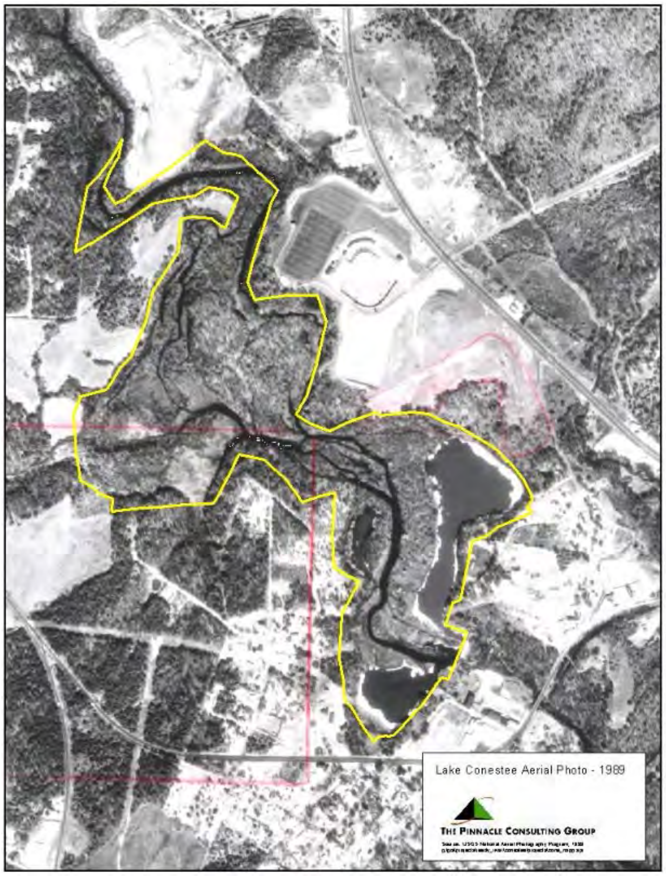

FIGURE 8 1989 AERIAL PHOTO OF LAKE CONESTEE

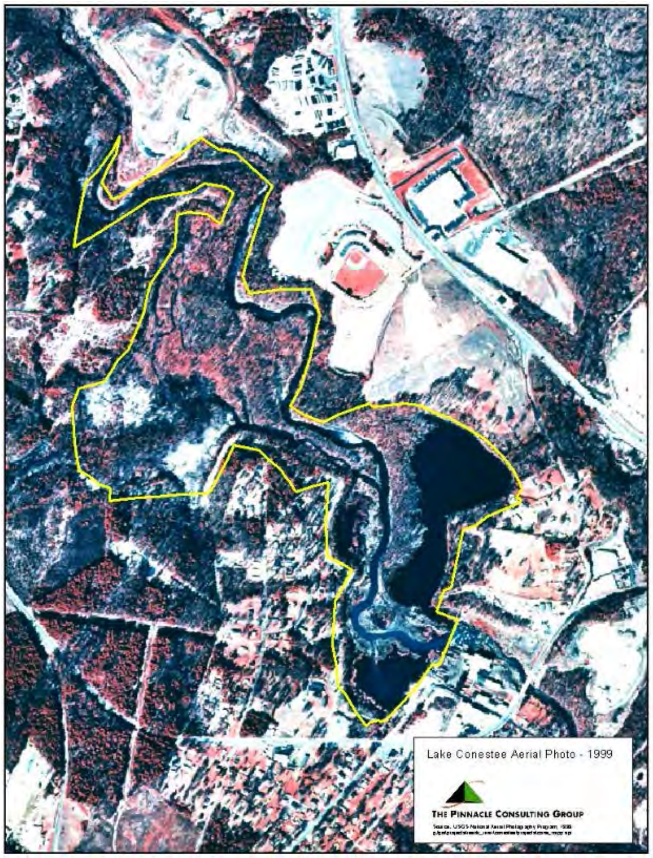

FIGURE 9 1999 AERIAL PHOTO OF LAKE CONESTEE

FIGURE 10 2010 INFRARED AERIAL PHOTO OF LAKE CONESTEE

FIGURE 11 2016 INFRARED AERIAL PHOTO OF LAKE CONESTEE

FIGURE 12 2018 AERIAL PHOTO OF LAKE CONESTEE

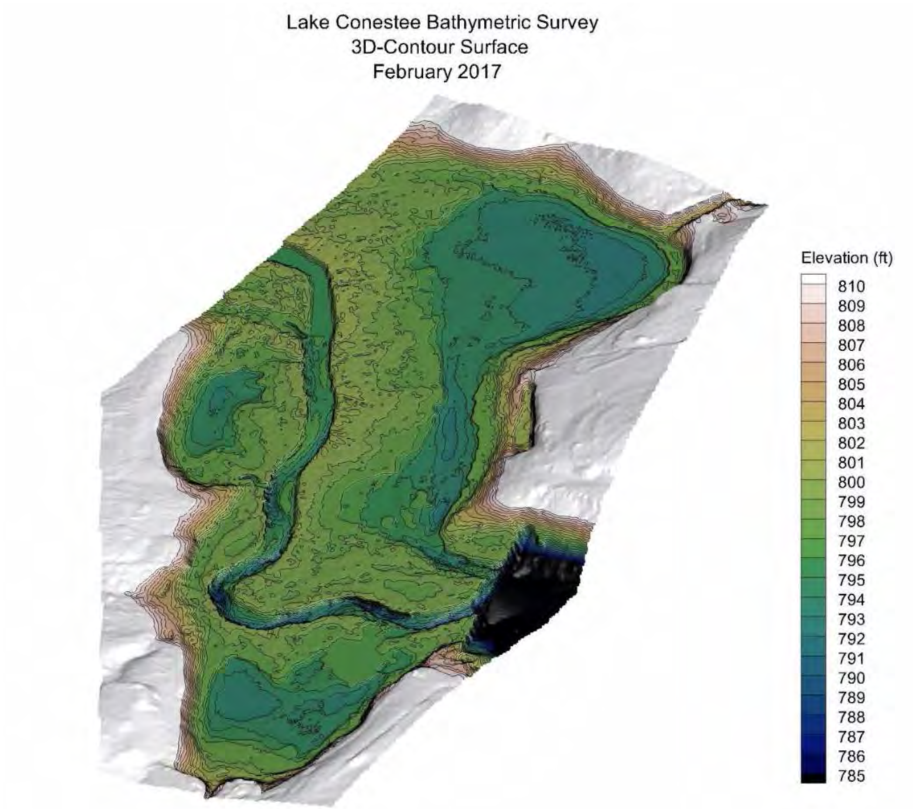

FIGURE 13 2017 BATHYMETRIC SURVEY OF LAKE CONESTEE

In 2014 the Lake Conestee Dam, the entirety of old Lake Conestee, and portions of the adjacent mill property were added to the National Register of Historic Places.

Historic flood events

The flood of record in the upper Reedy River basin occurred in August 1908. On August 26, 1908, the Lexington Dispatch reported Reedy River Factory, just downstream of Lake Conestee Dam had three feet of water on the second floor. The storm reportedly produced 7-10 inches of rain in 24 hours in Greenville. A machine shop and other outbuildings at the mill site were reportedly washed away by this flood. The 1908 flood reportedly caused significant damage to the dam and the Reedy River Factory had to close for nearly two years before it could reopen. We infer that the primary reason the mill was shut down was that two of three operating floors of the mill had been flooded and extensive repairs and replacements of equipment and mechanical systems were necessary as a result. Subsequent anecdotal information indicated that there had been some damage to the dam but that it was not "destroyed" as some newspapers had reported.

Other significant flood events occurred in 1918, 1928, 1936, 1949, 1963, 1995, 2004, and 2008. A historical photograph of the flood of April 1936, taken from the Conestee Road, 700 feet downstream of the dam, is provided as Figure 14. At the mill location, approximately 200 ft downstream of the dam, this image shows the water level approximately 3 feet deep in the first floor of the mill building, just below the window sills. Based on the only continuous gage with records back to the 1908 flood, the Westfield St. gage, six miles upstream (NOAA), the 1936 is the 6th highest flood of record on the Reedy. According to anecdotal and newspaper records, the 1908 flood was roughly 11 ft higher, and 3-ft deep into the 2nd floor of the mill. Projections (approximate) of the 1908 and 1936 flood levels at the mill are presented in Figures 14 and 15.

Future flood elevation levels below the dam, and potentially affecting the mill may be expected to be more extreme due to changes in channel and floodplain configuration at Conestee Road. The reconstruction of the Conestee Road bridge construction in 1958 included the construction of an extended earthen causeway on both sides of the river to shorten the bridge span. That constriction could potentially exacerbate flooding conditions between the dam, and the road, 700 ft downstream, to include the mill buildings.

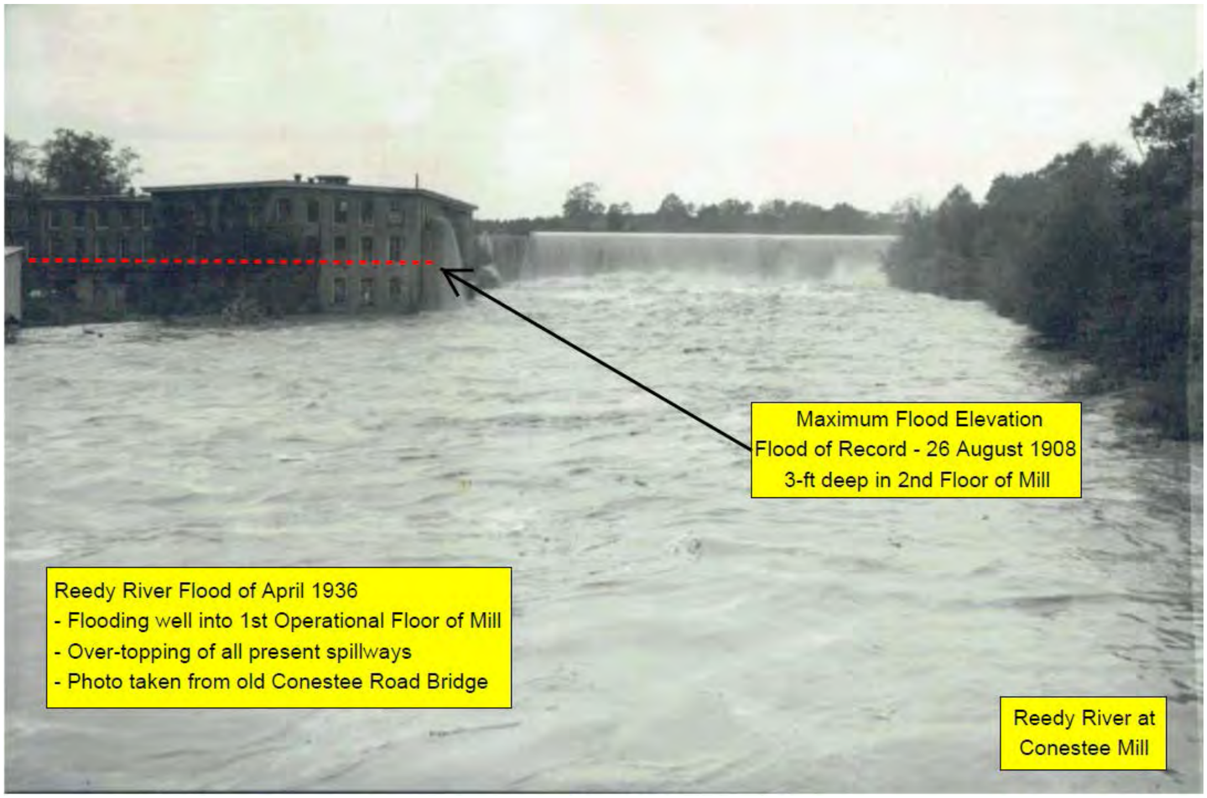

FIGURE 14 REEDY RIVER FLOOD OF 1936

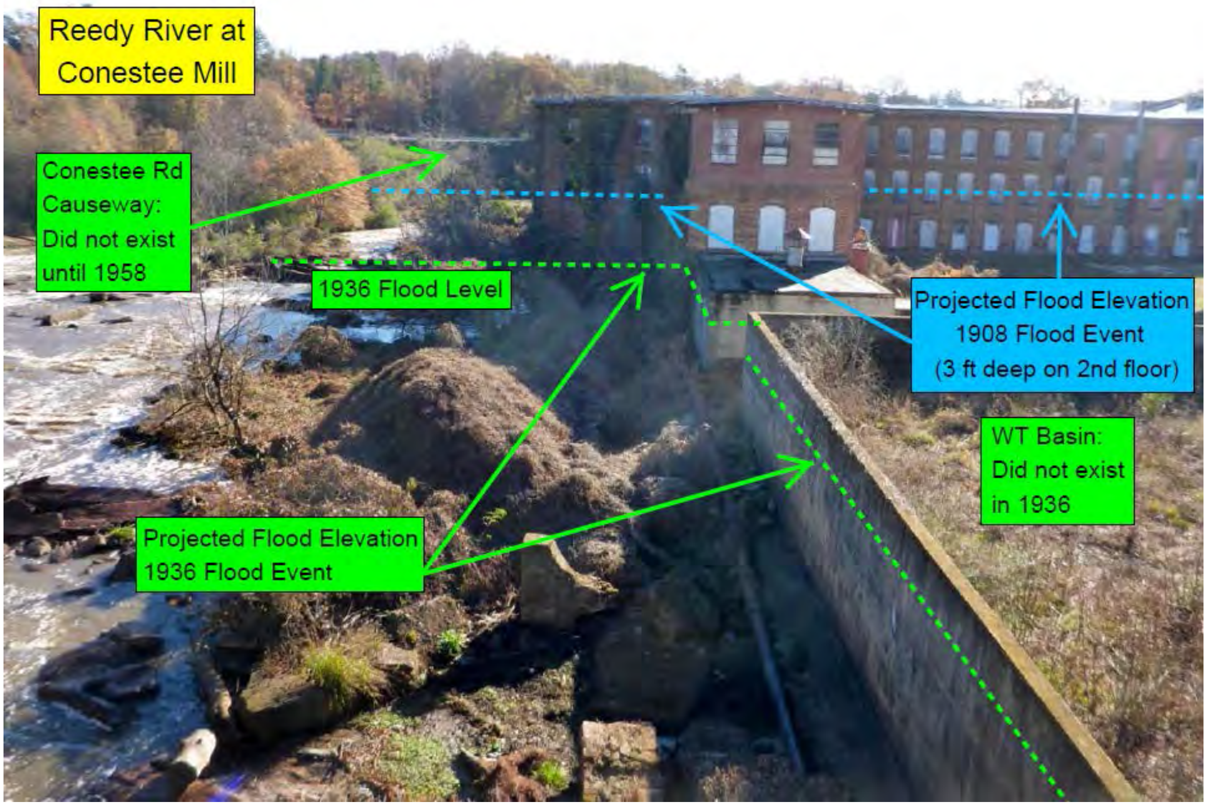

FIGURE 15 HISTORIC FLOOD ELEVATIONS

1.6.2 EXISTING / CURRENT CONDITIONS OF DAM

Upstream

Directly upstream of Lake Conestee Dam is the Lake Conestee impoundment. CFI estimates the bathymetric volume of the original lake is more than 90 percent infilled with sediment. In extensive areas of the lake sediment has accreted several feet above the ambient water control level of the primary dam spillway, which is 797 ft NAVD88. CFI estimates the body of sediment in the lake is approximately 2.3 million cubic yards of sediment. This body of sediment has high concentrations of numerous contaminants of concern, including PAHs, metals, PCBs, and pesticides. A failure of the dam would be expected to cause a release of large quantities of CoCs. These contaminants could impact natural resources, private property, public infrastructure, and public water supplies downstream.

On the upstream wing walls of the dam, the impoundment is nearly completely silted in up to or above the elevation of the primary spillway (797 ft NAVD88). These areas have wetland and woody vegetation up to the dam, some potentially with roots penetrating the upstream side of the structure. SCDHEC's most recent inspection reports from 2014 and 2016 indicate significant cracks in the mortar joints, and deterioration of the cap and the secondary spillways of the dam. However, most of the upstream face of the dam could not be observed due to the water elevation and sediment elevation at the time of the SCDHEC inspections.

Downstream

The downstream face of the dam has had significant vegetative growth in the past. Since CFI has owned the dam it has routinely removed vegetation from the top and downstream face of the dam through annual mowing and herbicide application. The top 3 feet of the downstream face of the dam is believed to have been added sometime after the 1908 flood event. This top section (3 feet) is of distinctively different construction and workmanship. This uppermost section of the structure presents the most extreme and accelerated deterioration.

A temporary replacement plate was added to the upstream side of the penstock orifice in 2001. In 2012 the south sluice gate was permanently closed by construction of a cast-in-place monolith of concrete, to fill the sluice gate cavity. The north sluice gate appears to have been closed several decades ago, probably prior to 1970. Another small area of the dam near the northern end appears to have been repaired with a cast-in-place concrete section several decades ago.

SCDHEC's recent inspection reports note that on the downstream face of the dam deterioration of the masonry face is observed generally over the dam face and there are innumerable cracks and crevices in the mortar and between the stonework. Numerous active seeps were observed along the entire length of the downstream face of the dam. Most of these seeps appear to be transporting fine sediment (silt and clay) resulting in an ochre coloration to the seeps and the accumulated materials where the seeps flow across the bedrock at the base of the dam. These accumulated translocated materials have been analyzed and documented to contain high concentrations of heavy metals previously detailed in this report.

The timber plate installed in 2001 against an existing timber frame to stop uncontrolled river flow through the penstock orifice allows flow through the orifice estimated at less than 3-5 cfs. The plate was intentionally designed to allow this discharge so as to provide a minimum flow in the river after the repair in June 2001. These existing timber frame, believed to be at least 110 years old, is in an undetermined condition. The flow of water around the temporary plate will continue to erode the timber seals. Once these wooden seals fail, there will be an increase in flow. The volume of flow could transport sediment and contaminants downstream of the dam. If the flow is great enough or if the bulkhead plate were to fail or be displaced, then there could be a repeat of the loss of the impoundment and release of sediment that occurred from June 2000 to June 2001, when the lake reservoir drained, and the river eroded a “canyon” through the lakebed.

There are two large open-air containment basins constructed with concrete walls buttressing up to the downstream dam face on the right side facing downstream (south end of the dam). These basins served as wastewater treatment unit processes for the mill building operations. Based on aerial imagery these structures appear to have been constructed in the 1950s and 1960s. They are assumed to have provided waste treatment for industrial process wastestreams as well as sanitary wastestreams. Some of the basins had circulation pumps and appurtenances. The discharge from these waste treatment works to the Reedy River is believed to have been downstream of the mill location. These unit processes have not been used since at least 1972 when the mill last operated. These basins, abutting the dam on the south end, are believed to contain large quantities (estimated at 4000 cu.yds.) of potentially contaminated soil and sludge. These materials would require special testing and could require special handling and disposal as part of the dam improvement project. The majority of the area of these tanks are owned by the adjacent mill property. If the concrete tank structures and accumulated sediments are removed as part of this project, as recommended, the effect of removal of these structures on the current dam structure must be evaluated during the detailed design phase of the project.

2018 Inspection Report by an Independent Engineer

Kleinschmidt Associates performed an engineering inspection in July 2018, in response to SCDHEC requirements for a routine inspection assessing the general condition of the dam. The inspector stated that "the structure is constructed of mortared stone and is more than 125 years old". The inspector related further that based on its age and construction, "the dam is in fair condition". There is no indication of movement of the dam nor displacement or bulging of the stone masonry. Some cracking was observed, but none that was structural or associated with movement. There are no original construction drawings showing the geometry or cross section of the dam, and no structural or stability analyses performed in support of this inspection.

The inspection identified one item of particular concern regarding the volume of leakage at the wood bulkhead plate placed over the former penstock orifice. This bulkhead was installed as a temporary measure, 18 years ago. CFI indicated that at that time, it was designed to intentionally leak at a rate of about 10 cfs, to continue to allow flow in the river as the reservoir refilled after positioning the plate. Now, this continuous flow is likely causing erosion of the old timber seals framing the orifice. As the timber seals erode and eventually fail, there could be a full or partial loss of the impoundment and significant release of sediment, such as occurred in 2001.

The inspection report notes that seepage through the stone masonry is occurring at numerous locations. This seepage is as expected for a dam of this age and construction. The seepage itself is not a dam safety concern, however, it is promoting the growth of vegetation which in turn will lead to deterioration of the mortar joints.

The CFI noted that the seepage and translocated sediments have been tested and confirmed to be a continuous unpermitted release of hazardous substances. Because the dam must effectively function as a waste containment structure, SCDHEC and CFI agreed during the conceptual design process that the current condition of the dam is no longer acceptable and must be soundly and effectively remediated.

Considering 1) that the ongoing and future function of the dam is to effectively contain highly contaminated sediments located upstream of the dam; and 2) the age, construction, and condition of the existing 1892 dam, the Inspector concludes his report with a statement of concurrence with the strategy to rehabilitate, repair, or replace the existing dam, as outlined in the Evaluation Report. (Appendix 2)

Property Ownership Situation and Accessibility

Lake Conestee Dam is located adjacent to the Conestee Mill, which has a street address of 1 Spanco Dr., Conestee, Greenville County, South Carolina. The project has limited accessibility, particularly for construction and maintenance equipment. CFI only owns about 10.5 feet of land downstream of the dam on the south (mill) side of the river. CFI owns the entirety of the tract situated on the north side of the river (approximately five acres), across the river from the mill. This tract begins at the centerline of the river and runs from the dam to Conestee Road.

Temporary access roads will need to be constructed to the downstream area of the dam. Based on topography and accessibility the primary construction access will necessarily be from the south, Spanco Drive end of the dam. Most construction activity, staging, and flow of materials will take place on this side of the dam. An additional temporary construction access road will be required from the north end of the dam. CFI owns sufficient area to access the dam on the north side, but a temporary construction easement across an adjacent property will be necessary to access CFI's property on the north side.

Other Relevant Features

Based on available information, the dam has not been regulated or used for hydroelectric production since the mill was last operated in 1972, or perhaps a decade or more prior to that. As a result, the gates are not believed to have been operable for decades, and either the gates have been closed or they have been substantially blocked by accumulated, submerged, large woody debris. The exception was the case in June 2000 when the log-jam behind the penstock orifice disintegrated to the point that the debris plug blew out. From June 2000 to June 2001, the penstock was entirely open, allowing the entirety of the Reedy River to pour through the opening. This orifice was plugged in June 2001, as previously described in Section 1.3.

As a result of these conditions the dam has basically functioned as a run-of-the-river structure year-round for the past several decades. Under summer low flow conditions flows at the dam can be as low as 50 cfs. During storm events the flow over the dam can be as high as 3000 to 5000 cfs. Because of the configuration of the dam, and the extremely variable flows, trees and large woody debris are often hung up on the dam structure and spillway. Safe removal of the trees can be challenging and quite costly. Under favorable conditions the trees and debris may stay in place atop the primary spillway for weeks or months, until the next significant storm event dislodges and washes them downstream. However, CFI has had to engage contractors to remove large accumulations of woody debris on multiple occasions.

The sediment continues to accumulate upstream of the dam, as observed in the Figures 3-12. This trend will not be impacted by the proposed structure, and if allowed to continue unabated, would have a potential negative impact on additional debris collection. As the impoundment gets shallower, less velocity will be available to flush the woody debris over the dam. To address this issue, costs for long-term dredging or sediment removal upstream of the dam, sediment characterization, and appropriate storage and disposal are included in the maintenance plan for the project.

1.6.3 SEDIMENT CONTAINMENT, HANDLING AND DISPOSAL

Contaminated sediment in the impoundment area will need to remain in place or require appropriate handling and disposal if disturbed. Depending on the nature of contamination in a specific volume of sediment, disposal may be extremely expensive. CFI's Restrictive Covenant with SCDHEC requires that the Foundation manage the dam and the lake area in a manner that minimizes the disturbance and release of sediments downstream. The Foundation is also required to manage the lake tract in a manner that minimizes human contact with contaminated sediment.

According to Lake Conestee Dam Feasibility Study Long-Term Alternatives completed by HRI and Caliber (2012), Lake Conestee has about 95% of its volume filled by sediment.

Containing the sediment behind the dam structure will minimize impacts of sediment releases.

The Lake Conestee impoundment is considered a regulated waste site, and Conestee Foundation and SCDHEC concluded the best strategy for managing the extensive contamination is to minimize disturbance of contaminated sediment, and to allow progressively cleaner sediment to naturally cap the existing sediment deposits. Otherwise, the strategy is consistent with a “monitored natural recovery” program.

In 2007 SCDHEC certified the Voluntary Cleanup Contract and a Restrictive Covenant defining the Conestee Foundation’s obligations in managing the Lake Conestee site, which was signed by all parties. Based on the regulatory status of the site, any disturbed sediments or waste soils produced as a result of dam construction or maintenance will be tested, and if contaminated, appropriately handled and disposed.

1.6.4 Measurements, Surveys, and Bedrock Exploration

Dam measurements, boundary line surveys, topographic surveys, building surveys, and river bed cross section surveys have been completed and the results will be used as part of the data for this report. The measurement and survey information that is currently available is satisfactory for completion of preliminary design. Final design efforts may require additional exploration and assessment of bedrock conditions and characteristics.

To develop an understanding of the site conditions expected during construction, soil borings to refusal had been conducted in the course of the 2012 study. These boring logs provide insight to the elevation of bedrock on both flanks of the dam. Additional bedrock elevation and rock quality data will be required for the final design, but the currently available information will provide the accuracy required for conceptual and preliminary designs.

1.6.5 Current Statutory and Regulatory Status of Dam

The Lake Conestee Dam is regulated by SCDHEC under the SC Code of Laws – Dams and Reservoirs Safety Act § 49-11-110, et seq. The dam is currently classified by SCDHEC as a Significant Hazard Level (Class II) structure in “POOR” condition.

Other Federal and State regulatory requirements are more fully discussed in Section 9 of this report.

1.6.6 PRELIMINARY HYDROLOGY AND HYDRAULIC EVALUATION

Hydrologic Evaluation

A hydrologic analysis was completed to determine the flood flows into Lake Conestee and past the section of the present Lake Conestee Dam. The Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS)[1] was used to determine the calculated flow values at the Lake Conestee Dam. The known flood flow values were extrapolated to determine the extreme flood flow for the 0.01 percent annual exceedance frequency. This magnitude of flood would be approximately equivalent to the flood expected to occur only once in 10,000-years (statistical return interval). Table 1 summarizes the flood flows at this location as determined by this analysis.

TABLE 1 SUMMARY OF MODELED FLOOD FLOWS – REEDY RIVER AT LAKE CONESTEE DAM

RETURN INTERVAL	ANNUAL PERCENTAGE	FIS DISCHARGE	CALCULATED DISCHARGE
10-year	10%	5,200	5,331
50-year	2%	8,500	8,259
100-year	1%	10,200	9,972
500-year	0.20%	15,100	15,450
10,000-year	0.01%		34,898

Hydraulic Modeling

A 1-dimensional hydraulic model was developed for this reach of the Reedy River using the U.S. Army Corp of Engineers HEC-RAS v 5.0.5 software. This model provides insights on the hydraulic conditions in this reach of the river, under the existing and proposed conditions of the dam. All modeling was completed in NAVD 88. The model domain was 3.5-miles-long and started at the upstream end of Lake Conestee and stopped downstream at the I-185 crossing. The model cross-sections were developed using data from the United States Geological Service (USGS) digital elevation model (DEM) and the FEMA FIS data. The

[1] FEMA FIS for Greenville County, South Carolina and incorporated areas. Revised August 18, 2014.

overbank terrain was developed from the USGS DEM and the bathymetry for Lake Conestee and the Reedy River were developed from the FEMA FIS elevations. The Lake Conestee Dam was included in the model as an inline structure. Elevations and dimensions for the Lake Conestee Dam were obtained from Figure 4 (Appendix 1) of the Final Report: Feasibility Study of Alternatives for Rehabilitation of Lake Conestee Dam, completed by HRI and Caliber. The profile survey was completed by Precision Land Surveying in January 2008. Elevations were assumed to be vertical datum National Geodetic Vertical Datum of 1929 (NGVD29) (Datum not shown on survey) and converted to North America Vertical Datum of 1988 (NAVD88).

The hydraulic model results indicate that the flooding at the mill building and bridge is not affected by the spillway capacity at the upstream Lake Conestee dam. The model shows that even the removal of the dam (although not considered a feasible alternative) would not lower the flood levels at the mill building. In fact, the vulnerability of the mill building to flooding is attributable to the building's location partially within the floodway, and otherwise in the floodplain, combined with by the constriction of flows caused by the valley topography downstream of the Conestee Road bridge. These conditions are exacerbated by the configuration of the bridge, located approximately 700 ft downstream of the dam, which includes extensive earthen causeways constructed as part of the bridge.

The historic flood of record in this reach of the Reedy River occurred in August 1908. Anecdotal information on the peak flood levels of this event at the mill are consistent with the results of the flood model. A photo of the 1936 flood event, the 6th highest flood on record for the Reedy River, are also consistent with the hydraulic model results.

Hydraulic modeling demonstrated that there would be no benefit to increase the spillway capacity. Due to flow constrictions downstream, for flood events greater than a certain magnitude, flooding occurs with or without a dam. Any increase in the elevation of the dam spillway would cause the flood water surface levels to increase upstream. Any lowering of the spillway elevation would cause an increase in the release of contaminated sediments from the reservoir deposits upstream of the dam. Flood Profiles for the 1% (100-yr) and .2% (500-yr) storm events are shown in Appendix 7. The profiles indicate tailwater elevations below the primary dam spillway of 799.4 ft (NAVD88) for the 100-year event and 800.5 ft (NAVD88) for the 500-year event.

The proposed condition for the Lake Conestee Dam is to maintain current spillway capacity, understanding that 100-year storm events would discharge 1.7 feet over the right side (facing downstream) of the dam, avoiding increases in upstream flood water surface elevations. These spillway specifications were selected to achieve performance requirements in agreement with SCDHEC (per project meetings on June 12, 2018 and July 9, 2018).

The spillway sill elevations cannot be lowered below 797.00 feet (NAVD88) because of the potential for release of contaminated sediment. The existing dam has about 130.6 feet of spillway at crest elevation 797.0 feet (NAVD88), about 62.5 feet of spillway at 798.0 feet (NAVD88), about 16.9 feet of spillway at 799.0 (NAVD88), and about 23.7 feet of piers at 800.0 feet (NAVD88) or higher. To provide improved flow and structural consistency, we propose to remove the piers, allowing 100 feet at the bottom of the primary spillway at crest elevation 797.0 feet (NAVD88), with sloped wing walls of approximately 95 ft on each side to a maximum elevation of 798.0 feet (NAVD88). This spillway configuration will allow the desired flow capacity and will minimize the potential accumulation of woody debris under low flow conditions. The existing and proposed profiles are shown in Figure 16 and Appendix 6 of this report. The proposed spillway configuration does not substantially alter flow capacity, in order to minimize upstream flooding conditions, and to minimize release of contaminated sediment.

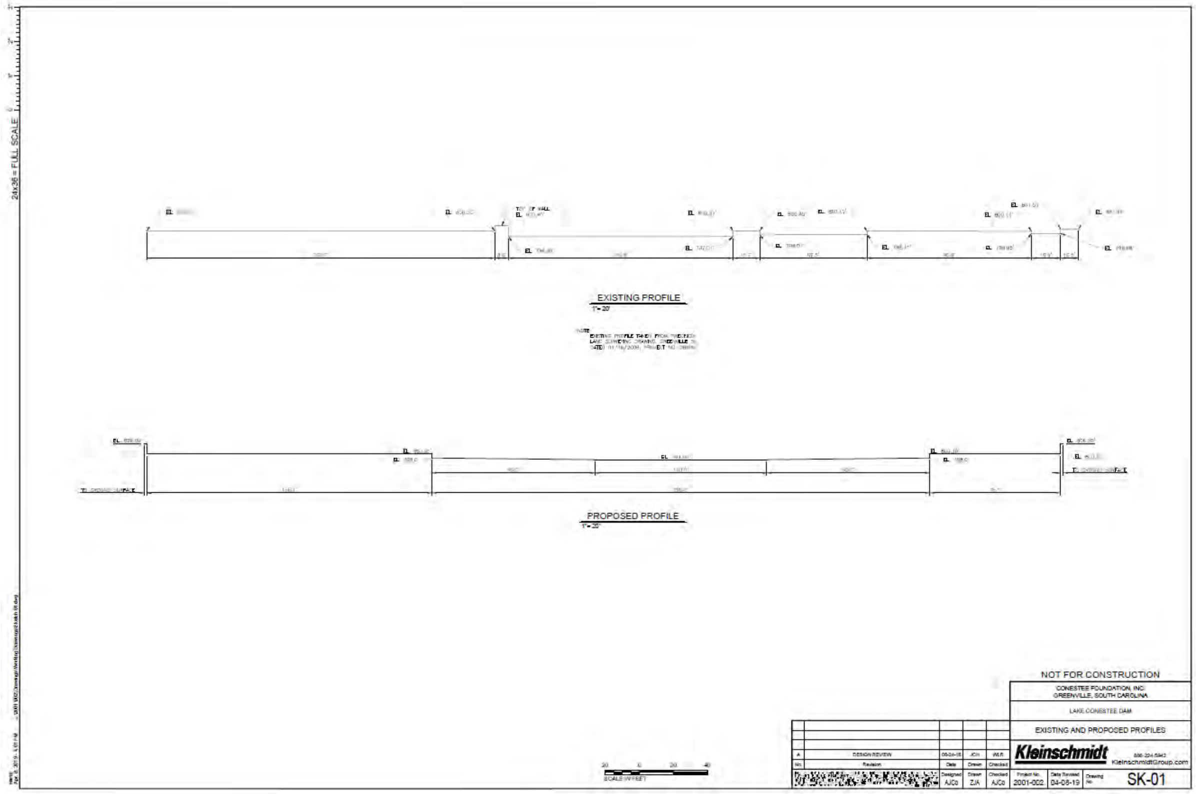

FIGURE 16 EXISTING AND PROPOSED DAM SPILLWAY PROFILES

We gather from anecdotal history of flooding events affecting the mill operations that significant flooding events allow flow through the mill buildings as a part of the valley cross-section under high water conditions. As a result, it is noted that removal of the mill building from the floodway would only have a minor impact on water elevations lowering the water level approximately six inches. Alternatively, if the mill buildings were surrounded by a flood wall to effectively divert flood waters around the building, such a structure would have a very significant impact on the flood cross-section, potentially elevating flooding levels upstream and downstream and on property across the river from the mill.

Breach Analysis

A breach analysis of the Lake Conestee Dam was completed using the hydraulic model. The breach parameters were determined using the Federal Energy Regulatory Commission (FERC) guidelines. Table 2 summarizes the breach parameters used for the model.

TABLE 2 LAKE CONESTEE DAM BREACH PARAMETERS – AS MODELED

PARAMETER	VALUE
Breach Width	65 ft
Breach Bottom Elevation	775.00 ft NAVD88 (Bottom of Cross-Section upstream of Dam)
Side Slope	0 (vertical)

Results of the breach analysis during a flooding event indicate that the incremental rise will be limited downstream of the dam. Table 3 summarizes the incremental rise at the bridge crossing directly below the Dam. The breach assumed failure of a section of dam 65 feet in length and down to bedrock during the storm event.

TABLE 3 INCREMENTAL RISE AT DOWNSTREAM BRIDGE – AS MODELED

FLOW CONDITION	INCREMENTAL RISE (FEET)
100-yr	1.25
500-yr	0.98
10,000-yr	0.70

NOTE: The Conestee Road Bridge is located approximately 700 ft downstream of the dam.

A single map showing the inundation extents for the 100-year, 500-year, and 10,000-year breach is included in Appendix 7.

Discharge Capacity

The hydraulic model was used to determine the discharge capacity for the existing and proposed conditions. Figure 17 shows the discharge rating curve for the existing and proposed conditions of the dam.

It is appropriate to comment on a hydrologic event that occurred at the LCD during this conceptual design process. On 15 November 2018, after several days of very wet conditions and an unusually wet fall, several inches of rain occurred in the upstream watershed. The ensuing event produced unique flooding levels at the LCD in which all spillways of the dam were spilling. This indicates a flow at just above an elevation of 800 ft NAVD88. Based on the dam stage-discharge curve developed in this modeling, this flood level at the dam is very consistent with a 10-year frequency storm. The flow projected at this elevation based on the Dam Stage-Discharge Rating Curve would be approximately 5000 cfs. Based on the nearest upstream USGS gage (Station 02164000), located at Mauldin Rd, approximately two miles upstream, the flow estimated at the LCD was approximately 5440 cfs. This value is believed to be roughly consistent with a 10-year frequency storm based on the rating curve and other available information.

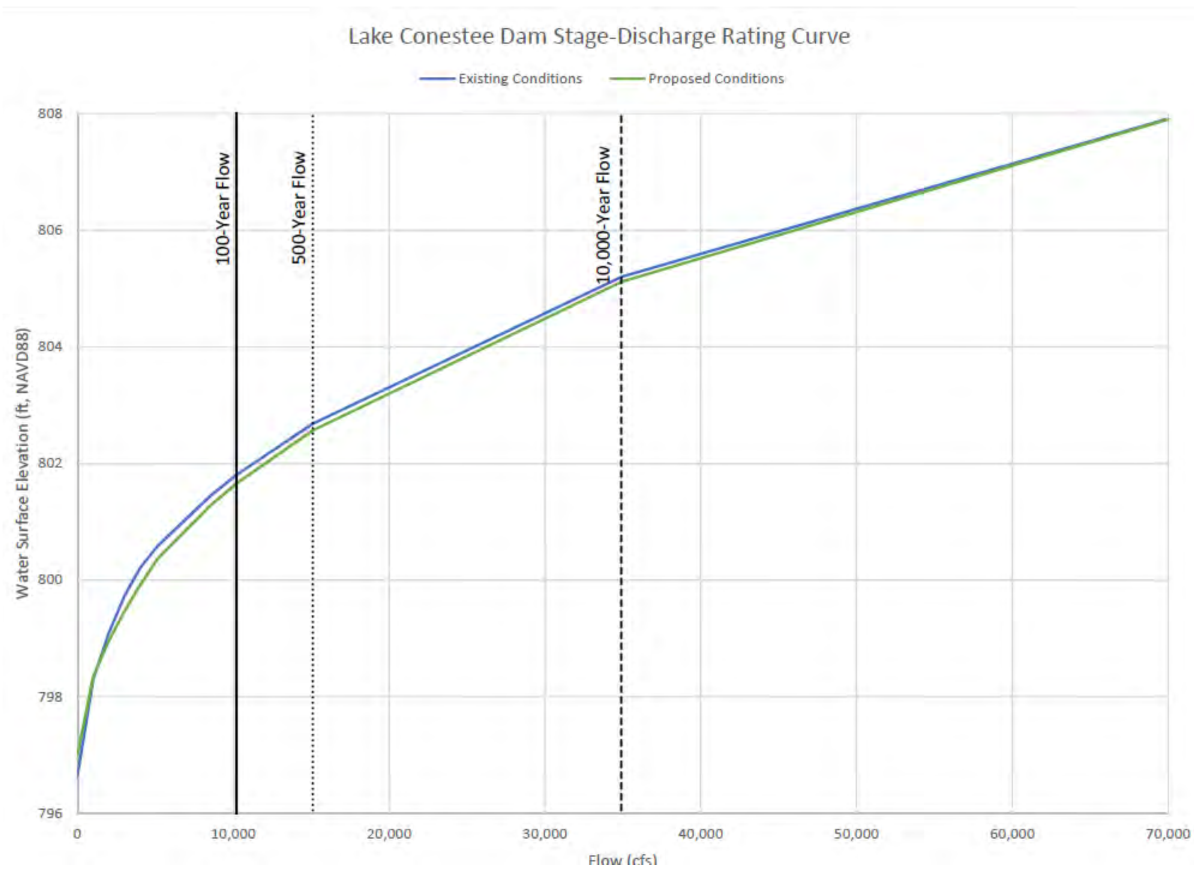

FIGURE 17 LAKE CONESTEE DAM STAGE DISCHARGE RATING CURVE

2.0 ALTERNATIVES

2.1 APPROACH TO ALTERNATIVE DEVELOPMENT

Kleinschmidt considered 9 alternatives (including the No-Action Alternative) for the replacement or rehabilitation of Lake Conestee Dam. The 8 action alternatives were screened using two tiers: (1) the ability to meet the goals of the project (outlined in section 1.5 of this report) using the design criteria in section 2.2 of this report, and (2) their ability to avoid or minimize impacts to the environment. Alternatives that met all the goals and design criteria (Tier 1) were considered in the Tier 2 analysis. The alternatives that were not eliminated at Tier 1 or Tier 2 advanced for further consideration and were evaluated with an environmental review and an opinion of probable construction cost. Additionally, construction of an upstream dam was also reviewed and dismissed as a potential alternative because of the significant additional cost involved in 1) the construction of a required temporary coffer dam to allow upstream work and 2) sediment removal and disposal with increased risk of hazardous sediment transport downstream. Screening Criteria

2.1.1 TIER 1 SCREENING CRITERIA

Tier 1 Screening Criteria focused on developing alternatives that would meet the project goals (outlined in Section 1.5). The Lake Conestee Dam alternatives were screened based on the following design criteria:

1. **The proposed alternative must maintain the same impoundment level as the existing dam and minimize sediment transport during ambient flow conditions and during flood events**. The proposed alternative must continue to retain the contaminants in Lake Conestee. This is the first screening criteria for all alternatives. This criterion must be met before an alternative is considered for further screening. To the extent technically feasible, hazardous substances cannot be discharged downstream.
2. **Minimize disturbance of the sediment behind the existing dam**. Testing performed through the Targeted Brownfields Assessment (2001, 2003) has confirmed that sediments located deeper in the lake are more highly contaminated than surficial sediments. This is explained by the older, deeper sediments being deposited during the pre-regulatory period, then capped by somewhat cleaner sediments in recent years. Surficial sediments are also contaminated with constituents of concern above screening standards, but at

somewhat lower concentrations. To minimize the release of contaminants during construction it is essential that disturbance of the sediments be kept to a minimum practicable. Best available construction practices to control and mitigate the accidental release of contaminated sediment during site disturbing activities will be required, to include in-stream measures to be deployed and maintained downstream.

3. **Seepage through the dam must be minimized to the extent possible**. Lake Conestee Dam has numerous seeps on its downstream face, at all elevations. Some of these seeps can be seen in Figure 18 below. Much of the discoloration shown in the photos is a result of the high concentration of heavy metals translocated with fine sediment particles through the cracks and fissures in the stone masonry structure. At numerous locations along the toe of the dam, on both the north and south flanks of the structure, these seeps have resulted in a substantial accumulation of sediment deposits highly contaminated with constituents of concern. Where these materials are washed into the river by precipitation or seepage, is considered an unpermitted discharge subject to regulatory action. Measures to control seepage and the transport of contaminants through the existing dam, and through any proposed dam must be implemented to mitigate future releases of hazardous substances.

FIGURE 18 SEEPAGE ON DOWNSTREAM FACE OF LAKE CONESTEE DAM

4. **The proposed alternative must have an expected service life and be maintainable for 100 years**. This criterion assumes that ordinary maintenance, such as vegetation removal, removal of woody debris from the spillway, minor surface repairs, removal of upstream sedimentation, and other maintenance of the dam will continue.

5. **The proposed alternative must have a spillway hydraulic capacity similar to the existing dam.** Because of the risks associated with the contaminants behind the LCD, and the potential downstream impacts of contaminants in the case of a catastrophic failure of the dam, SCDHEC has classified the dam as a Significant Hazard Potential (Class II) structure. Any future reassessment of the unique situation posed by this dam, as well as changes in other risk factors, could likely result in the dam being up-classified to a High Hazard Potential (Class III). Kleinschmidt, CFI and SCDHEC understand that changing the spillway capacity of the dam could potentially exacerbate the release of contaminated sediment downstream. Likewise, an increase in the control spillways could exacerbate flooding conditions upstream. Any solution considered must carefully balance these unique site sensitivities.

6. **The selected alternative must be constructible and maintainable**. This criterion evaluates the practicality of construction, engineering practices, materials, safety, access for inspection, and long-term maintenance required for the given alternative. Expected ongoing maintenance includes security, vegetation and woody debris and sediment removal, as well as periodic inspections.

7. **The sliding factor of safety must be greater than or equal to 1.5 for the worst static case, and greater than or equal to 1.3 for the PMF.** These factors of safety were chosen based on the minimum required factors of safety given in the FERC Engineering Guidelines, chapter 3, table 2A. This table is of FERC's "Alternate Recommended Minimum Factors of Safety for Use in Conjunction with a No Cohesion Assumption". FERC's definition of loading combinations are as follows:

    - <u>Worst Static Case:</u> The "static load case with the lowest factor of safety. It shall be up to the analyst to determine and prove the worst static case and to demonstrate that it truly is the worst static case."

8. **The sum of overturning forces must intersect the center third of the base of the dam, per FERC Engineering Guidelines Chapter 3.** The requirement replaces the prior FERC requirement to achieve a factor of safety in excess of 2 for overturning.

9. **The proposed alternative must meet the criteria of the 2007 Declaration of Covenants and Restrictions signed by both CFI and SCDHEC (referred to below as "the Department").** (Appendix 5). The relevant requirements stipulated in the Restrictive Covenant that apply to these dam criteria include:

    - CFI covenants that it shall manage lake area in a manner that protects humans and the environment, to the extent practicable,

- CFI covenants that it will manage the lake and contaminated sediments in a manner to minimize releases of sediment downstream, by minimizing the disturbance of sediment within the lake area and keeping sediments in place by means of keeping the dam in good condition, or by equally effective alternative means.
- These requirements are perpetual and apply to the Foundation as long as it owns the dam, or to its successors or assigns.

2.1.2 Tier 2 Screening Criteria

Tier 2 Screening Criteria was used to narrow the potential alternatives to be carried forward for further analysis. The Tier 2 criteria included:

- Avoidance/minimization of impacts to the existing footprint of the project site; and
- Avoidance/minimization of impacts to adjacent properties.

2.2 Alternatives Considered for analysis

2.2.1 No-Action Alternative (Alternative #1)

The No-Action Alternative requires the existing dam structure to remain in place and be the only barrier retaining the water and sediment of Lake Conestee. The No-Action Alternative does not include any large-scale modifications or repairs to the existing dam. However, the No-Action Alternative requires the continuation of present maintenance practices.

The No-Action Alternative is not feasible and not acceptable to SCDHEC. According to the 2014 preliminary inspection report (Appendix 2), the general condition of Lake Conestee Dam is "POOR". Specific issues with the current dam highlighted in the report include vegetation growth, mortar deterioration, cracks in the mortar, vegetation growth on both the right and left side slopes, missing dam face portions, deterioration of the masonry face, and seepage containing high levels of heavy metals.

These issues with the existing dam prevent the No-Action Alternative from meeting design criteria numbers 3, 4, 6, 7, and 8 as defined in section 2.2.1, above. The seepage through the dam conveys hazardous substances, which constitute an unpermitted release to the Reedy River. This continuing condition is unacceptable.

Other deficiencies of the current dam include concerns regarding the stability of the structure. Previous engineering stability analyses performed by independent professionals reported that the design, construction, and ambient forces on the structure provide no factor of safety (HRI & Caliber, 2012). Given that the existing structure has a multitude of structural, design, and construction features that are largely unknown, and are practically undeterminable, it cannot be assumed to function as a reliable dam for the required 100-year performance life.

It is also possible that previous flooding events such as the documented 1908 and 1936 floods (Figures 14 and 15) may have created tailwater flooding conditions encroaching on the dam from downstream. These conditions could potentially create increased uplift pressures making the structure less stable. If storm levels similar to these historic events occur in the future these forces could contribute to destabilizing the structure, or catastrophic failure.

Alternative 1, No-Action, is not acceptable and will not be considered further.

2.2.2 COMPLETE DAM REMOVAL (ALTERNATIVE #2)

This alternative considers removal of the existing structure without replacement. After removing the dam, the Reedy River will reconnect with its base level, the bedrock on the downstream side of the dam. With that hydraulic connection the river would begin the process of cleansing itself of excessive sediment . The river would immediately start eroding soft sediments in the former reservoir, transporting that sediment downstream. This phenomenon would have the potential to release of millions of pounds of contaminants of concern and a substantial portion of the approximately 2.3 million cubic yards of sediment filling the reservoir. To mitigate this potential would require the stabilization of lake sediments, or removal of a very large quantity of sediment.

2.2.3 POST-TENSION ROCK ANCHORING (ALTERNATIVE #3)

One alternative that would reinforce the existing structure is Post-Tension Anchoring. This alternative consists of setting evenly spaced post-tensioned anchors throughout the dam. These anchors would run vertically through the dam and into the existing bedrock directly beneath the dam. This alternative requires a concrete dam surface cap / bond beam to replace the seriously degraded top 3 feet of the dam. The top 3 feet of the dam can be seen in Figure 19 below. The post-tension anchoring is the only option that will not alter or completely cover the historic face of the dam.

Among the key criteria for performance of a recommended alternative is the cessation of hazardous substances through the existing dam via seeps. To satisfy this objective would require installation of an impermeable membrane on the upstream face of the dam to mitigate seepage. That dam face is obscured by lake sediment, and thus would require construction of a large coffer dam system and the removal, treatment and disposal of an extensive body of contaminated sediment. In addition, the placement and anticipated performance of an impermeable seal on the upstream side of the stone masonry structure would be extremely difficult. If the membrane failed, costly replacement would be required.

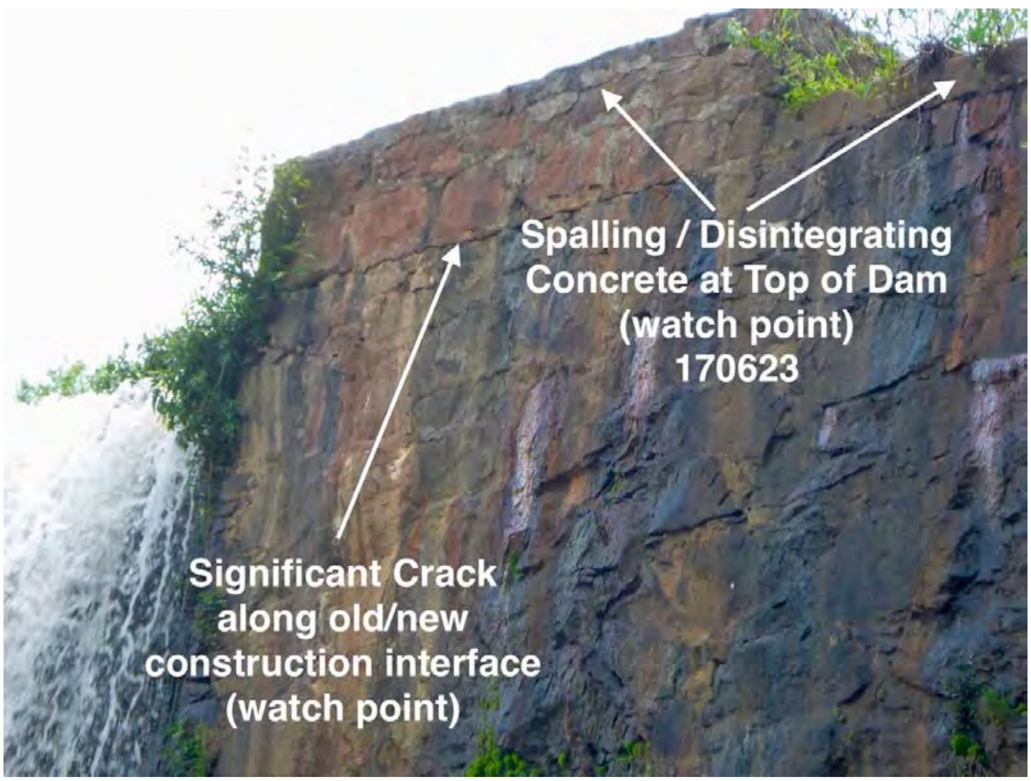

FIGURE 19 TOP 3 FEET OF DAM IN NEED OF REPAIR

2.2.4 Downstream CIP Concrete Buttressing with Post-Tension Rock Anchoring and Anchored into Existing Dam Structure (Alternative #4)

Downstream Cast-in-Place (CIP) Concrete Buttressing with Post-Tension Rock Anchoring consists of the addition of multiple concrete buttresses along the downstream face of the existing dam. The concrete buttresses will have reinforcement steel dowels into the existing dam and post-tension anchoring. Post-tension anchors would be driven through the new concrete buttressing at about 45 degrees and into the bedrock at the downstream toe of the dam.

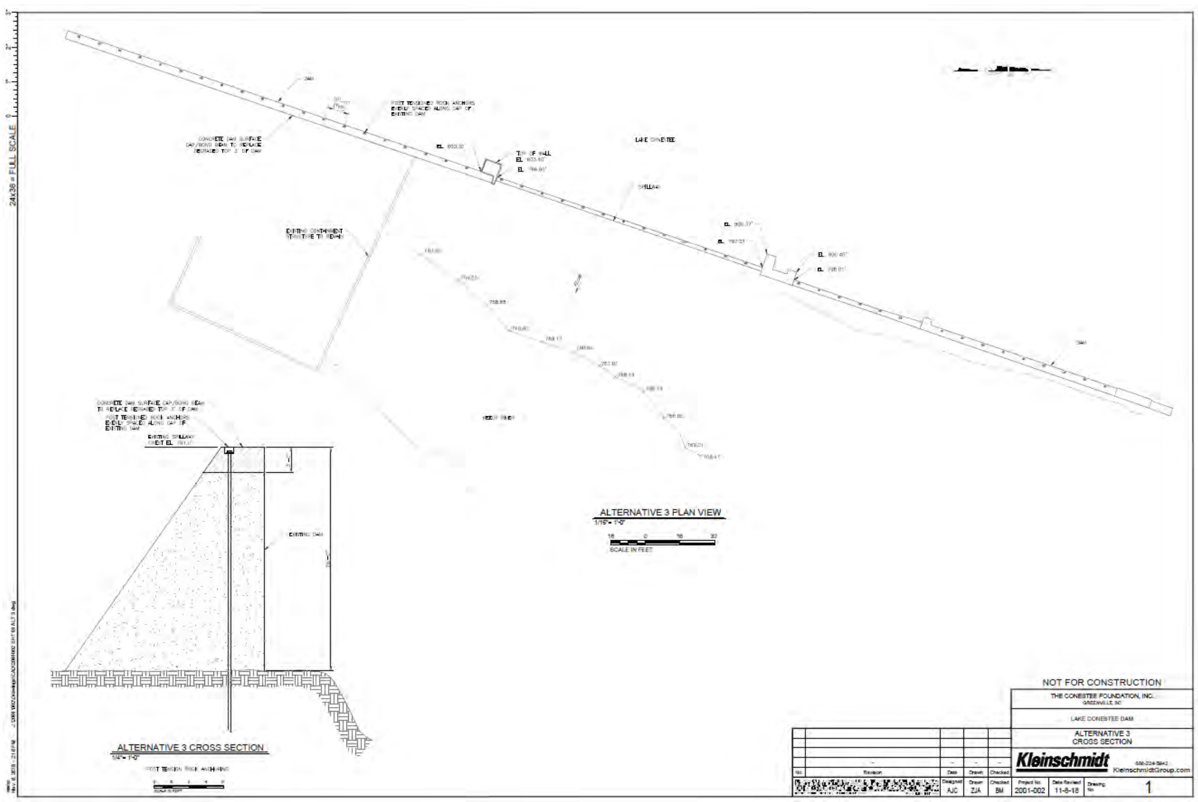

Figure 20 Alternative 3 Cross Section and Plan View

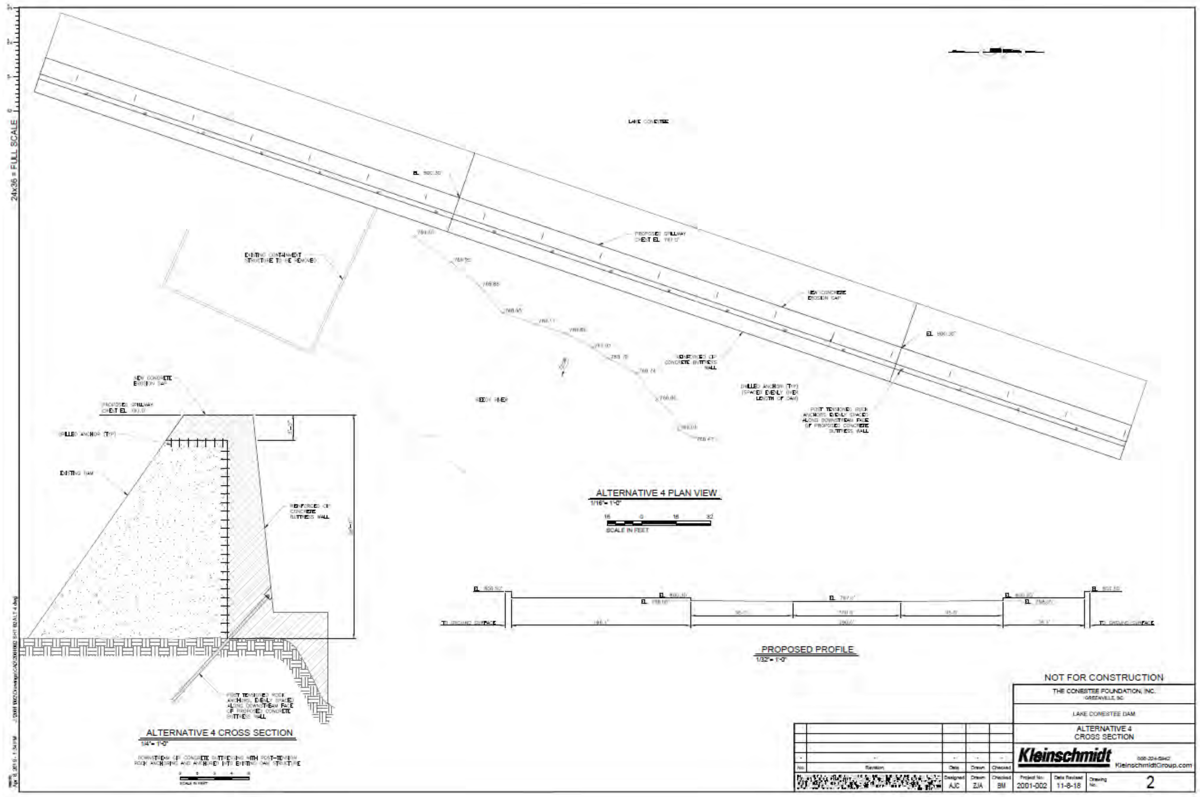

FIGURE 21 ALTERNATIVE 4 CROSS SECTION AND PLAN VIEW

2.2.5 DOWNSTREAM ROLLER-COMPACTED CONCRETE (RCC) BUTTRESSING (ALTERNATIVE #5)

The downstream roller-compacted concrete buttressing design alternative requires concrete buttresses to be placed downstream of the existing dam and anchored to the dam. Reinforcement dowels and post-tension rock anchorage would be driven through both the existing dam and the new roller compacted concrete buttresses.

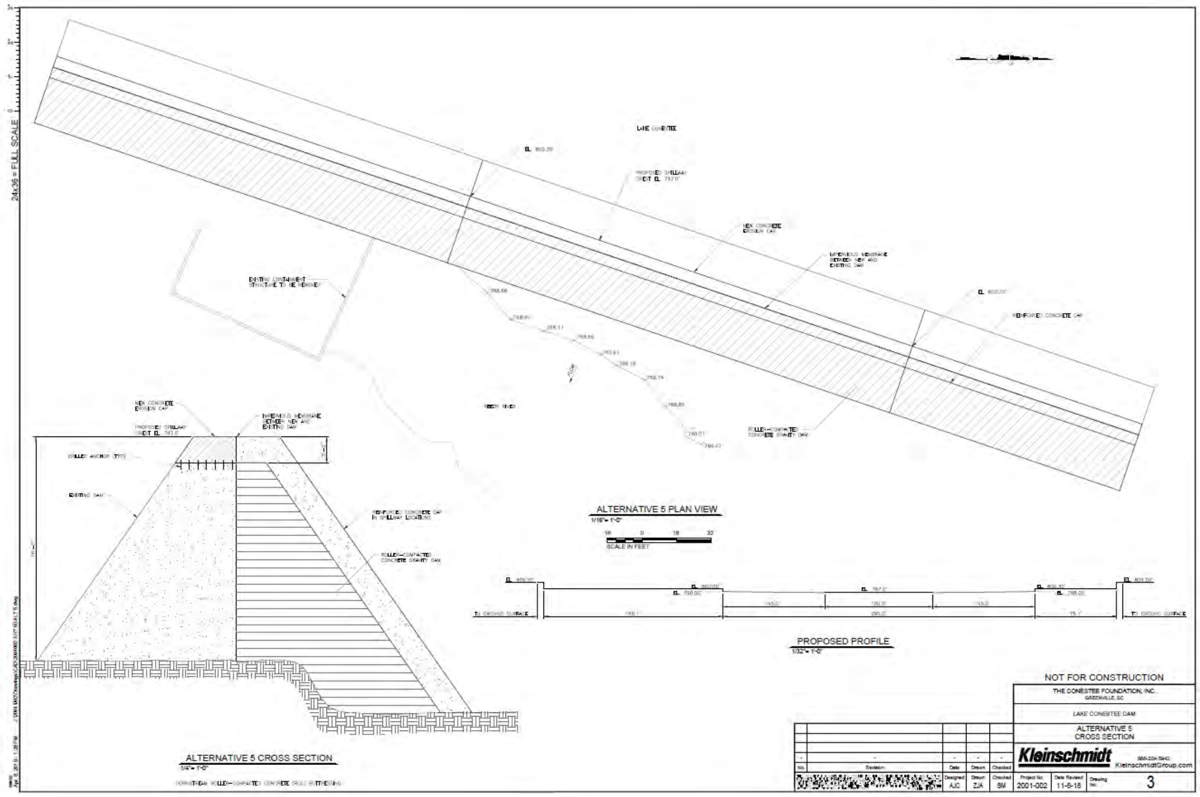

FIGURE 22 ALTERNATIVE 5 CROSS SECTION

2.2.6 NEW DOWNSTREAM CAST IN PLACE (CIP)CONCRETE DAM 60' DOWNSTREAM (ALTERNATIVE #6)

This alternative consists of a new CIP concrete gravity dam constructed about 60 feet downstream of the existing Lake Conestee Dam. The goal of this alternative would be to replace the existing dam. Anchors into bedrock for stability in severe events may be required. Once constructed, the top 3 feet of the existing dam would be demolished. This alternative has the same proposed spillway elevation as the existing dam. However, the overall height and length of the dam will increase, depending on the bedrock condition and the channel topography. An impervious membrane on the upstream face would also help reduce seepage.

2.2.7 NEW DOWNSTREAM ROLLER-COMPACTED CONCRETE (RCC) DAM 60' DOWNSTREAM (ALTERNATIVE #7)

This Alternative is a RCC gravity Dam that is about 60 feet downstream that is similar in location and height to the Alternative #6 Downstream CIP Concrete Dam, except it is constructed of roller-compacted concrete and would need to be larger in cross section for structural integrity. A watertight membrane or clay core would be required to minimize seepage.

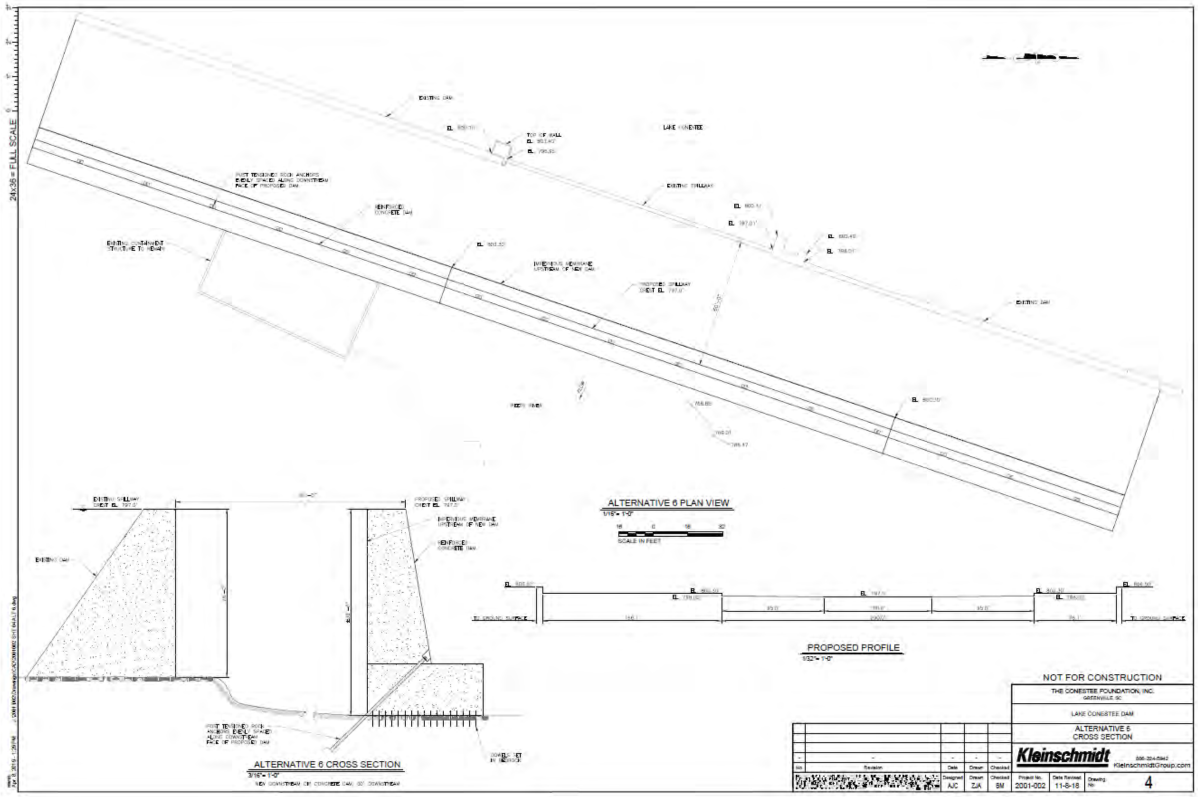

FIGURE 23 ALTERNATIVE 6 CROSS SECTION AND PLAN VIEW

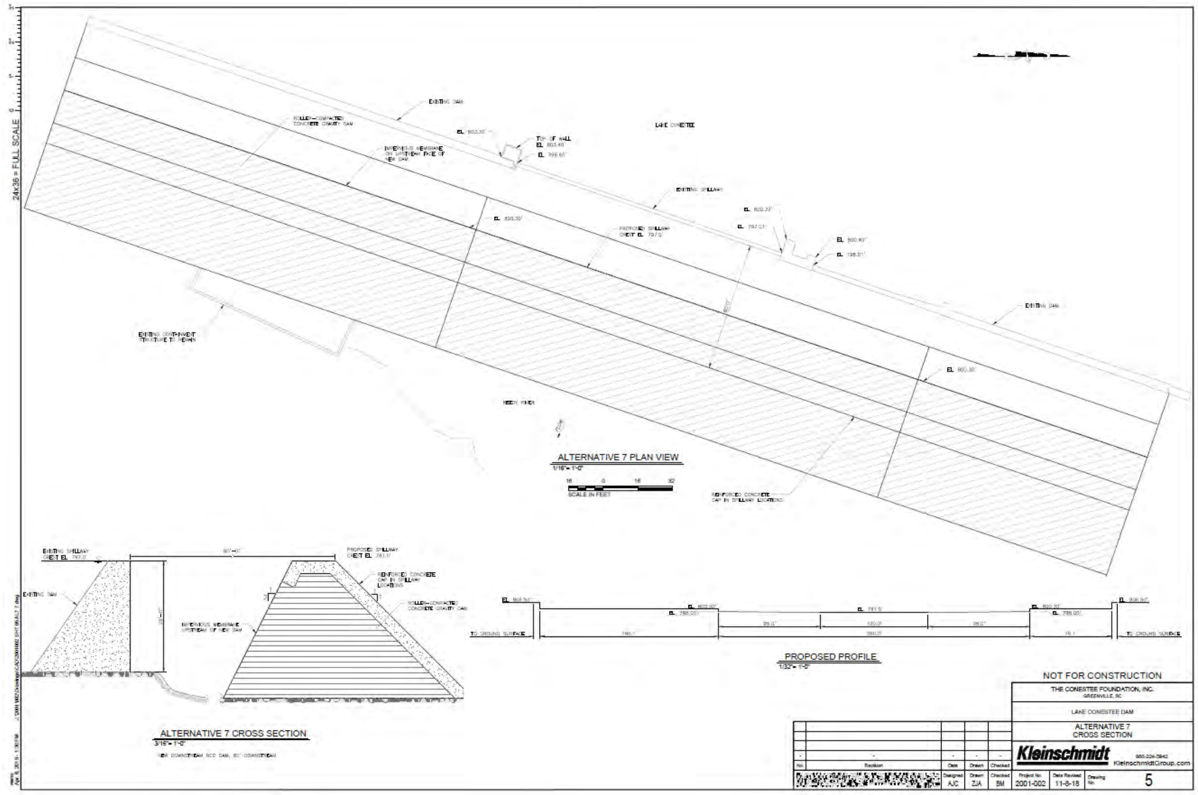

FIGURE 24 ALTERNATIVE 7 CROSS SECTION AND PLAN VIEW

2.2.8 NEW CAST IN PLACE CONCRETE DOWNSTREAM REPLACEMENT DAM ADJACENT TO EXISTING DAM (ALTERNATIVE #8)

This new downstream replacement dam option consists of a new stand-alone CIP concrete gravity dam built just downstream from the existing Lake Conestee Dam and adjacent to the existing dam. Rock anchors will be used as part or the final design to keep the dam stable under all flooding conditions. A waterproof membrane and/or water stop material will be used between the existing and new dam to minimize seepage. One design and construction challenge to be addressed in final design is seepage prevention around the bottom and sides of the waterproof membrane. This new dam would be completely independent from the existing structure; there would not be any anchorage between the existing and new dam structures. The new dam would be constructed with a one-sided concrete form, using the existing dam as the second side of the casting form.

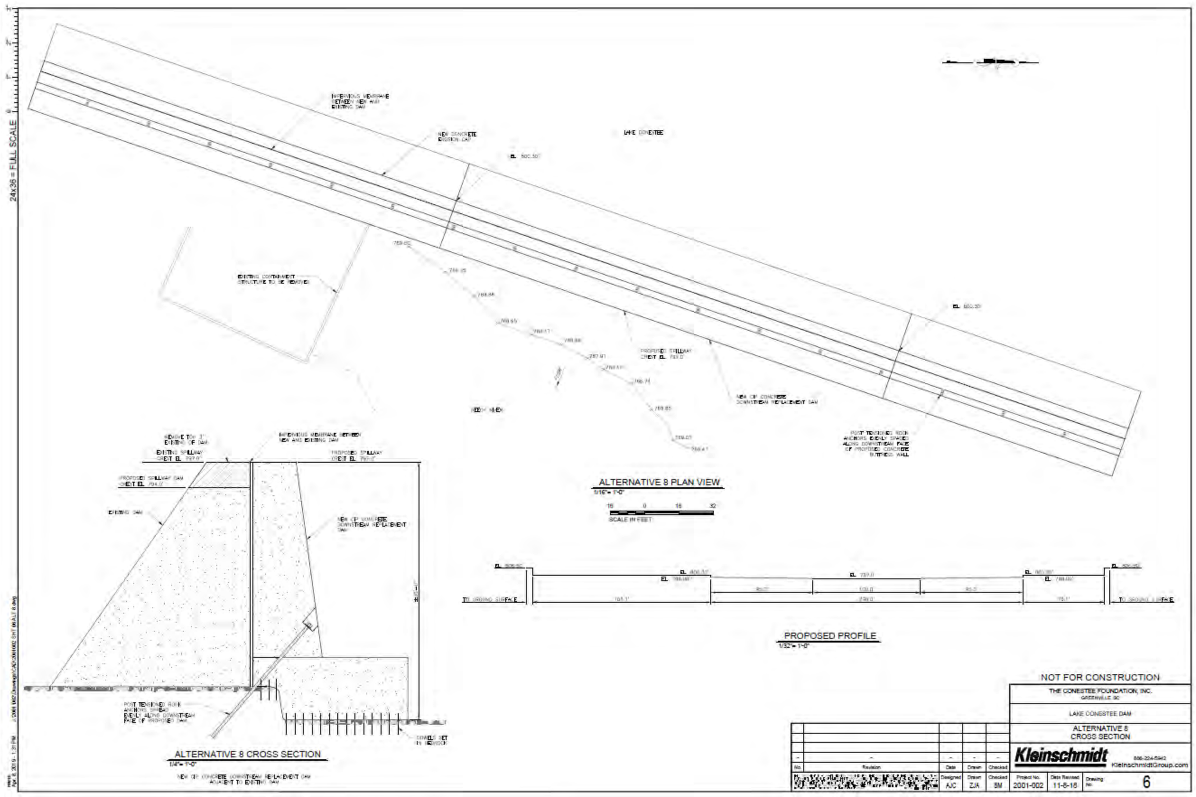

FIGURE 25 ALTERNATIVE 8 CROSS SECTION

2.2.9 NEW CAST IN PLACE CONCRETE REPLACEMENT DAM 10' DOWNSTREAM OF EXISTING DAM (ALTERNATIVE #9)

This alternative consists of a new dam similar to Alternative #8 but constructed about 10 feet downstream. This 10-foot space would be filled with an engineered core material to minimize seepage and to attenuate the transport of contaminants of concern to the extent possible; replacing or supplementing the waterproof membrane and water stop material. The engineered core layer would provide the maximum level of seepage protection. This alternative would have a two-sided form and be completely cast-in-place before the low permeability engineered soil blend core material is installed. Stabilization fabric and an articulated block paving system would be placed on top of the engineered core to stabilize and prevent the material from being washed downstream. This feature also provides the distinctive advantage of providing a vehicle-accessible surface across the dam. This capability would enable the safe and effective removal of woody debris and sediment, and routine maintenance and inspection of dam features.

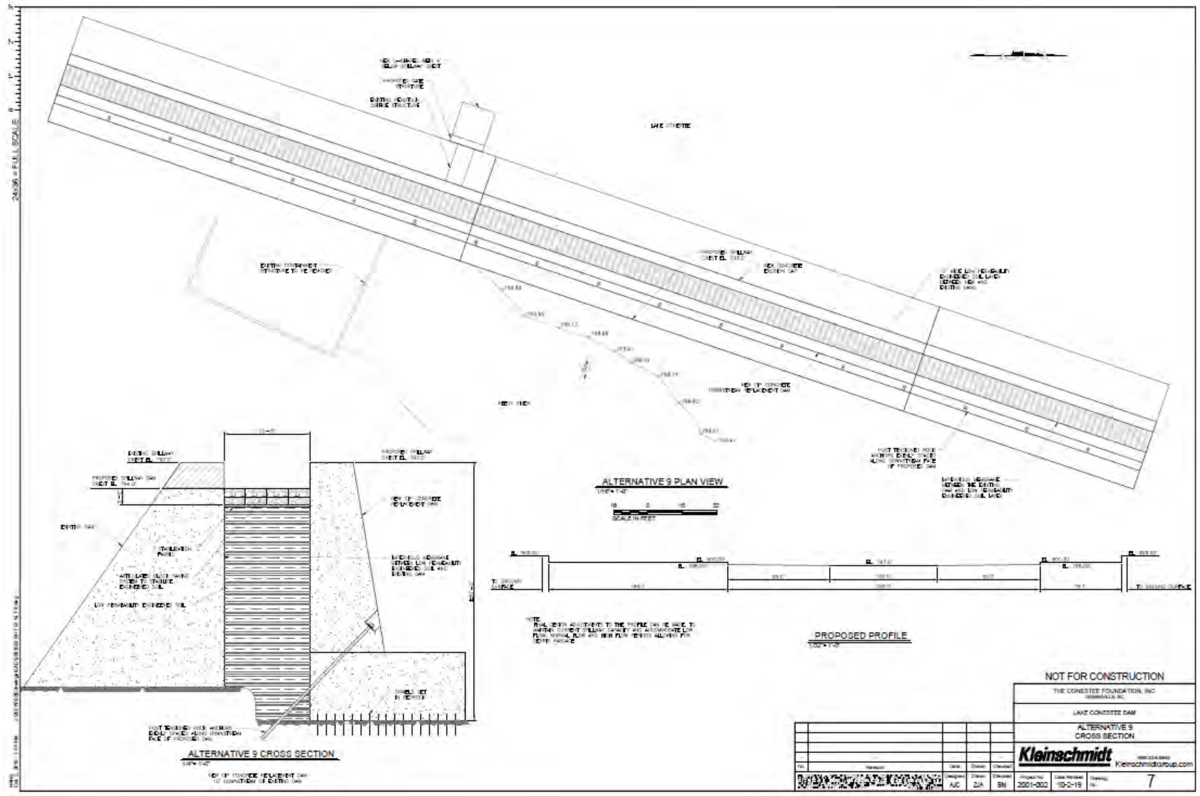

FIGURE 26 ALTERNATIVE 9 CROSS SECTION AND PLAN VIEW

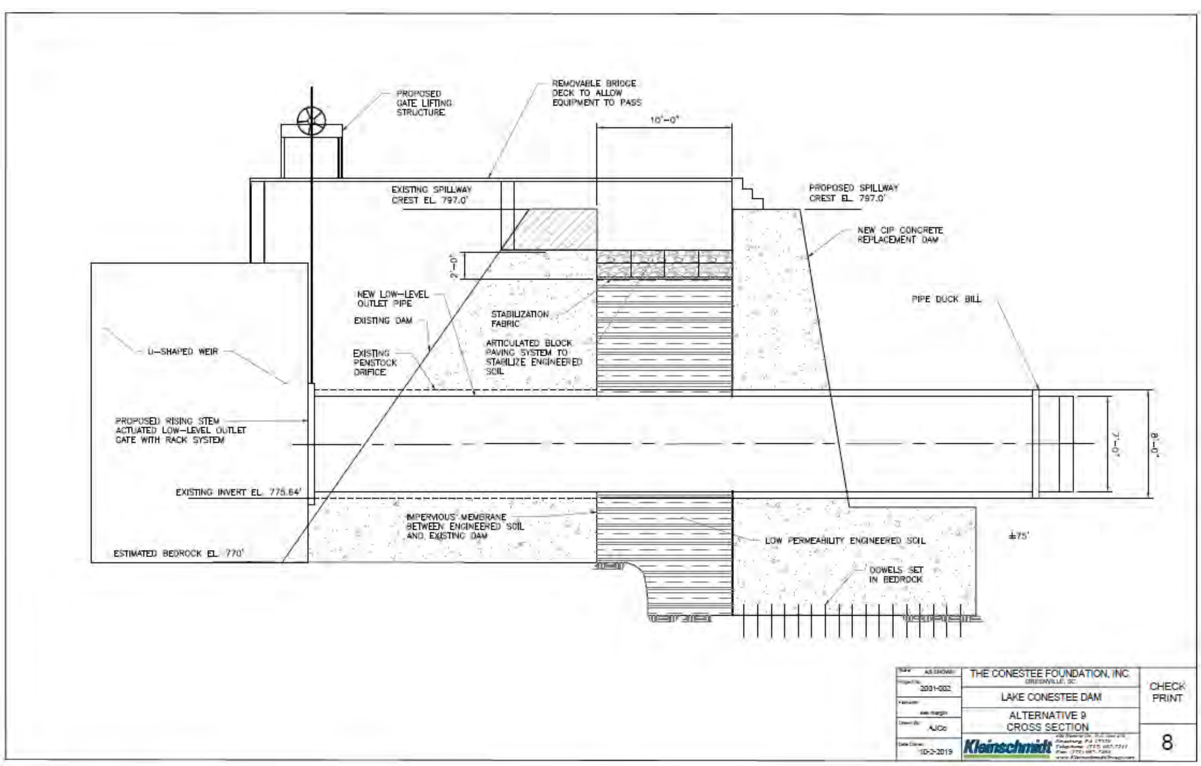

FIGURE 27 ALTERNATIVE 9 CROSS SECTION AT PIPE

2.3 SCREENING ANALYSIS

The screening criteria identified in Section 2.2 were used to evaluate the eight action alternatives (Alternatives 2 through 9) presented in Section 2.3. This analysis was conducted sequentially; all alternatives were evaluated with the Tier 1 screening criteria, then those alternatives carried forward were evaluated using the Tier 2 criteria. Those alternatives remaining after the Tier 1 and Tier 2 analyses were carried forward for further analysis.

2.3.1 TIER 1 SCREENING ANALYSIS

As discussed in Section 2.2.1, there were 9 design criteria developed to achieve project goals, and each action alternative was evaluated against each criterion. The no-action alternative was not acceptable and was not further evaluated. These criteria were jointly developed by the Kleinschmidt design team, representatives of the SCDHEC dam safety team, and CFI. These criteria include:

1. The proposed Recommended Alternative must keep the same impoundment level as the existing dam and minimize sediment transport during flood events.
2. Minimize disturbance of the sediment behind the existing dam.
3. Seepage through the dam must be minimized to the extent possible.
4. The proposed Recommended Alternative must have an expected service life and be maintainable for 100 years.
5. The proposed Recommended Alternative must have a spillway hydraulic capacity similar to the existing dam.
6. The proposed Recommended Alternative must be constructible and maintainable.
7. The sliding factor of safety must be greater than or equal to 1.5 for the worst static case, and greater than or equal to 1.3 for the PMF.
8. The sum of overturning forces must intersect the center third of the base of the dam, per FERC recent requirements.
9. The proposed Recommended Alternative must meet the requirements of the 2007 Declaration of Covenants and Restrictions signed by CFI and SCDHEC.

The 8 action alternatives were examined using these design criteria and were either eliminated from further consideration or carried forward for Tier 2 screening.

2.3.1.1 Complete Dam Removal (Alternative #2)

The complete dam removal option is removal of the existing structure without replacement. By removing the dam, the Reedy River would begin the process of returning to its natural grade and profile. After catchment and detention of sediment over 127 years, the river would be reconnected with its base level, the bedrock of Conestee Shoals immediately downstream of the dam. The volume of sediment within the footprint of the original Lake Conestee is conservatively estimated on the order of 2.3 million cubic yards. Additional sediment has accreted in the roughly one mile above the upper end of Lake Conestee, and that would also be subject to erosion as the river re-equilibrates with its valley.

To remove the dam, without the release of contaminated sediment would involve creation of a new and stable river channel through the former lake with stabilization of the remainder of sediments by some means. Alternatively, a very substantial amount of sediments within the lake could be removed for treatment and disposal. These actions would need to be completed prior to dam removal. The complete dam removal option is not viable, as it does not meet design criteria numbers 1, 2, 3, 5, and 9. If sediment removal is not completed as part of this alternative because of extreme cost, the contaminated sediment could have severe impacts on the downstream environment. This alternative will not be considered any further because it is not viable and would prohibitively costly.

2.3.1.2 Post-Tension Rock Anchoring (Alternative #3)

Alternative 3 is post-tension anchoring. The post-tension anchors are the only option that will not alter or completely cover the historic face of the dam. However, post-tension anchoring does not meet all the design criteria. Criteria numbers 3, 4, and 6 will not be satisfied. Since the top 3 feet of the dam will be replaced with a bond beam, the impoundment level of the dam will be temporarily altered. In addition, post-tension anchors require holes to be drilled near the downstream face of the dam for the anchor shafts to be driven into. These holes will create additional paths for seepage to flow during the construction process.

Given the age of most of the dam (constructed ca. 1892), the structural integrity and the stone masonry is highly suspect, making the structure fragile. These potential weaknesses are confirmed by the hundreds of cracks and fissures through the dam, manifested as active seeps. Considering these factors, and the progressive decay and disintegration of the mortar and masonry, it is likely the structure could be significantly destabilized by the process of drilling the anchor holes. Seepage could wash out or dilute the epoxy that bonds the concrete to the steel anchors.

This solution does not minimize seepage or the flow of sediment downstream, which does not satisfy seepage criteria. Another issue is that cracks could form around the anchors, introducing oxygen and advancing the corrosion process. Therefore, it is unlikely that the post-tension anchors will provide their full strength for the intended longevity of the dam.

Also, post tension anchors may not be safe to construct, as holes would need to be drilled near the downstream face of the dam. Given the current condition of the dam, this could be unsafe for contractors performing the work Failure of the existing structure would also cause environmental damage downstream. Another issue with the post-tensioned anchors alternative is that it relies on the structural integrity of the existing dam. Pieces of the downstream face of the dam have already begun spalling off due to age, deterioration of mortar, and progressive weathering of the rock faces, all of which are expected in a dam of this age. This alternative would be an extremely costly to build and very challenging to maintain. Because this alternative fails to satisfy criteria numbers 3, 4, and 6, this alternative is not considered further.

2.3.1.3 DOWNSTREAM CIP CONCRETE BUTTRESSING WITH POST-TENSION ROCK ANCHORING AND ANCHORING INTO EXISTING DAM STRUCTURE (ALTERNATIVE #4)

Downstream Cast-in-Place (CIP) Concrete Buttressing with Post-Tension Rock Anchoring consists of the addition of concrete buttresses along the downstream face of the existing dam.

Like the post-tensioned anchoring alternative, Alternative 4 does not meet criteria numbers 3 and 6, seepage through the dam and constructability. This alternative also requires the top 3 feet of the spillway to be removed and replaced with a 3-foot-thick concrete erosion cap on top of the dam spillway. The post-tension anchors and the anchoring dowels into the existing dam will allow additional seepage through the dam and are not safe to construct. The work for this alternative relies on the structural integrity of the existing dam and is not considered constructible. The addition of downstream concrete buttressing provides additional support against sliding and overturning forces. However, the structural integrity of the existing structure is questionable. This alternative is considered not viable and is not considered further.

2.3.1.4 DOWNSTREAM ROLLER-COMPACTED CONCRETE (RCC) BUTTRESSING (ALTERNATIVE #5)

The downstream roller-compacted concrete buttressing design alternative requires concrete buttresses to be placed downstream of the existing dam and anchored to the dam. Reinforcement dowels and post-tension rock anchorage would be driven through both the existing dam and the new roller compacted concrete buttresses.

This design alternative fails to meet design criteria 3 and 6, seepage and constructability. By placing a roller-compacted concrete buttress on the downstream side of Lake Conestee Dam, there could be disruption of the existing dam. This disruption could make construction high risk for both the workers and environment. Also, seepage through the dam could continue because anchoring would not allow for sealing between the new and existing structures. Because this alternative fails to satisfy key performance criteria numbers 3 and 6, this option is not considered further.

2.3.1.5 NEW DOWNSTREAM CIP CONCRETE DAM 60' DOWNSTREAM (ALTERNATIVE #6)

This alternative consists of a new CIP concrete gravity dam constructed 60' downstream of the existing Lake Conestee Dam. The goal of this alternative would be to replace the existing dam. There may be anchors into bedrock for stability in severe flood events. Once constructed, the top 3' of the existing dam would be demolished. To maintain the same principal spillway elevation of 797 ft NAVD88, this alternative, at this location, would add potentially 8 to 10 feet to the overall height of the structure, and roughly 10 feet to the length of the dam because of the topography and valley profile at that location. This alternative meets the Tier 1 screening criteria and therefore is carried forward for Tier 2 screening analysis in Section 2.4.2.

2.3.1.6 NEW DOWNSTREAM RCC DAM 60' DOWNSTREAM (ALTERNATIVE #7)

This Alternative is an RCC gravity Dam located 60' downstream, similar in location and height to the Downstream CIP Concrete Dam (Alternative #6), except it is constructed of roller-compacted concrete. This structure would need to have a wider dimension in cross section for structural integrity. A watertight membrane would be required to minimize seepage. This alternative meets the Tier 1 screening criteria and therefore is carried forward for Tier 2 screening analysis.

2.3.1.7 NEW CIP CONCRETE DOWNSTREAM REPLACEMENT DAM ADJACENT TO EXISTING DAM (ALTERNATIVE #8)

This alternative consists of a new standalone cast-in-place concrete gravity dam built just downstream from and adjacent to the existing Lake Conestee Dam. Rock anchors would be used as part of the final design to maintain dam stability under all severe flooding conditions. A waterproof membrane and/or water stop material will be used between the existing and new dam to minimize seepage. A design and construction challenge is to prevent seepage around the bottom and sides of the waterproof membrane. This new dam will be completely independent from the existing structure. There will not be any anchorage between the existing and new dam structures. The new dam will be constructed with a one-sided concrete form, using the existing dam as the second side of the casting form. This alternative meets the Tier 1 screening criteria and therefore is carried forward for Tier 2 screening analysis.

2.3.1.8 NEW CIP CONCRETE REPLACEMENT DAM 10' DOWNSTREAM OF EXISTING DAM (ALTERNATIVE #9)

This alternative consists of a new dam similar to the above CIP Concrete Replacement Dam adjacent to Existing Dam but constructed about 10-ft downstream. This 10-ft space would be filled with an engineered core soil material to minimize seepage and the release of hazardous substances through the dam, to the extent possible. This low permeability engineered soil medium will supplement the waterproof membrane and water stop material installed on the downstream face of the existing dam. The engineered soil core layer would provide the maximum level of seepage protection. This alternative would have a two-sided form and be completely cast-in-place before the engineered core is installed.

This 10-ft low permeability engineered soil material would be covered with geofabric and covered with an articulated block paving system. This surface armoring would be finished at an elevation of about 794 ft, at the same plane as the existing dam after the 3-ft cap is removed.

The core material would provide important benefits that none of the other alternatives would afford. The low permeability engineered soil blend filling this 10 ft zone would provide the ability to attenuate the transmission of contaminants presently flowing through seeps in the existing dam. Clay material mixed into the blend, likely bentonite, would also have the ability to help fill and seal any cracks that may develop in the new CIP structure. In addition, the armored surface of this engineered medium would provide a trafficable surface for heavy equipment to access for removal of large woody debris, sediment, and to access the dam surface for inspections, maintenance, and repairs.

This alternative meets the Tier 1 screening criteria and therefore will be carried forward for Tier 2 screening analysis.

Table 4 summarizes the viability of the eight action alternatives with respect to the Tier 1 screening criteria.

TABLE 4 SUMMARY OF TIER 1 SCREENING ANALYSIS

DOES ALTERNATIVE MEET DESIGN CRITERIA?									
Project Alternative	Tier 1 Criteria Number NOT Satisfied *(per Section 2.4.1)*								
	1	2	3	4	5	6	7	8	9
2 - Complete Dam Removal	✕	✕	✕	~	✕	~	~	~	✕
3 - Post-Tension Anchoring	~	~	✕	✕	~	✕	~	~	~
4 - Downstream CIP Concrete Buttressing, Post-Tension Anchoring, Anchored into Existing Dam	~	~	✕	~	~	✕	~	~	~
5 - Downstream RCC Buttressing	~	~	✕	~	~	✕	~	~	~
6 - New CIP Concrete Dam 60' Downstream	✓	✓	✓	✓	✓	✓	✓	✓	✓
7 - New Downstream RCC Dam 60' Downstream	✓	✓	✓	✓	✓	✓	✓	✓	✓
8 - New CIP Concrete Downstream Replacement Dam Adjacent to Existing Dam	✓	✓	✓	✓	✓	✓	✓	✓	✓
9 - New CIP Concrete Replacement Dam 10' Downstream of Existing Dam	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: ✕ = Does Not Meet Criterion, ✓ = Meets Criterion, ~ = Criterion Does Not Apply

2.3.2 TIER 2 SCREENING ANALYSIS

As discussed in Section 2.2.2, Tier 2 Screening Criteria included:

- Avoidance/minimization of impacts to the existing footprint of the project site; and
- Avoidance/minimization of impacts to adjacent properties.

Four remaining project alternatives (Alternatives 6-9) were carried forward for Tier 2 screening.

Alternative 6 (New Downstream CIP Concrete Dam 60' Downstream) and Alternative 7 (New Downstream RCC Dam 60' Downstream) meet all the Tier 1 design criteria ; however, their proposed design and location (60' downstream) results in increased impacts relative to proposed alternatives constructed in closer proximity to the existing dam. Both alternatives require additional property acquisition, would have greater impact on the mill buildings, are likely to have substantially higher cost, and would have increased environmental impact on the existing footprint as well as on adjacent properties due to the proposed design and location. For these reasons, Alternative 6 and Alternative 7 are screened out at Tier 2 and are not carried forward for further analysis.

Alternative 8 (New CIP Concrete Downstream Replacement Dam Adjacent to Existing Dam), meets the noted Tier 1 nine design criteria. This alternative is viable and is carried forward for further analysis.

Alternative 9 (New CIP Concrete Replacement Dam 10’ Downstream of Existing Dam) also meets all the design criteria (Tier 1), and, at only 10’ downstream of the existing dam, lessens impacts to the existing footprint as well as adjacent properties. This alternative is carried forward for further analysis.

2.3.3 SUMMARY OF SCREENING ANALYSIS

2.3.3.1 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

Based on the Tier 1 and Tier 2 screening analyses presented above, the following alternatives have been eliminated from further consideration:

- Alternative 2 (Complete Dam Removal);
- Alternative 3 (Post-Tension Rock Anchoring);
- Alternative 4 (Downstream CIP Concrete Buttressing with Post-Tension Rock Anchoring and Anchored into Existing Dam Structure);
- Alternative 5 (Downstream Roller-Compacted Concrete (RCC) Buttressing);
- Alternative 6 (New CIP Concrete Dam 60’ Downstream); and
- Alternative 7 (New RCC Dam 60’ Downstream).

2.3.3.2 ALTERNATIVES CARRIED FORWARD FOR FURTHER ANALYSIS

The alternatives carried forward for further analysis are:

- Alternative 1 (No-Action Alternative);
- Alternative 8 (New CIP Concrete Replacement Dam adjacent to Existing Dam); and
- Alternative 9 (New CIP Concrete Replacement Dam 10’ Downstream of the Existing Dam).

As discussed previously, the No-Action Alternative is carried forward for comparison purposes. The two action alternatives were carried forward because they met both Tier 1 and

Tier 2 screening criteria. A preliminary stability analysis of these action alternatives was performed and is discussed in Chapter 3 of this report. In addition to the stability analysis, the regulations, seepage, sediment impact, constructability, longevity, maintenance, access, property acquisition, and the level of meeting other project goals were considered for the action alternatives selected for further evaluation. These considerations are discussed in section 3 of this report.

3.0 DEVELOPMENT OF PROPOSED ACTION ALTERNATIVES

3.1 PROPOSED ALTERNATIVES FOR NEW DOWNSTREAM REPLACEMENT DAM

3.2 STABILITY ANALYSIS OF ALTERNATIVES

A preliminary stability analysis was completed for each of the four alternatives that met all the design criteria discussed in section 2.4 of this report. These four alternatives are

- Alternative #6-New Cast in Place Concrete Dam 60-ft Downstream of the Existing Dam;
- Alternative #7-New Roller Compacted Concrete Dam 60-ft Downstream of the Existing Dam;
- Alternative #8-New Cast in Place Concrete Downstream Replacement Dam adjacent to Existing Dam; and
- Alternative #9 - New Cast in Place Concrete Replacement Dam 10-ft Downstream of Existing Dam.

Three preliminary stability analyses had to be performed for these alternatives, with alternatives 8 and 9 sharing the same stability analysis. Alternatives 6 and 7 each had an independent analysis.

Since the channel downstream of Lake Conestee Dam increases in both width and depth, alternatives 6 and 7 will have a larger height and length than alternatives 8 and 9, which are located closer to the existing dam. Therefore, alternatives 8 and 9 have shorter cross sections with slightly different loading than alternatives 6 and 7. For alternative 9, a low permeability engineered soil material will be brought in and compacted in the 10-foot gap between the old and new dam. This compacted material will have a larger unit weight and therefore a larger force than the sediment will have on the alternatives located 60 feet downstream of the existing dam. The typical sediment was assumed to have an effective submerged unit weight of 40 pounds per cubic foot while the compacted engineered soil was assumed to have an effective unit weight of 90 pounds per cubic foot. This same loading was used in the stability analysis for alternative 8 because the existing dam could apply loads similar to the engineered soil backfill.

Alternatives 8 and 9 require rock anchors with approximately 50 kips of uplift capacity per foot at an angle of 60 degrees off the horizontal while alternative 6 requires rock anchors with 50 kips of capacity per foot at an angle of 53 degrees off the horizontal. The full dimensions and loads taken into consideration can be seen in the free body diagrams in Appendix 8. Alternative 7 has a completely different cross section from the other three alternatives because it is a roller-compacted concrete gravity dam. Alternative 7 has a trapezoidal cross section with the crest of the dam being 10 feet wide and the base of the dam being 58 feet wide. These dimensions were obtained from the required spillway elevation of 797 feet (proposed spillway elevation is the same for all alternatives) combined with a 1-1 side slopes.

3.3 ACCESS

Lake Conestee Dam is located at 1 Spanco Dr., Conestee, Greenville County, South Carolina. Due to the existing terrain and manmade structures (such as retaining walls, the existing mill building, and steep and rocky slopes), access to construct and maintain the proposed alternative will be difficult. Temporary access roads will need to be constructed for equipment access. Currently, there is not enough space for footprinting the base of any of the proposed viable dam alternatives, or for construction vehicles to access the Reedy River on the upstream side of the mill building. Therefore, the former wastewater basin structures and all appurtenances will need to be demolished. This is the most direct path to the Reedy River downstream of Lake Conestee Dam, from Spanco Drive. A temporary access road will need to be constructed and areas for construction laydown and staging will need to be cleared. In the footprint area of the new dam overburden soils and partially weathered bedrock will have to be removed to meet foundation interface specifications.

Likewise, on the north side of the dam site access will have to be cleared and prepared for the dam footprint area, and for construction laydown and staging. The north side of the valley is even more rugged and rocky. The abutting tract on the north side of the dam is owned by CFI but a construction easement and a permanent inspection easement may be required across an adjacent property.

3.4 PROPERTY ACQUISITION

On the south side of the river and the dam site the Conestee Foundation only owns about 10.5 feet of land downstream of the dam to the center line of the river. CFI owns the entirety of the tract from center line to the north side of the river. On the south side additional property will need to be acquired from the mill owner. All of the alternatives selected for further study will require additional property. If either alternative 8 or 9 is selected, Kleinschmidt recommends CFI owns 130 feet of land downstream of the existing dam. Figure 28 shows a 130-foot setback from Lake Conestee Dam. Based on currently available information this is the minimum area that will be required for construction, ongoing maintenance, and dam security. This area will need to be able to accommodate a staging pad below the new dam for temporary storage, handling and separation of sediment and for woody debris regularly removed from the dam spillway. However, the size of this area downstream of the dam is subject to change based upon the detailed design.

FIGURE 28 130' SETBACK FROM LAKE CONESTEE DAM

3.5 CONSTRUCTABILITY

The construction process for alternatives 6 and 9 should be very similar since they were both designed as independent, free-standing structures. As previously mentioned, alternative 6 will have a larger width and height due to the increase in width and depth of the Reedy River valley downstream from Lake Conestee Dam. Alternative 7 will have an even larger width (as a roller-compacted concrete gravity dam) and an equal height to alternative 6, thus requiring more material to construct than the other alternatives. Alternative 9 will require an infill of low permeability engineered soil material to be compacted between the new dam and Lake Conestee Dam. It would be difficult to get the proper machinery in this space to install and compact the engineered soil material if width is less than 10 feet as proposed. Alternative 8 was also designed as a free-standing dam. However, this alternative utilizes the existing Lake Conestee Dam as a form when the concrete for the new dam is being poured.

3.6 MAINTENANCE

For all alternatives 6, 7, 8, and 9 standard maintenance will need to be performed including vegetation control and removal, spillway woody debris removal, routine inspections, safety and security measures to include signage and fencing, and regulatory compliance including reporting and emergency action planning. One distinction in the Alternatives would be the ongoing requirement for minimizing seepage. Alternative 9 is expected to have less seepage than the other alternatives with the placement of the low permeability engineered soil core and impervious membrane. Alternative 9, with a trafficable, vehicle-accessible surface will be substantially easier to access for removal of woody debris and sediment and will minimize seepage through the use of the engineering soil section. All other maintenance items for each of the alternatives are similar in nature and cost.

3.7 LEVEL OF MEETING GOALS

Each of the four alternatives selected for further study meet all the design criteria listed in section 2.4 of this report. Each of the selected alternatives equally meet design criteria numbers 1, 2, 4, 5, 7, 8 and 9. The four alternatives selected for further study will have the same impoundment level, minimize disturbance of the upstream sediment equally, have an anticipated service life of 100 years, have the same hydraulic capacity as the existing dam, and meet the requirements of the 2007 Restrictive Covenant. In the stability analysis a sliding factor of safety and ratio of overturning moments was calculated for each alternative. The results from the stability analysis show that the 500-year flood load case is the controlling flood. For each dam the sliding factor of safety was lowest for the 500-year flood, making it the worst static case, meeting FERC guidelines. For each dam the ratio of overturning moments was found to be satisfactory as well. For criterion 3, alternative 9 will minimize seepage through the structure with the use of the compacted engineered core and impervious membrane between new and the existing dams. However, all alternatives should reduce seepage from the current level. Criterion 6, maintenance and constructability is slightly different between the alternatives as discussed at length in sections 3.1.5 and 3.1.6 of this report.

3.8 WATER CONVEYANCE

The alternatives selected for further study are all proposed to have the same spillway elevations and length, therefore maintaining the same water conveyance characteristics as the existing Lake Conestee Dam. In addition, Lake Conestee Dam will remain a non-power generating site. Both alternatives 8 and 9 will also have a low-level outlet pipe where the existing penstock orifice is currently located. The new pipe will be installed through the existing and new dams and will extend about 75 feet downstream of the new dam. The low-level outlet gate will be able to lower the water level and drain the impoundment if needed. This will be necessary when the sediment upstream of the dam is removed approximately every 5 years. The low-level outlet gate will be operated manually or by screw auger activation. A gate access structure will need to be built on top of the existing dam for gate operation. The gate access structure will be aluminum and will be removable so that maintenance and construction vehicles can drive on top of the dam.

4.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

This section describes the natural and human environment near the Lake Conestee Dam and the potential effects the Action Alternatives and the No Action Alternative may have on relevant resources. Elements of the natural and human environment that would potentially be affected by the Action Alternatives and the No Action Alternative include water resources, geology and soils, botanical resources, fishery resources, wildlife resources, threatened and endangered species, aesthetic resources, recreational resources, hazardous materials, public health and safety, socioeconomics, and environmental justice. Elements of the natural and human environment that are unlikely to be affected by the Action Alternatives and the No Action Alternative, or the effects would be unmeasurable, short-term, intermittent, or unavoidable, include cultural and tribal resources, navigation, land use, air quality, traffic and transportation, and climate. Table 5 summarizes the scope of analysis for each resource area. The geographic scope of the analysis includes Lake Conestee, Lake Conestee Dam, the footprint of the proposed construction area, access and lay-down areas, and the Reedy River from the dam to the headwaters of Lake Greenwood, which is approximately 45 river miles downstream.

TABLE 5 SCOPE OF ENVIRONMENTAL ANALYSIS AND SUMMARY OF POTENTIAL EFFECTS OF THE ALTERNATIVES

RESOURCE AREA	SCOPE OF ANALYSIS AND STATEMENT OF EFFECT
Water Resources	**Analyzed** – The Action Alternatives and No Action Alternative may affect water quality and water quantity, including contaminated sediments; therefore, water resources have been evaluated.
Geology and Soils	**Analyzed** - The Action Alternatives and No Action Alternative may affect existing bedrock and soils; therefore, geology and soil resources have been evaluated.
Botanical Resources	**Analyzed** – The Action Alternatives and No Action Alternative may affect plants and plant communities; therefore, botanical resources have been evaluated.
Fishery Resources	**Analyzed** – The Action Alternatives and No Action Alternative may affect fish and aquatic habitat; therefore, fishery resources have been evaluated.
Wildlife Resources	**Analyzed** – The Action Alternatives and No Action Alternative may affect wildlife and wildlife habitat during construction; therefore, wildlife resources have been evaluated.
Threatened and Endangered Species	**Analyzed** – The Action Alternatives and No Action Alternative may affect rare species or their habitats; therefore, Threatened and Endangered Species have been evaluated.
Historical Resources	**Analyzed** – The Action Alternatives and No Action Alternative may affect historical properties; therefore, historical resources have been evaluated.
Cultural and Tribal Resources	**Not evaluated in further detail –** Given previous disturbances at the site and the limited construction footprint, the Action Alternatives and No Action Alternative are not expected to adversely affect Cultural and Tribal Resources.
Navigation	**Not evaluated in further detail –** The Action Alternatives and No Action Alternative are not expected to affect navigation in the Reedy River.
Land Use	**Not evaluated in further detail** – Land use is primarily mixed commercial, residential and nature park (operated by the Conestee Foundation). The Action Alternatives and No Action Alternative are not expected to affect landowners or land use practices.
Recreational Resources	**Analyzed** - The Action Alternatives and No Action Alternative may affect recreation; therefore, recreational resources have been evaluated.
Aesthetic Resources	**Analyzed** – The Action Alternatives and No Action Alternative may affect the aesthetic character of the site; therefore, aesthetic resources have been evaluated.
Climate	**Not evaluated in further detail -** The Action Alternatives and No Action Alternative are not expected to affect the climate.
Traffic and Transportation	**Not evaluated in further detail –** Construction equipment and trucks transporting materials would use existing traffic patterns and abide by local traffic laws. The effects would be intermittent, unavoidable, and short-term. The Action Alternatives and No Action Alternative are not expected to affect the traffic and transportation. The No Action Alternative would eventually result in a failure of the dam, which would put Conestee Road, a high traffic count State Road, into jeopardy.
Air quality	**Not evaluated in further detail –** The Action Alternatives and No Action Alternative are not expected to affect air quality. The short duration of the project would result in minimal, if any, long term effects associated with air quality.
Noise	**Not evaluated in further detail** – Although the operation of machinery during construction would affect noise quality locally, the effects would be intermittent, unavoidable, and short-term.
Hazardous, Toxic, and Radioactive Waste	**Analyzed –** The Action Alternatives and No Action Alternative have the potential to result in hazardous, toxic, and radioactive waste, therefore this topic has been evaluated.
Public Health and Safety	**Analyzed –** The effects of the Action Alternatives and No Action Alternative on public health and safety have been evaluated.
Socioeconomic Resources	**Analyzed** – The effects of the Action Alternatives and No Action Alternative on socioeconomic resources have been evaluated.
Environmental Justice	**Analyzed -** The effects of the Action Alternatives and No Action Alternative on Environmental Justice in Minority Populations and Low-Income Populations have been evaluated.

4.1 WATER RESOURCES

4.1.1 AFFECTED ENVIRONMENT

Lake Conestee Dam impounds the Reedy River, forming Lake Conestee. The dam site is approximately 6 miles south of downtown Greenville. Nearly 80 percent of the City of Greenville is within the Reedy River watershed upstream of the Lake Conestee dam. Storm water runoff in this watershed entrained sediment and pollutants that settled in Lake Conestee over time. When first constructed in 1892, the surface area of Lake Conestee was approximately 135 acres, reaching over one-mile upriver.

Over the course of the last 75 years, the lake has filled rapidly with sediment from construction of major infrastructure projects such as Interstates 85 and 385, and Greenville Army Air Base (1943), and the rapid development of the watershed upstream (HRI, 2012). The current surface area of Lake Conestee for pools controlled by the dam is now less than 25 acres. Another roughly 20+ acres of the former lake are impounded above that elevation by numerous active beaver dams. An additional area of roughly 10 acres comprises the present river channel as it courses through the old lake. At this writing approximately, 43 percent of the former 135 lake area are submerged.

Average annual river flow at the dam is 150 cubic feet a second (HRI 2012). From Conestee dam, the Reedy River flows southeast until its confluence with the Saluda River near Greenwood, South Carolina, approximately 55 miles downstream of Greenville. The Reedy River and the Saluda River are the major tributaries of Lake Greenwood, a 11,400-acre lake that provides drinking water, hydropower generation, and recreation opportunities to Greenwood County and the surrounding region.

There are approximately 2.3 million cubic yards of sediment impounded behind the Lake Conestee Dam (Conestee Foundation, 2018). The sediments in the lake are contaminated with polycyclic aromatic hydrocarbons (PAHs), metals, pesticides, and PCBs, reflecting the historical industrial development of the upstream watershed. All of these suites of chemicals can be found at concentrations above ecological and human health screening standards throughout the historical lake area in areas that are wetland areas and pools submerged under a column of water, as well as in areas with sediment accreted above the water line to now form terrestrial ecosystems that are periodically flooded (HRI, 2012). The toxins are thought to have been discharged from textile mills, coal gasification plants, dyeing operations, and other industries that were once located along the Reedy River or its tributaries (HRI 2012). The contaminants found within the lake sediments have a strong affinity for sediment particles and, therefore, are relatively immobile, provided the sediments are not disturbed. Sampling of surface water and groundwater from locations around the lake revealed contamination was not a major concern (HRI, 2012). Lake Conestee Dam serves as a barrier to the mobilization of contaminated sediments that would otherwise be subject to downstream transport (HRI, 2012).

Recent inspections showed that there are numerous seeps on the downstream face of the dam (HRI 2012). In many of these locations sediments are being actively transmitted through the dam resulted mounds of accumulated sediments at the foot of the dam. Samples of these translocated materials were collected during the 2008 studies and were analyzed for total metals. The results indicate highly elevated concentrations of certain regulated metals, particularly arsenic (As) and cadmium (Cd). These conditions reflect the unique transport of very fine particles, mostly clay and fine silt-size particles, through the cracks of the dam, the unique geochemical conditions present, and the strong affinity of these metals for clay particles (HRI, 2012).

Lake Conestee is estimated to be volumetrically 95 percent full of sediment (HRI 2012). The dam functions as a run-of-river structure with essentially the entire river flow passing over the principal spillway under ordinary flow conditions. As a result of these factors the impoundment has little storage volume available for retention of flood flows. It also has a small normal pool area, limited mostly to the river channel and small shallow embayments totaling less than 25 acres. Approximately 57 percent of the former lake area has accreted sediments above the ambient full-pool water line (797 ft msl), or has been impounded by beaver ponds, effectively removing hundreds of acre-feet of potential flood storage capacity.

4.1.2 ENVIRONMENTAL EFFECTS OF THE ACTION ALTERNATIVES ON WATER RESOURCES

The overarching intent of Action Alternative 8 and Action Alternative 9 is to modify the dam structure to reduce the chances of existing dam failure that would release contaminated sediment into the Reedy River. This objective recognizes that the core purpose of the Recommended Alternative is to function not only as a replacement dam, but for the structure to function as a "waste containment structure" for the Lake Conestee Site.

The new CIP dam structures would continue to retain the contaminated sediments currently captured in Lake Conestee. These structures would also allow some ongoing accumulation of sediment, eventually filling much of the areas of the current embayments, sloughs, and former channels within the lake. Over time, progressively cleaner sediments would naturally cover and cap older more highly contaminated sediment, a process that has been ongoing for the past 75 years or more.

Both Action Alternatives 8 and 9 would be designed to minimize seepage through the dam structure, to the extent technically practicable, improving water quality conditions in downstream areas that are currently exposed to some entrainment of contaminated sediments as water seeps through cracks in the existing dam structure. Both Action Alternatives would reduce future intrusions of contaminated sediments to downstream waters, including Lake Greenwood, which is a major water supply reservoir for both Greenwood and Laurens Counties.

The volume and surface area of the lake would continue to shrink over time as sediments accumulate. The surface area of Lake Conestee would remain the same under Action Alternative 8. No changes to river flow, floodplains, or usage of the waterway are anticipated once construction is completed. Action Alternative 9 would minimize seepage through the dam with the application of a 10-foot-wide engineered core and a waterstop membrane.

4.1.3 Environmental Effects of the No Action Alternative on Water Resources

Under the No Action Alternative, the existing structure would continue to restrict large quantities of polluted sediment from washing downstream. However, the No Action Alternative would result in the continued intrusion of an unknown quantity of pollutants from behind the dam into downstream waters through existing leaks and seeps at the dam face. Given the age and condition of the dam, it is reasonable to assume the existing dam will eventually fail. Failure would result in the release of a considerable amount of contaminated sediment to downstream waters depending on the severity of the breach; the current estimate of the volume of contaminated sediment behind the dam is 2.3 million cubic yards. All of this volume would not be instantaneously released. More likely, a lowering of the water control level from the present 797 ft msl, by several feet, would actuate erosion of significant volumes of sediment from the reservoir. For example, when the penstock orifice opened in June 2000, and remained open until blocked by a temporary repair in June 2001, the resulting canyon through the lakebed indicated a release of 95,000 cu.yd. of lake sediment, per a survey of the canyon (HRI, 2012). This was during a drought year of roughly 35 inches of precipitation.

Under this breach scenario, if not contained, contaminated sediments would likely be re-distributed downstream in the Reedy River and its floodplain between the Lake Conestee Dam and Lake Greenwood. thereby adversely affecting surface water quality throughout a 45-mile-long reach of the river. SCDHEC currently considers the dam to be in non-compliance with established dam safety requirements due its structural instability and its continuous releases of hazardous substances emanating from lake sediments.

Industrial assets (i.e., Conestee Mill) and fewer than five private homes exist within or near the flood zone downstream of the dam that could be affected by a catastrophic dam failure during a 100-year flood event (HRI 2012). CFI performed a dam breach analysis using HECRAS that showed that a “sunny day” breach of the dam (i.e., under baseflow conditions) would have a limited hydraulic effect to downstream reaches of the river, except between the Conestee Road bridge and the Conestee dam. CFI also modeled a breach of the dam coincident with the occurrence of a 100-yr flood event. This event would result in significant flooding near the river as shown in the inundation map (Appendix 7). Flooding from such a dam breach event would be largely attenuated within approximately 2.5 miles downstream (HRI, 2012), largely because the storage of water in the Lake Conestee impoundment is so small. However, a significant breach could have severe implications with dam debris, large woody debris, and sediment lodging against the piers of Conestee Road, located 700 ft below the dam.

4.2 SOILS AND GEOLOGY

4.2.1 AFFECTED ENVIRONMENT

CFI studied bedrock conditions adjacent to and near the dam, dam foundation conditions, likely overburden volumes, and costs for various dam rehabilitation or replacement alternatives (HRI, 2012). Twelve drilling sites were established on the slope adjacent to the south abutment of the dam; 7 drilling sites were established on the slope adjacent to the north abutment. Drilling contractors used a hollow stem rig to reach refusal, which defined the depth to partially-weathered bedrock. This was followed by use of a tri-cone head to drill until the depth of “competent” and contiguous bedrock was confirmed. The results of the drilling demonstrated that the depth to competent bedrock was deep at most locations across the site, especially in the area east of the dam (HRI, 2012). This suggests the original dam may be constructed on partially-weathered bedrock. The reconnaissance drilling study also indicated that although the dam is situated on an apparently formidable bedrock shoal, the rock may in fact be substantially fractured (HRI, 2012).

4.2.2 ENVIRONMENTAL EFFECTS OF THE ACTION ALTERNATIVES ON SOIL AND GEOLOGY

The Action Alternatives may result in drilling of concrete anchors to support a new dam structure. The area of affected would be limited. Action Alternative 9 would result in the use of approximately 6,000 cubic yards of low-permeability engineered soil fill to provide a core between the new dam structure and the existing dam that will allow detention and attenuation of contaminated seepage moving through this medium and will allow the medium to flow to and seal downstream cracks in the new structure. The low-permeability engineered fill would be contained between the two dam structures and be covered with stabilization fabric and an articulated block paving system, installed in sections for serviceability. No erosion or scour of this low permeability engineered soil medium is expected.

4.2.3 Environmental Effects of the No Action Alternative on Soil and Geology

In the short-term, the No Action Alternative is not expected to affect soil or geological resources in the area. Existing soil and geological resources would remain intact. If the dam breaches or fails, it has been proven that very substantial volumes of contaminated sediment would be mobilized during high river flows and distributed to downstream river bed, banks, and floodplains. The deeper the breach or failure, from the elevation of the primary spillway, the more extreme the erosion from upstream. Over a relatively short term the stream channel upstream through the old lake bed area would become unstable and would degrade the adjacent forested riparian bottomland areas.

Downstream, the release of large volumes of sediment would cover the stream bed, and adjacent natural levee and backwater sloughs within the floodplain. Contaminants associated with the lake sediments would accumulate downstream, presenting impacts to benthic and aquatic resources, as well as terrestrial species. This scenario was demonstrated with the failure of the debris plug upstream of the penstock orifice in June 2000. Over the 12-month period until the penstock was patched, in June 2001, the canyon that developed through the lakebed had released a volume of approximately 95,000 cubic yards of sediment.

4.3 Botanical Resources

4.3.1 Affected Environment

Botanical resources that may be affected include native and non-native plants in the riparian corridor near the downstream face of the dam and upland plant communities along areas slated for access road construction on both sides of the dam. Given previous disturbance along both banks, it is likely that most plant species are common or non-native.

Upstream, the former Lake Conestee consisted of over 3 miles of shoreline, with extensive acreage of emergent and palustrine wetlands that have developed over time as the lake has filled with sediments, beaver have impounded certain areas, and as emergent wetland and mixed bottomland forest hardwood communities have developed.

4.3.2 Environmental Effects of the Action Alternatives on Botanical Resources

The Action Alternatives would result in limited clearing of riparian and shoreline vegetation on both river banks during construction of the new dam structure, access roads, and construction staging areas. Lowering the headpond temporarily during construction would have a short term, intermittent and spacially limited effect on wetland species. Therefore, botanical resources would be largely unaffected by implementation of Action Alternative 8 or Action Alternative 9. CFI or its contractors would develop and implement a Native Plant Species Revegetation Plan after construction is completed so that disturbed areas are re-colonized by native plant species. Construction equipment that is used in the water will be inspected and cleaned to reduce the chances of spreading invasive aquatic plant species.

4.3.3 Environmental Effects of the No Action Alternative on Botanical Resources

In the short-term, the No Action Alternative is not expected to affect botanical resources. Existing botanical resources would remain intact. If the dam breaches or fails, wetland habitats in the former impoundment would be affected as the water table is lowered and the reach returns to a riverine system; however, given, that the impoundment is currently almost full of sediment and wetland communities are well-established, the effects of a dam breach on wetland would likely occur over time, as sediment would continually be washed downstream after significant rain events, affecting plant communities both upstream and downstream. Upstream wetland impacts would occur from loss of environment, downstream from contaminated sediment accumulation.

4.4 Fishery Resources

4.4.1 Affected Environment

The Reedy River has been adversely affected by pollution and habitat degradation since the development and industrialization of the watershed.

A major diesel fuel spill in 1996 (Colonial Pipeline) destroyed the Reedy River fishery and aquatic habitats in a 30-mile-long reach of the river between Fork Shoals and Lake Greenwood (Greenville Online News 2016). However, since the spill, fish populations have fully recovered; 33 species of freshwater fish are reported from the Reedy River between Lake Conestee and Lake Greenwood (Greenville Online News 2016). The Reedy River now supports typical game and non-game fish species such as bass, catfish, and several sunfish species. SCDHEC issued an active fish consumption advisory for fish taken from Lake Conestee. Aquatic habitats include shoreline wetlands, submerged woody debris and aquatic vegetation in Lake Conestee and riverine habitats (e.g., riffles, runs, pools) downstream of the dam. Immediately downstream of the dam, for approximately 800 ft, the Reedy River is comprised of a bedrock shoal with a steep gradient. The most prominent feature of that reach is a bedrock shelf that drops roughly 8 ft within 30 ft of the dam base (Figure 29).

FIGURE 29 BEDROCK SHOAL CONFIGURATION IMMEDIATELY DOWNSTREAM OF THE EXISTING LAKE CONESTEE DAM

4.4.2 Environmental Effects of the Action Alternatives on Fishery Resources

Action Alternatives 8 and 9 would eliminate approximately 9,600 to 15,000 square feet of river bed within the footprint of the new CIP structures, respectively. The affected habitat represents a very minor portion of the overall habitat of the Reedy River. Containment of sediments behind a new dam structure would reduce the potential for bioaccumulation of pollutants in fish and aquatic organisms inhabiting the Reedy River. Lowering the level of the lake for construction would displace aquatic species using shoreline habitats (e.g., spawning fish) for up to a year.

4.4.3 Environmental Effects of the No Action Alternative on Fishery Resources

In the short-term, the No Action Alternative is not expected to affect fishery resources. Existing fish communities and aquatic habitats would remain intact. If the dam breaches or fails, the release of contaminated sediment to downstream waters could affect fish health and angling opportunities in the river and in Lake Greenwood. A breach or failure of the dam may allow fish species to move upstream and downstream past the former dam structure at high river flows, although the natural 8 to 10-foot drop at the bedrock shoal would preclude small, weaker swimmers from moving upstream.

4.5 Wildlife Resources

4.5.1 Affected Environment

Lake Conestee Nature Park provides a rich diversity of wildlife habitat that supports deer, raccoon, beaver, fox, river otter, and various small mammals, along with numerous species of reptiles and amphibians (Lake Conestee Natural Park 2018). The National Audubon Society designated the Lake Conestee Nature Park as an Important Bird Area of Global Significance due to the presence of a large overwintering population of Rusty Blackbirds, a species in significant decline. At this writing 219 species of birds have been observed at Lake Conestee Nature Park (Lake Conestee Natural Park, 2019). The river corridor provides extremely important riparian resources and cover important to a variety of wildlife species. Industrial and suburban encroachment diminishes the riparian corridor in some reaches, but overall the Reedy presents an important natural asset.

The entirety of Lake Conestee Nature Park is recognized under State of South Carolina Statutes as a "Wildlife Sanctuary." CFI does not allow hunting, fishing, or trapping within the park. Likewise, no boating, paddling, swimming, or wading are allowed on the lake except for specifically permitted research efforts. Park patrons are rigidly required to stay on marked trails and to consider the vast majority of the park as a "Do Not Disturb Area" for the benefit of wildlife. These restrictions also facilitate compliance with the protections and site management practices stipulated in the Restrictive Covenant (2007).

4.5.2 ENVIRONMENTAL EFFECTS OF THE ACTION ALTERNATIVES ON WILDLIFE RESOURCES

Implementation of the Action Alternatives would stabilize the structural integrity of the dam, thereby sustaining wildlife and wetland habitats by maintaining Lake Conestee. The construction of the Action Alternatives would affect wildlife and wildlife habitats in the immediate vicinity of the construction footprint; however, the geographic extent of the construction footprint is expected to be less than 10,000 (Alternative 8) and 15,000 square feet (Alternative 9). Removal of up to 10 small diameter trees to provide space for an access road on the north side of the dam is unlikely to significantly affect wildlife. After construction these areas would be restored with suitable native species.

4.5.3 ENVIRONMENTAL EFFECTS OF THE NO ACTION ALTERNATIVE ON WILDLIFE RESOURCES

In the short-term, the No Action Alternative is not expected to affect wildlife resources. Existing wildlife resources would remain intact. If the dam breaches or fails, wildlife habitats in the former impoundment would be affected as the water table is lowered and the reach returns to a riverine system. However, given that the impoundment is currently almost full of sediment and wildlife habitats are well-established, the effects of a dam breach on wetland and riparian habitats would likely be dynamic due to the steadily evolving impacts of channel erosion and shoreline sloughing upstream. The release of contaminated sediments to downstream reaches of the Reedy River could adversely affect the health of individual or populations of wildlife species that feed on aquatic organisms.

4.6 THREATENED AND ENDANGERED SPECIES

4.6.1 AFFECTED ENVIRONMENT

The USFWS reports that there are 10 federally listed species that are known to or believed to occur in Greenville County, South Carolina (USFWS 2018), including 7 flowering plants, 1 lichen, 1 mammal, and 1 reptile (Table 6). Three additional species are listed as threatened or endangered by the state of South Carolina (SCDNR 2018). Table 7 describes the habitat requirements for protected species.

TABLE 6 LIST OF FEDERALLY PROTECTED SPECIES THAT MAY OCCUR NEAR CONESTEE DAM

GROUP	COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	STATE STATUS
Flowering Plants	Bunched arrowhead	*Sagittaria fasciculata*	Endangered	-
Flowering Plants	Mountain sweet pitcher-plant	*Sarracenia rubra ssp. jonesii*	Endangered	-
Flowering Plants	White irisette	*Sisyrinchium dichotomum*	Endangered	-
Lichens	Rock gnome lichen	*Gymnoderma lineare*	Endangered	-
Flowering Plants	Dwarf-flowered heartleaf	*Hexastylis naniflora*	Threatened	-
Flowering Plants	Small whorled pogonia	*Isotria medeoloides*	Threatened	-
Flowering Plants	Swamp pink	*Helonias bullata*	Threatened	-
Flowering Plants	White fringeless orchid	*Platanthera integrilabia*	Threatened	-
Mammals	Northern Long-Eared Bat	*Myotis septentrionalis*	Threatened	-
Reptiles	Bog turtle	*Clemmys muhlenbergii*	Threatened	Threatened
Mammals	Rafinesque's Big-eared Bat	*Corynorhinus rafinesquii*	-	Endangered
Birds	American Peregrine Falcon	*Falco peregrinus anatum*	-	Threatened
Mammals	Eastern Small-footed Myotis	*Myotis leibii*	-	Threatened

TABLE 7 HABITAT REQUIREMENTS OF STATE AND FEDERALLY LISTED SPECIES THAT MAY OCCUR IN GREENVILLE COUNTY

COMMON NAME	SCIENTIFIC NAME	HABITAT REQUIREMENTS
Bunched arrowhead	*Sagittaria fasciculata*	Wetland species; Enoree River watershed
Mountain sweet pitcher-plant	*Sarracenia rubra ssp. jonesii*	Mountain bog species
White irisette	*Sisyrinchium dichotomum*	Open, dry oak-hickory forests on mid-elevation mountain slopes

Rock gnome lichen	*Gymnoderma lineare*	High-elevation cliffs or in deep river gorges at lower elevations.
Dwarf-flowered heartleaf	*Hexastylis naniflora*	Bogs with acidic soils
Small whorled pogonia	*Isotria medeoloides*	Hardwood forest understory
Swamp pink	*Helonias bullata*	Swampy forested wetlands
White fringeless orchid	*Platanthera integrilabia*	Wet, boggy areas at the heads of streams and on sloping areas kept moist by groundwater seeping to the surface
Northern Long-Eared Bat	*Myotis septentrionalis*	Caves, mines, and other hibernacula (winter); live trees and snags (summer)
Bog turtle	*Clemmys muhlenbergii*	Bogs, wet meadows, and emergent freshwater wetlands
Rafinesque's Big-eared Bat	*Corynorhinus rafinesquii*	Large hollow, tulip poplars, abandoned buildings, cave or cave-like structures, abandoned mines
American Peregrine Falcon	*Falco peregrinus anatum*	High cliffs for roosting; wetland areas that have waterfowl and shorebirds
Eastern Small-footed Myotis	*Myotis leibii*	Mixed hardwood-conifer stands, bottomland and floodplains

4.6.2 Environmental Effects of the Action Alternatives on Threatened and Endangered Species

Most of the state and federally listed species in South Carolina would not be expected to inhabit Lake Conestee or the Reedy River near or downstream of the dam because of their unique habitat requirements (e.g., bat habitat requirements are large, hollow tulip poplars, high cliffs, abandoned mines caves). However, it’s possible that some protected plant species could inhabit areas near Lake Conestee. Regardless, the Action Alternatives would maintain wetland and upland habitats in and around Lake Conestee, which would provide or preserve habitats for T&E species. A short-term drawdown for construction purposes would likely have limited effect on wetland or upland plant communities that are adapted to periodic flow fluctuations due to natural climatic and hydrologic variations. Removal of up to 10 small diameter trees to provide space for an access road on the east side of the dam is unlikely to adversely affect roosting habitat for the three protected bat species in South Carolina.

4.6.3 Environmental Effects of the No Action Alternative on Threatened and Endangered Species

The No Action Alternative is not expected to affect threatened and endangered species, unless there is dam failure. If dam failure occurs, the wetland and upland habitats in and around Lake Conestee would be impacted and would potentially impact threatened and endangered species through this habitat destruction.

4.7 HISTORIC RESOURCES

4.7.1 AFFECTED ENVIRONMENT

Portions of the Conestee Mill property and the Lake Conestee property were added to the National Register of Historic Places in 2014. The listed property includes the Conestee Mill buildings; Conestee dam and spillway; the entirety of Lake Conestee, defined as the original lakebed area as constructed in 1892; and the Company Store/Mill Office/Post Office, constructed in 1919. These features contribute to the significance of the structure regarding the textile industry, the history of the area, and the landscape (NPS 2018). The dam structure is constructed primarily of hand-quarried stones. Very little is known about the process of construction of the dam and no design drawings, or as-built drawings are known to exist.

4.7.2 ENVIRONMENTAL EFFECTS OF THE ACTION ALTERNATIVES ON HISTORIC RESOURCES

Implementation of the Action Alternatives would result in the overtopping and ongoing inundation of the existing dam structure by Lake Conestee. CFI would consult with the South Carolina's State Historic Preservation Office (SHPO) to determine appropriate documentation and mitigation of the resource. No other components of the historic properties would be affected. Construction of the proposed access roads is unlikely to affect historic structures, as the roads would be routed to avoid damaging existing structures.

4.7.3 ENVIRONMENTAL EFFECTS OF THE NO ACTION ALTERNATIVE ON HISTORIC RESOURCES

In the short-term, the No Action Alternative is not expected to affect historic resources. Existing structures would remain intact. If the dam breaches or fails, historic structures downstream may be subjected to flooding and the dam structure would be damaged, the extent of the damage would depend on the location and extent of the breach.

4.8 CULTURAL AND TRIBAL RESOURCES

Given previous disturbances at the site and the limited footprint, the Action Alternatives and No Action Alternative are not expected to adversely affect Cultural and Tribal Resources. Some cultural resources have been found in previous archaeological surveys upstream within Lake Conestee Nature Park, and at some locations downstream along the Reedy. Customary cautions will be taken in the course of construction to identify any artifacts or cultural resources of interest, and to stop work to assess those resources if necessary and justified.

4.9 NAVIGATION

The Action Alternatives and No Action Alternative are not expected to affect navigation in the Reedy River. Replacement of the dam would result in the same navigational conditions as currently exist.

4.10 LAND USE

The Action Alternatives and No Action Alternative are not expected to impact land use in and around the project site. The placement of any new dam configuration will require acquisition of a portion of the mill property for footprinting the new structure, construction roads, construction staging, and long-term security. Once the new dam is completed, no substantial impact on nearby land uses would be expected.

4.11 RECREATIONAL RESOURCES

4.11.1 AFFECTED ENVIRONMENT

The Lake Conestee Nature Park provides an extensive network of nature trails that are open to the public. The Park offers an extensive program of nature education programming based throughout the park's over 400 acres of forests, fields, and wetlands. The trail system is comprised of 6 miles of natural surface trails, 6 miles of paved trails, and includes roughly one mile of boardwalks and bog-walks. None of the existing nature trails are located in close proximity to the Lake Conestee Dam or the proposed dam locations. One trailhead parking area, the Spanco Drive entrance (park entrance S1) is located approximately 200 ft southwest of the south end of the dam. This trailhead would not be affected by anticipated dam construction activities.

Lake Conestee Nature Park is filled with wetlands that are dependent upon Lake Conestee Dam. By its policies, the Conestee Foundation does not allow hunting, fishing, or trapping within the park. Likewise, no boating, paddling, swimming, or wading are allowed anywhere in the park, including in or on the Reedy River. One exception is that fishing is allowed for specifically permitted research efforts. Park patrons are rigidly required to stay on marked trails and to consider the vast majority of the park as a "Do Not Disturb Area" for the benefit of wildlife. These restrictions also facilitate compliance with the protections and site management practices stipulated in the Restrictive Covenant (2007).

Downstream recreational opportunities include fishing, kayaking, and boating on the Reedy River, Boyd's Mill Pond, and Lake Greenwood.

4.11.2 Environmental Effects of the Action Alternatives on Recreational Resources

The Action Alternatives would not affect recreational opportunities at the Lake Conestee Nature Park. Access to the nature park and associated trails will not be affected by construction activities. Although there may be modifications to river flow during phases of the construction, these effects are expected to be short term, intermittent, and unavoidable. As such, the Action Alternatives are not expected to adversely affect recreational opportunities downstream.

4.11.3 Environmental Effects of the No Action Alternative on Recreational Resources

Downstream recreational resources at risk in the event of a dam failure, and resultant release of sediments, include the public parks and recreational resources in Greenville and Laurens Counties, Boyd's Mill Pond, Lake Greenwood, and private riparian users of the Reedy River (HRI 2012). To the extent technically practicable, efforts will be made to minimize the release of sediment and related contaminants during construction. Best management practices will be engaged to capture sediment accidentally released due to construction activities. The goal of these practices will be to minimize and mitigate the release of contaminated sediment.

4.11.4 AESTHETIC RESOURCES

4.11.4.1 AFFECTED ENVIRONMENT

The Lake Conestee Nature Park and historic properties at the dam and former mill site provide a unique aesthetic landscape and a visual amenity for enjoyment by the public. The appreciation of the aesthetic qualities of the dam and former mill site are limited to observation from Conestee Road and Spanco Drive, both hundreds of feet away, since access to the dam has not been available to the public for at least the last fifty years for reasons of safety, security, and risk management. Although the hand-hewn stones of the dam provide aesthetic character, there are clear deficiencies in the structure, indicated by seepage stains on the downstream face of the dam, translocation of contaminants via seepage, vegetation growth, and the deterioration of the top three feet of the dam.

4.11.5 ENVIRONMENTAL EFFECTS OF THE ACTION ALTERNATIVES ON AESTHETIC RESOURCES

The Action Alternatives will affect the aesthetic character of the site on a short-term basis during construction activities. However, the Action Alternatives would result in the encapsulating and/or inundation of the dam stone masonry work. The placement of all of the Action Alternatives will change the aesthetic character of the dam. To improve the aesthetics of the Action Alternatives, stamping of the concrete on the downstream exposed face of the potential structures is considered and included in the cost analysis. Additionally, development of a demonstration/exhibit area in the Lake Conestee Nature Park for the public's education about the historic dam will be considered in the final detailed design phase.

4.11.6 ENVIRONMENTAL EFFECTS OF THE NO ACTION ALTERNATIVE ON AESTHETIC RESOURCES

In the short-term, the No Action Alternative is not expected to affect aesthetic resources. Existing structures would remain intact. If the dam breaches or fails, historic structures that have visual appeal (i.e., hand-quarried stones) would be subjected to flooding and the dam structure could be damaged or displaced downstream.

4.12 CLIMATE

The Action Alternatives and No Action Alternative are not expected to affect short-term or long-term climatic conditions near Greenville. Changing climatic patterns (e.g., increased storm frequency and magnitude) could increase the potential for dam breach of the existing structure.

4.13 TRAFFIC AND TRANSPORTATION

The Action Alternatives are not expected to affect traffic and transportation. Any localized effects of increased traffic would be intermittent, unavoidable, and short-term. The No Action Alternative could potentially affect Conestee Road, and its Reedy River bridge located 700 ft downstream of the dam. In the case of an eventual failure of the dam, dam debris, and large woody debris could impact the bridge piers, situated in the river bed below. This scenario is addressed in the Emergency Action Plan for the dam.

4.14 AIR QUALITY

Although the Action Alternatives may affect air quality locally (i.e., increased truck traffic), the effects would be unmeasurable, intermittent, unavoidable, and short-term. The No Action Alternative is not expected to affect air quality.

4.15 NOISE

The Action Alternatives are expected to have only short-term, intermittent noise effects. Contractors will abide by City of Greenville ordinances (Section 16-95, operating between 7:00 am and 9:00 pm. The No Action Alternative is not expected to affect noise.

4.16 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

4.16.1 AFFECTED ENVIRONMENT

The volume of sediment trapped behind the Lake Conestee Dam and residual within the historic Lake Conestee basin is estimated at 2.3 million cubic yards (HRI, 2012). Because the present dam operates as a run-of-river structure, some sediment moves across the dam continuously, reflecting ambient flow conditions. During storm events much more sediment fluxes across the plane of the dam. Also, a small amount of seepage occurs continuously through cracks, crevices, and fissures within the stone masonry of the dam. Sediments and some contaminants are hence translocated through these seeps. There are also two out-of-service large concrete wastewater treatment basins, which historically provided waste treatment for wastestreams generated by mill operations (HRI, 2012). Historical operations of Conestee Mills reportedly included dyeing and finishing operations.

4.16.2 Environmental Effects of the Action Alternatives on Hazardous, Toxic, and Radioactive Waste

Limited information is available regarding potential pollutant residuals that could be deposited in the soils, sludge, or other residuals present in these treatment units. Some sampling was done by the mill owner in the course of a VCC process, and other sampling was performed in the portion of the basins owned by CFI (Cardno, 2016). These sampling activities confirmed the presence of elevated concentrations of heavy metals and polycyclic aromatic hydrocarbons in some samples. Before these materials can be removed it will be necessary to sample and analyze these materials to discern how they should be handled and disposed. Based on the dimensions of the basins the volume of materials is expected to be on the order of 4000 cu.yd.

In constructing the south access road, existing wastewater treatment basins and soil contamination will need to be excavated and removed from site, screened for hazard characteristics, and disposed of appropriately. Construction equipment would require small amounts of liquid fuels, solvents, oils, lubricants, and hydraulic fluids for operation. The contractor would implement an Inadvertent Fluid Release Prevention, Monitoring, and Contingency Plan. This plan would identify procedures for monitoring for fluid release, containing a fluid release if it occurs, and cleaning up any fluid losses. Prior to construction, meetings would be held with the authorizing agencies to review these plans. All applicable federal, state, and local laws and regulations would be followed in the use, handling, and disposal of potentially hazardous materials.

Sediment accretes normally upstream of the dam face. To minimize the contaminated sediment transport downstream, this settled sediment must be removed, tested for hazardous characteristics, and disposed of appropriately. This operation must be addressed periodically, the cost is included in the maintenance estimate.

Equipment needed to construct new CIP dams would not require the use of hazardous materials, thereby eliminating any potential for additional contribution to sediment contamination.

4.16.3 Environmental Effects of the No Action Alternatives on Hazardous, Toxic, and Radioactive Waste

The No Action Alternative would result in the continued transport of small amounts of sediment through seeps and cracks in the dam. This sediment contains elevated levels of hazardous substances including metals, PAHs, and PCBs. If the dam were to breach, the contaminated sediment behind the dam could be mobilized into downstream waters with the breach or during subsequent flood flow events, which would adversely affect downstream river reaches and impounded waters, including Boyd's Mill Pond and Lake Greenwood. In addition, there are existing wastewater treatment structures on the old mill property, which currently have retaining walls to prevent the discharge of contaminated material. Implementation of the No Action Alternative would keep wastewater structures in place with no timeline for removal.

4.17 Public Health and Safety

4.17.1 Affected Environment

Contaminated sediments and contaminants seeping through the dam into downstream waters are the biggest concerns related to public health and safety at this time. Furthermore, Lake Conestee dam is classified as being in "POOR" condition, which means there is a potential dam safety deficiency. Due to the age and deteriorated condition of the dam, and the discovery of the contaminated nature of the large volume of sediment contained by the dam, in 2006, SCDHEC's Dam Safety Program classified the Lake Conestee dam as a Class 2 structure with a Significant Hazard Risk Status. This classification recognizes the unique risk to downstream resources posed by the 1892 structure, because of the quantity of contaminated sediments behind it. This classification requires a higher level of management oversight, and the development of an Emergency Action Plan. An EAP was developed and filed by CFI in 2008.

Any change by SCDHEC to the current Lake Conestee Dam classification potentially impacts the design details and specifications for the alternative selected. This classification could change to High Hazard if the City of Greenville permits uses of the mill buildings to allow for residential or commercial uses, as such uses would present the potential for loss of life in the case of a catastrophic failure of the dam.

It is noted that portions of the historic mill buildings located approximately 150 ft downstream of the dam were constructed partly in the floodway of the Reedy River as defined by FEMA FIRM maps. This positioning of the mill works was not unusual in the late 19th century, as the proximity to the river and the penstock enabled construction of the hydropower works to power mill machinery. Most of the building footprint not in the floodway is situated within the 100-year floodplain. Portions of the building foundation, constructed in the 1880s, is situated directly downstream of the primary spillway of the dam. A FEMA Flood Hazard map is provided as Figure 30 and Appendix 11. This map shows Lake Conestee Dam, the mill building, as well as the surrounding FEMA flood zones. However, with the addition of the new dam these FEMA flood lines will need to be adjusted.

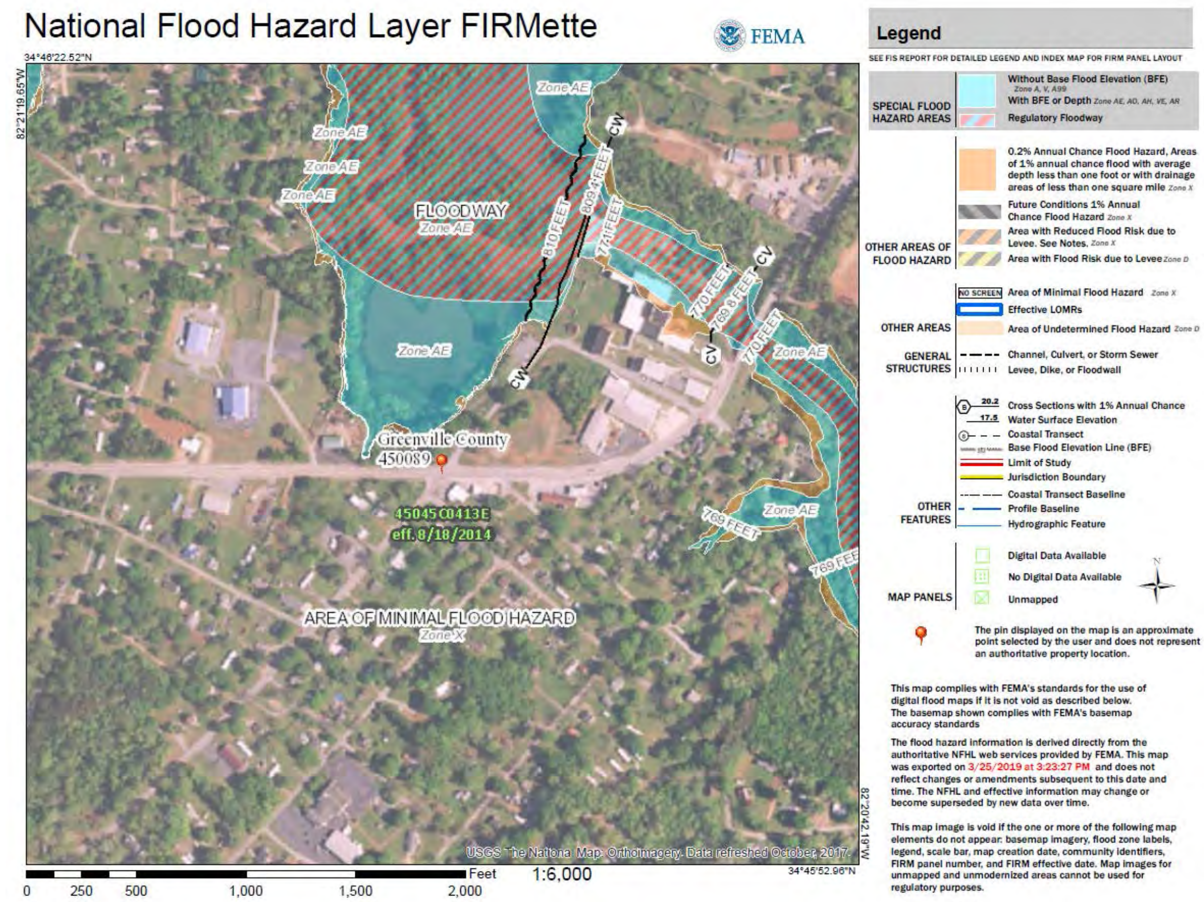

FIGURE 30 FEMA FLOOD HAZARD MAP

4.17.2 ENVIRONMENTAL EFFECTS OF THE ACTION ALTERNATIVES ON PUBLIC HEALTH AND SAFETY

The Action Alternatives reduce the chance of a potential public health and safety risk by addressing the current seepage and dam safety classification by constructing a new dam to stabilize the structural integrity of the existing dam and continue to impound the contaminated sediment. The Action Alternatives would be constructed within 45 feet downstream of the existing dam. Maintenance and construction would be confined to an area within approximately 100 ft of the present dam. All construction activities would be short-term, thereby posing minimal risk to public health and safety. Areas within this 100 ft construction and access area would be required for ongoing maintenance and to provide an appropriate security buffer.

4.17.3 Environmental Effects of the No Action Alternative on Public Health and Safety

If the dam were to breach and release contaminated sediments downstream to the Reedy River it could affect the recreational and hydroelectric lake, Boyd's Mill Pond, located in Laurens County approximately 35 miles downstream. The next major reservoir downstream is Lake Greenwood, which serves as the public water supply for Greenwood and for Laurens. Several public parks and recreational resources exist downstream along the Reedy River in Greenville, Laurens, and Greenwood Counties, (waters of the U.S., and natural resources (HRI, 2012). Further, an unplanned dam breach poses significant public safety risk to downstream residents and users of the Reedy River.

4.18 Socioeconomics

4.18.1 Affected Environment

Greenville and Greenville County have experienced rapid growth since 2010, with population increases of 15 and 12 percent, respectively, between 2010 and 2017. The estimated demographics for the city of Greenville are presented in Table 8

Table 8 Population Estimates for the Region of Influence for the Proposed Project

Location	2010	2017	2010 to 2017 Population Change	2010 to 2017 Percent Change
United States	308,758,105	325,719,178	16,961,073	5.50%
South Carolina	4,625,381	5,024,369	398,988	8.60%
Greenville County	451,221	506,837	55,616	12.30%
Greenville City	59,162	68,219	9,057	15.30%

Source: USCB 2017

4.18.2 Environmental Effects of the Action Alternatives on Socioeconomics

4.18.2.1 Employment

The Action Alternatives have the potential to create construction jobs during the peak of construction and non-construction temporary jobs. Limited if any additional jobs would be created for operations and maintenance of the proposed Project; therefore, long-term effects on employment in the region are expected to be minor.

4.18.2.2 POPULATION

Construction of the Action Alternatives is expected to be completed in approximately 1 year. Construction and long-term operations are likely to require only a small number of workers, construction workers for a relatively short period. Even if workers relocate to the region, the Action Alternatives would have no noticeable effect on the population of Greenville County and the City of Greenville.

4.18.2.3 HOUSING

Given the anticipated number of short-term jobs required to support the proposed construction, short-term accommodations (e.g., hotels, rental units) may be needed for some workers traveling from outside of the region. The anticipated construction period would be relatively short; therefore, effects of construction on the local or county housing markets would be minimal. Long-term effects on housing would be negligible because of the small number of permanent jobs anticipated.

4.18.2.4 TAXES AND REVENUE

The Action Alternatives would contribute to a minor increase in local revenues because of expenditures associated with construction, such as building materials, wages, and other goods and services, including food and lodging. In addition, the Action Alternatives would contribute to local taxes and revenues associated with land acquisition (i.e., property taxes, property easement fees, and real estate purchases and transfers); however, these effects would be minor and short-term.

4.18.3 ENVIRONMENTAL EFFECTS OF THE NO ACTION ALTERNATIVE ON SOCIOECONOMICS

The No Action Alternative would potentially have economic effects downstream if a dam breach occurs and results in a major release of contaminated sediments. Impaired water quality or diminished recreational opportunities in downstream communities would affect businesses, and potentially have a long-term effect on local economies, housing markets, and employment.

4.19 ENVIRONMENTAL JUSTICE

4.19.1 AFFECTED ENVIRONMENT

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* directs federal agencies to identify and address, as appropriate, any disproportionately high and adverse human health or environment effects of their actions on minority and low-income populations. Minority populations are those identified in census data as Native American or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; Hispanic; some other race; or two or more races (CEQ 1997). Low-income populations are identified as individuals and families that are living at or below the United States poverty level.

To assess potential minority or low-income populations affected within the project area, demographic data for United States, South Carolina, Greenville County, and the three census tracts associated with the affected city of Greenville were obtained from the U.S. Census Bureau (Table 9). In 2017, within Greenville County and the census tracts, minority populations comprised between 33 and 36 percent of the total population; the largest minority population was identified as black (27.1 percent in the City of Greenville). No Indian Tribe reservation or land is located within the vicinity of the Lake Conestee dam. The 2017 median household income of families in Greenville County and the townships within the ranged from $45,360 to $51,595 dollars. People in poverty ranged from 10.9 percent (Greenville city) to 16.8 percent (Greenville County).

TABLE 9 RACE, POVERTY AND HOUSEHOLD INCOME DEMOGRAPHICS IN 2017 FOR THE REGION OF INFLUENCE FOR THE LCD PROJECT

TOTAL POPULATION	**325,716,178**	**5,024,369**	**506,837**	**68,219**
RACE (PERCENT OF TOTAL POPULATION)				
Race and Hispanic Origin	United States	South Carolina	Greenville County	City of Greenville
White alone, percent(a)	76.6	68.5	76.5	67.8
Black or African American alone, percent(a)	13.4	27.3	18.5	27.1
American Indian and Alaska Native alone, percent(a)	1.3	0.5	0.5	0.3
Asian alone, percent(a)	5.8	1.7	2.5	2.1
Native Hawaiian and Other Pacific Islander alone, percent(a)	0.2	0.1	0.1	0.1
Two or More Races, percent	2.7	1.9	1.9	1.5
Hispanic or Latino, percent(b)	18.1	5.7	9.1	4.9
Total Percent Minority Population	41.5	37.2	32.60	36.00
Percent of Population Below Poverty				
People Below Poverty	12.3	15.4	10.9	16.8
Household Income				
Per Capita Income	$29,829	$28,521	$28,065	$33,442
Median Household Income	$55,322	$46,898	$51,595	$45,360

Source: USCB 2017

4.19.2 ENVIRONMENTAL EFFECTS OF THE ACTION ALTERNATIVES ON ENVIRONMENTAL JUSTICE

The Action Alternatives are not expected to adversely affect low-income or minority populations in Greenville or Greenville County. There are a limited number of residences immediately downstream of the Conestee dam and the communities near the project area appear to be sub-divisions, golf courses, and open space. Construction of the Action Alternatives would take place in a short-term period, would have a small footprint, and would use both existing roadways and small, new access roads. The Action Alternatives would result in no permanent displacement of existing residences or businesses and no significant effects on the population in general, including minority or low-income communities.

4.19.3 Environmental Effects of the No Action Alternative on Environmental Justice

As long as the existing dam remains in service, the No Action Alternative would result in no permanent displacement of existing residences or businesses and would not significantly affect the population in general , including minority or low-income communities.

5.0 OPINION OF PROBABLE CONSTRUCTION COSTS/PROJECT COST (FOR EACH ALTERNATIVE)

5.1 ACCESS

To construct either Alternative 8 or 9, the first step will be property acquisition downstream of the existing dam to provide land for construction of a temporary access road, to provide for construction staging, to access the existing dam, for maintenance of the new structure, and to provide an effective security buffer zone. The proposed Action Alternatives will require an area of the adjacent mill properties, approximately 1.6 acres, comprised of that area projected roughly 130 ft from CFI's property at the center line of the river, and projected parallel to the dam to the southwest to Spanco Drive. This area will satisfy all construction, long-term maintenance, and security requirements for the project.

5.2 WASTE WATER TREATMENT PLANT REMOVAL

The existing wastewater treatment plant components adjacent to the downstream south end of Lake Conestee Dam will need to be removed. The detailed design for the project must include the evaluation of the effect removal of these treatment plant components will have on the existing dam structural stability. The existing concrete retaining walls and wastewater treatment basins will be removed in accordance with design direction and the materials will be tested for hazardous substances and disposed of in an appropriate manner. The construction debris and material removed for the construction access roads will need to be removed from the property. The steps associated with dismantling and disposing of the waste water treatment plant have essentially the same cost for both Alternatives 8 and 9.

5.3 LOW-LEVEL OUTLET STRUCTURE

The low-level outlet structure is being installed so the head pond level can be lowered for structure maintenance, inspection, and repair. The initial step in construction of the low-level outlet structure is to remove an estimated 770 cubic yards of sediment from the upstream side of the dam to facilitate construction of the temporary cofferdam around the penstock. All the penstock gates and appurtenances will then be removed and disposed of. A new pipe will be inserted through the existing low-level outlet pipe. The new pipe will extend the low-level outlet through the 10-foot gap between old and new dams, through the new dam, and about

75 feet downstream of the new dam. The new pipe will be designed to resist the bearing pressure from the compacted low permeability engineered soil. The new pipe will be grouted in place to fill the void left between the old and new pipes. In addition, a watertight ring will be installed around the new pipe to seal the opening. A slide gate will be installed on the upstream of the dam to control flow through the low-level outlet pipe. The slide gate will be able to be operated manually or by screw auger activation, using a large generator powered portable drill, mounted to the top of the gate structure. Once the low-level outlet structure with slide gate is installed and functioning properly, the temporary penstock cofferdam can be removed.

These steps will be the same and have the approximately the same costs for both Alternatives 8 and 9.

5.4 INSTALL NEW CAST IN PLACE CONCRETE DAM

The downstream CIP concrete dam will be installed once the low-level outlet structure has been built. First, the top three feet of the existing Lake Conestee Dam will be removed and salvaged for repurposing in this and other projects. Next, another cofferdam will be installed on top of the existing Lake Conestee Dam to divert flows. A quote, provided in Appendix 9 of this report, was obtained from Portadam, Inc. to assist in the cost estimation of the cofferdam. The cofferdam will span half the length of the dam to displace water flowing out of Lake Conestee over one half of the dam while work is being done on the other half. Construction will begin on the dry half of the dam and that half of the downstream face will be cleared of all vegetation, sediment, loose rock, debris, and cleaned. A 3-ft thick bond beam will be installed on top of the existing dam in the area protected by the cofferdam.

Next, an impervious membrane will be installed on the downstream face of the dam to help prevent seepage. The major difference between Alternatives 8 and 9 is that Alternative 9 will have a 10-foot-wide layer of low permeability engineered soil between the impervious membrane on Lake Conestee Dam and the new CIP concrete dam, while Alternative 8 has the new CIP concrete dam adjacent to the existing Lake Conestee Dam. This makes Alternative 8 easier to construct since the downstream face can be cast against the existing dam. Two forms will need to be constructed to pour the concrete for Alternative 9 as opposed to just one form for Alternative 8. Roughly 6,000 cubic yards of low permeability engineered soil medium will need to be trucked to the site and compacted to form the 10-foot-wide engineered soil layer in Alternative 9. This is the largest cost difference between Alternatives 8 and 9. For both Alternatives 8 and 9, a concrete soldier beam will be cast at the toe of the dam. Once the soldier beam is in place the new CIP concrete dam will be installed. 25 rock anchors will be set in the first completed half of the dam. Finally, flows will be diverted over the completed half of the dam and the same procedure will be followed for completing the second half of the dam.

5.5 MAINTENANCE ACCESS RAMP AND DEBRIS REMOVAL STRUCTURE

The maintenance access ramp and debris removal structures will be built as part of the new dam construction. The purpose of the maintenance access ramp is to give maintenance vehicles a path to the crest of the dam. From there the maintenance vehicles will be able to remove debris that gets caught in the new dam's spillway. The debris removal structure will consist of a concrete pad or waste bin. The dimensions of the concrete pad will need to hold a volume of about 200 cubic yards to hold a 1-foot buildup of sediment along the length of the dam's crest. The sediment will need to be tested for contamination and disposed of properly. The machinery contacting any contaminated sediment will need to be cleaned on site before working on other jobs to avoid cross contamination. The steps and cost of constructing this access ramp and debris removal structure will be the same for both Alternatives 8 and 9.

5.6 COST CONCLUSIONS

Item A = Remove Existing WWTP and Construction Debris
Item B = Install Low-Level Outlet Control Structure
Item C = Install New CIP Concrete Dam
Item D = Construction of Maintenance Access Ramp and Debris Removal Structures
Item E = NRHP Permitting, Compliance, and Historical Preservation
Item F = Contractor General Profit and Overhead (25%)
Item G = Design, Permitting, and Construction Oversight and Testing (20%)
Item H = Contingency (34%)

TABLE 10 ALTERNATIVE 8 CAPITAL COST SUMMARY

	TOTAL COST PER CONSTRUCTION ITEM
Item A	$ 2,274,000
Item B	$ 3,248,000
Item C	$ 8,144,230
Item D	$ 167,000
Item E	$ 350,000
Item F	$ 3,545,807
Item G	$ 3,545,807
Item H	$ 7,233,447
	Total = $28,508,292

TABLE 11 ALTERNATIVE 9 CAPITAL COST SUMMARY

	TOTAL COST PER CONSTRUCTION ITEM
Item A	$ 2,274,000
Item B	$ 3,248,000
Item C	$ 8,792,230
Item D	$ 167,000
Item E	$ 350,000
Item F	$ 3,707,807
Item G	$ 3,707,807
Item H	$ 7,563,927
	Total = $29,810,772

5.7 CONTROL MEASURES NECESSARY TO PREVENT SUBSTANTIAL RELEASES OF CONTAMINATED SEDIMENT

To prevent transport of hazardous material downstream, some contaminated sediment will need to be removed from the jobsite. This contaminated sediment will result from seepage through the existing dam and the waste water treatment plant residuals and the sediment removal process. Each time hazardous material is removed from the jobsite, the excavator and truck used for hauling will need to be decontaminated before further use. The total cost of removal of sediment at the time of construction is estimated to be just over 2 million dollars and includes several sources of contaminated sediment. Estimates for contaminated sediment removal include 4,000 cubic yards of waste water treatment plant residuals, and 770 cubic yards of sediment removed for low-level outlet control structure and cofferdam construction. Since the Reedy River is continually depositing sediment in Lake Conestee, drawdown, removal, and disposal of 4,000 cubic yards of sediment is planned every 5 years.

5.8 CONTROL MEASURES NECESSARY TO PROTECT THE CONSTRUCTION SITE

To protect the construction site, best management practice sedimentation and erosion control procedures must be followed. These include but are not limited to silt fencing, rip rap, and a construction entrance. All of these measures will help prevent erosion and runoff into the river.

5.9 CONTROL MEASURES TO PROJECT DOWNSTREAM ASSETS IN CASE OF SIGNIFICANT FLOOD EVENT DURING CONSTRUCTION

In order to protect downstream assets such as construction equipment, workers, and downstream structures, a cofferdam will be installed at the start of construction. The cofferdam will be located on the existing dam's spillway. The cofferdam will be designed for 5 feet of head and will span half of the spillway. Half of the new dam can be constructed while flows are diverted over the other half of the spillway. Based on a quote from Portadam (provided in Appendix 9), it is estimated that the total cost of the cofferdam will be about $175,000; most of this cost is from equipment rental and labor. In addition, a low flow gate will be installed to lower the head pond.

5.10 HISTORIC PRESERVATION COSTS

Both of the preferred alternatives cover the existing downstream historic face of Lake Conestee Dam. However, there are construction options that can preserve some of the historic aspects of the existing dam. One such option is to use stone veneer on the downstream face of the new dam. The stone veneer could be used in an attempt to replicate the current downstream face of Lake Conestee Dam. It is estimated that the cost to add a stone veneer facing to the new dam is $972,450 (not including area of spillway covered by overflowing water). Form liners could also be used instead of stone veneer to reduce costs. It is estimated that using form liners on the same area of the dam would cost $155,592. These costs are for information only and are not included in the projected cost estimates. Another option to preserve the historic features of Lake Conestee Dam is to salvage the stone that will be removed from the top three feet of the existing dam and use it to create a display of the old dam in Lake Conestee Nature Park. It is estimated that the total cost to assess the alternatives, fulfill permitting and compliance requirements, salvage historic features of the existing dam, and design and construct the historic dam educational display and access is $250,000, which is included in the project cost estimates.

5.10.1 COSTS FOR LAND ACQUISITION TO CONSTRUCT THE DAM

Currently, the Conestee Foundation owns about 10.5 ft of land downstream of the existing dam on the south end of the dam. In order to have enough area for the footprint of the dam, adequate space for construction and access, and for long term maintenance practices, it is estimated that about 1.6 acres of land will need to be purchased for Alternatives 8 and 9. The long-term maintenance practices and amount of construction space needed for both alternatives will be the same.

5.10.2 LONG-TERM COSTS OF EACH ALTERNATIVE

In addition to the costs for constructing Lake Conestee Dam, there will be long-term costs associated with maintaining the dam. These costs include routine inspections, removing large woody debris and sediment from the dam spillway, completing regulatory compliance activities and reporting, creating an emergency action plan for the new dam, routine and possible non-routine repairs to include sediment removal upstream of the dam, and providing safety and security measures to protect the dam. These long-term costs have been estimated over a 100-year period since the new dam will have a minimum design service life of 100 years. These cost estimates for long-term care have been modeled to determine the funds necessary for an endowment to sustain the dam for its performance life.

5.10.2.1 ROUTINE INSPECTIONS

Once the new Lake Conestee Dam is built it will need to be routinely inspected to ensure that the dam is functioning properly. A professional engineer, licensed in the state of South Carolina, will perform onsite inspections for structural deficiencies in the dam, seepage through the dam, vegetation growth, or any other aspects of the dam that may compromise its continuing safe operation. This will be completed by an engineer independent of the Conestee Foundation. To project the total costs of inspections and inspection reports it was assumed that an independent inspection and inspection report will be completed every year.

In addition to the independent inspection, operators of the Lake Conestee Dam should inspect the dam monthly.

5.10.2.2 LARGE WOODY DEBRIS MANAGEMENT

Historically, the existing Lake Conestee Dam regularly has large woody debris hang up on the dam spillway during storm events. Since Lake Conestee has a large watershed, much of which consists of impervious surfaces, flood events raise and lower the water level in Lake Conestee very rapidly. When the water level is lowered, large woody debris gets caught in the dam spillway. The engineered core material between the two dams will have an articulated block paving system, designed to load with equipment to remove accumulated sediment and debris. In addition, any debris that is caught in the spillway can be reached and removed using equipment designed to do so, from this access. Therefore, it was assumed that two times a year, maintenance staff will need to clear the dam spillway.

5.10.2.3 REGULATORY COMPLIANCE AND REPORTING

The South Carolina Department of Health and Environmental Control (SCDHEC) is the agency which oversees dam safety in the State of South Carolina. The dam operator will need to meet the SCDHEC regulatory reporting requirements concerning dam safety. This projected cost is included in the long-term maintenance cost analysis.

5.10.2.4 EMERGENCY ACTION PLANNING

If a new emergency action plan is required for the new Lake Conestee Dam, an inundation map will need to be created to serve as the basis of the report. The inundation map will show the extent of flooding from a Lake Conestee Dam breach and given storm frequency. Based on typical rates, it is estimated that an inundation map will cost $30,000 and barring significant changes to the dam, will only need to be created once every 10 years. However, it is estimated that an EAP report will need to be updated annually to make sure that the inundation map is still adequate and to monitor changes in flow, land development, condition of the dam and any other modifications.

5.10.2.5 Routine and Possible Non-routine Maintenance and Repairs

Two routine repairs considered were routine mowing and vegetation removal. Additionally, non-routine miscellaneous repairs to the dam were considered. Because Lake Conestee Dam is a concrete gravity dam and does not produce power, it was assumed that most of the miscellaneous costs will be from concrete repair work or replenishment of low permeability engineered soil, gate repair, and sediment removal. The costs for these routine and non-routine maintenance items are included in the cost estimate in Appendix 4 and below in Table 12.

5.10.2.6 Safety and Security

The primary concern for safety and security is to protect the dam from intrusion by trespassers, and to protect the public from the attractive nuisance associated with such a structure. Current standards for security of such facilities include measures for sabotage and vandalism. These concerns require a protective security buffer surrounding the structure, including fencing, gates, signage, surveillance cameras, and related monitoring technology. Signage and barriers will also need to be erected upstream of the Lake Conestee property to assure recreational paddlers do not encroach on the property or the dam and are kept at a safe distance from the spillway.

For purposes of dam maintenance and repairs the largest safety concern is preventing fall and trip hazards for maintenance workers. The new Lake Conestee Dam will have a height of about 30 feet. Therefore, to prevent people from getting onto the dam crest, where falls could result in serious injury or death, fencing and signage should be installed. The annual maintenance and anticipated replacement costs of the signs and fencing is estimated to be $2000 each.

TABLE 12 LONG-TERM MAINTENANCE COSTS

	ANNUAL COSTS (2022)
Routine Inspection	$ 28,000
Large Woody Debris Management	$ 24,000
Regulatory Compliance and Reporting	$ 10,000
Emergency Action Planning	$ 25,000
Routine and Possible Non-Routine Repairs	$ 145,000
Safety and Security	$ 12,000
Risk and Financial Management	$ 80,000
Total	**$324,000**

6.0 RECOMMENDED ALTERNATIVE

6.1 SELECTION AND DETAILED ANALYSIS OF RECOMMENDED ALTERNATIVE (PROCESS 3)

Alternative 9 is the Recommended Alternative. This alternative will provide optimum access for maintenance, inspections, routine service, and potential repairs. These activities would be performed most safely and economically via use of a trafficable surface over the 10-ft low permeability engineered soil blend.

Both alternatives 8 and 9 would have an impervious membrane to prevent seepage. However, Alternative 9 will also have a 10-foot-wide low permeability engineered soil barrier. The combination of the impervious membrane and low permeability engineered soil layer will minimize seepage flow compared to the membrane alone. In addition to minimizing seepage flows, the engineered soil layer will seal fissures in the concrete when cracks begin to form. When cracks form on the upstream face of the new dam, the pressure on the engineered soil will force it into the cracks as they form. This will reduce the development of substantial seeps. Therefore, Alternative 9 will reduce the effect on the downstream environment, by minimizing the release of sediment and hazardous substances.

In addition to reducing seepage, the sealing quality of the low permeability engineered soil layer could potentially reduce concrete repair costs over the 100-year service life of the dam. Concrete repairs could be less frequent as the engineered soil layer is expected to reduce seepage. However, concrete repairs could become necessary to prevent compromise of the structure's integrity. Other than potentially having less frequent concrete repairs, the long-term maintenance associated with each dam should be essentially the same.

Each Action Alternative will require routine dam inspections, consisting of an independent dam inspection and report, as well as annual dam inspections completed by the owner. Both dams will also require safety signage and fencing. Each alternative will need large woody debris to be removed periodically from the spillway crest. Each alternative will also require regulatory compliance and reporting activities as required by SCDHEC. An EAP will be required for each dam as well, consisting of a notification plan, inundation map, and report.

The routine maintenance and repairs associated with each dam will include routine mowing, vegetation control and removal, and miscellaneous repairs such as concrete repair work. .

As shown in Tables 10 and 11, the estimated total cost of Alternative 8 is $28,508,292 while the estimated total cost of Alternative 9 is $29,810,772, a difference of $1,302,480. The projected cost of alternative 9 over 8 is relatively small, approximately 4%. The additional costs for Alternative 9 are due to the low permeability engineered soil layer, more forming required for construction, and related increased construction costs. It is Kleinschmidt's opinion that even at the higher estimated cost, Alternative 9 is a substantially superior solution.

Alternative 9 will provide optimal attenuation of seepage and contaminants. This alternative also offers several significant benefits in terms of accessibility, serviceability, and opportunity to conduct repairs from the spillway, and between the old dam structure and the new CIP dam.

Note that modifications to Alternatives 8 and 9 can be made during final design as long as the criteria outlined in section 2.2.1 are met. However, if modifications are made to the spillway it is important that the newly designed spillway have the same or similar hydraulic capacity of the existing dam and proposed dams.

6.2 Detailed Pre-Design Analysis of Preferred Alternative (Process 4)

Section 6.2 outlines the basic steps that need to be completed for Alternative 9 to be constructed.

6.2.1 Site Work

Before construction can begin, the following site work will need to occur:

- Proper erosion and sedimentation control barriers will be installed before ground is broken;
- The wastewater treatment plant facilities adjacent to the existing dam will be demolished;
  - Prior to removal of the concrete structures buttressing the dam a structural engineering assessment must be performed to confirm that removal of these

structures will not affect the dam. If this assessment determines the wastewater basin structures are integral to the stability of the dam, engineering solutions to address this vulnerability will have to be conceived and implemented.

    - Existing wastewater treatment plant structures and appurtenances will be demolished and removed from the site.
    - Residuals contained within the wastewater basins will be assessed to determine of residual materials must have special handling, treatment, or disposal. Based on the dimensions of the basins we estimate the basins could contain as much as 4,000 cy of materials or more.
    - Once the contaminated residuals/sediment are removed the construction equipment must be washed to avoid contamination of the next load.
    - Underlying soils, partially weathered rock materials, and any other overburden materials above competent bedrock will be similarly tested and appropriately disposed.

- Permanent access roads to the existing and new dams will be built to service the construction projects and long-term maintenance activities. The access roads will be constructed of gravel, at a minimum depth of 12 inches. The roads will be designed to assure stability, effective drainage, and long-term performance. The access roads will have a minimum width of 12 feet to allow for one-way traffic and turnarounds;
- A temporary cofferdam will be placed upstream of the low-level outlet in the existing dam;
- A slide gate will be installed to control flow through the low-level outlet;
    - The slide gate will be able to be operated manually or by screw auger activation. Screw auger activation is completed by using a large generator-powered portable drill, mounted to the top of the gate structure.
    - Once the slide gate is installed and functioning properly, the cofferdam can be removed.

6.2.2 CONSTRUCTION

- Before dam construction begins, flows will be diverted from the existing dam spillway. A cofferdam will be installed on top of the existing dam. The cofferdam will span half the length of the existing dam, diverting flows over the remaining open portion of the spillway. This will keep the construction area dry.
- In addition to the cofferdam, a barrier wall, perpendicular to the dam, must be built directly downstream of the existing dam to prevent flows from encroaching into the construction area.
- The barrier wall will be constructed of CIP concrete and will have the same height as the existing dam's spillway.

- Foundation construction begins with the removal of the layer of weathered bedrock until competent bedrock is found.
- All of the areas where weathered bedrock was removed will be filled with concrete to provide a foundation for the new dam.
- The foundation will be dowelled into the competent bedrock.
- A new low-level outlet pipe will be installed through the existing penstock and through the new dam, after sediment removal and cofferdam installation upstream of the penstock. The outlet pipe discharge will be controlled by a slide gate, operated by screw augar, located adjacent to the dam spillway, and accessed from the 10-ft. surface zone between the old and new dam structures.
- Forms will be built for the new dam starting 10 feet downstream from the existing dam.
- The forms must follow the outline in Figure 27 and allow for continuation of the low-level outlet in the existing dam through the new structure.
- Concrete reinforcement will be added to the forms.
- The new dam will be cast in place using the new forms and reinforcement.
- Post-tensioned rock anchors will be drilled through the downstream face of the new dam and into competent bedrock.
- An impervious membrane will be installed on the downstream face of the existing dam to provide an additional barrier to seepage flows.
- Low Permeability Engineered soil will be trucked to site to fill the 10-foot wide gap between the existing dam and new dam.
    - The engineered soil will need to be spread and compacted evenly across the constructed section of the dam.
- Stabilization fabric will be installed on top of compacted engineered soil layer.
- The surface of the 10-ft zone will be armored with an articulated block paving system. These mats will be placed on top of the stabilization fabric to provide additional stabilization. These mats will be installed in sections that enable removal for inspections or repairs.
- The top three feet of the dry section of the existing dam's spillway will be removed.
- Next, the cofferdam on top of the existing dam's spillway will be relocated to divert flows over the completed section, to allow for construction of the remaining portion of the new dam. The construction bullets listed above will be repeated for the remaining portion of the new dam.

6.2.3 HYDRAULICS

- Criterion No. 1 listed in Section 2.2.1 of this report states that the new dam must keep the same impoundment level as the existing dam
- Criterion No. 5 listed in Section 2.2.1 of this report states that the new dam must have a spillway hydraulic capacity similar to the existing dam.
- From a structural standpoint the new dam must be able to:
  - Pass PMF
  - Remain stable under seismic loading

6.2.4 PRECAUTIONS

- During construction, the existing dam must be inspected daily to ensure its structural integrity. This safety requirement is imperative to protect downstream construction site employees.
- Sediment testing for contaminants generated during site preparation and construction may be necessary. All contaminated sediment removed from the construction site must be disposed of properly.
- All construction equipment contacting contaminated sediment must be cleaned prior to working with uncontaminated sediment. This is a precaution to avoid contamination of clean sediment.
- To the extent possible dam construction activities should be performed in the dry season to minimize possible flooding.

7.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES (FOR PREFERRED ALTERNATIVE)

NEPA-implementing regulations require a review of irreversible and irretrievable effects that result from development of the Proposed Project (40 C.F.R. §§ 1500–1508). Irreversible commitments of resources are those that are expended in a way that cannot be completely restored to their original condition. Irretrievable commitments of resources are those that occur when a resource is removed or consumed and will therefore never be available to future generations for their use. These commitments of resources apply primarily to the use of non-renewable resources such as fossil fuels, water, labor, and electricity.

Regarding irreversible loss of resources, the Proposed Project would result in some minor clearing of riparian and shoreline vegetation on both river banks during construction of the new dam structure and access roads but would be replanted with native vegetation post-construction. Lowering the level of the lake for construction would displace aquatic species using shoreline habitats (e.g., spawning fish) for up to a year. Additionally, implementation of the Proposed Project would result in the covering of the existing dam structure by Lake Conestee, which would be an irreversible loss of an historic resource.

Lake Conestee dam construction activities would result in the irretrievable commitment of fossil fuels for the operation of vehicles and equipment, as well as labor and fiscal resources that would otherwise be available for other projects. Also, Action Alternatives 8 and 9 would eliminate approximately 9,600 to 15,000 square feet of river bed within the footprint of the new CIP structures, respectively. The affected habitat represents a minor percentage of the overall habitat in the Reedy River. Bedrock shoals generally provide limited habitat value as water velocities are often too high for fish to grow and feed and invertebrate (e.g., forage) production is low.

8.0 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

NEPA-implementing regulations (40 C.F.R 1502.16) require that consideration be given to the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity. For the purposes of this document, short-term is defined as the construction period for the new dam features and long-term is defined as the continued operation of the dam.

Construction of the Proposed Project would result in the short-term uses of physical, natural, and cultural resources. Short-term effects would include construction-related impacts such as transportation interruptions, temporary displacement of aquatic species using shoreline habitats, minor clearing of riparian and shoreline vegetation, and localized increase in noise and air emissions from vehicles and construction equipment.

Long term, the Proposed Project would reduce the chance of a potential public health and safety risk by addressing the current seepage and dam safety classification by constructing a new dam to stabilize the structural integrity of the existing dam and continue to impound the contaminated sediment.

9.0 REGULATORY AND PERMIT REQUIREMENTS

This chapter summarizes the federal and state environmental laws, regulations, and executive orders applicable to the construction and operation of the Proposed Project (see Table 13). Included in each summary are *(a)* a brief description of the law, regulation, or executive order; *(b)* the identification of the agency responsible for ensuring compliance with the law, regulation, or executive order; and *(c)* the potential applicability of the law, regulation, or executive order.

TABLE 13 OVERVIEW OF APPLICABLE LAWS, REGULATIONS, AND EXECUTIVE ORDERS

LAW/REGULATION/EXECUTIVE ORDER	RESPONSIBLE AGENCY	APPLICABLE RESOURCE AREA (SECTION)
Federal Laws		
Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c)	USFWS	Threatened and Endangered Species (4.6)
Clean Air Act (42 USC § 1857 et seq., as amended and recodified in 42 USC § 7401 et seq.)	USEPA	Air Quality (4.15)
Clean Water Act of 1972 (33 U.S.C. 1251 et seq.)	Corps, USEPA, USFWS, SCDHEC	Water Quality (4.1),
Endangered Species Act of 1973 (P.L. 93-205; 16 U.S.C. 1531(a)-(d))	USFWS	Threatened and Endangered Species (4.6)
Fish and Wildlife Coordination Act (16 U.S.C. 661-666c)	USFWS, SCDNR	Botanical Resources (4.3), Wildlife Resources (4.5), Threatened and Endangered Species (4.6)
Migratory Bird Treaty Act of 1918	USFWS, SCDNR	Botanical Resources (4.3), Wildlife Resources (4.5), Threatened and Endangered Species (4.6)
National Emissions Standards for Hazardous Air Pollutants (NESHAP)	USEPA, SCDHEC	Hazardous, Toxic, and Radioactive Waste (4.17)
National Environmental Policy Act of 1969 ("NEPA" P.L. 91-190; 42 U.S.C. 4321)	Lead Federal Agency (LFA), USEPA	All Sections
National Historic Preservation Act of 1966, Section 106 (P.L. 89-665; 16 U.S.C. 470(f))	SC SHPO	Cultural Resources (4.8)
Noise Control Act of 1972 (P.L. 92-574; 42 U.S.C. 4901)	City of Greenville	Noise (4.16)

LAW/REGULATION/EXECUTIVE ORDER	RESPONSIBLE AGENCY	APPLICABLE RESOURCE AREA (SECTION)
The Resource Conservation and Recovery Act of 1976 (P.L. 94-580; 42 U.S.C. 6901 et seq., as amended by the Solid Waste Disposal Act of 1980 (P.L. 96-482)	USEPA, SCDHEC	Hazardous, Toxic, and Radioactive Waste (4.17)
Rivers and Harbors Act of 1899 (33 U.S.C. 403)	Corps	Waters of the U.S. (4.9)
U.S. Environmental Protection Agency Endangerment Finding and Cause or Contribute Finding (2009)	USEPA	Air Quality (4.15)
Federal Executive Orders		
Executive Order 13045 – Environmental Health and Safety Risks to Children	Lead Federal Agency (LFA)	Public Health and Safety (4.18)
Executive Order 11296 (Flood Hazard Evaluation Guidelines)	Agency providing funds	Soils and Geology (4.2)
Executive Order 11514 (Protection and Enhancement of Environmental Quality, March 4, 1970)	Lead Federal Agency (LFA)	All Sections
Executive Order 11593 (Protection and Enhancement of the Cultural Environment, May 13, 1971)	Lead Federal Agency (LFA)	Cultural Resources (4.8)
Executive Order 11988 (Floodplain Management (43 FR 6030))	Lead Federal Agency (LFA)	Soils and Geology (4.2)
Executive Order 11990 (Protection of Wetlands)	Corps	Waters of the U.S. (4.3)
Executive Order 13112 – Invasive Species	Lead Federal Agency (LFA)	Botanical Resources (4.3), Wildlife Resources (4.5),
Executive Order 13186 – Responsibility of Federal Agencies to Protect Migratory Birds	Lead Federal Agency (LFA)	Botanical Resources (4.3), Wildlife Resources (4.5),
Executive Order 13690 – Establishing a Federal Flood Risk Management Standard (FFRMS)	Lead Federal Agency (LFA)	Soils and Geology(4.2)
Federal Regulations		
33 CFR Parts 320–331	Corps	Waters of the U.S. (4.3)
40 CFR Parts 1500-1508	Lead Federal Agency (LFA), EPA	All Sections
State		
SCDHEC 401 Water Quality Certification Regulations, R. 61-101, 1976 SC Code Ann., as amended.	SCDHEC	Water Quality (4.1)

Law/Regulation/Executive Order	Responsible Agency	Applicable Resource Area (Section)
SCDHEC Water Classifications and Standards, R. 61-68, 1976 SC Code Ann., as amended.	SCDHEC	Soils and Geology (4.2) and Water Quality (4.1)
SCDHEC Classified Waters, R. 61-69, 1976 SC Code Ann., as amended.	SCDHEC	Soils and Geology (4.2) and Water Quality (4.1)
South Carolina Pollution Control Act, § 48-39-10, et seq.	SCDHEC	Water Quality (4.1), Air Quality (4.15), and Hazardous, Toxic, and Radioactive Waste (4.17)
South Carolina Stormwater Management and Sediment Reduction Act, § 48-14-10, et seq.	SCDHEC	Water Quality (4.1), Waters of the U.S. (4.5), and soils and geology (4.2)
SCDHEC Total Maximum Daily Loads for Pollutants in Water. R. 61-110, 1976 SC Code.	SCDHEC	Hydrology (4.2) and Water Quality (4.1)
Air Pollution Control Regulations and Standards – Regulation 61-62 (Statutory Authority: Section 48-1-10 et seq., S.C. Code of Laws, 1976, as amended.)	SCDHEC	Air Quality (4.15)
Protection of Game – Section 50-11-10 et seq., S.C. Code of Laws	SCDNR	Botanical Resources (4.3), Wildlife Resources (4.5),
Nongame and Endangered Species Act – Section 50-15-10 et seq., S.C. Code of Laws	SCDNR	Botanical Resources (4.3), Wildlife Resources (4.5), and Threatened and Endangered Species (4.6)
Hazardous Waste Management Act – Section 44-56-10 et seq., S.C. Code of Laws	SCDHEC	Hazardous, Toxic, and Radioactive Waste (4.17)
South Carolina Solid Waste Policy and Management Act – Section 44-96-10 et seq., S.C. Code of Laws.	SCDHEC	Hazardous, Toxic, and Radioactive Waste (4.17)
Occupational Health and Safety Act – Section 41-15-10 et seq., S.C. Code of Laws	SC Department of Labor, Licensing, and Regulation	Hazardous, Toxic, and Radioactive Waste (4.17)

9.1 Federal Laws and Regulations

Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c)

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle . . . [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." The U.S. Fish and Wildlife Service (USFWS) is the lead agency tasked with ensuring compliance with Bald and Golden Eagle Protection Act.

Clean Air Act

The CAA of 1970 (42 USC § 1857 et seq., as amended and recodified in 42 USC § 7401 et seq.) requires the U.S. Environmental Protection Agency (USEPA) to establish national ambient air quality standards (NAAQS). The USEPA has primary and secondary NAAQS for the following air pollutants; ozone, respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. The primary standards are intended to protect the public health, while the secondary standards are aimed at protecting the public welfare. The CAA also requires each state to prepare an air quality control plan, hereafter referred to as a State Implementation Plan (SIP). Under the CAA, the primary responsibility for achieving and maintaining the NAAQS rests with the state and local agencies. Accordingly, state and local air quality management agencies are also designated as the primary permitting and enforcement authorities for most CAA requirements. States can develop their own ambient air quality standards in addition to the federal standards (NAAQS). Similar to the NAAQS, the State of South Carolina has established ambient air quality standards (SCAAQS) for the State that also apply to the Project site (SCDHEC Regulation 61-62.5). The SCAAQS include the same pollutants and criteria as the NAAQS, and in addition include gaseous fluorides (as hydrogen fluorides). A State Implementation Plan (SIP) is developed and used to determine ways the NAAQS and State Ambient Air Quality Standards will be achieved or maintained. The SIP for South Carolina identifies the ways in which NAAQS will be achieved or maintained within the state. The agencies responsible for ensuring compliance with this act would include the USEPA and the SCDHEC.

Furthermore, Section 176(c) of the CAA requires a General Conformity determination for all federally sponsored or funded actions that are located within areas designated as non-attainment or maintenance per the NAAQS. Areas that meet the NAAQS are classified as "attainment" areas, while areas that do not meet these standards are classified as "non-attainment" areas. Areas that were designated as a non-attainment area but that were later re-designated as an attainment area and that are required to develop a maintenance plan are called "maintenance" areas. The severity of the classifications for non-attainment range in magnitude from: marginal, moderate, serious, severe, and extreme.

Clean Water Act

The Federal Water Pollution Control Act, commonly referred to as the CWA (33 USC § 1251 et seq.) provides guidance for the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters. The USEPA is the lead agency for the CWA. Amendments to the CWA were enacted in 1981 (Municipal Wastewater Treatment Construction Grants Amendments (P.L. 97-117)) and in 1987 (Water Quality Act of 1987 (Public Law [P.L.] 100-4). The CWA is further intended to achieve a level of water quality that allows for recreation opportunities in and on the water and to promote the propagation of fish and wildlife. Two sections of the CWA may be pertinent: Section 404, which addresses condition-specific discharges into waters of the U.S.; and Section 401, which requires state certification of any permission granted under the auspices of Section 404. It should be noted that Section 401 requirements are presented after Section 404 in this document because Section 401 requirements are dependent on the actions taken in compliance with Section 404.

Section 404

Section 404 of the CWA establishes a program to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands. Any activity where material is placed in waters of the U.S. and has the effect of either replacing any portion of a water of the U.S. with dry land or changing the bottom elevation of any portion of water requires a permit from the Corps. Examples of "fill material" that could be used for the construction of the proposed Project include: rock, sand, clay, soil, and rip-rap.

404 (b)(1) Guidelines

Under Section 404(b)(1) of the CWA, the USEPA, in conjunction with the Corps, developed "guidelines" to insure compliance with Section 404 of the CWA when evaluating permit applications. These guidelines are specifically referred to as the "404(b)(1) Guidelines." These guidelines are heavily weighted towards preventing environmental degradation of waters of the U.S. and therefore place additional constraints on Section 404 discharges. The 404(b)(1) Guidelines specifically outline four conditions that must be satisfied in order to make a determination that a proposed discharge complies with these guidelines. These conditions are referred to as "restrictions on discharge." In general, these four "restrictions on discharge" do not allow the Corps to issue a permit if a discharge would:

1. have a "practicable" alternative which would have less adverse impact on the aquatic eco system as long as the alternative does not have other significant adverse environmental consequences;
2. cause or contribute to violations of any applicable state water quality standard; violate toxic effluent standards; jeopardize the continued existence of an endangered or threatened species; or violate any marine sanctuary;
3. cause or contribute to significant degradation of the waters of the U.S; and
4. not have taken appropriate and practicable steps to minimize potential adverse impacts of the discharge on the aquatic ecosystem.

Each of these "restrictions" has specific requirements in order to determine compliance. Appendix 13 outlines compliance with these "restrictions."

Section 401

Section 401 of the CWA dictates that applicants for federal permits that result in discharges to navigable waters must obtain a certification from SCDHEC that the proposed activity will not violate state water quality standards. This includes individual or general federal permits issued pursuant to Section 404 of the CWA (33 U.S.C. 1344), Sections 9 and 10 of the Federal Rivers and Harbors Act of 1899 (33 U.S.C. 401-403) and permits or licenses issued by the Federal Energy Regulatory Commission (16 U.S.C. 1791, et seq.). The Corps Section 404 permit applications cannot be issued without a state-issued Section 401 Water Quality Certification. SCDHEC's Regulation 61-101, entitled Water Quality Certification, directs the processing of applications for certification.

Endangered Species Act

The Federal ESA of 1973, as amended[2], requires a federal agency authorizing, funding or carrying out a project within its jurisdiction to determine whether any federally listed threatened or endangered species may be present within a study area and determine whether the agency's action could affect any federally listed species. Threatened and endangered species (which are identified in 50 CFR §§ 17.11 and 17.12) are protected and prohibited from "take," defined as direct or indirect harm or harassment, unless an ESA Section 10 permit is granted to an entity other than the federal agency or a Biological Opinion with incidental take provisions is rendered to a federal lead agency via ESA Section 7 consultation. Pursuant to the requirements of the ESA, an agency reviewing the Proposed Project within its jurisdiction must determine whether any federally listed or proposed species may be present in the study area and determine whether the Proposed Project is likely to jeopardize the continued existence of such species or result in the adverse modification or destruction of the habitat for such species (16 USC § 1536(a)). Under the ESA, habitat loss is considered to be an impact to a species. Therefore, any Project-related impacts to these species or their habitats would be considered significant and would require mitigation.

The agencies responsible for enforcement of this regulatory requirement would include the U.S. State Fish and Wildlife Service (USFWS).

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (FWCA) of 1934 (16 USC § 661 et seq.) ensures that fish and wildlife receive consideration equal to that of other project features for projects that are constructed, licensed, or permitted by federal agencies. The FWCA requires that the views of USFWS, NMFS, and the applicable state fish and wildlife agency be considered when impacts are evaluated, and mitigation needs determined. A Coordination Act Report (CAR), documenting the findings and recommendations of the reviewing agencies, is required before the Record of Decision is signed.

[2] 16 USC 1536

The agencies responsible for ensuring compliance with the provisions of the FWCA include the USFWS and the SCDNR.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA), which was first enacted in 1918[3], implements domestically a series of treaties between the United States and Great Britain (on behalf of Canada), Mexico, Japan, and the former Soviet Union that provide for international migratory bird protection. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds; the act provides that it shall be unlawful, except as permitted by regulations, “to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird,” (16 USC § 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nest, or eggs. The current list of species protected by the MBTA includes several hundred species. The act offers no statutory or regulatory mechanism for obtaining an incidental take permit for the loss of nongame migratory birds.

Compliance with the MBTA would be addressed through compliance with the ESA and the USFWS and the SCDNR are responsible for ensuring compliance with this Act.

National Emissions Standards for Hazardous Air Pollutants

National Emission Standards for Hazardous Air Pollutants (NESHAPS)[4] are stationary source standards for hazardous air pollutants. HAPs are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. Part 61 NESHAPs regulate only seven HAPs: asbestos, beryllium, mercury, vinyl chloride, benzene, arsenic, and radon/radionuclides. The NESHAPs are delegated to the states but both USEPA and the states, in this case, SCDHEC, implement and enforce these standards. This regulation is not anticipated to be applicable.

[3] 16 U.S.C. 703-712
[4] 40 CFR, Part 61

National Environmental Policy Act

NEPA of 1969 (42 USC § 4321 et seq., PL 91-190) obligates federal agencies to evaluate a proposed action, including feasible and reasonable alternatives, and identify mitigation measures to minimize adverse effects when federal agencies propose to carry out, approve, or fund a proposed action that may have a significant effect on the environment. Compliance with NEPA comes in a variety of chronological steps to determine a project's overall significance.

National Historic Preservation Act

The NHPA of 1966 (16 USC § 470 et seq.) requires federal agencies to take into account the effects of a proposed action on properties that have been determined to be eligible for listing in, or are listed in, the NRHP.

Section 106 of this act requires that federal agencies having direct or indirect jurisdiction over a proposed Federal, federally assisted, or federally licensed undertaking, prior to approval of the expenditure of funds or the issuance of a license, take into account the effect of the undertaking on any district, site, building, structure, or object included in or eligible for inclusion in the NRHP, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment with regard to the undertaking. If archaeological deposits are found during Project activities, work would be stopped. Discoveries would be assessed to determine the significance of the find as required under Section 106.

Due to the historic nature of the Lake Conestee Dam, the State Historic Preservation Office (SHPO) will be consulted during this project.

Noise Control Act

The Noise Control Act (NCA) of 1972 (42 USC §§ 4901–4918) was established to control excessive noise that jeopardizes human health and welfare. Under this act, any federal department or agency with jurisdiction over a particular property or facility or engaged in any activity resulting in, or which may result in, the emission of noise shall comply with federal, state, interstate, and local requirements respecting the control and abatement of environmental noise.

The local agency responsible for ensuring compliance with this act would be the City of Greenville. Typically, compliance with the NCA is addressed through compliance with local long-term planning documents and municipal codes. The requirements of the NCA would apply to the Proposed Project, based on the high likelihood of construction-related and operation noise; however, compliance with the NCA will be assessed based on the Proposed Project's ability to comply with local regulations and standards regarding noise levels, such as the Greenville, South Carolina Code of Ordinances (Section 16-91 and 16-92).

Resource Conservation and Recovery Act, Comprehensive Environmental Response, Compensation and Liability Act

RCRA of 1976 (42 USC § 6901 et seq.) and CERCLA of 1980 (42 USC § 9601 et seq.) regulate the hazardous substance sites used by the principal federal agency related to the generation of, transport, storage, and disposal of hazardous materials.

The agencies responsible for ensuring compliance with RCRA and CERCLA include the USEPA and the SCDHEC.

Rivers and Harbors Act

The Rivers and Harbors Act of 1899 (33 USC 403 et seq.) regulates the development and use of the nation's navigable waterways. Section 10 of the Act prohibits unauthorized obstruction or alteration of navigable waters of the U.S. and vests the Corps with authority to regulate discharges of fill and other materials into such waters.

Revised Guidance on CWA Jurisdiction Following the Supreme Court Decision in Rapanos v. U.S. and Carabell v. U.S. (Corps and USEPA 2008b) also was applied in evaluating final jurisdiction of non-tidal waters that are considered traditional navigable waters (TNWs). The Reedy River is part of TNW, which is located within the study area. The Corps will evaluate impacts from the Proposed Project under Section 10 of the Rivers and Harbors Act simultaneously with Section 404 of the CWA.

Executive Orders

For NEPA compliance these Executive Orders will be evaluated for their applicability to the project.

Executive Order (EO) 13045, Protection of Children from Environmental Health Risks and Safety Risks

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks (April 1997); requires that each federal agency: shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

Executive Order 11296 (Flood Hazard Evaluation Guidelines)

EO 11296, issued in 1966, was developed to direct federal agencies to integrate flood policy and programs into their procedures. EO 11296 was the first EO to direct agencies to not increase flood risk through their actions and to fund or provide technical assistance to their activity in flood hazard areas. EO 11296 directed the heads of the executive agencies to provide leadership in encouraging a broad and unified effort to prevent uneconomic uses and development of the Nation's flood plains and to lessen the risk of flood losses with federal lands, installations, and federally financed or supported improvements. EO 11296 was replaced with an updated order on floodplain protection in 1977, titled EO 11988 (Floodplain Management).

Executive Order 11514, Protection and Enhancement of Environmental Quality

In furtherance of the purpose and policy of the NEPA of 1969 (P.L. No. 91-190, approved January 1, 1970), EO 11514 instructed the federal government to provide leadership in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life. Federal agencies were directed to initiate measures needed to direct their policies, plans and programs so as to meet national environmental goals. The heads of federal agencies must monitor, evaluate, and control on a continuing basis their agencies' activities so as to protect and enhance the quality of the environment. Such activities shall include those directed to controlling pollution and enhancing the environment and those designed to accomplish other program objectives which may affect the quality of the environment. Agencies shall develop programs and measures to protect and enhance environmental quality and shall assess progress in meeting the specific objectives of such activities. Heads of agencies shall consult with appropriate federal, state and local agencies in carrying out their activities as they affect the quality of the environment. Agencies must have procedures developed to ensure the fullest practicable provision of timely public information and understanding of federal plans and programs with environmental impact in order to obtain the views of interested parties. These procedures shall include, whenever appropriate, provision for public hearings, and shall provide the public with relevant information, including information on alternative courses of action. Federal agencies shall also encourage state and local agencies to adopt similar procedures for informing the public concerning their activities affecting the quality of the environment.

Executive Order 11988 Floodplain Management and 13690, Establishing a Federal Flood Risk Management Standard

EO 11988, issued in 1977, directs federal agencies to issue or amend existing regulations and procedures to ensure that the potential effects of any action it may take in a floodplain are evaluated and that it's planning programs and budget requests reflect consideration of flood hazards and floodplain management. The purpose this EO is to "avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support or floodplain development wherever there is a practicable alternative." Guidance for implementation of EO 11988 is provided in the floodplain management guidelines of the U.S. Water Resources Council, 40 CFR 6030, dated February 10, 1978, and in *A Unified National Program for Floodplain Management* (FEMA 248), prepared by the Federal Interagency Floodplain Management Task Force. EO 11988 was amended on January 30, 2015, when the President signed Executive Order 13690, *Establishing a Federal Flood Risk Management Standard (FFRMS).*

The agency responsible for ensuring compliance with these EOs is the Lead Federal Agency for the NEPA document, and the EOs would apply because the Project site falls within floodplains.

Executive Order 11990, Protection of Wetlands

EO 11990, issued in 1977, is intended "to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands." To meet this intent, EO 11990 requires federal agencies, in planning their actions, to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided. EO 11990 applies to:

- the acquisition, management, and disposition of federal lands and facilities construction and improvements projects which are undertaken, financed, or assisted by federal agencies; and
- Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulation, and licensing activities.

EO 11990 directs the Corps to provide leadership and take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands in implementing civil works.

The agency responsible for ensuring compliance with this EO would be the Corps. Based on the waters of the U.S. study area, which includes wetlands, the Proposed Project would be subject to the requirements of EO 11990.

Executive Order 11593, Protection and Enhancement of the Cultural Environment

The federal government shall provide leadership in preserving, restoring and maintaining the historic and cultural environment of the Nation. Federal agencies have responsibilities consonant with the provisions of the following acts: NEPA of 1969 (83 Stat. 852, 42 U.S.C. 4321 et seq.), the NHPA of 1966 (80 Stat. 915, 16 U.S.C. 470 et seq.), the Historic Sites Act of 1935 (49 Stat. 666, 16 U.S.C. 461 et seq.), and the Antiquities Act of 1906 (34 Stat. 225, 16 U.S.C. 431 et seq.). Federal agencies must initiate measures to assure that where as a result of federal action or assistance a property listed on the National Register of Historic Places is to be substantially altered or demolished, timely steps be taken to make or have made records, including measured drawings, photographs and maps, of the property, and that copy of such records then be deposited in the Library of Congress as part of the Historic American Buildings Survey or Historic American Engineering Record for future use and reference. Agencies may call on the Department of the Interior for advice and technical assistance in the completion of the above records.

Executive Order 13112, Invasive Species

Each federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law, (1) identify such actions; (2) subject to the availability of appropriations, and within administration budgetary limits, use relevant programs and authorities to not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

Executive Order 13186 – Responsibility of Federal Agencies to Protect Migratory Birds

EO 13186 outlines the responsibility of federal agencies to protect migratory birds. Agencies must support the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions.

Executive Order 13690 – Establishing a Federal Flood Risk Management Standard (FFRMS)

On January 30, 2015, the President signed EO 13690, which amended E.O. 11988, Floodplain Management, originally issued in 1977. FFRMS seeks to reduce the risk and cost of future flood disasters by ensuring that federal investments in and affecting floodplains are constructed to better withstand the impacts of flooding. It applies to Hazard Mitigation Assistance Grants, the Public Assistance Program, and any other FEMA grants when they fund construction activities in or affecting a floodplain. FEMA, the Corps, and Housing and Urban Development (HUD) have produced fact sheets in response to several frequently asked questions regarding the intended scope of FFRMS and the anticipated impacts to many of the programs of these agencies.

9.2 State Laws and Regulations

SCDHEC 401 Water Quality Certification Regulations, R. 61-101, 1976 SC Code Ann., as amended.

Section 401 of the CWA dictates that applicants for federal permits that result in discharges to navigable waters must obtain a certification from SCDHEC that the proposed activity will not violate state water quality standards. This includes individual or general federal permits issued pursuant to Section 404 of the CWA (33 U.S.C. 1344), Sections 9 and 10 of the Federal Rivers and Harbors Act of 1899 (33 U.S.C. 401-403) and permits or licenses issued by the Federal Energy Regulatory Commission (16 U.S.C. 1791, et seq.). The Corps Section 404 permit applications cannot be issued without a state-issued Section 401 Water Quality Certification. SCDHEC's Regulation 61-101, entitled Water Quality Certification, directs the processing of applications for certification.

The SCDHEC administers the Water Quality Certification program pursuant to Section 401 of the CWA. Since activities requiring a 404 permit (a Corps permit for the discharge of dredged or fill material) result in a discharge to waters or wetlands, SCDHEC must take certification action on all 404 permit applications.

SCDHEC considers other factors to determine whether to issue a Section 401 Water Quality Certification, including:

- whether the activity is water dependent;
- the intended purpose of the activity;
- whether there are feasible alternatives to the activity; and
- all potential water quality impacts associated with the Project, both direct and indirect, over the life of the Project, including impacts on existing and classified uses; physical, chemical, and biological impacts, including cumulative impacts; the effect on circulation patterns and water movement; and the cumulative impacts of the proposed activity and reasonably foreseen similar activities of the applicant and others.

This Water Quality Certification must state that applicable effluent limits and water quality standards will not be violated and the certification must be denied if SCDHEC does not have a reasonable assurance that the proposed activity will not cause or contribute to a violation of water quality standards.

SCDHEC Water Classifications and Standards, R. 61-68, 1976 SC Code Ann., as amended and SCDHEC Classified Waters, R. 61-69, 1976 SC Code Ann., as amended.

Pursuant to South Carolina Code Sections 48-1-10, et seq. of the 1976 South Carolina Code of Laws, the Department of Health and Environmental Control promulgated regulations to implement the South Carolina Pollution Control Act. R. 61-68, Water Classifications and Standards, establish appropriate classified water uses to be achieved and protected, establish general rules and specific water quality criteria to protect classified and existing water uses, establish antidegradation rules, protect the public health and welfare, and maintain and enhance water quality. The water quality standards also serve as a basis for decision making in other water quality program areas. NPDES permit limitations for waste discharges are based upon the classifications and water quality standards of the receiving waters. This regulation also governs the control of toxic substances, thermal discharges, stormwater discharges, dredge and fill activities, and other water related activities.

R. 61-69, Classified Waters, is the only repository of the state's site-specific water quality standards and provides a listing of all named waterbodies, some specific unnamed waterbodies, their classifications, and locations.

South Carolina Dams and Reservoirs Safety Act, § 49-11-110, et seq.

The Department of Health and Environmental Control promulgated regulations to implement the Dams and Reservoirs Safety Act in response to 2018 Joint Resolution 231 (S. 1190, Sections 1 and 2). SCDHEC's dam safety program is responsible for implementation and enforcement of the South Carolina Dams and Reservoirs Safety Act Regulations . This program oversees the permitting of certain dams as specified in the Act and assures compliance with technical and safety requirements for state-regulated dams. The dam safety program classifies dams based on their hazard potential as required in the Act. Program staff inspect regulated dams on a frequency appropriate to their classification. Under this authority the Lake Conestee Dam is regulated as a Significant Hazard (Class 2) dam.

South Carolina Pollution Control Act, § 48-39-10, et seq.

The South Carolina Pollution Control Act defines the public policy of the state to maintain reasonable standards of purity of the air and water resources, consistent with the public health, safety and welfare of its citizens, maximum employment, the industrial development of the state, the propagation and protection of terrestrial and marine flora and fauna, and the protection of physical property and other resources. The SCDHEC was delegated the rulemaking and enforcement authority to abate, control and prevent pollution.

South Carolina Stormwater Management and Sediment Reduction Act, § 48-14-10, et seq.

This act allows the SCDHEC Bureau of Water to implement standards for managing stormwater runoff and controlling sediment loading to surface waters. These regulations, revised in June 2002, are provided in the *Standards for Stormwater Management and Sediment Reduction Regulations* 72-300 through 72-316. These regulations detail permit requirements and outline specific design criteria and specifications for stormwater facilities. Activities are deemed exempt if land-disturbing activities are conducted pursuant to a federal environmental permit, including Section 404 of the CWA.

Total Maximum Daily Loads for Pollutants in Water. R. 61-110, 1976 SC Code.

Section 303(d) of the Federal Water Pollution Control Act (33 USC Section 1313(d)) requires States to establish the total loading that a water can receive without violating state water quality standards for waters that do not meet them. This regulation defines the term “Total Maximum Daily Load” (TMDL) and defines the administrative appeal process for TMDLs. In addition, the regulation provides for public notice, public hearing, and notice of proposed decision, and addresses revisions to approved TMDLs.

State waters that do not attain their designated uses are included in the state’s Section 303(d) list of impaired waters. SCDHEC would be the agency responsible for assuring that the aforementioned laws and regulations were followed. Currently, SCDHEC, USEPA and ReWa are negotiating an alternative to a TMDL solution for the Reedy River.

Air Pollution Control Regulations and Standards – Regulation 61-62 (Statutory Authority: Section 48-1-10 et seq., S.C. Code of Laws, 1976, as amended.)

The State of South Carolina has established ambient air quality standards (SCAAQS) for the state that also applies to the study area. A State Implementation Plan (SIP) is developed and used to determine ways the NAAQS and State Ambient Air Quality Standards will be achieved or maintained. The SIP for South Carolina identifies the ways in which NAAQS will be achieved or maintained within the state. SCDHEC would be the agency responsible for assuring that the aforementioned laws and regulations were followed.

Protection of Game – Section 50-11-10 et seq., S.C. Code of Laws.

This law formally adopted the Federal Migratory Bird Treaty Act and codified prohibitions concerning hunting of waterfowl and leveling penalties. The board of SCDNR annually may set seasons, bag limits, and methods for hunting and taking migratory birds consistent with federal law. A violation of the Migratory Bird Treaty Act or its implementing regulations or a violation of regulations set by the board is a misdemeanor. SCDNR would be the agency responsible for assuring that the aforementioned laws and regulations were followed.

Nongame and Endangered Species Act – Section 50-15-10 et seq., S.C. Code of Laws.

This law gave authority to the SCDNR to issue regulations and develop management programs designed to ensure the continued ability of nongame wildlife to perpetuate themselves successfully. Regulations outline species or subspecies of nongame wildlife which the department deems in need of management, giving their common and scientific names by species or subspecies. The department also established proposed limitations relating to taking, possession, transportation, exportation, processing, sale or offer for sale, or shipment as may be deemed necessary to manage such nongame wildlife.

It is unlawful for any person to take, possess, transport, export, process, sell, or offer for sale or ship nongame wildlife deemed by the department to be in need of management under this law. Subject to the same exception, it shall further be unlawful for any common or contract carrier knowingly to transport or receive for shipment nongame wildlife deemed by the department to be in need of management pursuant to this law. SCDNR would be the agency responsible for assuring that the aforementioned laws and regulations were followed.

Wildlife Sanctuary Designation – Section 50-11-935 et seq., S.C. Code of Laws.

The land owned and managed by the Conestee Foundation, Incorporated, a private nonprofit conservation organization, located in Greenville County, and known as Lake Conestee Nature Park, is declared to be a wildlife sanctuary for the protection and conservation of game, songbirds, waterfowl, fish, amphibians, other animals, and plant life.

It is unlawful to hunt, trap, take, gather, harvest, or molest any plants, animals, or artifacts on the lands of Lake Conestee Nature Park, except for purposes of habitat management or research. The Conestee Foundation may at its discretion issue permits for research and site management activities related to wildlife and habitat management. It is unlawful to release any nonnative plants or animals, including pets and domesticated animals on the lands of Lake Conestee Nature Park.

The Conestee Foundation shall post signs along the outer boundaries of its lands and at locations where streams and creeks enter into Lake Conestee Nature Park, notifying the public that the area is a wildlife sanctuary and is closed to hunting, trapping, taking and collection of plants, animals, and artifacts, except as permitted by the Foundation.

No animals, flowers, shrubs, trees, plants, or artifacts shall be damaged or removed from the park without a permit from the Conestee Foundation.

Any person convicted of violating the provisions of this section is guilty of a misdemeanor and, upon conviction, shall be fined not more than five hundred dollars, or imprisoned for not more than thirty days.

Designation as a wildlife sanctuary does not alter existing rights held or conveyed under the conservation easement agreement applying to Lake Conestee Nature Park.

HISTORY: 2016 Act No. 177 (H.4743), § 1, eff May 23, 2016.

Hazardous Waste Management Act – Section 44-56-10 et seq., S.C. Code of Laws.

This Act directed the SCDHEC to develop regulations relating to procedures or standards as may be necessary to protect the health and safety of the public, the health of living organisms and the environment from the effects of improper, inadequate, or unsound management of hazardous wastes. SCDHEC would be the agency responsible for assuring that the aforementioned laws and regulations were followed.

South Carolina Solid Waste Policy and Management Act – Section 44-96-10 et seq., S.C. Code of Laws.

This law's intent is to protect the public health and safety, protect and preserve the environment of the state, and recover resources which have the potential for further usefulness by providing for, in the most environmentally safe, economically feasible and cost-effective manner, the storage, collection, transport, separation, treatment, processing, recycling, and disposal of solid waste. SCDHEC would be the agency responsible for assuring that the aforementioned laws and regulations were followed.

Occupational Health and Safety Act – Section 41-15-10 et seq., S.C. Code of Laws.

This Law governs occupational health and safety. Employers are required to provide employment and a place of employment that are "free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees . . ." The Department of Labor, Licensing, and Regulation was directed by this Act to issue regulations requiring employers to monitor and measure an employee's exposure to potentially toxic materials or harmful physical agents and to maintain accurate records of such employee exposure.

Proper worker protection will be required during construction. The SC Department of Labor, Licensing, and Regulation would be the agency responsible for assuring that the aforementioned laws and regulations were followed.

10.0 PROJECT SCHEDULE

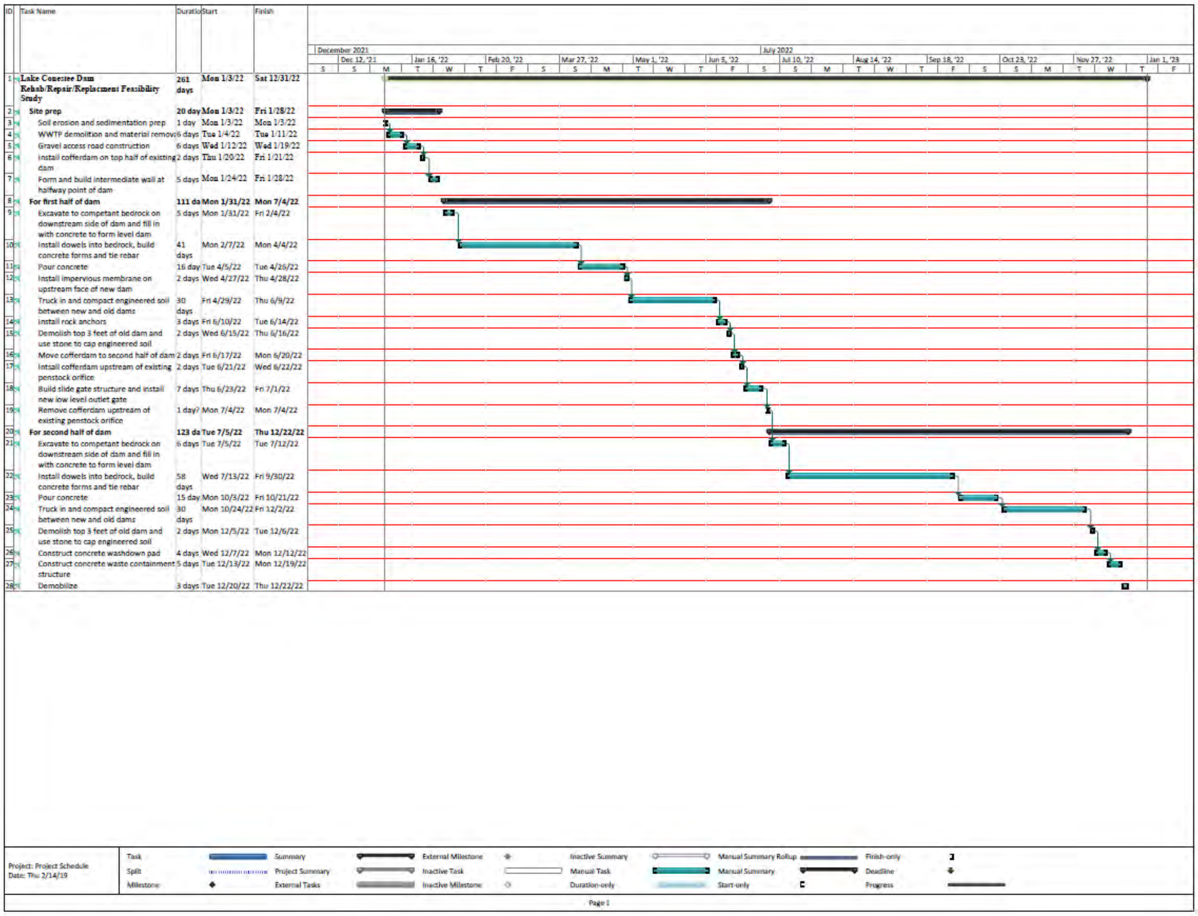

FIGURE 31 PROPOSED PROJECT CONSTRUCTION SCHEDULE

The proposed construction schedule (shown in Figure 31 and Appendix 10 of this report) provides an estimated length of time for the construction of the proposed alternative. The schedule does not include pre-construction tasks such as funding, final design, and permitting. The proposed construction schedule assumes that the necessary funding for the project will be completed by January 2021. It is also assumed that final design and permitting can be accomplished within the 2021 calendar year and construction can begin in January 2022. The proposed construction schedule is broken up into three tasks. The tasks are site preparation, construction of the first half of the dam, and construction of the second half of the dam. Preparing the site for construction includes soil erosion and sedimentation prep, demolishing the existing waste water treatment plant, creating a gravel access road, installing the first cofferdam, and building the intermediate concrete wall that will separate the two dam halves during construction. Site prep is anticipated to last approximately 1 month. The most time-consuming step within construction of the first half of the dam is installing dowels into bedrock, building concrete forms, and tying rebar into place. These steps are considered one because they will occur at the same time during construction. It is anticipated that they will take approximately 2 months to complete. The second most time-consuming task within constructing the first half of the dam is trucking in and compacting the low permeability engineered soil between the new and old dams. This step will take approximately 5 weeks. It is anticipated that constructing the first half of the dam will take just over 5 months. The length of time to complete these same tasks for the second half of the dam, as well as overall time are similar to the first half of the dam. The entire construction process will take about 1 year to complete.

11.0 CONCLUSION

Lake Conestee Dam is located on the Reedy River in the unincorporated historic mill village of Conestee, South Carolina. The reservoir created by the dam, Lake Conestee, is filled with an estimated 2.3 million cubic yards of very significantly contaminated sediment. Lake Conestee Dam is in poor condition due to its age. Failure of the dam would cause severe harm to the downstream environment, and potentially put private properties and public infrastructure at risk. Therefore, the current dam must be replaced or rehabilitated to prevent contaminated sediments from flowing downstream (whether its in the form of gradual seepage or a catastrophic release caused by a dam breach).

A two-tier screening process was used to determine the best solution. Nine alternatives were considered during the screening process, including a no-action alternative. The first screening step assessed the alternatives based on a list of nine criteria. Satisfaction of all of the nine criteria was required for an alternative to be advanced for further consideration. The second step screened the alternatives for their ability to minimize impacts to the existing project site and to adjacent properties. Based on this screening process Alternatives 8 and 9 were selected for further study. These two alternatives were then compared with one another with respect to their ability to meet state and federal regulations, stability, access to the project site, necessary land acquisition, constructability, serviceability long term, maintenance requirements, level of meeting the 9 criteria, their ability to pass water downstream, their cost, and their anticipated effect on the environment.

Alternative 9 is the Recommended Alternative. This alternative provides several important advantages in minimizing seepage and contaminated sediment movement downstream, providing a more serviceable condition for the management of sediment and woody debris, and accessibility to the structure for future repairs as necessary. Therefore, Alternative 9 provides the optimal solution meeting the design criteria and ultimately minimizing the impact on the health of the populations and environs of the Reedy River downstream of the Lake Conestee Dam.

12.0 DISTRIBUTION LIST

Website
CFI
EPA
SC DHEC
City of Greenville

13.0 REFERENCES

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14.0 LIST OF PREPARERS

DH
KA
AC
RC
BR

APPENDIX 1

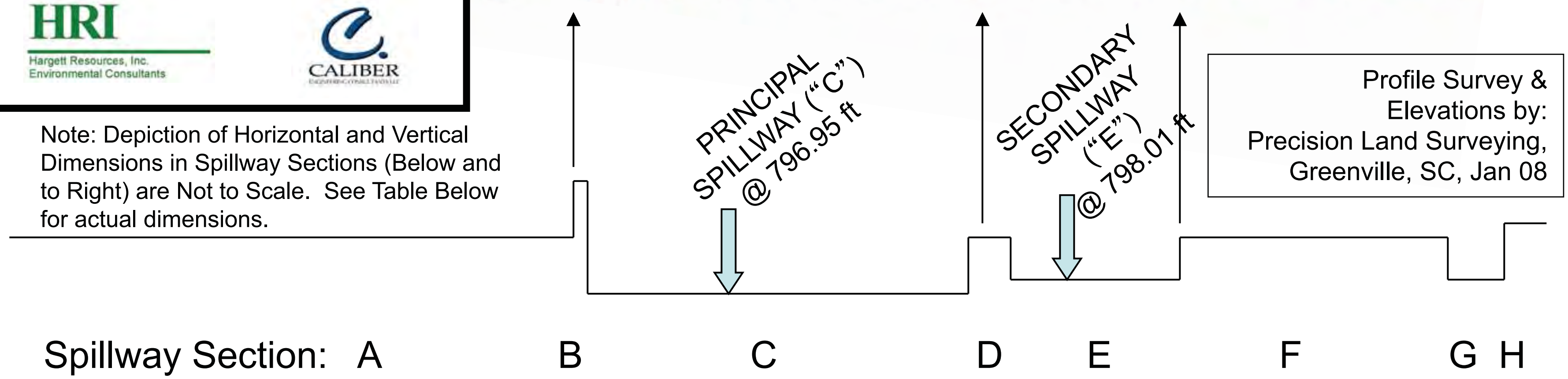
LAKE CONESTEE DAM FEASIBILITY STUDY 2012
FINAL REPORT RELEVANT FIGURES

Figure 4
LAKE CONESTEE DAM
FEASIBILITY STUDY
LONG-TERM ALTERNATIVES
Spillway Conditions

HRI
Hargett Resources, Inc.
Environmental Consultants

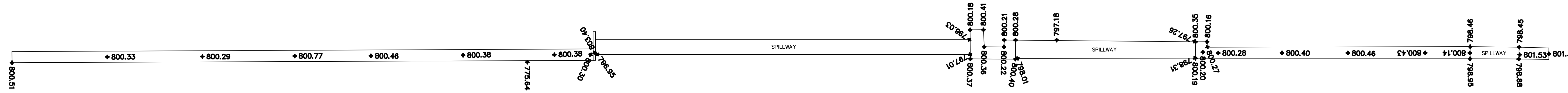
CALIBER

Note: Depiction of Horizontal and Vertical Dimensions in Spillway Sections (Below and to Right) are Not to Scale. See Table Below for actual dimensions.

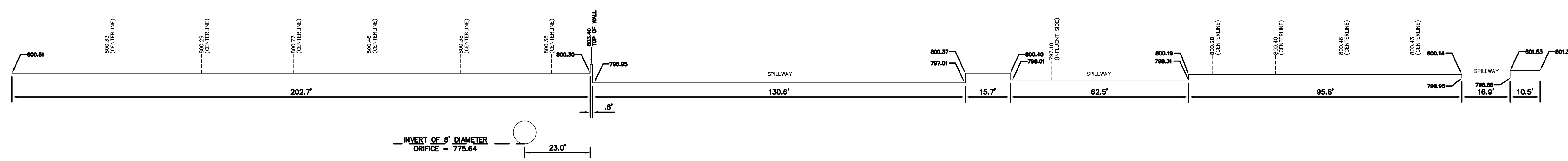


DAM SECTION	A	B	C	D	E	F	G	H
ELEVATION (FT MSL)	800.30	803.40	796.95	800.37	798.01	800.14	798.88	801.39
WIDTH (FT)	202.7	8.0	130.6	15.7	62.5	95.8	16.9	10.5

PLAN

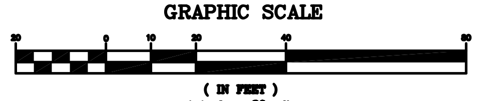


PROFILE



NOTE: ALL ELEVATIONS NOT LABELED ARE ON THE EFFLUENT SIDE

BRIDGE (APPROXIMATELY THE CENTER)
ELEVATION = 788.6'



I HEREBY STATE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF, THE SURVEY SHOWN HEREIN WAS MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE MINIMUM STANDARDS MANUAL FOR THE PRACTICE OF LAND SURVEYING IN SOUTH CAROLINA, AND MEETS OR EXCEEDS THE REQUIREMENTS FOR A CLASS "B" SURVEY AS SPECIFIED THEREIN; ALSO THERE ARE NO VISIBLE ENCROACHMENTS OR PROJECTIONS OTHER THAN THOSE SHOWN.

SOUTH CAROLINA
PRECISION LAND SURVEYING, INC.
No. C01589
CERTIFICATE OF AUTHORIZATION

PLAN/PROFILE OF CONESTEE DAM FOR:
HARGETT RESOURCES, INC.
GREENVILLE COUNTY, SOUTH CAROLINA

DATE : 01/16/08	TAX MAP NO. : N/A
SCALE : 1" = 20'	PROJECT NO. : 08006
PROPERTY ADDRESS: LAKE CONESTEE	

PRECISION
LAND SURVEYING, INC.
351 PRADO WAY : GREENVILLE, SC 29607
(864) 627-8067 Fax: (864) 627-1940

SOUTH CAROLINA
PROFESSIONAL LAND SURVEYOR
No. 17219
RICHARD BRUCE COOK II

1 inch = 30 ft.

SPOT ELEVATIONS FOR BORING SITES, TOP OF DAM AND TRANS SECTIONS ACROSS REEDY RIVER	
LAKE CONESTEE DAM GREENVILLE COUNTY, SOUTH CAROLINA	
	THOMAS P. DOWLING 210 E. PARK AVENUE GREENVILLE, SC 29601 (864) 370-1556
TMS #	423-1-1.1
DATED	6-15-2012
DRAWN BY	TPD
DWG. #	118-T99

Appendix 2

Lake Conestee Dam – Inspection Reports

2016 SCDHEC Inspection Report

2014 SCDHEC Inspection Report

2019 Kleinschmidt Associates Inspection Report, Paul Cyr, P.E. (2018 Inspection)

Preliminary Inspection Report for South Carolina Regulated Dams and Impoundment Structures Regulations
R.72-1 through R.72-9

DHEC — PROMOTE PROTECT PROSPER

Section I (Owner's Information)

A. Dam Number: **D** 2876 & Hazard Class 2

B. Name of Dam: Lake Conestee

C. Inspection Date (12/01/2016) & Time: 9:15 a.m.

D. Date of Last Inspection: (12/18/2014)

E. Location-County/City: Greenville / Greenville

F. EQC Regional Office: Upstate EQC Greenville

G. Inspector's Name: Melissa Dawkins, Chuck Owens

H. Owner's Name: Conestee Foundation Inc.

I. Contact Person (if different from above): Dave Hargett, PhD

J. Dam Owner's or Contact Person's Phone Numbers:

Home (_ _ _) _ _ _ - _ _ _ _

Office (864) 277 - 2004

Other (864) 787 - 8160

K. Dam Owner's or Contact Person's mailing address:

Address 1 P.O. Box 9111

Address 2 (optional)

City Greenville, State SC Zip Code 29604 - _ _ _ _

Section II (Dam Condition)

General Condition Assessment (Select one of the following):

a) Satisfactory ☐ b) Fair ☐ c) Poor ☑ d) Unsatisfactory ☐ e) Not Rated ☐

Section III (Dam Inspection Checklist)

A. Dam Crest

i. Vegetation (grass, trees weeds)? Vegetation was observed growing out of portions of the masonry. This vegetation should be removed.

ii. Animal activity observed? None observed

iii. Any obvious alteration or repairs made? None observed

iv. Erosion noticed on crest? No erosion was observed; however, deterioration of the mortar in some spots was observed. This should be monitored to ensure that the situation does not worsen.

v. Any visible settlement, misalignment or cracks? Cracks in the mortar were observed.

Section III (Dam Inspection Checklist) continued

B. Upstream Slope

i. Vegetation (grass, trees weeds)? Grass, weeds, vines. See Section IV, Item 1

ii. Animal activity observed? None observed. See Section IV, Item 1

iii. Any obvious alterations or repairs made? None observed. See Section IV, Item 1

iv. Erosion observed on upstream slope? None observed. See Section IV, Item 1

v. Settlement or cracks visible in slope? Cracks in the mortar joints were observed. See Section IV, Item 1

C. Down Stream Slope

i. Vegetation (grass, trees weeds)? On the right side, a small amount of vegetation was observed. On the left side, more vegetation was observed. The vegetation must be cut or treated and removed.

ii. Animal activity observed? None observed

iii. Any obvious alterations or repairs made? Yes, the permitted repairs to the sluice gate were observed. A few small cracks were observed in the concrete surface. Monitor these to ensure that they do not worsen.

iv. Erosion observed on down stream slope? No erosion was observed; however, deterioration of the masonry face was observed on the left side along the toe. Portions of the face were missing near the areas of seepage.

v. Settlement or cracks visible in slope? Cracks in the mortar were observed throughout the face.

vi. Toe drains flowing? The drain on the right side of the previously filled sluice gate on the left was dripping. Monitor to ensure that the flow does not increase.

vii. Any seepage observed? If so, describe location, flow rate, and any turbidity or color within the flow: Yes, flowing seeps were observed at multiple locations on the right and left sides. According to Dr. Hargett, the ochre has been tested and found to contain hazardous constituents. See Section IV, Item 3.

D. Primary Spillway

i. Any visible deterioration of structure? The primary spillway could not be observed due to heavy flows. The penstock also acts as a spillway. Deterioration of the mortar was observed along the crest of the secondary spillway. See Section IV, Item 2.

ii. Is there an obvious need to repair or replace trash rack? Not applicable

iii. Any noticeable problems with debris? None present at the time of the inspection.

iv. Is valve or gate present? No

E. Outlet Pipe

i. Any water visibly flowing or leaking outside of the discharge pipe? The penstock was reviewed as the outlet pipe. Flows were observed through the penstock. According to Dr. Hargett, the structure around the penstock was designed to leak.

ii. Describe any deflection or damage observed to the pipe: None observed

iii. Visible condition of outlet channel: Some debris was observed in the channel below the penstock. This should be removed. The main channel was in good condition with little erosion observed.

F. Auxiliary (Emergency) Spillway

i. Noticeable obstructions to flow? None observed. All of the masonry spillways were reviewed under item III, Section A.

ii. Animal activity observed? None observed for any spillways.

iii. Any noticeable deterioration in the approach or discharge channel? Not applicable

iv. Any visible deterioration of structure's crest? See Section III, Item A

F. Auxiliary (Emergency) Spillway continued

v. If applicable, any observed exposure of rebar reinforcement? Not applicable

vi. If applicable, any visible leakage below concrete spillway? Not applicable

H. Downstream/Hazard Class Issues

i. Any noticeable changes immediately downstream of the dam that affects the hazard classification? No

I. Emergency Action Plan (EAP)

i. Emergency Action Plan provided by owner? Yes, a revised version was submitted to the Department on May 26, 2015.

ii. Does EAP contains emergency alert notification plan? If so, when was it last updated? Yes

iii. Does EAP contain specific actions to take if the dam has failed or is near failure? Yes

Section IV (Conclusions)

General comments and recommendations:

1. The majority of the upstream face could not be observed due to current water level and sediment accumulations along the face of the dam. Visibility of the upstream face was limited to approximately 3 to 4 feet above the elevation of the primary spillway.

2. Dr. Hargett provided the Department an up to date survey of the dam's crest. Included in this survey are the locations, widths and elevations of the primary, secondary and auxiliary spillways.

3. Excessive seeps were observed on both the right and left downstream face of the dam. The seepage has been tested by the owner and hazardous constituents were present in the samples. These components may be detrimental to the mortar joints and could possibly accelerate the deterioration of these joints. These areas must be examined by a licensed SC professional engineer and a plan developed to address these issues.

Note: Dr. Hargett and John Gardner were present during the inspection

All directions given looking downstream

Preliminary Dam Inspection Disclaimer:

Preliminary Inspection Report for South Carolina Regulated Dams and Impoundment Structures Regulations – DHEC 2604
R.72-1 through R.72-9

INSTRUCTIONS

Purpose: To satisfy the inspection requirements for high and significant hazard dams regulated by South Carolina Department of Health and Environmental Control. See R.72-1 through R. 72-9.

Who will complete the form: Regional engineers and inspectors engaged in the dams and reservoir safety program performing dam inspections.

<u>Section I (Owner's Information):</u>

A) Dam Number; Enter the Dam's inventory number.
B) Name of Dam; Enter the common name of dam found within EFIS.
C) Inspection Month & Time; Enter the day, month, year, and time in which the inspections was performed.
D) Date of Last Inspection; Enter the day, month, and year, in which the last inspection was performed.
E) Location-County/City; Enter the county and city, if applicable, where the dam is located.
F) EQC Regional Office; Enter the DHEC EQC Regional office that covers the area in which the dam is located.
G) Inspector's Name: Enter the name of the person performing the inspection.
H) Owner's Name: Enter the name of the person owning the dam. If there is multiple owners list them and their contact information in the "General comments and recommendations are in section IV.
I) Contact Person; Enter the name of the person that represents the dam owner during the inspection. This person should be authorized to remedy any deficiencies found by the inspector.
J) Dam Owner's or Contact Person's Phone Numbers; Enter the home, office, and other available numbers for the Dam owner or Contact person.
K) Dam Owner's or Contact Person's mailing address; Enter the dam owner's or contact person's mailing address including city state and zip code.

<u>Section II (Dam Condition):</u>

Once the inspection is completed indicate the general condition of the dam. The assessment can be one of the following four categories:

a) SATISFACTORY- No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading conditions in accordance with state engineer's rules and regulations
for dams or tolerable risk guidelines.

b) FAIR- No existing dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency. Risk may be in the range to take further action.
c) POOR- A dam safety deficiency is recognized for loading conditions, which may realistically occur. Remedial action is necessary. A POOR condition is used when uncertainties exist as to critical analysis parameters, which identify a potential dam safety deficiency. Further investigations and studies are necessary.
d) UNSATISFACTORY- A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution.
e) NOT RATED- This should only be used if it is not possible to assess to dam's condition due to site constraints on visibility on the day of inspection. If vegetation is a problem the owner should be ordered perform maintenance to remove it before the next visit.

Section III (Dam Inspection Checklist):

This section is self-explanatory and guides the inspector though the inspection process. Follow the dam inspection checklist to complete the inspection. Mark any deficiencies observed during the inspection. If there were the deficiencies reported during the last inspection cycle check to see if they were corrected. If items are not applicable to the inspection of the dam, mark not applicable. If the dams has issues that are not covered in this section of the form make note of them in section IV.

Section IV(Conclusions):

Use the space to list additional responsible parties (dam owners) and issues found during the inspection that are not addressed in section III, as well as any general comments and recommendations generated during the inspection.

Office Mechanisms and filing: The form must be sent to the Dam's owner(s) and filed with the Bureau of Water, Dams and Reservoir Safety Program, before the end of the following month after which the inspections were performed. The report will be filed in the Bureau of Water's file room and will be retained for at least three years after the Department certifies the removal of the inspected dam.

Preliminary Inspection Report for South Carolina Regulated Dams and Impoundment Structures Regulations R.72-1 through R.72-9

DHEC
PROMOTE PROTECT PROSPER

Section I (Owner's Information)

A. Dam Number: **D** 2876 & Hazard Class 2

B. Name of Dam: Lake Conestee

C. Inspection Date (12/18/20 14) & Time: 10:20 a.m.

D. Date of Last Inspection: (11/17/2011)

E. Location-County/City: Greenville / Greenville

F. EQC Regional Office: Upstate EQC Greenville

G. Inspector's Name: Melissa Dawkins, Petar Milenkov, John Poole

H. Owner's Name: Conestee Foundation Inc.

I. Contact Person (if different from above): Dave Hargett, PhD

J. Dam Owner's or Contact Person's Phone Numbers:

Home (___) ___ - ____

Office (864) 277 - 2004

Other (864) 787 - 8160

K. Dam Owner's or Contact Person's mailing address:

Address 1 P.O. Box 9111

Address 2 (optional)

City Greenville, State SC Zip Code 29604 - ____

Section II (Dam Condition)

General Condition Assessment (Select one of the following):

a) Satisfactory ☐ b) Fair ☐ c) Poor ☑ d) Unsatisfactory ☐ e) Not Rated ☐

Section III (Dam Inspection Checklist)

A. Dam Crest

i. Vegetation (grass, trees weeds)? Vegetation was observed growing out of portions of the masonry. This vegetation should be removed.

ii. Animal activity observed? None observed

iii. Any obvious alteration or repairs made? None observed

iv. Erosion noticed on crest? No erosion was observed; however, deterioration of the mortar in some spots was observed. This should be monitored to ensure that the situation does not worsen.

v. Any visible settlement, misalignment or cracks? Cracks in the mortar were observed.

Section III (Dam Inspection Checklist) continued

B. Upstream Slope

i. Vegetation (grass, trees weeds)? Vegetation was observed growing out of portions of the masonry. This vegetation should be removed.

ii. Animal activity observed? None observed

iii. Any obvious alterations or repairs made? None observed but could not fully inspect because of safety concerns

iv. Erosion observed on upstream slope? None observed but could not fully inspect because of safety concerns

v. Settlement or cracks visible in slope? None observed but could not fully inspect because of safety concerns

C. Down Stream Slope

i. Vegetation (grass, trees weeds)? On the right side, a small amount of vegetation was observed. On the left side, more vegetation was observed. The vegetation must be cut or treated and removed.

ii. Animal activity observed? None observed

iii. Any obvious alterations or repairs made? Yes, the permitted repairs to the sluice gate were observed. A few small cracks were observed in the concrete surface. Monitor these to ensure that they do not worsen.

iv. Erosion observed on down stream slope? No erosion was observed; however, deterioration of the masonry face was observed on the left side along the toe. Portions of the face were missing near the areas of seepage.

v. Settlement or cracks visible in slope? Cracks in the mortar were observed throughout the face.

vi. Toe drains flowing? The drain on the right side of the previously filled sluice gate on the left was dripping. Monitor to ensure that the flow does not increase.

vii. Any seepage observed? If so, describe location, flow rate, and any turbidity or color within the flow: Yes, flowing seeps were observed at multiple locations on the right and left sides. According to Dr. Hargett, the ochre has been tested and found to contain high levels of heavy metals. See Section IV, items 1 and 2.

D. Primary Spillway

i. Any visible deterioration of structure? According to Dr. Hargett, there are 8 different primary spillway elevations. The penstock also acts as a spillway. Some of the spillways could be observed; deterioration of the mortar was observed.

ii. Is there an obvious need to repair or replace trash rack? Not applicable

iii. Any noticeable problems with debris? Yes, some debris was observed in some of the spillways and must be removed. According to Dr. Hargett, debris is removed on a regular basis and access to remove it is an issue.

iv. Is valve or gate present? No

E. Outlet Pipe

i. Any water visibly flowing or leaking outside of the discharge pipe? The penstock was reviewed as the outlet pipe. Significant flows were observed through the penstock. According to Dr. Hargett, the structure around the penstock was designed to leak. See Section IV, item 3.

ii. Describe any deflection or damage observed to the pipe: Could not inspect because of flowing water

iii. Visible condition of outlet channel: Some debris was observed in the channel below the penstock. This should be removed. The main channel was in good condition with little erosion observed.

F. Auxiliary (Emergency) Spillway

i. Noticeable obstructions to flow? All of the masonry spillways were reviewed under item III.C.iii above. It is unknown which are considered to be primary and which are auxiliary.

ii. Animal activity observed? None observed for any spillways.

iii. Any noticeable deterioration in the approach or discharge channel? Not applicable

iv. Any visible deterioration of structure's crest? See item III.C.i above.

F. Auxiliary (Emergency) Spillway continued

v. If applicable, any observed exposure of rebar reinforcement? Not applicable

vi. If applicable, any visible leakage below concrete spillway? Not applicable

H. Downstream/Hazard Class Issues

i. Any noticeable changes immediately downstream of the dam that affects the hazard classification? No

I. Emergency Action Plan (EAP)

i. Emergency Action Plan provided by owner? An updated EAP must be submitted on or before 4/29/15.

ii. Does EAP contains emergency alert notification plan? If so, when was it last updated? ______

iii. Does EAP contain specific actions to take if the dam has failed or is near failure? ______

Section IV (Conclusions)

General comments and recommendations:

1. Submit the laboratory results for these seeps to the Department. Additional requirements may be given upon review of these results.
2. A qualified, licensed S.C. professional engineer must evaluate this seepage to determine whether it is affecting the safety of the dam and whether measurements should be taken to determine baseline flows.
3. A qualified, licensed S.C. professional engineer must evaluate these flows to determine whether measurements should be taken to determine baseline flows.

Preliminary Dam Inspection Disclaimer:

Preliminary Inspection Report for South Carolina Regulated Dams and Impoundment Structures Regulations – DHEC 2604
R.72-1 through R.72-9

INSTRUCTIONS

Purpose: To satisfy the inspection requirements for high and significant hazard dams regulated by South Carolina Department of Health and Environmental Control. See R.72-1 through R. 72-9.

Who will complete the form: Regional engineers and inspectors engaged in the dams and reservoir safety program performing dam inspections.

Section I (Owner's Information):

A) Dam Number; Enter the Dam's inventory number.
B) Name of Dam; Enter the common name of dam found within EFIS.
C) Inspection Month & Time; Enter the day, month, year, and time in which the inspections was performed.
D) Date of Last Inspection; Enter the day, month, and year, in which the last inspection was performed.
E) Location-County/City; Enter the county and city, if applicable, where the dam is located.
F) EQC Regional Office; Enter the DHEC EQC Regional office that covers the area in which the dam is located.
G) Inspector's Name: Enter the name of the person performing the inspection.
H) Owner's Name: Enter the name of the person owning the dam. If there is multiple owners list them and their contact information in the "General comments and recommendations are in section IV.
I) Contact Person; Enter the name of the person that represents the dam owner during the inspection. This person should be authorized to remedy any deficiencies found by the inspector.
J) Dam Owner's or Contact Person's Phone Numbers; Enter the home, office, and other available numbers for the Dam owner or Contact person.
K) Dam Owner's or Contact Person's mailing address; Enter the dam owner's or contact person's mailing address including city state and zip code.

Section II (Dam Condition):

Once the inspection is completed indicate the general condition of the dam. The assessment can be one of the following four categories:

a) SATISFACTORY- No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading conditions in accordance with state engineer's rules and regulations
for dams or tolerable risk guidelines.

b) FAIR- No existing dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency. Risk may be in the range to take further action.
c) POOR- A dam safety deficiency is recognized for loading conditions, which may realistically occur. Remedial action is necessary. A POOR condition is used when uncertainties exist as to critical analysis parameters, which identify a potential dam safety deficiency. Further investigations and studies are necessary.
d) UNSATISFACTORY- A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution.
e) NOT RATED- This should only be used if it is not possible to assess to dam's condition due to site constraints on visibility on the day of inspection. If vegetation is a problem the owner should be ordered perform maintenance to remove it before the next visit.

Section III (Dam Inspection Checklist):

This section is self-explanatory and guides the inspector though the inspection process. Follow the dam inspection checklist to complete the inspection. Mark any deficiencies observed during the inspection. If there were the deficiencies reported during the last inspection cycle check to see if they were corrected. If items are not applicable to the inspection of the dam, mark not applicable. If the dams has issues that are not covered in this section of the form make note of them in section IV.

Section IV(Conclusions):

Use the space to list additional responsible parties (dam owners) and issues found during the inspection that are not addressed in section III, as well as any general comments and recommendations generated during the inspection.

Office Mechanisms and filing: The form must be sent to the Dam's owner(s) and filed with the Bureau of Water, Dams and Reservoir Safety Program, before the end of the following month after which the inspections were performed. The report will be filed in the Bureau of Water's file room and will be retained for at least three years after the Department certifies the removal of the inspected dam.

Lake Conestee Dam Inspection Report

Inspection by a SC Professional Engineer,
Required by SCDHEC Bureau of Water, Dams and
Reservoir Safety Program

Kleinschmidt

April 17, 2019

VIA ELECTRONIC MAIL

Mr. David Hargett, Ph.D.
Conestee Foundation, Inc.
PO Box 9111
Greenville, SC 29604

Inspection of Lake Conestee Dam, SC Dam No. D-2876

Dear David:

On July 9, 2018, the undersigned conducted an inspection of the Lake Conestee Dam. The inspection was performed in response to the South Carolina DHEC's (DHEC) requirements for an independent Engineer's Inspection Report assessing the general condition of the dam that is appropriate to satisfy DHEC requirements for a routine inspection of a dam (SC Reg 72-1). In preparation for the inspection, DHEC's dam inspection report of December 1, 2016, and associated letter of December 8, 2016, were reviewed and DHEC's dam inspection report of December 18, 2014, was also reviewed.

The Conestee Foundation (CFI) contracted with Kleinschmidt to conduct the field inspection to observe and assess the condition of the water retaining structures and to perform a visual inspection of the dam's outlet works to determine if there is any significant deficiency with their integrity. The work performed did not include the performance of any analyses or reports or investigations.

The undersigned's area of expertise is in the design, analyses, and inspections of dams and hydroelectric projects, and assessment of the operations of same. The undersigned has been approved by the Federal Energy Regulatory Commission (FERC) since 1988 to perform Part 12 Dam Safety Inspections as an Independent Consultant per FERC's dam safety regulations and guidelines.

The inspection was performed in conjunction with the initial kick-off meeting to discuss the *Lake Conestee Dam Evaluation of Alternatives Report*, Kleinschmidt, April 2019 *(Evaluation Report)*. The undersigned was accompanied on part of the inspection by the following individuals who were attending the kick-off meeting:

Jill Stewart, P.E.	DHEC, Director, Dam Safety Program
Ann Clark	DHEC, Director, Stormwater, Construction, Agricultural, and Dams Permitting Division. Bureau of Water
John McCain, P.E.	DHEC, Manager, Dam Safety Program
Shawn Frazer	DHEC, Regional Engineer, Dam Safety Program
Michael Traynham	DHEC, Chief Council
Dave Hargett	Conestee Foundation, Inc.
Jim Gossett	Conestee Foundation, Inc.
Bill Remington, P.E.	Kleinschmidt, Project Manager for the *Evaluation Report*

Any reference in this report to the “left” and “right” of the project’s structures are established when looking downstream. Elevations are in units of feet. Figures and photos referenced in this report are contained in Appendix A. Photos 1 and 2 are aerial photos of the site; Photos 3 and 4 are drawings of the dam.

SPECIAL CONSIDERATIONS FOR THIS DAM

Although this dam was constructed for industrial power generation purposes in 1892, its primary purpose today is as a waste containment structure. Per a *Declaration of Covenants and Restrictions* (Covenants), October 25, 2007, between CFI and DHEC, the dam and associated property is subject of a Voluntary Cleanup Contract pursuant to the Brownfields/Voluntary Cleanup Programs, the Comprehensive Environmental Response Compensation and Liability Act, and the South Carolina Hazardous Water Management Act.

As part of the Covenants Recital #3 regarding maintaining the dam, CFI covenants “…that appropriate measures shall be implemented to substantially limit the downstream migration of Lake Conestee sediments. Currently the Lake Conestee dam is preventing migration of substantial quantizes of lake-deposited sediments downstream of the dam. As long as the dam continues to serve as the mechanism to substantially limit downstream sediment migrations, CFI shall reasonably ensure that the dam is maintained in a manner sufficient for this purpose…”

Stability analyses of the dam are reported in *Final Report: Feasibility Study of Alternatives for Rehabilitation of Lake Conestee Dam,* Hargett Resources, Inc., October 30, 2012, Appendix 5 (*Feasibility Study)*. Analyses were performed for the right non-overflow structure for Normal Pond and 100-Year Flood loading conditions and they indicated that the structure was unstable (Factors of Safety of less than 1.0) in overturning for both loading conditions.

Based on the findings of the *Evaluation Report*, CFI will be proposing to DHEC a recommended alternative for the “rehabilitation, repair, or replacement of the existing dam to effectively contain contaminated sediment within Lake Conestee for an extended term.”

INSPECTION AND ASSESSMENT

The inspection was performed in two parts from 7:00 – 9:30 am by Misters Cyr, Remington, and Hargett; and from noon to 2:00 pm by the attendees for the *Evaluation Report* kick-off meeting. The weather was hot and sunny, with temperature exceeding 85 degrees. An estimated flow of 75 cfs discharged over the unregulated spillway (approximately 4 inches of flow over the low section of spillway).

Description of Dam

The dam is a mortared stone masonry structure that was constructed in 1892. The dam is approximately 556 feet long and has a maximum structural height of approximately 29 feet. Inclusive within the dam’s length is 230 feet of unregulated spillway that is divided into three spillway lengths; the longest section of spillway, 130.6 feet, has a crest that is approximately 1.2 feet lower that the remaining 99.4 feet of spillway (Photo 4).

At some point in time the crest of the non-overflow structures and spillway were raised approximately 3 feet as indicated by horizontal lift joints in the masonry (Photos 5, 6, 25, and 4.1 &

4.2). Photo 29 shows that flashboards were in place on the Right Non-Overflow Structure during the 1936 flood. Photos 4.1 and 4.2 indicate that the flashboards on the Right Non-Overflow Structure were 3 feet high based on survey information shown in Photo 4. Based on Photo 4.2, the flashboards on the spillway portion of the dam were shorter than those on the Right Non-Overflow Structure; the spillway flashboards are estimated to be no more than 18-inches high. Photos 4.3 and 4.4 show that the steel flashboard support frames were still in place in 2001/02. The spillway crests have been capped with concrete, but flashboard anchorages can still be seen in the concrete.

Right Non-Overflow Structure (RNO)

See Photo 2 for location. Photos 5 through 9 show the condition of the RNO.

Based on visual observations, the structure appeared to be true to alignment and elevation exhibiting no signs of movement or structural distress. No displacement or bulging of stone masonry blocks was observed other than along the crest of the structure (Photo 8) where displaced or missing small stone has occurred as would be expected as a result of thermal movements and possible minor freeze thaw action occurring over 100 years. There was no structural cracking observed, nor cracking that would be associated with movement.

Seepage through the masonry is occurring, although it does not appear to be as bad as on the Left Non-Overflow structure. At the time of the inspection, the impoundment was approximately 3 feet below the crest of the structure and sediment and vegetation on the upstream side of the structure also 3 feet below the crest (Photo 7). The base of the RNO structure, and any associated seepage that may be along the contact with foundation rock, is hidden below 2 to 8 feet of soil. Mortar joints are tight and with little indication of mortar loss; there is some mortar deterioration (softening) ongoing where seepage is the heaviest.

Outlet Structure

Photos 9 through 13.1.

At the left end of the RNO is an outlet structure that used to connect to a penstock that extended to the mill downstream; the outlet structure also used to have a sluice gate (Photos 9 and 10). The penstock has collapsed and has been cut away (Photo 11) and the sluice gate opening was plugged with concrete in 2002 (Photo 12). A wood bulkhead was installed in 2001 on the upstream side of the penstock intake (Photo 13.1). The bulkhead is not operational as it is not connected to an operator. The bulkhead can be removed only with a crane after connecting to the lifting cables that are attached to the top of the bulkhead. Leakage from the bulkhead was reported to be intentional in order to assure some flow is being released from the dam but based on the condition of the timber seals around the penstock opening as seen on 2002 (Photo 13.1), it is the opinion of the undersigned that the current volume of leakage could be the result of erosion of the deteriorated timber seals.

Based on visual observations, the structure appeared to be true to alignment and elevation exhibiting no signs of movement or structural distress. There was no observed displacement or bulging of stone masonry blocks. Seepage through the masonry and at the base of the structure appears to be minimal. Mortar joints are tight and are generally in good condition with little indication of mortar loss.

Spillway Dam

See Photo 2 for location. Photos 14 through 25 show the condition of the spillway dam.

Low Crest Section

The "low crest" is 12-inches below the "high crest". At the time of the inspection there was approximately 4-inches of water passing over the low crest section of the spillway dam and the condition of the structure could not be seen (Photos 14, 16, and 17). Based on the shape of the discharge over the crest (Photos 16 and 17) it appears that the crest is intact and without any loss or displacement of the concrete cap. As could be discerned from Photo 15, there does not appear to be any stone masonry blocks missing from the face of the low crest section of the spillway. The extent and volume of seepage from the low crest section of the spillway could not be determined.

There was a minimal amount of debris accumulation on the low spillway crest (Photo 16). It was reported that any heavy accumulation of large wood debris is periodically removed in compliance with the requirements of the Covenant. Based on the shape of the discharge over the crest it does not appear that debris has damaged or displaced any of the crest's capping concrete. Debris accumulation in the river channel downstream of the dam is also minimal; due to the height of the dam, it is improbable that debris accumulation in the river downstream of the dam could ever be significant enough to impact the stability or discharge capacity of the dam.

The foundation rock along the spillway toe appears sound and solid. The rock shelf on which the dam is founded (Photos 15 and 23) does not indicate that there has been any loss or displacement of foundation rock, nor is there any indication of historic or recent undermining of the dam having occurred. The exposed ridges and bedrock downstream of the spillway do not indicate that there has been any signification scour or erosion of the bedrock.

Due to the flow being discharged over the spillway, the condition of the downstream face and the extent and volume of seepage through the structure could not be assessed.

High Crest Section

The high crest section of the spillway appears to be in good condition (Photos 20 through 25). There is some leakage, but not great in volume nor being discharged under pressure, through the masonry approximately 3 feet below the spillway crest (Photos 20 and 21). The base of the spillway is founded on exposed bedrock and there was no seepage observed to be occurring along the base of the spillway. There was vegetation growing on the face of the structure; it was reported that herbicides are applied annually to control vegetation. Mortar joints are tight and are generally in good condition with little indication of mortar loss; vegetation growth and seepage could result in the softening of the mortar, and eventual deterioration and loss of mortar from the exposed face.

Based of visual observations of the high and low crest sections of the spillway, the spillway dam appears to be true to alignment and elevation exhibiting no signs of movement or structural distress. There was no observed displacement or bulging of the stone masonry. There was no structural cracking observed, nor cracking that could be associated with movement. There is no indication of overturning or sliding of the structure nor is there any sign of displacement of any of the stone masonry.

Left Non-Overflow Structure (LNO)

See Photo 2 for location. Photos 26 through 28 show the condition of the LNO.

Based on visual observations, the structure appeared to be true to alignment and elevation, exhibiting no signs of movement or structural distress. There was no observed displacement or bulging of the stone masonry observed, including along the crest (Photo 27). There were no anchorages observed indicating that flashboards had been installed on the LNO. There was no structural cracking observed, nor cracking that could be associated with movement. There is no indication of overturning or sliding of the structure nor is there any sign of displacement of any of the stone masonry. Mortar joints are tight with little indication of mortar loss; there is some mortar deterioration (softening) ongoing where seepage and vegetation are the heaviest, conditions could result in the greater deterioration and loss of mortar from the exposed face.

Seepage through the masonry is occurring, and it is worse at the LNO than at any other part of the dam. At the time of the inspection, the impoundment was approximately 3 feet below the crest of the LNO structure and sediment and vegetation on the upstream side of the structure was 2 to 3 feet below the crest (Photo 27). The base of the structure is founded on exposed bedrock, there was no indication of seepage or leakage occurring along the base of the structure.

Seepage through the masonry is occurring 4 to 5 feet below the crest of the structure which is surprising considering the depth of sediment behind the structure. The seepage is reported to contain high concentration of heavy metals and iron, the undersigned is not aware of any reference to concentrated heavy metals causing deterioration of cement-based materials. There was vegetation growing on the face of structure; it was reported that herbicides are applied annually to control vegetation.

FINDINGS AND RECOMMENDATIONS

It is the opinion of the undersigned that the dam is in fair condition considering that the structure is constructed of mortared stone and is more than 125 years old. While the stability analyses cited in the *Feasibility Study* indicate that the Right Non-overflow structure is unstable against overturning under Normal Pond loading conditions, there was nothing observed during the inspection that gives cause for concern with the stability or structural safety of any of the water retaining structures other than for the wood bulkhead over the former penstock intake. Historical photographs indicated that the dam has been subjected to flood events that reached the top of the flashboards on the Right Non-Overflow Structure (Photo 29), a loading condition that cannot be replicated today without the installation of flashboards or for a flood condition that results in an impoundment level that is greater than that which occurred in 1936. It is possible that the results of the stability analyses are due to dimensional assumptions made regarding the cross-sectional geometry of the dam.

There was no indication of movement of the dam nor displacement or bulging of the stone masonry. Some cracking was observed but none that was structural or associated with movement. There is no scour, erosion, material loss or undermining of the foundation rock along the spillway and Left-Non-Overflow nor is there undermining or material loss at the base on the dam. Mortar in the masonry joints is tight and intact and generally sound. There was nothing observed that indicated an immediate or near term need to perform any structural repairs to the dam.

The volume of leakage at the wood bulkhead over the former penstock intake is a concern. The flow of water under pressure will erode the timber seals around the penstock opening against which the bulkhead bears and sometime in the future a section of the seal will fail and there will be an increase in flow. In addition, the volume of flow could carry and transport sediment downstream of the dam. If the flow is great enough or if the bulkhead were to fail or be displaced, then there could be a repeat of the loss of the impoundment and release of sediment that occurred from June 2000 to June 2001.

Seepage through the stone masonry is occurring, with the seepage being worse at the Left Non-Overflow Structure. The seepage unto itself is not considered to be excessive considering how the dam was constructed; there were no heavy flows or leakage observed. The current volume of seepage is not detrimental to the integrity of the dam. The seepage itself does not impact the structural integrity of the dam and is not a dam safety concern. The seepage is promoting the growth of vegetation which in turn will lead to deterioration of the mortar joints if the vegetation is not controlled.

The seepage is reported to contain high concentrations of regulated hazardous materials, including heavy metals. The undersigned is not aware of any reference to concentrated heavy metals causing deterioration of cement-based materials. It was reported that translocated hazardous substances in the dam's seepage are considered by DHEC to constitute a constant unpermitted discharge of hazardous substances, and it was further reported that DHEC has communicated to CFI that these discharges must be controlled by whatever means practicable.

It was reported that sedimentation fines are being transported through the dam, but the undersigned did not observe any deposition of sediment on the downstream side of the dam that could have been deposited by seepage through the stone masonry. The accumulation of brown deposits of "talus" on the face and at the base of the non-overflow and high crest spillway sections appear to be soft, light deposits of iron bacteria.

There are no original construction drawings showing the geometry or cross section of the dam. There were no stability or structural analyses performed in support of the inspection.

The following are my recommendations regarding the observed condition of the structures:

1. Continue periodically applying herbicides to the downstream faces of all the water retaining structures to control vegetative growth on the structures that otherwise would accelerate the deterioration of masonry and concrete.
2. Continue the removal of debris from the crest of the spillway per the requirements of the Covenant. It is the opinion of the undersigned that the presence of large tree sized debris on the dam's spillway crest does not damage or endanger the crest; debris accumulation could impact the spillway's discharge capacity during low flows but as flows increase the debris will be washed off of the crest and new debris will accumulate as the flow over the dam reduces.
3. Visually monitor and photograph seepage and leakage through the dam to document any change. Localized, random grouting of seepage/leakage is not recommended as the seepage flow will undoubtedly move to discharge in another location, possibly a location that cannot be easily observed or a location that could cause displacement of some of the stone masonry.
4. Visually monitor and photographically document leakage from around the wood bulkhead over the penstock opening for any significant change. If the leakage increases significantly

then measures may need to be implemented to seal the leak to prevent displacement or damage to the bulkhead.

5. At this time there is no need to repair the stone masonry along the crest of the right non-overflow structure. If it is elected to make repairs, then they should be made using methods suitable for constructing or repair of stone masonry. If repairs are made with concrete, then some of the stone masonry should be removed and replaced with concrete that does not raise the elevation of the crest, and the concrete should be reinforced and structurally anchored to the underlying masonry.

It is the opinion of the undersigned that the dam does not appear to be serving and meeting the functional requirements of the Covenant to "substantially limit the downstream migration of Lake Conestee sediments." The leaking wood bulkhead is the primary source for the continual release of sediment downstream. The condition of the bulkhead is such that it is susceptible to erosive deterioration from the water flowing through the gate openings, and as such there is an ever-increasing potential for an increase in the release of sediment.

Considering 1) that the ongoing and future function of the dam is to effectively contain highly contaminated sediments located upstream of the dam; and 2) the age, construction, and condition of the existing 1892 dam, the undersigned concurs with the strategy to rehabilitate, repair, or replace the existing dam, as outlined in the *Evaluation Report.*

All conclusions and recommendations contained in this report were made independent of SCDHEC and CFI, their employees and representatives.

I apologize for not having submitted this inspection report to you sooner. I was distracted from the inspection report by the work we were performing for the *Evaluation Report*. If you have any questions or require further information, do not hesitate to contact me.

Sincerely,

KLEINSCHMIDT ASSOCIATES

SOUTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
NO. 15986
PAUL E. CYR
04/17/2019

Paul E. Cyr, P.E.
Independent Consultant

PEC:KAK

Attachments: Appendix A - Figures and Inspection Photos

J:\2001\002\Docs\Dam Inspection July 2018\2018 Insp Rpt.Final.docx

APPENDIX A

FIGURES AND INSPECTION PHOTOS

Photo 1: Late 2018. GOOGLE Aerial view.

2 for location

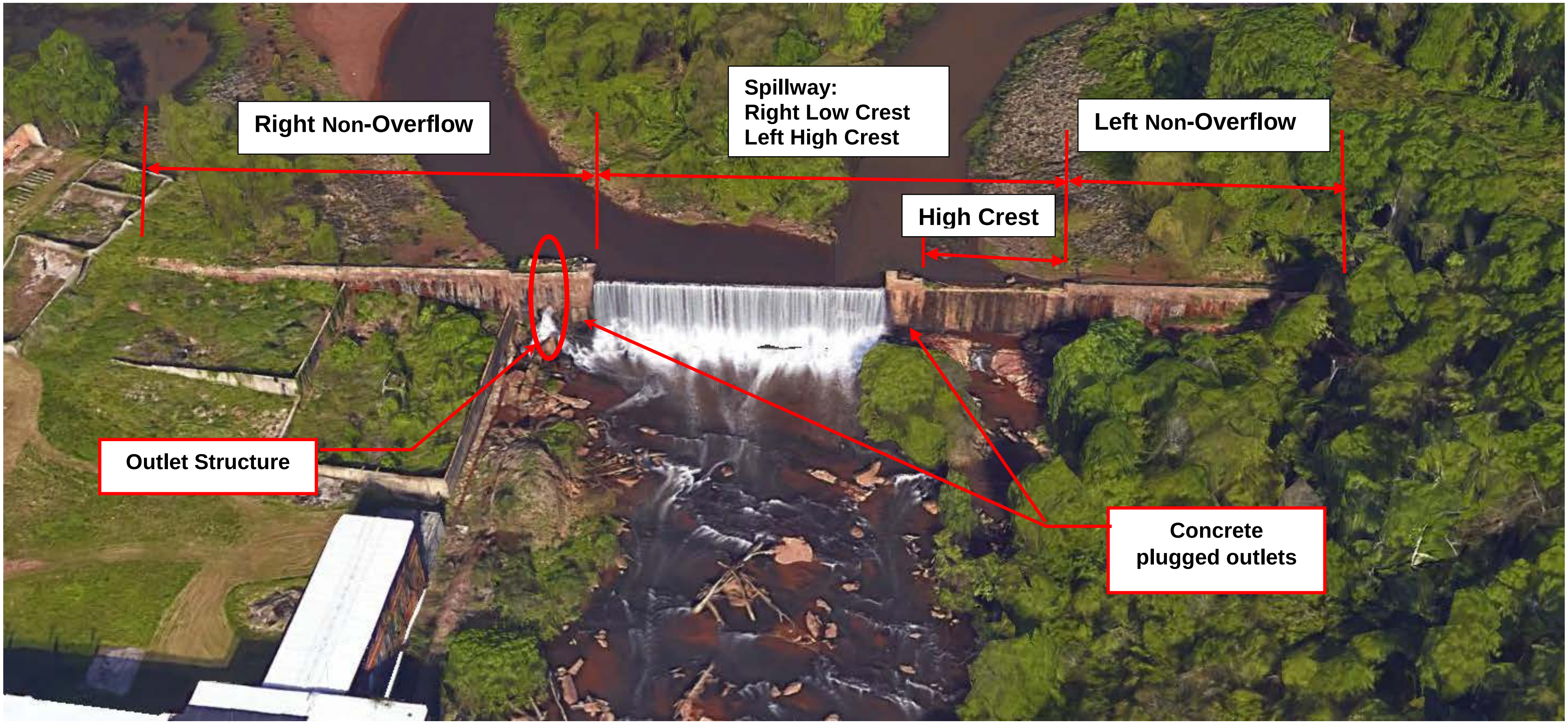


Photo 2: Late 2018. GOOGLE Elevation view.

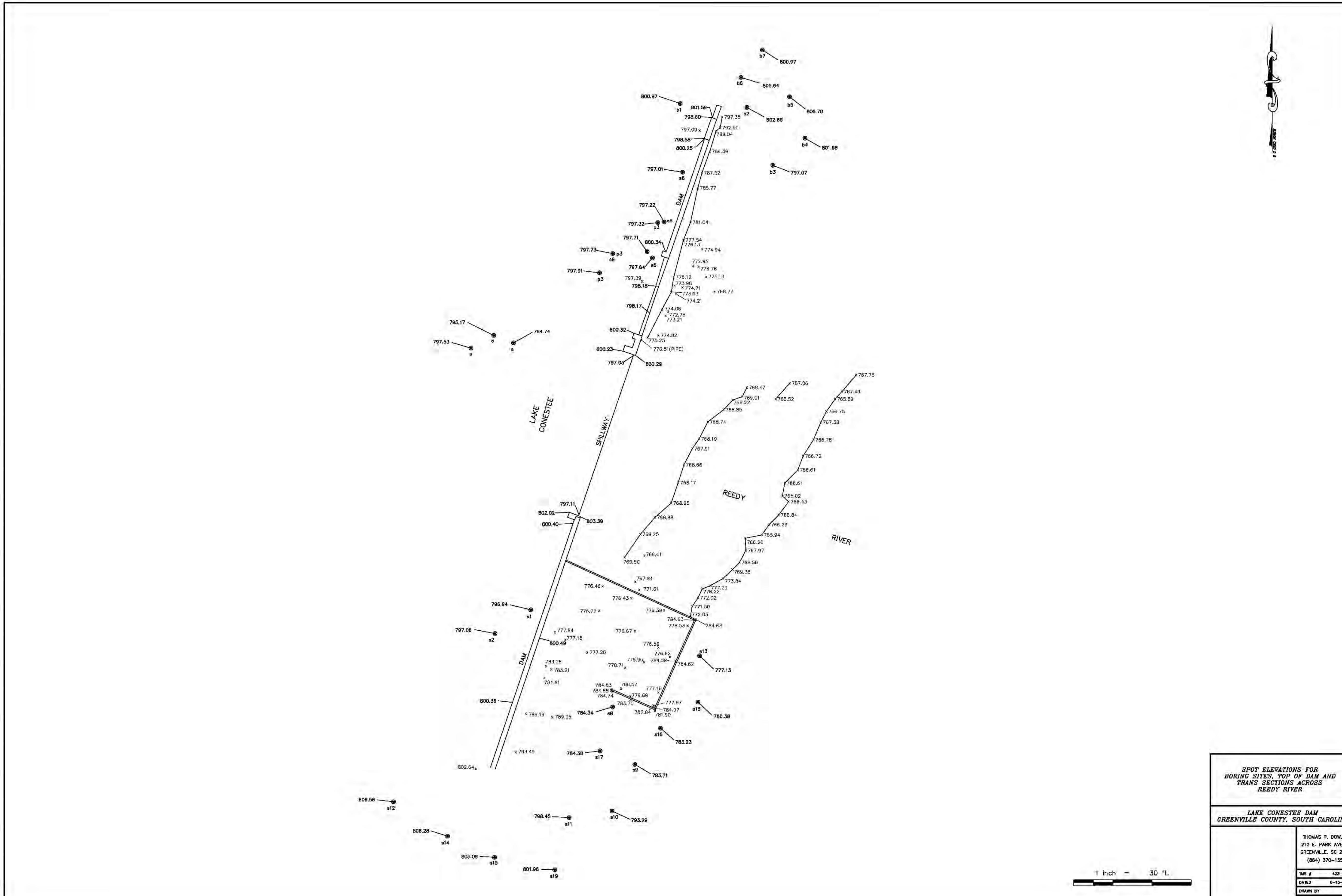
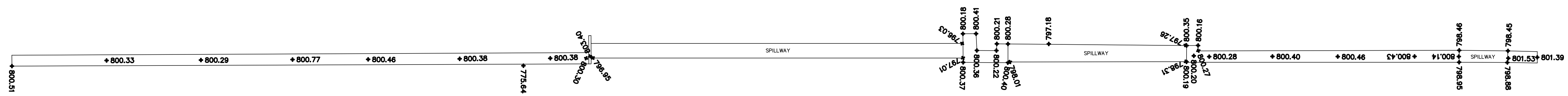
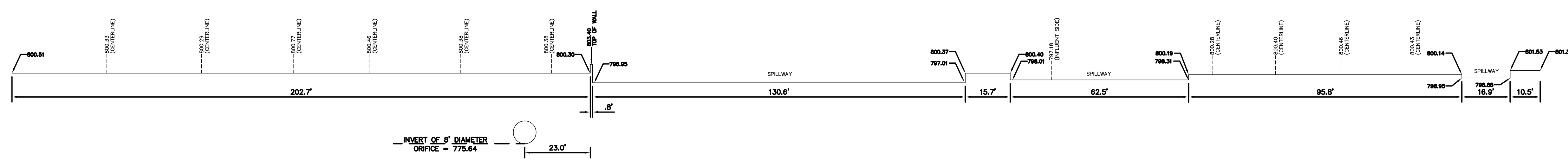


Photo 3: Site Plan

PLAN



PROFILE



NOTE: ALL ELEVATIONS NOT LABELED ARE ON THE EFFLUENT SIDE

BRIDGE (APPROXIMATELY THE CENTER)
ELEVATION = 788.6'

GRAPHIC SCALE

(IN FEET)
1 inch = 20 ft.

I HEREBY STATE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF, THE SURVEY SHOWN HEREIN WAS MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE MINIMUM STANDARDS MANUAL FOR THE PRACTICE OF LAND SURVEYING IN SOUTH CAROLINA, AND MEETS OR EXCEEDS THE REQUIREMENTS FOR A CLASS "B" SURVEY AS SPECIFIED THEREIN; ALSO THERE ARE NO VISIBLE ENCROACHMENTS OR PROJECTIONS OTHER THAN THOSE SHOWN.

SOUTH CAROLINA
PRECISION LAND SURVEYING, INC.
No. C01589
CERTIFICATE OF AUTHORIZATION

PLAN/PROFILE OF CONESTEE DAM FOR:
HARGETT RESOURCES, INC.
GREENVILLE COUNTY, SOUTH CAROLINA

DATE : 01/16/08	TAX MAP NO. : N/A
SCALE : 1" = 20'	PROJECT NO. : 08006
PROPERTY ADDRESS: LAKE CONESTEE	

PRECISION
LAND SURVEYING, INC.
351 PRADO WAY : GREENVILLE, SC 29607
(864) 627-8067 Fax: (864) 627-1940

SOUTH CAROLINA
PROFESSIONAL LAND SURVEYOR
No. 17219
RICHARD BRUCE COOK II

Photo 4: Crest Profile

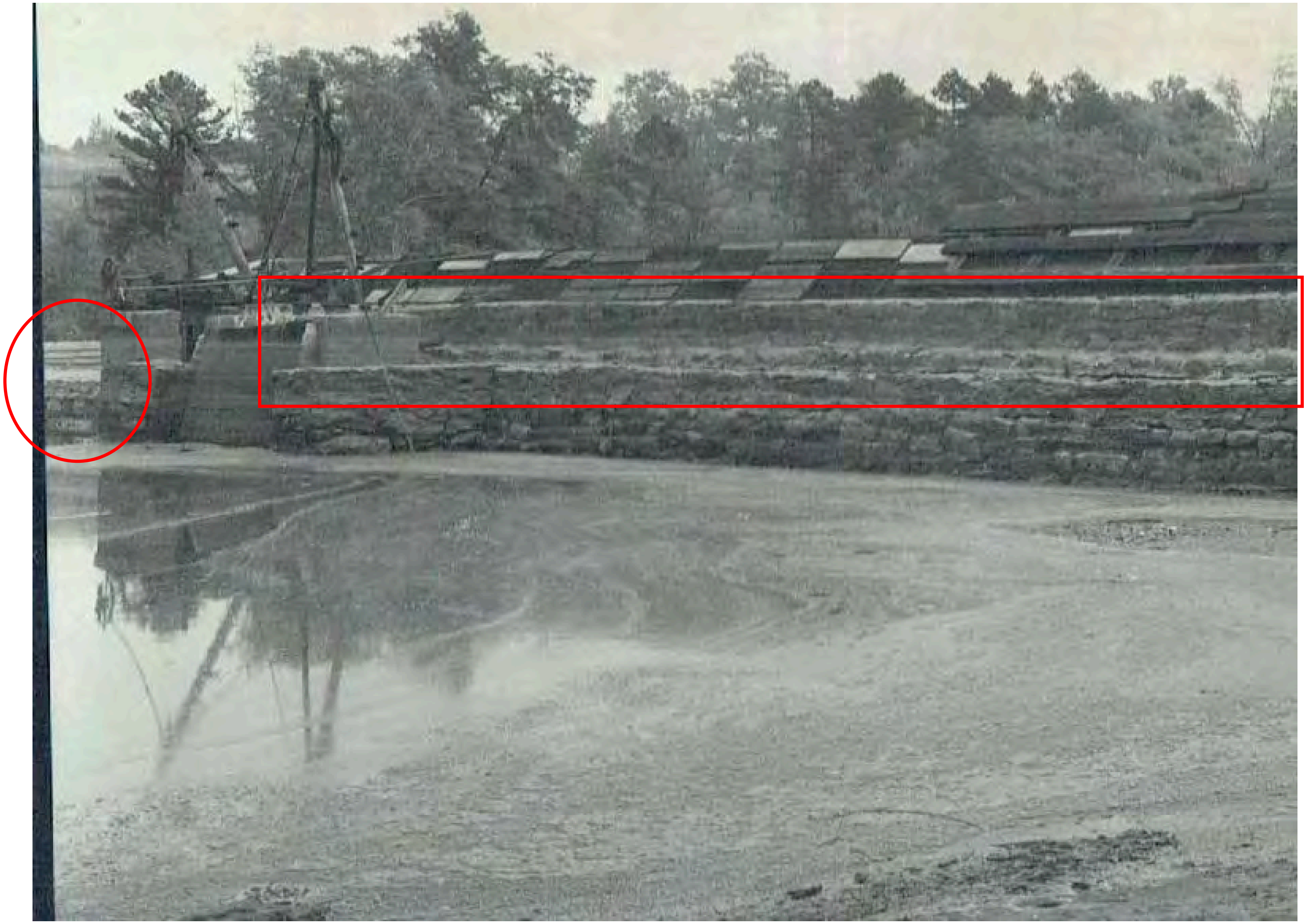


Photo 4.1: 1933. Flashboards atop Right Non-Overflow and on spillway dam (circled); upstream side. Also note masonry added to increase height of dam (rectangle).

Photo 4.2: 1950s. Note flashboards atop Right Non-Overflow and on spillway dam. Note difference in masonry color on Right Non-Overflow Structure (rectangle) indicating masonry added to increase height of dam.

Photo 4.3: 2001. Note flashboard steel support frames.

Photo 4.4: 2002. Note flashboard steel support frames.

Photo 5: Right Non-Overflow; downstream side middle third.

Photo 6: Right Non-Overflow; downstream side left third.

Photo 7: 4 ft wide Right Non-Overflow, crest looking left.

Photo 8: Right Non-Overflow, crest. Flashboard support frame anchors are circled; 2’-4” apart and spaced at 5’-3”.

Photo 9: **Right Non-Overflow, crest looking right at outlet structure.**

Photo 10: Outlet structure, location of former penstock to mill.

Photo 11: Outlet structure, gate leakage.

Kleinschmidt

Photo 12: Outlet structure; concrete plug at one of the outlets.

Photo 13: Outlet structure as seen from left side of spillway dam.

Photo13.1: June 2001, wood bulkhead installed on upstream side of intake to penstock.

Photo 14: Spillway dam, low crest section.

Photo 15: Spillway dam (2016), low crest section showing rock shelf on which dam is founded.

Photo 16: Spillway dam, low crest section looking left.

Photo 17: Spillway dam, low crest section looking right. Note remains of flashboard pins/anchors.

Photo 18: Tailwater conditions at toe of dam.

Photo 19: Tailwater conditions downstream of dam.

Photo 20: Spillway (circled, high crested section) and Left non-overflow beyond.

Photo 21: End of high crest spillway and start of left non-overflow.

Photo 22: High crest section of spillway looking left.

Photo 23: High crest section of spillway looking right, rock shelf along base of structure and plugged outlet gate.

Photo 24: High crest section of spillway, plugged outlet gate.

Photo 25: Looking right at dam spillway, high crest starting at red line.

Photo 26: Left non-over flow with high crest spillway starting at fence (circled).

Photo 27: Left non-overflow crest; note high cattails on upstream side.

Photo 28: Left Non-Overflow Structure, seepage through dam.

Photo 29: Flood of April 1936. Note flows just starting to overtop flashboards on Right Non-Overflow Structure.

APPENDIX 3

ROGERS AND CALLCOTT LABORATORIES, INC.
SEDIMENT ANALYSIS RESULTS

ROGERS & CALLCOTT
LABORATORY SERVICES

Laboratory Services Report

Client	Hargett Resources Inc - David Hargett 408 Deepwood Drive Greer, SC 29651-6868	**Project:** **Work Order:** **Received:**	Miscellaneous 2070746 07/24/2012 17:45

Dear Client:

Rogers and Callcott appreciates the opportunity to be of service to you. The attached laboratory services report includes analytical results and chain of custody for samples that were received on July 24, 2012. Rogers and Callcott maintains a formal QA/QC program. Unless otherwise noted, all analyses performed under NELAP certification have complied with all the requirements for the NELAC standard. The analyses met the QA/QC confidence interval for each test method unless otherwise qualified. Estimated uncertainty is available upon request.

Privileged / Confidential information may be contained in this report and is intended only for the use of the addressee. If you are not the addressee, or the person responsible for delivering to the person addressed, you may not copy or deliver this message to anyone else. If you receive this message by mistake, please notify Rogers and Callcott immediately.

We strive to provide excellent service to our clients. Please contact Jason Swanger, your Project Manager, at jason.swanger@rogersandcallcott.com or (864)-335-4997 if you have any questions about this report.

CC: Stan Golaski (R&C)

Report Approved By:

Jason Swanger
Project Manager

426 Fairforest Way, Greenville SC 29607 - PO Box 5655, Greenville SC 29606
Phone 864-232-1556 Fax 864-232-6140
www.rogersandcallcott.com

ROGERS & CALLCOTT
LABORATORY SERVICES

Laboratory Services Report

South Carolina Laboratory Identification 23105
South Carolina Mobile Lab Identification 40572
North Carolina Laboratory Certification Number 27
NELAP Laboratory Identification E87822

Client Hargett Resources Inc - David Hargett
408 Deepwood Drive
Greer, SC 29651-6868

Project: Miscellaneous
Work Order: 2070746
Received: 07/24/2012 17:45

Sample Number	Sample Description	Matrix	Sampled	Type
2070746-01	LC-1 (3-7')	Soil	07/23/12 11:36	Grab
2070746-02	LC-2 (3-7')	Soil	07/23/12 13:30	Grab
2070746-03	LC-2 (7-11')	Soil	07/23/12 14:20	Grab
2070746-04	LC-5 (2-4')	Soil	07/24/12 09:13	Grab
2070746-05	LC-7 (2-4')	Soil	07/24/12 09:29	Grab
2070746-06	LC-8 (2-4')	Soil	07/24/12 09:40	Grab
2070746-07	LC-6 (2.5-5')	Soil	07/24/12 10:11	Grab
2070746-08	LC-6 (7.5-10')	Soil	07/24/12 10:27	Grab
2070746-09	LC-6 (14-16')	Soil	07/24/12 10:50	Grab
2070746-10	LC-4 (2.5-5')	Soil	07/24/12 13:28	Grab
2070746-11	LC-4 (7.5-10')	Soil	07/24/12 14:31	Grab
2070746-12	LC-4 (11-13')	Soil	07/24/12 14:50	Grab
2070746-13	LC-3 (2.5-5')	Soil	07/24/12 15:42	Grab

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Data

Sample Number 2070746-01
Sample Description LC-1 (3-7') collected on 07/23/12 11:36

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
General Chemistry Parameters									
Total Solids	**53.4**	0.10	%	1.00	07/26/12 09:35	Dry Weight		CGW	B2G0685
Total Metals									
Aluminum	**39100**	2320	mg/kg dry	500	07/31/12 11:08	EPA 6010C		KFJ	B2G0741
Antimony	**9.76**	4.63	mg/kg dry	1.00	07/31/12 11:23	EPA 6010C	S1	KFJ	B2G0741
Arsenic	**9.62**	4.63	mg/kg dry	1.00	07/31/12 11:23	EPA 6010C		KFJ	B2G0741
Barium	**198**	23.2	mg/kg dry	5.00	07/31/12 15:33	EPA 6010C		KFJ	B2G0741
Beryllium	ND	4.63	mg/kg dry	1.00	07/31/12 11:23	EPA 6010C	X	KFJ	B2G0741
Cadmium	**3.27**	1.85	mg/kg dry	1.00	07/31/12 11:23	EPA 6010C		KFJ	B2G0741
Calcium	**1530**	232	mg/kg dry	50.0	07/31/12 11:16	EPA 6010C		KFJ	B2G0741
Chromium	**131**	4.63	mg/kg dry	1.00	07/31/12 11:23	EPA 6010C		KFJ	B2G0741
Cobalt	**14.6**	1.85	mg/kg dry	1.00	07/31/12 11:23	EPA 6010C		KFJ	B2G0741
Copper	**57.8**	1.85	mg/kg dry	1.00	07/31/12 11:23	EPA 6010C		KFJ	B2G0741
Iron	**47400**	2320	mg/kg dry	500	07/31/12 11:08	EPA 6010C		KFJ	B2G0741
Lead	**104**	4.63	mg/kg dry	1.00	07/31/12 11:23	EPA 6010C		KFJ	B2G0741
Magnesium	**3820**	232	mg/kg dry	50.0	07/31/12 11:16	EPA 6010C		KFJ	B2G0741
Manganese	**520**	92.7	mg/kg dry	50.0	07/31/12 11:16	EPA 6010C		KFJ	B2G0741
Mercury	**0.66**	0.19	mg/kg dry	5.00	08/06/12 14:14	EPA 7471B		MER	B2H0129
Nickel	**22.3**	1.85	mg/kg dry	1.00	07/31/12 11:23	EPA 6010C		KFJ	B2G0741
Potassium	**3530**	463	mg/kg dry	50.0	07/31/12 11:16	EPA 6010C		KFJ	B2G0741
Selenium	ND	23.2	mg/kg dry	5.00	07/31/12 15:33	EPA 6010C	X, S1	KFJ	B2G0741
Silver	ND	1.85	mg/kg dry	1.00	07/31/12 11:23	EPA 6010C		KFJ	B2G0741
Sodium	**144**	9.27	mg/kg dry	1.00	07/31/12 11:23	EPA 6010C	S1	KFJ	B2G0741
Thallium	ND	4.63	mg/kg dry	1.00	07/31/12 11:23	EPA 6010C		KFJ	B2G0741
Vanadium	**93.5**	1.85	mg/kg dry	1.00	07/31/12 11:23	EPA 6010C		KFJ	B2G0741
Zinc	**258**	23.2	mg/kg dry	5.00	07/31/12 15:33	EPA 6010C		KFJ	B2G0741
Semi-Volatiles Organics									
Acenaphthene	ND	317	ug/kg dry	1.00	08/06/12 20:36	EPA 8270D		RJM	B2G0761
Acenaphthylene	ND	317	ug/kg dry	1.00	08/06/12 20:36	EPA 8270D		RJM	B2G0761
Anthracene	ND	317	ug/kg dry	1.00	08/06/12 20:36	EPA 8270D		RJM	B2G0761
Benzo(a)anthracene	ND	317	ug/kg dry	1.00	08/06/12 20:36	EPA 8270D		RJM	B2G0761
Benzo(a)pyrene	ND	317	ug/kg dry	1.00	08/06/12 20:36	EPA 8270D		RJM	B2G0761
Benzo(b)fluoranthene	**502**	317	ug/kg dry	1.00	08/06/12 20:36	EPA 8270D		RJM	B2G0761
Benzo(g,h,i)perylene	ND	317	ug/kg dry	1.00	08/06/12 20:36	EPA 8270D		RJM	B2G0761
Benzo(k)fluoranthene	ND	317	ug/kg dry	1.00	08/06/12 20:36	EPA 8270D		RJM	B2G0761
Chrysene	**395**	317	ug/kg dry	1.00	08/06/12 20:36	EPA 8270D		RJM	B2G0761

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-01
Sample Description LC-1 (3-7') collected on 07/23/12 11:36

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Semi-Volatiles Organics									
Dibenzo(a,h)anthracene	ND	317	ug/kg dry	1.00	08/06/12 20:36	EPA 8270D		RJM	B2G0761
Fluoranthene	**554**	317	ug/kg dry	1.00	08/06/12 20:36	EPA 8270D		RJM	B2G0761
Fluorene	ND	317	ug/kg dry	1.00	08/06/12 20:36	EPA 8270D		RJM	B2G0761
Indeno(1,2,3-cd)pyrene	ND	317	ug/kg dry	1.00	08/06/12 20:36	EPA 8270D		RJM	B2G0761
Phenanthrene	ND	317	ug/kg dry	1.00	08/06/12 20:36	EPA 8270D		RJM	B2G0761
Pyrene	**437**	317	ug/kg dry	1.00	08/06/12 20:36	EPA 8270D		RJM	B2G0761

Surrogates	%REC	%REC Limits	Flag
2-Fluorobiphenyl	84	30-115	
Nitrobenzene-D5	105	23-120	
Terphenyl-D14	74	18-137	

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Organochlorine Pesticides							X		
Aldrin	ND	31.2	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011
alpha-BHC	ND	31.2	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011
beta-BHC	ND	31.2	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011
delta-BHC	ND	31.2	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011
Gamma-BHC (Lindane)	ND	31.2	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011
Chlordane	ND	312	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011
4,4'-DDD	ND	31.2	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011
4,4'-DDE	ND	31.2	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011
4,4'-DDT	ND	31.2	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011
Dieldrin	ND	31.2	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011
Endosulfan I	ND	31.2	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011
Endosulfan II	ND	31.2	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011
Endosulfan sulfate	ND	31.2	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011
Endrin	ND	31.2	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011
Endrin aldehyde	ND	31.2	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011
Heptachlor	ND	31.2	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011
Heptachlor epoxide	ND	31.2	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011
Toxaphene	ND	312	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011
Methoxychlor	ND	125	ug/kg dry	10.0	08/09/12 09:58	EPA 8081B		RKH	B2H0011

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1016	ND	312	ug/kg dry	10.0	08/09/12 09:58	EPA 8082A		RKH	B2H0010
PCB-1221	ND	312	ug/kg dry	10.0	08/09/12 09:58	EPA 8082A		RKH	B2H0010

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-01
Sample Description LC-1 (3-7') collected on 07/23/12 11:36

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1232	ND	312	ug/kg dry	10.0	08/09/12 09:58	EPA 8082A		RKH	B2H0010
PCB-1242	ND	312	ug/kg dry	10.0	08/09/12 09:58	EPA 8082A		RKH	B2H0010
PCB-1248	ND	312	ug/kg dry	10.0	08/09/12 09:58	EPA 8082A		RKH	B2H0010
PCB-1254	ND	312	ug/kg dry	10.0	08/09/12 09:58	EPA 8082A		RKH	B2H0010
PCB-1260	ND	312	ug/kg dry	10.0	08/09/12 09:58	EPA 8082A		RKH	B2H0010

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-02
Sample Description LC-2 (3-7') collected on 07/23/12 13:30

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
General Chemistry Parameters									
Total Solids	**50.5**	0.10	%	1.00	07/26/12 09:35	Dry Weight		CGW	B2G0685
Total Metals									
Aluminum	**52000**	2430	mg/kg dry	500	07/31/12 11:49	EPA 6010C		KFJ	B2G0741
Antimony	**5.79**	4.86	mg/kg dry	1.00	07/31/12 12:04	EPA 6010C	S1	KFJ	B2G0741
Arsenic	**11.0**	4.86	mg/kg dry	1.00	07/31/12 12:04	EPA 6010C		KFJ	B2G0741
Barium	**275**	24.3	mg/kg dry	5.00	07/31/12 15:52	EPA 6010C		KFJ	B2G0741
Beryllium	ND	4.86	mg/kg dry	1.00	07/31/12 12:04	EPA 6010C	X	KFJ	B2G0741
Cadmium	**2.87**	1.94	mg/kg dry	1.00	07/31/12 12:04	EPA 6010C		KFJ	B2G0741
Calcium	**1020**	243	mg/kg dry	50.0	07/31/12 11:57	EPA 6010C		KFJ	B2G0741
Chromium	**827**	243	mg/kg dry	50.0	07/31/12 11:57	EPA 6010C		KFJ	B2G0741
Cobalt	**10.6**	1.94	mg/kg dry	1.00	07/31/12 12:04	EPA 6010C		KFJ	B2G0741
Copper	**85.0**	1.94	mg/kg dry	1.00	07/31/12 12:04	EPA 6010C		KFJ	B2G0741
Iron	**51000**	2430	mg/kg dry	500	07/31/12 11:49	EPA 6010C		KFJ	B2G0741
Lead	**173**	4.86	mg/kg dry	1.00	07/31/12 12:04	EPA 6010C	S1	KFJ	B2G0741
Magnesium	**3050**	243	mg/kg dry	50.0	07/31/12 11:57	EPA 6010C		KFJ	B2G0741
Manganese	**247**	97.1	mg/kg dry	50.0	07/31/12 11:57	EPA 6010C		KFJ	B2G0741
Mercury	**1.3**	0.19	mg/kg dry	5.00	08/06/12 14:17	EPA 7471B		MER	B2H0129
Nickel	**15.5**	1.94	mg/kg dry	1.00	07/31/12 12:04	EPA 6010C		KFJ	B2G0741
Potassium	**2700**	486	mg/kg dry	50.0	07/31/12 11:57	EPA 6010C		KFJ	B2G0741
Selenium	ND	24.3	mg/kg dry	5.00	07/31/12 15:52	EPA 6010C	X, S1	KFJ	B2G0741
Silver	**2.54**	1.94	mg/kg dry	1.00	07/31/12 12:04	EPA 6010C		KFJ	B2G0741
Sodium	**134**	9.71	mg/kg dry	1.00	07/31/12 12:04	EPA 6010C		KFJ	B2G0741
Thallium	ND	4.86	mg/kg dry	1.00	07/31/12 12:04	EPA 6010C		KFJ	B2G0741
Vanadium	**103**	1.94	mg/kg dry	1.00	07/31/12 12:04	EPA 6010C		KFJ	B2G0741
Zinc	**277**	24.3	mg/kg dry	5.00	07/31/12 15:52	EPA 6010C		KFJ	B2G0741
Semi-Volatiles Organics									
Acenaphthene	ND	336	ug/kg dry	1.00	08/06/12 21:13	EPA 8270D		RJM	B2G0761
Acenaphthylene	ND	336	ug/kg dry	1.00	08/06/12 21:13	EPA 8270D		RJM	B2G0761
Anthracene	ND	336	ug/kg dry	1.00	08/06/12 21:13	EPA 8270D		RJM	B2G0761
Benzo(a)anthracene	ND	336	ug/kg dry	1.00	08/06/12 21:13	EPA 8270D		RJM	B2G0761
Benzo(a)pyrene	ND	336	ug/kg dry	1.00	08/06/12 21:13	EPA 8270D		RJM	B2G0761
Benzo(b)fluoranthene	**548**	336	ug/kg dry	1.00	08/06/12 21:13	EPA 8270D		RJM	B2G0761
Benzo(g,h,i)perylene	ND	336	ug/kg dry	1.00	08/06/12 21:13	EPA 8270D		RJM	B2G0761
Benzo(k)fluoranthene	ND	336	ug/kg dry	1.00	08/06/12 21:13	EPA 8270D		RJM	B2G0761
Chrysene	**396**	336	ug/kg dry	1.00	08/06/12 21:13	EPA 8270D		RJM	B2G0761
Dibenzo(a,h)anthracene	ND	336	ug/kg dry	1.00	08/06/12 21:13	EPA 8270D		RJM	B2G0761
Fluoranthene	**493**	336	ug/kg dry	1.00	08/06/12 21:13	EPA 8270D		RJM	B2G0761

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-02
Sample Description LC-2 (3-7') collected on 07/23/12 13:30

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Semi-Volatiles Organics									
Fluorene	ND	336	ug/kg dry	1.00	08/06/12 21:13	EPA 8270D		RJM	B2G0761
Indeno(1,2,3-cd)pyrene	ND	336	ug/kg dry	1.00	08/06/12 21:13	EPA 8270D		RJM	B2G0761
Phenanthrene	ND	336	ug/kg dry	1.00	08/06/12 21:13	EPA 8270D		RJM	B2G0761
Pyrene	**417**	336	ug/kg dry	1.00	08/06/12 21:13	EPA 8270D		RJM	B2G0761
Surrogates				%REC	%REC Limits		Flag		
2-Fluorobiphenyl				83	30-115				
Nitrobenzene-D5				79	23-120				
Terphenyl-D14				72	18-137				
Organochlorine Pesticides							X		
Aldrin	ND	33.0	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
alpha-BHC	ND	33.0	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
beta-BHC	ND	33.0	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
delta-BHC	ND	33.0	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
Gamma-BHC (Lindane)	ND	33.0	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
Chlordane	ND	330	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
4,4'-DDD	ND	33.0	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
4,4'-DDE	ND	33.0	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
4,4'-DDT	ND	33.0	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
Dieldrin	ND	33.0	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
Endosulfan I	ND	33.0	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
Endosulfan II	ND	33.0	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
Endosulfan sulfate	ND	33.0	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
Endrin	ND	33.0	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
Endrin aldehyde	ND	33.0	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
Heptachlor	ND	33.0	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
Heptachlor epoxide	ND	33.0	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
Toxaphene	ND	330	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
Methoxychlor	ND	65.9	ug/kg dry	10.0	08/09/12 11:34	EPA 8081B		RKH	B2H0011
Surrogates				%REC	%REC Limits		Flag		
2,4,5,6-Tetrachloro-m-xylene				0	60-130		DO		
Decachlorobiphenyl				0	30-150		DO		
PCBs							X		
PCB-1016	ND	330	ug/kg dry	10.0	08/09/12 11:34	EPA 8082A		RKH	B2H0010
PCB-1221	ND	330	ug/kg dry	10.0	08/09/12 11:34	EPA 8082A		RKH	B2H0010
PCB-1232	ND	330	ug/kg dry	10.0	08/09/12 11:34	EPA 8082A		RKH	B2H0010
PCB-1242	ND	330	ug/kg dry	10.0	08/09/12 11:34	EPA 8082A		RKH	B2H0010

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-02
Sample Description LC-2 (3-7') collected on 07/23/12 13:30

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1248	ND	330	ug/kg dry	10.0	08/09/12 11:34	EPA 8082A		RKH	B2H0010
PCB-1254	ND	330	ug/kg dry	10.0	08/09/12 11:34	EPA 8082A		RKH	B2H0010
PCB-1260	ND	330	ug/kg dry	10.0	08/09/12 11:34	EPA 8082A		RKH	B2H0010

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-03
Sample Description LC-2 (7-11') collected on 07/23/12 14:20

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
General Chemistry Parameters									
Total Solids	**61.7**	0.10	%	1.00	07/26/12 09:35	Dry Weight		CGW	B2G0685
Total Metals									
Aluminum	**54400**	1970	mg/kg dry	500	07/31/12 12:41	EPA 6010C		KFJ	B2G0741
Antimony	ND	3.93	mg/kg dry	1.00	07/31/12 16:00	EPA 6010C		KFJ	B2G0741
Arsenic	**10.5**	3.93	mg/kg dry	1.00	07/31/12 16:00	EPA 6010C		KFJ	B2G0741
Barium	**178**	19.7	mg/kg dry	5.00	08/07/12 12:27	EPA 6010C		KFJ	B2G0741
Beryllium	ND	3.93	mg/kg dry	1.00	07/31/12 16:00	EPA 6010C	X	KFJ	B2G0741
Cadmium	ND	1.57	mg/kg dry	1.00	07/31/12 16:00	EPA 6010C		KFJ	B2G0741
Calcium	**1580**	197	mg/kg dry	50.0	07/31/12 13:20	EPA 6010C		KFJ	B2G0741
Chromium	**49.1**	3.93	mg/kg dry	1.00	07/31/12 16:00	EPA 6010C		KFJ	B2G0741
Cobalt	**15.1**	1.57	mg/kg dry	1.00	07/31/12 16:00	EPA 6010C		KFJ	B2G0741
Copper	**63.6**	1.57	mg/kg dry	1.00	07/31/12 16:00	EPA 6010C		KFJ	B2G0741
Iron	**72700**	1970	mg/kg dry	500	07/31/12 12:41	EPA 6010C		KFJ	B2G0741
Lead	**82.2**	3.93	mg/kg dry	1.00	07/31/12 16:00	EPA 6010C		KFJ	B2G0741
Magnesium	**1850**	197	mg/kg dry	50.0	07/31/12 13:20	EPA 6010C		KFJ	B2G0741
Manganese	**896**	78.6	mg/kg dry	50.0	07/31/12 13:20	EPA 6010C		KFJ	B2G0741
Mercury	**0.88**	0.16	mg/kg dry	5.00	08/06/12 14:25	EPA 7471B		MER	B2H0129
Nickel	**12.6**	1.57	mg/kg dry	1.00	07/31/12 16:00	EPA 6010C		KFJ	B2G0741
Potassium	**1450**	393	mg/kg dry	50.0	07/31/12 13:20	EPA 6010C		KFJ	B2G0741
Selenium	ND	19.7	mg/kg dry	5.00	08/07/12 12:27	EPA 6010C	X	KFJ	B2G0741
Silver	ND	1.57	mg/kg dry	1.00	07/31/12 16:00	EPA 6010C		KFJ	B2G0741
Sodium	**109**	7.86	mg/kg dry	1.00	07/31/12 16:00	EPA 6010C		KFJ	B2G0741
Thallium	ND	3.93	mg/kg dry	1.00	07/31/12 16:00	EPA 6010C		KFJ	B2G0741
Vanadium	**93.9**	1.57	mg/kg dry	1.00	07/31/12 16:00	EPA 6010C		KFJ	B2G0741
Zinc	**275**	19.7	mg/kg dry	5.00	08/07/12 12:27	EPA 6010C		KFJ	B2G0741
Semi-Volatiles Organics									
Acenaphthene	ND	275	ug/kg dry	1.00	08/06/12 21:50	EPA 8270D		RJM	B2G0761
Acenaphthylene	ND	275	ug/kg dry	1.00	08/06/12 21:50	EPA 8270D		RJM	B2G0761
Anthracene	ND	275	ug/kg dry	1.00	08/06/12 21:50	EPA 8270D		RJM	B2G0761
Benzo(a)anthracene	ND	275	ug/kg dry	1.00	08/06/12 21:50	EPA 8270D		RJM	B2G0761
Benzo(a)pyrene	ND	275	ug/kg dry	1.00	08/06/12 21:50	EPA 8270D		RJM	B2G0761
Benzo(b)fluoranthene	ND	275	ug/kg dry	1.00	08/06/12 21:50	EPA 8270D		RJM	B2G0761
Benzo(g,h,i)perylene	ND	275	ug/kg dry	1.00	08/06/12 21:50	EPA 8270D		RJM	B2G0761
Benzo(k)fluoranthene	ND	275	ug/kg dry	1.00	08/06/12 21:50	EPA 8270D		RJM	B2G0761
Chrysene	ND	275	ug/kg dry	1.00	08/06/12 21:50	EPA 8270D		RJM	B2G0761
Dibenzo(a,h)anthracene	ND	275	ug/kg dry	1.00	08/06/12 21:50	EPA 8270D		RJM	B2G0761
Fluoranthene	ND	275	ug/kg dry	1.00	08/06/12 21:50	EPA 8270D		RJM	B2G0761

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-03
Sample Description LC-2 (7-11') collected on 07/23/12 14:20

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Semi-Volatiles Organics									
Fluorene	ND	275	ug/kg dry	1.00	08/06/12 21:50	EPA 8270D		RJM	B2G0761
Indeno(1,2,3-cd)pyrene	ND	275	ug/kg dry	1.00	08/06/12 21:50	EPA 8270D		RJM	B2G0761
Phenanthrene	ND	275	ug/kg dry	1.00	08/06/12 21:50	EPA 8270D		RJM	B2G0761
Pyrene	ND	275	ug/kg dry	1.00	08/06/12 21:50	EPA 8270D		RJM	B2G0761

Surrogates	%REC	%REC Limits	Flag
2-Fluorobiphenyl	68	30-115	
Nitrobenzene-D5	69	23-120	
Terphenyl-D14	84	18-137	

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Organochlorine Pesticides							X		
Aldrin	ND	27.0	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011
alpha-BHC	ND	27.0	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011
beta-BHC	ND	27.0	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011
delta-BHC	ND	27.0	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011
Gamma-BHC (Lindane)	ND	27.0	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011
Chlordane	ND	270	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011
4,4'-DDD	ND	27.0	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011
4,4'-DDE	ND	27.0	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011
4,4'-DDT	ND	27.0	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011
Dieldrin	ND	27.0	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011
Endosulfan I	ND	27.0	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011
Endosulfan II	ND	27.0	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011
Endosulfan sulfate	ND	27.0	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011
Endrin	ND	27.0	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011
Endrin aldehyde	ND	27.0	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011
Heptachlor	ND	27.0	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011
Heptachlor epoxide	ND	27.0	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011
Toxaphene	ND	270	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011
Methoxychlor	ND	27.0	ug/kg dry	10.0	08/09/12 12:06	EPA 8081B		RKH	B2H0011

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1016	ND	270	ug/kg dry	10.0	08/09/12 12:06	EPA 8082A		RKH	B2H0010
PCB-1221	ND	270	ug/kg dry	10.0	08/09/12 12:06	EPA 8082A		RKH	B2H0010
PCB-1232	ND	270	ug/kg dry	10.0	08/09/12 12:06	EPA 8082A		RKH	B2H0010
PCB-1242	ND	270	ug/kg dry	10.0	08/09/12 12:06	EPA 8082A		RKH	B2H0010

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-03
Sample Description LC-2 (7-11') collected on 07/23/12 14:20

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1248	ND	270	ug/kg dry	10.0	08/09/12 12:06	EPA 8082A		RKH	B2H0010
PCB-1254	ND	270	ug/kg dry	10.0	08/09/12 12:06	EPA 8082A		RKH	B2H0010
PCB-1260	ND	270	ug/kg dry	10.0	08/09/12 12:06	EPA 8082A		RKH	B2H0010

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-04
Sample Description LC-5 (2-4') collected on 07/24/12 09:13

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
General Chemistry Parameters									
Total Solids	**42.8**	0.10	%	1.00	07/26/12 09:35	Dry Weight		CGW	B2G0685
Total Metals									
Aluminum	**41600**	2800	mg/kg dry	500	07/31/12 12:44	EPA 6010C		KFJ	B2G0741
Antimony	ND	5.59	mg/kg dry	1.00	07/31/12 16:03	EPA 6010C		KFJ	B2G0741
Arsenic	**7.86**	5.59	mg/kg dry	1.00	07/31/12 16:03	EPA 6010C		KFJ	B2G0741
Barium	**201**	28.0	mg/kg dry	5.00	08/07/12 12:30	EPA 6010C		KFJ	B2G0741
Beryllium	ND	5.59	mg/kg dry	1.00	07/31/12 16:03	EPA 6010C	X	KFJ	B2G0741
Cadmium	ND	2.24	mg/kg dry	1.00	07/31/12 16:03	EPA 6010C		KFJ	B2G0741
Calcium	**1690**	280	mg/kg dry	50.0	07/31/12 13:22	EPA 6010C		KFJ	B2G0741
Chromium	**75.6**	5.59	mg/kg dry	1.00	07/31/12 16:03	EPA 6010C		KFJ	B2G0741
Cobalt	**14.8**	2.24	mg/kg dry	1.00	07/31/12 16:03	EPA 6010C		KFJ	B2G0741
Copper	**50.8**	2.24	mg/kg dry	1.00	07/31/12 16:03	EPA 6010C		KFJ	B2G0741
Iron	**51400**	2800	mg/kg dry	500	07/31/12 12:44	EPA 6010C		KFJ	B2G0741
Lead	**85.8**	5.59	mg/kg dry	1.00	07/31/12 16:03	EPA 6010C		KFJ	B2G0741
Magnesium	**3860**	280	mg/kg dry	50.0	07/31/12 13:22	EPA 6010C		KFJ	B2G0741
Manganese	**407**	112	mg/kg dry	50.0	07/31/12 13:22	EPA 6010C		KFJ	B2G0741
Mercury	**0.25**	0.23	mg/kg dry	5.00	08/06/12 14:28	EPA 7471B		MER	B2H0129
Nickel	**18.4**	2.24	mg/kg dry	1.00	07/31/12 16:03	EPA 6010C		KFJ	B2G0741
Potassium	**3460**	559	mg/kg dry	50.0	07/31/12 13:22	EPA 6010C		KFJ	B2G0741
Selenium	ND	28.0	mg/kg dry	5.00	08/07/12 12:30	EPA 6010C	X	KFJ	B2G0741
Silver	ND	2.24	mg/kg dry	1.00	07/31/12 16:03	EPA 6010C		KFJ	B2G0741
Sodium	**112**	11.2	mg/kg dry	1.00	07/31/12 16:03	EPA 6010C		KFJ	B2G0741
Thallium	ND	5.59	mg/kg dry	1.00	07/31/12 16:03	EPA 6010C		KFJ	B2G0741
Vanadium	**87.4**	2.24	mg/kg dry	1.00	07/31/12 16:03	EPA 6010C		KFJ	B2G0741
Zinc	**289**	28.0	mg/kg dry	5.00	08/07/12 12:30	EPA 6010C		KFJ	B2G0741
Semi-Volatiles Organics									
Acenaphthene	ND	396	ug/kg dry	1.00	08/06/12 22:26	EPA 8270D		RJM	B2G0761
Acenaphthylene	ND	396	ug/kg dry	1.00	08/06/12 22:26	EPA 8270D		RJM	B2G0761
Anthracene	ND	396	ug/kg dry	1.00	08/06/12 22:26	EPA 8270D		RJM	B2G0761
Benzo(a)anthracene	ND	396	ug/kg dry	1.00	08/06/12 22:26	EPA 8270D		RJM	B2G0761
Benzo(a)pyrene	ND	396	ug/kg dry	1.00	08/06/12 22:26	EPA 8270D		RJM	B2G0761
Benzo(b)fluoranthene	**497**	396	ug/kg dry	1.00	08/06/12 22:26	EPA 8270D		RJM	B2G0761
Benzo(g,h,i)perylene	ND	396	ug/kg dry	1.00	08/06/12 22:26	EPA 8270D		RJM	B2G0761
Benzo(k)fluoranthene	ND	396	ug/kg dry	1.00	08/06/12 22:26	EPA 8270D		RJM	B2G0761
Chrysene	ND	396	ug/kg dry	1.00	08/06/12 22:26	EPA 8270D		RJM	B2G0761
Dibenzo(a,h)anthracene	ND	396	ug/kg dry	1.00	08/06/12 22:26	EPA 8270D		RJM	B2G0761
Fluoranthene	**521**	396	ug/kg dry	1.00	08/06/12 22:26	EPA 8270D		RJM	B2G0761

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-04
Sample Description LC-5 (2-4') collected on 07/24/12 09:13

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Semi-Volatiles Organics									
Fluorene	ND	396	ug/kg dry	1.00	08/06/12 22:26	EPA 8270D		RJM	B2G0761
Indeno(1,2,3-cd)pyrene	ND	396	ug/kg dry	1.00	08/06/12 22:26	EPA 8270D		RJM	B2G0761
Phenanthrene	ND	396	ug/kg dry	1.00	08/06/12 22:26	EPA 8270D		RJM	B2G0761
Pyrene	**407**	396	ug/kg dry	1.00	08/06/12 22:26	EPA 8270D		RJM	B2G0761

Surrogates	%REC	%REC Limits	Flag
2-Fluorobiphenyl	63	30-115	
Nitrobenzene-D5	90	23-120	
Terphenyl-D14	76	18-137	

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Organochlorine Pesticides							X		
Aldrin	ND	38.9	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011
alpha-BHC	ND	38.9	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011
beta-BHC	ND	38.9	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011
delta-BHC	ND	38.9	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011
Gamma-BHC (Lindane)	ND	38.9	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011
Chlordane	ND	389	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011
4,4'-DDD	ND	38.9	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011
4,4'-DDE	ND	38.9	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011
4,4'-DDT	ND	38.9	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011
Dieldrin	ND	38.9	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011
Endosulfan I	ND	38.9	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011
Endosulfan II	ND	38.9	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011
Endosulfan sulfate	ND	38.9	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011
Endrin	ND	38.9	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011
Endrin aldehyde	ND	38.9	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011
Heptachlor	ND	38.9	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011
Heptachlor epoxide	ND	38.9	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011
Toxaphene	ND	389	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011
Methoxychlor	ND	38.9	ug/kg dry	10.0	08/09/12 12:38	EPA 8081B		RKH	B2H0011

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1016	ND	389	ug/kg dry	10.0	08/09/12 12:38	EPA 8082A		RKH	B2H0010
PCB-1221	ND	389	ug/kg dry	10.0	08/09/12 12:38	EPA 8082A		RKH	B2H0010
PCB-1232	ND	389	ug/kg dry	10.0	08/09/12 12:38	EPA 8082A		RKH	B2H0010
PCB-1242	ND	389	ug/kg dry	10.0	08/09/12 12:38	EPA 8082A		RKH	B2H0010

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-04
Sample Description LC-5 (2-4') collected on 07/24/12 09:13

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1248	ND	389	ug/kg dry	10.0	08/09/12 12:38	EPA 8082A		RKH	B2H0010
PCB-1254	ND	389	ug/kg dry	10.0	08/09/12 12:38	EPA 8082A		RKH	B2H0010
PCB-1260	ND	389	ug/kg dry	10.0	08/09/12 12:38	EPA 8082A		RKH	B2H0010

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-05
Sample Description LC-7 (2-4') collected on 07/24/12 09:29

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
General Chemistry Parameters									
Total Solids	**42.2**	0.10	%	1.00	07/26/12 09:35	Dry Weight		CGW	B2G0685
Total Metals									
Aluminum	**50400**	2850	mg/kg dry	500	07/31/12 12:46	EPA 6010C		KFJ	B2G0741
Antimony	ND	5.70	mg/kg dry	1.00	07/31/12 16:06	EPA 6010C		KFJ	B2G0741
Arsenic	**8.71**	5.70	mg/kg dry	1.00	07/31/12 16:06	EPA 6010C		KFJ	B2G0741
Barium	**207**	28.5	mg/kg dry	5.00	08/07/12 12:33	EPA 6010C		KFJ	B2G0741
Beryllium	ND	5.70	mg/kg dry	1.00	07/31/12 16:06	EPA 6010C	X	KFJ	B2G0741
Cadmium	ND	2.28	mg/kg dry	1.00	07/31/12 16:06	EPA 6010C		KFJ	B2G0741
Calcium	**1460**	285	mg/kg dry	50.0	07/31/12 13:25	EPA 6010C		KFJ	B2G0741
Chromium	**85.6**	5.70	mg/kg dry	1.00	07/31/12 16:06	EPA 6010C		KFJ	B2G0741
Cobalt	**13.4**	2.28	mg/kg dry	1.00	07/31/12 16:06	EPA 6010C		KFJ	B2G0741
Copper	**51.1**	2.28	mg/kg dry	1.00	07/31/12 16:06	EPA 6010C		KFJ	B2G0741
Iron	**50800**	2850	mg/kg dry	500	07/31/12 12:46	EPA 6010C		KFJ	B2G0741
Lead	**90.5**	5.70	mg/kg dry	1.00	07/31/12 16:06	EPA 6010C		KFJ	B2G0741
Magnesium	**3720**	285	mg/kg dry	50.0	07/31/12 13:25	EPA 6010C		KFJ	B2G0741
Manganese	**270**	114	mg/kg dry	50.0	07/31/12 13:25	EPA 6010C		KFJ	B2G0741
Mercury	**0.25**	0.23	mg/kg dry	5.00	08/06/12 14:30	EPA 7471B		MER	B2H0129
Nickel	**19.0**	2.28	mg/kg dry	1.00	07/31/12 16:06	EPA 6010C		KFJ	B2G0741
Potassium	**3480**	570	mg/kg dry	50.0	07/31/12 13:25	EPA 6010C		KFJ	B2G0741
Selenium	ND	28.5	mg/kg dry	5.00	08/07/12 12:33	EPA 6010C	X	KFJ	B2G0741
Silver	ND	2.28	mg/kg dry	1.00	07/31/12 16:06	EPA 6010C		KFJ	B2G0741
Sodium	**115**	11.4	mg/kg dry	1.00	07/31/12 16:06	EPA 6010C		KFJ	B2G0741
Thallium	ND	5.70	mg/kg dry	1.00	07/31/12 16:06	EPA 6010C		KFJ	B2G0741
Vanadium	**99.5**	2.28	mg/kg dry	1.00	07/31/12 16:06	EPA 6010C		KFJ	B2G0741
Zinc	**231**	28.5	mg/kg dry	5.00	08/07/12 12:33	EPA 6010C		KFJ	B2G0741
Semi-Volatiles Organics									
Acenaphthene	ND	402	ug/kg dry	1.00	08/06/12 23:03	EPA 8270D		RJM	B2G0761
Acenaphthylene	ND	402	ug/kg dry	1.00	08/06/12 23:03	EPA 8270D		RJM	B2G0761
Anthracene	ND	402	ug/kg dry	1.00	08/06/12 23:03	EPA 8270D		RJM	B2G0761
Benzo(a)anthracene	ND	402	ug/kg dry	1.00	08/06/12 23:03	EPA 8270D		RJM	B2G0761
Benzo(a)pyrene	ND	402	ug/kg dry	1.00	08/06/12 23:03	EPA 8270D		RJM	B2G0761
Benzo(b)fluoranthene	**587**	402	ug/kg dry	1.00	08/06/12 23:03	EPA 8270D		RJM	B2G0761
Benzo(g,h,i)perylene	ND	402	ug/kg dry	1.00	08/06/12 23:03	EPA 8270D		RJM	B2G0761
Benzo(k)fluoranthene	ND	402	ug/kg dry	1.00	08/06/12 23:03	EPA 8270D		RJM	B2G0761
Chrysene	**426**	402	ug/kg dry	1.00	08/06/12 23:03	EPA 8270D		RJM	B2G0761
Dibenzo(a,h)anthracene	ND	402	ug/kg dry	1.00	08/06/12 23:03	EPA 8270D		RJM	B2G0761
Fluoranthene	**621**	402	ug/kg dry	1.00	08/06/12 23:03	EPA 8270D		RJM	B2G0761

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-05
Sample Description LC-7 (2-4') collected on 07/24/12 09:29

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Semi-Volatiles Organics									
Fluorene	ND	402	ug/kg dry	1.00	08/06/12 23:03	EPA 8270D		RJM	B2G0761
Indeno(1,2,3-cd)pyrene	ND	402	ug/kg dry	1.00	08/06/12 23:03	EPA 8270D		RJM	B2G0761
Phenanthrene	ND	402	ug/kg dry	1.00	08/06/12 23:03	EPA 8270D		RJM	B2G0761
Pyrene	**460**	402	ug/kg dry	1.00	08/06/12 23:03	EPA 8270D		RJM	B2G0761
Surrogates				%REC	%REC Limits		Flag		
2-Fluorobiphenyl				68	30-115				
Nitrobenzene-D5				68	23-120				
Terphenyl-D14				76	18-137				
Organochlorine Pesticides							X		
Aldrin	ND	39.4	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
alpha-BHC	ND	39.4	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
beta-BHC	ND	39.4	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
delta-BHC	ND	39.4	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
Gamma-BHC (Lindane)	ND	39.4	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
Chlordane	ND	394	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
4,4'-DDD	ND	39.4	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
4,4'-DDE	ND	39.4	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
4,4'-DDT	ND	39.4	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
Dieldrin	ND	39.4	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
Endosulfan I	ND	39.4	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
Endosulfan II	ND	39.4	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
Endosulfan sulfate	ND	39.4	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
Endrin	ND	39.4	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
Endrin aldehyde	ND	39.4	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
Heptachlor	ND	39.4	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
Heptachlor epoxide	ND	39.4	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
Toxaphene	ND	394	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
Methoxychlor	ND	39.4	ug/kg dry	10.0	08/09/12 13:10	EPA 8081B		RKH	B2H0011
Surrogates				%REC	%REC Limits		Flag		
2,4,5,6-Tetrachloro-m-xylene				0	60-130		DO		
Decachlorobiphenyl				0	30-150		DO		
PCBs							X		
PCB-1016	ND	394	ug/kg dry	10.0	08/09/12 13:10	EPA 8082A		RKH	B2H0010
PCB-1221	ND	394	ug/kg dry	10.0	08/09/12 13:10	EPA 8082A		RKH	B2H0010
PCB-1232	ND	394	ug/kg dry	10.0	08/09/12 13:10	EPA 8082A		RKH	B2H0010
PCB-1242	ND	394	ug/kg dry	10.0	08/09/12 13:10	EPA 8082A		RKH	B2H0010

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-05
Sample Description LC-7 (2-4') collected on 07/24/12 09:29

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1248	ND	394	ug/kg dry	10.0	08/09/12 13:10	EPA 8082A		RKH	B2H0010
PCB-1254	ND	394	ug/kg dry	10.0	08/09/12 13:10	EPA 8082A		RKH	B2H0010
PCB-1260	ND	394	ug/kg dry	10.0	08/09/12 13:10	EPA 8082A		RKH	B2H0010

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-06
Sample Description LC-8 (2-4') collected on 07/24/12 09:40

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
General Chemistry Parameters									
Total Solids	**51.5**	0.10	%	1.00	07/26/12 09:35	Dry Weight		CGW	B2G0685
Total Metals									
Aluminum	**51600**	2340	mg/kg dry	500	07/31/12 12:48	EPA 6010C		KFJ	B2G0741
Antimony	ND	4.68	mg/kg dry	1.00	07/31/12 16:09	EPA 6010C		KFJ	B2G0741
Arsenic	**9.02**	4.68	mg/kg dry	1.00	07/31/12 16:09	EPA 6010C		KFJ	B2G0741
Barium	**304**	23.4	mg/kg dry	5.00	08/07/12 12:35	EPA 6010C		KFJ	B2G0741
Beryllium	ND	4.68	mg/kg dry	1.00	07/31/12 16:09	EPA 6010C	X	KFJ	B2G0741
Cadmium	**9.00**	1.87	mg/kg dry	1.00	07/31/12 16:09	EPA 6010C		KFJ	B2G0741
Calcium	**1270**	234	mg/kg dry	50.0	07/31/12 13:27	EPA 6010C		KFJ	B2G0741
Chromium	**1270**	234	mg/kg dry	50.0	07/31/12 13:27	EPA 6010C		KFJ	B2G0741
Cobalt	**9.85**	1.87	mg/kg dry	1.00	07/31/12 16:09	EPA 6010C		KFJ	B2G0741
Copper	**82.5**	1.87	mg/kg dry	1.00	07/31/12 16:09	EPA 6010C		KFJ	B2G0741
Iron	**46200**	2340	mg/kg dry	500	07/31/12 12:48	EPA 6010C		KFJ	B2G0741
Lead	**297**	4.68	mg/kg dry	1.00	07/31/12 16:09	EPA 6010C		KFJ	B2G0741
Magnesium	**2900**	234	mg/kg dry	50.0	07/31/12 13:27	EPA 6010C		KFJ	B2G0741
Manganese	**222**	93.6	mg/kg dry	50.0	07/31/12 13:27	EPA 6010C		KFJ	B2G0741
Mercury	**0.77**	0.19	mg/kg dry	5.00	08/06/12 14:33	EPA 7471B		MER	B2H0129
Nickel	**16.6**	1.87	mg/kg dry	1.00	07/31/12 16:09	EPA 6010C		KFJ	B2G0741
Potassium	**2350**	468	mg/kg dry	50.0	07/31/12 13:27	EPA 6010C		KFJ	B2G0741
Selenium	ND	23.4	mg/kg dry	5.00	08/07/12 12:35	EPA 6010C	X	KFJ	B2G0741
Silver	**2.04**	1.87	mg/kg dry	1.00	07/31/12 16:09	EPA 6010C		KFJ	B2G0741
Sodium	**97.8**	9.36	mg/kg dry	1.00	07/31/12 16:09	EPA 6010C		KFJ	B2G0741
Thallium	ND	4.68	mg/kg dry	1.00	07/31/12 16:09	EPA 6010C		KFJ	B2G0741
Vanadium	**87.4**	1.87	mg/kg dry	1.00	07/31/12 16:09	EPA 6010C		KFJ	B2G0741
Zinc	**330**	23.4	mg/kg dry	5.00	08/07/12 12:35	EPA 6010C		KFJ	B2G0741
Semi-Volatiles Organics									
Acenaphthene	ND	329	ug/kg dry	1.00	08/06/12 23:40	EPA 8270D		RJM	B2G0761
Acenaphthylene	ND	329	ug/kg dry	1.00	08/06/12 23:40	EPA 8270D		RJM	B2G0761
Anthracene	ND	329	ug/kg dry	1.00	08/06/12 23:40	EPA 8270D		RJM	B2G0761
Benzo(a)anthracene	ND	329	ug/kg dry	1.00	08/06/12 23:40	EPA 8270D		RJM	B2G0761
Benzo(a)pyrene	ND	329	ug/kg dry	1.00	08/06/12 23:40	EPA 8270D		RJM	B2G0761
Benzo(b)fluoranthene	ND	329	ug/kg dry	1.00	08/06/12 23:40	EPA 8270D		RJM	B2G0761
Benzo(g,h,i)perylene	ND	329	ug/kg dry	1.00	08/06/12 23:40	EPA 8270D		RJM	B2G0761
Benzo(k)fluoranthene	ND	329	ug/kg dry	1.00	08/06/12 23:40	EPA 8270D		RJM	B2G0761
Chrysene	ND	329	ug/kg dry	1.00	08/06/12 23:40	EPA 8270D		RJM	B2G0761
Dibenzo(a,h)anthracene	ND	329	ug/kg dry	1.00	08/06/12 23:40	EPA 8270D		RJM	B2G0761
Fluoranthene	ND	329	ug/kg dry	1.00	08/06/12 23:40	EPA 8270D		RJM	B2G0761

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-06
Sample Description LC-8 (2-4') collected on 07/24/12 09:40

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Semi-Volatiles Organics									
Fluorene	ND	329	ug/kg dry	1.00	08/06/12 23:40	EPA 8270D		RJM	B2G0761
Indeno(1,2,3-cd)pyrene	ND	329	ug/kg dry	1.00	08/06/12 23:40	EPA 8270D		RJM	B2G0761
Phenanthrene	ND	329	ug/kg dry	1.00	08/06/12 23:40	EPA 8270D		RJM	B2G0761
Pyrene	ND	329	ug/kg dry	1.00	08/06/12 23:40	EPA 8270D		RJM	B2G0761
Surrogates				%REC	%REC Limits		Flag		
2-Fluorobiphenyl				61	30-115				
Nitrobenzene-D5				56	23-120				
Terphenyl-D14				69	18-137				
Organochlorine Pesticides							X		
Aldrin	ND	64.6	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
alpha-BHC	ND	64.6	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
beta-BHC	ND	64.6	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
delta-BHC	ND	64.6	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
Gamma-BHC (Lindane)	ND	64.6	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
Chlordane	ND	646	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
4,4'-DDD	ND	64.6	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
4,4'-DDE	ND	64.6	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
4,4'-DDT	ND	64.6	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
Dieldrin	ND	64.6	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
Endosulfan I	ND	64.6	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
Endosulfan II	ND	64.6	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
Endosulfan sulfate	ND	64.6	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
Endrin	ND	64.6	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
Endrin aldehyde	ND	64.6	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
Heptachlor	ND	64.6	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
Heptachlor epoxide	ND	64.6	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
Toxaphene	ND	646	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
Methoxychlor	**84.0**	64.6	ug/kg dry	20.0	08/08/12 08:24	EPA 8081B		RKH	B2H0011
Surrogates				%REC	%REC Limits		Flag		
2,4,5,6-Tetrachloro-m-xylene				0	60-130		DO		
Decachlorobiphenyl				0	30-150		DO		
PCBs							X		
PCB-1016	ND	646	ug/kg dry	20.0	08/08/12 08:24	EPA 8082A		RKH	B2H0010
PCB-1221	ND	646	ug/kg dry	20.0	08/08/12 08:24	EPA 8082A		RKH	B2H0010
PCB-1232	ND	646	ug/kg dry	20.0	08/08/12 08:24	EPA 8082A		RKH	B2H0010
PCB-1242	ND	646	ug/kg dry	20.0	08/08/12 08:24	EPA 8082A		RKH	B2H0010

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-06
Sample Description LC-8 (2-4') collected on 07/24/12 09:40

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1248	ND	646	ug/kg dry	20.0	08/08/12 08:24	EPA 8082A		RKH	B2H0010
PCB-1254	ND	646	ug/kg dry	20.0	08/08/12 08:24	EPA 8082A		RKH	B2H0010
PCB-1260	ND	646	ug/kg dry	20.0	08/08/12 08:24	EPA 8082A		RKH	B2H0010

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-07
Sample Description LC-6 (2.5-5') collected on 07/24/12 10:11

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
General Chemistry Parameters									
Total Solids	**49.9**	0.10	%	1.00	07/26/12 09:35	Dry Weight		CGW	B2G0685
Total Metals									
Aluminum	**46200**	2500	mg/kg dry	500	07/31/12 12:51	EPA 6010C		KFJ	B2G0741
Antimony	**7.02**	5.00	mg/kg dry	1.00	07/31/12 16:12	EPA 6010C		KFJ	B2G0741
Arsenic	**9.68**	5.00	mg/kg dry	1.00	07/31/12 16:12	EPA 6010C		KFJ	B2G0741
Barium	**187**	25.0	mg/kg dry	5.00	08/07/12 12:38	EPA 6010C		KFJ	B2G0741
Beryllium	ND	5.00	mg/kg dry	1.00	07/31/12 16:12	EPA 6010C	X	KFJ	B2G0741
Cadmium	ND	2.00	mg/kg dry	1.00	07/31/12 16:12	EPA 6010C		KFJ	B2G0741
Calcium	**1060**	250	mg/kg dry	50.0	07/31/12 13:30	EPA 6010C		KFJ	B2G0741
Chromium	**83.3**	5.00	mg/kg dry	1.00	07/31/12 16:12	EPA 6010C		KFJ	B2G0741
Cobalt	**14.4**	2.00	mg/kg dry	1.00	07/31/12 16:12	EPA 6010C		KFJ	B2G0741
Copper	**48.4**	2.00	mg/kg dry	1.00	07/31/12 16:12	EPA 6010C		KFJ	B2G0741
Iron	**54200**	2500	mg/kg dry	500	07/31/12 12:51	EPA 6010C		KFJ	B2G0741
Lead	**88.4**	5.00	mg/kg dry	1.00	07/31/12 16:12	EPA 6010C		KFJ	B2G0741
Magnesium	**3920**	250	mg/kg dry	50.0	07/31/12 13:30	EPA 6010C		KFJ	B2G0741
Manganese	**333**	100	mg/kg dry	50.0	07/31/12 13:30	EPA 6010C		KFJ	B2G0741
Mercury	**0.23**	0.20	mg/kg dry	5.00	08/06/12 14:36	EPA 7471B		MER	B2H0129
Nickel	**18.6**	2.00	mg/kg dry	1.00	07/31/12 16:12	EPA 6010C		KFJ	B2G0741
Potassium	**3680**	500	mg/kg dry	50.0	07/31/12 13:30	EPA 6010C		KFJ	B2G0741
Selenium	ND	25.0	mg/kg dry	5.00	08/07/12 12:38	EPA 6010C	X	KFJ	B2G0741
Silver	ND	2.00	mg/kg dry	1.00	07/31/12 16:12	EPA 6010C		KFJ	B2G0741
Sodium	**98.2**	10.0	mg/kg dry	1.00	07/31/12 16:12	EPA 6010C		KFJ	B2G0741
Thallium	ND	5.00	mg/kg dry	1.00	07/31/12 16:12	EPA 6010C		KFJ	B2G0741
Vanadium	**95.5**	2.00	mg/kg dry	1.00	07/31/12 16:12	EPA 6010C		KFJ	B2G0741
Zinc	**203**	25.0	mg/kg dry	5.00	08/07/12 12:38	EPA 6010C		KFJ	B2G0741
Semi-Volatiles Organics							Z		
Acenaphthene	ND	677	ug/kg dry	2.00	08/09/12 19:32	EPA 8270D		RJM	B2H0088
Acenaphthylene	ND	677	ug/kg dry	2.00	08/09/12 19:32	EPA 8270D		RJM	B2H0088
Anthracene	ND	677	ug/kg dry	2.00	08/09/12 19:32	EPA 8270D		RJM	B2H0088
Benzo(a)anthracene	ND	677	ug/kg dry	2.00	08/09/12 19:32	EPA 8270D		RJM	B2H0088
Benzo(a)pyrene	ND	677	ug/kg dry	2.00	08/09/12 19:32	EPA 8270D		RJM	B2H0088
Benzo(b)fluoranthene	ND	677	ug/kg dry	2.00	08/09/12 19:32	EPA 8270D		RJM	B2H0088
Benzo(g,h,i)perylene	ND	677	ug/kg dry	2.00	08/09/12 19:32	EPA 8270D		RJM	B2H0088
Benzo(k)fluoranthene	ND	677	ug/kg dry	2.00	08/09/12 19:32	EPA 8270D		RJM	B2H0088
Chrysene	ND	677	ug/kg dry	2.00	08/09/12 19:32	EPA 8270D		RJM	B2H0088
Dibenzo(a,h)anthracene	ND	677	ug/kg dry	2.00	08/09/12 19:32	EPA 8270D		RJM	B2H0088
Fluoranthene	ND	677	ug/kg dry	2.00	08/09/12 19:32	EPA 8270D		RJM	B2H0088

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-07
Sample Description LC-6 (2.5-5') collected on 07/24/12 10:11

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Semi-Volatiles Organics							Z		
Fluorene	ND	677	ug/kg dry	2.00	08/09/12 19:32	EPA 8270D		RJM	B2H0088
Indeno(1,2,3-cd)pyrene	ND	677	ug/kg dry	2.00	08/09/12 19:32	EPA 8270D		RJM	B2H0088
Phenanthrene	ND	677	ug/kg dry	2.00	08/09/12 19:32	EPA 8270D		RJM	B2H0088
Pyrene	ND	677	ug/kg dry	2.00	08/09/12 19:32	EPA 8270D		RJM	B2H0088

Surrogates	%REC	%REC Limits	Flag
2-Fluorobiphenyl	88	30-115	
Nitrobenzene-D5	84	23-120	
Terphenyl-D14	94	18-137	

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Organochlorine Pesticides							X		
Aldrin	ND	66.5	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011
alpha-BHC	ND	66.5	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011
beta-BHC	ND	66.5	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011
delta-BHC	ND	66.5	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011
Gamma-BHC (Lindane)	ND	66.5	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011
Chlordane	ND	665	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011
4,4'-DDD	ND	66.5	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011
4,4'-DDE	ND	66.5	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011
4,4'-DDT	ND	66.5	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011
Dieldrin	ND	66.5	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011
Endosulfan I	ND	66.5	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011
Endosulfan II	ND	66.5	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011
Endosulfan sulfate	ND	66.5	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011
Endrin	ND	66.5	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011
Endrin aldehyde	ND	66.5	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011
Heptachlor	ND	66.5	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011
Heptachlor epoxide	ND	66.5	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011
Toxaphene	ND	665	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011
Methoxychlor	ND	66.5	ug/kg dry	20.0	08/09/12 13:42	EPA 8081B		RKH	B2H0011

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1016	ND	665	ug/kg dry	20.0	08/09/12 13:42	EPA 8082A		RKH	B2H0010
PCB-1221	ND	665	ug/kg dry	20.0	08/09/12 13:42	EPA 8082A		RKH	B2H0010
PCB-1232	ND	665	ug/kg dry	20.0	08/09/12 13:42	EPA 8082A		RKH	B2H0010
PCB-1242	ND	665	ug/kg dry	20.0	08/09/12 13:42	EPA 8082A		RKH	B2H0010

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-07
Sample Description LC-6 (2.5-5') collected on 07/24/12 10:11

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1248	ND	665	ug/kg dry	20.0	08/09/12 13:42	EPA 8082A		RKH	B2H0010
PCB-1254	ND	665	ug/kg dry	20.0	08/09/12 13:42	EPA 8082A		RKH	B2H0010
PCB-1260	ND	665	ug/kg dry	20.0	08/09/12 13:42	EPA 8082A		RKH	B2H0010

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-08
Sample Description LC-6 (7.5-10') collected on 07/24/12 10:27

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
General Chemistry Parameters									
Total Solids	**47.8**	0.10	%	1.00	07/30/12 09:35	Dry Weight		KFJ	B2H0015
Total Metals									
Aluminum	**49400**	2500	mg/kg dry	500	07/31/12 12:53	EPA 6010C		KFJ	B2G0741
Antimony	ND	4.99	mg/kg dry	1.00	07/31/12 16:14	EPA 6010C		KFJ	B2G0741
Arsenic	**10.3**	4.99	mg/kg dry	1.00	07/31/12 16:14	EPA 6010C		KFJ	B2G0741
Barium	**270**	25.0	mg/kg dry	5.00	08/07/12 12:41	EPA 6010C		KFJ	B2G0741
Beryllium	ND	4.99	mg/kg dry	1.00	07/31/12 16:14	EPA 6010C	X	KFJ	B2G0741
Cadmium	**11.7**	2.00	mg/kg dry	1.00	07/31/12 16:14	EPA 6010C		KFJ	B2G0741
Calcium	**2200**	250	mg/kg dry	50.0	07/31/12 13:44	EPA 6010C		KFJ	B2G0741
Chromium	**1190**	250	mg/kg dry	50.0	07/31/12 13:44	EPA 6010C		KFJ	B2G0741
Cobalt	**10.9**	2.00	mg/kg dry	1.00	07/31/12 16:14	EPA 6010C		KFJ	B2G0741
Copper	**104**	2.00	mg/kg dry	1.00	07/31/12 16:14	EPA 6010C		KFJ	B2G0741
Iron	**53400**	2500	mg/kg dry	500	07/31/12 12:53	EPA 6010C		KFJ	B2G0741
Lead	**217**	4.99	mg/kg dry	1.00	07/31/12 16:14	EPA 6010C		KFJ	B2G0741
Magnesium	**2980**	250	mg/kg dry	50.0	07/31/12 13:44	EPA 6010C		KFJ	B2G0741
Manganese	**378**	99.8	mg/kg dry	50.0	07/31/12 13:44	EPA 6010C		KFJ	B2G0741
Mercury	**0.92**	0.20	mg/kg dry	5.00	08/06/12 14:39	EPA 7471B		MER	B2H0129
Nickel	**18.0**	2.00	mg/kg dry	1.00	07/31/12 16:14	EPA 6010C		KFJ	B2G0741
Potassium	**2710**	499	mg/kg dry	50.0	07/31/12 13:44	EPA 6010C		KFJ	B2G0741
Selenium	ND	25.0	mg/kg dry	5.00	08/07/12 12:41	EPA 6010C	X	KFJ	B2G0741
Silver	**2.68**	2.00	mg/kg dry	1.00	07/31/12 16:14	EPA 6010C		KFJ	B2G0741
Sodium	**161**	9.98	mg/kg dry	1.00	07/31/12 16:14	EPA 6010C		KFJ	B2G0741
Thallium	ND	4.99	mg/kg dry	1.00	07/31/12 16:14	EPA 6010C		KFJ	B2G0741
Vanadium	**80.7**	2.00	mg/kg dry	1.00	07/31/12 16:14	EPA 6010C		KFJ	B2G0741
Zinc	**467**	25.0	mg/kg dry	5.00	08/07/12 12:41	EPA 6010C		KFJ	B2G0741
Semi-Volatiles Organics							X, Za		
Acenaphthene	ND	354	ug/kg dry	1.00	08/09/12 18:55	EPA 8270D		RJM	B2G0761
Acenaphthylene	ND	354	ug/kg dry	1.00	08/09/12 18:55	EPA 8270D		RJM	B2G0761
Anthracene	**357**	354	ug/kg dry	1.00	08/09/12 18:55	EPA 8270D		RJM	B2G0761
Benzo(a)anthracene	**524**	354	ug/kg dry	1.00	08/09/12 18:55	EPA 8270D		RJM	B2G0761
Benzo(a)pyrene	**623**	354	ug/kg dry	1.00	08/09/12 18:55	EPA 8270D		RJM	B2G0761
Benzo(b)fluoranthene	**859**	354	ug/kg dry	1.00	08/09/12 18:55	EPA 8270D		RJM	B2G0761
Benzo(g,h,i)perylene	ND	354	ug/kg dry	1.00	08/09/12 18:55	EPA 8270D		RJM	B2G0761
Benzo(k)fluoranthene	ND	354	ug/kg dry	1.00	08/09/12 18:55	EPA 8270D		RJM	B2G0761
Chrysene	**622**	354	ug/kg dry	1.00	08/09/12 18:55	EPA 8270D		RJM	B2G0761
Dibenzo(a,h)anthracene	ND	354	ug/kg dry	1.00	08/09/12 18:55	EPA 8270D		RJM	B2G0761
Fluoranthene	**1320**	354	ug/kg dry	1.00	08/09/12 18:55	EPA 8270D		RJM	B2G0761

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-08
Sample Description LC-6 (7.5-10') collected on 07/24/12 10:27

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Semi-Volatiles Organics							X, Za		
Fluorene	ND	354	ug/kg dry	1.00	08/09/12 18:55	EPA 8270D		RJM	B2G0761
Indeno(1,2,3-cd)pyrene	ND	354	ug/kg dry	1.00	08/09/12 18:55	EPA 8270D		RJM	B2G0761
Phenanthrene	**1490**	354	ug/kg dry	1.00	08/09/12 18:55	EPA 8270D		RJM	B2G0761
Pyrene	**1390**	354	ug/kg dry	1.00	08/09/12 18:55	EPA 8270D		RJM	B2G0761
Surrogates				%REC	%REC Limits		Flag		
2-Fluorobiphenyl				79	30-115				
Nitrobenzene-D5				71	23-120				
Terphenyl-D14				76	18-137				
Organochlorine Pesticides							X		
Aldrin	ND	69.6	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
alpha-BHC	ND	69.6	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
beta-BHC	ND	69.6	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
delta-BHC	ND	69.6	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
Gamma-BHC (Lindane)	ND	69.6	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
Chlordane	ND	696	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
4,4'-DDD	ND	69.6	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
4,4'-DDE	ND	69.6	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
4,4'-DDT	ND	69.6	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
Dieldrin	ND	69.6	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
Endosulfan I	ND	69.6	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
Endosulfan II	ND	69.6	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
Endosulfan sulfate	ND	69.6	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
Endrin	ND	69.6	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
Endrin aldehyde	ND	69.6	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
Heptachlor	ND	69.6	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
Heptachlor epoxide	ND	69.6	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
Toxaphene	ND	696	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
Methoxychlor	**717**	69.6	ug/kg dry	20.0	08/08/12 09:28	EPA 8081B		RKH	B2H0011
Surrogates				%REC	%REC Limits		Flag		
2,4,5,6-Tetrachloro-m-xylene				0	60-130		DO		
Decachlorobiphenyl				0	30-150		DO		
PCBs							X		
PCB-1016	ND	696	ug/kg dry	20.0	08/08/12 09:28	EPA 8082A		RKH	B2H0010
PCB-1221	ND	696	ug/kg dry	20.0	08/08/12 09:28	EPA 8082A		RKH	B2H0010
PCB-1232	ND	696	ug/kg dry	20.0	08/08/12 09:28	EPA 8082A		RKH	B2H0010
PCB-1242	ND	696	ug/kg dry	20.0	08/08/12 09:28	EPA 8082A		RKH	B2H0010

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-08
Sample Description LC-6 (7.5-10') collected on 07/24/12 10:27

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1248	ND	696	ug/kg dry	20.0	08/08/12 09:28	EPA 8082A		RKH	B2H0010
PCB-1254	ND	696	ug/kg dry	20.0	08/08/12 09:28	EPA 8082A		RKH	B2H0010
PCB-1260	ND	696	ug/kg dry	20.0	08/08/12 09:28	EPA 8082A		RKH	B2H0010

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-09
Sample Description LC-6 (14-16') collected on 07/24/12 10:50

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
General Chemistry Parameters									
Total Solids	**66.9**	0.10	%	1.00	07/30/12 09:35	Dry Weight		KFJ	B2H0015
Total Metals									
Aluminum	**36400**	1780	mg/kg dry	500	07/31/12 12:56	EPA 6010C		KFJ	B2G0741
Antimony	ND	3.56	mg/kg dry	1.00	07/31/12 16:32	EPA 6010C		KFJ	B2G0741
Arsenic	**7.72**	3.56	mg/kg dry	1.00	07/31/12 16:32	EPA 6010C		KFJ	B2G0741
Barium	**164**	17.8	mg/kg dry	5.00	08/07/12 12:43	EPA 6010C		KFJ	B2G0741
Beryllium	ND	3.56	mg/kg dry	1.00	07/31/12 16:32	EPA 6010C	X	KFJ	B2G0741
Cadmium	**2.46**	1.42	mg/kg dry	1.00	07/31/12 16:32	EPA 6010C		KFJ	B2G0741
Calcium	**817**	178	mg/kg dry	50.0	07/31/12 13:46	EPA 6010C		KFJ	B2G0741
Chromium	**291**	3.56	mg/kg dry	1.00	07/31/12 16:32	EPA 6010C		KFJ	B2G0741
Cobalt	**7.64**	1.42	mg/kg dry	1.00	07/31/12 16:32	EPA 6010C		KFJ	B2G0741
Copper	**52.0**	1.42	mg/kg dry	1.00	07/31/12 16:32	EPA 6010C		KFJ	B2G0741
Iron	**50800**	1780	mg/kg dry	500	07/31/12 12:56	EPA 6010C		KFJ	B2G0741
Lead	**93.6**	3.56	mg/kg dry	1.00	07/31/12 16:32	EPA 6010C		KFJ	B2G0741
Magnesium	**1640**	178	mg/kg dry	50.0	07/31/12 13:46	EPA 6010C		KFJ	B2G0741
Manganese	**251**	71.2	mg/kg dry	50.0	07/31/12 13:46	EPA 6010C		KFJ	B2G0741
Mercury	**0.81**	0.14	mg/kg dry	5.00	08/06/12 14:42	EPA 7471B		MER	B2H0129
Nickel	**8.99**	1.42	mg/kg dry	1.00	07/31/12 16:32	EPA 6010C		KFJ	B2G0741
Potassium	**1470**	356	mg/kg dry	50.0	07/31/12 13:46	EPA 6010C		KFJ	B2G0741
Selenium	ND	17.8	mg/kg dry	5.00	08/07/12 12:43	EPA 6010C	X	KFJ	B2G0741
Silver	ND	1.42	mg/kg dry	1.00	07/31/12 16:32	EPA 6010C		KFJ	B2G0741
Sodium	**103**	7.12	mg/kg dry	1.00	07/31/12 16:32	EPA 6010C		KFJ	B2G0741
Thallium	ND	3.56	mg/kg dry	1.00	07/31/12 16:32	EPA 6010C		KFJ	B2G0741
Vanadium	**79.8**	1.42	mg/kg dry	1.00	07/31/12 16:32	EPA 6010C		KFJ	B2G0741
Zinc	**238**	17.8	mg/kg dry	5.00	08/07/12 12:43	EPA 6010C		KFJ	B2G0741
Semi-Volatiles Organics									
Acenaphthene	ND	253	ug/kg dry	1.00	08/07/12 00:54	EPA 8270D		RJM	B2G0761
Acenaphthylene	ND	253	ug/kg dry	1.00	08/07/12 00:54	EPA 8270D		RJM	B2G0761
Anthracene	ND	253	ug/kg dry	1.00	08/07/12 00:54	EPA 8270D		RJM	B2G0761
Benzo(a)anthracene	ND	253	ug/kg dry	1.00	08/07/12 00:54	EPA 8270D		RJM	B2G0761
Benzo(a)pyrene	ND	253	ug/kg dry	1.00	08/07/12 00:54	EPA 8270D		RJM	B2G0761
Benzo(b)fluoranthene	ND	253	ug/kg dry	1.00	08/07/12 00:54	EPA 8270D		RJM	B2G0761
Benzo(g,h,i)perylene	ND	253	ug/kg dry	1.00	08/07/12 00:54	EPA 8270D		RJM	B2G0761
Benzo(k)fluoranthene	ND	253	ug/kg dry	1.00	08/07/12 00:54	EPA 8270D		RJM	B2G0761
Chrysene	ND	253	ug/kg dry	1.00	08/07/12 00:54	EPA 8270D		RJM	B2G0761
Dibenzo(a,h)anthracene	ND	253	ug/kg dry	1.00	08/07/12 00:54	EPA 8270D		RJM	B2G0761
Fluoranthene	**290**	253	ug/kg dry	1.00	08/07/12 00:54	EPA 8270D		RJM	B2G0761

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-09
Sample Description LC-6 (14-16') collected on 07/24/12 10:50

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Semi-Volatiles Organics									
Fluorene	ND	253	ug/kg dry	1.00	08/07/12 00:54	EPA 8270D		RJM	B2G0761
Indeno(1,2,3-cd)pyrene	ND	253	ug/kg dry	1.00	08/07/12 00:54	EPA 8270D		RJM	B2G0761
Phenanthrene	ND	253	ug/kg dry	1.00	08/07/12 00:54	EPA 8270D		RJM	B2G0761
Pyrene	**423**	253	ug/kg dry	1.00	08/07/12 00:54	EPA 8270D		RJM	B2G0761

Surrogates	%REC	%REC Limits	Flag
2-Fluorobiphenyl	83	30-115	
Nitrobenzene-D5	80	23-120	
Terphenyl-D14	92	18-137	

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Organochlorine Pesticides							X		
Aldrin	ND	24.9	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062
alpha-BHC	ND	24.9	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062
beta-BHC	ND	24.9	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062
delta-BHC	ND	24.9	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062
Gamma-BHC (Lindane)	ND	24.9	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062
Chlordane	ND	249	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062
4,4'-DDD	ND	24.9	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062
4,4'-DDE	ND	24.9	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062
4,4'-DDT	ND	24.9	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062
Dieldrin	ND	24.9	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062
Endosulfan I	ND	24.9	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062
Endosulfan II	ND	24.9	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062
Endosulfan sulfate	ND	24.9	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062
Endrin	ND	24.9	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062
Endrin aldehyde	ND	24.9	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062
Heptachlor	ND	24.9	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062
Heptachlor epoxide	ND	24.9	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062
Toxaphene	ND	249	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062
Methoxychlor	ND	24.9	ug/kg dry	10.0	08/11/12 19:44	EPA 8081B		RKH	B2H0062

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1016	ND	249	ug/kg dry	10.0	08/11/12 19:44	EPA 8082A		RKH	B2H0060
PCB-1221	ND	249	ug/kg dry	10.0	08/11/12 19:44	EPA 8082A		RKH	B2H0060
PCB-1232	ND	249	ug/kg dry	10.0	08/11/12 19:44	EPA 8082A		RKH	B2H0060
PCB-1242	ND	249	ug/kg dry	10.0	08/11/12 19:44	EPA 8082A		RKH	B2H0060

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-09
Sample Description LC-6 (14-16') collected on 07/24/12 10:50

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1248	ND	249	ug/kg dry	10.0	08/11/12 19:44	EPA 8082A		RKH	B2H0060
PCB-1254	ND	249	ug/kg dry	10.0	08/11/12 19:44	EPA 8082A		RKH	B2H0060
PCB-1260	ND	249	ug/kg dry	10.0	08/11/12 19:44	EPA 8082A		RKH	B2H0060

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-10
Sample Description LC-4 (2.5-5') collected on 07/24/12 13:28

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
General Chemistry Parameters									
Total Solids	**69.1**	0.10	%	1.00	07/30/12 09:35	Dry Weight		KFJ	B2H0015
Total Metals									
Aluminum	**7350**	1800	mg/kg dry	500	07/31/12 12:58	EPA 6010C		KFJ	B2G0741
Antimony	ND	3.60	mg/kg dry	1.00	07/31/12 16:35	EPA 6010C		KFJ	B2G0741
Arsenic	ND	3.60	mg/kg dry	1.00	07/31/12 16:35	EPA 6010C		KFJ	B2G0741
Barium	**60.1**	18.0	mg/kg dry	5.00	08/07/12 12:46	EPA 6010C		KFJ	B2G0741
Beryllium	ND	1.44	mg/kg dry	1.00	07/31/12 16:35	EPA 6010C		KFJ	B2G0741
Cadmium	ND	1.44	mg/kg dry	1.00	07/31/12 16:35	EPA 6010C		KFJ	B2G0741
Calcium	**247**	180	mg/kg dry	50.0	07/31/12 13:49	EPA 6010C		KFJ	B2G0741
Chromium	**51.0**	3.60	mg/kg dry	1.00	07/31/12 16:35	EPA 6010C		KFJ	B2G0741
Cobalt	**2.57**	1.44	mg/kg dry	1.00	07/31/12 16:35	EPA 6010C		KFJ	B2G0741
Copper	**8.29**	1.44	mg/kg dry	1.00	07/31/12 16:35	EPA 6010C		KFJ	B2G0741
Iron	**9960**	1800	mg/kg dry	500	07/31/12 12:58	EPA 6010C		KFJ	B2G0741
Lead	**28.2**	3.60	mg/kg dry	1.00	07/31/12 16:35	EPA 6010C		KFJ	B2G0741
Magnesium	**1360**	180	mg/kg dry	50.0	07/31/12 13:49	EPA 6010C		KFJ	B2G0741
Manganese	**56.7**	1.44	mg/kg dry	1.00	07/31/12 16:35	EPA 6010C		KFJ	B2G0741
Mercury	ND	0.14	mg/kg dry	5.00	08/06/12 14:44	EPA 7471B		MER	B2H0129
Nickel	**3.87**	1.44	mg/kg dry	1.00	07/31/12 16:35	EPA 6010C		KFJ	B2G0741
Potassium	**1200**	360	mg/kg dry	50.0	07/31/12 13:49	EPA 6010C		KFJ	B2G0741
Selenium	ND	18.0	mg/kg dry	5.00	08/07/12 12:46	EPA 6010C	X	KFJ	B2G0741
Silver	ND	1.44	mg/kg dry	1.00	07/31/12 16:35	EPA 6010C		KFJ	B2G0741
Sodium	**46.9**	7.19	mg/kg dry	1.00	07/31/12 16:35	EPA 6010C		KFJ	B2G0741
Thallium	ND	3.60	mg/kg dry	1.00	07/31/12 16:35	EPA 6010C		KFJ	B2G0741
Vanadium	**18.0**	1.44	mg/kg dry	1.00	07/31/12 16:35	EPA 6010C		KFJ	B2G0741
Zinc	**55.4**	18.0	mg/kg dry	5.00	08/07/12 12:46	EPA 6010C		KFJ	B2G0741
Semi-Volatiles Organics									
Acenaphthene	ND	245	ug/kg dry	1.00	08/07/12 01:31	EPA 8270D		RJM	B2G0761
Acenaphthylene	ND	245	ug/kg dry	1.00	08/07/12 01:31	EPA 8270D		RJM	B2G0761
Anthracene	ND	245	ug/kg dry	1.00	08/07/12 01:31	EPA 8270D		RJM	B2G0761
Benzo(a)anthracene	**289**	245	ug/kg dry	1.00	08/07/12 01:31	EPA 8270D		RJM	B2G0761
Benzo(a)pyrene	**266**	245	ug/kg dry	1.00	08/07/12 01:31	EPA 8270D		RJM	B2G0761
Benzo(b)fluoranthene	**418**	245	ug/kg dry	1.00	08/07/12 01:31	EPA 8270D		RJM	B2G0761
Benzo(g,h,i)perylene	ND	245	ug/kg dry	1.00	08/07/12 01:31	EPA 8270D		RJM	B2G0761
Benzo(k)fluoranthene	ND	245	ug/kg dry	1.00	08/07/12 01:31	EPA 8270D		RJM	B2G0761
Chrysene	**315**	245	ug/kg dry	1.00	08/07/12 01:31	EPA 8270D		RJM	B2G0761
Dibenzo(a,h)anthracene	ND	245	ug/kg dry	1.00	08/07/12 01:31	EPA 8270D		RJM	B2G0761
Fluoranthene	**543**	245	ug/kg dry	1.00	08/07/12 01:31	EPA 8270D		RJM	B2G0761

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-10
Sample Description LC-4 (2.5-5') collected on 07/24/12 13:28

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Semi-Volatiles Organics									
Fluorene	ND	245	ug/kg dry	1.00	08/07/12 01:31	EPA 8270D		RJM	B2G0761
Indeno(1,2,3-cd)pyrene	ND	245	ug/kg dry	1.00	08/07/12 01:31	EPA 8270D		RJM	B2G0761
Phenanthrene	**435**	245	ug/kg dry	1.00	08/07/12 01:31	EPA 8270D		RJM	B2G0761
Pyrene	**483**	245	ug/kg dry	1.00	08/07/12 01:31	EPA 8270D		RJM	B2G0761

Surrogates	%REC	%REC Limits	Flag
2-Fluorobiphenyl	81	30-115	
Nitrobenzene-D5	75	23-120	
Terphenyl-D14	78	18-137	

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Organochlorine Pesticides							X		
Aldrin	ND	24.1	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062
alpha-BHC	ND	24.1	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062
beta-BHC	ND	24.1	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062
delta-BHC	ND	24.1	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062
Gamma-BHC (Lindane)	ND	24.1	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062
Chlordane	ND	241	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062
4,4'-DDD	ND	24.1	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062
4,4'-DDE	ND	24.1	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062
4,4'-DDT	ND	24.1	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062
Dieldrin	ND	24.1	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062
Endosulfan I	ND	24.1	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062
Endosulfan II	ND	24.1	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062
Endosulfan sulfate	ND	24.1	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062
Endrin	ND	24.1	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062
Endrin aldehyde	ND	24.1	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062
Heptachlor	ND	24.1	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062
Heptachlor epoxide	ND	24.1	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062
Toxaphene	ND	241	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062
Methoxychlor	ND	24.1	ug/kg dry	10.0	08/11/12 21:19	EPA 8081B		RKH	B2H0062

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1016	ND	241	ug/kg dry	10.0	08/11/12 21:19	EPA 8082A		RKH	B2H0060
PCB-1221	ND	241	ug/kg dry	10.0	08/11/12 21:19	EPA 8082A		RKH	B2H0060
PCB-1232	ND	241	ug/kg dry	10.0	08/11/12 21:19	EPA 8082A		RKH	B2H0060
PCB-1242	ND	241	ug/kg dry	10.0	08/11/12 21:19	EPA 8082A		RKH	B2H0060

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-10
Sample Description LC-4 (2.5-5') collected on 07/24/12 13:28

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1248	ND	241	ug/kg dry	10.0	08/11/12 21:19	EPA 8082A		RKH	B2H0060
PCB-1254	ND	241	ug/kg dry	10.0	08/11/12 21:19	EPA 8082A		RKH	B2H0060
PCB-1260	ND	241	ug/kg dry	10.0	08/11/12 21:19	EPA 8082A		RKH	B2H0060

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-11
Sample Description LC-4 (7.5-10') collected on 07/24/12 14:31

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
General Chemistry Parameters									
Total Solids	**83.1**	0.10	%	1.00	07/30/12 09:35	Dry Weight		KFJ	B2H0015
Total Metals									
Aluminum	**4310**	1440	mg/kg dry	500	07/31/12 13:13	EPA 6010C		KFJ	B2G0741
Antimony	ND	2.88	mg/kg dry	1.00	07/31/12 16:37	EPA 6010C		KFJ	B2G0741
Arsenic	ND	2.88	mg/kg dry	1.00	07/31/12 16:37	EPA 6010C		KFJ	B2G0741
Barium	**36.6**	14.4	mg/kg dry	5.00	08/07/12 12:49	EPA 6010C		KFJ	B2G0741
Beryllium	ND	1.15	mg/kg dry	1.00	07/31/12 16:37	EPA 6010C		KFJ	B2G0741
Cadmium	ND	1.15	mg/kg dry	1.00	07/31/12 16:37	EPA 6010C		KFJ	B2G0741
Calcium	**182**	144	mg/kg dry	50.0	07/31/12 13:51	EPA 6010C		KFJ	B2G0741
Chromium	**49.3**	2.88	mg/kg dry	1.00	07/31/12 16:37	EPA 6010C		KFJ	B2G0741
Cobalt	**1.61**	1.15	mg/kg dry	1.00	07/31/12 16:37	EPA 6010C		KFJ	B2G0741
Copper	**7.77**	1.15	mg/kg dry	1.00	07/31/12 16:37	EPA 6010C		KFJ	B2G0741
Iron	**5900**	1440	mg/kg dry	500	07/31/12 13:13	EPA 6010C		KFJ	B2G0741
Lead	**16.6**	2.88	mg/kg dry	1.00	07/31/12 16:37	EPA 6010C		KFJ	B2G0741
Magnesium	**751**	144	mg/kg dry	50.0	07/31/12 13:51	EPA 6010C		KFJ	B2G0741
Manganese	**35.5**	1.15	mg/kg dry	1.00	07/31/12 16:37	EPA 6010C		KFJ	B2G0741
Mercury	ND	0.12	mg/kg dry	5.00	08/06/12 15:01	EPA 7471B		MER	B2H0129
Nickel	**2.28**	1.15	mg/kg dry	1.00	07/31/12 16:37	EPA 6010C		KFJ	B2G0741
Potassium	**761**	288	mg/kg dry	50.0	07/31/12 13:51	EPA 6010C		KFJ	B2G0741
Selenium	ND	14.4	mg/kg dry	5.00	08/07/12 12:49	EPA 6010C	X	KFJ	B2G0741
Silver	ND	1.15	mg/kg dry	1.00	07/31/12 16:37	EPA 6010C		KFJ	B2G0741
Sodium	**19.7**	5.76	mg/kg dry	1.00	07/31/12 16:37	EPA 6010C		KFJ	B2G0741
Thallium	ND	2.88	mg/kg dry	1.00	07/31/12 16:37	EPA 6010C		KFJ	B2G0741
Vanadium	**10.5**	1.15	mg/kg dry	1.00	07/31/12 16:37	EPA 6010C		KFJ	B2G0741
Zinc	**26.3**	14.4	mg/kg dry	5.00	08/07/12 12:49	EPA 6010C		KFJ	B2G0741
Semi-Volatiles Organics									
Acenaphthene	ND	204	ug/kg dry	1.00	08/07/12 02:08	EPA 8270D		RJM	B2G0761
Acenaphthylene	ND	204	ug/kg dry	1.00	08/07/12 02:08	EPA 8270D		RJM	B2G0761
Anthracene	ND	204	ug/kg dry	1.00	08/07/12 02:08	EPA 8270D		RJM	B2G0761
Benzo(a)anthracene	ND	204	ug/kg dry	1.00	08/07/12 02:08	EPA 8270D		RJM	B2G0761
Benzo(a)pyrene	ND	204	ug/kg dry	1.00	08/07/12 02:08	EPA 8270D		RJM	B2G0761
Benzo(b)fluoranthene	ND	204	ug/kg dry	1.00	08/07/12 02:08	EPA 8270D		RJM	B2G0761
Benzo(g,h,i)perylene	ND	204	ug/kg dry	1.00	08/07/12 02:08	EPA 8270D		RJM	B2G0761
Benzo(k)fluoranthene	ND	204	ug/kg dry	1.00	08/07/12 02:08	EPA 8270D		RJM	B2G0761
Chrysene	ND	204	ug/kg dry	1.00	08/07/12 02:08	EPA 8270D		RJM	B2G0761
Dibenzo(a,h)anthracene	ND	204	ug/kg dry	1.00	08/07/12 02:08	EPA 8270D		RJM	B2G0761
Fluoranthene	ND	204	ug/kg dry	1.00	08/07/12 02:08	EPA 8270D		RJM	B2G0761

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-11
Sample Description LC-4 (7.5-10') collected on 07/24/12 14:31

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Semi-Volatiles Organics									
Fluorene	ND	204	ug/kg dry	1.00	08/07/12 02:08	EPA 8270D		RJM	B2G0761
Indeno(1,2,3-cd)pyrene	ND	204	ug/kg dry	1.00	08/07/12 02:08	EPA 8270D		RJM	B2G0761
Phenanthrene	ND	204	ug/kg dry	1.00	08/07/12 02:08	EPA 8270D		RJM	B2G0761
Pyrene	ND	204	ug/kg dry	1.00	08/07/12 02:08	EPA 8270D		RJM	B2G0761

Surrogates	%REC	%REC Limits	Flag
2-Fluorobiphenyl	87	30-115	
Nitrobenzene-D5	88	23-120	
Terphenyl-D14	89	18-137	

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Organochlorine Pesticides							X		
Aldrin	ND	40.1	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062
alpha-BHC	ND	40.1	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062
beta-BHC	ND	40.1	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062
delta-BHC	ND	40.1	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062
Gamma-BHC (Lindane)	ND	40.1	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062
Chlordane	ND	401	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062
4,4'-DDD	ND	40.1	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062
4,4'-DDE	ND	40.1	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062
4,4'-DDT	ND	40.1	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062
Dieldrin	ND	40.1	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062
Endosulfan I	ND	40.1	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062
Endosulfan II	ND	40.1	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062
Endosulfan sulfate	ND	40.1	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062
Endrin	ND	40.1	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062
Endrin aldehyde	ND	40.1	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062
Heptachlor	ND	40.1	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062
Heptachlor epoxide	ND	40.1	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062
Toxaphene	ND	401	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062
Methoxychlor	ND	40.1	ug/kg dry	20.0	08/11/12 21:51	EPA 8081B		RKH	B2H0062

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1016	ND	401	ug/kg dry	20.0	08/11/12 21:51	EPA 8082A		RKH	B2H0060
PCB-1221	ND	401	ug/kg dry	20.0	08/11/12 21:51	EPA 8082A		RKH	B2H0060
PCB-1232	ND	401	ug/kg dry	20.0	08/11/12 21:51	EPA 8082A		RKH	B2H0060
PCB-1242	ND	401	ug/kg dry	20.0	08/11/12 21:51	EPA 8082A		RKH	B2H0060

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-11
Sample Description LC-4 (7.5-10') collected on 07/24/12 14:31

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1248	ND	401	ug/kg dry	20.0	08/11/12 21:51	EPA 8082A		RKH	B2H0060
PCB-1254	ND	401	ug/kg dry	20.0	08/11/12 21:51	EPA 8082A		RKH	B2H0060
PCB-1260	ND	401	ug/kg dry	20.0	08/11/12 21:51	EPA 8082A		RKH	B2H0060

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-12
Sample Description LC-4 (11-13') collected on 07/24/12 14:50

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
General Chemistry Parameters									
Total Solids	**77.1**	0.10	%	1.00	07/30/12 09:35	Dry Weight		KFJ	B2H0015
Total Metals									
Aluminum	**8260**	1560	mg/kg dry	500	07/31/12 13:15	EPA 6010C		KFJ	B2G0741
Antimony	ND	3.12	mg/kg dry	1.00	07/31/12 16:40	EPA 6010C		KFJ	B2G0741
Arsenic	ND	3.12	mg/kg dry	1.00	07/31/12 16:40	EPA 6010C		KFJ	B2G0741
Barium	**83.5**	15.6	mg/kg dry	5.00	08/07/12 13:01	EPA 6010C		KFJ	B2G0741
Beryllium	ND	1.25	mg/kg dry	1.00	07/31/12 16:40	EPA 6010C		KFJ	B2G0741
Cadmium	**1.39**	1.25	mg/kg dry	1.00	07/31/12 16:40	EPA 6010C		KFJ	B2G0741
Calcium	**297**	156	mg/kg dry	50.0	07/31/12 13:54	EPA 6010C		KFJ	B2G0741
Chromium	**81.3**	3.12	mg/kg dry	1.00	07/31/12 16:40	EPA 6010C		KFJ	B2G0741
Cobalt	**3.45**	1.25	mg/kg dry	1.00	07/31/12 16:40	EPA 6010C		KFJ	B2G0741
Copper	**16.3**	1.25	mg/kg dry	1.00	07/31/12 16:40	EPA 6010C		KFJ	B2G0741
Iron	**11800**	1560	mg/kg dry	500	07/31/12 13:15	EPA 6010C		KFJ	B2G0741
Lead	**28.4**	3.12	mg/kg dry	1.00	07/31/12 16:40	EPA 6010C		KFJ	B2G0741
Magnesium	**2080**	156	mg/kg dry	50.0	07/31/12 13:54	EPA 6010C		KFJ	B2G0741
Manganese	**79.1**	1.25	mg/kg dry	1.00	07/31/12 16:40	EPA 6010C		KFJ	B2G0741
Mercury	ND	0.13	mg/kg dry	5.00	08/06/12 15:12	EPA 7471B		MER	B2H0129
Nickel	**5.19**	1.25	mg/kg dry	1.00	07/31/12 16:40	EPA 6010C		KFJ	B2G0741
Potassium	**2090**	312	mg/kg dry	50.0	07/31/12 13:54	EPA 6010C		KFJ	B2G0741
Selenium	ND	15.6	mg/kg dry	5.00	08/07/12 13:01	EPA 6010C	X	KFJ	B2G0741
Silver	ND	1.25	mg/kg dry	1.00	07/31/12 16:40	EPA 6010C		KFJ	B2G0741
Sodium	**32.6**	6.25	mg/kg dry	1.00	07/31/12 16:40	EPA 6010C		KFJ	B2G0741
Thallium	ND	3.12	mg/kg dry	1.00	07/31/12 16:40	EPA 6010C		KFJ	B2G0741
Vanadium	**20.1**	1.25	mg/kg dry	1.00	07/31/12 16:40	EPA 6010C		KFJ	B2G0741
Zinc	**60.5**	15.6	mg/kg dry	5.00	08/07/12 13:01	EPA 6010C		KFJ	B2G0741
Semi-Volatiles Organics									
Acenaphthene	ND	220	ug/kg dry	1.00	08/06/12 18:45	EPA 8270D		RJM	B2G0761
Acenaphthylene	ND	220	ug/kg dry	1.00	08/06/12 18:45	EPA 8270D		RJM	B2G0761
Anthracene	ND	220	ug/kg dry	1.00	08/06/12 18:45	EPA 8270D		RJM	B2G0761
Benzo(a)anthracene	ND	220	ug/kg dry	1.00	08/06/12 18:45	EPA 8270D		RJM	B2G0761
Benzo(a)pyrene	ND	220	ug/kg dry	1.00	08/06/12 18:45	EPA 8270D		RJM	B2G0761
Benzo(b)fluoranthene	**280**	220	ug/kg dry	1.00	08/06/12 18:45	EPA 8270D		RJM	B2G0761
Benzo(g,h,i)perylene	ND	220	ug/kg dry	1.00	08/06/12 18:45	EPA 8270D		RJM	B2G0761
Benzo(k)fluoranthene	ND	220	ug/kg dry	1.00	08/06/12 18:45	EPA 8270D		RJM	B2G0761
Chrysene	**237**	220	ug/kg dry	1.00	08/06/12 18:45	EPA 8270D		RJM	B2G0761
Dibenzo(a,h)anthracene	ND	220	ug/kg dry	1.00	08/06/12 18:45	EPA 8270D		RJM	B2G0761
Fluoranthene	**395**	220	ug/kg dry	1.00	08/06/12 18:45	EPA 8270D		RJM	B2G0761

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-12
Sample Description LC-4 (11-13') collected on 07/24/12 14:50

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Semi-Volatiles Organics									
Fluorene	ND	220	ug/kg dry	1.00	08/06/12 18:45	EPA 8270D		RJM	B2G0761
Indeno(1,2,3-cd)pyrene	ND	220	ug/kg dry	1.00	08/06/12 18:45	EPA 8270D		RJM	B2G0761
Phenanthrene	**245**	220	ug/kg dry	1.00	08/06/12 18:45	EPA 8270D		RJM	B2G0761
Pyrene	**379**	220	ug/kg dry	1.00	08/06/12 18:45	EPA 8270D		RJM	B2G0761
Surrogates				%REC	%REC Limits		Flag		
2-Fluorobiphenyl				65	30-115				
Nitrobenzene-D5				52	23-120				
Terphenyl-D14				93	18-137				
Organochlorine Pesticides							X		
Aldrin	ND	21.6	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
alpha-BHC	ND	21.6	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
beta-BHC	ND	21.6	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
delta-BHC	ND	21.6	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
Gamma-BHC (Lindane)	ND	21.6	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
Chlordane	ND	216	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
4,4'-DDD	ND	21.6	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
4,4'-DDE	ND	21.6	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
4,4'-DDT	ND	21.6	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
Dieldrin	ND	21.6	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
Endosulfan I	ND	21.6	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
Endosulfan II	ND	21.6	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
Endosulfan sulfate	ND	21.6	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
Endrin	ND	21.6	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
Endrin aldehyde	ND	21.6	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
Heptachlor	ND	21.6	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
Heptachlor epoxide	ND	21.6	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
Toxaphene	ND	216	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
Methoxychlor	ND	21.6	ug/kg dry	10.0	08/11/12 22:23	EPA 8081B		RKH	B2H0062
Surrogates				%REC	%REC Limits		Flag		
2,4,5,6-Tetrachloro-m-xylene				0	60-130		DO		
Decachlorobiphenyl				0	30-150		DO		
PCBs							X		
PCB-1016	ND	216	ug/kg dry	10.0	08/11/12 22:23	EPA 8082A		RKH	B2H0060
PCB-1221	ND	216	ug/kg dry	10.0	08/11/12 22:23	EPA 8082A		RKH	B2H0060
PCB-1232	ND	216	ug/kg dry	10.0	08/11/12 22:23	EPA 8082A		RKH	B2H0060
PCB-1242	ND	216	ug/kg dry	10.0	08/11/12 22:23	EPA 8082A		RKH	B2H0060

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-12
Sample Description LC-4 (11-13') collected on 07/24/12 14:50

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1248	ND	216	ug/kg dry	10.0	08/11/12 22:23	EPA 8082A		RKH	B2H0060
PCB-1254	ND	216	ug/kg dry	10.0	08/11/12 22:23	EPA 8082A		RKH	B2H0060
PCB-1260	ND	216	ug/kg dry	10.0	08/11/12 22:23	EPA 8082A		RKH	B2H0060

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-13
Sample Description LC-3 (2.5-5') collected on 07/24/12 15:42

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
General Chemistry Parameters									
Total Solids	**33.0**	0.10	%	1.00	07/30/12 09:35	Dry Weight		KFJ	B2H0015
Total Metals									
Aluminum	**31100**	3630	mg/kg dry	500	07/31/12 13:17	EPA 6010C		KFJ	B2G0741
Antimony	ND	7.26	mg/kg dry	1.00	07/31/12 16:42	EPA 6010C		KFJ	B2G0741
Arsenic	ND	7.26	mg/kg dry	1.00	07/31/12 16:42	EPA 6010C		KFJ	B2G0741
Barium	**159**	36.3	mg/kg dry	5.00	08/07/12 13:04	EPA 6010C		KFJ	B2G0741
Beryllium	ND	2.90	mg/kg dry	1.00	07/31/12 16:42	EPA 6010C		KFJ	B2G0741
Cadmium	ND	2.90	mg/kg dry	1.00	07/31/12 16:42	EPA 6010C		KFJ	B2G0741
Calcium	**3450**	363	mg/kg dry	50.0	07/31/12 13:56	EPA 6010C		KFJ	B2G0741
Chromium	**58.3**	7.26	mg/kg dry	1.00	07/31/12 16:42	EPA 6010C		KFJ	B2G0741
Cobalt	**14.8**	2.90	mg/kg dry	1.00	07/31/12 16:42	EPA 6010C		KFJ	B2G0741
Copper	**41.7**	2.90	mg/kg dry	1.00	07/31/12 16:42	EPA 6010C		KFJ	B2G0741
Iron	**43400**	3630	mg/kg dry	500	07/31/12 13:17	EPA 6010C		KFJ	B2G0741
Lead	**68.1**	7.26	mg/kg dry	1.00	07/31/12 16:42	EPA 6010C		KFJ	B2G0741
Magnesium	**2980**	363	mg/kg dry	50.0	07/31/12 13:56	EPA 6010C		KFJ	B2G0741
Manganese	**298**	145	mg/kg dry	50.0	07/31/12 13:56	EPA 6010C		KFJ	B2G0741
Mercury	ND	0.30	mg/kg dry	5.00	08/06/12 15:15	EPA 7471B		MER	B2H0129
Nickel	**14.3**	2.90	mg/kg dry	1.00	07/31/12 16:42	EPA 6010C		KFJ	B2G0741
Potassium	**2710**	726	mg/kg dry	50.0	07/31/12 13:56	EPA 6010C		KFJ	B2G0741
Selenium	ND	36.3	mg/kg dry	5.00	08/07/12 13:04	EPA 6010C	X	KFJ	B2G0741
Silver	ND	2.90	mg/kg dry	1.00	07/31/12 16:42	EPA 6010C		KFJ	B2G0741
Sodium	**94.6**	14.5	mg/kg dry	1.00	07/31/12 16:42	EPA 6010C		KFJ	B2G0741
Thallium	ND	7.26	mg/kg dry	1.00	07/31/12 16:42	EPA 6010C		KFJ	B2G0741
Vanadium	**50.1**	2.90	mg/kg dry	1.00	07/31/12 16:42	EPA 6010C		KFJ	B2G0741
Zinc	**275**	36.3	mg/kg dry	5.00	08/07/12 13:04	EPA 6010C		KFJ	B2G0741
Semi-Volatiles Organics									
Acenaphthene	ND	513	ug/kg dry	1.00	08/07/12 02:45	EPA 8270D		RJM	B2G0761
Acenaphthylene	ND	513	ug/kg dry	1.00	08/07/12 02:45	EPA 8270D		RJM	B2G0761
Anthracene	ND	513	ug/kg dry	1.00	08/07/12 02:45	EPA 8270D		RJM	B2G0761
Benzo(a)anthracene	**1050**	513	ug/kg dry	1.00	08/07/12 02:45	EPA 8270D		RJM	B2G0761
Benzo(a)pyrene	**822**	513	ug/kg dry	1.00	08/07/12 02:45	EPA 8270D		RJM	B2G0761
Benzo(b)fluoranthene	**1420**	513	ug/kg dry	1.00	08/07/12 02:45	EPA 8270D		RJM	B2G0761
Benzo(g,h,i)perylene	ND	513	ug/kg dry	1.00	08/07/12 02:45	EPA 8270D		RJM	B2G0761
Benzo(k)fluoranthene	ND	513	ug/kg dry	1.00	08/07/12 02:45	EPA 8270D		RJM	B2G0761
Chrysene	**1250**	513	ug/kg dry	1.00	08/07/12 02:45	EPA 8270D		RJM	B2G0761
Dibenzo(a,h)anthracene	ND	513	ug/kg dry	1.00	08/07/12 02:45	EPA 8270D		RJM	B2G0761
Fluoranthene	**1820**	513	ug/kg dry	1.00	08/07/12 02:45	EPA 8270D		RJM	B2G0761

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-13
Sample Description LC-3 (2.5-5') collected on 07/24/12 15:42

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Semi-Volatiles Organics									
Fluorene	ND	513	ug/kg dry	1.00	08/07/12 02:45	EPA 8270D		RJM	B2G0761
Indeno(1,2,3-cd)pyrene	ND	513	ug/kg dry	1.00	08/07/12 02:45	EPA 8270D		RJM	B2G0761
Phenanthrene	**1240**	513	ug/kg dry	1.00	08/07/12 02:45	EPA 8270D		RJM	B2G0761
Pyrene	**1470**	513	ug/kg dry	1.00	08/07/12 02:45	EPA 8270D		RJM	B2G0761

Surrogates	%REC	%REC Limits	Flag
2-Fluorobiphenyl	80	30-115	
Nitrobenzene-D5	79	23-120	
Terphenyl-D14	74	18-137	

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
Organochlorine Pesticides							X		
Aldrin	ND	50.4	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062
alpha-BHC	ND	50.4	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062
beta-BHC	ND	50.4	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062
delta-BHC	ND	50.4	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062
Gamma-BHC (Lindane)	ND	50.4	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062
Chlordane	ND	504	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062
4,4'-DDD	ND	50.4	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062
4,4'-DDE	ND	50.4	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062
4,4'-DDT	ND	50.4	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062
Dieldrin	ND	50.4	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062
Endosulfan I	ND	50.4	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062
Endosulfan II	ND	50.4	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062
Endosulfan sulfate	ND	50.4	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062
Endrin	ND	50.4	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062
Endrin aldehyde	ND	50.4	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062
Heptachlor	ND	50.4	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062
Heptachlor epoxide	ND	50.4	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062
Toxaphene	ND	504	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062
Methoxychlor	ND	50.4	ug/kg dry	10.0	08/11/12 22:55	EPA 8081B		RKH	B2H0062

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1016	ND	504	ug/kg dry	10.0	08/11/12 22:55	EPA 8082A		RKH	B2H0060
PCB-1221	ND	504	ug/kg dry	10.0	08/11/12 22:55	EPA 8082A		RKH	B2H0060
PCB-1232	ND	504	ug/kg dry	10.0	08/11/12 22:55	EPA 8082A		RKH	B2H0060
PCB-1242	ND	504	ug/kg dry	10.0	08/11/12 22:55	EPA 8082A		RKH	B2H0060

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Number 2070746-13
Sample Description LC-3 (2.5-5') collected on 07/24/12 15:42

Parameter	Result	Reporting Limit	Units	DF	Analyzed	Method	Flag	Analyst	Batch
PCBs							X		
PCB-1248	ND	504	ug/kg dry	10.0	08/11/12 22:55	EPA 8082A		RKH	B2H0060
PCB-1254	ND	504	ug/kg dry	10.0	08/11/12 22:55	EPA 8082A		RKH	B2H0060
PCB-1260	ND	504	ug/kg dry	10.0	08/11/12 22:55	EPA 8082A		RKH	B2H0060

Surrogates	%REC	%REC Limits	Flag
2,4,5,6-Tetrachloro-m-xylene	0	60-130	DO
Decachlorobiphenyl	0	30-150	DO

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Sample Preparation Data

Parameter	Batch	Sample ID	Prepared	Analyst
EPA 3050B Metal Digestion				
EPA 3050B	B2G0741	2070746-01	07/30/2012 10:05	KFJ
EPA 3050B	B2G0741	2070746-02	07/30/2012 10:05	KFJ
EPA 3050B	B2G0741	2070746-03	07/30/2012 10:05	KFJ
EPA 3050B	B2G0741	2070746-04	07/30/2012 10:05	KFJ
EPA 3050B	B2G0741	2070746-05	07/30/2012 10:05	KFJ
EPA 3050B	B2G0741	2070746-06	07/30/2012 10:05	KFJ
EPA 3050B	B2G0741	2070746-07	07/30/2012 10:05	KFJ
EPA 3050B	B2G0741	2070746-08	07/30/2012 10:05	KFJ
EPA 3050B	B2G0741	2070746-09	07/30/2012 10:05	KFJ
EPA 3050B	B2G0741	2070746-10	07/30/2012 10:05	KFJ
EPA 3050B	B2G0741	2070746-11	07/30/2012 10:05	KFJ
EPA 3050B	B2G0741	2070746-12	07/30/2012 10:05	KFJ
EPA 3050B	B2G0741	2070746-13	07/30/2012 10:05	KFJ
EPA 3550C Extraction				
EPA 3550C - GC	B2H0010	2070746-01	08/01/2012 10:20	CGW
EPA 3550C - GC	B2H0011	2070746-01	08/01/2012 10:20	CGW
EPA 3550C - GC	B2H0010	2070746-02	08/01/2012 10:20	CGW
EPA 3550C - GC	B2H0011	2070746-02	08/01/2012 10:20	CGW
EPA 3550C - GC	B2H0010	2070746-03	08/01/2012 10:20	CGW
EPA 3550C - GC	B2H0011	2070746-03	08/01/2012 10:20	CGW
EPA 3550C - GC	B2H0010	2070746-04	08/01/2012 10:20	CGW
EPA 3550C - GC	B2H0011	2070746-04	08/01/2012 10:20	CGW
EPA 3550C - GC	B2H0010	2070746-05	08/01/2012 10:20	CGW
EPA 3550C - GC	B2H0011	2070746-05	08/01/2012 10:20	CGW
EPA 3550C - GC	B2H0010	2070746-06	08/01/2012 10:20	CGW
EPA 3550C - GC	B2H0011	2070746-06	08/01/2012 10:20	CGW
EPA 3550C - GC	B2H0010	2070746-07	08/01/2012 10:20	CGW
EPA 3550C - GC	B2H0011	2070746-07	08/01/2012 10:20	CGW
EPA 3550C - GC	B2H0010	2070746-08	08/01/2012 10:20	CGW
EPA 3550C - GC	B2H0011	2070746-08	08/01/2012 10:20	CGW
EPA 3550C - GC	B2H0060	2070746-09	08/02/2012 10:30	CGW
EPA 3550C - GC	B2H0062	2070746-09	08/02/2012 10:30	CGW
EPA 3550C - GC	B2H0060	2070746-10	08/02/2012 10:30	CGW
EPA 3550C - GC	B2H0062	2070746-10	08/02/2012 10:30	CGW
EPA 3550C - GC	B2H0060	2070746-11	08/02/2012 10:30	CGW
EPA 3550C - GC	B2H0062	2070746-11	08/02/2012 10:30	CGW
EPA 3550C - GC	B2H0060	2070746-12	08/02/2012 10:30	CGW
EPA 3550C - GC	B2H0062	2070746-12	08/02/2012 10:30	CGW

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous	
408 Deepwood Drive		Work Order:	2070746	
Greer, SC 29651-6868		Reported:	08/17/12 13:30	

EPA 3550C - GC	B2H0060	2070746-13	08/02/2012 10:30	CGW
EPA 3550C - GC	B2H0062	2070746-13	08/02/2012 10:30	CGW
EPA 3550C Extraction				
EPA 3550C - GCMS	B2G0761	2070746-01	07/31/2012 07:30	DBB
EPA 3550C - GCMS	B2G0761	2070746-02	07/31/2012 07:30	DBB
EPA 3550C - GCMS	B2G0761	2070746-03	07/31/2012 07:30	DBB
EPA 3550C - GCMS	B2G0761	2070746-04	07/31/2012 07:30	DBB
EPA 3550C - GCMS	B2G0761	2070746-05	07/31/2012 07:30	DBB
EPA 3550C - GCMS	B2G0761	2070746-06	07/31/2012 07:30	DBB
EPA 3550C - GCMS	B2H0088	2070746-07	08/03/2012 08:00	DBB
EPA 3550C - GCMS	B2G0761	2070746-08	07/31/2012 07:30	DBB
EPA 3550C - GCMS	B2G0761	2070746-09	07/31/2012 07:30	DBB
EPA 3550C - GCMS	B2G0761	2070746-10	07/31/2012 07:30	DBB
EPA 3550C - GCMS	B2G0761	2070746-11	07/31/2012 07:30	DBB
EPA 3550C - GCMS	B2G0761	2070746-12	07/31/2012 07:30	DBB
EPA 3550C - GCMS	B2G0761	2070746-13	07/31/2012 07:30	DBB
EPA 7471B Mercury Digestion				
EPA 7471B	B2H0129	2070746-01	08/03/2012 15:18	MER
EPA 7471B	B2H0129	2070746-02	08/03/2012 15:18	MER
EPA 7471B	B2H0129	2070746-03	08/03/2012 15:18	MER
EPA 7471B	B2H0129	2070746-04	08/03/2012 15:18	MER
EPA 7471B	B2H0129	2070746-05	08/03/2012 15:18	MER
EPA 7471B	B2H0129	2070746-06	08/03/2012 15:18	MER
EPA 7471B	B2H0129	2070746-07	08/03/2012 15:18	MER
EPA 7471B	B2H0129	2070746-08	08/03/2012 15:18	MER
EPA 7471B	B2H0129	2070746-09	08/03/2012 15:18	MER
EPA 7471B	B2H0129	2070746-10	08/03/2012 15:18	MER
EPA 7471B	B2H0129	2070746-11	08/03/2012 15:18	MER
EPA 7471B	B2H0129	2070746-12	08/03/2012 15:18	MER
EPA 7471B	B2H0129	2070746-13	08/03/2012 15:18	MER

ROGERS & CALLCOTT
LABORATORY SERVICES

Hargett Resources Inc - David Hargett		Project:	Miscellaneous
408 Deepwood Drive		Work Order:	2070746
Greer, SC 29651-6868		Reported:	08/17/12 13:30

Data Qualifiers and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not reported
DO	Diluted Out
S1	The matrix spike and / or the matrix spike duplicate sample recovery was not within control limits due to matrix interference. The Laboratory Control Sample (LCS) was within control limits.
X	Result subject to sample matrix interference. Reporting limit has been adjusted where applicable.
Z	Elevated reporting limit due to the nature of the sample.
Za	See enclosed chromatogram.

ROGERS & CALLCOTT LABORATORY SERVICES

P.O. Box 5655, Greenville, SC 29606
Phone (864) 232-1556 Fax (864) 232-6140
Shipping Address: 426 Fairforest Way
Greenville, SC 29607

CHAIN OF CUSTODY RECORD

PAGE 1 OF 2

Client Name: HRI

Address: Conestee, SC

Report To: D. Hargett

Telephone No. ______ FAX No. ______

PO No. ______ Project No. 12-047

Filtered (Yes/No)	N	N	N
Cooled (Yes/No)	Y	Y	Y
Container Type (P/G)	G	P	G
Container Volume	250	500 mL	500 mL / 4 L
Sample Type (Grab/Composite)	G	G	G
Sample Source (WW, GW, DW, Other)	Soil	GW	GW
Sample Source Chlorinated (Yes/No)			
Lab Receipt Cl_2 Check	NA	NA	NA
Lab Receipt pH Check	NA	<2	7
Preserved (Code)	A	B	A
PARAMETERS	Metals, Pesticides, PAH, PCB	Metals	PAH, PCB, Pesticides

Lab Receipt Cl_2 Check mcy 7-25-12

Preserved (Code): A–None, B–HNO_3, C–H_2SO_4, D–NaOH, E–HCL, F–$Na_2S_2O_3$, G–Boric Acid, H–Ascorbic Acid, I– ____

COMMENTS:

	Rogers & Callcott Lab No.	Yr. 12 Date	Time	Sample Description	Total Number of Containers	Metals, Pesticides, PAH, PCB	Metals	PAH, PCB, Pesticides
207	0746-01	7/23	1136	LC-1 (3-7')	2	2		
	-02		1330	LC-2 (3-7')	2	2		
	-03		1420	LC-2 (7-11')	2	2		
207	0747-01	7/24	0813	Equipment Blank	2		1	1
207	0746-04		0913	LC-5 (2-4')	2	2		
	-05		0929	LC-7 (2-4')	2	2		
	-06		0940	LC-8 (2-4')	2	2		

Relinquished	Date/Time	Received	Date/Time
SAMPLER Relinquished by (Sig.) ① [signature]	7/24/2012 1745	Received by (Sig.) ② [signature] Shipper Name & #	7.24.12 1745
Relinquished by (Sig.) ③	Date/Time	Received by (Sig.) ④ Shipper Name & #	Date/Time
Relinquished by (Sig.) ⑤	Date/Time	Received by (Sig.) ⑥ Shipper Name & #	Date/Time
Seal # at'chd by ○ Recvd. Intact by ○		Seal # at'chd by ○ Recvd. Intact by ○	

KNOWN HAZARDS ASSOCIATED WITH SAMPLES

Temperature of blank or representative sample
At time of collection ______ °C
At time of lab receipt 0.8 °C

Form Revised July 2008

R/C COC FORM

ROGERS & CALLCOTT
LABORATORY SERVICES
P.O. Box 5655, Greenville, SC 29606
Phone (864) 232-1556 Fax (864) 232-6140
Shipping Address: 426 Fairforest Way
Greenville, SC 29607

CHAIN OF CUSTODY RECORD

PAGE 2 OF 2

Client Name: HRI
Address: Conestee, SC
Report To: D. Harget
Telephone No. ______ FAX No. ______
PO No. ______ Project No. 12-087

Filtered (Yes/No): N
Cooled (Yes/No): Y
Container Type (P/G): G
Container Volume: 500 mL; 250
Sample Type (Grab/Composite): G
Sample Source (WW, GW, DW, Other): Soil
Sample Source Chlorinated (Yes/No):
Lab Receipt Cl_2 Check: NA
Lab Receipt pH Check: NA — mcd 7-25-12
Preserved (Code): A

A–None, B–HNO_3, C–H_2SO_4, D–NaOH, E–HCL, F–$Na_2S_2O_3$, G–Boric Acid, H–Ascorbic Acid, I–

PARAMETERS: Metals, Pesticides, PAH, PCB

COMMENTS:

Rogers & Callcott Lab No.	Yr. 12 Date	Time	Sample Description	Total Number of Containers	Metals, Pesticides, PAH, PCB
207 0746-07	7/24	1011	LC-6 (2.5-5')	2	2
-08		1027	LC-6 (7.5-10')	2	2
-09		1050	LC-6 (14-16')	2	2
-10		1328	LC-4 (2.5-5')	2	2
-11		1431	LC-4 (7.5-10')	2	2
-12		1450	LC-4 (11-13')	2	2
13		1542	LC-3 (2.5-5')	2	2

SAMPLER Relinquished by (Sig.) ① [signature]	Date/Time 7/24/2012 1745	Received by (Sig.) ② [signature] Shipper Name & #	Date/Time 7.24.12 1745
Relinquished by (Sig.) ③	Date/Time	Received by (Sig.) ④ Shipper Name & #	Date/Time
Relinquished by (Sig.) ⑤	Date/Time	Received by (Sig.) ⑥ Shipper Name & #	Date/Time
Seal # at'chd by ○	Recvd. Intact by ○	Seal # at'chd by ○	Recvd. Intact by ○

KNOWN HAZARDS ASSOCIATED WITH SAMPLES

Temperature of blank or representative sample
At time of collection ______ °C
At time of lab receipt 0.8 °C

Form Revised July 2008

R/C COC FORM

ROGERS & CALLCOTT
LABORATORY SERVICES
P.O. Box 5655, Greenville, SC 29606
Phone: (864) 232-1556 - FAX: (864) 232-6140

Sample Receipt Verification

Client: HRI   Date Received: 7.24.12   Work Order: 2070746

Carrier Name: Client FedEx UPS US Mail Courier Field Services Other: ______

Tracking Number: ______

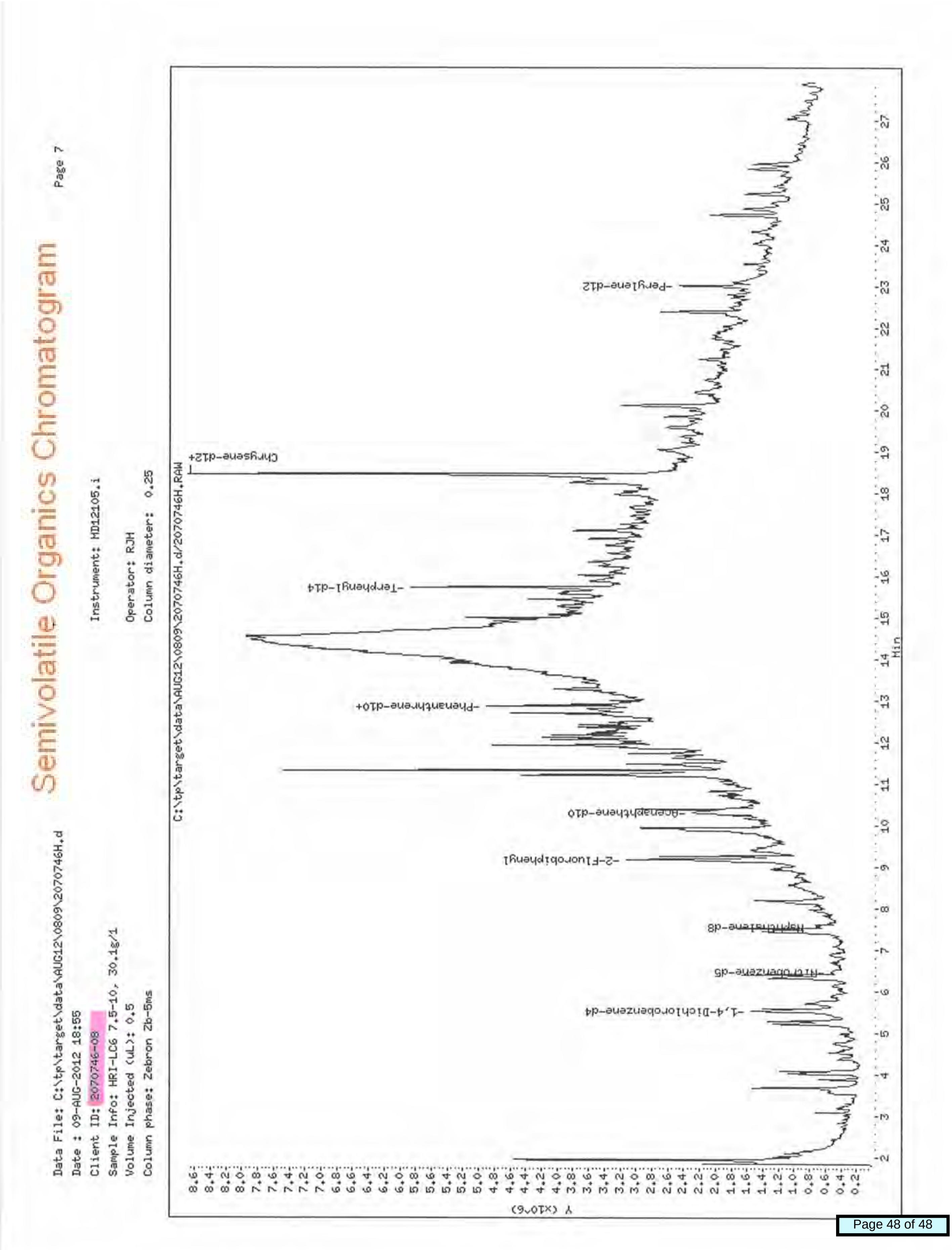
Receipt Criteria	Yes	No	NA	Comments
Shipping container / cooler intact?	X			Damaged Leaking Other:
Custody seals intact?			X	
COC included with samples?	X			
COC signed when relinquished and received?	X			
Sample bottles intact?	X			Damaged Leaking Other:
Sample ID on COC agree with label on bottle(s)?	X			
Date / time on COC agree with label on bottle(s)?	X			
Number of bottles on COC agrees with number of bottles received?	X			
Samples received within holding time?	X			
Sample volume sufficient for analysis?	X			
VOA vials free of headspace (<6mm bubble)?			X	
Samples cooled? Temp at receipt recorded on COC; Temp measured with IR thermometer - SN: 97050067	X			Ice Cold Packs Dry Ice None
Samples requiring pH preservation at proper pH? Note: Samples for metals analysis may be preserved upon receipt in the lab.			X	

If in-house preservation used – record Lot #		
	HCL	
	H_2SO_4	
	HNO_3	
	H_3PO_4	
	NaOH	
	Other	

Comments:

Completed by: KRU

Revised April 2012


Semivolatile Organics Chromatogram
Page 7
Data File: C:\tp\target\data\AUG12\0809\2070746H.d
Date : 09-AUG-2012 18:55
Client ID: 2070746-08
Instrument: HD12105.i
Sample Info: HRI-LC6 7.5-10, 30.1g/1
Volume Injected (uL): 0.5
Operator: RJH
Column phase: Zebron Zb-5ms
Column diameter: 0.25
C:\tp\target\data\AUG12\0809\2070746H.d/2070746H.RAW
-1,4-Dichlorobenzene-d4
-Nitrobenzene-d5
-Naphthalene-d8
-2-Fluorobiphenyl
-Acenaphthene-d10
-Phenanthrene-d10+
-Terphenyl-d14
Chrysene-d12+
-Perylene-d12
Y (x10^6)
Min

APPENDIX 4

COST ANALYSIS TABLES

CONESTEE FOUNDATION, INC.

LAKE CONESTEE DAM
REHAB / REPAIR / REPLACE FEASIBILITY STUDY

TABLE 1

ALTERNATIVE 8
NEW CIP CONCRETE REPLACEMENT DAM ADJACENT TO EXISTING DAM

Preliminary Opinion of Construction Cost in 2022 Dollars

	Item	Quantity	Unit	Unit Cost 2022	Cost
A	**Remove Existing WWTP & Construction Debris**				
1	Purchase adjacent property for construction access & staging	1.6	Acre	$120,000.00	$192,000
2	Demolish and remove existing WWTP concrete walls	1	LS	$50,000.00	$50,000
3	Dispose of existing WWTP concrete walls at C&D landfill (haul cost & disposal fees)	1	LS	$120,000.00	$120,000
4	Remove & dewater existing WWTP residuals in bottom of all basins source	4,000	CU YD	$240.00	$960,000
5	Dispose of existing WWTP residuals at MSW landfill (haul cost & disposal fees)	4,000	CU YD	$200.00	$800,000
6	Remove existing construction debris stockpiled in river	1	LS	$80,000.00	$80,000
7	Dispose of existing construction debris at C&D landfill (haul cost & disposal fees)	1	LS	$72,000.00	$72,000
B	**Install Low Level Outlet Control Structure and Cofferdam & Upstream Site Preparations**				
1	Build access roads (2)	2	LS	$60,000.00	$120,000
2	Upstream sediment removal, testing, and disposal	4,000	CU YD	$500.00	$2,000,000
3	Construct temporary cofferdam around penstock	1	LS	$150,000.00	$150,000
4	Remove and dispose of penstock gate and appurtances	1	LS	$18,000.00	$18,000
5	Install new 84"x84" outlet control gate, grouted in place, and weir structure	1	LS	$400,000.00	$400,000
6	Install 84" dia. steel pipe with 3" steel plate wall thimble, grouted in place	1	LS	$30,000.00	$30,000
7	Extend 84" dia steel pipe through buttress airspace with concrete encasement, secure outlet	1	LS	$60,000.00	$60,000
8	U-Shaped Weir upstream of gate	1	LS	$160,000.00	$160,000
9	Remove temporary cofferdam	1	LS	$60,000.00	$60,000
10	In-river Sediment Management	1	LS	$250,000.00	$250,000
C	**Install New CIP Concrete Dam Adjacent to Existing Dam**				
1	Clear and clean downstream side of dam	1	LS	$30,000.00	$30,000
2	Remove and dispose of top 4' of dam	400	CU YD	$360.00	$144,000
3	Construct 1' thick CIP concrete bond beam on top of dam	100	CU YD	$1,200.00	$120,000
4	Install cofferdam on top of existing dam	1	LS	$175,000.00	$175,000
5	Remove and dispose of fractured rock	3,800	CU YD	$200.00	$760,000
6	Concrete fill in fractured rock location	3,800	CU YD	$350.00	$1,330,000
7	Install impervious membrane on downstream face of existing dam	1,444	SY	$27.86	$40,230
8	Install cable block trafficable surface	5,000	SF	$25.00	$125,000
9	Install 5'x8' concrete soldier beam across toe of dam	1,000	CU YD	$450.00	$450,000
10	Install new cast in place concrete dam	5,000	CU YD	$800.00	$4,000,000
11	Install 50 rock anchors through soldier beam into foundation under dam	3,000	LIN FT	$240.00	$720,000
12	Security Fencing and Signage	1	LS	$40,000.00	$40,000
13	End wall buttresses	200	CU YD	$800.00	$160,000
14	Security Camera System	1	LS	$25,000.00	$25,000
16	Native Plant Species Revegetation Plan	1	LS	$25,000.00	$25,000
D	**Construction of Maintenance Access Ramp & Debris & Sediment Processing Structures**				
1	Construct concrete mobile dredge access ramp along west dam wall	200	CU YD	$360.00	$72,000
2	Construct concrete debris removal structure and winch points (TBD)	2	LS	$30,000.00	$60,000
3	Construct concrete washdown pad for contaminated equipment	1	LS	$10,000.00	$10,000
4	Construct concrete waste containment structure for contaminated sediment	1	LS	$25,000.00	$25,000
E	**Permitting, Compliance, NHRP, and Historical Preservation**				
1	Assessment of Alternatives	1	LS	$20,000.00	$20,000
2	Permitting and Compliance	1	LS	$30,000.00	$30,000
3	Salvage of Critical Historical Features	1	LS	$50,000.00	$50,000
4	Design and Construction of Historic Educational Display and Kiosk / Programs - NRHP Concessions	1	LS	$250,000.00	$250,000
	Subtotal A-D				**$14,183,230**
F	**Contractor General Overhead & Profit**	1	LS	25.0%	**$3,545,807**
G	**Design, Permitting, & Construction Oversight & Testing**	1	LS	20.0%	**$3,545,807**
H	**Contingency**	1	LS	34.0%	**$7,233,447**

$28,508,292

CONESTEE FOUNDATION, INC.

LAKE CONESTEE DAM
REHAB / REPAIR / REPLACE FEASIBILITY STUDY

TABLE 2

ALTERNATIVE 9
NEW CIP CONCRETE REPLACEMENT DAM 10' DOWNSTREAM OF EXISTING DAM

Preliminary Opinion of Construction Cost in 2022 Dollars

	Item	Quantity	Unit	Unit Cost 2022	Cost
A	**Remove Existing WWTP & Construction Debris**				
1	Purchase adjacent property for construction, access, staging, and long-term care	1.6	Acre	$120,000.00	$192,000
2	Demolish and remove existing WWTP concrete walls	1	LS	$50,000.00	$50,000
3	Dispose of existing WWTP concrete walls at C&D landfill (haul cost & disposal fees)	1	LS	$120,000.00	$120,000
4	Remove & dewater existing WWTP residuals in bottom of all basins source	4,000	CU YD	$240.00	$960,000
5	Dispose of existing WWTP residuals at MSW landfill (haul cost & disposal fees)	4,000	CU YD	$200.00	$800,000
6	Remove existing construction debris stockpiled in river	1	LS	$80,000.00	$80,000
7	Dispose of existing construction debris at C&D landfill (haul cost & disposal fees)	1	LS	$72,000.00	$72,000
B	**Install Low Level Outlet Control Structure and Cofferdam & Upstream Site Preparations**				
1	Build access roads (2)	2	LS	$60,000.00	$120,000
2	Upstream sediment removal, de-watering, testing, and disposal	4,000	CU YD	$500.00	$2,000,000
3	Construct temporary cofferdam around penstock	1	LS	$150,000.00	$150,000
4	Remove and dispose of penstock gate and appurtances	1	LS	$18,000.00	$18,000
5	Install new 84"x84" outlet control gate, grouted in place, and weir structure	1	LS	$400,000.00	$400,000
6	Install 84" dia. steel pipe with 3" steel plate wall thimble, grouted in place	1	LS	$30,000.00	$30,000
7	Extend 84" dia steel pipe through buttress airspace with concrete encasement, secure outlet	1	LS	$60,000.00	$60,000
8	U-Shaped Weir upstream of gate	1	LS	$160,000.00	$160,000
9	Remove temporary cofferdam	1	LS	$60,000.00	$60,000
10	In-river Sediment Containment / Management	1	LS	$250,000.00	$250,000
C	**Install New CIP Concrete Dam Adjacent to Existing Dam**				
1	Clear and clean downstream side of dam	1	LS	$30,000.00	$30,000
2	Remove and dispose of top 4' of dam	400	CU YD	$360.00	$144,000
3	Construct 1' thick CIP concrete bond beam on top of dam	100	CU YD	$1,200.00	$120,000
4	Install cofferdam on top of existing dam	1	LS	$175,000.00	$175,000
5	Remove and dispose of fractured rock	3,800	CU YD	$200.00	$760,000
6	Concrete fill in fractured rock location	3,800	CU YD	$350.00	$1,330,000
7	Install impervious membrane on downstream face of existing dam	1,444	SY	$27.86	$40,230
8	Install 10' thick engineered soil medium between new and exisitng dam	6,000	CU YD	$100.00	$600,000
9	Compaction of 10' thick engineered soil medium	6,000	ECY	$8.00	$48,000
10	Install cable block trafficable surface	5,000	SF	$25.00	$125,000
11	Install 5'x8' concrete soldier beam across toe of dam	1,000	CU YD	$450.00	$450,000
12	Install new cast in place concrete dam	5,000	CU YD	$800.00	$4,000,000
13	Install 50 rock anchors through soldier beam into foundation under dam	3,000	LIN FT	$240.00	$720,000
14	Security Fencing and Signage	1	LS	$40,000.00	$40,000
15	End wall buttresses	200	CU YD	$800.00	$160,000
16	Security Camera System	1	LS	$25,000.00	$25,000
17	Native Plant Species Revegetation Plan and Installation	1	LS	$25,000.00	$25,000
D	**Construction of Maintenance Access Ramp & Debris & Sediment Processing Structures**				
1	Construct concrete mobile dredge access ramp along west dam wall	200	CU YD	$360.00	$72,000
2	Construct concrete debris removal structure and winch points (TBD)	2	LS	$30,000.00	$60,000
3	Construct concrete washdown pad for contaminated equipment	1	LS	$10,000.00	$10,000
4	Construct concrete waste containment structure for contaminated sediment	1	LS	$25,000.00	$25,000
				$65,360.00	
E	**Permitting, Compliance, NHRP, and Historical Preservation**				
1	Assessment of Alternatives	1	LS	$20,000.00	$20,000
2	Permitting and Compliance	1	LS	$30,000.00	$30,000
3	Salvage of Critical Historical Features	1	LS	$50,000.00	$50,000
4	Design and Construction of Historic Educational Display and Kiosk / Programs - NRHP Concessions	1	LS	$250,000.00	$250,000
	Subtotal A-E				**$14,831,230**
F	**Contractor General Overhead & Profit**	1	LS	25.0%	**$3,707,807**
G	**Design, Permitting, & Construction Oversight & Testing**	1	LS	20.0%	**$3,707,807**
H	**Contingency**	1	LS	34.0%	**$7,563,927**

$29,810,772

CONESTEE FOUNDATION, INC.

LAKE CONESTEE DAM
REHAB / REPAIR / REPLACE FEASIBILITY STUDY

Long-Term Costs of Alternative 9

Preliminary Opinion of Long-Term Costs in 2022 Dollars*

	Item	Frequency/Year	Unit Cost 2022	Avg. Annual 2022 Cost
A	**Routine Inspections**			$28,000
1	Independent Dam Inspection	1.00	$10,000.00	$10,000
2	Independent Inspection Report	1.00	$6,000.00	$6,000
3	Owner Dam Inspection	12.00	$1,000.00	$12,000
B	**Large Woody Debris Management**			$24,000
1	Remove Large Woody Debris in Dam Spillway	2.00	$12,000.00	
C	**Regulatory Compliance and Reporting**			$10,000
1	Owner Submission State Compliance Regulations	1.00	$10,000.00	
D	**Emergency Action Planning**			$25,000
1	Inundation Mapping	0.10	$30,000.00	$3,000
2	EAP Annual Update, and Re-Testing	1.00	$12,000.00	$12,000
3	EAP Annual Report	1.00	$5,000.00	$5,000
4	BL&WM Annual Report	1.00	$5,000.00	$5,000
E	**Routine and Possible Non-Routine Maintenance**			$145,000
1	Routine Mowing	6.00	$1,000.00	$6,000
2	Vegetation Removal	2.00	$5,000.00	$10,000
3	Miscellaneous Repairs**	0.20	$50,000.00	$10,000
4	Gate Maintenance	1.00	$4,000.00	$4,000
5	Gate Replacement	0.05	$200,000.00	$10,000
6	Cleaning Contaminated Equipment	1.00	$5,000.00	$5,000
7	Sediment Removal & Disposal	0.20	$500,000.00	$100,000
F	**Safety and Security**			$12,000
1	Signage Maintenance	2.00	$1,000.00	$2,000
2	Fencing Maintenance	2.00	$1,000.00	$2,000
3	Security Cameras /Surveillance Management	1.00	$8,000.00	$8,000
G	**Risk and Financial Management**			$80,000
1	Escrow management	1.00	$20,000.00	$20,000
2	Insurance (PLL)	1.00	$60,000.00	$60,000
	Subtotal A-G			**$324,000**

*Assumes Structure is High Hazard and/or Hazardous Sediment Containment.

**Estimate based on expected repairs, could vary if significant damage occurs.

Estimated Endowment for Conestee Dam to Cover Future Maintenance and Repairs for 100 Years

			October 2019					
ASSUMPTIONS								
Average Investment Return		5.10%	*					
Average Inflation		2.94%	**					
Annual costs		201,000						
Costs every 5 years		550,000						
Costs every 10 years		30,000						
Cost every 20 years		200,000						
					Cash Outlays			
	Beginning	Estimated	Annual	Every 5	Every 10	Every 20	Ending	Year-Specific
Year	Balance	Return	Outlays	Years	Years	Years	Balance	Cost
January 1, 2023	12,780,000	651,780	201,000				13,230,780	201,000
January 1, 2024	13,230,780	674,770	206,909				13,698,640	206,909
January 1, 2025	13,698,640	698,631	212,993				14,184,279	212,993
January 1, 2026	14,184,279	723,398	219,255				14,688,422	219,255
January 1, 2027	14,688,422	749,110	225,701				15,211,831	225,701
January 1, 2028	15,211,831	775,803	232,336	635,746			15,119,552	868,082
January 1, 2029	15,119,552	771,097	239,167				15,651,483	239,167
January 1, 2030	15,651,483	798,226	246,198				16,203,510	246,198
January 1, 2031	16,203,510	826,379	253,437				16,776,452	253,437
January 1, 2032	16,776,452	855,599	260,888				17,371,164	260,888
January 1, 2033	17,371,164	885,929	268,558	734,860	40,083		17,213,593	1,043,501

Estimated Endowment for Conestee Dam to Cover Future Maintenance and Repairs for 100 Years

January 1, 2034	17,213,593	877,893	276,453				17,815,033	276,453
January 1, 2035	17,815,033	908,567	284,581				18,439,018	284,581
January 1, 2036	18,439,018	940,390	292,948				19,086,460	292,948
January 1, 2037	19,086,460	973,409	301,560				19,758,309	301,560
January 1, 2038	19,758,309	1,007,674	310,426	849,425			19,606,132	1,159,852
January 1, 2039	19,606,132	999,913	319,553				20,286,491	319,553
January 1, 2040	20,286,491	1,034,611	328,948				20,992,155	328,948
January 1, 2041	20,992,155	1,070,600	338,619				21,724,136	338,619
January 1, 2042	21,724,136	1,107,931	348,574				22,483,493	348,574
January 1, 2043	22,483,493	1,146,658	358,822	981,852	53,556	357,037	21,878,884	1,394,230
January 1, 2044	21,878,884	1,115,823	369,372				22,625,336	369,372
January 1, 2045	22,625,336	1,153,892	380,231				23,398,997	380,231
January 1, 2046	23,398,997	1,193,349	391,410				24,200,936	391,410
January 1, 2047	24,200,936	1,234,248	402,917				25,032,266	402,917
January 1, 2048	25,032,266	1,276,646	414,763	1,134,924			24,759,224	1,549,687
January 1, 2049	24,759,224	1,262,720	426,957				25,594,988	426,957
January 1, 2050	25,594,988	1,305,344	439,510				26,460,822	439,510
January 1, 2051	26,460,822	1,349,502	452,431				27,357,893	452,431
January 1, 2052	27,357,893	1,395,253	465,733				28,287,413	465,733
January 1, 2053	28,287,413	1,442,658	479,425	1,311,860	71,556		27,867,229	1,862,842
January 1, 2054	27,867,229	1,421,229	493,520				28,794,937	493,520
January 1, 2055	28,794,937	1,468,542	508,030				29,755,449	508,030
January 1, 2056	29,755,449	1,517,528	522,966				30,750,011	522,966
January 1, 2057	30,750,011	1,568,251	538,341				31,779,920	538,341
January 1, 2058	31,779,920	1,620,776	554,168	1,516,381			31,330,146	2,070,550

Estimated Endowment for Conestee Dam to Cover Future Maintenance and Repairs for 100 Years

January 1, 2059	31,330,146	1,597,837	570,461				32,357,523	570,461
January 1, 2060	32,357,523	1,650,234	587,233				33,420,524	587,233
January 1, 2061	33,420,524	1,704,447	604,497				34,520,474	604,497
January 1, 2062	34,520,474	1,760,544	622,269				35,658,748	622,269
January 1, 2063	35,658,748	1,818,596	640,564	1,752,787	95,607	637,377	34,351,009	2,488,958
January 1, 2064	34,351,009	1,751,901	659,397				35,443,514	659,397
January 1, 2065	35,443,514	1,807,619	678,783				36,572,350	678,783
January 1, 2066	36,572,350	1,865,190	698,739				37,738,801	698,739
January 1, 2067	37,738,801	1,924,679	719,282				38,944,198	719,282
January 1, 2068	38,944,198	1,986,154	740,429	2,026,050			38,163,873	2,766,479
January 1, 2069	38,163,873	1,946,358	762,198				39,348,033	762,198
January 1, 2070	39,348,033	2,006,750	784,606				40,570,176	784,606
January 1, 2071	40,570,176	2,069,079	807,674				41,831,582	807,674
January 1, 2072	41,831,582	2,133,411	831,419				43,133,573	831,419
January 1, 2073	43,133,573	2,199,812	855,863	2,341,914	127,741		42,007,868	3,325,517
January 1, 2074	42,007,868	2,142,401	881,025				43,269,244	881,025
January 1, 2075	43,269,244	2,206,731	906,928				44,569,048	906,928
January 1, 2076	44,569,048	2,273,021	933,591				45,908,478	933,591
January 1, 2077	45,908,478	2,341,332	961,039				47,288,771	961,039
January 1, 2078	47,288,771	2,411,727	989,293	2,707,021			46,004,184	3,696,315
January 1, 2079	46,004,184	2,346,213	1,018,379				47,332,019	1,018,379
January 1, 2080	47,332,019	2,413,933	1,048,319				48,697,633	1,048,319
January 1, 2081	48,697,633	2,483,579	1,079,139				50,102,073	1,079,139
January 1, 2082	50,102,073	2,555,206	1,110,866				51,546,412	1,110,866
January 1, 2083	51,546,412	2,628,867	1,143,526	3,129,050	170,675	1,137,836	48,594,192	4,443,251

January 1, 2084	48,594,192	2,478,304	1,177,145				49,895,350	1,177,145
January 1, 2085	49,895,350	2,544,663	1,211,753				51,228,260	1,211,753
January 1, 2086	51,228,260	2,612,641	1,247,379				52,593,522	1,247,379
January 1, 2087	52,593,522	2,682,270	1,284,052				53,991,740	1,284,052
January 1, 2088	53,991,740	2,753,579	1,321,803	3,616,874			51,806,642	4,938,677
January 1, 2089	51,806,642	2,642,139	1,360,664				53,088,117	1,360,664
January 1, 2090	53,088,117	2,707,494	1,400,667				54,394,943	1,400,667
January 1, 2091	54,394,943	2,774,142	1,441,847				55,727,238	1,441,847
January 1, 2092	55,727,238	2,842,089	1,484,237				57,085,090	1,484,237
January 1, 2093	57,085,090	2,911,340	1,527,874	4,180,750	228,041		54,059,765	5,936,665
January 1, 2094	54,059,765	2,757,048	1,572,793				55,244,020	1,572,793
January 1, 2095	55,244,020	2,817,445	1,619,034				56,442,431	1,619,034
January 1, 2096	56,442,431	2,878,564	1,666,633				57,654,362	1,666,633
January 1, 2097	57,654,362	2,940,372	1,715,632				58,879,102	1,715,632
January 1, 2098	58,879,102	3,002,834	1,766,072	4,832,535			55,283,330	6,598,607
January 1, 2099	55,283,330	2,819,450	1,817,994				56,284,786	1,817,994
January 1, 2100	56,284,786	2,870,524	1,871,443				57,283,866	1,871,443
January 1, 2101	57,283,866	2,921,477	1,926,464				58,278,880	1,926,464
January 1, 2102	58,278,880	2,972,223	1,983,102				59,268,001	1,983,102
January 1, 2103	59,268,001	3,022,668	2,041,405	5,585,934	304,687	2,031,249	52,327,394	7,932,026
January 1, 2104	52,327,394	2,668,697	2,101,422				52,894,669	2,101,422
January 1, 2105	52,894,669	2,697,628	2,163,204				53,429,093	2,163,204
January 1, 2106	53,429,093	2,724,884	2,226,802				53,927,174	2,226,802
January 1, 2107	53,927,174	2,750,286	2,292,270				54,385,190	2,292,270
January 1, 2108	54,385,190	2,773,645	2,359,663	6,456,789			48,342,382	8,816,452

Estimated Endowment for Conestee Dam to Cover Future Maintenance and Repairs for 100 Years

January 1, 2109	48,342,382	2,465,461	2,429,037				48,378,806	2,429,037
January 1, 2110	48,378,806	2,467,319	2,500,451				48,345,675	2,500,451
January 1, 2111	48,345,675	2,465,629	2,573,964				48,237,340	2,573,964
January 1, 2112	48,237,340	2,460,104	2,649,639				48,047,806	2,649,639
January 1, 2113	48,047,806	2,450,438	2,727,538	7,463,412	407,095		39,900,198	10,598,046
January 1, 2114	39,900,198	2,034,910	2,807,728				39,127,381	2,807,728
January 1, 2115	39,127,381	1,995,496	2,890,275				38,232,602	2,890,275
January 1, 2116	38,232,602	1,949,863	2,975,249				37,207,216	2,975,249
January 1, 2117	37,207,216	1,897,568	3,062,721				36,042,063	3,062,721
January 1, 2118	36,042,063	1,838,145	3,152,765	8,626,969			26,100,473	11,779,735
January 1, 2119	26,100,473	1,331,124	3,245,457				24,186,141	3,245,457
January 1, 2120	24,186,141	1,233,493	3,340,873				22,078,761	3,340,873
January 1, 2121	22,078,761	1,126,017	3,439,095				19,765,684	3,439,095
January 1, 2122	19,765,684	1,008,050	3,540,204				17,233,529	3,540,204
January 1, 2123	17,233,529	878,910	3,644,286	9,971,927	543,923	3,626,155	326,148	14,160,136
*Value based on history with 10 year t-bond investment average returns from 1928 to 2018.								
**Value averaged based on inflation history 1919 to 2018.								

APPENDIX 5

DECLARATION OF COVENANTS AND RESTRICTIONS

OCT 2 9 2007

Book 2297 Page 636

STATE OF SOUTH CAROLINA)
) **DECLARATION OF COVENANTS**
COUNTY OF GREENVILLE) **AND RESTRICTIONS**

THIS DECLARATION OF COVENANTS AND RESTRICTIONS (Declaration) is made and entered into this 25th day of October 2007 by The Conestee Foundation, Inc., a South Carolina non-profit organization (hereinafter referred to as CFI).

RECITALS

WHEREAS, CFI is the owner of certain real property in Greenville County, South Carolina, more particularly described as Tract 1 in Exhibit A attached hereto and incorporated herein by reference ("Property"); and

WHEREAS, contaminants in excess of allowable concentrations for unrestricted use remain at the Property; and

WHEREAS, the Property is the subject of Voluntary Cleanup Contract VCC-00-5393-NRP (VCC) entered into by the South Carolina Department of Health and Environmental Control and CFI, pursuant to the Brownfields/Voluntary Cleanup Program, S.C. Code Ann. § 44-56-710, et seq. (2005), the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 42 U.S.C. §§ 9601, et seq., and the South Carolina Hazardous Waste Management Act (HWMA), S.C. Code Ann. § 44-56-200.

WHEREAS, the Property may be used for certain purposes without further remediation in accordance with the conditions of the VCC and requires that certain restrictions are placed on development and use of the Property; and

WHEREAS, CFI has agreed to impose restrictions on the manner in which the Property may be developed (said restrictions to run with the land and inure to the benefit of and be enforceable by the Department and its successor agencies); and

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS that CFI hereby declares and covenants on behalf of itself, its successors, and assigns that the Property described in Exhibit A shall be held, mortgaged, transferred, sold, conveyed, leased, occupied, and used subject to VCC 00-5393-NRP, dated January 22, 2001, to include the following restrictions, which shall touch and concern and run with the title to the Property:

1. CFI hereby covenants for itself, its successors and assigns that the Property shall not be used for the following types of facilities:

residential, agricultural, child day care facilities, schools, or elderly care facilities.

2. CFI covenants for itself, its successors and assigns that groundwater beneath the Property may not be used for drinking or irrigation purposes without prior approval from the Department or its successor agency.

3. CFI covenants for itself, its successors and assigns that appropriate measures shall be implemented to substantially limit the downstream migration of Lake Conestee sediments. Currently the Lake Conestee dam is preventing migration of substantial quantities of lake-deposited sediments downstream of the dam. As long as the dam continues to serve as the mechanism to substantially limit downstream sediment migration, CFI shall reasonably ensure that the dam is maintained in a manner sufficient for this purpose by undertaking the following specific actions only: development of an Emergency Action Plan, removal of large woody debris from atop the dam as necessary, removal of vegetation atop and adjacent to the dam as necessary, and implementation of limited annual inspections of the dam.

4. CFI covenants for itself, its successors and assigns that appropriate measures shall be implemented (1) to limit human exposure to Lake Conestee soil and sediments and, (2) to prevent disturbance of Lake Conestee soil and sediments unless prior approval from the Department or its successor agency is obtained. The Department represents that the current measures being implemented by CFI (as described in the next sentence) with respect to limiting human exposure to Lake Conestee soils and sediments are appropriate at this time within the meaning of this paragraph 4. The current measures being implemented by CFI are:1) signage restricting human access to specified areas of the Property; 2) signage restricting the nature of human activities on the Property; 3) signage advising park users of specific environmental hazards; 4) signage posting restrictions on taking and consumption of fish and game; 5) management strategies to minimize disturbance of contaminated soils and sediments; 6) ongoing public education efforts to familiarize park users of environmental conditions as well as access and use limitations; and 7) site security controls.

5. CFI covenants for itself, its successors and assigns that the Department or its successor agency, and all other parties performing response actions under the Department's oversight shall be provided reasonable access to inspect the property, to oversee the activities conducted on the property, or to take samples as may be necessary to enforce this Declaration.

6. The covenants and restrictions set forth herein shall run with the title to the Property and shall be binding upon CFI, its successors and assigns. CFI and its successors, and assigns shall include the following notice on all deeds, mortgages, plats, or any legal instruments used to convey any interest in the Property (failure to comply with this paragraph does not impair the validity or enforceability of these covenants):

> NOTICE: This Property Subject to Declaration of Covenants and Restrictions and any subsequent Amendments Recorded at ______________________

7. CFI, its successors and assigns shall submit to the Department a statement of maintenance of the covenants and restrictions as set forth above annually on May 31st of every year.

8. This Declaration shall remain in place until such time as the Department has made a written determination that the covenants and restrictions set forth herein are no longer necessary. This Declaration shall not be amended without the written consent of the Department or its successor agency.

9. This Declaration only applies to the Property expressly identified in Exhibit A and does not impair the Department's authority with respect to the Property or other real property under the control of CFI.

THE REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK

IN WITNESS WHEREOF, THE CONESTEE FOUNDATION, INC. has caused this instrument to be executed as of the date first above written.

WITNESSES:

Katherine S. Andruzzi

Nancy Lickey

THE CONESTEE FOUNDATION, INC

A SOUTH CAROLINA NON-PROFIT ORGANIZATION

By: Douglas J. Stevens

Douglas J. Stevens

Chairman of the Board

(Name and Title)

STATE OF SOUTH CAROLINA)

) ACKNOWLEDGEMENT

COUNTY OF GREENVILLE)

I, Katherine S. Andruzzi (Notary Public), do hereby certify that, Douglas J. Stevens, an authorized representative of The Conestee Foundation, Inc., personally appeared before me this day and acknowledged the due execution of the foregoing instrument, on behalf of the Non-Profit Organization.

Witness my hand and official seal this 25th day of October, 2007.

Katherine S. Andruzzi

Notary Public for South Carolina

My Commission Expires: 12/6/2016

IN WITNESS WHEREOF, the Department has caused this instrument to be executed as of the date first above written.

WITNESSES:

Lavinia K. Hiatt

[signature]

South Carolina Department of Health and Environmental Control

By: [signature]

Robert W. King, Jr., P.E., Deputy Commissioner, Environmental Quality Control

South Carolina Department of Health and Environmental Control

STATE OF SOUTH CAROLINA)

) ACKNOWLEDGEMENT

COUNTY OF RICHLAND)

I, Barry B. Nelson (Notary Public), do hereby certify that, Robert W. King, Jr., P.E., Deputy Commissioner Environmental Quality Control of the South Carolina Department of Health and Environmental Control, personally appeared before me this day and acknowledged the due execution of the foregoing instrument.

Witness my hand and official seal this 16 day of October, 2007.

[signature]

Notary Public for South Carolina

My Commission Expires My Commission Expires February 2nd, 2009

EXHIBIT A

BOOK 1926 PAGE 987

Grantee's Address:
1 Marshall Court
Greenville, SC 29605

FILED GREENVILLE CO. SC
2000 SEP 28 P 4:06

STATE OF SOUTH CAROLINA)
) TITLE TO REAL ESTATE
COUNTY OF GREENVILLE)

KNOW ALL MEN BY THESE PRESENTS, that H. J. BRAND, INC.,

in consideration of Two Hundred Thousand and no/100 ($200,000.00) Dollars, the receipt of which is hereby acknowledged, has granted, bargained, sold, and released, and by these presents does grant, bargain, sell, and release unto

CONESTEE FOUNDATION, INC., its successors and assigns:

All those two pieces, parcels, or lots of land in the County of Greenville, State of South Carolina, in or near the Town of Conestee, shown as Tract 1 and Tract 2 on the plat by Dalton &. Neves Co., dated March 20, 2000, captioned, "Survey for Conestee Foundation, Inc.," recorded in the Office of the Register of Deeds for Greenville County, South Carolina, in Plat Book 42X, Page 35AB Tract 1, containing 144.97 acres, more or less, and comprising Conestee Lake and the dam on, over, and across Reedy River, and Tract 2, containing 5.84 acres, more or less, both tracts to be combined to form one tract, and having the following metes and bounds according to said plat:

STATE 520.00 SEP 28 2000 54

-155-423-1-10

1. TRACT 1

BEGINNING at a point at the northwest corner of Lot 29, and thence N 40-00-00 E 81.60 feet to a point at the joint rear corner of Lot 29 and Lot 30; thence with the rear line of Lot 30, N 65-00-00 E 165.40 feet to an iron pin old; thence N 38-34-10 E 374.00 feet along the northwestern line of the lot shown on Tax Map 422-1-1 to a point; thence N 48-45-10 E 118.80 feet; thence N 34-09-29 E 131.20 feet extending beyond the line of a 20 feet easement, hereafter described, to a point; thence S 72-26-58 E 82.77 feet to a point in the property of H. J. Brand, Inc. shown on Tax Map 423-1-10.1 at a point on the eastern side of the dam over Reedy River; thence with and including the dam, N 17-18-50 E 579.05 feet; thence N 72-41-10 W 169.00 feet to a point in the northwest rear corner of Tract 2 at Conestee Lake; thence with the western line of Tract 2, N 11-13-00 E 129.67 feet to an iron point old at the joint rear corner of Conestee Lake and property now or formerly belonging to William G. Friddle, shown on Tax Map 423-1-8; thence continuing with the joint line of Conestee Lake and Willliam G. Friddle, N 11-13-00 E 338.00 feet to a point and thence N 09-40-00 E 146.30 feet; thence with the joint line of Conestee Lake and property now or formerly belonging to Morris (Tax Map 423-1-3.7) N 54-15-00 E 214.80 feet; thence continuing with the joint line of Conestee Lake and Morris, N 67-43-00 E 271.50 feet to a point and thence N 13-38-00 E

9-28 7387 3 11.00

43.60 feet to a point at the joint corner of Conestee Lake and property now or formerly belonging to Samuel L. Kuykendall (Tax Map 423-1-3.11); thence continuing with the joint line of Conestee Lake and Kuykendall, N 23-38-00 E 68.80 feet to a point and thence N 05-07-00 W 53.00 feet to a point in the corner of property now or formerly belonging to Jimmy A. Dill (Tax Map 423-1-3.2); thence with the line of said property N 25-30-00 W 122.50 feet to the joint corner of said property and property now or formerly belonging to Lindsey J. Forester (Tax Map 423-1-1); thence continuing with the line of Conestee Lake and the Forester property the following metes and bounds: N 50-10-00 W 235.00 feet, thence N 41-00-00 W 170.00 feet, thence N 62-49-00 W 213.00 feet, thence N 72-08-00 W 105.00 feet, thence N 63-49-00 W 154.00 feet, thence N 84-05-00 W 136.00 feet, thence S 83-26-00 W 248.00 feet, and thence N 47-31-00 W 39.00 feet, thence with the line of the Forester property and property now or formerly belonging to City of Greenville (Tax Map 423-1-1.4), S 72-04-00 W 275.00 feet, and thence continuing with the line of property of City of Greenville the following metes and bounds: S 61-54-00 W 140.00 feet, thence N 68-26-00 W 172.00 feet, thence N 56-16-00 W 128.00 feet, thence N 29-48-00 E 181.00 feet, thence N 16-35-00 E 234.00 feet, thence N 10-23-00 E 386.00 feet, thence N 19-12-00 W 220.00 feet, thence S 89-00-00 W 242.00 feet, thence S 83-13-00 W 266.00 feet, thence N 21-47-00 W 149.00 feet, thence N 15-43-00 E 315.00 feet, thence N 16-33-00 E 250.00 feet, thence N 18-05-00 E 102.00 feet, thence N 28-25-00 E 117.00 feet, thence N 47-02-00 W 407.00 feet, and thence N 70-52-00 W 105.00 feet to a point in the property now or formerly belonging to City of Greenville shown on Tax Map 423-1-1.1; thence still continuing with property now or formerly belonging to City of Greenville, N 57-07-00 W 189.00 feet, thence S 46-40-26 W 336.99 feet, thence S 56-32-00 W 256.00 feet, thence S 48-57-00 W 174.00 feet, thence S 64-13-00 W 84.00 feet, thence N 33-42-00 W 176.00 feet, thence N 22-18-00 E 150.00 feet, thence N 27-48-00 E 112.00 feet, thence N 11-45-00 E 218.00 feet, thence N 06-07-00 W 175.00 feet, thence S 09-37-00 W 347.80 feet, thence S 38-00-00 W 194.00 feet, thence S 43-50-00 W 171.80 feet, thence S 15-40-00 W 118.90 feet, thence S 08-20-00 W 435.00 feet, thence N 57-30-00 E 719.00 feet, thence N 76-47-00 E 201.00 feet, thence N 83-08-00 E 148.00 feet, thence N 58-00-00 E 131.00 feet, thence S 81-00-00 E 167.00 feet, thence S 53-47-00 E 85.00 feet, thence S 23-00-00 W 271.00 feet, thence N 54-00-00 W 134.00 feet, thence N 84-54-00 W 156.00 feet, thence S 74-52-00 W 92.00 feet, thence S 04-03-00 W 117.00 feet, thence S 03-57-00 E 140.00 feet, thence S 33-35-00 W 373.00 feet, thence S 12-34-00 W 222.00 feet, thence S 21-46-00 W 354.00 feet, thence S 51-00-00 W 113.00 feet, thence S 27-46-00 W 113.00 feet, thence S 35-26-00 W 111.00 feet, thence S 69-53-00 W 198.00 feet, thence S 21-13-00 W 166.00 feet, thence S 04-02-00 E 142.00 feet, thence S 05-25-00 E 384.00 feet, thence S 51-40-00 E 171.00 feet, thence S 68-00-00 E 103.00 feet, thence S 01-00-00 W 100.00 feet, thence N 85-40-00 E 432.00 feet, thence N 86-05-00 E 395.00 feet, thence N 26-39-00 E 435.00 feet, thence S 81-17-00 E 210.00 feet, thence S 48-30-00 E 238.00 feet, thence S 36-05-00 E 230.00 feet, thence N 73-45-00 E 272.00 feet, thence S 07-33-00 W 635.00 feet, thence S 57-03-00 E 235.00 feet, thence S 28-10-00 W 214.00 feet, thence S 02-35-00 W 365.00 feet, thence S 09-30-00 E 200.00 feet, thence S 02-00-00 W 315.00 feet, thence S 36-00-00 E 368.00 feet to a point of beginning,

TOGETHER with an easement for purposes of ingress and egress for access to Conestee Lake, located on the western side of Main Street at the joint front corner of property of H. J. Brand, Inc. (Tax Map 423-1-10.1) and the lot shown on Tax Map 422-1-2, which easement is twenty (20) feet in width and extending to the northeastern side of Conestee Lake and which is subject to the following conditions:

1. The Grantee shall maintain the easement in a safe condition, free from any obstructions, hazardous wastes, or other pollutants, and in accordance with any existing easements affecting that property.
2. The Grantee shall be responsible for any damage to the remaining property of H. J. Brand, Inc. which may result from the Grantee's negligent use of the easement.
3. The easement shall be used for the purpose of access only and for no other purpose.
4. H. J. Brand, Inc. has and shall retain the unrestricted right to the use and enjoyment of its property, including the parcel in the easement, and may allow the use thereof by other parties.
5. This easement shall be permanent, non-exclusive, and shall run with the land.
6. This easement shall be subject to any other easements or rights to the use of the property subject to this easement heretofore granted by H. J. Brand, Inc. to any other party.

2. TRACT 2

BEGINNING at a point in the joint corner of Tract 2 and other property of H. J. Brand, Inc., shown on Tax Map 423-1-10.1 at the the eastern side of the dam across Reedy River on Conestee Lake, thence with the joint line of said property S 72-41-10 E 205.11 feet; thence S 62-09-25 E 249.24 feet; thence S 69-08-06 E 77.23 feet; thence S 45-56-34 E 109.62 feet; thence S 21-21-45 E 24.67 feet to a point on the western side of the right-of-way of Conestee Road, S-221; thence with the western side of the right of way of Conestee Road, S-221, N 26-12-59 E 123.09 feet; thence S 63-45-36 E 42.00 feet to a point on the western side of Conestee Road, S-221; thence continuing with the western side of Conestee Road, S-221, N 26-30-03 E 129.66 feet and thence N 30-05-43 E 95.65 feet to a point in the joint front corner of Tract 2 and property now or formerly belonging to Forrest Hammet, shown on Tax Map 423-1-9; thence with the joint line of said property, N 60-37-00 W 946.65 feet to a point on Conestee Lake at the joint corner of the property of Forrest Hammet and H. J. Brand, Inc., referred to above, and the property now or formerly belonging to William G. Friddle, shown on Tax Map 423-1-8; thence with the line of Conestee Lake, N 11-13-00 E 129.67 feet and N 72-41-10 W 169.00 feet to a point on the eastern side of the dam across Reedy

River, referred to above, being conveyed by separate deed to the Grantee; thence S 17-18-50 W 286.46 feet to the point of beginning.

This conveyance is made subject to rights, if any, of others entitled in and to the continued uninterrupted flow of Reedy River, and the rights, if any of the upper and lower riparian owners in and to the use of the waters of Reedy River and Conestee Lake; the rights, if any, of the property owners abutting Conestee Lake in and to the waters of Reedy River and Conestee Lake; and any easements, rights of way, or zoning regulations applicable to the property herein conveyed which may in any way affect the property conveyed herein or the remaining property of the grantor.

The Grantor makes no warranty or representation whatsoever about the dam which constitutes a part of the property conveyed herein, including but not limited to its structural or physical condition or its compliance with any laws or regulations imposed by any statute, government department or agency, or any environmental or engineering entity, and the grantee accepts the dam "as is."

The Grantor makes no warranty or representations about conditions of hazardous wastes, hazardous substances, and other pollutants which may be in or which may affect Conestee Lake, and the grantee accepts Conestee Lake "as is."

Being a portion of the property conveyed to the Grantor by H. J. Brand by deed dated December 9, 1985, recorded December 10, 1985 in the Office of the Register of Deeds for Greenville County, South Carolina, in Deed Book 1255, Page 42.

TOGETHER with all and singular the rights, members, hereditaments, and appurtenances to said premises belonging or in any wise incident or appertaining;

TO HAVE AND TO HOLD all and singular the premises before mentioned unto Grantee and its successors and assigns forever;

AND the Grantor does hereby bind itself and its successors and assigns to warrant and forever defend all and singular said premises unto the Grantee and its successors and assigns against the Grantor and its successors and assigns and against every person whomsoever lawfully claiming or to claim the same or any part thereof.

IN WITNESS WHEREOF, H. J. Brand, Inc. has caused its corporate seal to be affixed hereto and this instrument to be signed and subscribed by its duly authorized officer this 28 day of September, 2000.

SIGNED, sealed and delivered in the in the presence of

H. J. BRAND, INC. (Seal)

By: H. J. Brand
H. J. Brand, President

STATE OF SOUTH CAROLINA)
) PROBATE
COUNTY OF GREENVILLE)

Personally appeared the undersigned witness and made oath that (s)he saw the within named H. J. Brand, Inc. sign, seal, and as its act and deed deliver the within written Deed and (s)he with the other witness subscribed above witnessed the execution thereof.

SWORN to before me this 28
day of September, 2000
Linda H. Lewis (Seal)
Notary Public for South Carolina
My Commission Expires: 05/15/02

FILED FOR RECORD IN GREENVILLE
COUNTY SC R.O.D. OFFICE AT 04:06 PM
09 28 00 RECORDED IN DEED
BOOK 1926 PAGE 0987 THRU 0991
DOC # 2000077105
Judy B. Hix

GREENVILLE COUNTY REG OF DEEDS
301 UNIVERSITY RIDGE, STE 1300
GREENVILLE, SC 29601
864-467-7240

ISSUED TO: CONESTEE FOUNDATION

RECEIPT # 64669
DATE 10/29/2007 01:29:31 PM

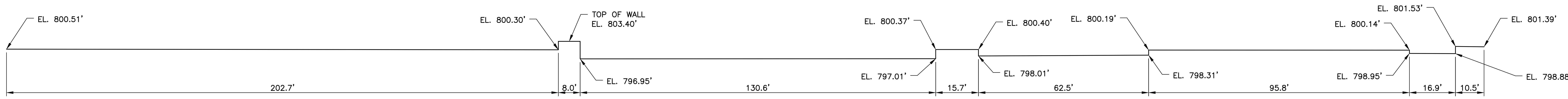
DOCUMENT #	Book	Page	PGS	FEE
OTHER, POSTAGE				0.41
2007107266	2257	636	11	
RESTRICTIVE COVENANT				17.00
Total Amount Due				17.41
CHECK 1263				17.41
Total Amount Paid				17.41

THANK YOU
Deputy: JHIX

APPENDIX 6

PROPOSED PROFILE

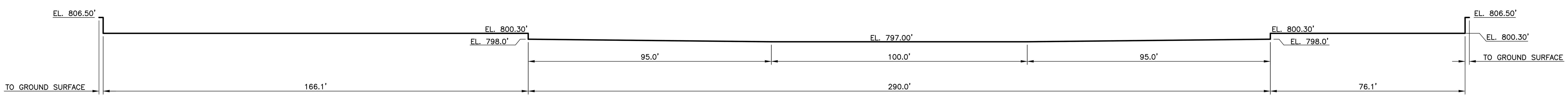
24x36 = FULL SCALE



EXISTING PROFILE

1"= 20'

NOTE:
EXISTING PROFILE TAKEN FROM PRECISION LAND SURVEYING DRAWING, GREENVILLE SC, DATED 01/16/2008, PROJECT NO. 08006.



PROPOSED PROFILE

1"= 20'

20 0 20 40
SCALE IN FEET

NOT FOR CONSTRUCTION

CONESTEE FOUNDATION, INC.
GREENVILLE, SOUTH CAROLINA

LAKE CONESTEE DAM

EXISTING AND PROPOSED PROFILES

No.	Revision	Date	Drawn	Checked
A	DESIGN REVIEW	08-24-18	JCH	WLR

Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.
AJCo	ZJA	AJCo	2001-002	04-08-19	SK-01

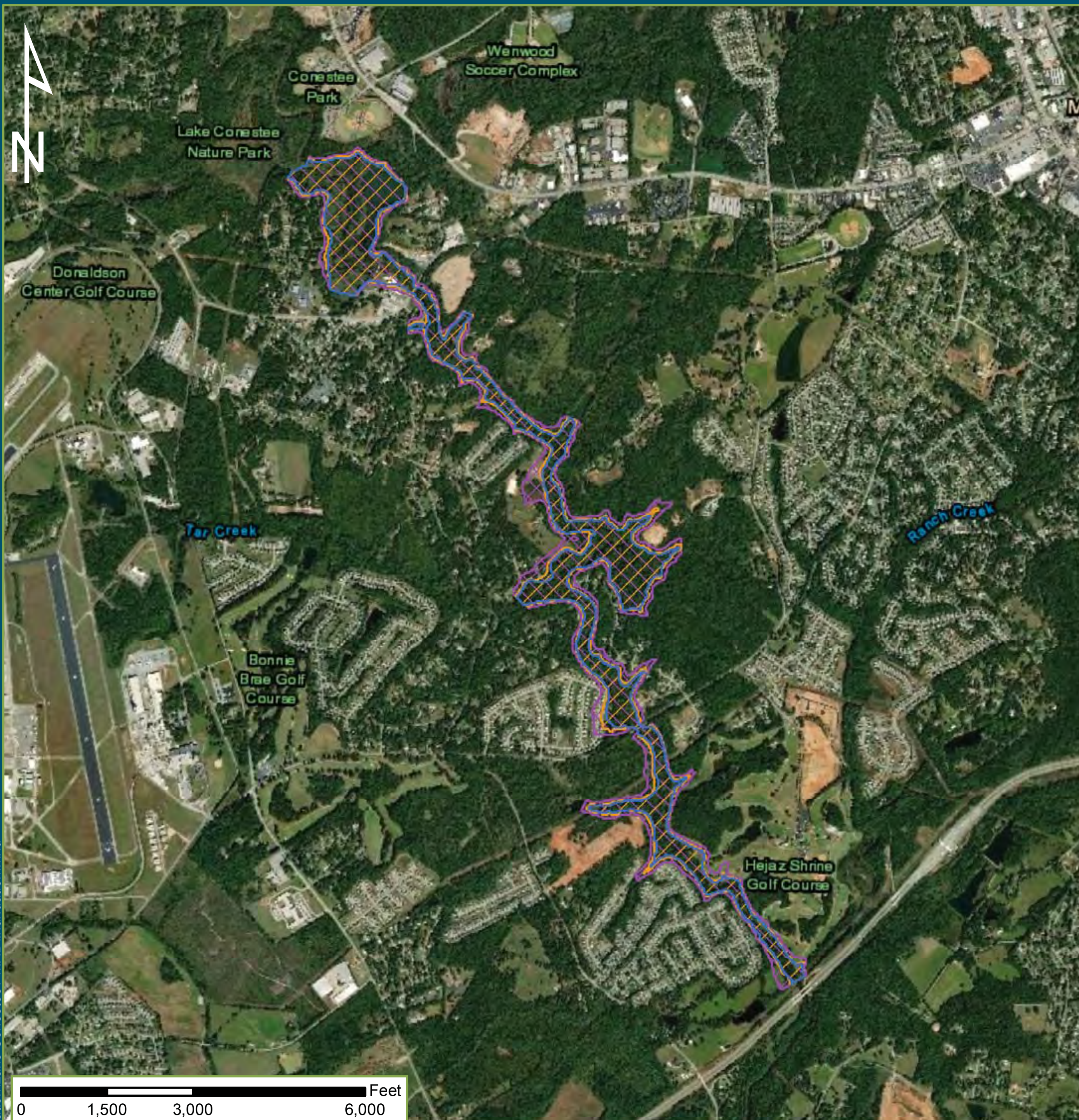
Kleinschmidt
888-224-5942
KleinschmidtGroup.com

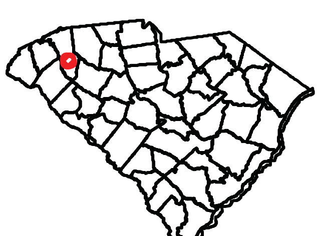
PRINTED: Apr. 8, 2019 - 4:01 PM J:\2001\002\Drawings\Working Drawings\Sketch 01.dwg

APPENDIX 7

INUNDATION MAP AND FLOOD PROFILES

Conestee Breach Analysis





Legend

- 100 YR WB
- 500 YR WB
- 10000 YR WB

Conestee Foundation, Inc.

Greenville, SC

Final Pre-Design Study of Alternatives for Rehabilitation and/or Replacement of Lake Conestee Dam

Drawn By:	Date Drawn:	Checked By:	Date Checked:
JJJ	8/6/2018	JSJ	8/6/2018

Kleinschmidt

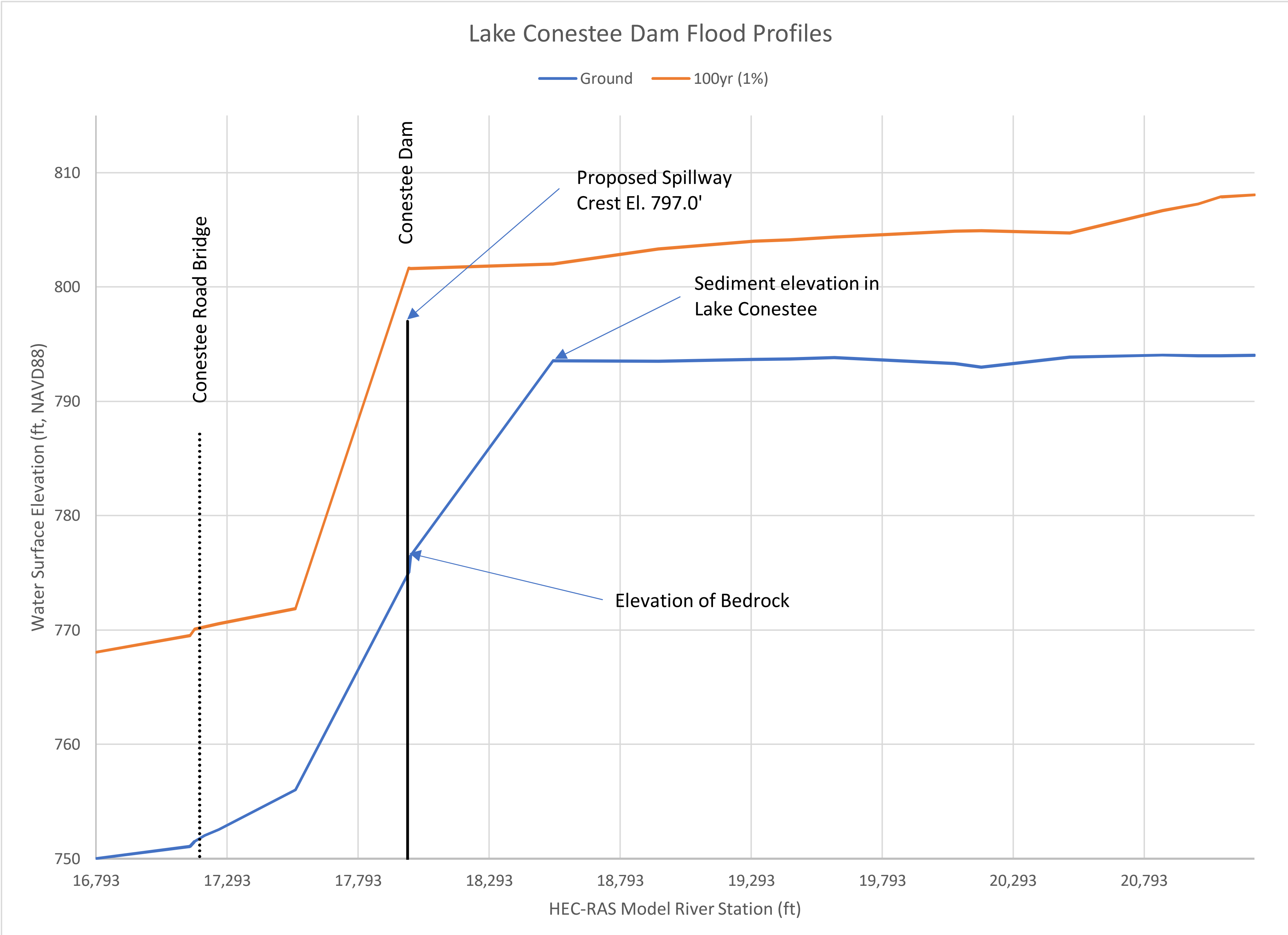
141 Main St., PO Box 650
Pittsfield, Maine 04967
Telephone: (207) 487-3328
Fax: (207) 487-3124
www.KleinschmidtGroup.com

Path: G:\ Client Data\Conestee Foundation\Lake Conestee\ MXD\Inundation.mxd

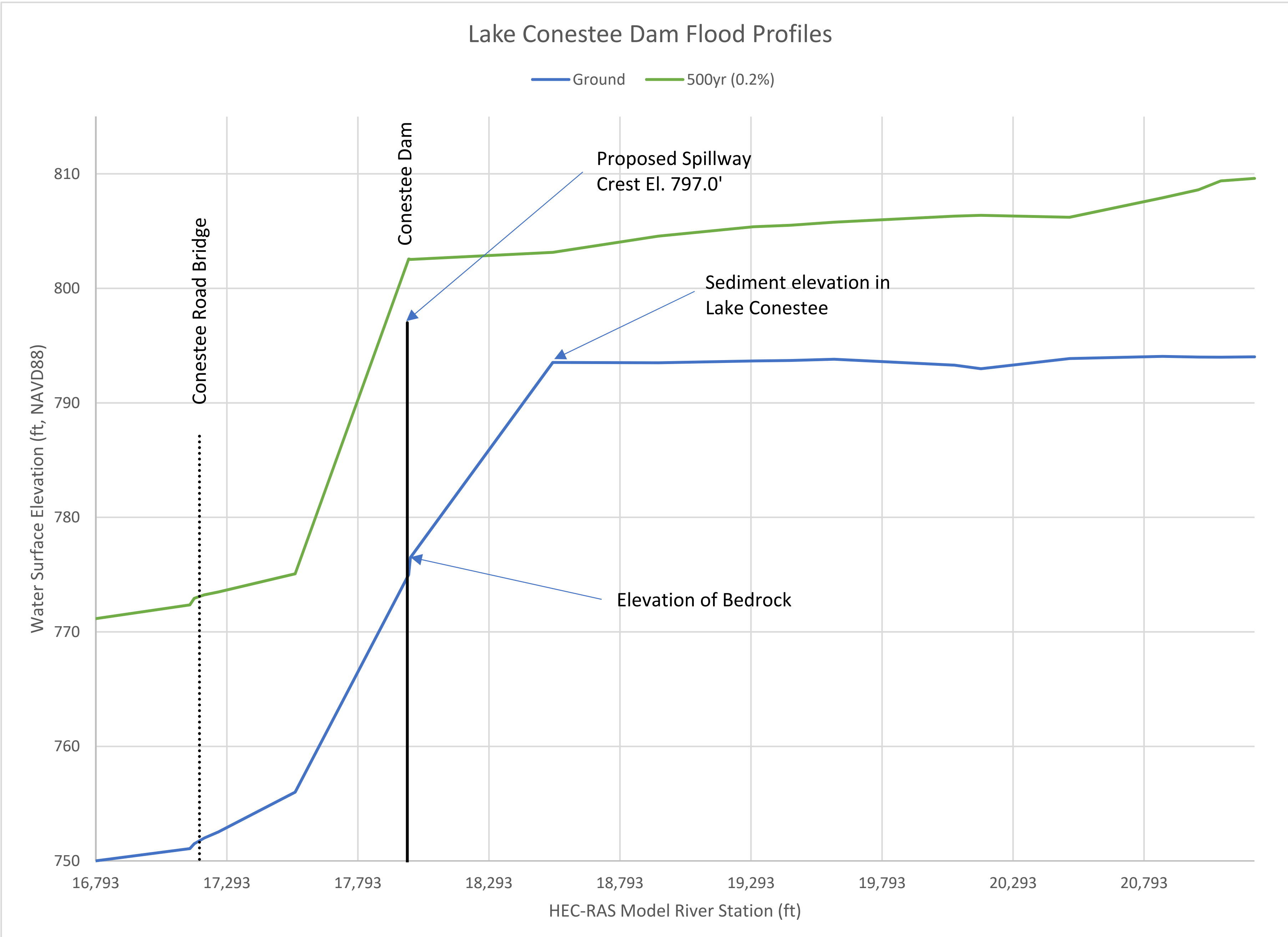
Date Printed: 8/6/2018

Source: ESRI World Imagery

PN: 2001002.01



Lake Conestee Dam Flood Profiles
Ground
100yr (1%)
Conestee Road Bridge
Conestee Dam
Proposed Spillway
Crest El. 797.0'
Sediment elevation in
Lake Conestee
Elevation of Bedrock
Water Surface Elevation (ft, NAVD88)
810
800
790
780
770
760
750
16,793
17,293
17,793
18,293
18,793
19,293
19,793
20,293
20,793
HEC-RAS Model River Station (ft)



Lake Conestee Dam Flood Profiles
Ground
500yr (0.2%)
Water Surface Elevation (ft, NAVD88)
810
800
790
780
770
760
750
16,793
17,293
17,793
18,293
18,793
19,293
19,793
20,293
20,793
HEC-RAS Model River Station (ft)
Conestee Road Bridge
Conestee Dam
Proposed Spillway
Crest El. 797.0'
Sediment elevation in
Lake Conestee
Elevation of Bedrock

APPENDIX 8

COMPILED STABILITY DIAGRAMS, REPORT, AND CROSS SECTIONS

File Name: Lake Conestee Dam Stability 8-24-18.dam
Job Name: Lake Conestee Dam
Job Number: 2001002
Comments: Feasibility Study for Lake Conestee Dam Rehabilitation

Kleinschmidt Associates
KAStable 1.06
Date: 8/2/18
By: AJCo
Reviewed by:__________
Date: __________

-- STABILITY ANALYSIS SUMMARY TABLE --

FILE NAME: Lake Conestee Dam Stability 8-24-18.dam

LOAD CASE	V KIPS	H KIPS	H/V	SLIDE SF	M+ FT-K	M- FT-K	M+/M-	M FT-K	R FT	BASE TOE PSI	PRESS. HEEL PSI	TENS. ZONE FT
GRAVITY	32.77	0.00	-0.000	N/A	415.66	0.00	-Inf	415.66	12.68	N/A	N/A	N/A
Normal Pond	-0.17	-39.98	-233.435	N/A	416.35	-658.22	0.633	-241.87	1412.27	N/A	N/A	N/A
100-Year Flood	-3.52	-46.61	-13.251	N/A	433.29	-713.54	0.607	-280.25	79.67	N/A	N/A	N/A
500-Year Flood	-2.83	-46.79	-16.552	N/A	445.73	-726.38	0.614	-280.64	99.28	N/A	N/A	N/A
10,000 Year Flood	2.88	-42.20	14.672	N/A	528.83	-749.18	0.706	-220.36	-76.61	N/A	N/A	N/A
2x10,000 Year Flood	16.13	-21.76	1.349	0.370	795.77	-659.38	1.207	136.39	8.46	7.35	5.10	0.00
Normal Conditions Load Case with Rock Anchors	56.25	-9.89	0.176	2.840	1101.25	-559.26	1.969	541.99	9.63	17.11	26.29	0.00
100-Year Flood Conditions with rock Anchors	52.94	-16.52	0.312	1.600	1118.20	-614.41	1.820	503.78	9.52	16.91	23.94	0.00
500-Year Flood Conditions with Rock Anchors	52.22	-16.70	0.320	1.560	1130.64	-635.70	1.779	494.93	9.48	16.93	23.36	0.00
10,000 Year Flood With Rock Anchors	53.42	-12.11	0.227	2.210	1213.73	-685.53	1.770	528.20	9.89	14.51	26.71	0.00

File Name:	Lake Conestee Dam Stability 8-24-18.dam	Kleinschmidt Associates	
Job Name:	Lake Conestee Dam	KAStable 1.06	
Job Number:	2001002	Date:	8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By:	AJCo
		Reviewed by:	__________
		Date:	__________

SECTION DATA - GRAVITY

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
100	18.00	5.00	1.00	150.0	0	V	0.00	13.50	121.50	9.00
101	5.00	24.10	1.00	150.0	0	V	13.00	18.07	280.16	15.50
102	4.00	4.00	1.00	150.0	2	V	9.00	1.20	14.00	11.67

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	32.77	0.00	415.66	0.00
TOTAL	GRAVITY	32.77	0.00	415.66	0.00

LOAD CASE CONSTANTS - GRAVITY

STABILITY CASE CONSTANTS

Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI

DIMENSIONAL CASE CONSTANTS

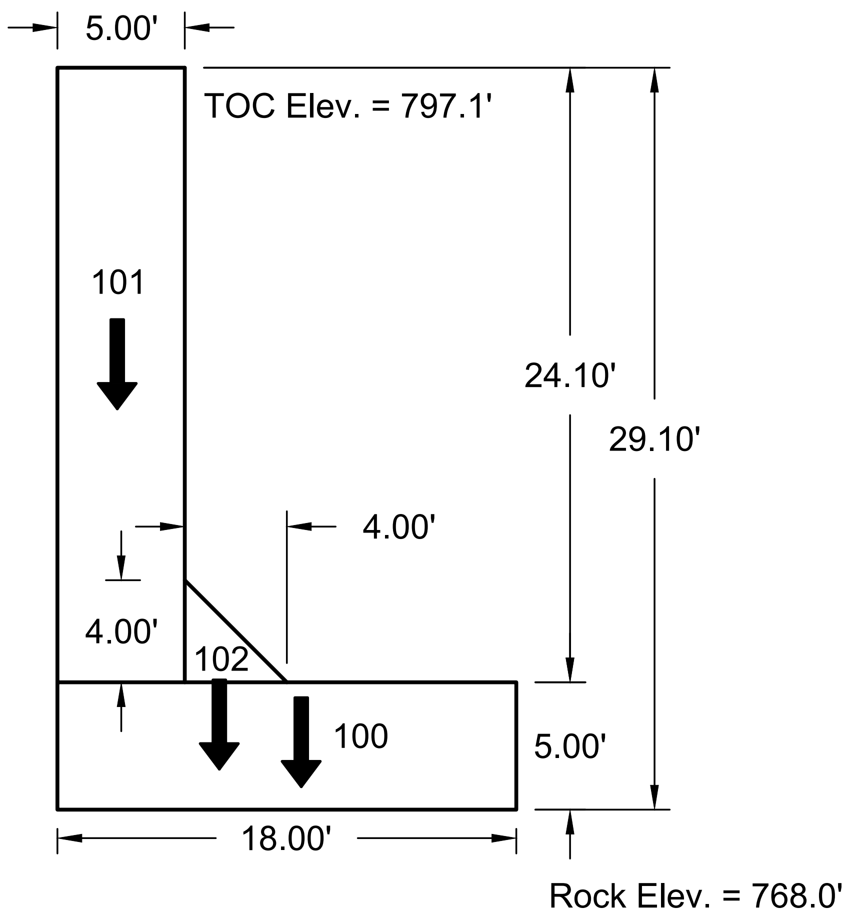
Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	

FINAL RESULTS OF STABILITY ANALYSIS - GRAVITY

V=	32.77	KIPS
H=	0.00	KIPS
H/V=	-0.000	
SLIDING S.F.=	N/A	
M+=	415.66	FT-K
M-=	0.00	FT-K
SUM.M=	415.66	FT-K
M+/M-=	-Inf	
R=	12.68	FT from Toe
Tension Zone=	N/A	FT
Toe Pressure=	N/A	PSI
Heel Pressure=	N/A	PSI

TZ UNDER TOE. TZ ANALYSIS NOT PERFORMED AND RESULTS ARE INVALID.

Alternative 6
Gravity Load Case



Note: Dam Cross Section
Dimensions and Section ID Numbers
are Typical for All Load Cases

No.	Revision	Date	Drawn	Checked
-	-	-	-	-

Conestee Foundation

Lake Conestee Dam Stability Analysis
New Downstream CIP Concrete Dam, 60' Downstream

Gravity Load Conditions

Kleinschmidt
141 Main Street P.O. Box 650
Pittsfield, Maine 04967
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www.KleinschmidtGroup.com

Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.

File Name:	Lake Conestee Dam Stability 8-24-18.dam	Kleinschmidt Associates	
Job Name:	Lake Conestee Dam	KAStable 1.06	
Job Number:	2001002	Date:	8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By:	AJCo
		Reviewed by:	__________
		Date:	__________

SECTION DATA - Normal Pond

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
200	18.00	29.37	1.00	-62.4	0	V	0.00	-32.99	-296.90	9.00
210	29.10	29.10	1.00	-62.4	1	H	0.00	-26.42	-256.28	9.70
211	5.00	0.27	1.00	62.4	2	V	13.00	0.04	0.69	16.33
212	0.27	29.10	1.00	-62.4	0	H	0.00	-0.49	-0.07	0.14
213	24.10	24.10	1.00	-45.0	1	H	0.00	-13.07	-104.98	8.03

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	32.77	0.00	415.66	0.00
	Normal Pond	N/A	N/A	N/A	N/A
TOTAL	Normal Pond	N/A	N/A	N/A	N/A

LOAD CASE CONSTANTS - Normal Pond

STABILITY CASE CONSTANTS		
Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI
DIMENSIONAL CASE CONSTANTS		
Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	
LOAD CASE CONSTANTS		
Drain Efficiency, DE:	0.00	%
Headpond:	29.37	
Tailwater:	0.00	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

FINAL RESULTS OF STABILITY ANALYSIS - Normal Pond

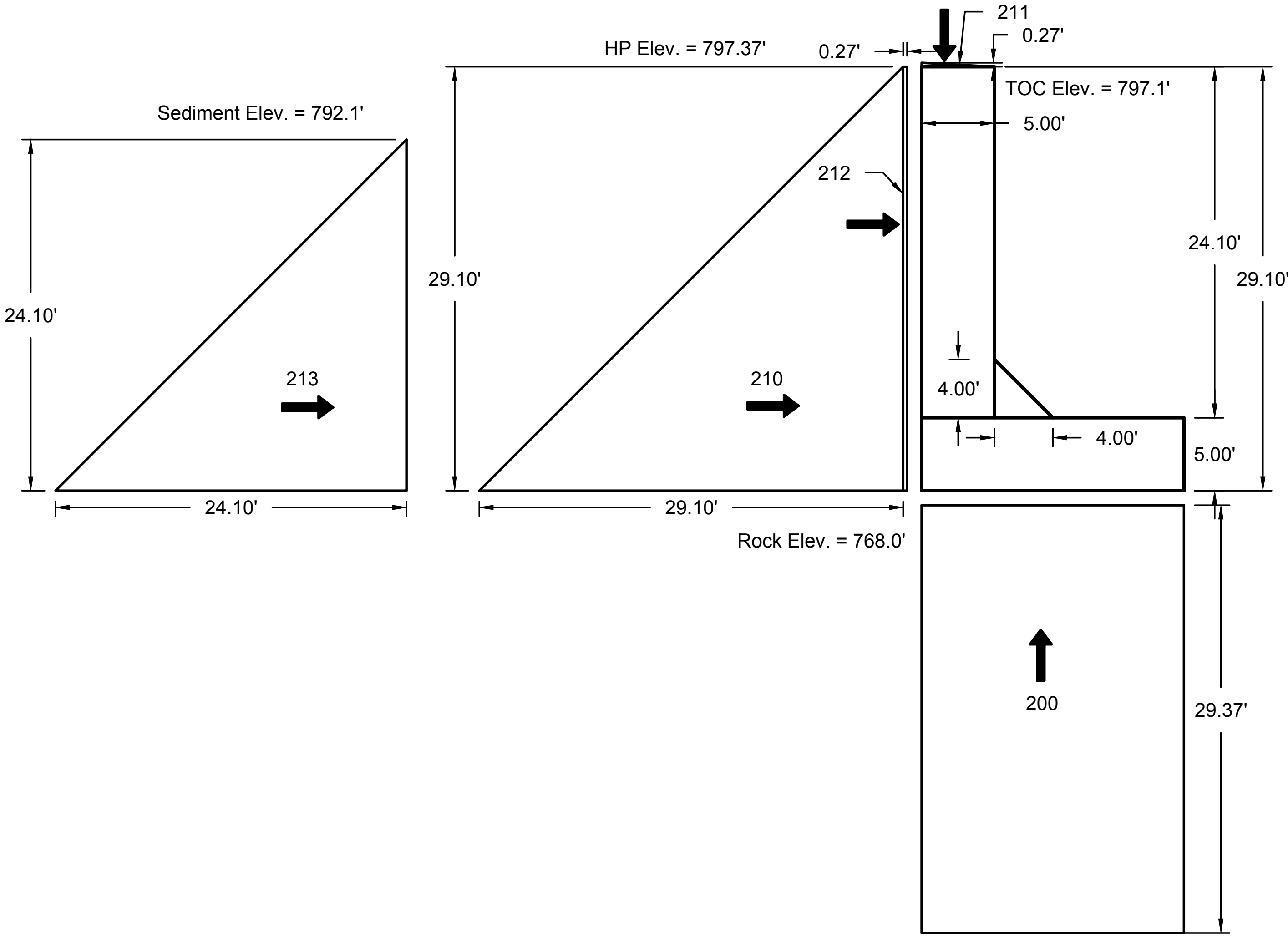
V=	-0.17	KIPS
H=	-39.98	KIPS
H/V=	-233.435	
SLIDING S.F.=	N/A	
M+=	416.35	FT-K
M-=	-658.22	FT-K
SUM.M=	-241.87	FT-K
M+/M-=	0.633	
R=	1412.27	FT from Toe
Tension Zone=	N/A	FT
Toe Pressure=	N/A	PSI
Heel Pressure=	N/A	PSI

DAM IS UNSTABLE!!!

8.5X11 = FULL SCAL

Alternative 6

Normal Pool Condition (No Rock Anchors)



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No.	Revision	Date	Drawn	Checked
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Conestee Foundation

Lake Conestee Dam Stability Analysis
New Downstream CIP Concrete Dam, 60' Downstream

Normal Pool Load Conditions
(No Rock Anchors)

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.
AJCo	AJCo		2001.002			

File Name:	Lake Conestee Dam Stability 8-24-18.dam	Kleinschmidt Associates	
Job Name:	Lake Conestee Dam	KAStable 1.06	
Job Number:	2001002	Date:	8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By:	AJCo
		Reviewed by:	__________
		Date:	__________

SECTION DATA - 100-Year Flood

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
300	18.00	3.86	1.00	-62.4	0	V	0.00	-4.34	-39.02	9.00
301	18.00	29.42	1.00	-62.4	0	V	0.00	-33.04	-297.40	9.00
310	29.10	29.10	1.00	-62.4	1	H	0.00	-26.42	-256.28	9.70
311	3.86	3.86	1.00	62.4	1	H	0.00	0.46	0.60	1.29
312	5.00	1.39	1.00	62.4	2	V	13.00	0.22	3.54	16.33
313	5.00	2.79	1.00	62.4	0	V	13.00	0.87	13.49	15.50
314	4.18	29.10	1.00	-62.4	0	H	0.00	-7.59	-15.86	2.09
315	24.10	24.10	1.00	-45.0	1	H	0.00	-13.07	-104.98	8.03

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	32.77	0.00	415.66	0.00
	100-Year Flood	N/A	N/A	N/A	N/A
TOTAL	100-Year Flood	N/A	N/A	N/A	N/A

LOAD CASE CONSTANTS - 100-Year Flood

STABILITY CASE CONSTANTS

Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI

DIMENSIONAL CASE CONSTANTS

Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	

LOAD CASE CONSTANTS

Drain Efficiency, DE:	0.00	%
Headpond:	33.28	
Tailwater:	3.86	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

FINAL RESULTS OF STABILITY ANALYSIS - 100-Year Flood

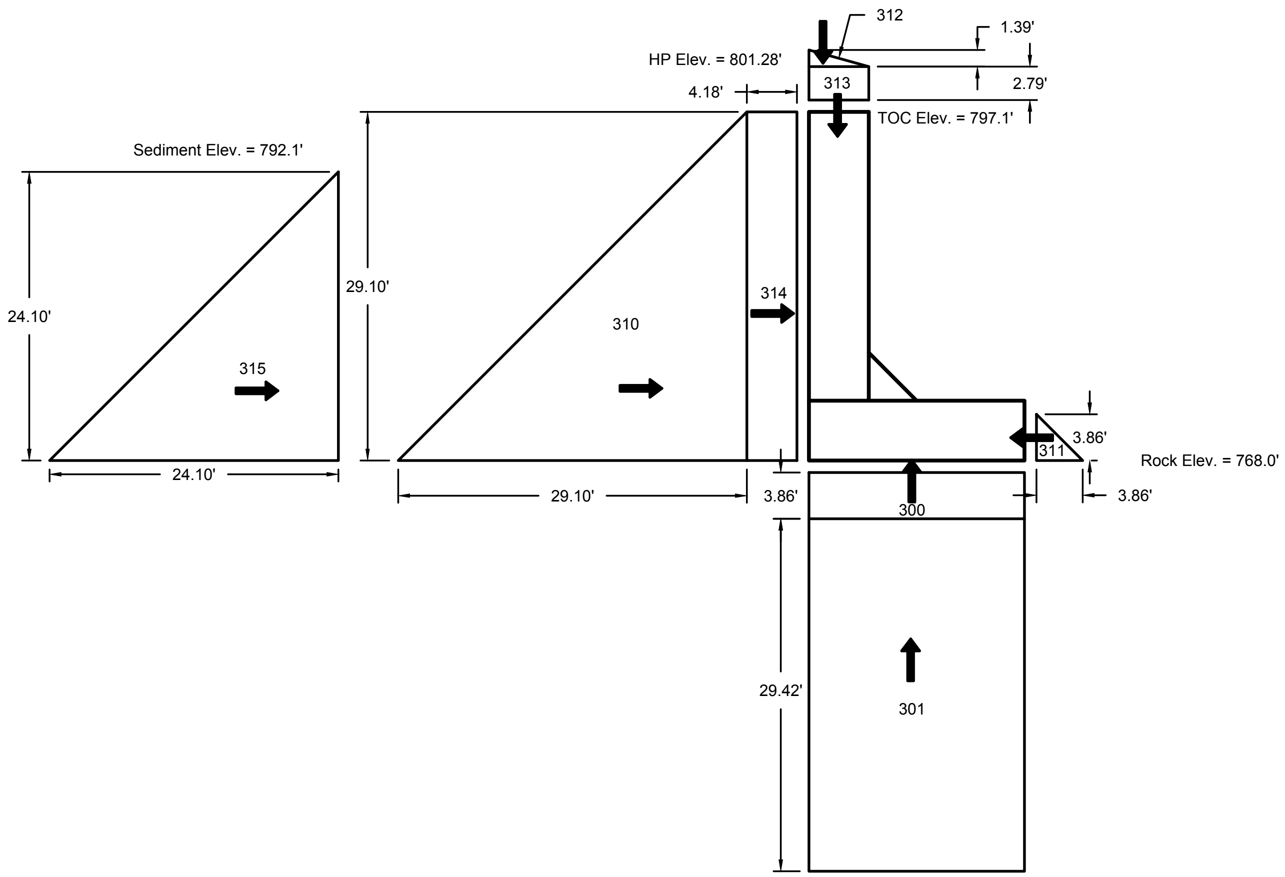
V=	-3.52	KIPS
H=	-46.61	KIPS
H/V=	-13.251	
SLIDING S.F.=	N/A	
M+=	433.29	FT-K
M-=	-713.54	FT-K
SUM.M=	-280.25	FT-K
M+/M-=	0.607	
R=	79.67	FT from Toe
Tension Zone=	N/A	FT
Toe Pressure=	N/A	PSI
Heel Pressure=	N/A	PSI

DAM IS UNSTABLE!!!

8.5X11 = FULL SCAL

Alternative 6

100 Year Flood (No Rock Anchors)



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No.	Revision	Date	Drawn	Checked
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Conestee Foundation

Lake Conestee Dam Stability Analysis
New Downstream CIP Concrete Dam, 60' Downstream

100 Year Flood Load Conditions
(No Rock Anchors)

Kleinschmidt

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.
AJCo	AJCo		2001.002			

File Name:	Lake Conestee Dam Stability 8-24-18.dam	Kleinschmidt Associates	
Job Name:	Lake Conestee Dam	KAStable 1.06	
Job Number:	2001002	Date:	8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By:	AJCo
		Reviewed by:	__________
		Date:	__________

SECTION DATA - 500-Year Flood

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
400	18.00	7.07	1.00	-62.4	0	V	0.00	-7.94	-71.47	9.00
401	18.00	26.91	1.00	-62.4	0	V	0.00	-30.23	-272.03	9.00
410	29.10	29.10	1.00	-62.4	1	H	0.00	-26.42	-256.28	9.70
411	7.07	7.07	1.00	62.4	1	H	0.00	1.56	3.68	2.36
412	5.00	1.63	1.00	62.4	2	V	13.00	0.25	4.15	16.33
413	9.00	2.07	1.00	62.4	0	V	0.00	1.16	5.23	4.50
414	4.88	29.10	1.00	-62.4	0	H	0.00	-8.86	-21.62	2.44
415	5.00	3.25	1.00	62.4	0	V	13.00	1.01	15.72	15.50
416	2.07	2.07	1.00	62.4	1	V	9.00	0.13	1.30	9.69
417	24.10	24.10	1.00	-45.0	1	H	0.00	-13.07	-104.98	8.03

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	32.77	0.00	415.66	0.00
	500-Year Flood	N/A	N/A	N/A	N/A
TOTAL	500-Year Flood	N/A	N/A	N/A	N/A

LOAD CASE CONSTANTS - 500-Year Flood

STABILITY CASE CONSTANTS		
Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI
DIMENSIONAL CASE CONSTANTS		
Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	
LOAD CASE CONSTANTS		
Drain Efficiency, DE:	0.00	%
Headpond:	33.98	
Tailwater:	7.07	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

FINAL RESULTS OF STABILITY ANALYSIS - 500-Year Flood

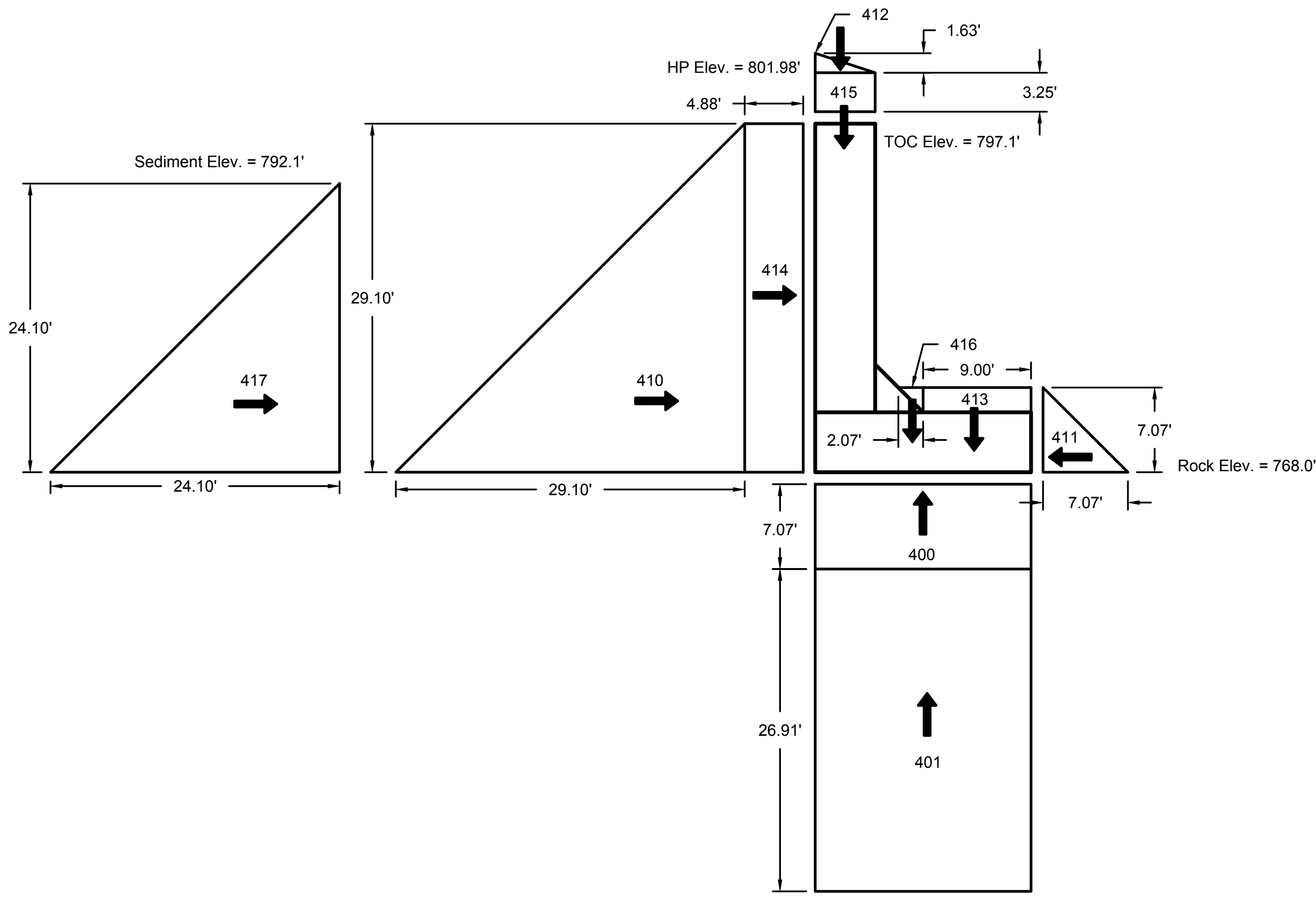
V=	-2.83	KIPS
H=	-46.79	KIPS
H/V=	-16.552	
SLIDING S.F.=	N/A	
M+=	445.73	FT-K
M-=	-726.38	FT-K
SUM.M=	-280.64	FT-K
M+/M-=	0.614	
R=	99.28	FT from Toe
Tension Zone=	N/A	FT
Toe Pressure=	N/A	PSI
Heel Pressure=	N/A	PSI

DAM IS UNSTABLE!!!

8.5X11 = FULL SCAL

Alternative 6

500 Year Flood (No Rock Anchors)



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No.	Revision	Date	Drawn	Checked
-	-	-	-	-

Conestee Foundation

Lake Conestee Dam Stability Analysis
New Downstream CIP Concrete Dam, 60' Downstream

500 Year Flood Load Conditions
(No Rock Anchors)

Kleinschmidt

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.

File Name:	Lake Conestee Dam Stability 8-24-18.dam	Kleinschmidt Associates	
Job Name:	Lake Conestee Dam	KAStable 1.06	
Job Number:	2001002	Date:	8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By:	AJCo
		Reviewed by:	__________
		Date:	__________

SECTION DATA - 10,000 Year Flood

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
500	18.00	16.23	1.00	-62.4	0	V	0.00	-18.23	-164.07	9.00
501	18.00	18.89	1.00	-62.4	0	V	0.00	-21.22	-190.96	9.00
510	29.10	29.10	1.00	-62.4	1	H	0.00	-26.42	-256.28	9.70
511	16.23	16.23	1.00	62.4	1	H	0.00	8.22	44.46	5.41
512	5.00	2.00	1.00	62.4	2	V	13.00	0.31	5.10	16.33
513	9.00	11.23	1.00	62.4	0	V	0.00	6.31	28.38	4.50
514	6.02	29.10	1.00	-62.4	0	H	0.00	-10.93	-32.90	3.01
515	5.00	4.01	1.00	62.4	2	V	13.00	0.63	10.22	16.33
516	4.00	7.23	1.00	62.4	0	V	9.00	1.80	19.85	11.00
517	4.00	4.00	1.00	62.4	1	V	9.00	0.50	5.16	10.33
518	24.10	24.10	1.00	-45.0	1	H	0.00	-13.07	-104.98	8.03

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	32.77	0.00	415.66	0.00
	10,000 Year Flood	N/A	N/A	N/A	N/A
TOTAL	10,000 Year Flood	N/A	N/A	N/A	N/A

LOAD CASE CONSTANTS - 10,000 Year Flood

STABILITY CASE CONSTANTS		
Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI
DIMENSIONAL CASE CONSTANTS		
Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	
LOAD CASE CONSTANTS		
Drain Efficiency, DE:	0.00	%
Headpond:	35.12	
Tailwater:	16.23	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

FINAL RESULTS OF STABILITY ANALYSIS - 10,000 Year Flood

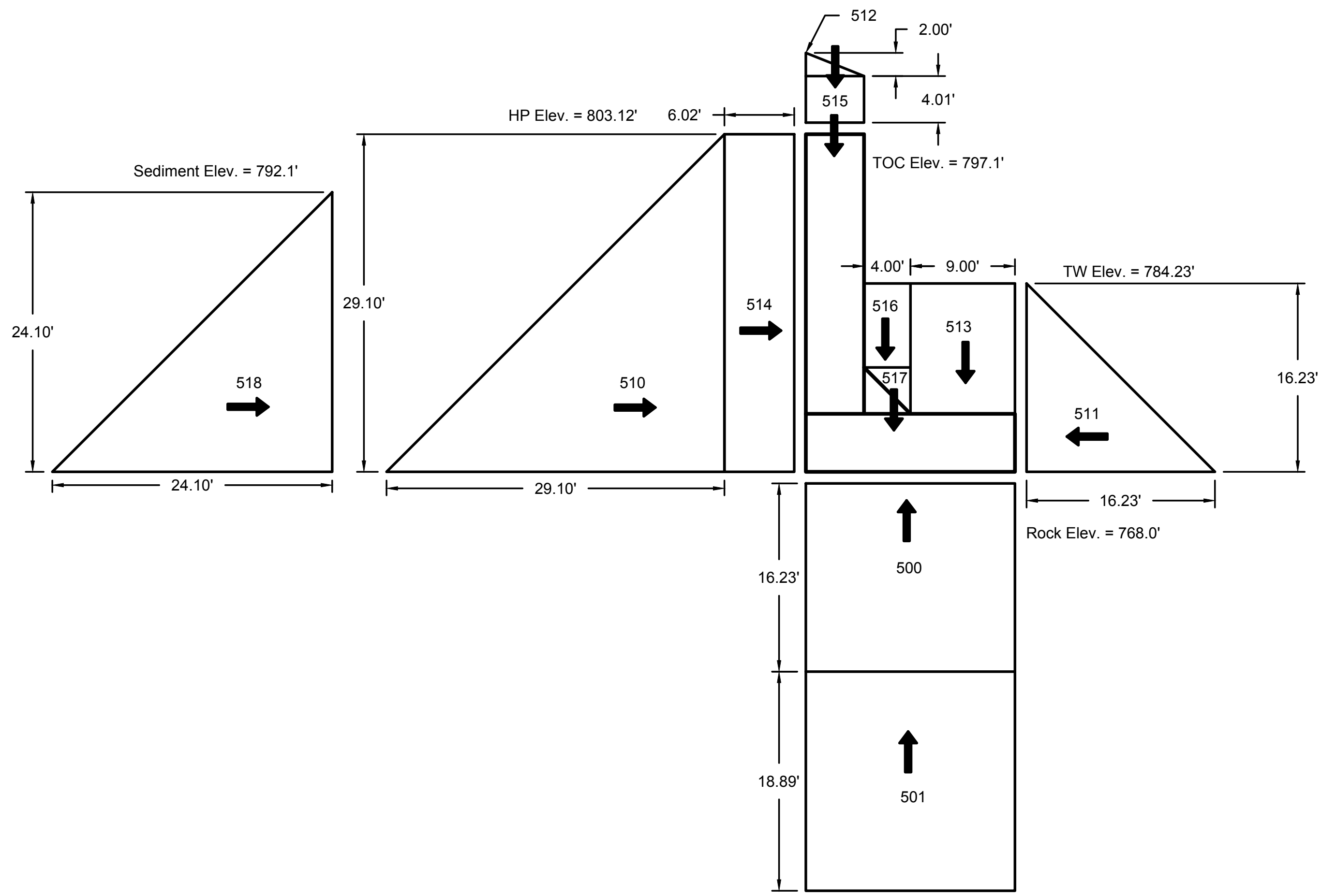
V=	2.88	KIPS
H=	-42.20	KIPS
H/V=	14.672	
SLIDING S.F.=	N/A	
M+=	528.83	FT-K
M-=	-749.18	FT-K
SUM.M=	-220.36	FT-K
M+/M-=	0.706	
R=	-76.61	FT from Toe
Tension Zone=	N/A	FT
Toe Pressure=	N/A	PSI
Heel Pressure=	N/A	PSI

DAM IS UNSTABLE!!!

8.5X11 = FULL SCAL

Alternative 6

10,000 Year Flood (No Rock Anchors)



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No.	Revision	Date	Drawn	Checked

Conestee Foundation

Lake Conestee Dam Stability Analysis
New Downstream CIP Concrete Dam, 60' Downstream

10,000 Year Flood Load Conditions
(No Rock Anchors)

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.

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File Name:	Lake Conestee Dam Stability 8-24-18.dam	Kleinschmidt Associates	
Job Name:	Lake Conestee Dam	KAStable 1.06	
Job Number:	2001002	Date:	8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By:	AJCo
		Reviewed by:	__________
		Date:	__________

SECTION DATA - 2x10,000 Year Flood

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
600	18.00	27.98	1.00	-62.4	0	V	0.00	-31.43	-282.84	9.00
601	18.00	10.19	1.00	-62.4	2	V	0.00	-5.72	-68.67	12.00
610	23.10	23.10	1.00	-62.4	1	H	0.00	-16.65	-128.19	7.70
611	27.98	27.98	1.00	62.4	1	H	0.00	24.43	227.81	9.33
612	9.07	29.10	1.00	-62.4	0	H	0.00	-16.47	-74.69	4.54
613	24.10	24.10	1.00	-45.0	1	H	0.00	-13.07	-104.98	8.03
614	5.00	3.02	1.00	62.4	2	V	13.00	0.47	7.69	16.33
615	5.00	6.05	1.00	62.4	0	V	13.00	1.89	29.26	15.50
616	4.00	4.00	1.00	62.4	1	V	9.00	0.50	5.16	10.33
617	4.00	18.98	1.00	62.4	0	V	9.00	4.74	52.11	11.00
618	9.00	22.98	1.00	62.4	0	V	0.00	12.91	58.08	4.50

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	32.77	0.00	415.66	0.00
	2x10,000 Year Flood	-16.65	-21.76	380.11	-659.38
TOTAL	2x10,000 Year Flood	16.13	-21.76	795.77	-659.38

LOAD CASE CONSTANTS - 2x10,000 Year Flood

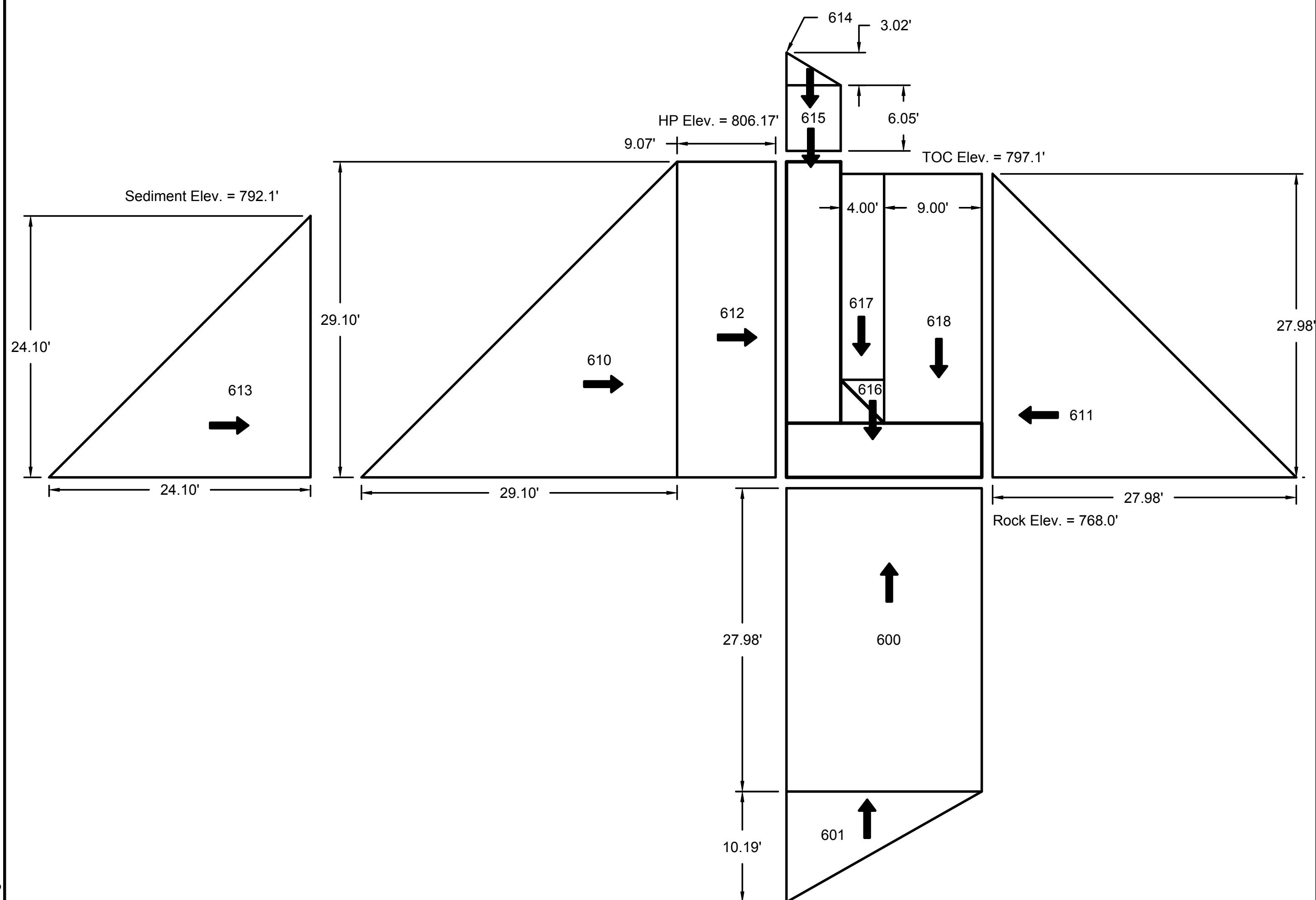
STABILITY CASE CONSTANTS		
Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI
DIMENSIONAL CASE CONSTANTS		
Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	
LOAD CASE CONSTANTS		
Drain Efficiency, DE:	0.00	%
Headpond:	38.17	
Tailwater:	27.98	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

FINAL RESULTS OF STABILITY ANALYSIS - 2x10,000 Year Flood

V=	16.13	KIPS
H=	-21.76	KIPS
H/V=	1.349	
SLIDING S.F.=	0.370	
M+=	795.77	FT-K
M-=	-659.38	FT-K
SUM.M=	136.39	FT-K
M+/M-=	1.207	
R=	8.46	FT from Toe
Tension Zone=	0.00	FT
Toe Pressure=	7.35	PSI
Heel Pressure=	5.10	PSI

Alternative 6

2 x 10,000-Year Flood Condition (No Rock Anchors)



No.	Revision	Date	Drawn	Checked
-	-	-	-	-

Conestee Foundation

Lake Conestee Dam Stability Analysis
New Downstream CIP Concrete Dam, 60' Downstream

2 x 10,000 Year Flood Load Conditions
(No Rock Anchors)

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.
AJCo	AJCo		2001-002			

File Name:	Lake Conestee Dam Stability 8-24-18.dam	Kleinschmidt Associates	
Job Name:	Lake Conestee Dam	KAStable 1.06	
Job Number:	2001002	Date:	8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By:	AJCo
		Reviewed by:	__________
		Date:	__________

SECTION DATA - Normal Conditions Load Case with Rock Anchors

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
700	18.00	29.37	1.00	-62.4	2	V	0.00	-16.49	-197.93	12.00
710	29.10	29.10	1.00	-62.4	1	H	0.00	-26.42	-256.28	9.70
711	5.00	0.27	1.00	62.4	2	V	13.00	0.04	0.69	16.33
712	0.27	29.10	1.00	-62.4	0	H	0.00	-0.49	-0.07	0.14
713	24.10	24.10	1.00	-45.0	1	H	0.00	-13.07	-104.98	8.03
714	1.00	1.00	1.00	39932.0	0	V	11.00	39.93	459.22	11.50
715	1.00	1.00	1.00	30091.0	0	H	7.00	30.09	225.68	7.50

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	32.77	0.00	415.66	0.00
	Normal Conditions Load Case with Rock Anchors	23.48	-9.89	685.59	-559.26
TOTAL	Normal Conditions Load Case with Rock Anchors	56.25	-9.89	1101.25	-559.26

LOAD CASE CONSTANTS - Normal Conditions Load Case with Rock Anchors

STABILITY CASE CONSTANTS

Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI

DIMENSIONAL CASE CONSTANTS

Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	

LOAD CASE CONSTANTS

Drain Efficiency, DE:	0.00	%
Headpond:	29.37	
Tailwater:	0.00	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

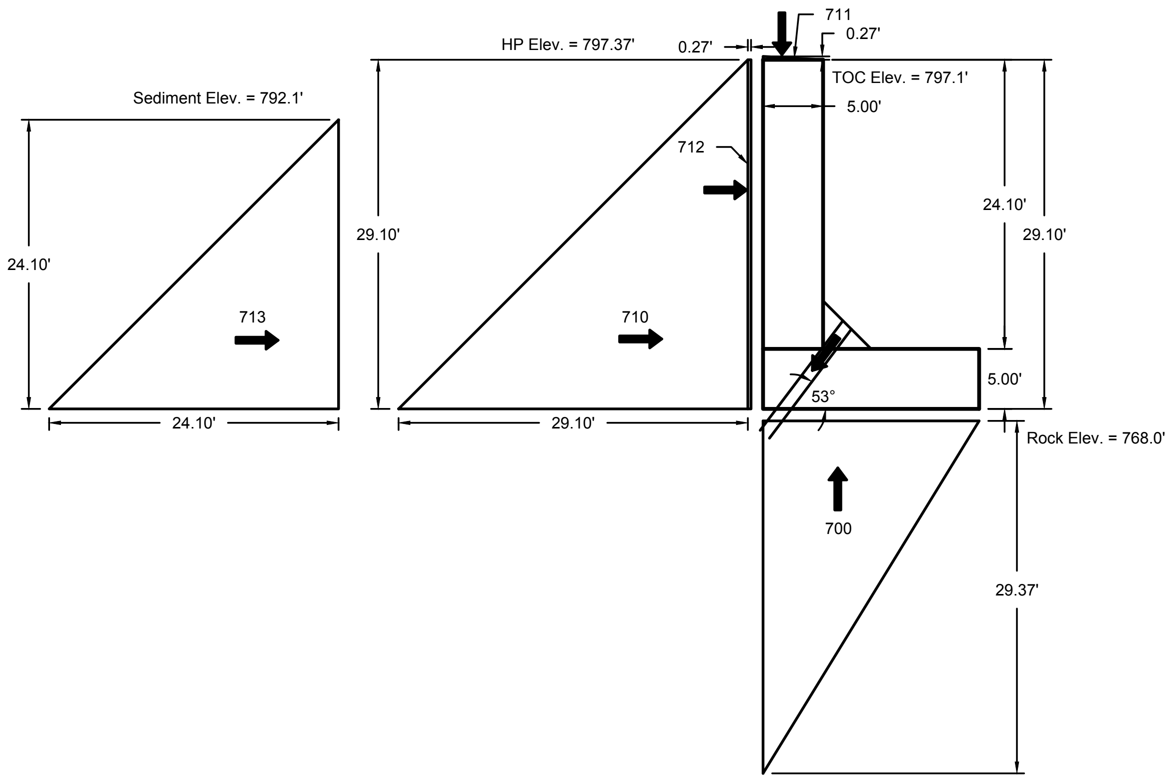
FINAL RESULTS OF STABILITY ANALYSIS - Normal Conditions Load Case with Rock Anchors

V=	56.25	KIPS
H=	-9.89	KIPS
H/V=	0.176	
SLIDING S.F.=	2.840	
M+=	1101.25	FT-K
M-=	-559.26	FT-K
SUM.M=	541.99	FT-K
M+/M-=	1.969	
R=	9.63	FT from Toe
Tension Zone=	0.00	FT
Toe Pressure=	17.11	PSI
Heel Pressure=	26.29	PSI

8.5X11 = FULL SCAL

Alternative 6

Normal Pool Condition (With Rock Anchors)



Rock Anchor Section ID's:
714 and 715
Rock Anchor Capacity = 50 k/ft
Section ID 714 Force = (50 k/ft)*sin(53°) = 39.932 k
Section ID 715 Force = (50 k/ft)*cos(53°) = 30.091 k
Note: Rock Anchor Capacity and Forces are Typical

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No.	Revision	Date	Drawn	Checked
-	-	-	-	-

Conestee Foundation

Lake Conestee Dam Stability Analysis
New Downstream CIP Concrete Dam, 60' Downstream

Normal Pool Load Conditions
(With Rock Anchors)

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.
AJCo	AJCo		2001.002			

File Name:	Lake Conestee Dam Stability 8-24-18.dam	Kleinschmidt Associates	
Job Name:	Lake Conestee Dam	KAStable 1.06	
Job Number:	2001002	Date:	8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By:	AJCo
		Reviewed by:	__________
		Date:	__________

SECTION DATA - 100-Year Flood Conditions with Rock Anchors

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
800	18.00	3.86	1.00	-62.4	0	V	0.00	-4.34	-39.02	9.00
801	18.00	29.42	1.00	-62.4	2	V	0.00	-16.52	-198.27	12.00
810	29.10	29.10	1.00	-62.4	1	H	0.00	-26.42	-256.28	9.70
811	3.86	3.86	1.00	62.4	1	H	0.00	0.46	0.60	1.29
812	5.00	1.39	1.00	62.4	2	V	13.00	0.22	3.54	16.33
813	5.00	2.79	1.00	62.4	0	V	13.00	0.87	13.49	15.50
814	4.18	29.10	1.00	-62.4	0	H	0.00	-7.59	-15.86	2.09
815	24.10	24.10	1.00	-45.0	1	H	0.00	-13.07	-104.98	8.03
816	1.00	1.00	1.00	39932.0	0	V	11.00	39.93	459.22	11.50
817	1.00	1.00	1.00	30091.0	0	H	7.00	30.09	225.68	7.50

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	32.77	0.00	415.66	0.00
	100-Year Flood Conditions with rock Anchors	20.16	-16.52	702.53	-614.41
TOTAL	100-Year Flood Conditions with rock Anchors	52.94	-16.52	1118.20	-614.41

LOAD CASE CONSTANTS - 100-Year Flood Conditions with Rock Anchors

STABILITY CASE CONSTANTS		
Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI
DIMENSIONAL CASE CONSTANTS		
Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	
LOAD CASE CONSTANTS		
Drain Efficiency, DE:	0.00	%
Headpond:	33.28	
Tailwater:	3.86	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

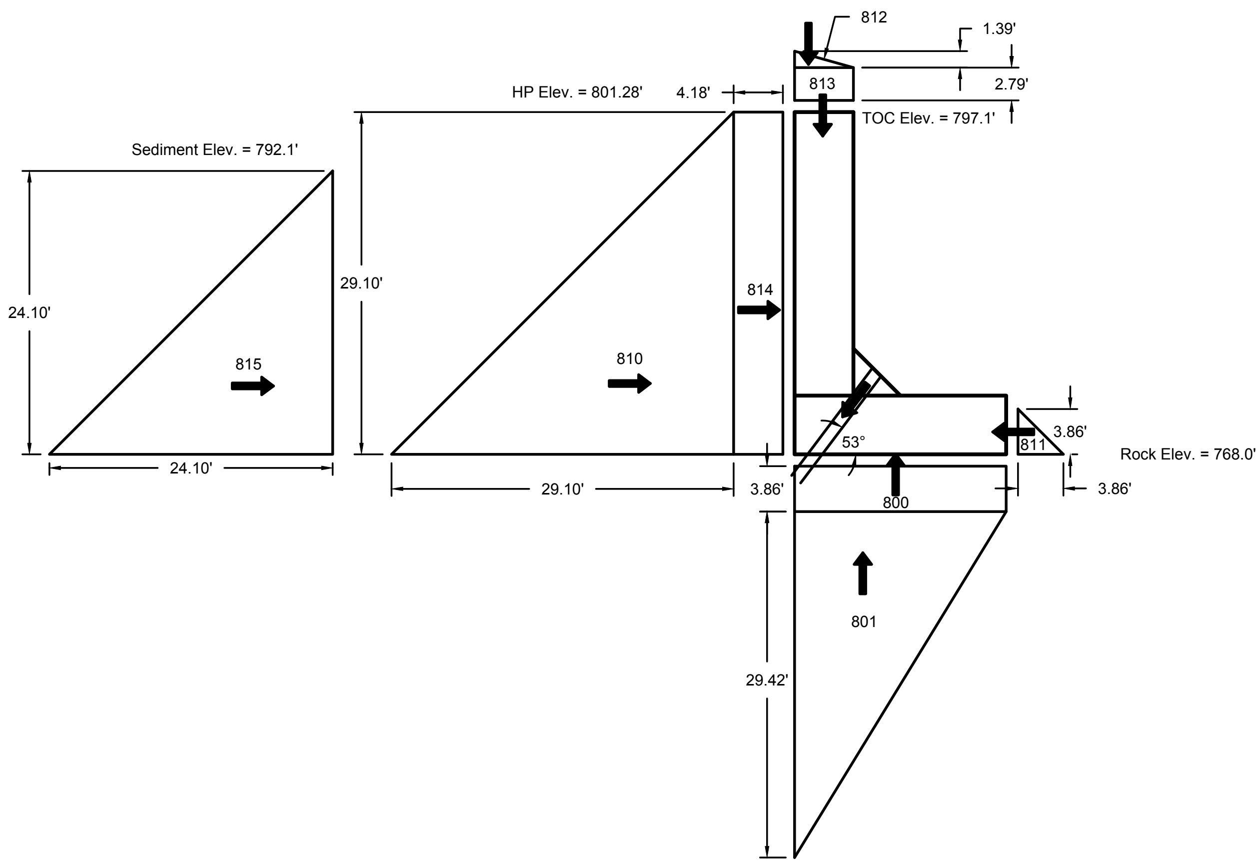
FINAL RESULTS OF STABILITY ANALYSIS - 100-Year Flood Conditions with Rock Anchors

V=	52.94	KIPS
H=	-16.52	KIPS
H/V=	0.312	
SLIDING S.F.=	1.600	
M+=	1118.20	FT-K
M-=	-614.41	FT-K
SUM.M=	503.78	FT-K
M+/M-=	1.820	
R=	9.52	FT from Toe
Tension Zone=	0.00	FT
Toe Pressure=	16.91	PSI
Heel Pressure=	23.94	PSI

8.5X11 = FULL SCAL

Alternative 6

100 Year Flood (With Rock Anchors)



Rock Anchor Section ID's:
816 and 817

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No.	Revision	Date	Drawn	Checked

Conestee Foundation

Lake Conestee Dam Stability Analysis
New Downstream CIP Concrete Dam, 60' Downstream

100 Year Flood Load Conditions
(With Rock Anchors)

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.
AJCo	AJCo		2001-002			

File Name:	Lake Conestee Dam Stability 8-24-18.dam	Kleinschmidt Associates	
Job Name:	Lake Conestee Dam	KAStable 1.06	
Job Number:	2001002	Date:	8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By:	AJCo
		Reviewed by:	__________
		Date:	__________

SECTION DATA - 500-Year Flood Conditions with Rock Anchors

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
900	18.00	7.07	1.00	-62.4	0	V	0.00	-7.94	-71.47	9.00
901	18.00	26.91	1.00	-62.4	2	V	0.00	-15.11	-181.35	12.00
910	29.10	29.10	1.00	-62.4	1	H	0.00	-26.42	-256.28	9.70
911	7.07	7.07	1.00	62.4	1	H	0.00	1.56	3.68	2.36
912	5.00	1.63	1.00	62.4	2	V	13.00	0.25	4.15	16.33
913	9.00	2.07	1.00	62.4	0	V	0.00	1.16	5.23	4.50
914	4.88	29.10	1.00	-62.4	0	H	0.00	-8.86	-21.62	2.44
915	5.00	3.25	1.00	62.4	0	V	13.00	1.01	15.72	15.50
916	2.07	2.07	1.00	62.4	1	V	9.00	0.13	1.30	9.69
917	24.10	24.10	1.00	-45.0	1	H	0.00	-13.07	-104.98	8.03
918	1.00	1.00	1.00	39932.0	0	V	11.00	39.93	459.22	11.50
919	1.00	1.00	1.00	30091.0	0	H	7.00	30.09	225.68	7.50

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	32.77	0.00	415.66	0.00
	500-Year Flood Conditions with Rock Anchors	19.44	-16.70	714.97	-635.70
TOTAL	500-Year Flood Conditions with Rock Anchors	52.22	-16.70	1130.64	-635.70

LOAD CASE CONSTANTS - 500-Year Flood Conditions with Rock Anchors

---

STABILITY CASE CONSTANTS

Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI

DIMENSIONAL CASE CONSTANTS

Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	

LOAD CASE CONSTANTS

Drain Efficiency, DE:	0.00	%
Headpond:	33.98	
Tailwater:	7.07	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

FINAL RESULTS OF STABILITY ANALYSIS - 500-Year Flood Conditions with Rock Anchors

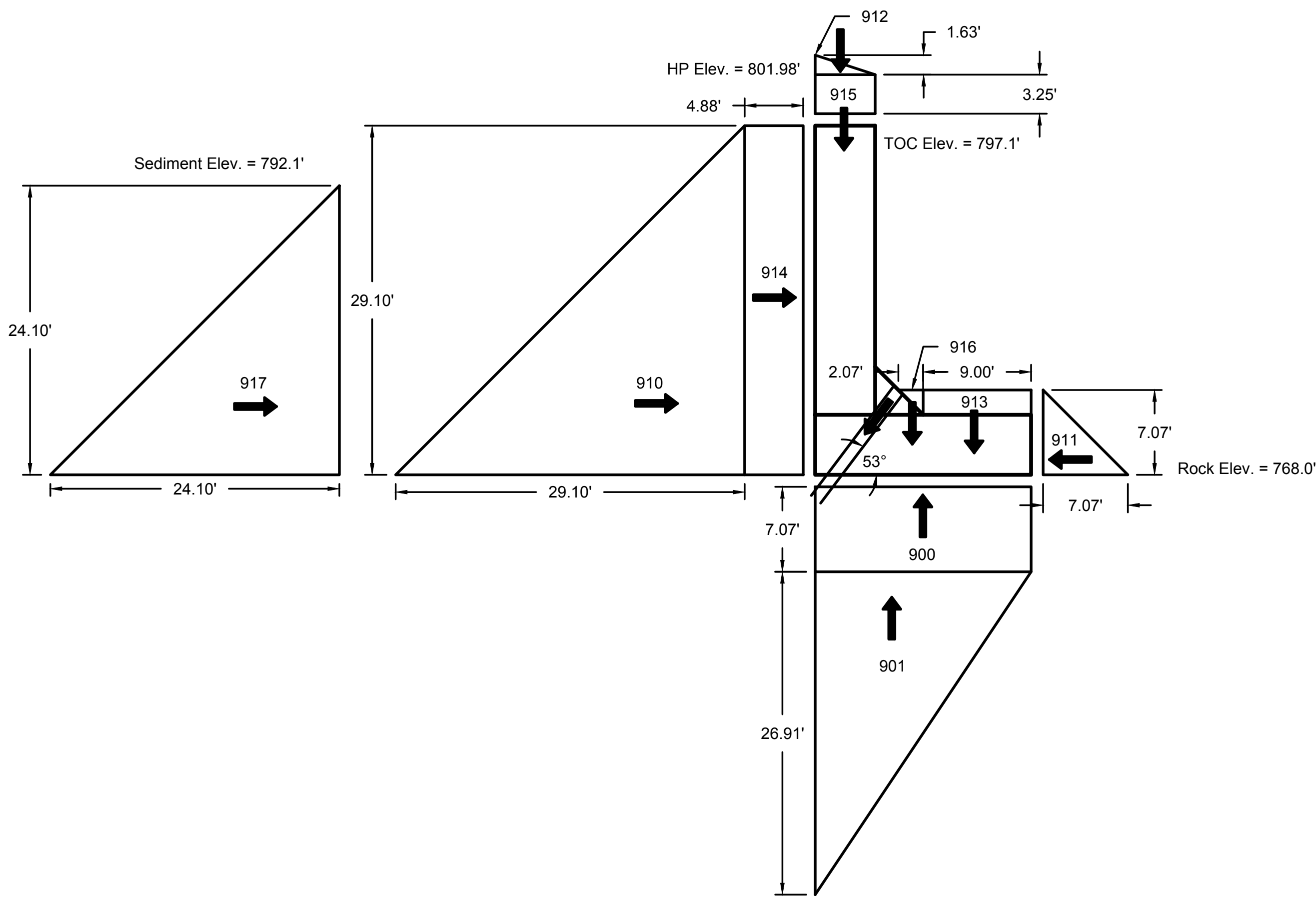
---

V=	52.22	KIPS
H=	-16.70	KIPS
H/V=	0.320	
SLIDING S.F.=	1.560	
M+=	1130.64	FT-K
M-=	-635.70	FT-K
SUM.M=	494.93	FT-K
M+/M-=	1.779	
R=	9.48	FT from Toe
Tension Zone=	0.00	FT
Toe Pressure=	16.93	PSI
Heel Pressure=	23.36	PSI

8.5X11 = FULL SCAL

Alternative 6

500 Year Flood (With Rock Anchors)



Rock Anchor Section ID's:
918 and 919

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No.	Revision	Date	Drawn	Checked
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Conestee Foundation

Lake Conestee Dam Stability Analysis
New Downstream CIP Concrete Dam, 60' Downstream

500 Year Flood Load Conditions
(With Rock Anchors)

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.

File Name:	Lake Conestee Dam Stability 8-24-18.dam	Kleinschmidt Associates	
Job Name:	Lake Conestee Dam	KAStable 1.06	
Job Number:	2001002	Date:	8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By:	AJCo
		Reviewed by:	__________
		Date:	__________

SECTION DATA - 10,000 Year Flood with Rock Anchors

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
1000	18.00	16.23	1.00	-62.4	0	V	0.00	-18.23	-164.07	9.00
1001	18.00	18.89	1.00	-62.4	2	V	0.00	-10.61	-127.30	12.00
1010	29.10	29.10	1.00	-62.4	1	H	0.00	-26.42	-256.28	9.70
1011	16.23	16.23	1.00	62.4	1	H	0.00	8.22	44.46	5.41
1012	5.00	2.00	1.00	62.4	2	V	13.00	0.31	5.10	16.33
1013	9.00	11.23	1.00	62.4	0	V	0.00	6.31	28.38	4.50
1014	6.02	29.10	1.00	-62.4	0	H	0.00	-10.93	-32.90	3.01
1015	5.00	4.01	1.00	62.4	2	V	13.00	0.63	10.22	16.33
1016	4.00	7.23	1.00	62.4	0	V	9.00	1.80	19.85	11.00
1017	4.00	4.00	1.00	62.4	1	V	9.00	0.50	5.16	10.33
1018	24.10	24.10	1.00	-45.0	1	H	0.00	-13.07	-104.98	8.03
1019	1.00	1.00	1.00	39932.0	0	V	11.00	39.93	459.22	11.50
1020	1.00	1.00	1.00	30091.0	0	H	7.00	30.09	225.68	7.50

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	32.77	0.00	415.66	0.00
	10,000 Year Flood with Rock Anchors	20.64	-12.11	798.07	-685.53
TOTAL	10,000 Year Flood with Rock Anchors	53.42	-12.11	1213.73	-685.53

LOAD CASE CONSTANTS - 10,000 Year Flood with Rock Anchors

STABILITY CASE CONSTANTS

Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI

DIMENSIONAL CASE CONSTANTS

Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	

LOAD CASE CONSTANTS

Drain Efficiency, DE:	0.00	%
Headpond:	35.12	
Tailwater:	16.23	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

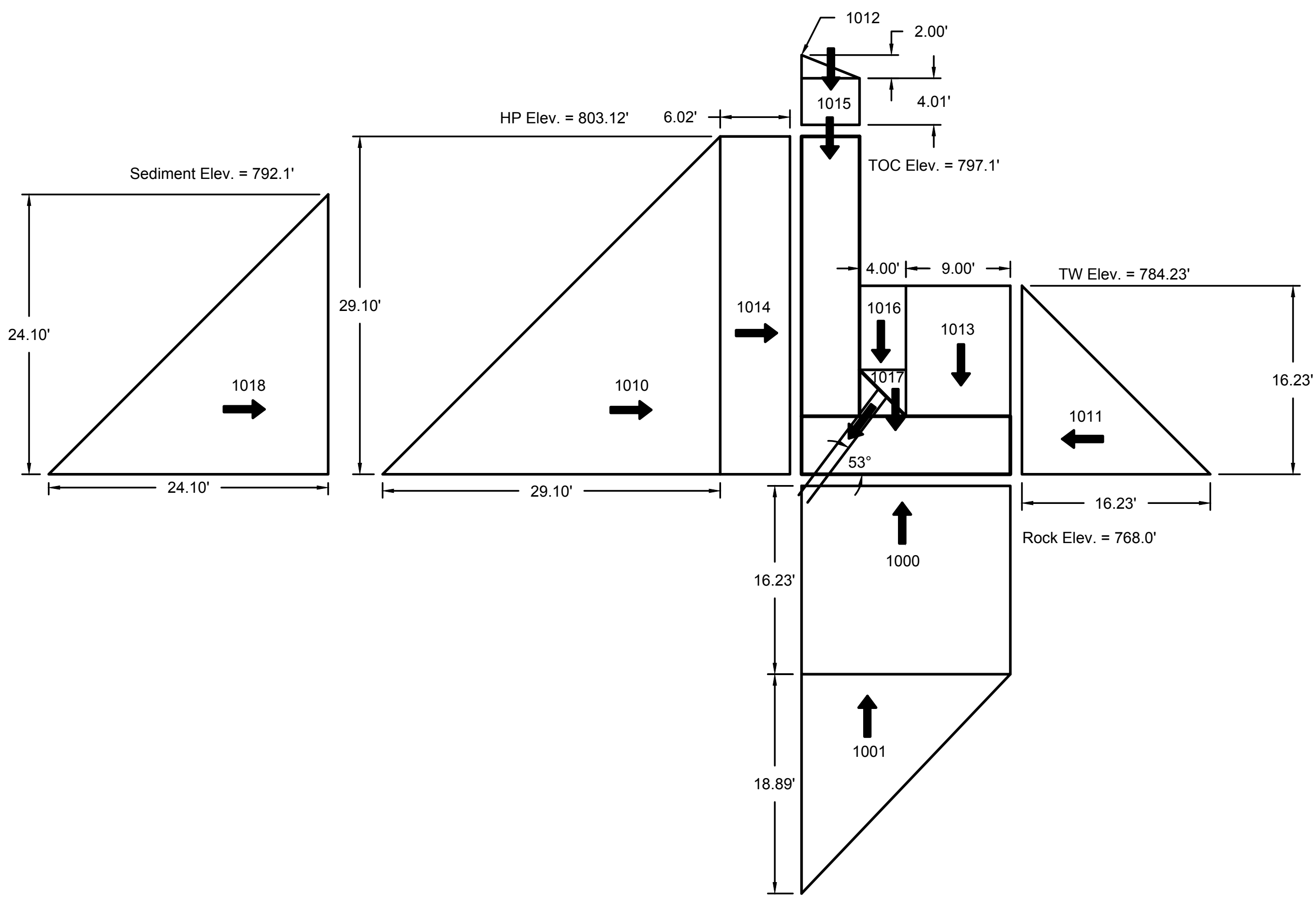
FINAL RESULTS OF STABILITY ANALYSIS - 10,000 Year Flood with Rock Anchors

V=	53.42	KIPS
H=	-12.11	KIPS
H/V=	0.227	
SLIDING S.F.=	2.210	
M+=	1213.73	FT-K
M-=	-685.53	FT-K
SUM.M=	528.20	FT-K
M+/M-=	1.770	
R=	9.89	FT from Toe
Tension Zone=	0.00	FT
Toe Pressure=	14.51	PSI
Heel Pressure=	26.71	PSI

8.5X11 = FULL SCAL

Alternative 6

10,000 Year Flood (With Rock Anchors)



Rock Anchor Section ID's:
1019 and 1020

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No.	Revision	Date	Drawn	Checked
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Conestee Foundation

Lake Conestee Dam Stability Analysis
New Downstream CIP Concrete Dam, 60' Downstream

10,000 Year Flood Load Conditions
(No Rock Anchors)

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.

File Name:	Lake Conestee Dam Alternative 7 Stability Analysis.dam	Kleinschmidt Associates	
Job Name:	Lake Conestee Dam Alternative 7	KAStable 1.06	
Job Number:	2001-002	Date:	10/18/18
Comments:		By:	Austin Cormier
		Reviewed by:	__________
		Date:	__________

-- STABILITY ANALYSIS SUMMARY TABLE --

LOAD CASE V KIPS	H KIPS	H/V	SLIDE SF	M+ FT-K	M- FT-K	M+/M-	M FT-K	R FT	BASE TOE PSI	PRESS. HEEL PSI	TENS. ZONE FT

FILE NAME: Lake Conestee Dam Alternative 7 Stability Analysis.dam

LOAD CASE / V (KIPS)	H (KIPS)	H/V	SLIDE SF	M+ (FT-K)	M- (FT-K)	M+/M-	M (FT-K)	R (FT)	BASE TOE (PSI)	PRESS. HEEL (PSI)	TENS. ZONE (FT)
GRAVITY											
138.92	0.00	-0.000	Inf	4116.22	0.00	-Inf	4116.22	29.63	12.34	23.62	0.00
Normal Pool Condition											
117.04	-38.53	0.329	1.970	5358.59	-2091.85	2.562	3266.73	27.91	13.31	16.99	0.00
100 Year Flood Condition											
96.83	-29.98	0.310	2.100	5043.48	-2457.59	2.052	2585.89	26.71	12.70	12.37	0.00
500 Year Flood											
105.66	-45.34	0.429	1.510	5725.88	-2617.21	2.188	3108.67	29.42	9.70	17.65	0.00
10,000 Year Flood Condition											
83.61	-40.75	0.487	1.330	5275.83	-2970.94	1.776	2304.89	27.57	9.93	11.72	0.00
2 x 10,000 Year Flood Condition											
79.72	-21.85	0.274	2.370	6019.20	-3497.26	1.721	2521.94	31.64	4.77	15.87	0.00

File Name:	Lake Conestee Dam Alternative 7 Stability Analysis.dam	Kleinschmidt Associates	
Job Name:	Lake Conestee Dam Alternative 7	KAStable 1.06	
Job Number:	2001-002	Date:	10/18/18
Comments:		By:	Austin Cormier
		Reviewed by:	__________
		Date:	__________

SECTION DATA - GRAVITY

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
100	14.55	29.10	1.00	150.0	1	V	39.10	31.76	1395.65	43.95
101	10.00	29.10	1.00	150.0	0	V	29.10	43.65	1488.46	34.10
102	29.10	29.10	1.00	150.0	2	V	0.00	63.51	1232.11	19.40

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	138.92	0.00	4116.22	0.00
TOTAL	GRAVITY	138.92	0.00	4116.22	0.00

LOAD CASE CONSTANTS - GRAVITY

STABILITY CASE CONSTANTS

Friction Factor, FF:	0.65	
Shear Friction Value, CV:	0.00	PSI

DIMENSIONAL CASE CONSTANTS

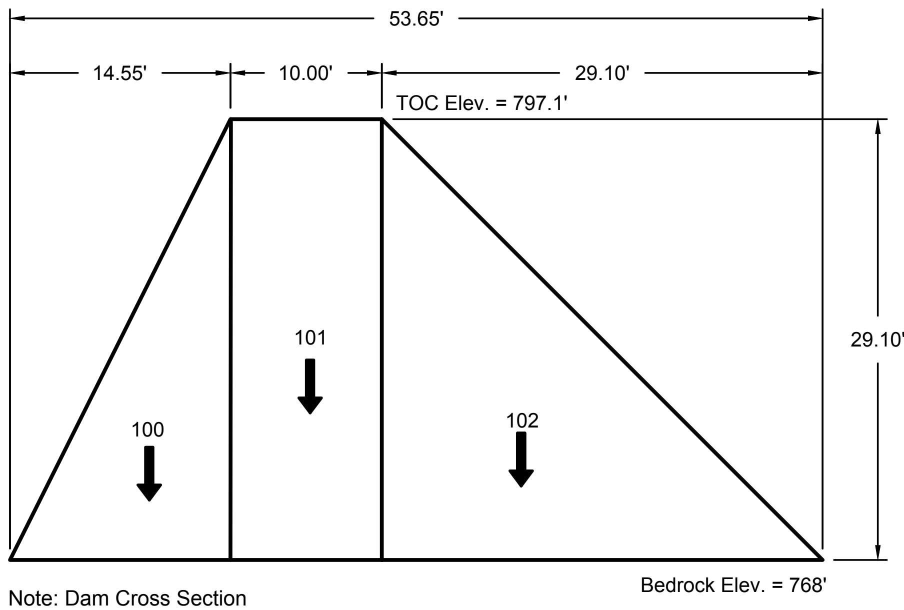
Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	53.65	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	

FINAL RESULTS OF STABILITY ANALYSIS - GRAVITY

V=	138.92	KIPS
H=	0.00	KIPS
H/V=	-0.000	
SLIDING S.F.=	Inf	
M+=	4116.22	FT-K
M-=	0.00	FT-K
SUM.M=	4116.22	FT-K
M+/M-=	-Inf	
R=	29.63	FT from Toe
Tension Zone=	0.00	FT
Toe Pressure=	12.34	PSI
Heel Pressure=	23.62	PSI

8.5X11 = FULL SCAL

Alternative 7
Gravity Load Case



Note: Dam Cross Section
Dimensions and Section ID Numbers
are Typical for All Load Cases

No.	Revision	Date	Drawn	Checked
-	-	-	-	-

Conestee Foundation
Lake Conestee Dam Stability Analysis
New Downstream Roller Compacted Concrete Dam 60' Downstream of Existing Dam (Alternative 7)

Gravity Load Conditions

Kleinschmidt
141 Main Street P.O. Box 650
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www.KleinschmidtGroup.com

Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.
AJCo	AJCo		2001.002			

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File Name:	Lake Conestee Dam Alternative 7 Stability Analysis.dam	Kleinschmidt Associates	
Job Name:	Lake Conestee Dam Alternative 7	KAStable 1.06	
Job Number:	2001-002	Date:	10/18/18
Comments:		By:	Austin Cormier
		Reviewed by:	__________
		Date:	__________

SECTION DATA - Normal Pool Condition

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
200	53.65	29.10	1.00	-62.4	2	V	0.00	-48.71	-1742.19	35.77
210	29.10	29.10	1.00	-62.4	1	H	0.00	-26.42	-256.28	9.70
211	24.55	0.27	1.00	62.4	0	V	29.10	0.41	17.11	41.38
212	0.27	29.10	1.00	-62.4	0	H	0.00	-0.49	-0.07	0.14
213	24.10	24.10	1.00	-40.0	1	H	0.00	-11.62	-93.32	8.03
214	14.55	29.10	1.00	62.4	0	V	39.10	26.42	1225.25	46.38

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	138.92	0.00	4116.22	0.00
	Normal Pool Condition	-21.88	-38.53	1242.36	-2091.85
TOTAL	Normal Pool Condition	117.04	-38.53	5358.59	-2091.85

LOAD CASE CONSTANTS - Normal Pool Condition

STABILITY CASE CONSTANTS		
Friction Factor, FF:	0.65	
Shear Friction Value, CV:	0.00	PSI
DIMENSIONAL CASE CONSTANTS		
Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	53.65	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	
LOAD CASE CONSTANTS		
Drain Efficiency, DE:	0.00	%
Headpond:	29.10	
Tailwater:	0.00	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

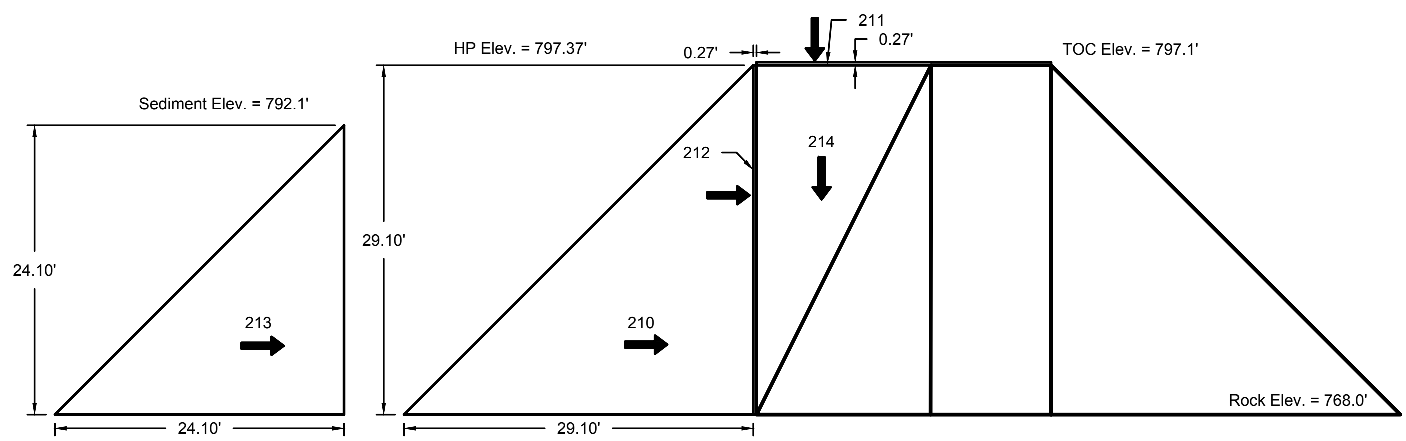
FINAL RESULTS OF STABILITY ANALYSIS - Normal Pool Condition

V=	117.04	KIPS
H=	-38.53	KIPS
H/V=	0.329	
SLIDING S.F.=	1.970	
M+=	5358.59	FT-K
M-=	-2091.85	FT-K
SUM.M=	3266.73	FT-K
M+/M-=	2.562	
R=	27.91	FT from Toe
Tension Zone=	0.00	FT
Toe Pressure=	13.31	PSI
Heel Pressure=	16.99	PSI

8.5X11 = FULL SCAL

Alternative 7

Normal Pool Condition



No.	Revision	Date	Drawn	Checked
-	-	-	-	-

Conestee Foundation
Lake Conestee Dam Stability Analysis
New Downstream Roller Compacted Concrete Dam 60' Downstream of Existing Dam (Alternative 7)

Normal Pool Load Conditions

Kleinschmidt
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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.

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File Name:	Lake Conestee Dam Alternative 7 Stability Analysis.dam	Kleinschmidt Associates	
Job Name:	Lake Conestee Dam Alternative 7	KAStable 1.06	
Job Number:	2001-002	Date:	10/18/18
Comments:		By:	Austin Cormier
		Reviewed by:	__________
		Date:	__________

SECTION DATA - 100 Year Flood Condition

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
300	53.65	3.86	1.00	-62.4	0	V	0.00	-12.92	-346.64	26.82
301	53.65	29.42	1.00	-62.4	2	V	0.00	-49.25	-1761.35	35.77
310	29.10	29.10	1.00	-62.4	1	H	0.00	-26.42	-256.28	9.70
311	3.86	3.86	1.00	62.4	2	H	0.00	0.46	1.20	2.57
312	3.86	3.86	1.00	62.4	1	V	0.00	0.46	0.60	1.29
313	24.55	4.18	1.00	62.4	0	V	29.10	6.40	264.94	41.38
314	4.18	29.10	1.00	62.4	0	H	0.00	7.59	15.86	2.09
315	24.10	24.10	1.00	-40.0	1	H	0.00	-11.62	-93.32	8.03
316	14.55	29.10	1.00	62.4	2	V	39.10	13.21	644.66	48.80

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	138.92	0.00	4116.22	0.00
	100 Year Flood Condition	-42.09	-29.98	927.26	-2457.59
TOTAL	100 Year Flood Condition	96.83	-29.98	5043.48	-2457.59

LOAD CASE CONSTANTS - 100 Year Flood Condition

STABILITY CASE CONSTANTS

Friction Factor, FF:	0.65	
Shear Friction Value, CV:	0.00	PSI

DIMENSIONAL CASE CONSTANTS

Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	53.65	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	

LOAD CASE CONSTANTS

Drain Efficiency, DE:	0.00	%
Headpond:	33.28	
Tailwater:	3.86	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

FINAL RESULTS OF STABILITY ANALYSIS - 100 Year Flood Condition

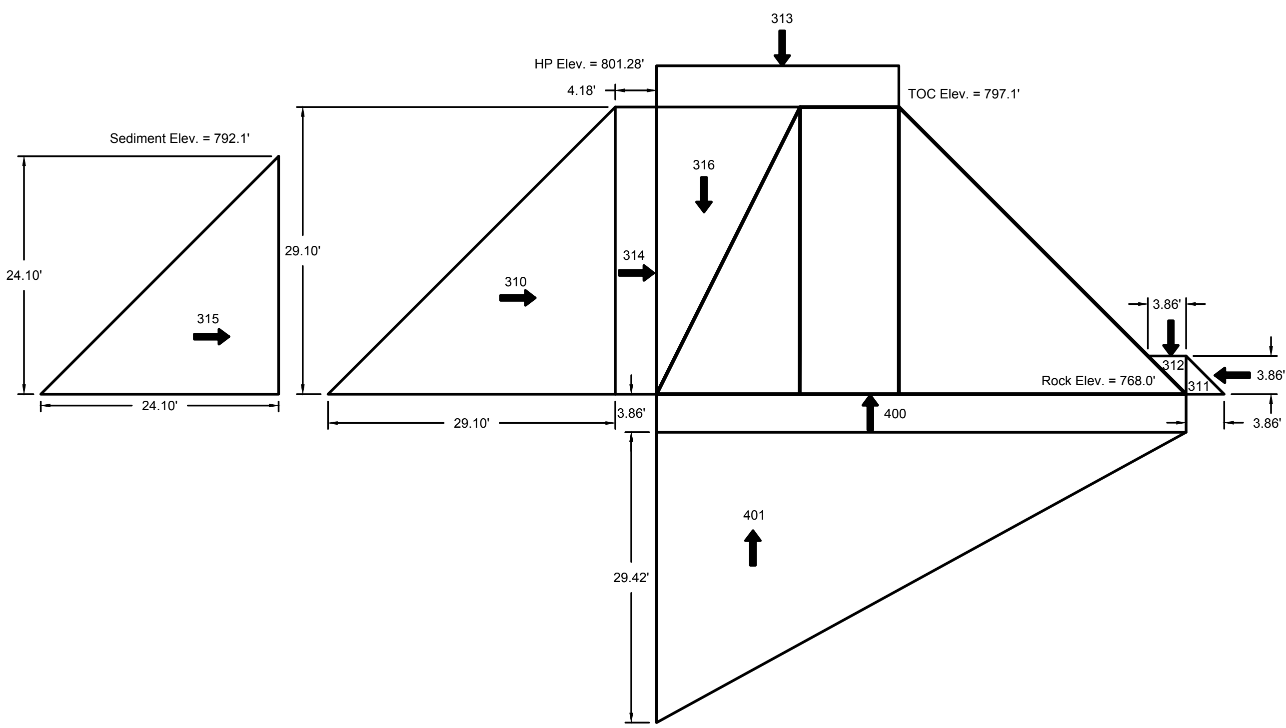
---

V=	96.83	KIPS
H=	-29.98	KIPS
H/V=	0.310	
SLIDING S.F.=	2.100	
M+=	5043.48	FT-K
M-=	-2457.59	FT-K
SUM.M=	2585.89	FT-K
M+/M-=	2.052	
R=	26.71	FT from Toe
Tension Zone=	0.00	FT
Toe Pressure=	12.70	PSI
Heel Pressure=	12.37	PSI

8.5X11 = FULL SCAL

Alternative 7

100 Year Flood Condition



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No.	Revision	Date	Drawn	Checked
-	-	-	-	-

Conestee Foundation
Lake Conestee Dam Stability Analysis

New Downstream Roller Compacted Concrete Dam 60' Downstream of Existing Dam (Alternative 7)

100 Year Flood Load Conditions

Kleinschmidt

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www.KleinschmidtGroup.com

Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.
AJCo	AJCo		2001.002			

SECTION DATA - 500 Year Flood

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
400	53.65	7.07	1.00	-62.4	0	V	0.00	-23.67	-634.91	26.82
401	53.65	26.91	1.00	-62.4	2	V	0.00	-45.04	-1611.08	35.77
410	29.10	29.10	1.00	-62.4	1	H	0.00	-26.42	-256.28	9.70
411	7.07	7.07	1.00	62.4	2	H	0.00	1.56	7.35	4.71
412	7.07	7.07	1.00	62.4	1	V	0.00	1.56	3.68	2.36
413	24.55	4.88	1.00	62.4	0	V	29.10	7.48	309.31	41.38
414	4.88	29.10	1.00	-62.4	0	H	0.00	-8.86	-21.62	2.44
415	24.10	24.10	1.00	-40.0	1	H	0.00	-11.62	-93.32	8.03
416	14.55	29.10	2.00	62.4	2	V	39.10	26.42	1289.32	48.80

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	138.92	0.00	4116.22	0.00
	500 Year Flood	-33.26	-45.34	1609.65	-2617.21
TOTAL	500 Year Flood	105.66	-45.34	5725.88	-2617.21

LOAD CASE CONSTANTS - 500 Year Flood

STABILITY CASE CONSTANTS

Friction Factor, FF:	0.65	
Shear Friction Value, CV:	0.00	PSI

DIMENSIONAL CASE CONSTANTS

Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	53.65	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	

LOAD CASE CONSTANTS

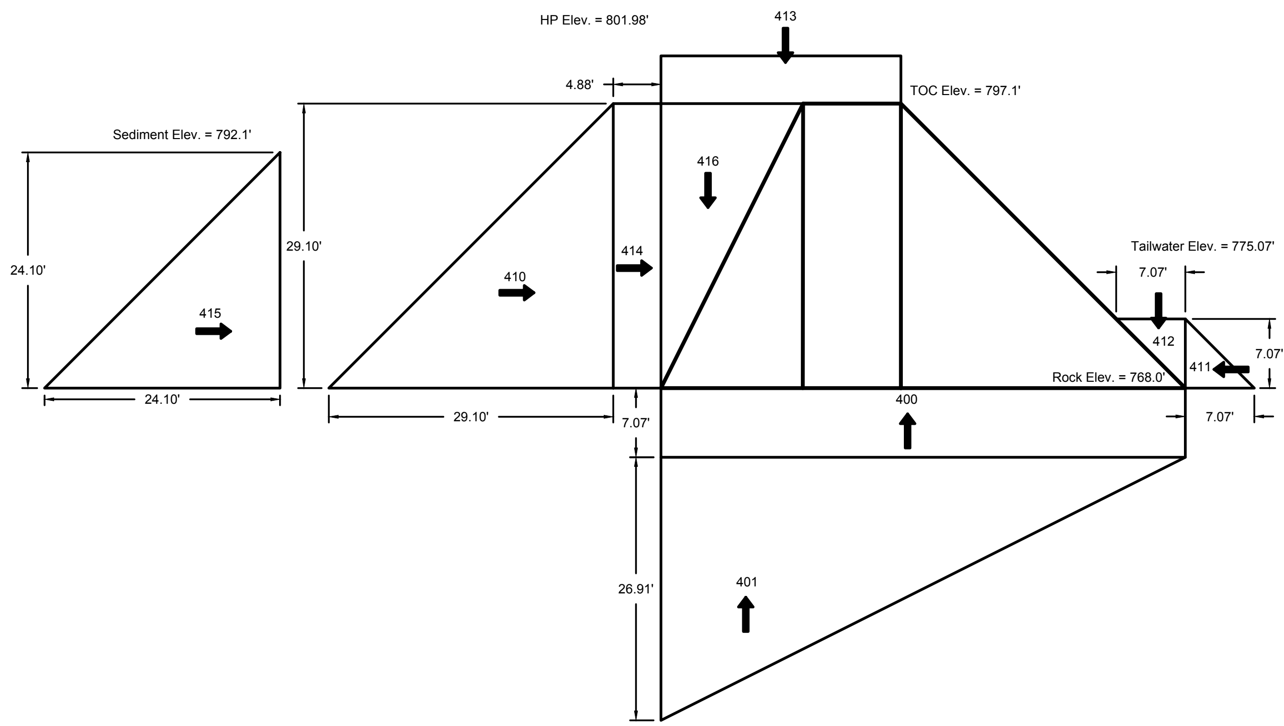
Drain Efficiency, DE:	0.00	%
Headpond:	33.98	
Tailwater:	7.07	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

FINAL RESULTS OF STABILITY ANALYSIS - 500 Year Flood

V=	105.66	KIPS
H=	-45.34	KIPS
H/V=	0.429	
SLIDING S.F.=	1.510	
M+=	5725.88	FT-K
M-=	-2617.21	FT-K
SUM.M=	3108.67	FT-K
M+/M-=	2.188	
R=	29.42	FT from Toe
Tension Zone=	0.00	FT
Toe Pressure=	9.70	PSI
Heel Pressure=	17.65	PSI

8.5X11 = FULL SCAL

Alternative 7
500 Year Flood Condition



-	-	-	-	-
No.	Revision	Date	Drawn	Checked

Conestee Foundation
Lake Conestee Dam Stability Analysis

New Downstream Roller Compacted Concrete Dam 60' Downstream of Existing Dam (Alternative 7)

500 Year Flood Load Conditions

Kleinschmidt
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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.

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File Name:	Lake Conestee Dam Alternative 7 Stability Analysis.dam	Kleinschmidt Associates	
Job Name:	Lake Conestee Dam Alternative 7	KAStable 1.06	
Job Number:	2001-002	Date:	10/18/18
Comments:		By:	Austin Cormier
		Reviewed by:	__________
		Date:	__________

SECTION DATA - 10,000 Year Flood Condition

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
500	53.65	16.23	1.00	-62.4	0	V	0.00	-54.33	-1457.51	26.82
501	53.65	18.89	1.00	-62.4	2	V	0.00	-31.62	-1130.93	35.77
510	29.10	29.10	1.00	-62.4	1	H	0.00	-26.42	-256.28	9.70
511	16.23	16.23	1.00	62.4	2	H	0.00	8.22	88.92	10.82
512	16.23	16.23	1.00	62.4	1	V	0.00	8.22	44.46	5.41
513	24.55	6.02	1.00	62.4	0	V	29.10	9.22	381.57	41.38
514	6.02	29.10	1.00	-62.4	0	H	0.00	-10.93	-32.90	3.01
515	24.10	24.10	1.00	-40.0	1	H	0.00	-11.62	-93.32	8.03
516	14.55	29.10	1.00	62.4	2	V	39.10	13.21	644.66	48.80

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	138.92	0.00	4116.22	0.00
	10,000 Year Flood Condition	-55.30	-40.75	1159.61	-2970.94
TOTAL	10,000 Year Flood Condition	83.61	-40.75	5275.83	-2970.94

LOAD CASE CONSTANTS - 10,000 Year Flood Condition

STABILITY CASE CONSTANTS		
Friction Factor, FF:	0.65	
Shear Friction Value, CV:	0.00	PSI
DIMENSIONAL CASE CONSTANTS		
Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	53.65	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	
LOAD CASE CONSTANTS		
Drain Efficiency, DE:	0.00	%
Headpond:	35.12	
Tailwater:	16.23	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

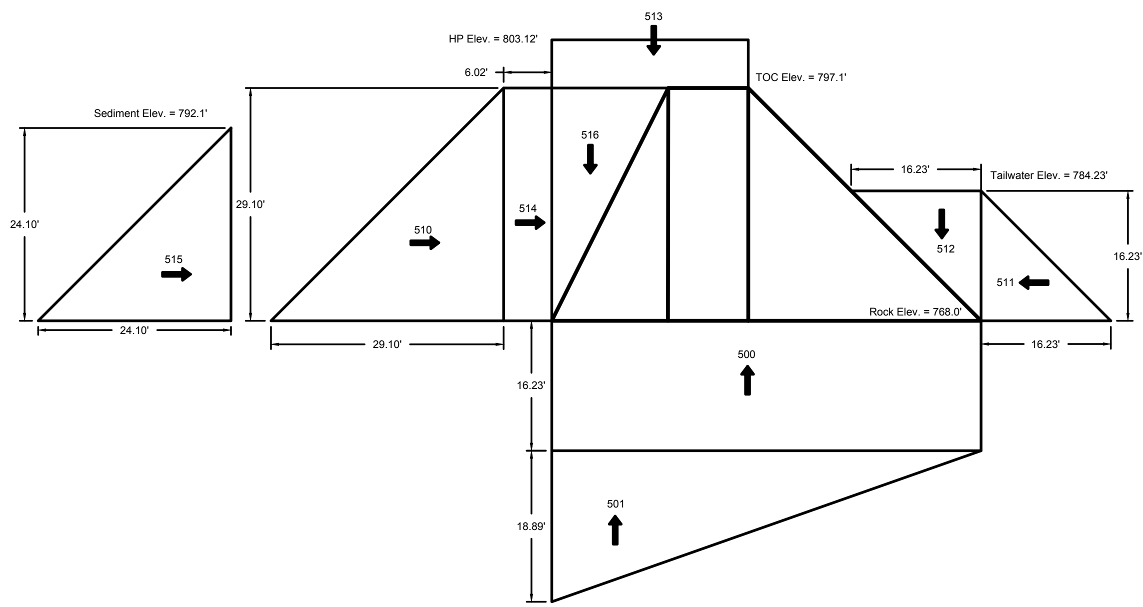
FINAL RESULTS OF STABILITY ANALYSIS - 10,000 Year Flood Condition

V=	83.61	KIPS
H=	-40.75	KIPS
H/V=	0.487	
SLIDING S.F.=	1.330	
M+=	5275.83	FT-K
M-=	-2970.94	FT-K
SUM.M=	2304.89	FT-K
M+/M-=	1.776	
R=	27.57	FT from Toe
Tension Zone=	0.00	FT
Toe Pressure=	9.93	PSI
Heel Pressure=	11.72	PSI

8.5X11 = FULL SCAL

Alternative 7

10,000 Year Flood Condition



No.	Revision	Date	Drawn	Checked
-	-	-	-	-

Conestee Foundation
Lake Conestee Dam Stability Analysis

New Downstream Roller Compacted Concrete Dam 60' Downstream of Existing Dam (Alternative 7)

10,000 Year Flood Load Conditions

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.
AJCo	AJCo		2001.002			

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File Name:	Lake Conestee Dam Alternative 7 Stability Analysis.dam	Kleinschmidt Associates	
Job Name:	Lake Conestee Dam Alternative 7	KAStable 1.06	
Job Number:	2001-002	Date:	10/18/18
Comments:		By:	Austin Cormier
		Reviewed by:	__________
		Date:	__________

SECTION DATA - 2 x 10,000 Year Flood Condition

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
600	53.65	27.98	1.00	-62.4	0	V	0.00	-93.67	-2512.71	26.82
601	53.65	10.19	1.00	-62.4	2	V	0.00	-17.06	-610.07	35.77
610	29.10	29.10	1.00	-62.4	1	H	0.00	-26.42	-256.28	9.70
611	27.98	27.98	1.00	62.4	2	H	0.00	24.43	455.62	18.65
612	27.98	27.98	1.00	62.4	1	V	0.00	24.43	227.81	9.33
613	24.55	9.07	1.00	62.4	0	V	29.10	13.89	574.89	41.38
614	9.07	29.10	1.00	-62.4	1	H	0.00	-8.23	-24.90	3.02
615	24.10	24.10	1.00	-40.0	1	H	0.00	-11.62	-93.32	8.03
616	14.55	29.10	1.00	62.4	2	V	39.10	13.21	644.66	48.80

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	138.92	0.00	4116.22	0.00
	2 x 10,000 Year Flood Condition	-59.20	-21.85	1902.98	-3497.26
TOTAL	2 x 10,000 Year Flood Condition	79.72	-21.85	6019.20	-3497.26

LOAD CASE CONSTANTS - 2 x 10,000 Year Flood Condition

STABILITY CASE CONSTANTS

Friction Factor, FF:	0.65	
Shear Friction Value, CV:	0.00	PSI

DIMENSIONAL CASE CONSTANTS

Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	53.65	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	

LOAD CASE CONSTANTS

Drain Efficiency, DE:	0.00	%
Headpond:	38.17	
Tailwater:	27.98	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

FINAL RESULTS OF STABILITY ANALYSIS - 2 x 10,000 Year Flood Condition

V=	79.72	KIPS
H=	-21.85	KIPS
H/V=	0.274	
SLIDING S.F.=	2.370	
M+=	6019.20	FT-K
M-=	-3497.26	FT-K
SUM.M=	2521.94	FT-K
M+/M-=	1.721	
R=	31.64	FT from Toe
Tension Zone=	0.00	FT
Toe Pressure=	4.77	PSI
Heel Pressure=	15.87	PSI

8.5X11 = FULL SCAL

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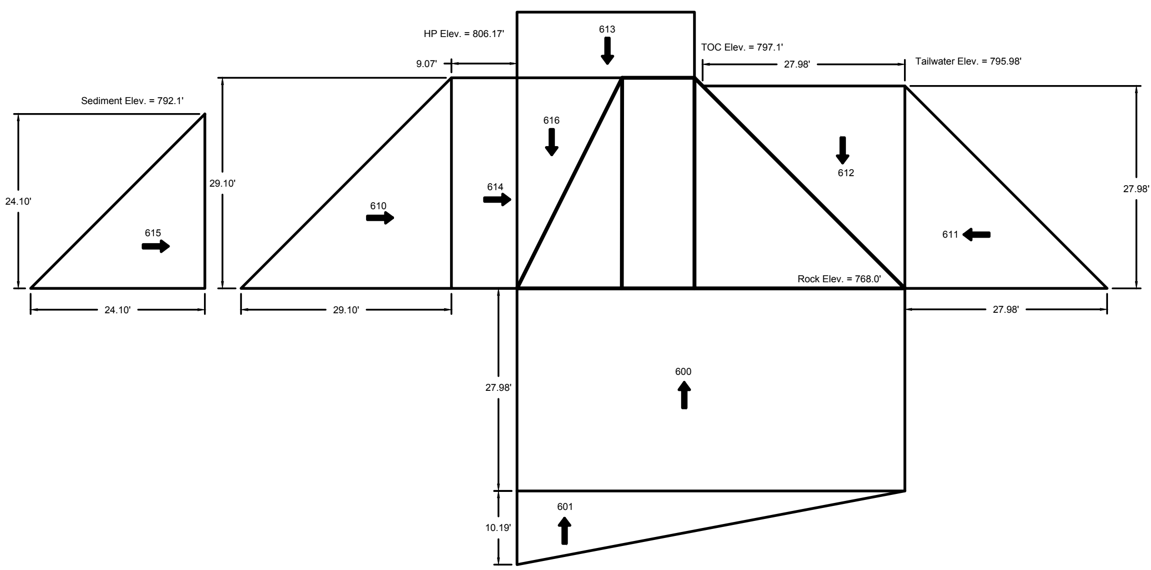
Alternative 7

2 x 10,000 Year Flood Condition



No.	Revision	Date	Drawn	Checked
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Conestee Foundation
Lake Conestee Dam Stability Analysis

New Downstream Roller Compacted Concrete Dam 60' Downstream of Existing Dam (Alternative 7)

2 x 10,000 Year Flood Load Conditions (No Rock Anchors)

Kleinschmidt

141 Main Street P.O. Box 650
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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.
AJCo	AJCo		2001.002			

File Name: Lake Conestee Dam Stability 10' downstream bedrock at 771ft.dam
Job Name: Lake Conestee Dam
Job Number: 2001002
Comments: Feasibility Study for Lake Conestee Dam Rehabilitation

Kleinschmidt Associates
KAStable 1.06
Date: 8/2/18
By: AJCo
Reviewed by:__________
Date: __________

-- STABILITY ANALYSIS SUMMARY TABLE --

FILE NAME: Lake Conestee Dam Stability 10' downstream bedrock at 771ft.dam

LOAD CASE	V KIPS	H KIPS	H/V	SLIDE SF	M+ FT-K	M- FT-K	M+/M-	M FT-K	R FT	BASE TOE PSI	PRESS. HEEL PSI	TENS. ZONE FT
GRAVITY	48.12	0.00	-0.000	Inf	559.28	0.00	-Inf	559.28	11.62	2.34	34.79	0.00
Normal Pond	18.57	-41.73	2.247	N/A	560.31	-592.45	0.946	-32.13	-1.73	N/A	N/A	N/A
100-Year Flood	15.85	-48.07	3.033	N/A	584.11	-646.14	0.904	-62.03	-3.91	N/A	N/A	N/A
500-Year Flood	15.35	-48.72	3.173	N/A	589.63	-658.38	0.896	-68.75	-4.48	N/A	N/A	N/A
10,000 Year Flood	16.68	-45.63	2.736	N/A	617.34	-680.02	0.908	-62.68	-3.76	N/A	N/A	N/A
2x10,000 Year Flood	30.20	-36.59	1.212	0.410	870.26	-726.80	1.197	143.46	4.75	29.43	0.00	3.75
Normal Conditions Load Case with Rock Anchors	129.00	-41.73	0.323	1.550	1424.34	-503.59	2.828	920.76	7.14	80.66	18.87	0.00
100-Year Flood Conditions with rock Anchors	92.99	-13.07	0.141	3.560	1448.14	-547.01	2.647	901.14	9.69	27.62	44.13	0.00
500-Year Flood Conditions with Rock Anchors	91.09	-13.72	0.151	3.320	1453.67	-567.70	2.561	885.96	9.73	26.63	43.65	0.00
10,000 Year Flood with Rock Anchors	87.54	-10.63	0.121	4.120	1482.39	-616.37	2.405	866.02	9.89	23.72	43.83	0.00

File Name: Lake Conestee Dam Stability 10' downstream bedrock at 771ft.dam
Job Name: Lake Conestee Dam
Job Number: 2001002
Comments: Feasibility Study for Lake Conestee Dam Rehabilitation

Kleinschmidt Associates
KAStable 1.06
Date: 8/2/18
By: AJCo
Reviewed by:__________
Date: __________

SECTION DATA - GRAVITY

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
100	18.00	8.00	1.00	150.0	0	V	0.00	21.60	194.40	9.00
101	8.00	21.10	1.00	150.0	0	V	10.00	25.32	354.48	14.00
102	4.00	4.00	1.00	150.0	2	V	6.00	1.20	10.40	8.67

SUM OF SECTIONAL FORCES

CASE	VERTICAL	HORIZONTAL	POSITIVE	NEGATIVE

		FORCE (KIPS)	FORCE (KIPS)	MOMENT (FT-K)	MOMENT (FT-K)
SUBTOTAL	GRAVITY	48.12	0.00	559.28	0.00
TOTAL	GRAVITY	48.12	0.00	559.28	0.00

LOAD CASE CONSTANTS - GRAVITY

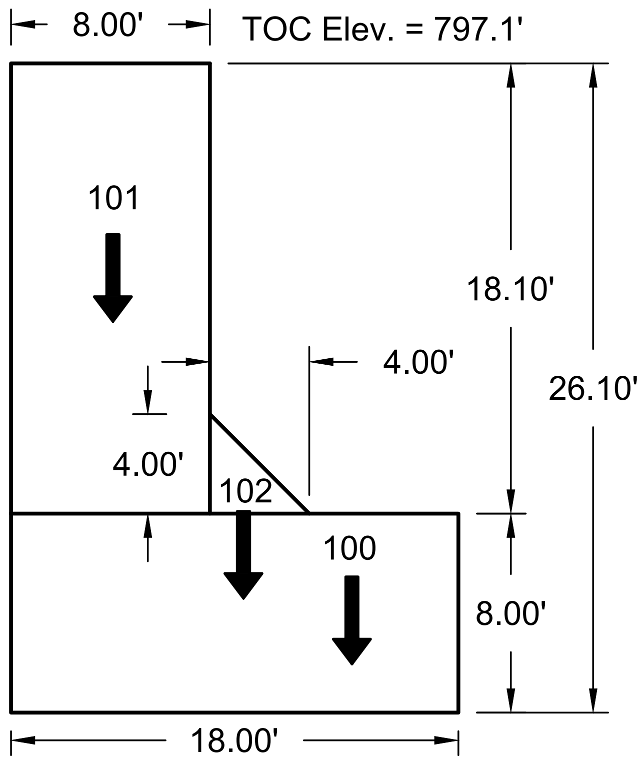
STABILITY CASE CONSTANTS		
Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI
DIMENSIONAL CASE CONSTANTS		
Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	

FINAL RESULTS OF STABILITY ANALYSIS - GRAVITY

V=	48.12	KIPS
H=	0.00	KIPS
H/V=	-0.000	
SLIDING S.F.=	Inf	
M+=	559.28	FT-K
M-=	0.00	FT-K
SUM.M=	559.28	FT-K
M+/M-=	-Inf	
R=	11.62	FT from Toe
Tension Zone=	0.00	FT
Toe Pressure=	2.34	PSI
Heel Pressure=	34.79	PSI

8.5X11 = FULL SCAL

Alternatives 8 and 9
Gravity Load Case



Rock Elev. = 771.0'

Note: Dam Cross Section
Dimensions and Section ID Numbers
are Typical for All Load Cases

No.	Revision	Date	Drawn	Checked
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Conestee Foundation
Lake Conestee Dam Stability Analysis
New CIP Concrete Downstream Replacement Dams Adjacent to and 10' Downstream of Existing Dam (Alternatives 8 and 9)

Gravity Load Conditions

Kleinschmidt
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AJCo	AJCo		2001.002			

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File Name:	Lake Conestee Dam Stability 10' downstream bedrock at 771ft.dam		Kleinschmidt Associates
Job Name:	Lake Conestee Dam		KAStable 1.06
Job Number:	2001002	Date:	8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By:	AJCo
		Reviewed by:	__________
		Date:	__________

SECTION DATA - Normal Pond

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
200	18.00	26.37	1.00	-62.4	0	V	0.00	-29.62	-266.57	9.00
210	26.10	26.10	1.00	-62.4	1	H	0.00	-21.25	-184.91	8.70
211	8.00	0.27	1.00	62.4	2	V	10.00	0.07	1.03	15.33
212	0.27	26.10	1.00	-62.4	0	H	0.00	-0.44	-0.06	0.14
213	21.10	21.10	1.00	-90.0	1	H	0.00	-20.03	-140.91	7.03

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	48.12	0.00	559.28	0.00
	Normal Pond	N/A	N/A	N/A	N/A
TOTAL	Normal Pond	N/A	N/A	N/A	N/A

LOAD CASE CONSTANTS - Normal Pond

STABILITY CASE CONSTANTS		
Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI
DIMENSIONAL CASE CONSTANTS		
Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	
LOAD CASE CONSTANTS		
Drain Efficiency, DE:	0.00	%
Headpond:	26.37	
Tailwater:	0.00	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

FINAL RESULTS OF STABILITY ANALYSIS - Normal Pond

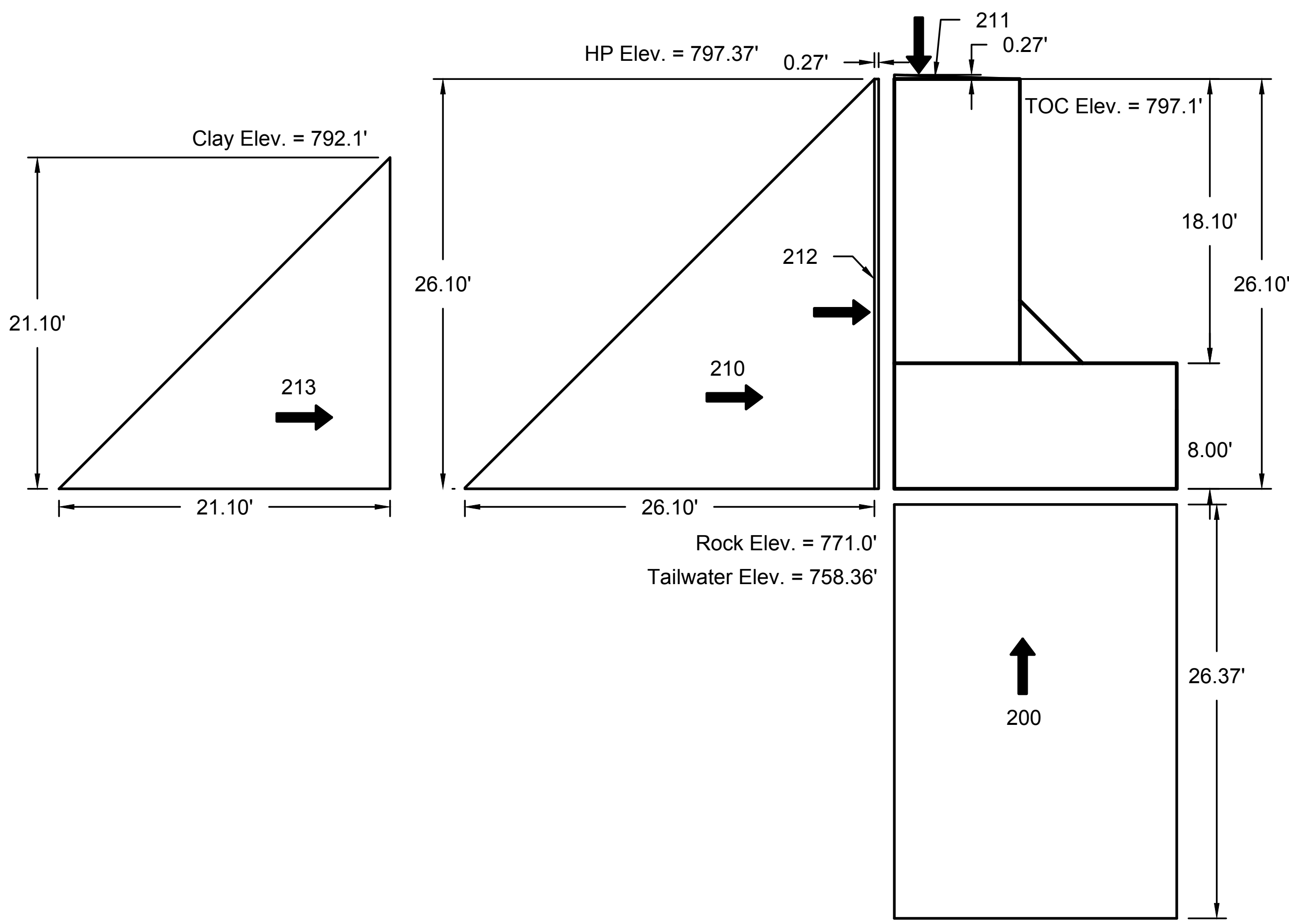
V=	18.57	KIPS
H=	-41.73	KIPS
H/V=	2.247	
SLIDING S.F.=	N/A	
M+=	560.31	FT-K
M-=	-592.45	FT-K
SUM.M=	-32.13	FT-K
M+/M-=	0.946	
R=	-1.73	FT from Toe
Tension Zone=	N/A	FT
Toe Pressure=	N/A	PSI
Heel Pressure=	N/A	PSI

DAM IS UNSTABLE!!!

8.5X11 = FULL SCAL

Alternatives 8 and 9

Normal Pool Condition (No Rock Anchors)



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No.	Revision	Date	Drawn	Checked

Conestee Foundation
Lake Conestee Dam Stability Analysis
New CIP Concrete Downstream Replacement Dams Adjacent to and 10' Downstream of Existing Dam (Alternatives 8 and 9)
Normal Pool Load Conditions
(No Rock Anchors)

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.

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File Name:	Lake Conestee Dam Stability 10' downstream bedrock at 771ft.dam	Kleinschmidt Associates	
Job Name:	Lake Conestee Dam	KAStable 1.06	
Job Number:	2001002	Date:	8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By:	AJCo
		Reviewed by:	__________
		Date:	__________

SECTION DATA - 100-Year Flood

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
300	18.00	0.86	1.00	-62.4	0	V	0.00	-0.97	-8.69	9.00
301	18.00	29.42	1.00	-62.4	0	V	0.00	-33.04	-297.40	9.00
310	26.10	26.10	1.00	-62.4	1	H	0.00	-21.25	-184.91	8.70
311	0.86	0.86	1.00	62.4	2	H	0.00	0.02	0.01	0.57
312	8.00	1.39	1.00	62.4	2	V	10.00	0.35	5.32	15.33
313	8.00	2.79	1.00	62.4	0	V	10.00	1.39	19.50	14.00
314	4.18	26.10	1.00	-62.4	0	H	0.00	-6.81	-14.23	2.09
315	21.10	21.10	1.00	-90.0	1	H	0.00	-20.03	-140.91	7.03

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	48.12	0.00	559.28	0.00
	100-Year Flood	N/A	N/A	N/A	N/A
TOTAL	100-Year Flood	N/A	N/A	N/A	N/A

LOAD CASE CONSTANTS - 100-Year Flood

STABILITY CASE CONSTANTS		
Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI
DIMENSIONAL CASE CONSTANTS		
Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	
LOAD CASE CONSTANTS		
Drain Efficiency, DE:	0.00	%
Headpond:	30.28	
Tailwater:	0.86	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

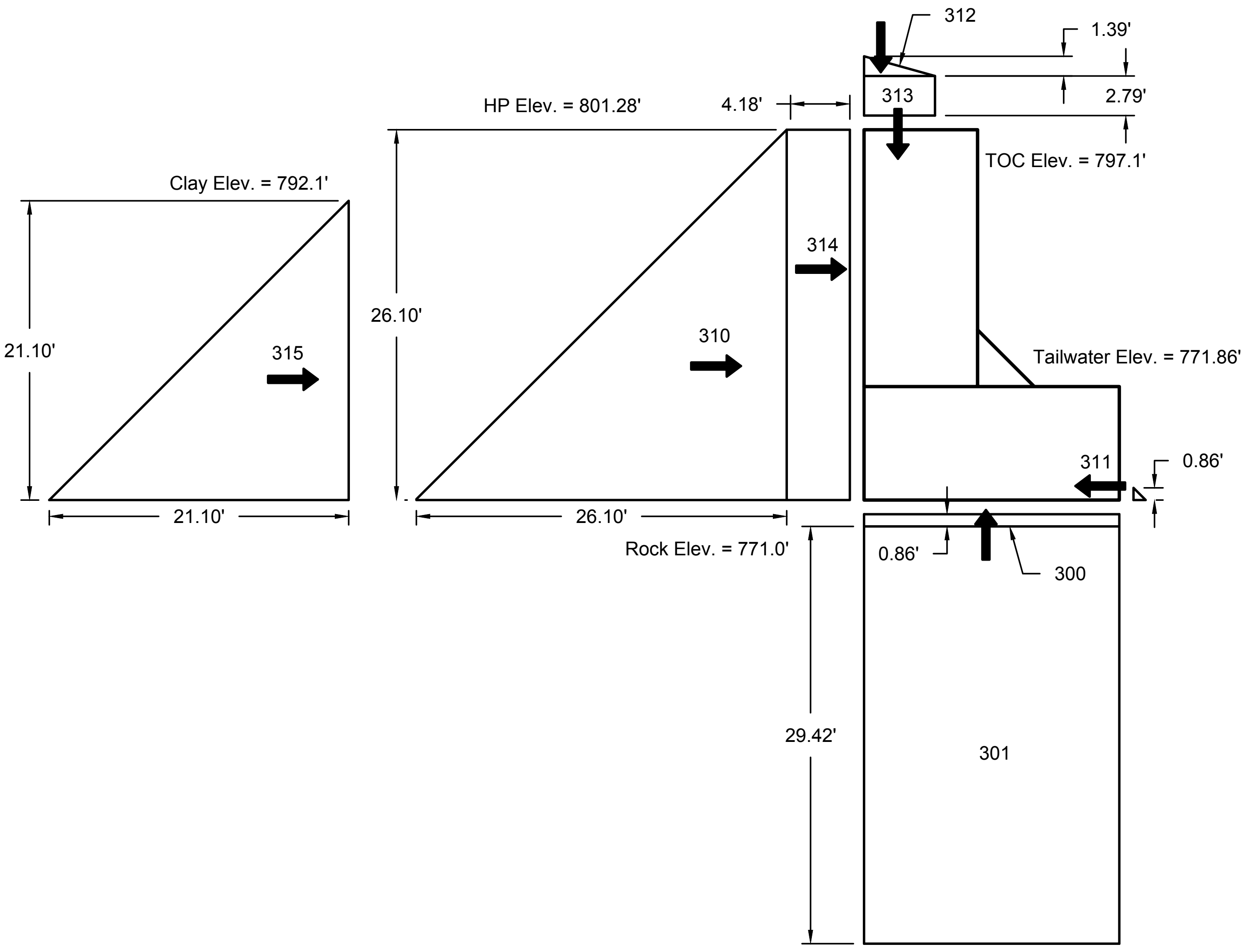
FINAL RESULTS OF STABILITY ANALYSIS - 100-Year Flood

V=	15.85	KIPS
H=	-48.07	KIPS
H/V=	3.033	
SLIDING S.F.=	N/A	
M+=	584.11	FT-K
M-=	-646.14	FT-K
SUM.M=	-62.03	FT-K
M+/M-=	0.904	
R=	-3.91	FT from Toe
Tension Zone=	N/A	FT
Toe Pressure=	N/A	PSI
Heel Pressure=	N/A	PSI

DAM IS UNSTABLE!!!

Alternatives 8 and 9

100 Year Flood (No Rock Anchors)



No.	Revision	Date	Drawn	Checked
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Conestee Foundation
Lake Conestee Dam Stability Analysis
New CIP Concrete Downstream Replacement Dams Adjacent to and 10' Downstream of Existing Dam (Alternatives 8 and 9)
100 Year Flood Load Conditions
(No Rock Anchors)

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.
AJCo	AJCo		2001.002			

File Name:	Lake Conestee Dam Stability 10' downstream bedrock at 771ft.dam	Kleinschmidt Associates	
Job Name:	Lake Conestee Dam	KAStable 1.06	
Job Number:	2001002	Date:	8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By:	AJCo
		Reviewed by:	__________
		Date:	__________

SECTION DATA - 500-Year Flood

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
400	18.00	4.07	1.00	-62.4	0	V	0.00	-4.57	-41.14	9.00
401	18.00	26.91	1.00	-62.4	0	V	0.00	-30.23	-272.03	9.00
410	26.10	26.10	1.00	-62.4	1	H	0.00	-21.25	-184.91	8.70
411	4.07	4.07	1.00	62.4	2	H	0.00	0.52	1.40	2.71
412	8.00	1.63	1.00	62.4	2	V	10.00	0.41	6.24	15.33
414	4.88	26.10	1.00	-62.4	0	H	0.00	-7.95	-19.39	2.44
415	8.00	3.25	1.00	62.4	0	V	10.00	1.62	22.71	14.00
417	21.10	21.10	1.00	-90.0	1	H	0.00	-20.03	-140.91	7.03

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	48.12	0.00	559.28	0.00
	500-Year Flood	N/A	N/A	N/A	N/A
TOTAL	500-Year Flood	N/A	N/A	N/A	N/A

LOAD CASE CONSTANTS - 500-Year Flood

STABILITY CASE CONSTANTS		
Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI
DIMENSIONAL CASE CONSTANTS		
Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	
LOAD CASE CONSTANTS		
Drain Efficiency, DE:	0.00	%
Headpond:	30.98	
Tailwater:	4.07	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

FINAL RESULTS OF STABILITY ANALYSIS - 500-Year Flood

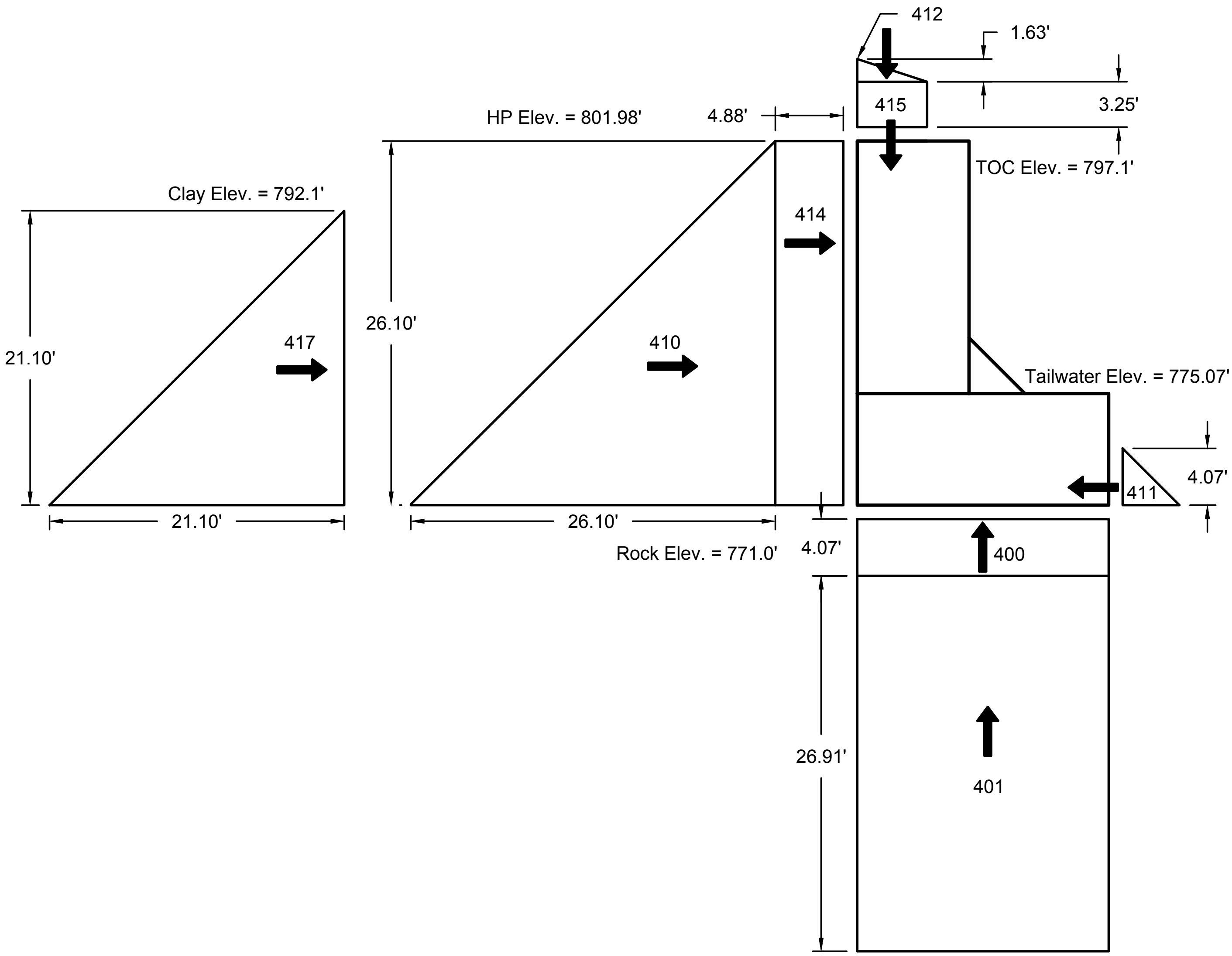
V=	15.35	KIPS
H=	-48.72	KIPS
H/V=	3.173	
SLIDING S.F.=	N/A	
M+=	589.63	FT-K
M-=	-658.38	FT-K
SUM.M=	-68.75	FT-K
M+/M-=	0.896	
R=	-4.48	FT from Toe
Tension Zone=	N/A	FT
Toe Pressure=	N/A	PSI
Heel Pressure=	N/A	PSI

DAM IS UNSTABLE!!!

8.5X11 = FULL SCAL

Alternatives 8 and 9

500 Year Flood (No Rock Anchors)



No.	Revision	Date	Drawn	Checked
-	-	-	-	-

Conestee Foundation
Lake Conestee Dam Stability Analysis
New CIP Concrete Downstream Replacement Dams Adjacent to and 10' Downstream of Existing Dam (Alternatives 8 and 9)
500 Year Flood Load Conditions
(No Rock Anchors)

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.
AJCo	AJCo		2001.002			

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File Name:	Lake Conestee Dam Stability 10' downstream bedrock at 771ft.dam		Kleinschmidt Associates
Job Name:	Lake Conestee Dam		KAStable 1.06
Job Number:	2001002	Date:	8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By:	AJCo
		Reviewed by:	__________
		Date:	__________

SECTION DATA - 10,000 Year Flood

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
500	18.00	13.23	1.00	-62.4	0	V	0.00	-14.86	-133.74	9.00
501	18.00	18.89	1.00	-62.4	0	V	0.00	-21.22	-190.96	9.00
510	26.10	26.10	1.00	-62.4	1	H	0.00	-21.25	-184.91	8.70
511	13.23	13.23	1.00	62.4	1	H	0.00	5.46	24.08	4.41
512	8.00	2.00	1.00	62.4	2	V	10.00	0.50	7.65	15.33
513	6.00	5.23	1.00	62.4	0	V	0.00	1.96	5.87	3.00
514	6.02	26.10	1.00	-62.4	0	H	0.00	-9.80	-29.51	3.01
515	5.00	4.01	1.00	62.4	2	V	10.00	0.63	8.34	13.33
516	4.00	4.23	1.00	62.4	0	V	6.00	1.06	8.45	8.00
517	4.00	4.00	1.00	62.4	1	V	6.00	0.50	3.66	7.33
518	21.10	21.10	1.00	-90.0	1	H	0.00	-20.03	-140.91	7.03

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	48.12	0.00	559.28	0.00
	10,000 Year Flood	N/A	N/A	N/A	N/A
TOTAL	10,000 Year Flood	N/A	N/A	N/A	N/A

LOAD CASE CONSTANTS - 10,000 Year Flood

STABILITY CASE CONSTANTS		
Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI
DIMENSIONAL CASE CONSTANTS		
Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	
LOAD CASE CONSTANTS		
Drain Efficiency, DE:	0.00	%
Headpond:	32.12	
Tailwater:	13.23	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

FINAL RESULTS OF STABILITY ANALYSIS - 10,000 Year Flood

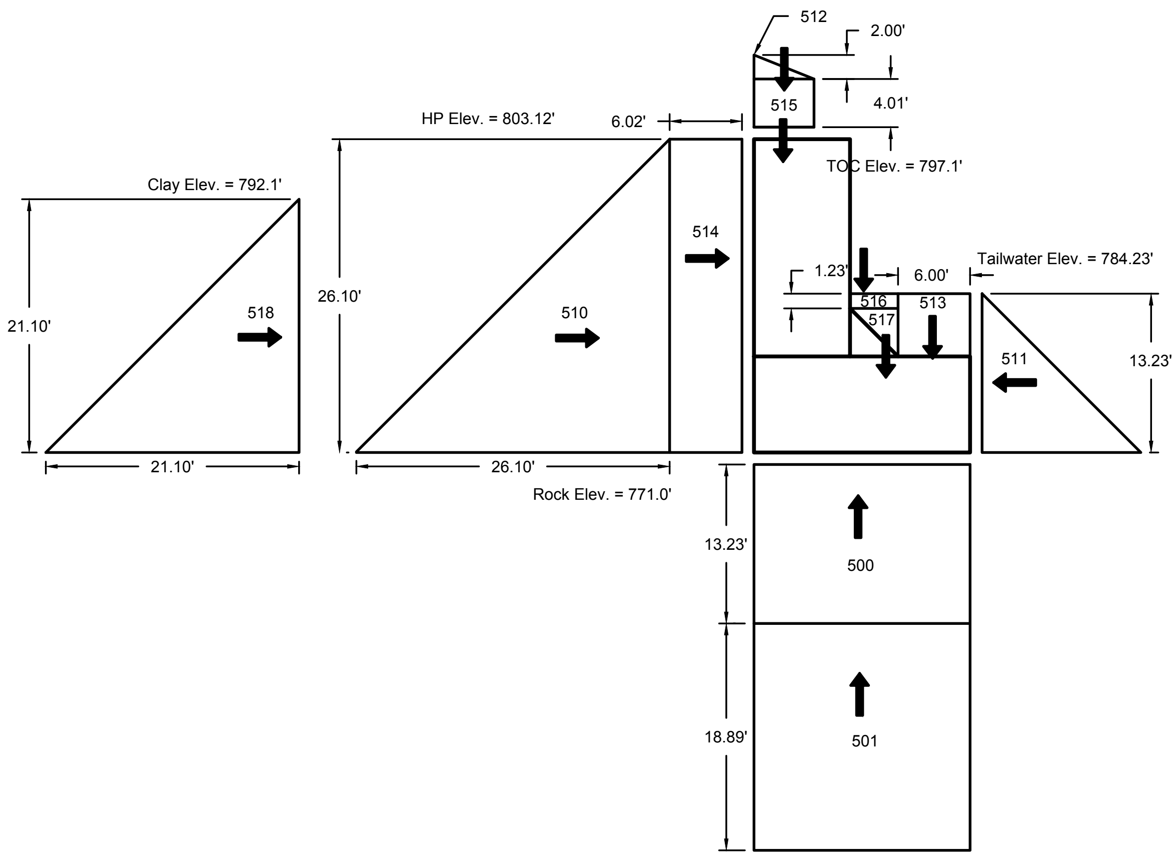
V=	16.68	KIPS
H=	-45.63	KIPS
H/V=	2.736	
SLIDING S.F.=	N/A	
M+=	617.34	FT-K
M-=	-680.02	FT-K
SUM.M=	-62.68	FT-K
M+/M-=	0.908	
R=	-3.76	FT from Toe
Tension Zone=	N/A	FT
Toe Pressure=	N/A	PSI
Heel Pressure=	N/A	PSI

DAM IS UNSTABLE!!!

8.5X11 = FULL SCAL

Alternatives 8 and 9

10,000 Year Flood (No Rock Anchors)



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No.	Revision	Date	Drawn	Checked
-	-	-	-	-

Conestee Foundation
Lake Conestee Dam Stability Analysis

New CIP Concrete Downstream Replacement Dams Adjacent to and 10' Downstream of Existing Dam (Alternatives 8 and 9)

10,000 Year Flood Load Conditions
(No Rock Anchors)

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.

File Name:	Lake Conestee Dam Stability 10' downstream bedrock at 771ft.dam		Kleinschmidt Associates
Job Name:	Lake Conestee Dam		KAStable 1.06
Job Number:	2001002	Date:	8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By:	AJCo
		Reviewed by:	__________
		Date:	__________

SECTION DATA - 2x10,000 Year Flood

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
600	18.00	24.98	1.00	-62.4	0	V	0.00	-28.06	-252.52	9.00
601	3.75	10.19	1.00	-62.4	0	V	14.25	-2.38	-38.41	16.13
602	14.25	10.19	1.00	-62.4	2	V	0.00	-4.53	-43.06	9.50
610	26.10	26.10	1.00	-62.4	1	H	0.00	-21.25	-184.91	8.70
611	24.98	24.98	1.00	62.4	1	H	0.00	19.47	162.11	8.33
612	9.07	26.10	1.00	-62.4	0	H	0.00	-14.77	-66.99	4.54
613	21.10	21.10	1.00	-90.0	1	H	0.00	-20.03	-140.91	7.03
614	8.00	3.02	1.00	62.4	2	V	13.00	0.75	13.82	18.33
615	8.00	6.05	1.00	62.4	0	V	13.00	3.02	51.34	17.00
616	4.00	4.00	1.00	62.4	1	V	9.00	0.50	5.16	10.33
617	4.00	12.98	1.00	62.4	0	V	9.00	3.24	35.64	11.00
618	9.00	16.98	1.00	62.4	0	V	0.00	9.54	42.91	4.50

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	48.12	0.00	559.28	0.00
	2x10,000 Year Flood	-17.92	-36.59	310.98	-726.80
TOTAL	2x10,000 Year Flood	30.20	-36.59	870.26	-726.80

LOAD CASE CONSTANTS - 2x10,000 Year Flood

STABILITY CASE CONSTANTS		
Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI
DIMENSIONAL CASE CONSTANTS		
Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	
LOAD CASE CONSTANTS		
Drain Efficiency, DE:	0.00	%
Headpond:	35.17	
Tailwater:	24.98	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

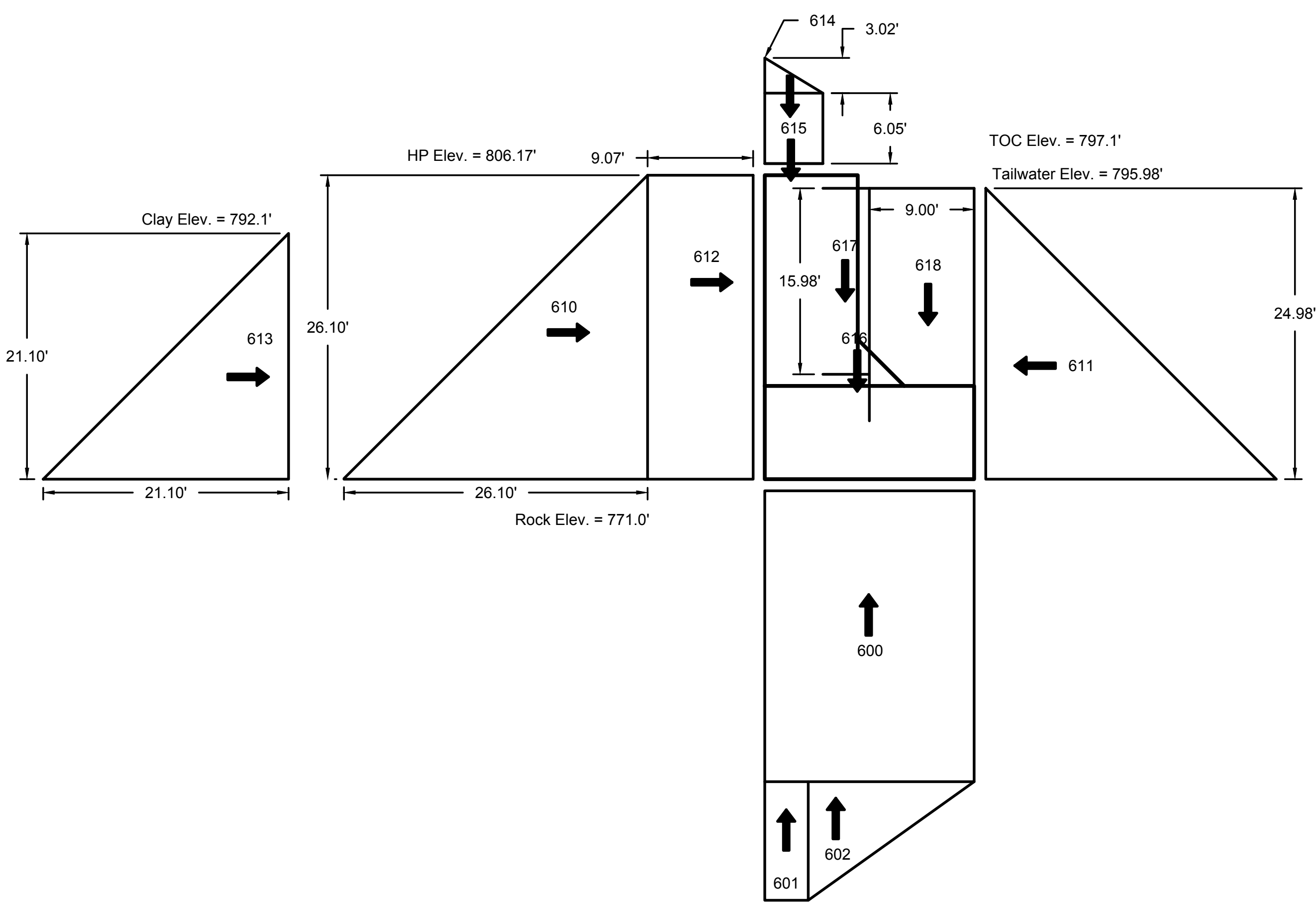
FINAL RESULTS OF STABILITY ANALYSIS - 2x10,000 Year Flood

V=	30.20	KIPS
H=	-36.59	KIPS
H/V=	1.212	
SLIDING S.F.=	0.410	
M+=	870.26	FT-K
M-=	-726.80	FT-K
SUM.M=	143.46	FT-K
M+/M-=	1.197	
R=	4.75	FT from Toe
Tension Zone=	3.75	FT
Toe Pressure=	29.43	PSI
Heel Pressure=	0.00	PSI

8.5X11 = FULL SCAL

Alternatives 8 and 9

2 x 10,000-Year Flood Condition (No Rock Anchors)



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No.	Revision	Date	Drawn	Checked
-	-	-	-	-

Conestee Foundation
Lake Conestee Dam Stability Analysis
New CIP Concrete Downstream Replacement Dams Adjacent to and 10' Downstream of Existing Dam (Alternatives 8 and 9)
2 x 10,000 Year Flood Load Conditions
(No Rock Anchors)

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.
AJCo	AJCo		2001.002			

File Name:	Lake Conestee Dam Stability 10' downstream bedrock at 771ft.dam		Kleinschmidt Associates
Job Name:	Lake Conestee Dam		KAStable 1.06
Job Number:	2001002	Date:	8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By:	AJCo
		Reviewed by:	__________
		Date:	__________

SECTION DATA - Normal Conditions Load Case with Rock Anchors

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
700	18.00	26.37	1.00	-62.4	2	V	0.00	-14.81	-177.71	12.00
710	26.10	26.10	1.00	-62.4	1	H	0.00	-21.25	-184.91	8.70
711	8.00	0.27	1.00	62.4	2	V	10.00	0.07	1.03	15.33
712	0.27	26.10	1.00	-62.4	0	H	0.00	-0.44	-0.06	0.14
713	21.10	21.10	1.00	-90.0	1	H	0.00	-20.03	-140.91	7.03
714	1.00	1.00	1.00	60622.0	0	V	10.00	60.62	636.53	10.50
715	1.00	1.00	1.00	35000.0	0	V	6.00	35.00	227.50	6.50

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	48.12	0.00	559.28	0.00
	Normal Conditions Load Case with Rock Anchors	80.88	-41.73	865.06	-503.59
TOTAL	Normal Conditions Load Case with Rock Anchors	129.00	-41.73	1424.34	-503.59

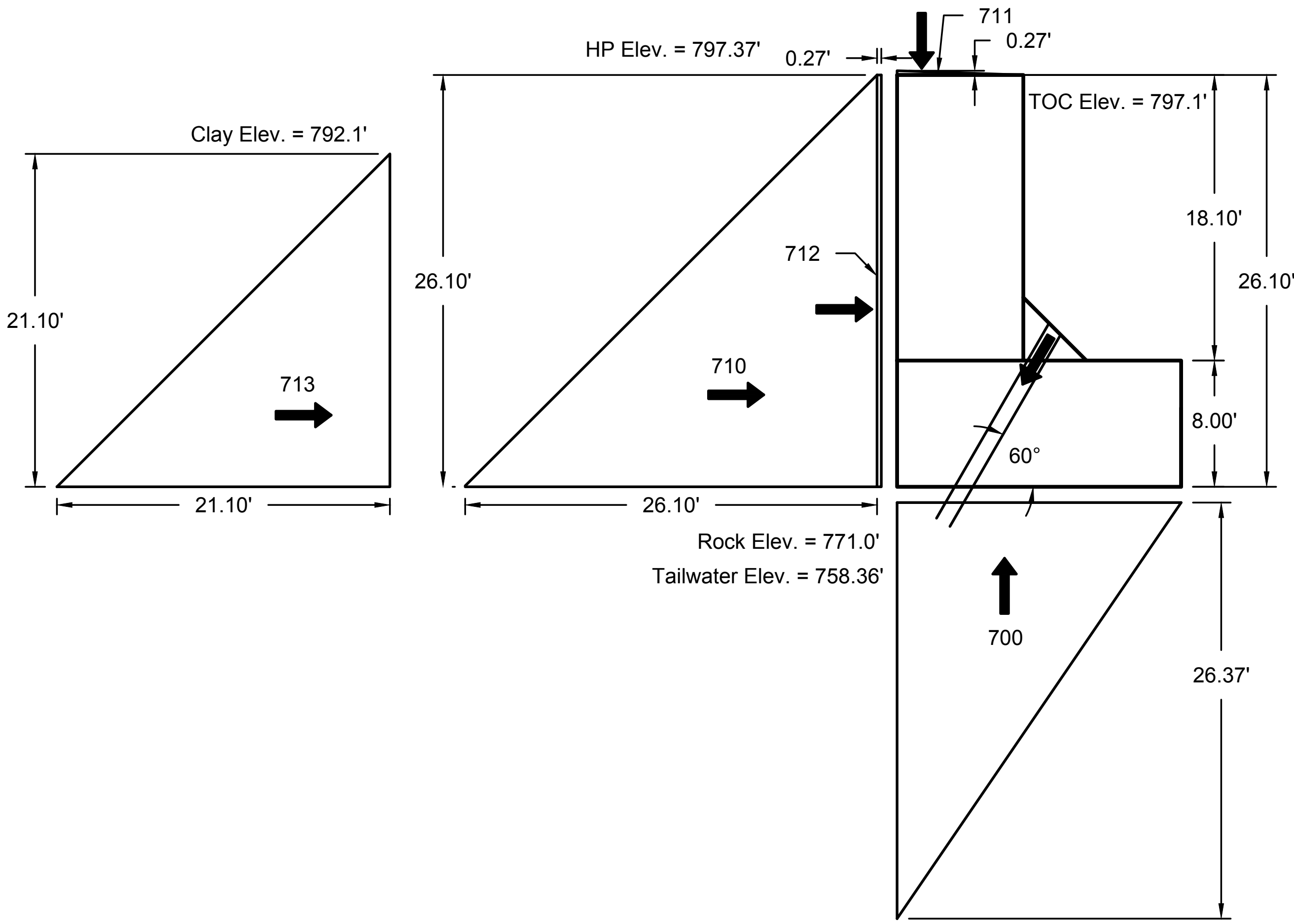
LOAD CASE CONSTANTS - Normal Conditions Load Case with Rock Anchors

STABILITY CASE CONSTANTS		
Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI
DIMENSIONAL CASE CONSTANTS		
Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	
LOAD CASE CONSTANTS		
Drain Efficiency, DE:	0.00	%
Headpond:	26.37	
Tailwater:	0.00	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

FINAL RESULTS OF STABILITY ANALYSIS - Normal Conditions Load Case with Rock Anchors

V=	129.00	KIPS
H=	-41.73	KIPS
H/V=	0.323	
SLIDING S.F.=	1.550	
M+=	1424.34	FT-K
M-=	-503.59	FT-K
SUM.M=	920.76	FT-K
M+/M-=	2.828	
R=	7.14	FT from Toe
Tension Zone=	0.00	FT
Toe Pressure=	80.66	PSI
Heel Pressure=	18.87	PSI

Alternatives 8 and 9
Normal Pool Condition (With Rock Anchors)



Rock Anchor Section ID's:
714 and 715
Rock Anchor Capacity = 50 k/ft
Section ID 714 Force = (50 k/ft)*sin(60°) = 43.301 k
Section ID 715 Force = (50 k/ft)*cos(60°) = 25.000 k
Note: Rock Anchor Capacity and Forces are Typical

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Conestee Foundation
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Normal Pool Load Conditions
(With Rock Anchors)

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8.5X11 = FULL SCAL

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File Name:	Lake Conestee Dam Stability 10' downstream bedrock at 771ft.dam	Kleinschmidt Associates
Job Name:	Lake Conestee Dam	KAStable 1.06
Job Number:	2001002	Date: 8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By: AJCo
		Reviewed by:__________
		Date: __________

SECTION DATA - 100-Year Flood Conditions with Rock Anchors

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
800	18.00	0.86	1.00	-62.4	0	V	0.00	-0.97	-8.69	9.00
801	18.00	29.42	1.00	-62.4	2	V	0.00	-16.52	-198.27	12.00
810	26.10	26.10	1.00	-62.4	1	H	0.00	-21.25	-184.91	8.70
811	0.86	0.86	1.00	62.4	2	H	0.00	0.02	0.01	0.57
812	8.00	1.39	1.00	62.4	2	V	10.00	0.35	5.32	15.33
813	8.00	2.79	1.00	62.4	0	V	10.00	1.39	19.50	14.00
814	4.18	26.10	1.00	-62.4	0	H	0.00	-6.81	-14.23	2.09
815	21.10	21.10	1.00	-90.0	1	H	0.00	-20.03	-140.91	7.03
816	1.00	1.00	1.00	60622.0	0	V	10.00	60.62	636.53	10.50
817	1.00	1.00	1.00	35000.0	0	H	6.00	35.00	227.50	6.50

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	48.12	0.00	559.28	0.00
	100-Year Flood Conditions with Rock Anchors	44.87	-13.07	888.86	-547.01
TOTAL	100-Year Flood Conditions with Rock Anchors	92.99	-13.07	1448.14	-547.01

LOAD CASE CONSTANTS - 100-Year Flood Conditions with Rock Anchors

STABILITY CASE CONSTANTS		
Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI
DIMENSIONAL CASE CONSTANTS		
Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	
LOAD CASE CONSTANTS		
Drain Efficiency, DE:	0.00	%
Headpond:	30.28	
Tailwater:	0.86	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

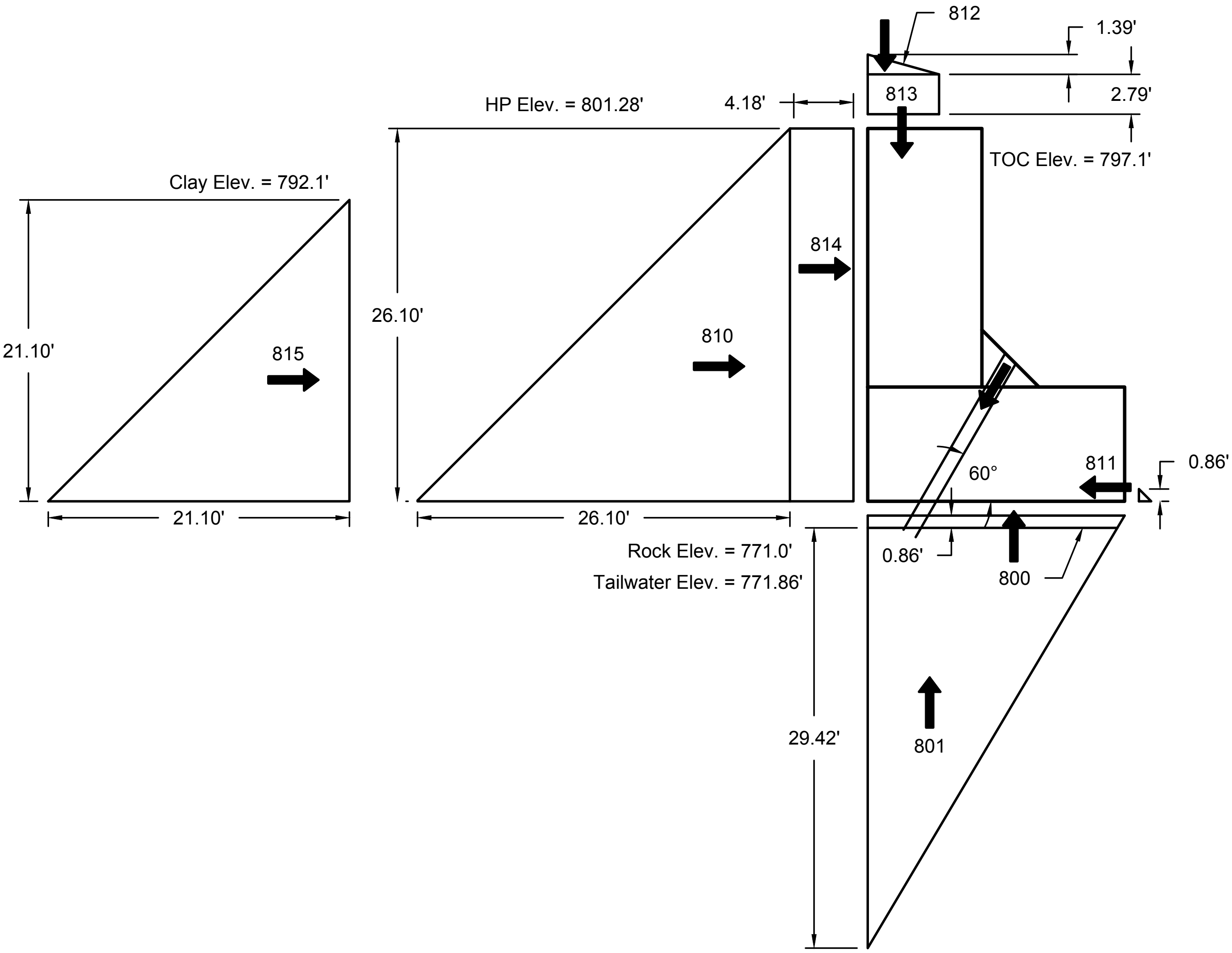
FINAL RESULTS OF STABILITY ANALYSIS - 100-Year Flood Conditions with Rock Anchors

V=	92.99	KIPS
H=	-13.07	KIPS
H/V=	0.141	
SLIDING S.F.=	3.560	
M+=	1448.14	FT-K
M-=	-547.01	FT-K
SUM.M=	901.14	FT-K
M+/M-=	2.647	
R=	9.69	FT from Toe
Tension Zone=	0.00	FT
Toe Pressure=	27.62	PSI
Heel Pressure=	44.13	PSI

8.5X11 = FULL SCAL

Alternatives 8 and 9

100 Year Flood (With Rock Anchors)



Rock Anchor Section ID's:
811 and 816

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No.	Revision	Date	Drawn	Checked
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Conestee Foundation
Lake Conestee Dam Stability Analysis
New CIP Concrete Downstream Replacement Dams Adjacent to and 10' Downstream of Existing Dam (Alternatives 8 and 9)
100 Year Flood Load Conditions
(With Rock Anchors)

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.
AJCo	AJCo		2001.002			

File Name:	Lake Conestee Dam Stability 10' downstream bedrock at 771ft.dam		Kleinschmidt Associates
Job Name:	Lake Conestee Dam	KAStable 1.06	
Job Number:	2001002	Date:	8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By:	AJCo
		Reviewed by:	__________
		Date:	__________

SECTION DATA - 500-Year Flood Conditions with Rock Anchors

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
900	18.00	4.07	1.00	-62.4	0	V	0.00	-4.57	-41.14	9.00
901	18.00	26.91	1.00	-62.4	2	V	0.00	-15.11	-181.35	12.00
910	26.10	26.10	1.00	-62.4	1	H	0.00	-21.25	-184.91	8.70
911	4.07	4.07	1.00	62.4	2	H	0.00	0.52	1.40	2.71
912	8.00	1.63	1.00	62.4	2	V	10.00	0.41	6.24	15.33
913	1.00	1.00	1.00	60622.0	0	V	10.00	60.62	636.53	10.50
914	4.88	26.10	1.00	-62.4	0	H	0.00	-7.95	-19.39	2.44
915	8.00	3.25	1.00	62.4	0	V	10.00	1.62	22.71	14.00
916	1.00	1.00	1.00	35000.0	0	H	6.00	35.00	227.50	6.50
917	21.10	21.10	1.00	-90.0	1	H	0.00	-20.03	-140.91	7.03

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	48.12	0.00	559.28	0.00
	500-Year Flood Conditions with Rock Anchors	42.97	-13.72	894.39	-567.70
TOTAL	500-Year Flood Conditions with Rock Anchors	91.09	-13.72	1453.67	-567.70

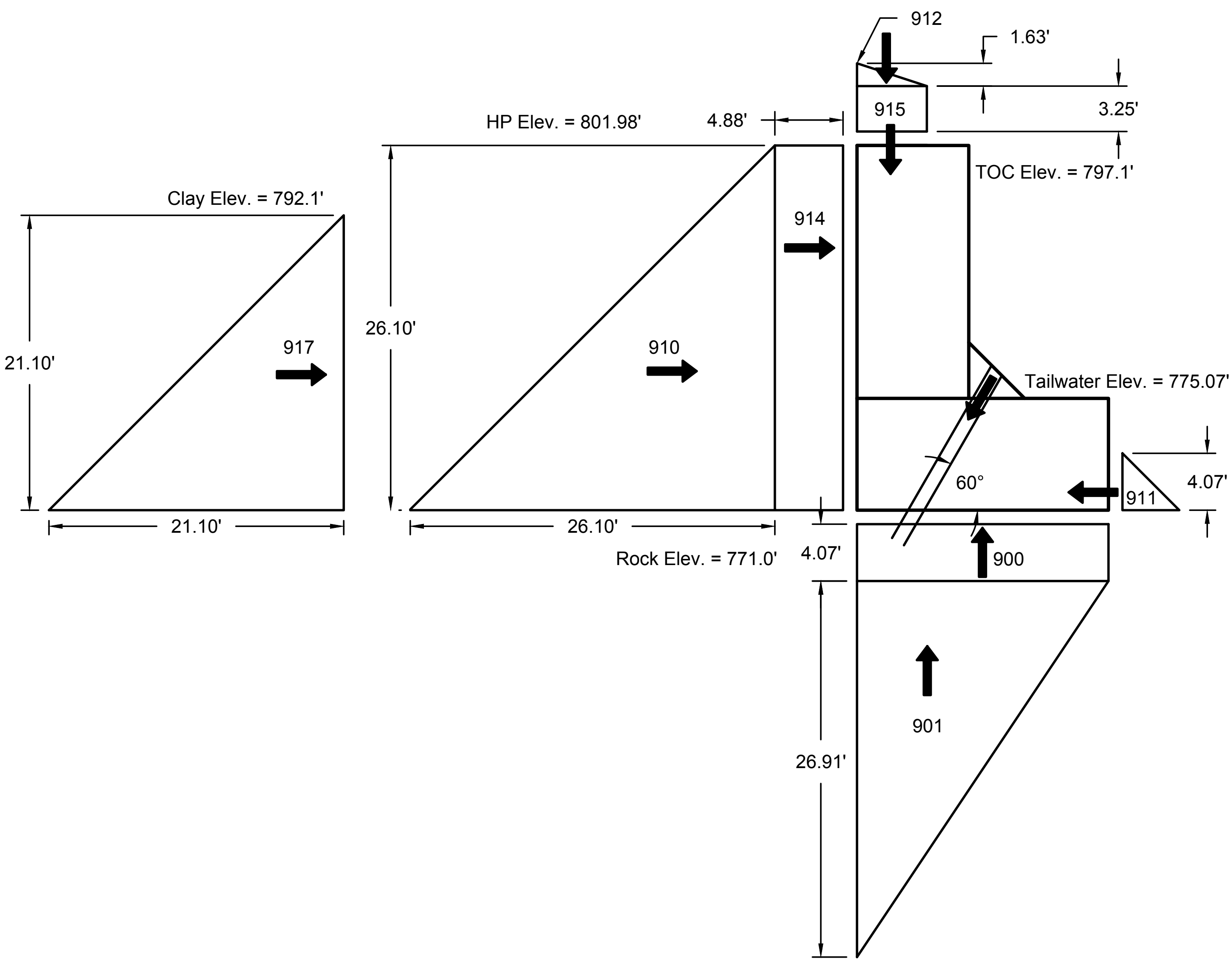
LOAD CASE CONSTANTS - 500-Year Flood Conditions with Rock Anchors

STABILITY CASE CONSTANTS			
	Friction Factor, FF:	0.50	
	Shear Friction Value, CV:	0.00	PSI
DIMENSIONAL CASE CONSTANTS			
	Width, W1:	1.00	FT
	Width, W2:	0.00	FT
	Length, L1:	18.00	FT
	Length, L2:	0.00	FT
	Length, L3:	0.00	FT
	Slope of Base, (Angle):	0.00	Degrees
	Underdrain, (Y Yes, N No):	N	
	Dist. Toe to Drain, DT:	0.00	FT
	Method, (1 = FERC, 2 = ACoE):	N/A	
	Height of Drainage Gallery, H4:	0.00	
LOAD CASE CONSTANTS			
	Drain Efficiency, DE:	0.00	%
	Headpond:	30.98	
	Tailwater:	4.07	
	Length, L4:	0.00	FT
	Length, L5:	0.00	FT
	Additional Sliding Resistance(s):	0.00	KIPS

FINAL RESULTS OF STABILITY ANALYSIS - 500-Year Flood Conditions with Rock Anchors

V=	91.09	KIPS
H=	-13.72	KIPS
H/V=	0.151	
SLIDING S.F.=	3.320	
M+=	1453.67	FT-K
M-=	-567.70	FT-K
SUM.M=	885.96	FT-K
M+/M-=	2.561	
R=	9.73	FT from Toe
Tension Zone=	0.00	FT
Toe Pressure=	26.63	PSI
Heel Pressure=	43.65	PSI

Alternatives 8 and 9
500 Year Flood (With Rock Anchors)



Rock Anchor Section ID's:
913 and 916

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No.	Revision	Date	Drawn	Checked

Conestee Foundation
Lake Conestee Dam Stability Analysis

New CIP Concrete Downstream Replacement Dams Adjacent to and 10' Downstream of Existing Dam (Alternatives 8 and 9)

500 Year Flood Load Conditions
(With Rock Anchors)

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.

File Name:	Lake Conestee Dam Stability 10' downstream bedrock at 771ft.dam	Kleinschmidt Associates
Job Name:	Lake Conestee Dam	KAStable 1.06
Job Number:	2001002	Date: 8/2/18
Comments:	Feasibility Study for Lake Conestee Dam Rehabilitation	By: AJCo
		Reviewed by:__________
		Date: __________

SECTION DATA - 10,000 Year Flood with Rock Anchors

ID NO.	BASE (FT)	ALTITUDE (FT)	DEPTH (FT)	UNIT WT. (PCF)	SHP	DIR	DISTANCE (FT)	FORCE (KIPS)	MOMENT (FT-KIPS)	ARM (FT)
1000	18.00	13.23	1.00	-62.4	0	V	0.00	-14.86	-133.74	9.00
1001	18.00	18.89	1.00	-62.4	2	V	0.00	-10.61	-127.30	12.00
1010	26.10	26.10	1.00	-62.4	1	H	0.00	-21.25	-184.91	8.70
1011	13.23	13.23	1.00	62.4	1	H	0.00	5.46	24.08	4.41
1012	8.00	2.00	1.00	62.4	2	V	10.00	0.50	7.65	15.33
1013	6.00	5.23	1.00	62.4	0	V	0.00	1.96	5.87	3.00
1014	6.02	26.10	1.00	-62.4	0	H	0.00	-9.80	-29.51	3.01
1015	8.00	4.01	1.00	62.4	2	V	10.00	1.00	15.35	15.33
1016	4.00	1.23	1.00	62.4	0	V	6.00	0.31	2.46	8.00
1017	4.00	4.00	1.00	62.4	1	V	6.00	0.50	3.66	7.33
1018	21.10	21.10	1.00	-90.0	1	H	0.00	-20.03	-140.91	7.03
1019	1.00	1.00	1.00	60622.0	0	V	10.00	60.62	636.53	10.50
1020	1.00	1.00	1.00	35000.0	0	H	6.00	35.00	227.50	6.50

SUM OF SECTIONAL FORCES

	CASE	VERTICAL FORCE (KIPS)	HORIZONTAL FORCE (KIPS)	POSITIVE MOMENT (FT-K)	NEGATIVE MOMENT (FT-K)
SUBTOTAL	GRAVITY	48.12	0.00	559.28	0.00
	10,000 Year Flood with Rock Anchors	39.42	-10.63	923.11	-616.37
TOTAL	10,000 Year Flood with Rock Anchors	87.54	-10.63	1482.39	-616.37

LOAD CASE CONSTANTS - 10,000 Year Flood with Rock Anchors

STABILITY CASE CONSTANTS		
Friction Factor, FF:	0.50	
Shear Friction Value, CV:	0.00	PSI
DIMENSIONAL CASE CONSTANTS		
Width, W1:	1.00	FT
Width, W2:	0.00	FT
Length, L1:	18.00	FT
Length, L2:	0.00	FT
Length, L3:	0.00	FT
Slope of Base, (Angle):	0.00	Degrees
Underdrain, (Y Yes, N No):	N	
Dist. Toe to Drain, DT:	0.00	FT
Method, (1 = FERC, 2 = ACoE):	N/A	
Height of Drainage Gallery, H4:	0.00	
LOAD CASE CONSTANTS		
Drain Efficiency, DE:	0.00	%
Headpond:	32.12	
Tailwater:	13.23	
Length, L4:	0.00	FT
Length, L5:	0.00	FT
Additional Sliding Resistance(s):	0.00	KIPS

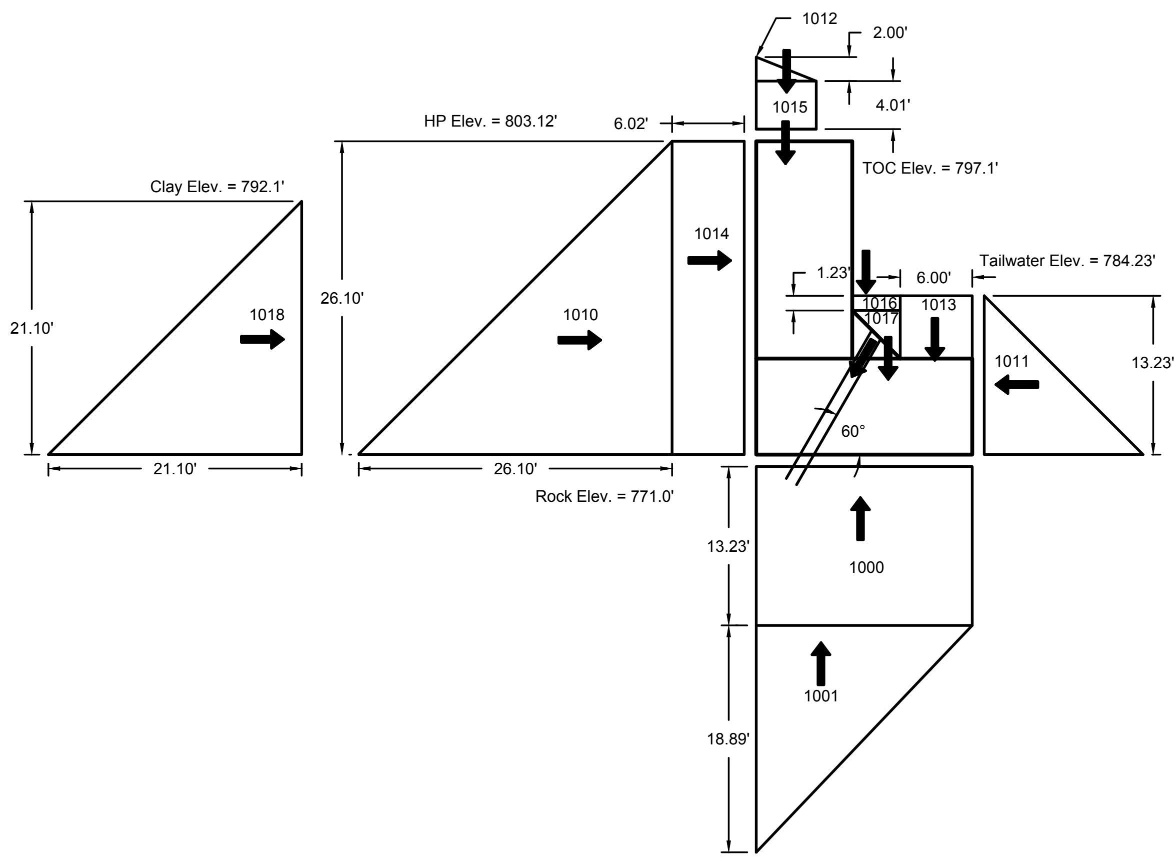
FINAL RESULTS OF STABILITY ANALYSIS - 10,000 Year Flood with Rock Anchors

V=	87.54	KIPS
H=	-10.63	KIPS
H/V=	0.121	
SLIDING S.F.=	4.120	
M+=	1482.39	FT-K
M-=	-616.37	FT-K
SUM.M=	866.02	FT-K
M+/M-=	2.405	
R=	9.89	FT from Toe
Tension Zone=	0.00	FT
Toe Pressure=	23.72	PSI
Heel Pressure=	43.83	PSI

8.5X11 = FULL SCAL

Alternatives 8 and 9

10,000 Year Flood (With Rock Anchors)



Rock Anchor Section ID's:
1019 and 1020

No.	Revision	Date	Drawn	Checked
-	-	-	-	-

Conestee Foundation
Lake Conestee Dam Stability Analysis
New CIP Concrete Downstream Replacement Dams Adjacent to and 10' Downstream of Existing Dam (Alternatives 8 and 9)
10,000 Year Flood Load Conditions
(No Rock Anchors)

Kleinschmidt
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Pittsfield, Maine 04967
Telephone: (207) 487-3328
Fax: (207) 487-3124
www.KleinschmidtGroup.com

Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.	Rev.
AJCo	AJCo		2001.002			

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APPENDIX 9

PORTADAM QUOTE

PORTADAM BUDGET QUOTATION

TO:	**Austin Cormier-Kleinschmidt Associates**
PROJECT:	**Conestee Dam**
LOCATION:	**Conestee, SC**
DATE:	**November 14, 2018**

This "site unseen" job quote is based on 550 LF of 5 ft. high (max.) 1- sided Portadam cofferdam equipment to be installed in 1 phase(s). Upon request, Portadam can provide in-water technical advisory services to assist the customer with their installation and removal of the cofferdam equipment.

I. PORTADAM EQUIPMENT RENTAL RATES, one month minimum; LABOR EXTRA…

a) First month minimum rental period… includes shipping… **$19,875** **/Month**
b) Second month rental period… **$10,110** **/Month**
c) Third month rental & each month thereafter... **$6,740** **/Month**
d) Weekly rental will charged at 1/3rd of the monthly rate in effect after first month minimum rental.
e) Rental period begins upon delivery to site and continues without interruption for any reason until returned.
f) Alternate equipment requirements will be quoted upon request.
g) Applicable state and local taxes will be added to all rental, labor and other charges unless a tax exemption certificate is furnished.

II. TECHNICAL ASSISTANCE LABOR; capable of inwater work...

a) Portadam in-water technical assistance; standard 10 hour weekday **$2,565** **/Crewday**
b) Crew travel expenses; each roundtrip… **$1,295** **/Per Trip**
c) OT, SAT, SUN & Holiday rates available upon request.
d) Any additional trade union or prevailing wage requirements will be for the customer's account.
e) Production estimates… **Est. Crewdays:** **8-10** **Install & Remove**
Est. Trips: **2** **Trips**

**Does not include contingencies for adverse weather or high water and are dependent on site suitability, access and assistance by customer.*

III. CUSTOMER MUST PROVIDE; at his own expense...

a) Clearing, access, loading, and offloading to installation point.
b) During offloading and loading, operators of lifting rig services will be provided by customer
c) Sufficient labor to install and remove cofferdam (typically **2** men if using Portadam in-water technical assistance).
d) Lifting rig services (and associated operators) during installation and removal.
e) Sandbags (approx. #). **1000** **/Sandbags (approx.)**
f) Structure maintenance, security & rental equipment insurance.
g) Initial dewatering & maintenance pumping to include all seepage, groundwater, overflow & precipitation.
h) 185 cfm air compressor + sufficient hose to reach the entire cofferdam perimeter.

Monte Hickman

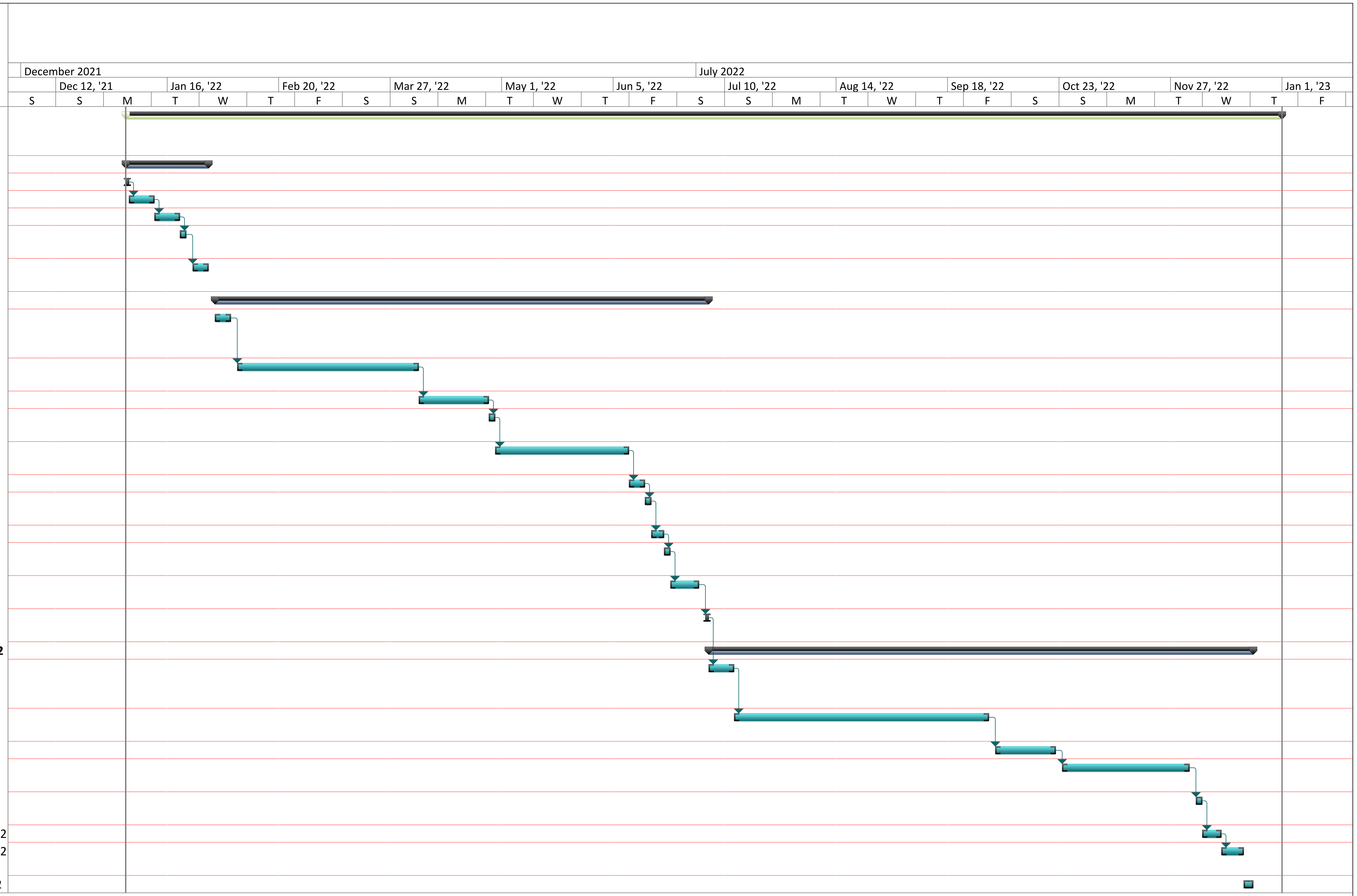
Monte Hickman, Midwest Region Sales Manager

This quotation is contingent on site conditions suitable for Portadam system use. Any agreement derived from this quotation must include our standard terms and conditions and payment terms. These terms and conditions are available upon request. Please contact me if you have any questions.

APPENDIX 10

PROJECT SCHEDULE

ID		Task Name	Duration	Start	Finish
1		**Lake Conestee Dam Rehab/Repair/Replacment Feasibility Study**	**261 days**	**Mon 1/3/22**	**Sat 12/31/22**
2		**Site prep**	**20 day**	**Mon 1/3/22**	**Fri 1/28/22**
3		Soil erosion and sedimentation prep	1 day	Mon 1/3/22	Mon 1/3/22
4		WWTP demolition and material remova	6 days	Tue 1/4/22	Tue 1/11/22
5		Gravel access road construction	6 days	Wed 1/12/22	Wed 1/19/22
6		Install cofferdam on top half of existing dam	2 days	Thu 1/20/22	Fri 1/21/22
7		Form and build intermediate wall at halfway point of dam	5 days	Mon 1/24/22	Fri 1/28/22
8		**For first half of dam**	**111 da**	**Mon 1/31/22**	**Mon 7/4/22**
9		Excavate to competent bedrock on downstream side of dam and fill in with concrete to form level dam	5 days	Mon 1/31/22	Fri 2/4/22
10		Install dowels into bedrock, build concrete forms and tie rebar	41 days	Mon 2/7/22	Mon 4/4/22
11		Pour concrete	16 day	Tue 4/5/22	Tue 4/26/22
12		Install impervious membrane on upstream face of new dam	2 days	Wed 4/27/22	Thu 4/28/22
13		Truck in and compact engineered soil between new and old dams	30 days	Fri 4/29/22	Thu 6/9/22
14		Install rock anchors	3 days	Fri 6/10/22	Tue 6/14/22
15		Demolish top 3 feet of old dam and use stone to cap engineered soil	2 days	Wed 6/15/22	Thu 6/16/22
16		Move cofferdam to second half of dam	2 days	Fri 6/17/22	Mon 6/20/22
17		Intsall cofferdam upstream of existing penstock orifice	2 days	Tue 6/21/22	Wed 6/22/22
18		Build slide gate structure and install new low level outlet gate	7 days	Thu 6/23/22	Fri 7/1/22
19		Remove cofferdam upstream of existing penstock orifice	1 day?	Mon 7/4/22	Mon 7/4/22
20		**For second half of dam**	**123 da**	**Tue 7/5/22**	**Thu 12/22/22**
21		Excavate to competant bedrock on downstream side of dam and fill in with concrete to form level dam	6 days	Tue 7/5/22	Tue 7/12/22
22		Install dowels into bedrock, build concrete forms and tie rebar	58 days	Wed 7/13/22	Fri 9/30/22
23		Pour concrete	15 day	Mon 10/3/22	Fri 10/21/22
24		Truck in and compact engineered soil between new and old dams	30 days	Mon 10/24/22	Fri 12/2/22
25		Demolish top 3 feet of old dam and use stone to cap engineered soil	2 days	Mon 12/5/22	Tue 12/6/22
26		Construct concrete washdown pad	4 days	Wed 12/7/22	Mon 12/12/22
27		Construct concrete waste containment structure	5 days	Tue 12/13/22	Mon 12/19/22
28		Demobilize	3 days	Tue 12/20/22	Thu 12/22/22



Project: Project Schedule
Date: Thu 2/14/19

Task	Summary	External Milestone	Inactive Summary	Manual Summary Rollup	Finish-only
Split	Project Summary	Inactive Task	Manual Task	Manual Summary	Deadline
Milestone	External Tasks	Inactive Milestone	Duration-only	Start-only	Progress

APPENDIX 11

FEMA FLOOD HAZARD MAP

National Flood Hazard Layer FIRMette

FEMA

34°46'22.52"N

82°21'19.65"W

82°20'42.19"W

34°45'52.96"N

Feet 0 250 500 1,000 1,500 2,000

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

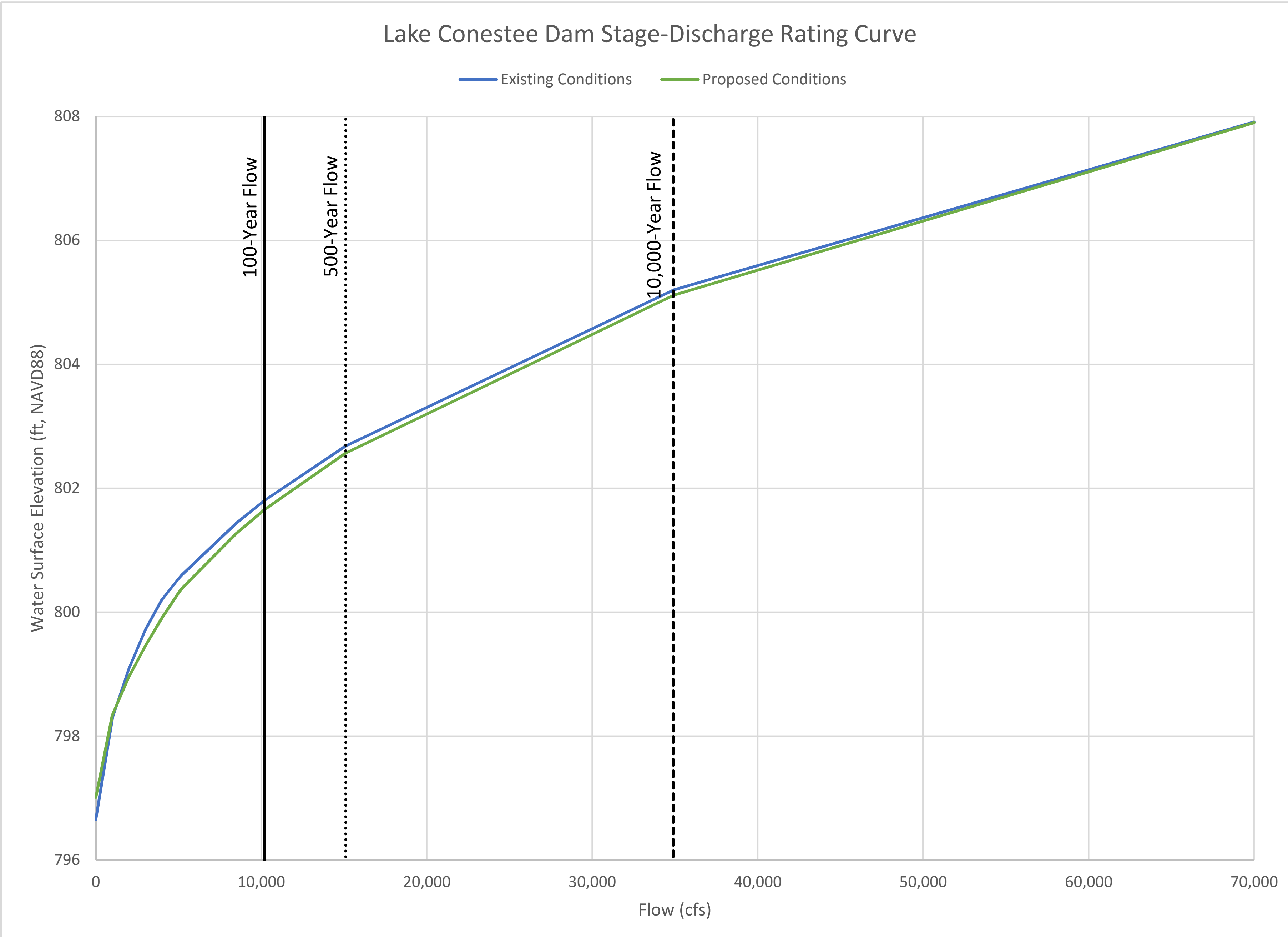
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/25/2019 at 3:23:27 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX 12

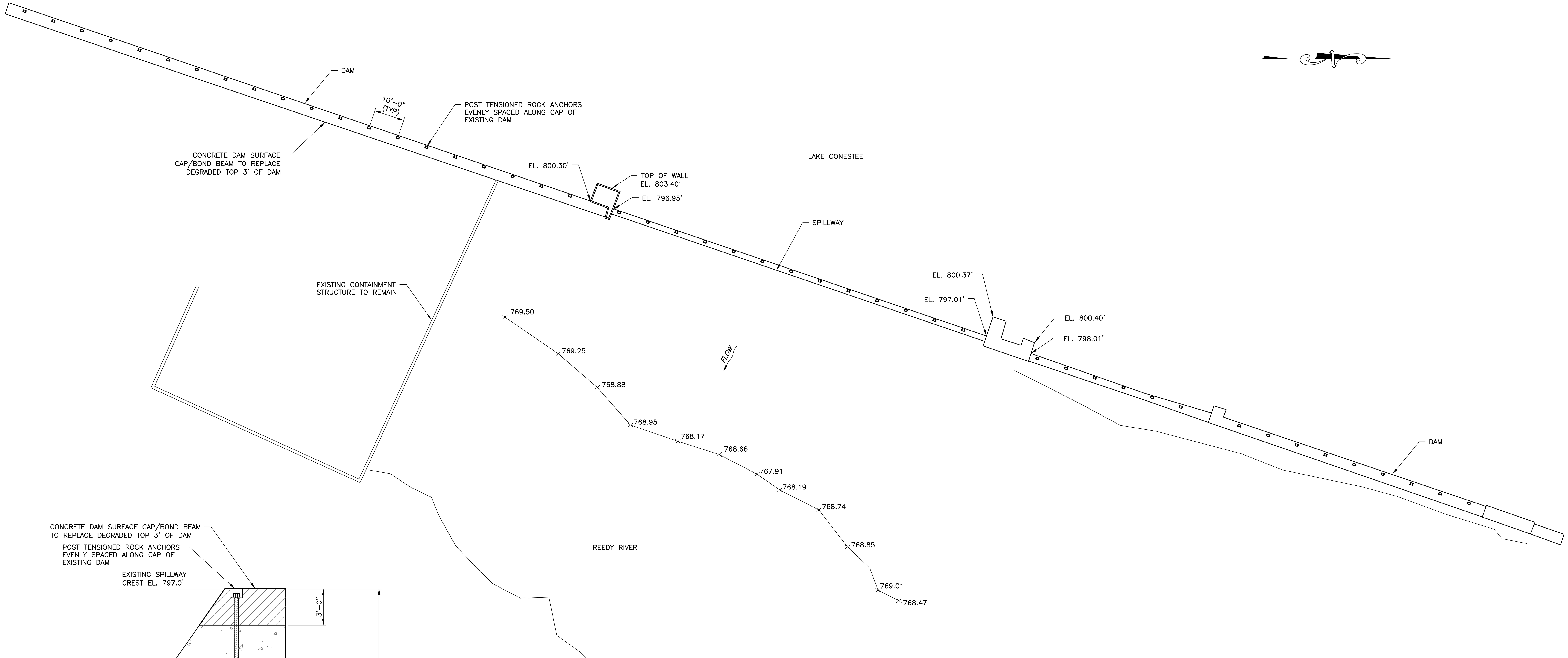
DISCHARGE RATING CURVE


Lake Conestee Dam Stage-Discharge Rating Curve
Existing Conditions
Proposed Conditions
100-Year Flow
500-Year Flow
10,000-Year Flow
Water Surface Elevation (ft, NAVD88)
808
806
804
802
800
798
796
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
Flow (cfs)

APPENDIX 13

DRAWINGS

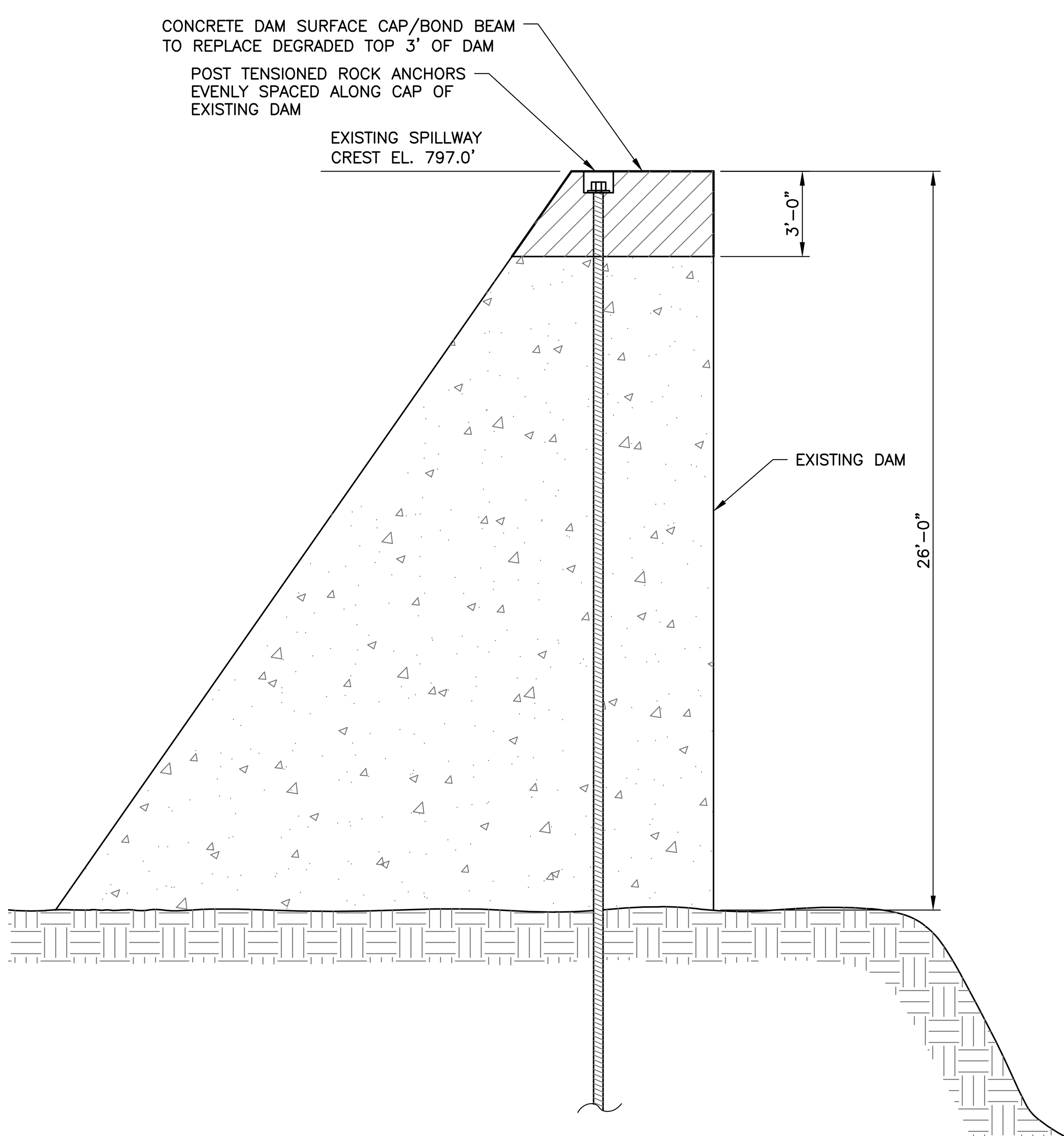
24x36 = FULL SCALE



ALTERNATIVE 3 PLAN VIEW

1/16"= 1'-0"

16 0 16 32
SCALE IN FEET



ALTERNATIVE 3 CROSS SECTION

1/4"= 1'-0"

POST TENSION ROCK ANCHORING

2 0 2 4 6
SCALE IN FEET

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GREENVILLE, SC

LAKE CONESTEE DAM

ALTERNATIVE 3
CROSS SECTION

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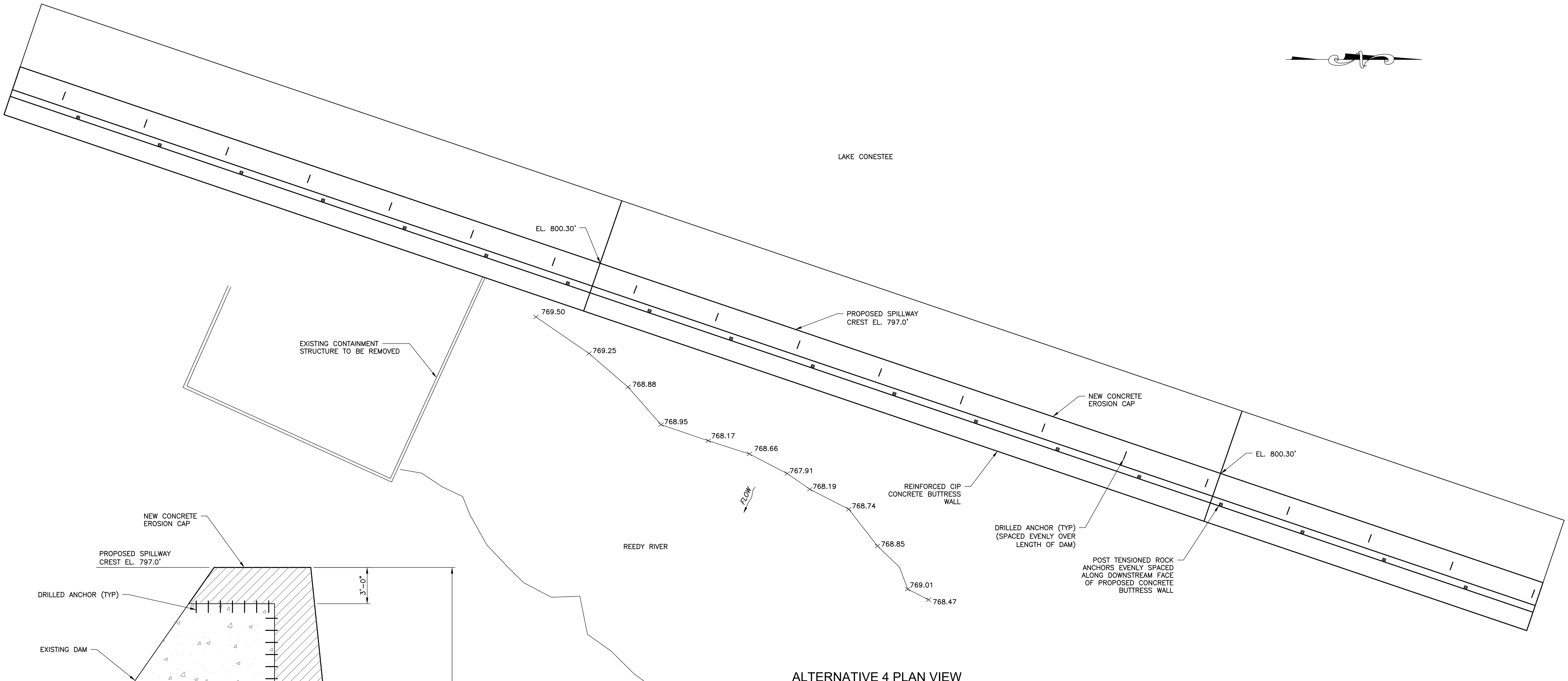
No.	Revision	Date	Drawn	Checked
	-	-	-	-

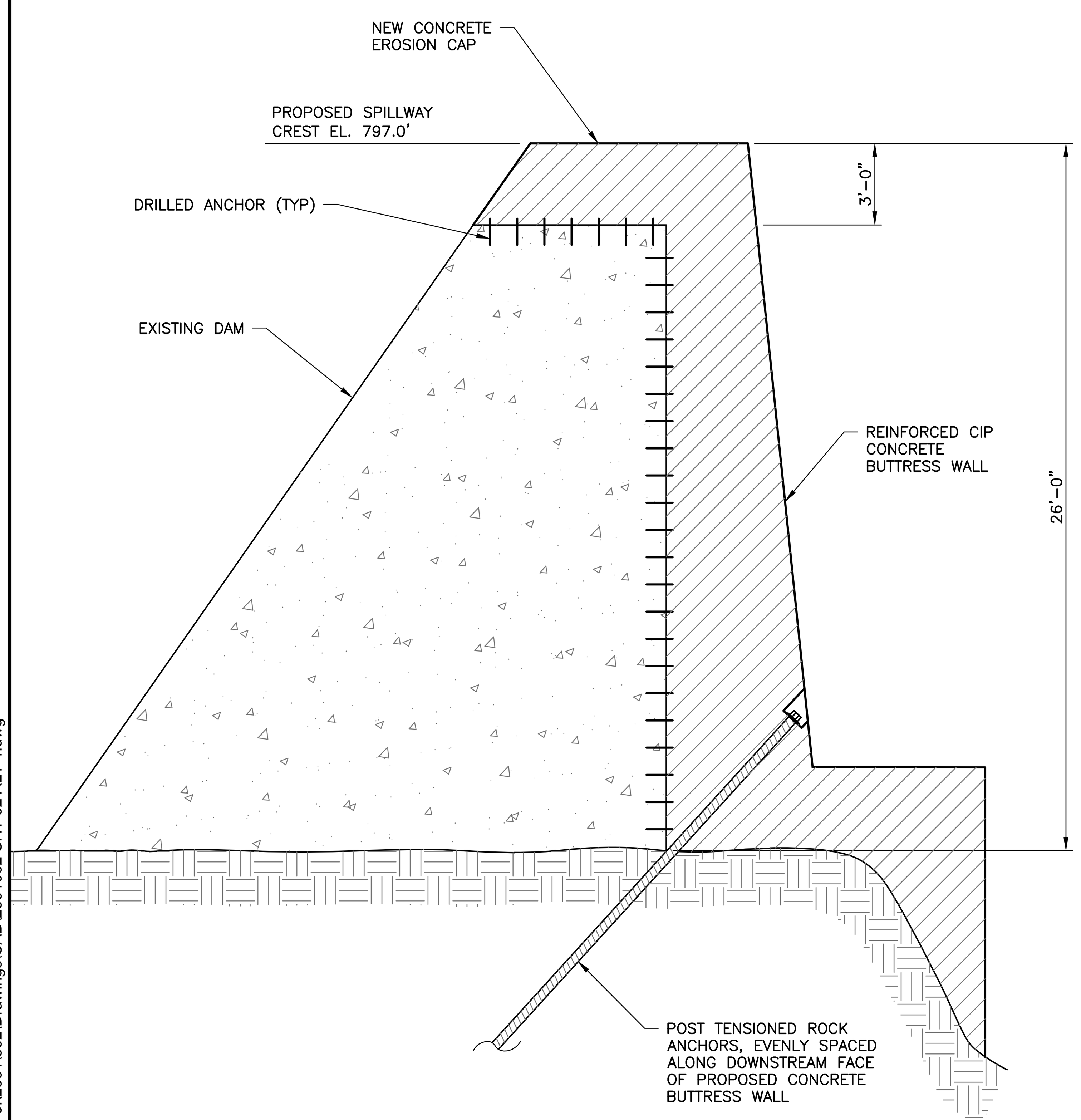
Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.
AJC	ZJA	BM	2001-002	11-8-18	1



ALTERNATIVE 4 PLAN VIEW

1/16"= 1'-0"

16 0 16 32
SCALE IN FEET

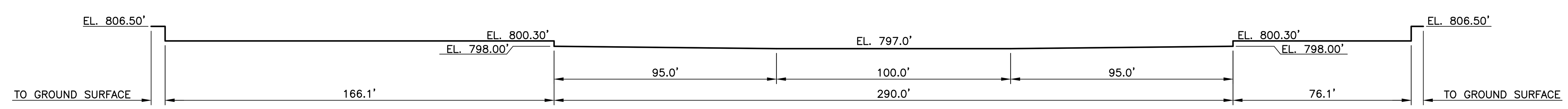


ALTERNATIVE 4 CROSS SECTION

1/4"= 1'-0"

DOWNSTREAM CIP CONCRETE BUTTRESSING WITH POST-TENSION ROCK ANCHORING AND ANCHORED INTO EXISTING DAM STRUCTURE

2 0 2 4 6
SCALE IN FEET



PROPOSED PROFILE

1/32"= 1'-0"

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ALTERNATIVE 4
CROSS SECTION

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.
AJC	ZJA	BM	2001-002	11-8-18	2

24x36 = FULL SCALE

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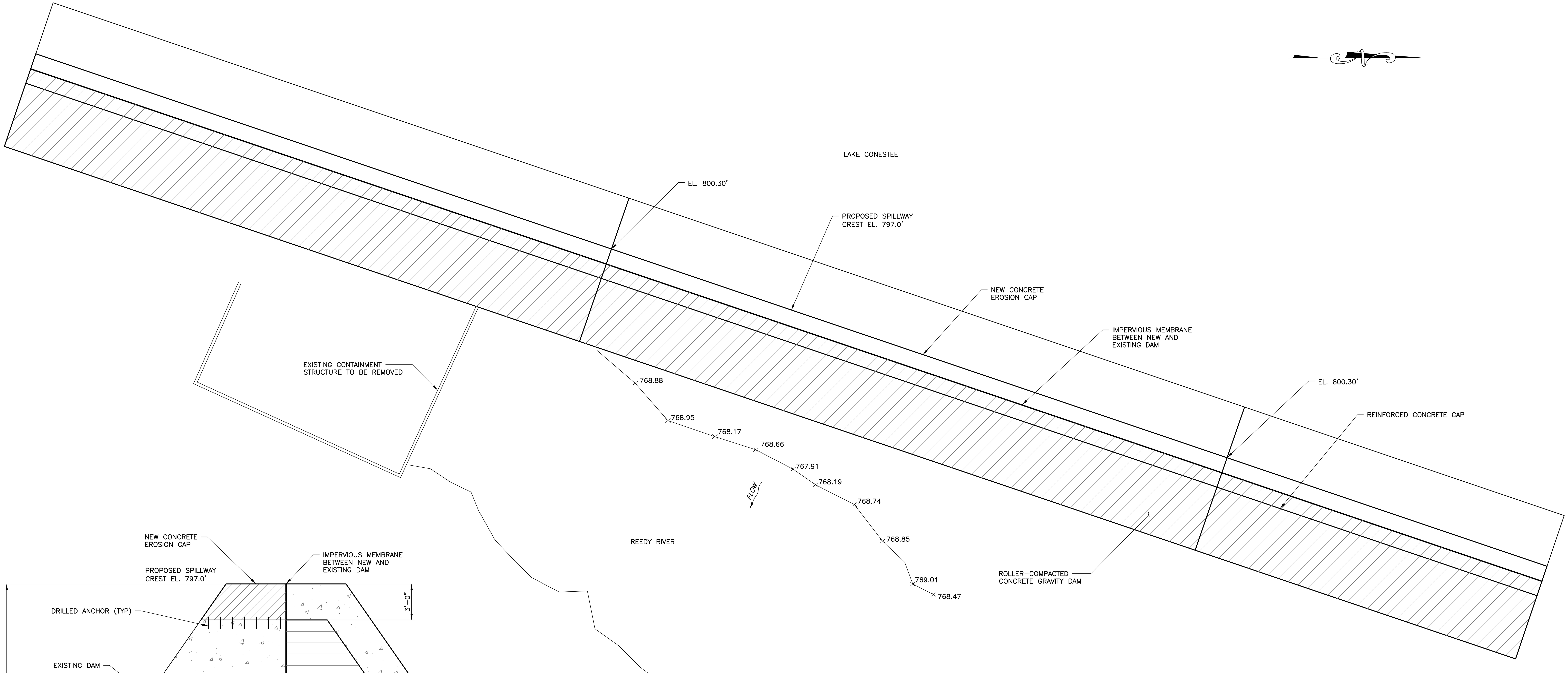
24x36 = FULL SCALE



ALTERNATIVE 5 PLAN VIEW

1/16"= 1'-0"

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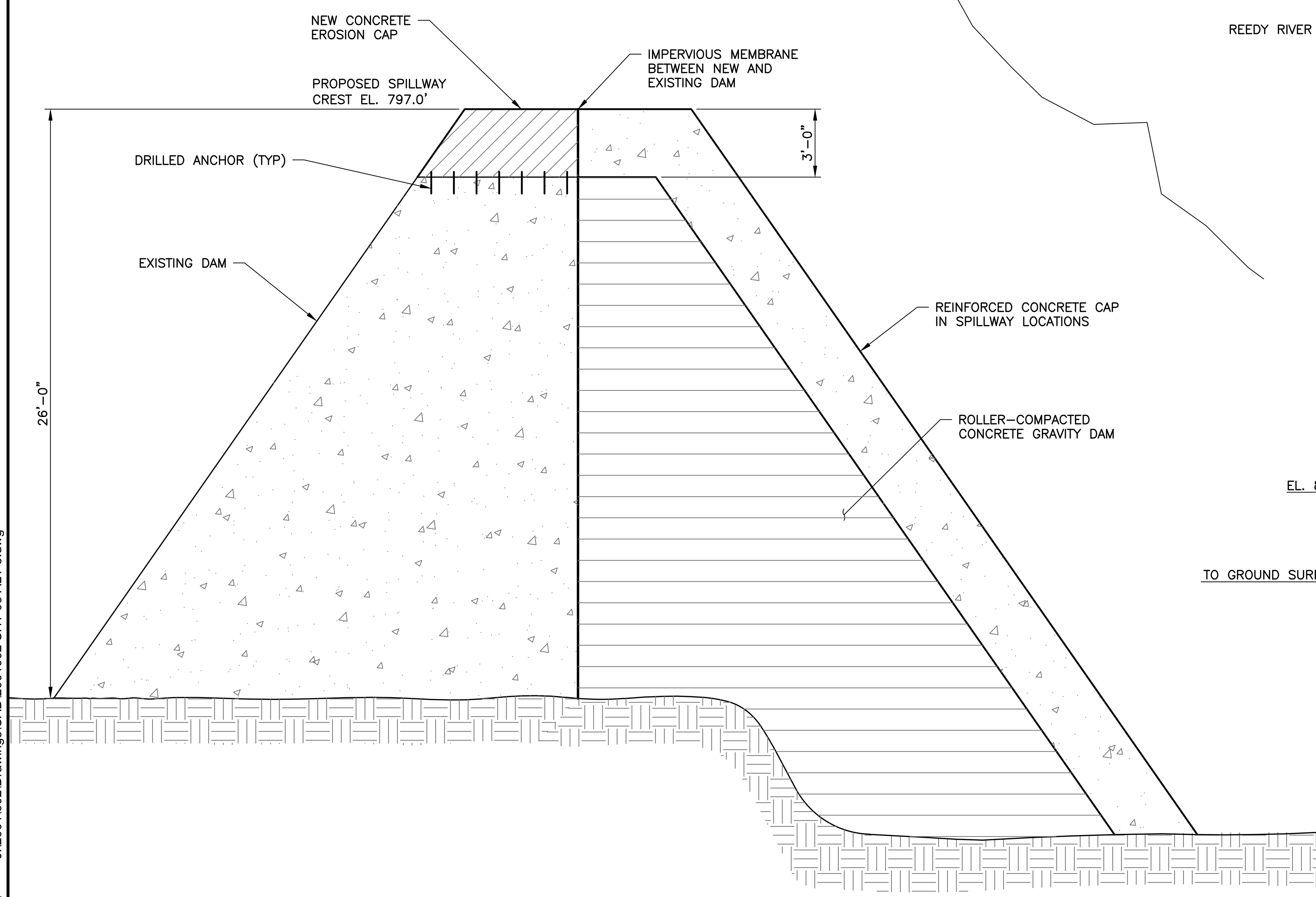
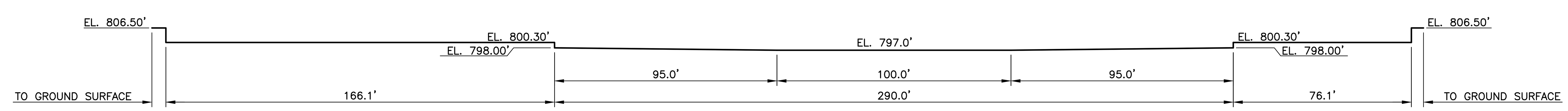
SCALE IN FEET





PROPOSED PROFILE

1/32"= 1'-0"

ALTERNATIVE 5 CROSS SECTION

1/4"= 1'-0"

DOWNSTREAM ROLLER-COMPACTED CONCRETE (RCC) BUTTRESSING

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ALTERNATIVE 5
CROSS SECTION

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.
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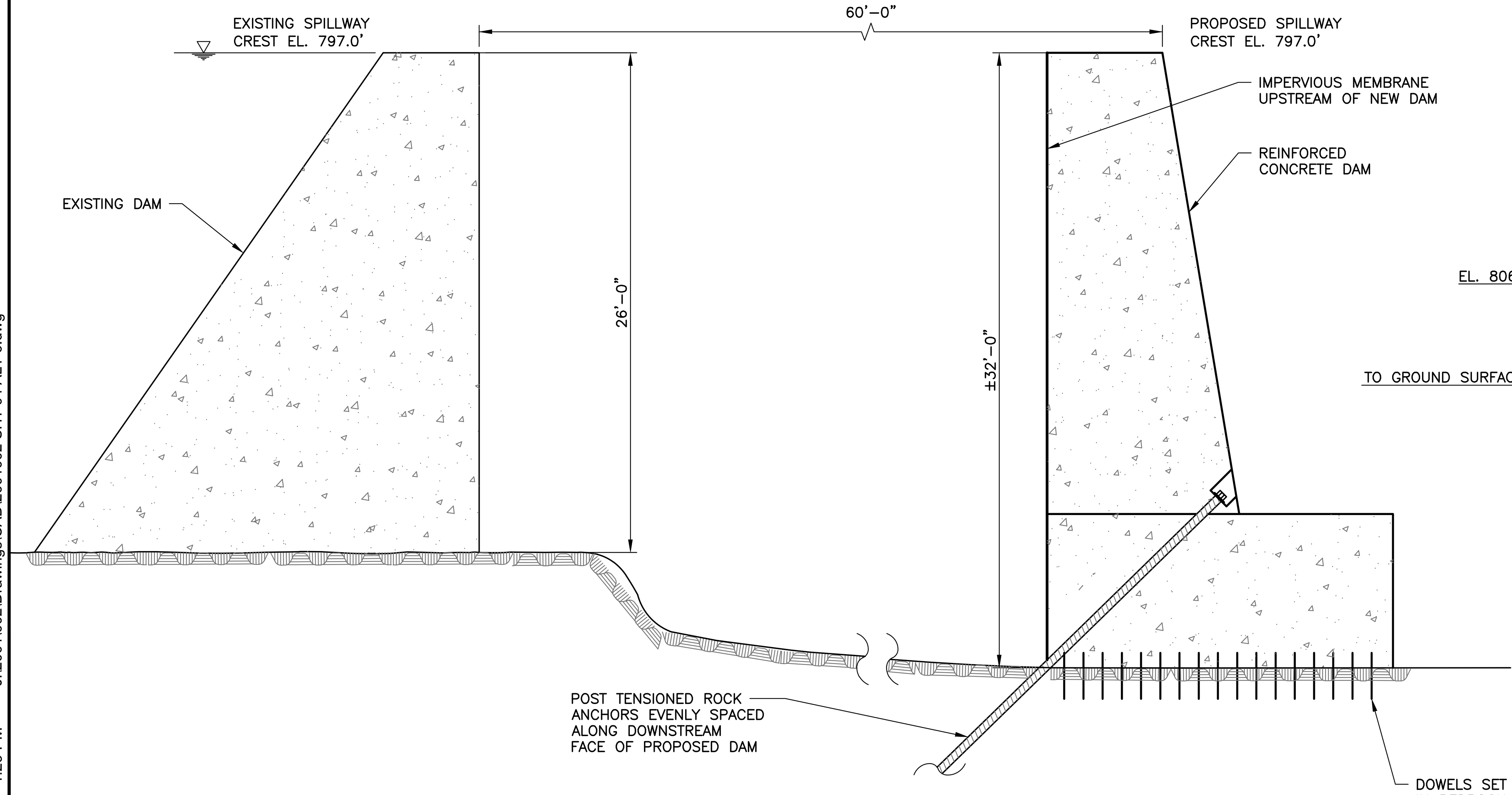
24x36 = FULL SCALE

ALTERNATIVE 6 PLAN VIEW

1/16"= 1'-0"

16 0 16 32

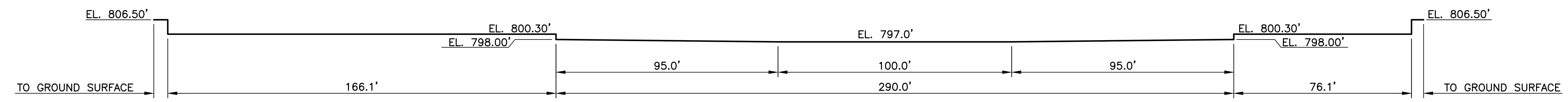
SCALE IN FEET



ALTERNATIVE 6 CROSS SECTION

3/16"= 1'-0"

NEW DOWNSTREAM CIP CONCRETE DAM, 60' DOWNSTREAM



PROPOSED PROFILE

1/32"= 1'-0"

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GREENVILLE, SC

LAKE CONESTEE DAM

ALTERNATIVE 6
CROSS SECTION

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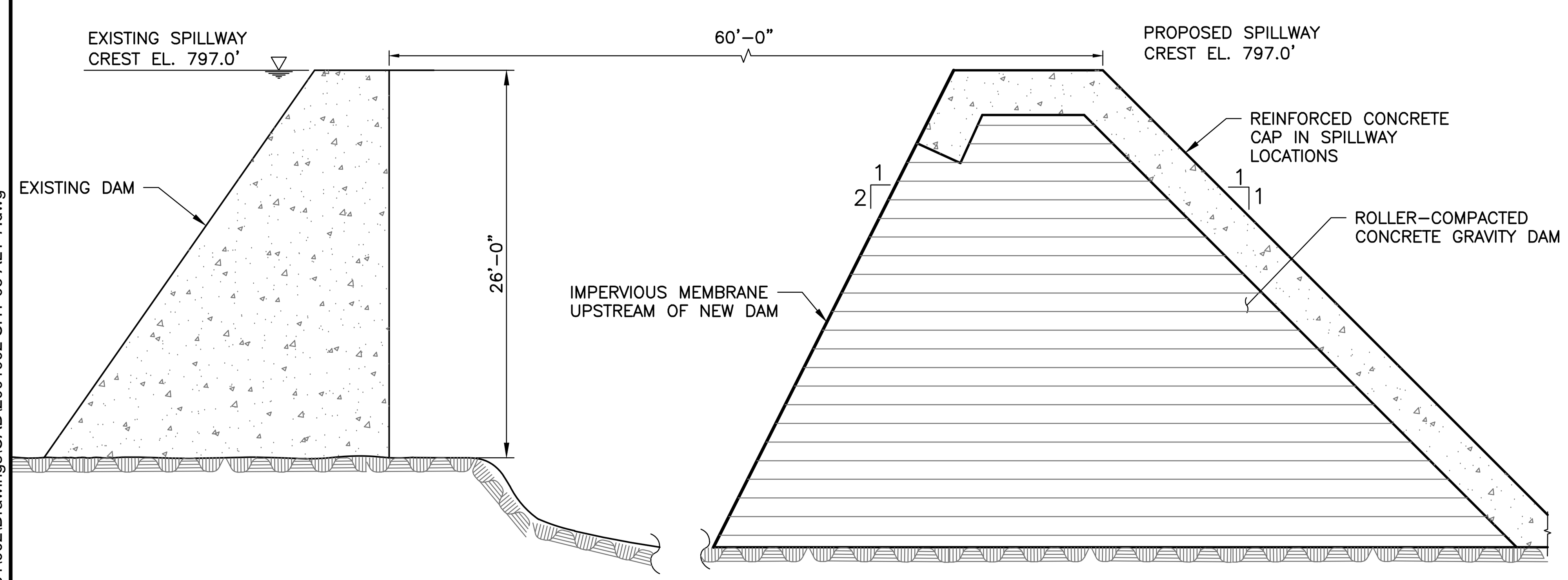
24x36 = FULL SCALE

ALTERNATIVE 7 PLAN VIEW

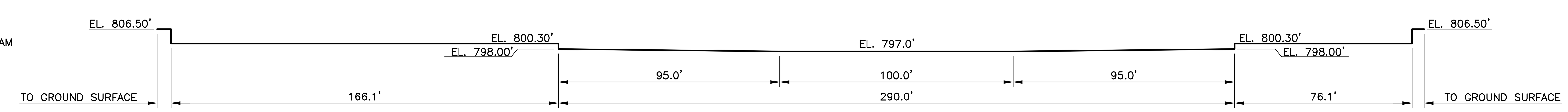
1/16"= 1'-0"



ALTERNATIVE 7 CROSS SECTION

3/16"= 1'-0"

NEW DOWNSTREAM RCC DAM, 60' DOWNSTREAM



PROPOSED PROFILE

1/32"= 1'-0"

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GREENVILLE, SC

LAKE CONESTEE DAM

ALTERNATIVE 7
CROSS SECTION

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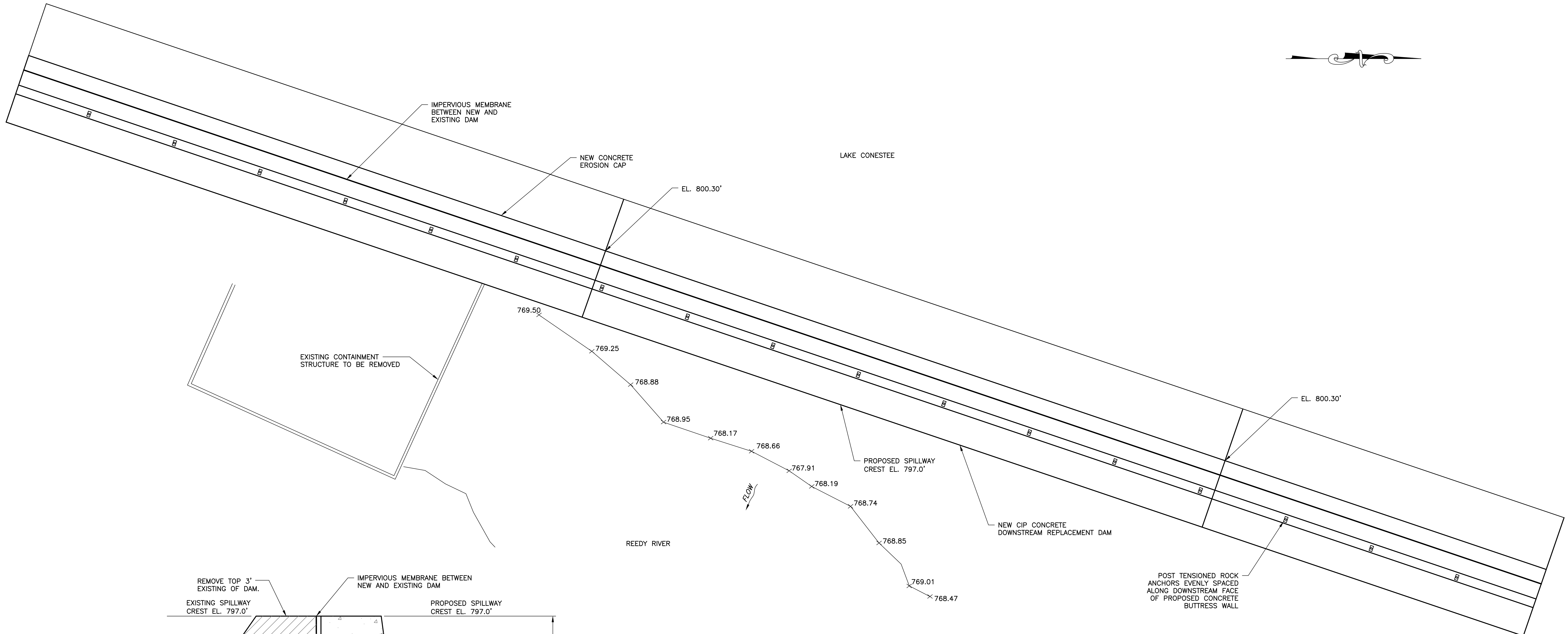
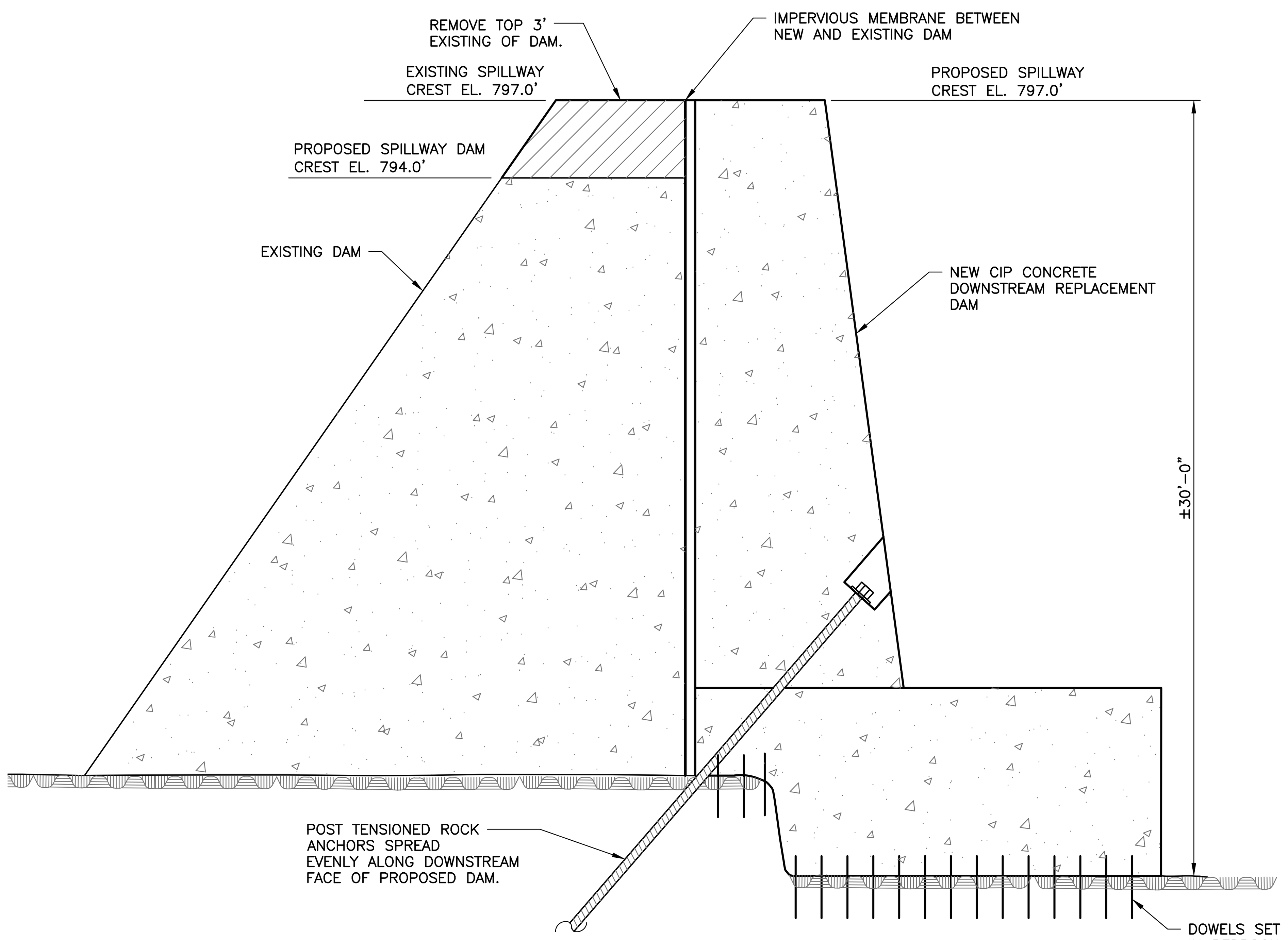


ALTERNATIVE 8 PLAN VIEW

1/16"= 1'-0"

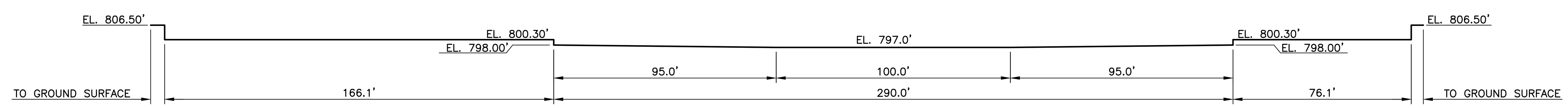
16 0 16 32
SCALE IN FEET



ALTERNATIVE 8 CROSS SECTION

1/4"= 1'-0"

NEW CIP CONCRETE DOWNSTREAM REPLACEMENT DAM ADJACENT TO EXISTING DAM



PROPOSED PROFILE

1/32"= 1'-0"

24x36 = FULL SCALE

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LAKE CONESTEE DAM

ALTERNATIVE 8
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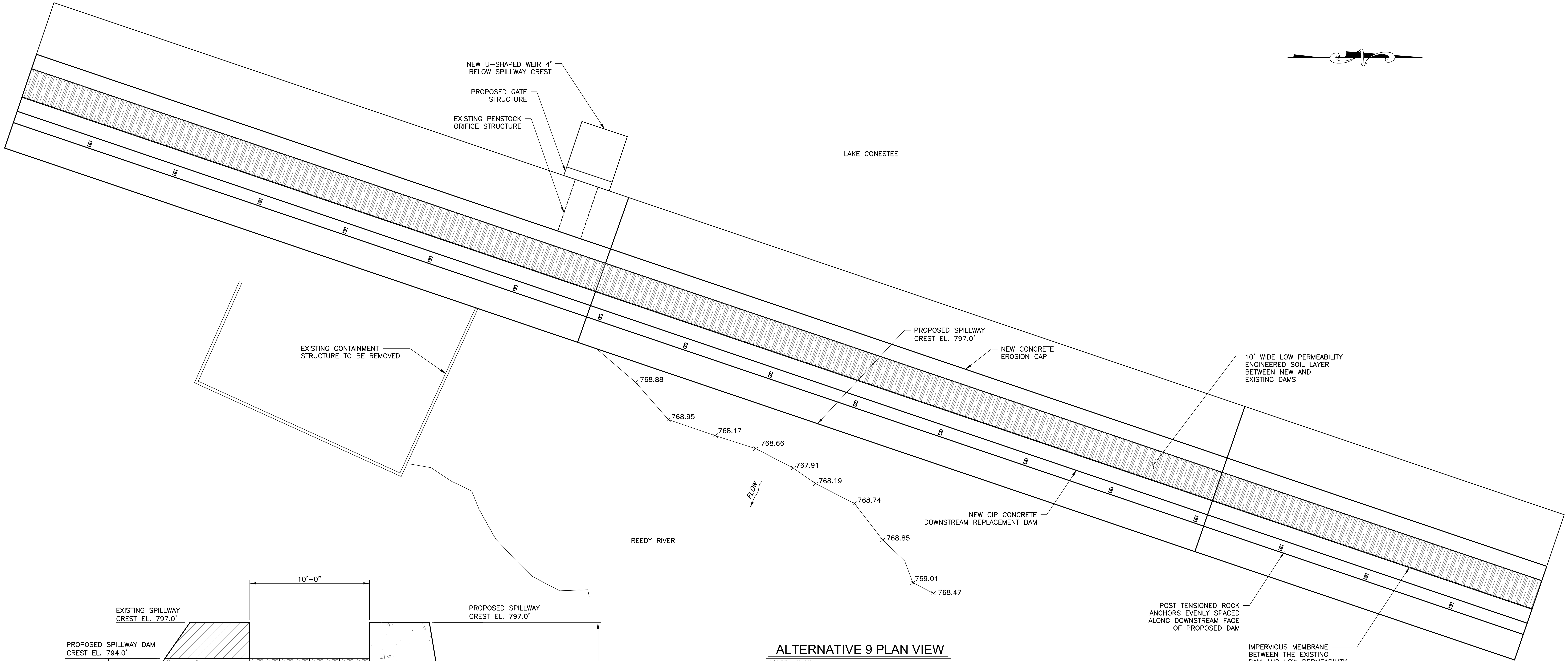
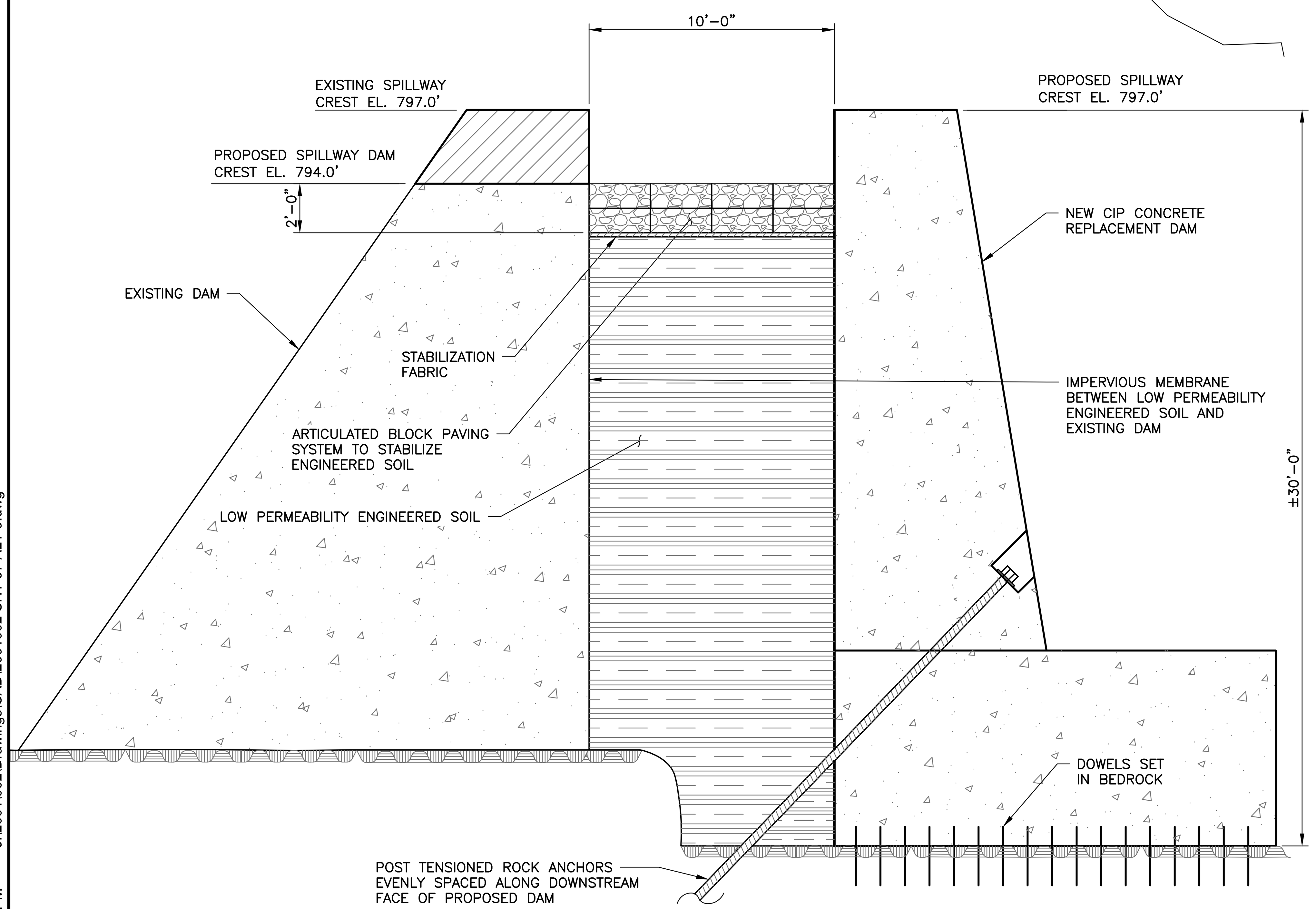
Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.
AJC	ZJA	BM	2001-002	11-8-18	6



ALTERNATIVE 9 PLAN VIEW

1/16"= 1'-0"

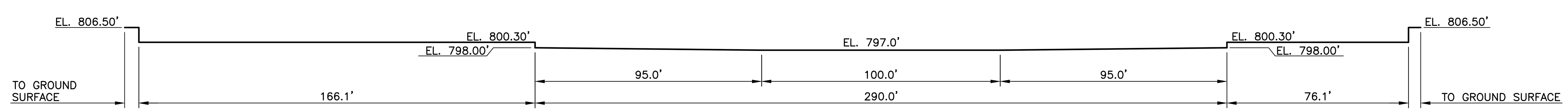
16 0 16 32
SCALE IN FEET



ALTERNATIVE 9 CROSS SECTION

1/4"= 1'-0"

NEW CIP CONCRETE REPLACEMENT DAM 10' DOWNSTREAM OF EXISTING DAM



NOTE:
FINAL DESIGN ADJUSTMENTS TO THE PROFILE CAN BE MADE, TO MAINTAIN CURRENT SPILLWAY CAPACITY AND ACCOMMODATE LOW FLOW, NORMAL FLOW AND HIGH FLOW PERIODS ALLOWING FOR DEBRIS PASSAGE.

PROPOSED PROFILE

1/32"= 1'-0"

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LAKE CONESTEE DAM

ALTERNATIVE 9
CROSS SECTION

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Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.
AJC	ZJA	BM	2001-002	10-2-19	7

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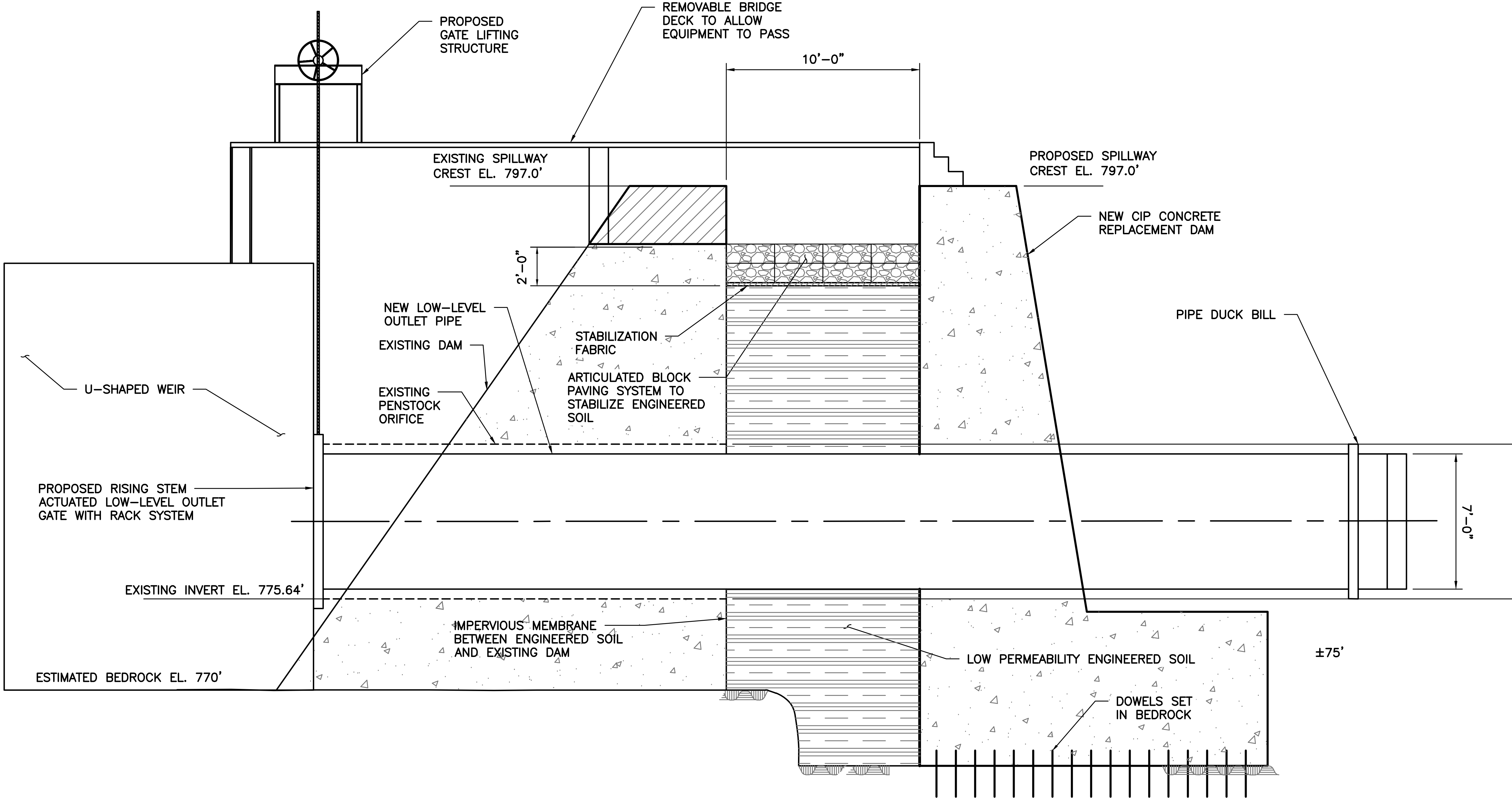

Scale: AS SHOWN	THE CONESTEE FOUNDATION, INC. GREENVILLE, SC	CHECK PRINT
Project No: 2001-002	LAKE CONESTEE DAM	
Filename: see margin	ALTERNATIVE 9 CROSS SECTION	
Drawn By: AJCo	Kleinschmidt 400 Historic Dr., P.O. Box 278 Strasburg, PA 17579 Telephone: (717) 687-7211 Fax: (171) 687-7266 www.KleinschmidtGroup.com	8
Date Drawn: 10-2-2019		