



**STAKEHOLDER-DEVELOPED MODIFIED REMOVAL ACTION WORK PLAN  
CONGAREE RIVER  
COLUMBIA, SOUTH CAROLINA**

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## TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>1</b>
<b>2.0</b>	<b>DESCRIPTION OF OVERALL PROJECT .....</b>	<b>2</b>
<b>3.0</b>	<b>IMPLEMENTATION CONSIDERATIONS .....</b>	<b>3</b>
3.1	Project Area Access.....	3
3.2	Cofferdams.....	3
3.3	Site Operations Plan .....	5
3.4	Water Management.....	5
3.5	Excavation and Material Management.....	6
3.6	UXO and Historical Artifacts Support Plans.....	7
<b>4.0</b>	<b>SITE RESTORATION .....</b>	<b>9</b>
<b>5.0</b>	<b>MITIGATION MEASURES.....</b>	<b>10</b>
5.1	Public Protection .....	11
5.2	Aquatic Life Movements, Spawning Areas and Endangered Species.....	13
<b>6.0</b>	<b>CONSTRUCTION SCHEDULE AND OTHER PERMITS AND APPROVALS .....</b>	<b>16</b>
6.1	Schedule Considerations .....	16
6.2	Other Permits and Approvals.....	17
<b>7.0</b>	<b>REPORTING.....</b>	<b>17</b>

## TABLES

1	Estimated Removal Volumes
2	Summary of Federal and State Rare, Threatened and Endangered Species

## FIGURES

1	Site Location Map
2	Comparison of Removal Areas
3	TLM Distribution and Approximate Thickness
4	TLM Thickness and Volume Comparison
5	Conceptual Site Operations Plan

## **APPENDICES**

### **Project Design and Related Information**

- A SCDHEC Correspondence
- B Design Drawings
- C Cultural Resource Identification Survey, Archaeological Data Recovery Plan, Memorandum of Agreement and Current Recovery License
- D UXO Management Plans

### **Implementation Plans**

- E Site Operations Plan
- F Stormwater Management and Sediment Control Plan
- G Mussel Relocation Plan
- H Water Management Plan
- I Cofferdam Inspection and Maintenance Plan
- J Total Suspended Solids Monitoring Plan
- K Restoration Operation, Maintenance and Monitoring Plan

### **Public Protection Plans**

- L Public Safety Plan
- M Traffic Control Plan
- N Air Monitoring and Odor/Dust Control Plan
- O Navigation Plan with USCG Application
- P Notification Plan

## 1.0 INTRODUCTION

This Stakeholder-Developed Modified Removal Action Work Plan (MRA Work Plan) has been prepared on behalf of Dominion Energy South Carolina, Inc. (DESC) to address the occurrence of tar-like material (TLM) and impacted sediments within a portion of the Congaree River in Columbia, South Carolina. The content of this MRA Work Plan is based on the supplemental information provided with the Joint Federal and State Application Form (Joint Application) submitted to the U.S. Army Corps of Engineers (USACE) for this project in September 2020. The Joint Application was approved via receipt of the Nationwide Permit 38 (NWP-38) verification received from the USACE on December 10, 2021.

The general site location and planned removal areas are shown on Figure 1. The project area includes the proposed removal areas and landside area necessary for access and operations to support the removal activities. The purpose of the MRA is to remove TLM and impacted sediments from the project area and eliminate its potential for human contact. The MRA will also mitigate the potential for resuspension and downstream movement of impacted sediments.

The MRA is being planned at the direction of the South Carolina Department of Health and Environmental Control (SCDHEC). A plan for the removal of tar-like material within the Congaree River was requested by SCDHEC in a letter dated July 31, 2018 (see Appendix A). In response to the July 2018 SCDHEC letter, a Preliminary Removal Action Work Plan (PRAWP) was prepared and submitted to SCDHEC on September 12, 2018. In a letter dated October 22, 2018 (see Appendix A), SCDHEC acknowledged receipt of the PRAWP and proposal to remove tar-like material from the Congaree River, and directed DESC to proceed with the process of obtaining permit approval from USACE.

To facilitate the planning process and assure concurrence with the scope of the planned removal efforts, DESC participated in a meeting with Stakeholders on November 15, 2018. As follow-up to that meeting, DESC prepared the Conceptual Plan for a Modified Removal Action – December 2018 (Stakeholder-Developed MRA Plan) described in Section 2.0. The Stakeholder-Developed Conceptual Plan was submitted to SCDHEC on December 12, 2018 for confirmation of Stakeholders agreement. In a letter dated February 7, 2019 (see Appendix A), SCDHEC provided their agreement with the plan along with Declarations of Support from two primary stakeholders, Congaree Riverkeeper and Guignard Associates LLC.

There has been a considerable amount of work undertaken in support of this project, which is available in the Administrative Record and can be found on SCDHEC's website at the following location: <http://www.scdhec.gov/HomeAndEnvironment/Pollution/CleanUpPrograms/OngoingProjectsUpdates/CongareeRiverSediment/AdministrativeRecord/>. The Administrative Record is also available for review at the main branch of the Richland County Public Library located at 1431 Assembly Street, Columbia, SC 29201.

A significant amount of information to support the design and implementation of the MRA was developed and presented with the Joint Application submitted to USACE in September 2020. That information is referenced and summarized in this MRA Work Plan and included as appendices that are presented in groups for easier reference. Project design and related information is presented in the first group (Appendices A through D). Implementation plans are presented in the second group (Appendices E through K). The third group (Appendices L through P) presents public protection plans developed for the

project, including the Navigation Plan that was included with the Joint Application. These plans are discussed further in Section 5.1.

## 2.0 DESCRIPTION OF OVERALL PROJECT

The Stakeholder-Developed Conceptual Plan delineates a revised approach toward completing a “Modified” Removal Action to address impacted sediment that exists within a portion of the Congaree River in Columbia, SC. The project objective is to pursue a MRA that consists of the removal of TLM and impacted sediment from two separate areas as depicted on Figure 2 as a revised approach that may be able to receive a favorable USACE permit decision for the necessary cofferdam as well as all other required regulatory approvals.

The MRA will involve removal of impacted sediments from areas that are:

- Close to the shoreline and therefore more susceptible to human dermal contact or exposure (e.g., river users such as kayakers, waders/swimmers, fishermen etc.); and
- More concentrated with tar-like-material (TLM), or where thicker deposits of TLM are shown to exist.

Figure 2 shows the outline of the previously proposed full-scale removal area versus the currently proposed two areas comprising the MRA. The volumes shown on Figure 1 for each approach were calculated using a combination of new survey information collected in the spring of 2018 and the sediment coring logs collected from the remedial investigations conducted in 2010 to 2012. Figure 3 shows the proposed MRA areas with a GIS visualization of each sediment boring as a TLM “hot-spot” which depicts the greater thickness of the TLM by a brighter color. Figure 4 provides an updated depiction of the average TLM thickness with estimated volume, using a similar GIS tool in which the data representation extends into the adjacent data point. Sediments in the “other areas” that will not be removed consist of either:

- Relatively minor thicknesses of TLM, and/or
- Are now covered by additional sediment resulting from the “superstorm” of 2015; and/or
- Occur far enough away from the shoreline and in deeper water, whereby risk of human dermal contact or exposure is minimal.

The currently proposed MRA consists of two areas as shown on Figures 2 through 4. Area 1 is approximately 2.6 acres and as proposed, has a similar footprint to the original full-scale Phase 1 Area. Area 2 is approximately 0.5 acres in size. Table 1 provides a comparison of volume estimates from previously submitted documents. Assuming successful completion of the MRA, an estimated 73 percent of the total TLM will have been removed from the Congaree River.

### **3.0 IMPLEMENTATION CONSIDERATIONS**

The primary implementation considerations involve the following items discussed in this section:

- Access to the project area;
- Cofferdam placement within the river for isolation of the removal areas;
- Site operations plan for the landside support zone;
- Dewatering and water management for the removal areas inside the cofferdams;
- TLM and sediment excavation, management, transport and disposal; and
- Support plans for screening and management of unexploded ordnance (UXO) and historical artifacts.

#### **3.1 Project Area Access**

DESC evaluated several options for access to the project area, including access from the north along the river using City of Columbia-owned property (northern access), from Senate and Gist Streets (central access), and from Blossom Street (southern access).

Landside access to the project area within the river will be from Senate Street using the central access option. A lease agreement with the property owner was established to allow for both access to the river and the landside operations that will be necessary to support MRA activities within the river. Site access and the approximate lease area are identified on the conceptual site operations plan provided as Figure 5.

#### **3.2 Cofferdams**

To isolate the removal areas and allow for dewatering and screening the areas for the potential presence of UXO and historical artifacts, reinforced rockfill berm cofferdams will be installed. The cofferdam locations around Areas 1 and 2 are identified on Figure 3. The design of the cofferdams is presented with the set of drawings provided as Appendix B.

#### **Design and Construction Considerations**

Features of the design include:

- A spillway height of 123.5 feet (NGVD 29), designed to minimize overtopping events during the primary construction season;
- Full reinforcement of the outboard side of the cofferdam to minimize damage and risk of material loss;
- Full reinforcement of the overtopping structure to minimize damage to the cofferdam during overtopping events;
- A level surface at the top of the cofferdam, of sufficient width and finish to provide a driving surface for project support vehicles;
- Placement of a liner within the cofferdam to reduce leakage and associated water handling requirements; and

- A HDPE pipe (or equivalent) through the downriver end of the cofferdam with a check valve, to allow for dewatering of the interior area following an overtopping event.

Prior to initiating cofferdam construction, the footprint of each cofferdam will be addressed following the Mussel Relocation Plan described in Section 5.0 and UXO Management Plans described in Section 3.6. Detailed plans for cofferdam construction will be developed by the construction/remediation contractor. Each area will be addressed separately using the following general construction considerations:

- Total suspended solids (TSS) monitoring will be conducted in accordance with the TSS Monitoring Plan provided in Appendix J during cofferdam construction to monitor and control potential sediment release from the work area;
- The river bank surface that interfaces with the cofferdam will be carefully stripped of vegetation and prepared properly during installation;
- Material will generally be placed in lifts as the cofferdam is constructed;
- The outlet structure will be installed as material lifts are being placed;
- The liner and reinforcement material (articulated concrete block (ACB) mats or equivalent) will be placed over the outboard slope and crest of the cofferdam, with additional reinforcement on the inboard slope at the spillways and other critical sections (based on anticipated sediment removal depth);
- Diversion berms, sumps and pumps will be utilized for dewatering the inboard area;
- To the extent practicable during initial dewatering, fish present within the cofferdam area will be captured and relocated within the river, and the presence of vulnerable or imperiled plant species (Rocky Shoal's Spider Lily) will be assessed and if present, these plants will be relocated to a suitable habitat.
- Removal of TLM and sediment within the isolated area, to the extent feasible;
- Pressure wash the exposed bedrock bottom of the river where necessary;
- Deconstruction (i.e., removal of the reinforcement and other cofferdam materials from within the river following completion of sediment removal within each area); and
- The cofferdam in each area will be constructed following the same general sequence.

### **Real-Time Water Quality Monitoring**

Downstream and upstream (background) real-time TSS monitoring will be conducted during cofferdam construction activities to ensure the project does not contribute to elevated TSS levels within the river. Conducting real-time TSS monitoring downstream of the construction area and comparing the results to the background levels from upstream, if needed, will provide timely notification of elevated project related TSS conditions, should they occur. Mitigation measures, such as deployment of a silt curtain, will be employed if an increase above the established conservative TSS action level is indicated. Specific details with respect to the TSS monitoring, action level and the mitigation procedures are provided in the TSS Monitoring Plan located in Appendix J.

### **Inspection and Maintenance**

The Cofferdam Inspection and Maintenance Plan (Appendix I) provides a detailed daily cofferdam structure inspection plan that will be implemented by project oversight personnel. Areas of inspection include the cofferdam structural integrity, exterior conditions (such as debris buildup), riverbank tie-in

locations, overall performance and leakage volumes, navigational signage and notification components, expected future river levels, etc. An inspection form will be completed during each work day and any potential areas in need of repairs will be documented and addressed as soon as practical. Implementation of this plan will ensure that cofferdam structural issues are identified and rectified in a timely manner and that project personnel are aware of changing river conditions and can plan accordingly.

### **3.3 Site Operations Plan**

The Site Operations Plan (Appendix E) is intended to provide general procedures to safely and effectively implement the proposed MRA activities. Several site preparation activities will take place prior to initiating the removal work to assure the safe and effective implementation of the MRA. The conceptual approach to the site operations plan is summarized on Figure 5. Some variations to the plan may occur, depending on site conditions encountered at the time of remediation. The actual layout for site operations will be finalized at the discretion of remediation personnel provided DESC, SCDHEC and the landside property owner concur with any significant modifications.

Site preparation and operations will involve the following activities addressed in the plan:

- Landside support zone construction;
- Utility clearance and management;
- Archaeologist demarcation of historic and archaeological sites;
- Evaluation of the power line corridor and demarcation of plant species of concern locations, if present;
- Site office location;
- Site security and fencing;
- Stormwater management and sedimentation controls;
- Work zones;
- Traffic control; and
- Staging areas.

### **3.4 Water Management**

Management of water will be a major component of the overall remediation project. The Water Management Plan (Appendix H) provides details on the anticipated procedures to be implemented during remediation activities. For implementation purposes, water to be managed has been divided into two categories: non-contact water and contact water.

Non-contact water is visually unimpacted water that has not been in contact with TLM or impacted sediments. It includes water from initial dewatering or overtopping events, cofferdam leakage, landside stormwater run-on, and non-contact removal area water including precipitation falling within the cofferdams. Contact water is water that has been in contact with TLM or impacted sediments or appears to be visually impacted (e.g., contains large amounts of suspended solids, exhibits a sheen, or has TLM

particles suspended within the water column). The area of origin of the water will be a primary consideration in determining which mode of water management will be used, along with a visual evaluation by site personnel.

The on-site water management system will be used to contain, filter and discharge contact water. The planned discharge location is a sanitary sewer manhole located near the eastern perimeter of the landside support zone shown on Figure 5. Stormwater from the landside operations area will be controlled via the requirements and best management practices (BMPs) established in the Comprehensive Stormwater Pollution Prevention Plan (C-SWPPP) submitted with the Notice of Intent (NOI) for coverage under the South Carolina National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Construction Activities. Non-contact water within the removal areas, including leakage through the cofferdam, will be contained and returned to the river as described further in the Water Management Plan.

### **3.5 Excavation and Material Management**

The major objective of this project is the removal of the TLM and impacted sediment from within the removal areas to the extent practicable. However, visually un-impacted sediment will also be removed and conservatively managed similar to “impacted sediment”. After the cofferdam in each area is constructed, initial dewatering operations will begin and the water from within the cofferdam will be systematically lowered. At this point coordination of several activities will be required including:

- Conduct mussel relocation activities, if not conducted in conjunction with the cofferdam footprint;
- Safely screen the removal area for potential UXO as described in the UXO Management Plans;
- Complete final dewatering of the removal area; and
- Construct an internal, bermed area along the toe of the cofferdam for the leakage/seepage water collection system.

There will be two types of advance screening of the work areas, including mussel relocation activities and UXO clearance and management. No intrusive removal operations will be conducted unless the planned removal area has been screened and designated as safe by the UXO management personnel. UXO screening and management will be conducted in accordance with the UXO Management Plans further discussed in Section 3.6. The UXO personnel will clear portions or the entire isolated and dewatered area prior to permitting the initiation of removal operations. The mussel relocation activities are further discussed in Section 5.0.

After final dewatering and construction of the leakage/seepage water collection system, the removal area will be relatively water-free and suitable for safe removal of the sediment. A combination of removal methodologies and equipment will most likely be required to successfully complete the project due to the varying thickness of sediment and changing bathymetric conditions within the project area. Standard excavation methods coupled with vacuum removal or other techniques will likely be employed.

It is currently estimated that approximately 11,700 cubic yards (CY) of sediment material (or 23,350 tons using a 2.0 conversion factor) are present within the proposed removal areas. Table 1 provides a summary of the material estimates. These volume estimates are approximations due to the inherent

difficulties with measuring sediment thicknesses and the variations of the river bottom within the project area. Additionally, the majority of material to be removed from the river will likely require addition of a drying agent or other bulking agent to render the material suitable for transportation to the on-site screening facility or the off-site disposal facility. Therefore, the actual final tonnage will depend on a number of variables.

Sediment material removed from the river will be screened for historical artifacts by trained professionals operating under direct supervision of the project archaeologist. Methods and procedures to be used have been developed and reviewed by SCIAA. A Memorandum of Agreement (MOA) between DESC, USACE and SCIAA has been signed. As currently planned, a major percentage of the impacted material will be transported directly to a prepared site at the disposal landfill for artifact screening. Recovered artifacts will be preserved in accordance with SCIAA-approved procedures.

As envisioned, sediment removal will start from the northern portion of each cofferdam and progress southward. However, the removal area sequence is subject to change based on conditions including the river bottom characteristics, sediment volume and thickness, and presence of TLM, as well as the judgement of the remediation contractor. Sediment removal within the cofferdam will be further controlled via the establishment of grids, or controlled sequences, to minimize the area of open excavation, to document progress and conditions, and for artifact recovery purposes. To the extent practicable, sediment removal operations will extend inward toward the riverbank until visual impacts are no longer present.

To the extent practicable, the excavated sediment will be piled or stacked in designated draining areas where entrained water will be allowed to flow away from excessively wet material. This water will be contained and ultimately transferred to the water management system. This technique will reduce the amount of material conditioning required to transport the impacted sediment to the next location or step in the process. Any contact water collected on the landside will also be transferred to the water management system.

After allowed to drain, the sediment will be mixed with a conditioning or drying agent (e.g., saw dust), as necessary, to render it suitable for transport to the landside support zone for further conditioning as needed. Artifact screening for a portion of the material will also be conducted on-site. Appropriately licensed transportation companies will be utilized to conduct the material transportation activities to the landfill for artifact screening prior to disposal. Similar to material disposal during remediation of the Huger Street former MGP site, use of the Waste Management Richland County Landfill is currently anticipated for disposal of the excavated material. All shipments will be manifested in accordance with federal and state requirements.

### **3.6 UXO and Historical Artifacts Support Plans**

Due to the potential presence of UXO and historical artifacts in the removal areas, support plans have been developed to address these items. The plans have been provided as Appendix D and are summarized below.

### **UXO Screening and Management**

UXO screening and management will be conducted in accordance with the UXO Management Plans (Appendix D), which provide specific details pertaining to the UXO management operations. No intrusive construction or removal operations will be conducted unless the work area has been screened and designated as safe by the UXO management personnel. As currently planned, the UXO management personnel will conduct diving operations to clear the path of the cofferdam footprint prior to the initiation of cofferdam construction. The area within the cofferdam will be cleared in sections or its entirety after the area has been adequately dewatered.

DESC previously retained Explosive Ordnance Technologies, Inc. (EOTI) to address the planning phase for screening, removal and management of the UXOs. EOTI developed the following four UXO Management Plan documents, consistent with typical USACE guidance and protocols.

- Work Plan for Munitions Response MEC Clearance and Support;
- Explosive Safety Submission Munitions and Explosives of Concern Clearance and Support;
- Dive Safe Practices Manual; and
- Diving Operations Plan.

These plans were updated and revised by Titan Associates Group, Inc. (Titan) to reflect the scope of work set forth in the Stakeholder-Developed MRA. In February 2021, SCDHEC provided comments on the UXO Plans prepared by Titan. When DESC's consultants provided the comments to Titan, Titan advised that they were no longer providing UXO support services. DESC's consultants subsequently contracted with Tetra Tech and the Plans have been revised based on SCDHEC's comments and updated as required. The four revised and updated plans are provided in Appendix D.

During implementation of the MRA, each identified metal anomaly will be evaluated and confirmed as either UXO, historical artifact or other metallic debris and managed in accordance with the approved plans.

### **Historical Artifacts Screening and Recovery**

This project involves the potential presence of historical artifacts located within the river. Therefore, DESC has worked closely with the South Carolina Institute of Archaeology and Anthropology (SCIAA) and the State Historical Preservation Office (SHPO) to develop an appropriate approach to recover and preserve any potential historical properties.

The Cultural Resource Identification Survey and Archaeological Data Recovery Plan developed by TRC Environmental Corporation are provided in Appendix C. The recovery plan contains the specific methodology and techniques that are currently planned for processing the removed material and segregating the potential artifacts. Recovered artifacts will be preserved in accordance with SCIAA-approved procedures. A Memorandum of Agreement (MOA) between USACE, DESC and SHPO/SCIAA is also provided in Appendix C.

## 4.0 SITE RESTORATION

Minimizing disturbance and properly restoring disturbed areas will be a critical component of the overall project. Figure 5 provides the currently anticipated site operations plan scenario and indicates the potential approximate areas of activity for landside operations, removal operations within the river, and locations along the eastern shoreline of the riverbank that will likely be disturbed as a result of MRA activities. Efforts will be undertaken to safeguard the remainder of the areas from impacts. Areas where disturbance may not be necessary will be demarcated with flagging or fencing to ensure they are not impacted by removal operations or heavy equipment movement unless required. This preservation technique will be a key to minimizing the disturbed areas.

In areas where landside operations occur and shoreline impacts are unavoidable, DESC will conduct restoration activities. DESC plans to strategically locate landside site operations components in areas that will limit the need for clearing and grading activities, as much as practical. This scenario will reduce disturbance of currently forested land and further preserve the riparian corridor. It will also minimize the amount of landside restoration activities that will be required prior to final demobilization. Restoration plans are described in two documents provided as appendices (Appendix F – Stormwater Management and Sediment Control Plan and Appendix K – Restoration Operation, Maintenance and Monitoring Plan). Restoration of the landside operations area, removal areas within the river, and the disturbed riverbank and shoreline locations are described briefly below.

### **Landside Restoration**

Prior to mobilization, a Notice of Intent will be submitted to the City of Columbia for coverage under South Carolina NPDES General Permit For Stormwater Discharges From Construction Activities SC100000. This submittal will include a Comprehensive Stormwater Pollution Prevention Plan which includes a Stormwater Management and Sediment Control Plan (SMSCP). The SMSCP provides details on erosion and sediment control methods to be established, maintained and inspected at the site during active operations, as well as plans for final restoration following completion of landside activities. The general approach to final restoration of the landside operations areas is to restore the locations to pre-MRA conditions to the extent practical.

### **River Restoration**

DESC plans on removing all sediment and gravel, small rocks, etc. (both visually impacted with TLM and visually unimpacted material) from the removal areas to the extent practical. Large rocks that are visually unimpacted may be temporarily relocated within the work area to facilitate sediment removal and then returned to their approximate original locations. As an additional measure, DESC plans to pressure wash the exposed bedrock bottom of the river where necessary. Water generated during the pressure washing stage will be collected and removed from the excavation for treatment and discharge to the City of Columbia Public Owned Treatment Works (POTW). The intent is to remove any residual staining or impacts due to the presence of TLM.

Current plans do not include replacing any removed material with backfill. The TLM, impacted sediment, and visually un-impacted sediment will be removed down to the top of the underlying bedrock. In many areas, this will only require removal of several inches of sediment. Following completion of the removal activities, the cofferdam will be removed and over time, the natural depositional processes of the river will restore the river bottom to natural conditions. This process will allow for natural re-deposition of sediment

within the removal area based on current river hydraulics. Not replacing the impacted sediment with fill material will also eliminate the potential for backfill materials to be washed downstream and deposited in other areas or degrade other habitats through siltation, etc.

### **Riverbank and Shoreline Restoration**

Detailed plans for the riverbank and shoreline restoration are provided in Appendix K (Restoration Operation, Maintenance and Monitoring Plan). It is estimated that approximately 975 linear feet of the project area shoreline may be impacted by MRA activities. Shoreline disturbances will be limited to the extent practical. These locations include access roads and cofferdam/riverbank tie-in locations. Available delineation data suggest that TLM is not located within the riverbank soil and as a result, much of the riverbank and riparian corridor may be left undisturbed.

Restoration will include recreating the approximate shoreline slope, stabilization of the bank via riprap and/or bioengineered solutions, and restoration of vegetative cover where practical. DESC's goals are to minimize riverbank disturbance where possible, to restore disturbed areas to natural pre-MRA conditions, and to utilize bioengineering techniques and structures to the extent practical when repairing impacted shoreline. As stated above, portions of the riparian corridor where disturbance may not be necessary will be demarcated to ensure that they are not impacted unless required. This preservation technique will be a key component of the overall project.

Following completion of the MRA sediment removal and restoration activities, the riverbank and shoreline area will be monitored to assure restoration was successful. Periodic inspections will occur on a monthly basis or following significant weather-related events for a period of one year, unless property owner redevelopment plans result in an earlier change to restored conditions. Should issues be identified during inspections that warrant mitigation, DESC will implement repairs to the affected area(s), as necessary, to assure sufficient stabilization.

As project plans are further developed, certain details or specifications regarding restoration may be modified in order to reflect minor changes or input from applicable experts and/or the property owner. The USACE, SCDHEC and other agencies, as may be appropriate, will be made aware of any major modifications to planned activities prior to implementation.

## **5.0 MITIGATION MEASURES**

Measures to mitigate potential impacts during implementation of the MRA are described in this section. The measures are based on anticipated requirements of the permit authorization from the USACE. The mitigation measures described below include plans to address:

- Public protection; and
- Aquatic life, spawning areas and endangered species within the project area.

Additional measures to avoid impacts associated with MRA implementation are described in plans developed to address requirements of the Joint Application. These measures address landside, riverbank and shoreline, and within the river project areas, and include:

- Stormwater Management and Sediment Control Plan for the landside area (Appendix F);
- Restoration Operation, Maintenance and Monitoring Plan which addresses the riverbank and shoreline, including the area below the ordinary high-water mark (Appendix K); and
- Total Suspended Solids Monitoring Plan which describes monitoring and contingency measures for TSS within the river (Section 3.2 and Appendix J).

Compensatory mitigation is not required because no wetlands are adversely impacted and the MRA project has an overall positive environmental impact. The proposed removal action within the river portion of the project area is short-term and the improvement resulting from removal of the TLM-impacted sediment will be permanent. Removing the impacted sediment will provide benefit in the form of reduced potential for contact with the TLM by humans and other organisms. Removal of the TLM also reduces the potential for resuspension and downstream movement and reduction in the potential for flux of dissolved phase constituents with the water column. Aquatic resource function and quality will be improved due to the removal of the impacted sediment. The cofferdams and other support operations will be removed and disturbed portions of the riparian corridor will be restored following completion of the MRA. No permanent loss of wetlands, open waters, riparian areas or aquatic habitat will occur.

## **5.1 Public Protection**

### **Public Safety Plan**

The Public Safety Plan provided in Appendix L summarizes several other project plans and components that have been developed to provide guidance and specific details pertaining to public safety during completion of the project. Site security measures are also explained since they are likely the most integral public safety component. Maintaining site security will ensure that only properly trained personnel have access to the various work areas associated with the project.

The other public protection plans provided as appendices to this MRA Work Plan that are summarized in the Public Safety Plan and described further below include:

- Traffic Control Plan (Appendix M)
- Air Monitoring and Odor/Dust Control Plan (Appendix N)
- Navigation Plan (Appendix O)
- Notification Plan (Appendix P)

The Public Safety Plan also provides reference to information in the UXO Management Plans (Appendix D) and Cofferdam Inspection and Maintenance Plan (Appendix I). Safe management of UXO that may be encountered during the removal operations is critical to public safety. Routine inspection of the cofferdams, including navigational signage and notification components, and maintaining an awareness of projected river levels will ensure that the integrity of the structures is maintained and associated public safety concerns are addressed.

### **Traffic Control Plan**

In order to complete this project, a significant amount of truck movements into and away from the project area are anticipated. The majority of the truck movements will be associated with importation of stone for

cofferdam construction and installation of site access roads, as well as for the transportation of the excavated material to a local landfill.

The Traffic Control Plan (Appendix M) was developed to ensure that the necessary truck movements are completed with as minimal of an impact to the surrounding area as practical. Controlled use of established truck routes will minimize potential impacts to local traffic patterns. The Traffic Control Plan presents the proposed methodology for development of the truck routes and for monitoring of driver compliance during completion of the project.

The specific routes were developed through consultation with local officials. All routes will be verified prior to commencement of the project and will be modified, if necessary, to account for changing traffic patterns or public input. Each truck driver will be informed of the prescribed routes for site entry and exit and an effort will be made to utilize regular drivers who are familiar with these routes. All site-related vehicles will follow the specific routes and project oversight personnel will conduct periodic monitoring of truck movements to ensure compliance with the Traffic Control Plan. Any identified deviation from the prescribed route will be immediately addressed.

#### **Air Monitoring and Odor/Dust Control Plan**

The Air Monitoring and Odor/Dust Control Plan provided in Appendix N establishes work area and site perimeter air monitoring procedures to ensure that site-related constituents of concern, dust and odors are monitored and controlled throughout completion of the project.

Work area air monitoring will be conducted to ensure that remediation workers are safely able to complete their duties. If elevated readings are identified, appropriate engineering controls will be implemented. Impacted material excavation and handling activities will be conducted only within the cofferdam areas of the river or within a prepared sediment management area. To protect the public during completion of the project, perimeter air monitoring will also be implemented to monitor and control site-related activities.

Odor control measures will be implemented, as needed, to ensure that site activities do not produce unsatisfactory odors. Plastic sheeting, tarps or other such means may be utilized to cover impacted material and prevent or minimize fugitive odors within the river-based excavation areas. Additional control measures will be available on-site as contingency measures during on-going impacted material handling operations, including the use of commercially available vapor suppressant products (sprays or foams).

Dust is not anticipated to be an issue with the excavated material (wet sediment). Site personnel will visually monitor for dust during equipment movement and windy conditions. Nuisance dust from truck movements along haul roads may require management through the application of a water spray. A street sweeper or power broom will be utilized, as needed, to ensure the site entry/exit area is clear of mud and dust.

#### **Navigation Plan**

The Navigation Plan (Appendix O) was developed in accordance with the instructions provided with the United States Coast Guard (USCG) Private Aids to Navigation Application. The Application and

Navigation Plan have been submitted to the USCG and approval will be obtained prior to initiating in-river activities.

The Plan provides specific methods for notifying boaters and other users of the river in advance of the project location (upriver and downriver) and the need to take appropriate measures to avoid the cofferdam structure. It provides the specific methods for demarcating the area to be avoided and the buoy/signage/lighting scenario for the project. Implementation of the MRA will have no adverse impact on navigation in the Congaree River.

### **Notification Plan**

The Notification Plan (Appendix P) describes various potential situations/site conditions and the planned response steps that DESC will undertake to notify regulatory agencies, emergency response agencies, local officials, and stakeholders of significant events that may occur during project implementation. Timely notification of appropriate agencies, officials and the general public is critical in certain situations to assure proper management of conditions that may result in significant interruptions or disturbances due to project activities, or potential violation of permit or approval conditions.

The Notification Plan contains a contact list of State and Federal agencies, City and County government officials, and project stakeholders that may be contacted should the project conditions identified in the Plan occur which include:

- UXO-Related Conditions - On-Site Demilitarization;
- UXO-Related Conditions – Off-Site Demilitarization; and
- Other Project-Related Conditions, including:
  - Type A – Security breach (beyond that managed by on-site security);
  - Type B – On-site medical emergencies;
  - Type C – Significant traffic incidents (including loss of TLM material); and
  - Type D – Catastrophic failure of cofferdam, water management system, on-site structures, or other critical operational assets.

## **5.2 Aquatic Life Movements, Spawning Areas and Endangered Species**

### **Aquatic Life Movements**

Because the project area will only occupy a portion of the river at any given time and downstream and upstream movement and access of aquatic organisms will not be impeded, minimal impact on aquatic life movements is anticipated.

### **Spawning Areas**

Downstream movement of suspended particles and sediment liberated from the work area can potentially impact spawning areas and other aquatic resources. BMPs such as roadway construction and maintenance, shoreline stabilization and deployment of sediment (i.e., silt) curtains, etc. will be utilized as needed. Erosion and sediment control measures associated with the landside support zone are presented in the Stormwater Management and Sediment Control Plan (Appendix F).

As described in Section 3.2, downstream and upstream (background) real-time TSS monitoring will be conducted during cofferdam construction activities to ensure the project does not contribute to elevated TSS levels within the river. Specific details with respect to the TSS monitoring, action level and the mitigation procedures are provided in the TSS Monitoring Plan located in Appendix J. Conducting real-time TSS monitoring downstream of the construction area and comparing the results to the background levels from upstream, if needed, will provide timely notification of elevated project related TSS conditions, should they occur. Mitigation measures, such as deployment of a silt curtain, will be employed if an increase above the established conservative TSS action level is indicated.

### **Endangered Species**

The project area was evaluated for the potential presence of threatened and endangered species and spawning habitat. Due to the nature of the project and the associated mitigation measures built into the project plans, specifically the project construction schedule (Section 6.0) and the freshwater mussel relocation activities described in this section, project related activities are not anticipated to negatively impact sensitive species or spawning areas/migrations. A number of sources were used to assess the potential presence of endangered or threatened species in the project area and include:

- U.S. Fish and Wildlife Service (FWS);
- U.S. National Marine Fisheries Service (NMFS);
- South Carolina Department of Natural Resources (SCDNR); and
- The Rare, Threatened and Endangered Species Assessment developed by Kleinschmidt (March, 2008) prepared for the Saluda Hydroelectric Relicensing Project (FERC project no. 516).

Table 2 provides a summary of Federal and State Rare, Threatened and Endangered Species for the project area general vicinity. The Kleinschmidt report was primarily focused on Lake Murray and the Lower Saluda River and the downriver extent was generally terminated at the confluence with the Broad River or the headwaters of the Congaree River (Figure 1). However, the shortnose sturgeon study and the freshwater mussels study conducted as part of the assessment activities extended into the upper Congaree River including the planned project area. Review of these assessments and the available information from the FWS and SCDNR identified a number of federal and state threatened and endangered species, federal candidate species and other species of concern.

Of specific interest to this general project area are the Rafinesque's big-eared bat, shortnose sturgeon, robust redhorse sucker, species of freshwater mussels, and three plant species (Georgia aster, smooth coneflower and Rocky Shoal's Spider Lily). The Rafinesque's big-eared bat and shortnose sturgeon are listed as state endangered species and state and federal endangered species, respectively. The robust redhorse sucker is identified as critically imperiled on the federal list. Eight species of freshwater mussels listed in Table 2 are potentially present in the project area and range from "vulnerable" to "imperiled" at either the national or state level in the NatureServe database. The smooth coneflower is a federal endangered species, the Georgia aster is a federal candidate species, and the Rocky Shoal's Spider Lily is a federal vulnerable and NatureServe imperiled species.

The Rafinesque's big-eared bat's range includes the sandhills region and it is known to roost under I-beam and T-beam bridges. The Gervais Street Bridge may provide a roosting site for this bat. However,

project activities will occur downstream of the bridge and should not impact potential roosting sites within the structure.

The shortnose sturgeon have been anecdotally reported to be present in the vicinity of the project area during spawning runs. Based on available information and prior communications with USACE trustees (NMFS and USFWS), if the project is completed between the months of May through October it will not impact potential sturgeon migration. The robust redhorse sucker has been stocked in large numbers in the Broad River and may be periodically present in the vicinity of the project area. The relatively limited extent of project operations within the river will not be detrimental to this species, if present. Also, during initial dewatering of the areas within the cofferdams, any fish present within the cofferdam areas will be captured and relocated within the river to the extent practicable.

DESC has agreed to conduct freshwater mussel screening and relocation operations in an attempt to preserve indigenous freshwater mussels that may be present within the project footprint. As seen in Table 2, a number of sensitive mussel species were identified in the planned project vicinity. The anticipated mussel relocation activities are explained in detail in the Mussel Relocation Plan (Appendix G). Mussels located within the removal areas, including the planned footprint of the cofferdam structures, will be collected and relocated. As currently envisioned, one of two potential scenarios will be implemented based on project logistical considerations. The first scenario includes conducting the mussel collection and relocation in one mobilization per construction phase following determination of a suitable relocation site. Relocation area(s) will be chosen by the subject matter experts and will be located close to the planned project area. A combination of wading and diving will be necessary in order to adequately survey the majority of the project area. The second scenario includes mobilizing the collection and relocation team and removing the mussels from the approximate footprint of the planned cofferdam and the outboard buffer zone. The relocation team would then demobilize until the cofferdam is constructed and the isolated area is partially dewatered. The team would remobilize and complete the collection and relocation of the mussels within the isolated area. With this scenario, the partial dewatering will facilitate access to the mussels and potentially increase the effectiveness and overall efficiency of the process.

The potential habitat for the smooth coneflower and Georgia Aster would be along the power line corridor located directly east of the river-based project area. Current plans include the use of portions of the power line corridor for landside support activities. Based on a USACE request following submittal of the Joint Application, the corridor was evaluated for the presence of smooth coneflower and Georgia Aster. These species were not identified as being present during the survey, and the habitat was considered poor and not appropriate for either smooth coneflower or Georgia Aster. Should these species be identified in the future and disturbance of their location become necessary, these plants will be protected or relocated to the extent practical.

The Rocky Shoal's Spider Lily is a perennial plant that inhabits rocky shoals or bedrock outcrops in large streams or rivers at or above the fall line (Kleinschmidt, 2008). It is found in relatively large numbers directly upstream of the project area at the confluence of the Saluda and Broad Rivers, and some portions of the project area may exhibit favorable conditions for its occurrence. Because of the potential for Rocky Shoal's Spider Lily to exist within the removal areas within the river, DESC plans to assess their

presence during cofferdam installation and initial dewatering activities. If present, these plants will be relocated to a suitable habitat to the extent practicable.

## **6.0 CONSTRUCTION SCHEDULE AND OTHER PERMITS AND APPROVALS**

### **6.1 Schedule Considerations**

A detailed schedule of activities will be developed following receipt of approval of this MRA Work Plan by SCDHEC. Key components of the schedule include:

- Finalizing plans with the selected contractor;
- Obtaining other required permits and approvals; and
- Implementation of the removal action.

Due to seasonal fluctuations in typical river levels, the active in-the-river construction season for building or relocating the cofferdams will be from May through October of each year. This construction season also avoids impacts on aquatic life migration and spawning seasons within the river.

The cofferdam construction and sediment removal work will require several seasons to complete. DESC has also requested permission to work behind the cofferdam year-round, with minimal site activity projected during the months of December through April. Conceptually, the UXO screening may be able to be completed during the off-season, assuming favorable weather/river conditions. The total duration of the project will be contingent upon factors including:

- Detailed plans of the selected contractor, developed in conjunction with DESC;
- Weather and river level conditions;
- The extent of UXO, historical artifact, and cultural debris presence within the project area; and
- Volume of water to be managed.

General considerations regarding the overall schedule for implementation of the MRA include:

- SCDHEC approval – Submit this MRA Work Plan to SCDHEC for review, obtain final public and stakeholder comments, and receive authorization.
- City of Columbia approvals –Submit applications to the City of Columbia and receive the required authorizations.
- Remediation Contractor selection and site operations setup –Review contractor bids, select contractor, and complete site operations setup including access roads.
- Sediment removal with restoration and documentation – Removal of the impacted sediment within Areas 1 and 2, including construction and removal of the cofferdams, is expected to occur over three seasons.

## 6.2 Other Permits and Approvals

Following review of the Joint Federal and State Application, USACE authorization for the project under Nationwide Permit 38 was received on December 10, 2021 and recertification of the authorization was received by DESC in March 2022. The SCDHEC Water Quality Certification and Wetlands Section provided authorization under General Permit SC GP-2009-001 on December 23, 2021.

In addition to the above authorizations and SCDHEC Bureau of Land and Waste Management (BLWM) approval of this MRA Work Plan, other permits, approvals or agreements that are or may be required for implementation of the removal action include:

- An access agreement with the adjacent landside property owner (obtained by DESC);
- Acceptance of the removed material for disposal at the landfill (currently anticipated to be the Waste Management Richland County Landfill);
- NPDES stormwater discharge approval from the City of Columbia;
- Industrial wastewater discharge permit approval to discharge contact water, as necessary, to the City of Columbia sanitary sewer system for treatment at the POTW;
- Building permit(s) from the City of Columbia for office trailers and enclosed structures utilized during MRA operations; and
- United State Coast Guard (USGC) review and approval of the Navigation Plan.

## 7.0 REPORTING

Routine communications will be maintained between DESC and SCDHEC (and other agencies as may be required) throughout the removal action. Project reports will be provided to SCDHEC during implementation and after completion of the removal action. As currently envisioned, the reporting approach will include:

- Issuing weekly progress reports with photographs of completed activities submitted via e-mail;
- Submitting interim progress reports following each season; and
- Submitting a Final Modified Removal Action Documentation Report.

Weekly progress reports will include a description of completed activities, anticipated activities, problems or constraints encountered, and schedule updates.

Interim progress reports will be submitted following each construction/remediation season. The interim reports will summarize completed activities and the work that remains to be completed. Any significant issues or findings will be addressed, along with an updated projection of the schedule for completion.

The Removal Action Report will provide documentation of the completed removal action activities, and will address the following:

- Site preparation activities;

- UXO and historical artifact screening and management;
- Cofferdam installation;
- Water management and disposal;
- Sediment removal;
- Removed material conditioning and disposal; and
- Site restoration.

Support documentation, in the form of manifests, photographs, inventories of recovered artifacts, etc. will also be included in the final report.

Documentation of artifact recovery will be prepared and submitted by the project archaeologist, consistent with the relevant plans and signed MOA.

## TABLES

**Table 1 Estimated Removal Volumes**

<b>Estimated by</b>	<b>MTR</b>	<b>Glenn &amp; Associates</b>	<b>Apex</b>	<b>Percent Removal</b>
	<b>EE/CA Sediment Volume Estimate January 2013</b>  Original, Full-Area Removal	<b>Preliminary Removal Action Work Plan (PRAWP) September 2018</b>  Full-Area Removal	<b>Proposed Conceptual Plan - MRA Sediment Volume Estimate December 2018</b>  MRA Areas 1 & 2	<b>MRA vs PRAWP</b>
<b>Total Volume of Sediment to be Removed</b>	<b>26,700 CY</b>	<b>25,550 CY</b>	<b>11,675 CY</b>	<b>46%</b>
<b>Total Volume of TLM to be Removed</b>	<b>Not Estimated</b>	<b>5,745 CY</b>	<b>4,204 CY</b>	<b>73%</b>

TABLE 2

## SUMMARY OF RARE, THREATENED AND ENDANGERED SPECIES FOR THE PROJECT AREA AND VICINITY

Congaree River Sediments  
Columbia, South Carolina

Common Name	Scientific Name	Federal Listed and Status <sup>(2)</sup>	State Protection and Status <sup>(3)</sup>	Potential Occurrence
<b>Mammals</b>				
Rafinesque's Big-Eared Bat	<i>Corynorhinus Rafinesquii</i> / <i>Plecotus Rafinesquii</i>	No	Yes - Endangered	Potential for occurrence in project vicinity under the Gervais and Blossom Street bridges.
American Alligator	<i>Alligator mississippiensis</i>	Yes - Threatened	Yes - Threatened	No - habitat not suitable
<b>Birds</b>				
Red-Cockaded Woodpecker	<i>Picoides Borealis</i>	Yes - Endangered	Yes - Endangered	No - habitat not suitable.
Wood stork	<i>Mycteria Americana</i>	Yes - Threatened	Yes - Endangered	No - habitat not suitable, extremely rare and if present likely from dispersion or migration.
Bald Eagle	<i>Haliaeetus Leucocephalus</i>	No	Yes - Threatened	Noted upstream of the project area but not in vicinity of project area. No anticipated impact.
<b>Fish/Amphibians/Reptiles</b>				
Pine Barrens Treefrog	<i>Hyla Andersonii</i>	No	Yes - Threatened	No - found in the sandhills region located northeast of the project area.
Shortnose Sturgeon	<i>Acipenser Brevirostrum</i>	Yes - Endangered	Yes - Endangered	Yes - though if present numbers likely limited
Robust Redhorse Sucker	<i>Moxostoma Robustum</i>	N1 - Critically Imperiled	SNR - Not Ranked	Yes - stocked by SCDNR below Parr Shoals dam.
Southern Hognose Snake	<i>Heterodon Simus</i>	No	Yes - Threatened	No - habitat not suitable
<b>Freshwater Mussels</b>				
Carolina Heelsplitter	<i>Lasmigona Decorata</i>	Yes - Endangered	Yes - Endangered	No - found in rivers and tributaries other than the Congaree River.
Roanoke Slabshell	<i>Elliptio Roanokensis</i>	N3 - Vulnerable	S2 - Imperiled	Yes - potential for occurrence in project vicinity
Yellow Lampmussel	<i>Lampsilis Cariosa</i>	N3N4 - Vulnerable, Apparently Secure	S2 - Imperiled	Yes - potential for occurrence in project vicinity
Carolina Slabshell	<i>Elliptio Congaraea</i>	N3 - Vulnerable	S3 - Vulnerable	Yes - potential for occurrence in project vicinity
Carolina Lance	<i>Elliptio Angustata</i>	N4 - Apparently Secure	S3 - Vulnerable	Yes - potential for occurrence in project vicinity
Fatmucket	<i>Lampsilis Splendida</i>	N3 - Vulnerable	S2 - Imperiled	Yes - potential for occurrence in project vicinity
Eastern Floater	<i>Pyganodon cataracta</i>	N5 - Secure	SNR - Not Ranked	Yes - potential for occurrence in project vicinity
Creeper	<i>Strophitus undulatus</i>	N5 - Secure	S2 - Imperiled	Yes - potential for occurrence in project vicinity
Eastern Creekshell	<i>Villosa delumbis</i>	N4 - Apparently Secure	S4 - Apparently Secure	Yes - potential for occurrence in project vicinity
<b>Plants</b>				
Canby's Dropwort	<i>Oxypolis Canbyi</i>	Yes - Endangered	S2 - Imperiled	No - habitat not suitable
Georgia Aster	<i>Symphyotrichum Georgianum</i>	Yes - Candidate	SNR - Not Ranked	Yes - power line corridor provides potential habitat.
Rough-Leaved Loosestrife	<i>Lysimachia Asperulaefolia</i>	Yes - Endangered	S1 - Critically Impaired	No - habitat is not suitable.
Rocky Shoal's Spider Lily	<i>Hymenocallis coronaria</i>	G3 - Vulnerable	S2 - Imperiled	Yes - known to occur directly upriver of project area.
Michaux's Sumac	<i>Rhus michauxii</i>	Yes - Endangered	SX - Presumed Extinct	No - habitat is not suitable.
Smooth Coneflower	<i>Echinacea Laevigata</i>	Yes - Endangered	S3 - Vulnerable	Yes - power line corridor provides potential habitat.

**Notes:**

- (1) Freshwater mussel occurrence taken from Kleinschmidt, March 2008.
- (2) If species was not listed in the USFWS Endangered Species Database the NatureServe Global or National Status is shown.
- (3) If species was not listed in the SCDNR SC Rare, Threatened & Endangered Species Inventory the NatureServe State or Subnational Status is shown.
- (4) Federal and state listed threatened and endangered mammals, birds, fish, amphibians, reptiles and plants are provided in table. Mussels with a NatureServe rank are also listed due to their potential presence in the project area.

## FIGURES

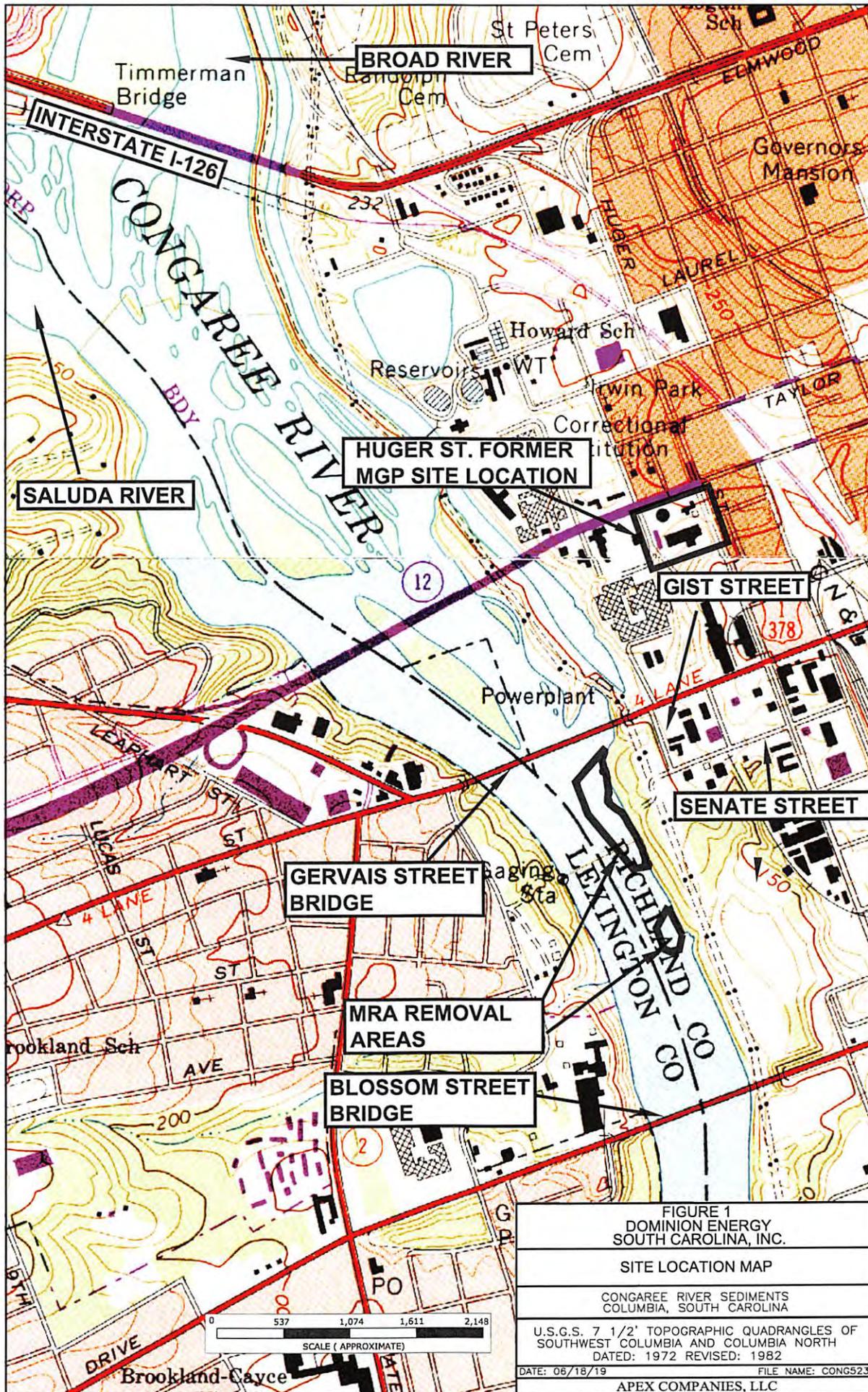


FIGURE 1  
DOMINION ENERGY  
SOUTH CAROLINA, INC.

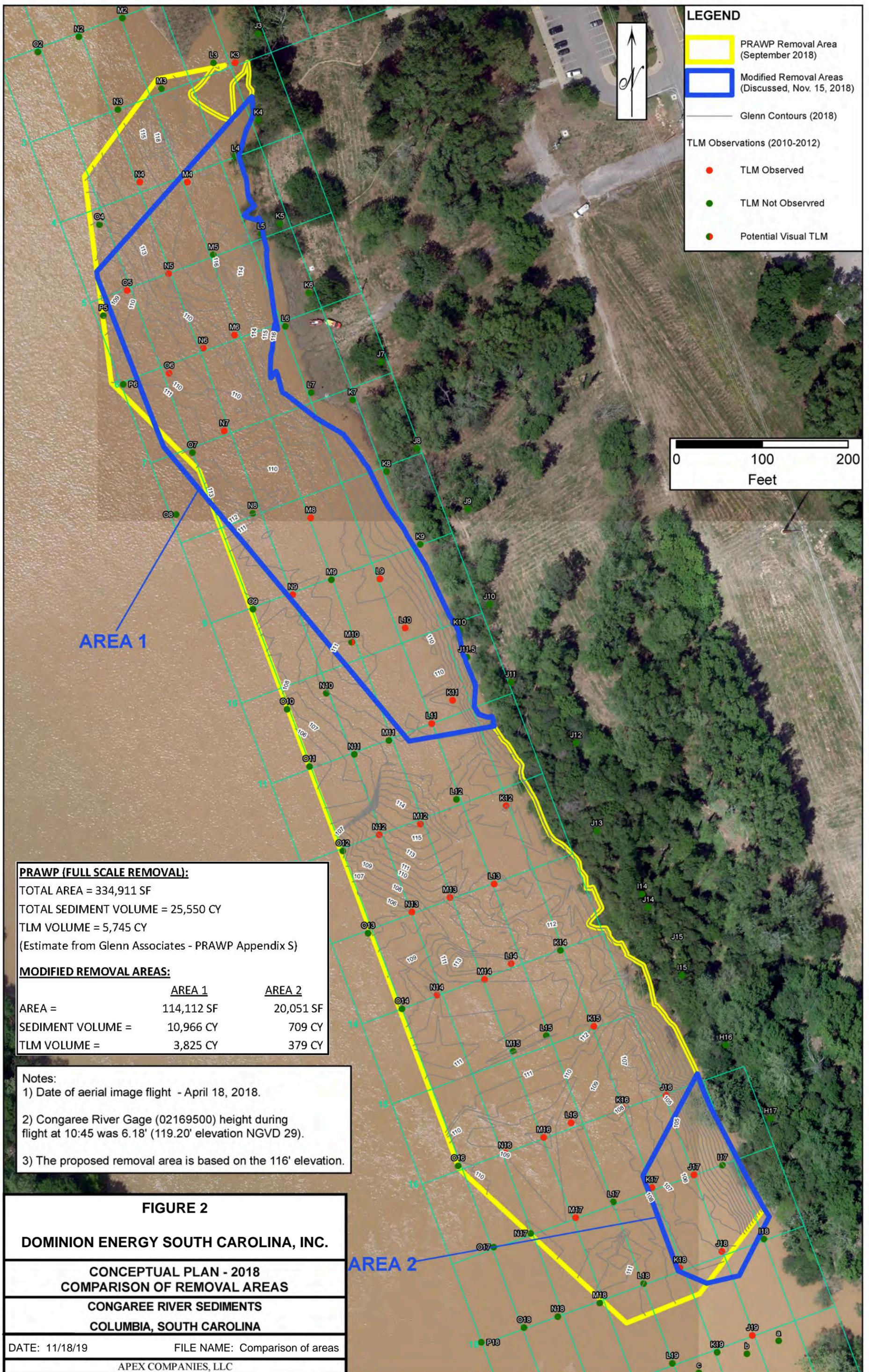
SITE LOCATION MAP

CONGAREE RIVER SEDIMENTS  
COLUMBIA, SOUTH CAROLINA

U.S.G.S. 7 1/2' TOPOGRAPHIC QUADRANGLES OF  
SOUTHWEST COLUMBIA AND COLUMBIA NORTH  
DATED: 1972 REVISED: 1982

DATE: 06/18/19 FILE NAME: CONGS23

APEX COMPANIES, LLC



**LEGEND**

- PRAWP Removal Area (September 2018)
- Modified Removal Areas (Discussed, Nov. 15, 2018)
- Glenn Contours (2018)
- TLM Observed
- TLM Not Observed
- Potential Visual TLM



**PRAWP (FULL SCALE REMOVAL):**  
 TOTAL AREA = 334,911 SF  
 TOTAL SEDIMENT VOLUME = 25,550 CY  
 TLM VOLUME = 5,745 CY  
 (Estimate from Glenn Associates - PRAWP Appendix S)

**MODIFIED REMOVAL AREAS:**

	AREA 1	AREA 2
AREA =	114,112 SF	20,051 SF
SEDIMENT VOLUME =	10,966 CY	709 CY
TLM VOLUME =	3,825 CY	379 CY

- Notes:**
- 1) Date of aerial image flight - April 18, 2018.
  - 2) Congaree River Gage (02169500) height during flight at 10:45 was 6.18' (119.20' elevation NGVD 29).
  - 3) The proposed removal area is based on the 116' elevation.

**FIGURE 2**

**DOMINION ENERGY SOUTH CAROLINA, INC.**

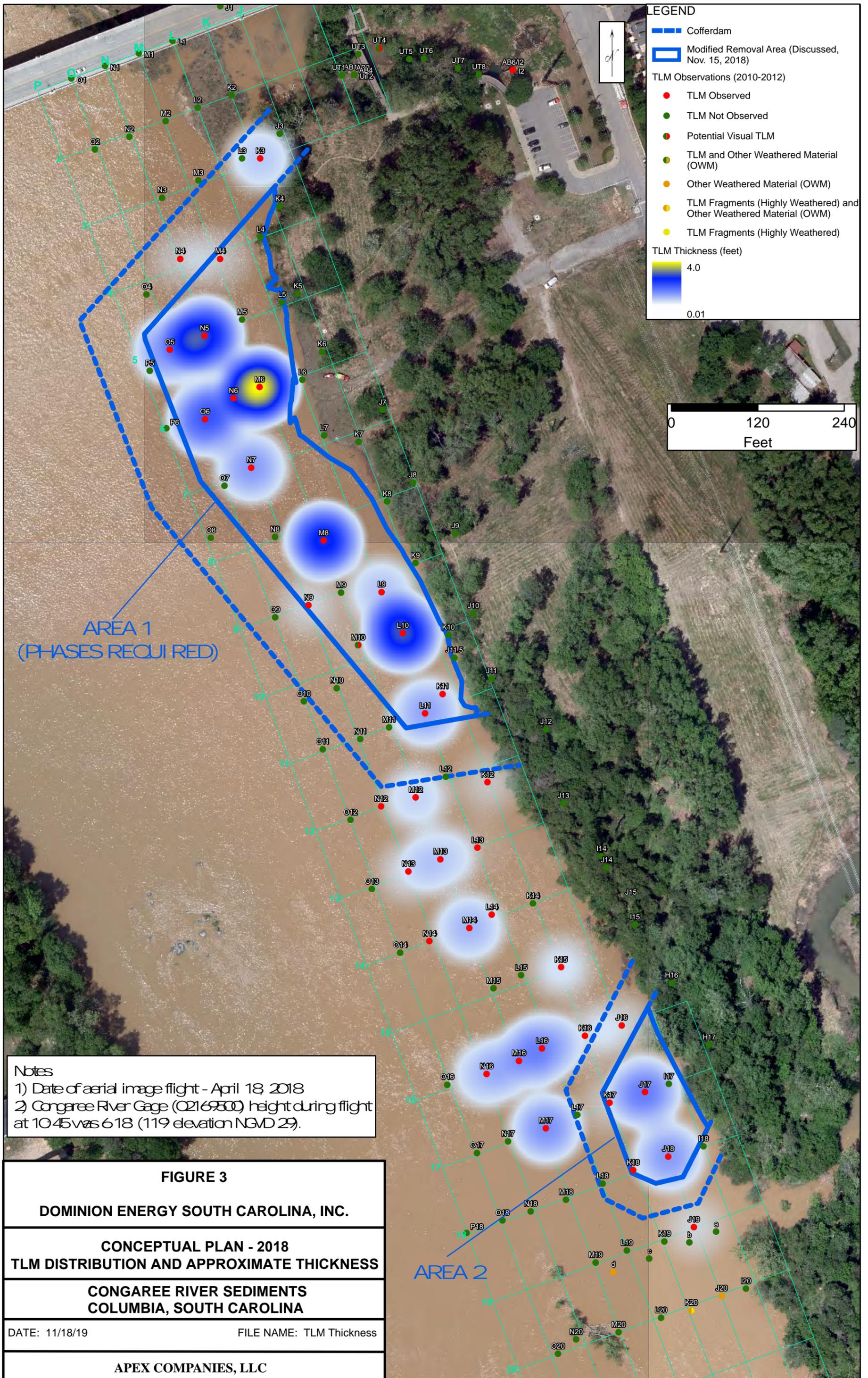
**CONCEPTUAL PLAN - 2018**  
**COMPARISON OF REMOVAL AREAS**  
**CONGAREE RIVER SEDIMENTS**  
**COLUMBIA, SOUTH CAROLINA**

DATE: 11/18/19      FILE NAME: Comparison of areas

APEX COMPANIES, LLC

**AREA 1**

**AREA 2**



**LEGEND**

- Cofferdam
- Modified Removal Area (Discussed, Nov. 15, 2018)
- TLM Observations (2010-2012)**
- TLM Observed
- TLM Not Observed
- Potential Visual TLM
- TLM and Other Weathered Material (OWM)
- Other Weathered Material (OWM)
- TLM Fragments (Highly Weathered) and Other Weathered Material (OWM)
- TLM Fragments (Highly Weathered)

**TLM Thickness (feet)**

4.0  
0.01



AREA 1  
(PHASES REQUI RED)

AREA 2

**Notes**  
 1) Date of aerial image flight - April 18, 2018  
 2) Congaree River Gage (02169500) height during flight at 10:45 was 6.18 (119 elevation NGVD 29).

**FIGURE 3**

**DOMINION ENERGY SOUTH CAROLINA, INC.**

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**CONCEPTUAL PLAN - 2018**  
**TLM DISTRIBUTION AND APPROXIMATE THICKNESS**

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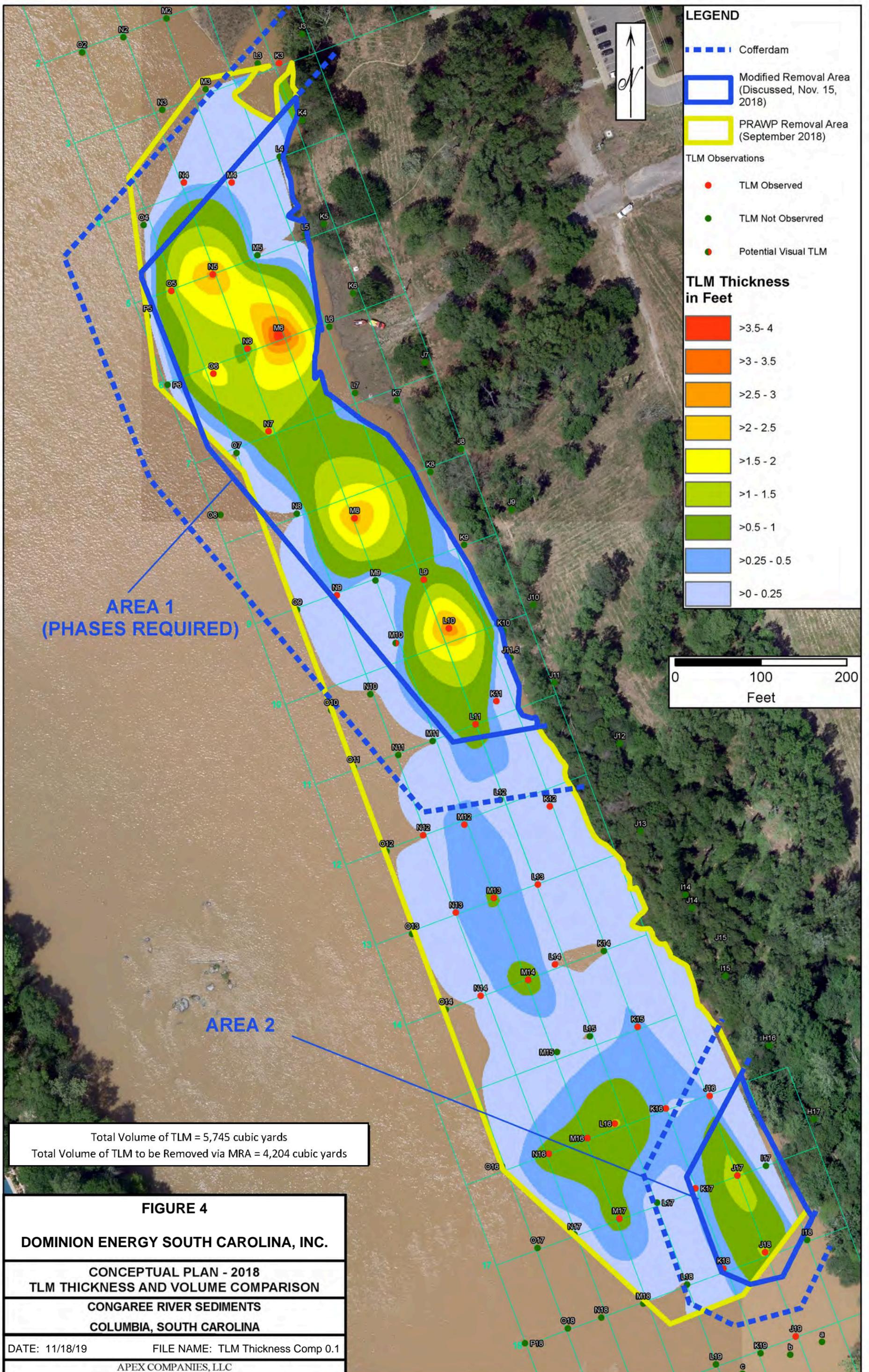
**CONGAREE RIVER SEDIMENTS**  
**COLUMBIA, SOUTH CAROLINA**

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DATE: 11/18/19 FILE NAME: TLM Thickness

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**APEX COMPANIES, LLC**



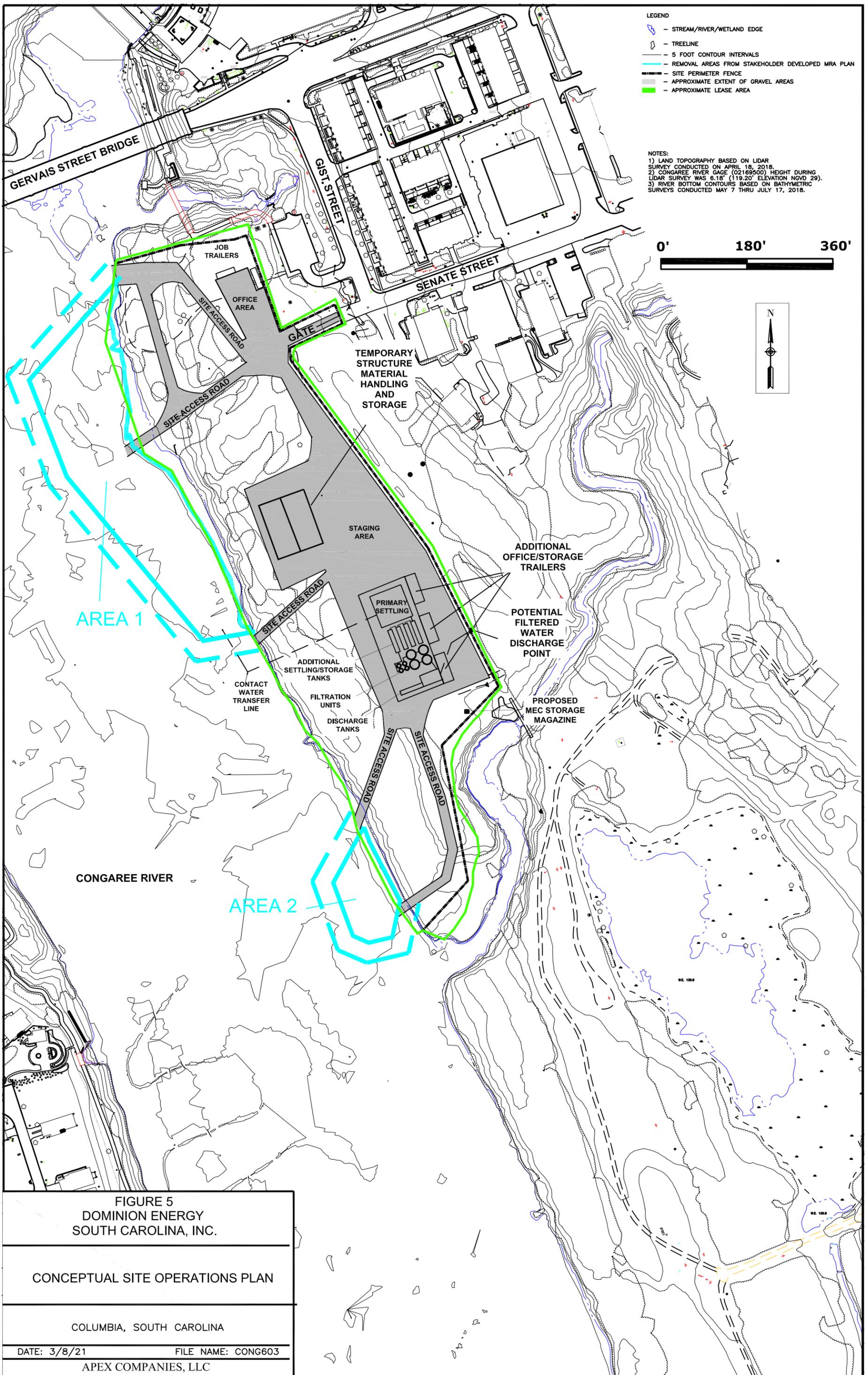


FIGURE 5  
DOMINION ENERGY  
SOUTH CAROLINA, INC.

CONCEPTUAL SITE OPERATIONS PLAN

COLUMBIA, SOUTH CAROLINA

DATE: 3/8/21

FILE NAME: CONG603

APEX COMPANIES, LLC