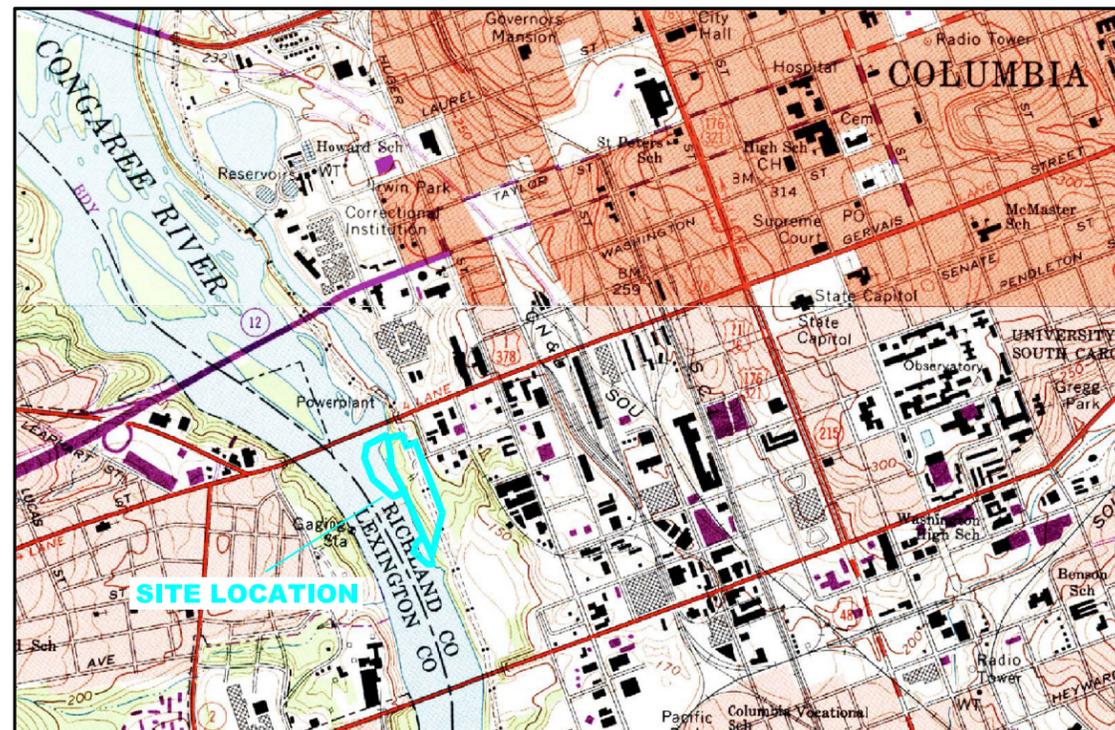


ATTACHMENT K

DRAFT STORMWATER MANAGEMENT AND SEDIMENT CONTROL PLAN

DRAFT STORMWATER MANAGEMENT AND SEDIMENT CONTROL PLAN FOR MODIFIED REMOVAL ACTION

CONGAREE RIVER
COLUMBIA, SOUTH CAROLINA



SEPTEMBER 2020

INDEX:

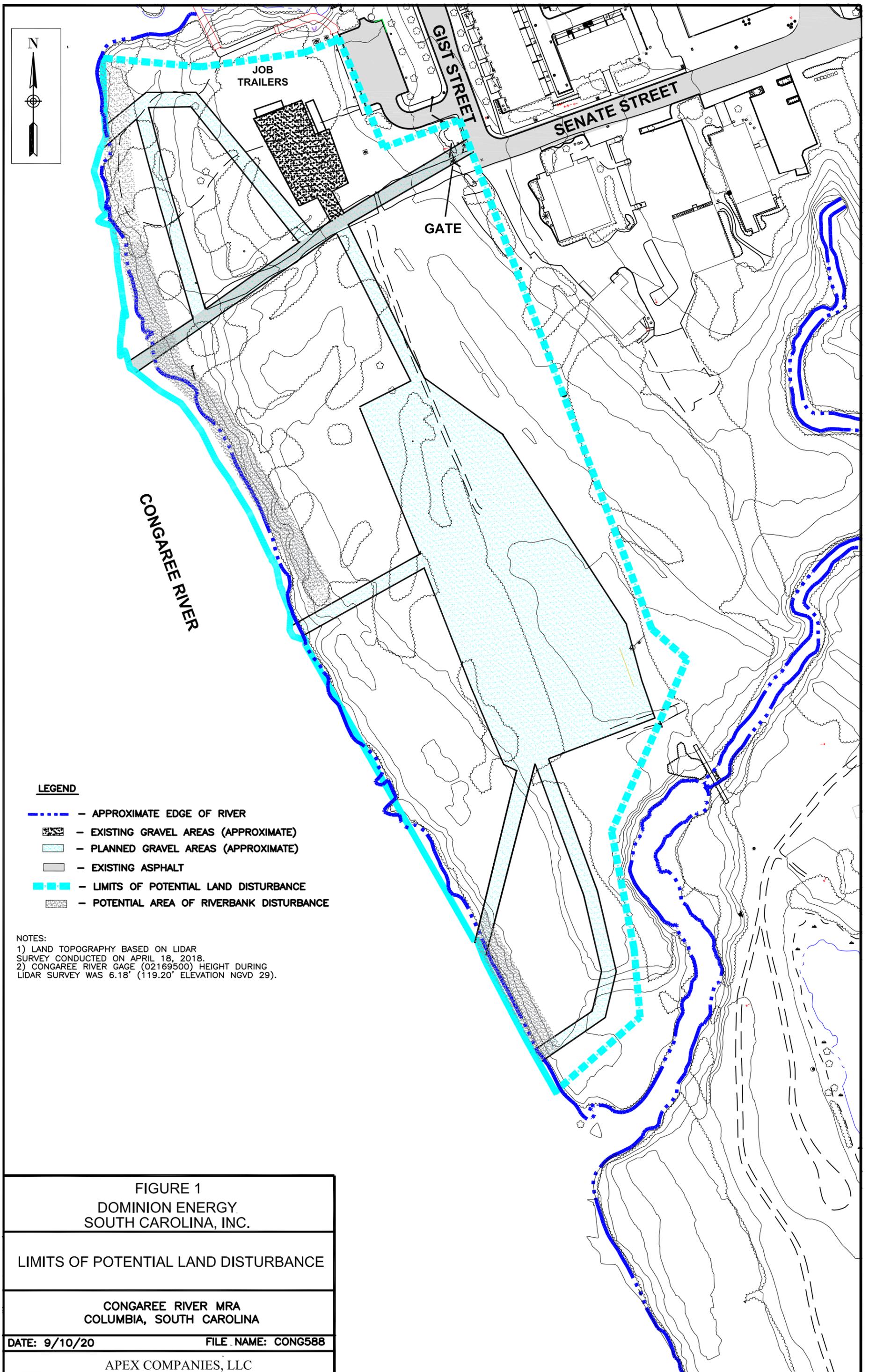
- FIGURE 1: LIMITS OF POTENTIAL LAND DISTURBANCE
- FIGURE 2: SITE RESTORATION PLAN
- FIGURE 3: PRE CONSTRUCTION SITE DRAINAGE PLAN AND FLOODWAY LIMITS
- FIGURE 4: POST CONSTRUCTION SITE DRAINAGE
- FIGURE 5: LANDSIDE OPERATIONS AREA AND E&S BMP LOCATIONS
- FIGURE 6A, 6B, 6C, 6D: E&S CONTROL DETAILS
- FIGURE 7A, 7B, 7C, 7D: SITE RESTORATION DETAILS
- FIGURE 8: CONSTRUCTION SEQUENCE
- FIGURE 9: STANDARD NOTES
- FIGURE 10: SOIL TYPE SURVEY

PREPARED FOR:

DOMINION ENERGY SOUTH CAROLINA, INC.
400 OTARRE PARKWAY
CAYCE, SOUTH CAROLINA 29033

PREPARED BY:





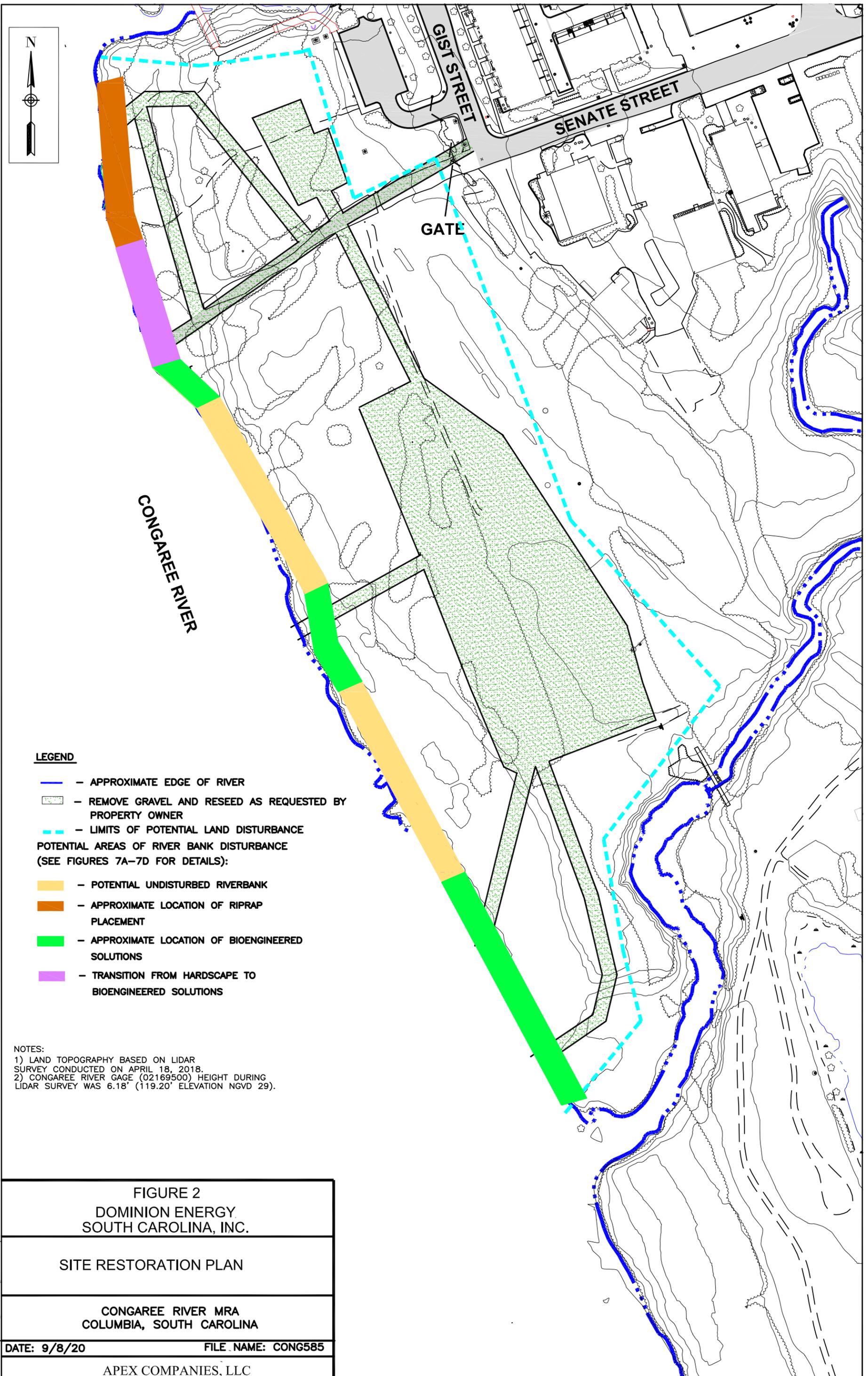


FIGURE 2
 DOMINION ENERGY
 SOUTH CAROLINA, INC.

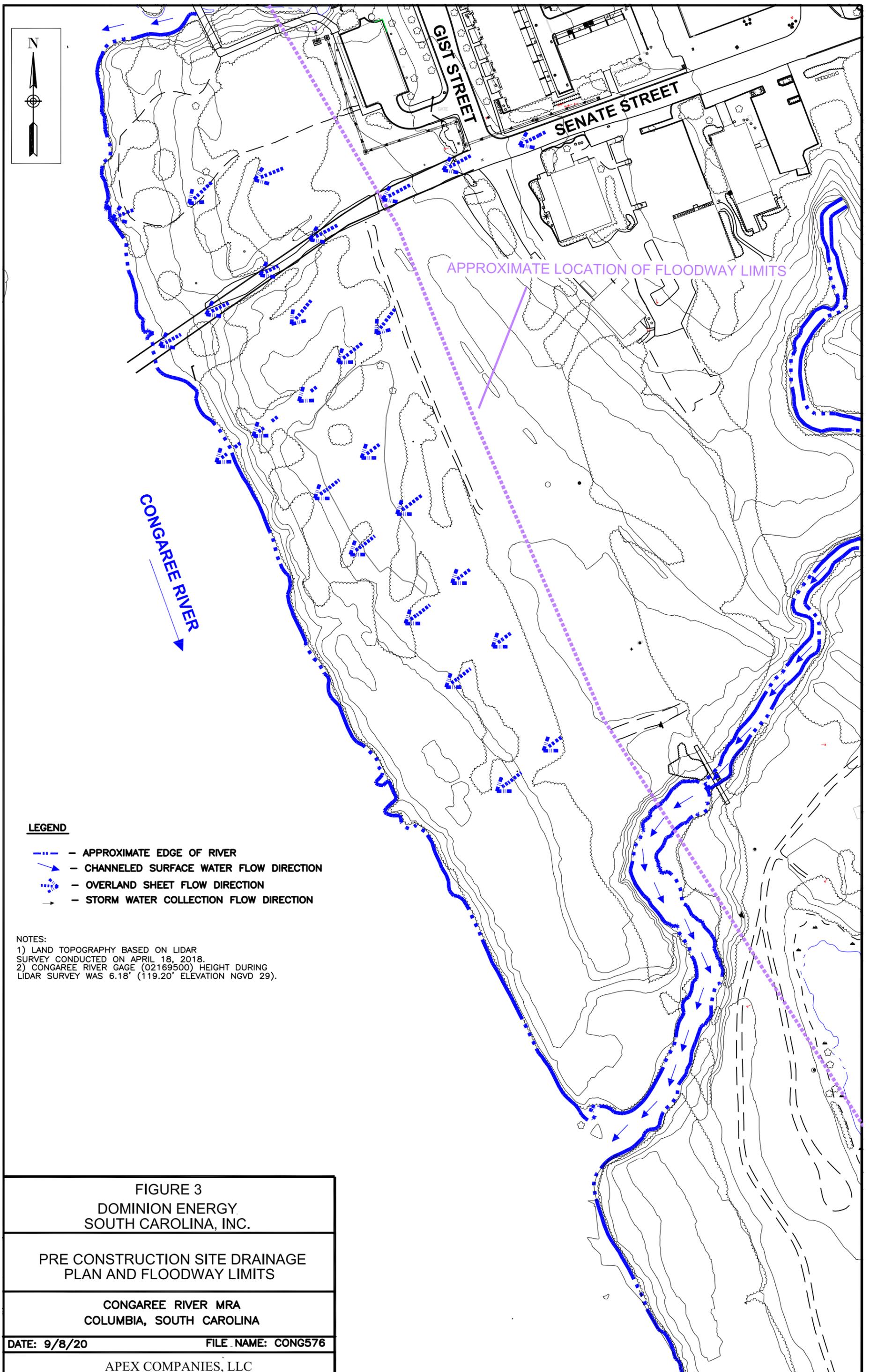
SITE RESTORATION PLAN

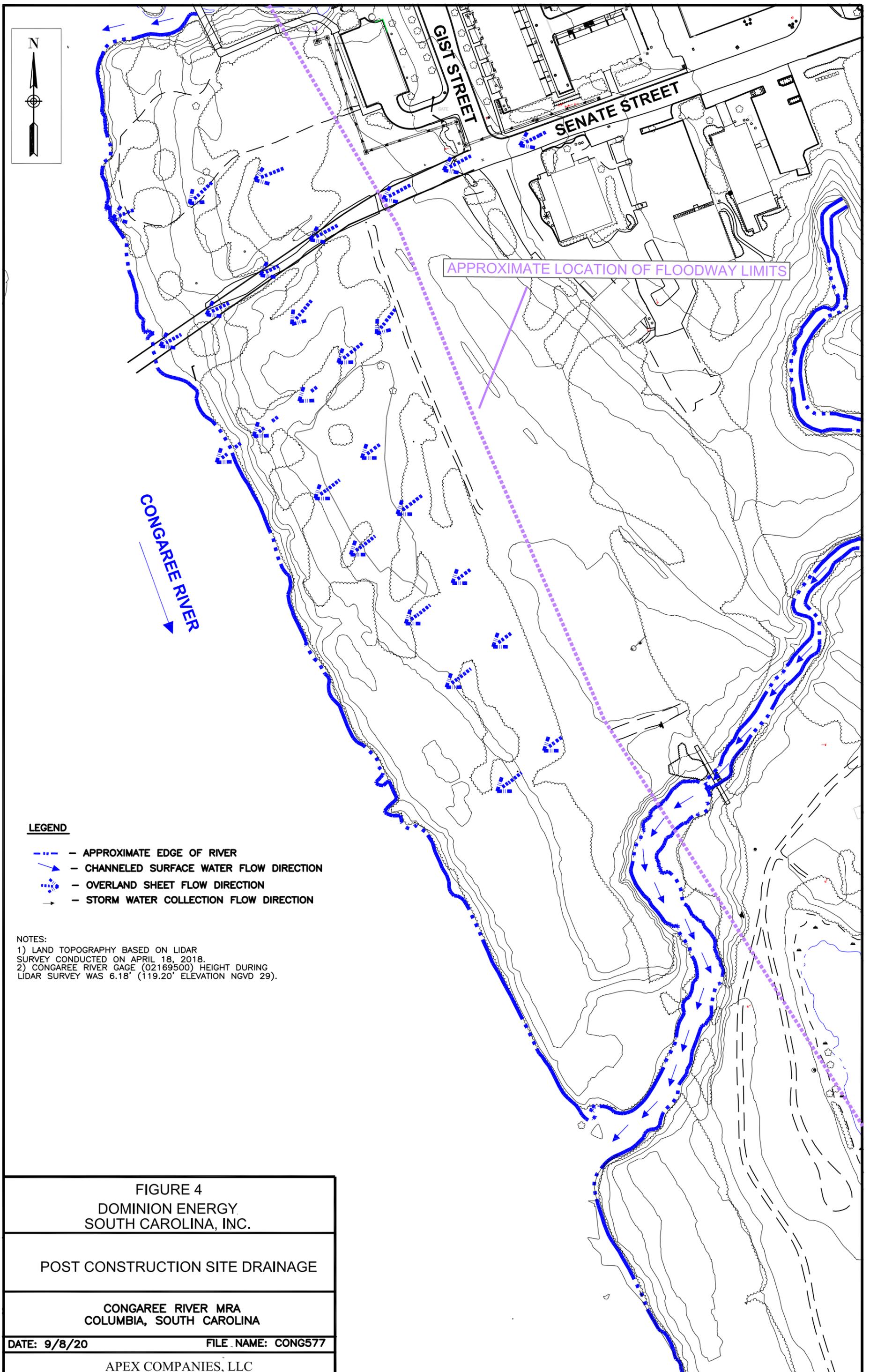
CONGAREE RIVER MRA
 COLUMBIA, SOUTH CAROLINA

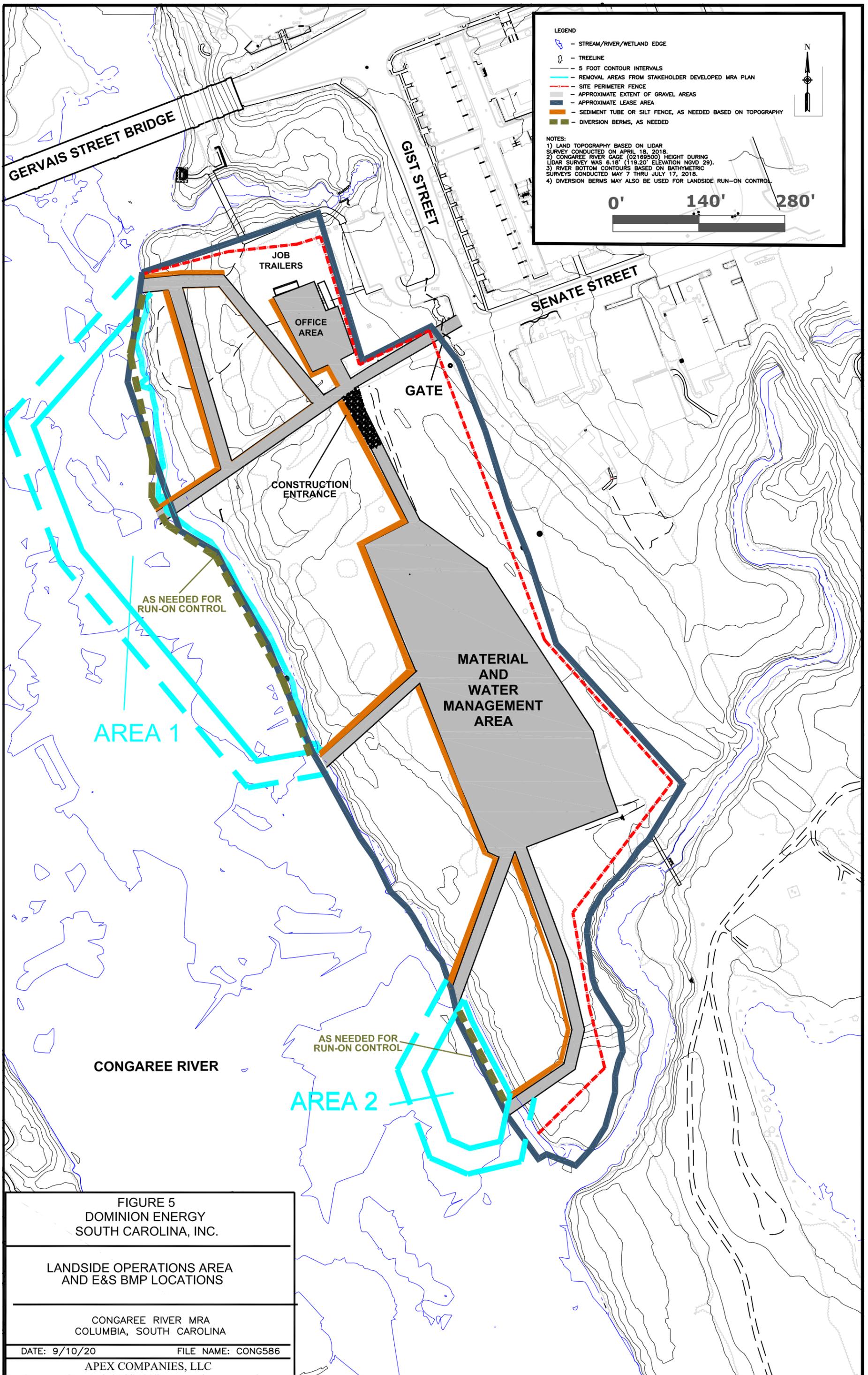
DATE: 9/8/20

FILE NAME: CONG585

APEX COMPANIES, LLC







LEGEND

- STREAM/RIVER/WETLAND EDGE
- TREELINE
- 5 FOOT CONTOUR INTERVALS
- REMOVAL AREAS FROM STAKEHOLDER DEVELOPED MRA PLAN
- - - SITE PERIMETER FENCE
- APPROXIMATE EXTENT OF GRAVEL AREAS
- APPROXIMATE LEASE AREA
- SEDIMENT TUBE OR SILT FENCE, AS NEEDED BASED ON TOPOGRAPHY
- DIVERSION BERMS, AS NEEDED

NOTES:

- 1) LAND TOPOGRAPHY BASED ON LIDAR SURVEY CONDUCTED ON APRIL 18, 2018.
- 2) CONGAREE RIVER GAGE (02169500) HEIGHT DURING LIDAR SURVEY WAS 6.18' (119.20' ELEVATION NGVD 29).
- 3) RIVER BOTTOM CONTOURS BASED ON BATHYMETRIC SURVEYS CONDUCTED MAY 7 THRU JULY 17, 2018.
- 4) DIVERSION BERMS MAY ALSO BE USED FOR LANDSIDE RUN-ON CONTROL.

0' 140' 280'

FIGURE 5
DOMINION ENERGY
SOUTH CAROLINA, INC.

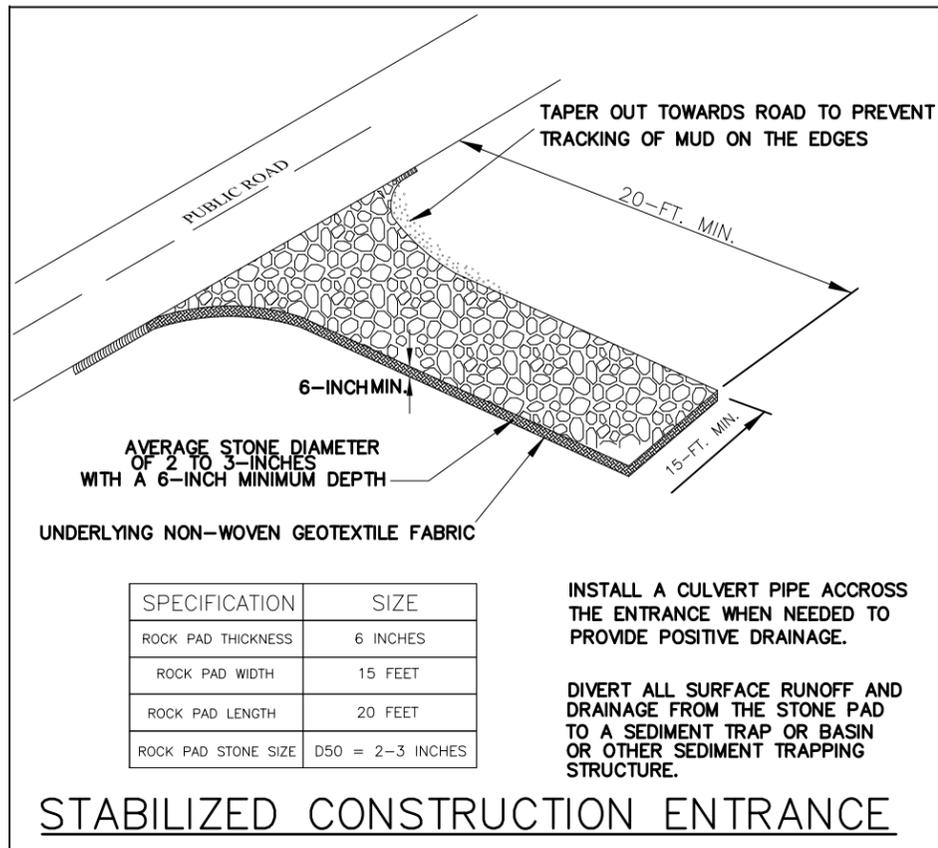
LANDSIDE OPERATIONS AREA
AND E&S BMP LOCATIONS

CONGAREE RIVER MRA
 COLUMBIA, SOUTH CAROLINA

DATE: 9/10/20

FILE NAME: CONG586

APEX COMPANIES, LLC



SPECIFICATION	SIZE
ROCK PAD THICKNESS	6 INCHES
ROCK PAD WIDTH	15 FEET
ROCK PAD LENGTH	20 FEET
ROCK PAD STONE SIZE	D50 = 2-3 INCHES

INSTALL A CULVERT PIPE ACROSS THE ENTRANCE WHEN NEEDED TO PROVIDE POSITIVE DRAINAGE.

DIVERT ALL SURFACE RUNOFF AND DRAINAGE FROM THE STONE PAD TO A SEDIMENT TRAP OR BASIN OR OTHER SEDIMENT TRAPPING STRUCTURE.

STABILIZED CONSTRUCTION ENTRANCE

STABILIZED CONSTRUCTION ENTRANCE

When and Where to Use It

Stabilized construction entrances should be used at all points where traffic will be leaving a construction site and moving directly onto a public road.

Important Considerations

If washing is used, provisions must be made to intercept the wash water and trap the sediment before it is carried offsite. Washdown facilities shall be required as directed by SCDHEC as needed. Washdown areas in general must be established with crushed gravel and drain into a sediment trap or sediment basin. Construction entrances should be used in conjunction with the stabilization of construction roads to reduce the amount of mud picked up by vehicles.

Installation:

Remove all vegetation and any objectionable material from the foundation area.

Divert all surface runoff and drainage from stones to a sediment trap or basin.

Install a non-woven geotextile fabric prior to placing any stone.

Install a culvert pipe across the entrance when needed to provide positive drainage.

The entrance shall consist of 2-inch to 3-inch D50 stone placed at a minimum depth of 6-inches.

Minimum dimensions of the entrance shall be 15-feet wide by 20-feet long, and may be modified as necessary to accommodate site constraints.

The edges of the entrance shall be tapered out towards the road to prevent tracking of mud at the edge of the entrance.

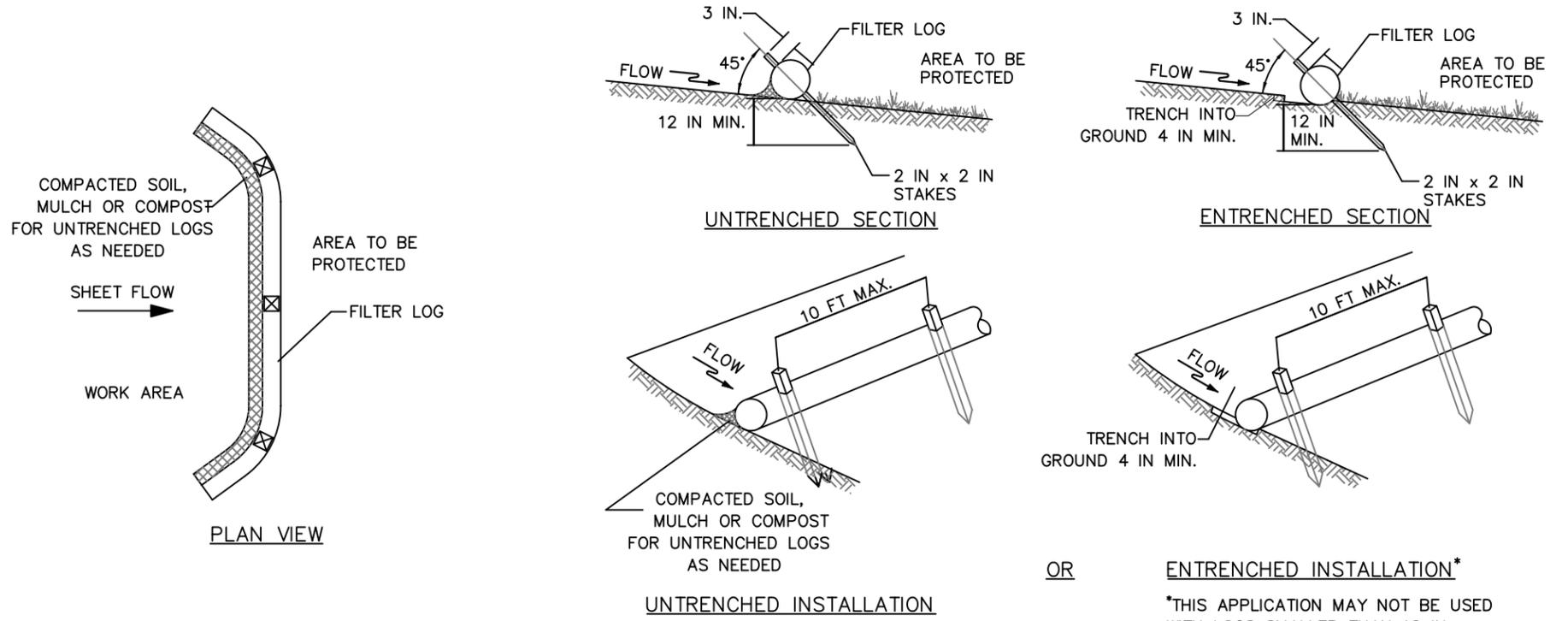
Inspection and Maintenance:

Inspect construction entrances every seven (7) calendar days and within 24-hours after each rainfall event that produces 1/2-inches or more of precipitation, or after heavy use. Check for mud and sediment buildup and pad integrity. Make daily inspections during periods of wet weather. Maintenance is required more frequently in wet weather conditions. Reshape the stone pad as needed for drainage and runoff control.

Wash or replace stones as needed and as directed by the inspector. The stone in the entrance should be washed or replaced whenever the entrance fails to reduce mud being carried off-site by vehicles. Frequent washing will extend the useful life of stone.

Immediately remove mud and sediment tracked or washed onto public roads by brushing or sweeping. Flushing should only be used when the water can be discharged to a sediment trap or basin.

Repair any broken pavement immediately.



SEDIMENT TUBE / FILTER LOG INSTALLATION

CONSTRUCTION SPECIFICATIONS

1. PRIOR TO INSTALLATION, CLEAR ALL OBSTRUCTIONS INCLUDING ROCKS, CLODS, AND DEBRIS GREATER THAN ONE INCH THAT MAY INTERFERE WITH PROPER FUNCTION OF FILTER LOG.
2. FILL LOG NETTING UNIFORMLY WITH COMPOST OR OTHER APPROVED BIODEGRADABLE MATERIAL TO DESIRED LENGTH SUCH THAT LOGS DO NOT DEFORM.
3. INSTALL FILTER LOGS PERPENDICULAR TO THE FLOW DIRECTION AND PARALLEL TO THE SLOPE WITH THE BEGINNING AND END OF THE INSTALLATION POINTING SLIGHTLY UP THE SLOPE CREATING A "J" SHAPE AT EACH END TO PREVENT BYPASS.
4. FOR UNTRENCHED INSTALLATION, BLOW OR HAND PLACE MATERIAL ON UPHILL SIDE OF THE SLOPE ALONG LOG AS NEEDED TO PREVENT UNDERCUTTING, AND STAKE EVERY 10 FEET OR CLOSER.
5. FOR ENTRENCHED INSTALLATION, TRENCH LOG INTO GROUND A MINIMUM OF 4 INCHES AND STAKE LOG EVERY 10 FEET OR CLOSER.
6. USE STAKES WITH A MINIMUM NOMINAL CROSS SECTION OF 2X2 INCH AND OF SUFFICIENT LENGTH TO ATTAIN A MINIMUM OF 12 INCHES INTO THE GROUND AND 3 INCHES PROTRUDING ABOVE LOG.
7. WHEN MORE THAN ONE LOG IS NEEDED, OVERLAP ENDS 12 INCHES MINIMUM AND STAKE.
8. REMOVE SEDIMENT WHEN IT HAS ACCUMULATED TO A DEPTH OF 1/2 THE EXPOSED HEIGHT OF LOG AND REPLACE MULCH. REPLACE FILTER LOG IF TORN. REINSTALL FILTER LOG IF UNDERMINING OR DISLODGING OCCURS. REPLACE CLOGGED FILTER LOGS.

ACCESS GRAVEL ROAD DETAIL

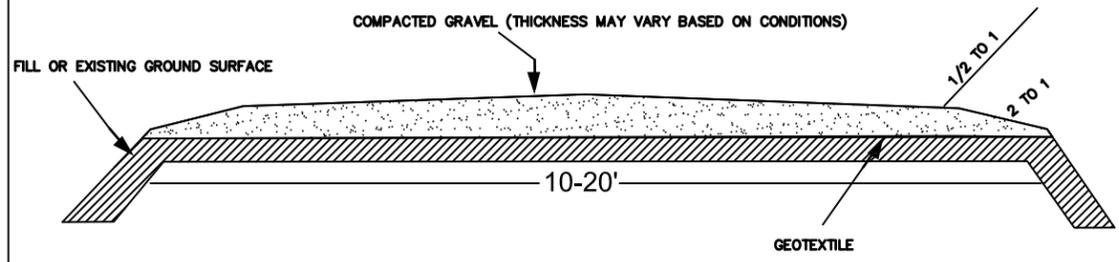


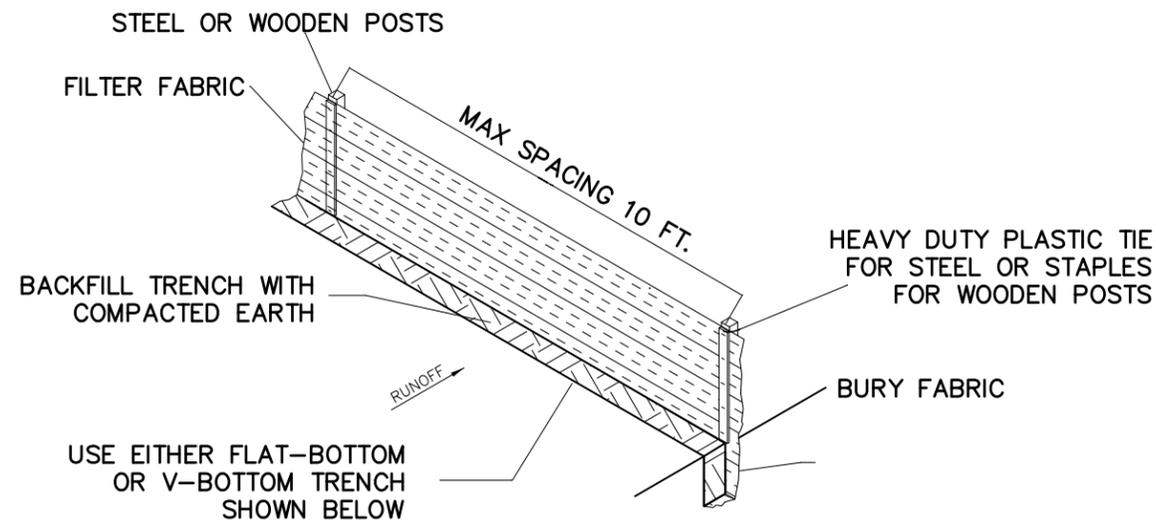
FIGURE 6A
DOMINION ENERGY SOUTH CAROLINA, INC.

E&S CONTROL DETAILS

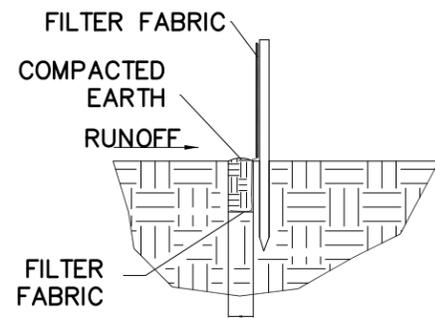
CONGAREE RIVER MRA
 COLUMBIA, SOUTH CAROLINA

DATE: 9/10/20 FILE NAME: CONG566

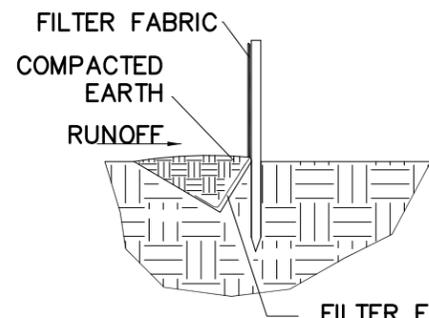
APEX COMPANIES, LLC



SILT FENCE INSTALLATION



FLAT-BOTTOM TRENCH DETAIL



V-SHAPED TRENCH DETAIL

SILT FENCE DETAIL (CONTINUED)

Installation (Typical)

Excavate a trench approximately 6-inches wide and 6-inches deep when placing fabric by hand. Place 12-inches of geotextile fabric into the 6-inch deep trench, extending the remaining 6-inches towards the upslope side of the trench. Backfill the trench with soil or gravel and compact.

Bury 12-inches of fabric into the ground when pneumatically installing silt fence with a slicing method.

Purchase fabric in continuous rolls and cut to the length of the barrier to avoid joints. When joints are necessary, wrapped the fabric together at a support post with both ends fastened to the post, with a 6-inch minimum overlap.

Install posts to a minimum depth of 24-inches. Install posts a minimum of 1- to 2- inches above the fabric, with no more than 3-feet of the post above the ground. Space posts to maximum 10-foot centers.

Attach fabric to wood posts using staples made of heavy-duty wire at least 1½-inch long, spaced a maximum of 6-inches apart. Staple a 2-inch wide lathe over the filter fabric to securely fasten it to the upslope side of the wooden posts. Attach fabric to steel posts using heavy-duty plastic ties that are evenly spaced and placed in a manner to prevent sagging or tearing of the fabric. In all cases, ties should be affixed in no less than 4 places.

Install the fabric the minimum specified distance above the ground. When necessary, the height of the fence above ground may be greater than the minimum. In tidal areas, extra silt fence height may be required. Locate silt fence checks every 100 feet maximum and at low points.

Install the fence perpendicular to the direction of flow and place the fence the proper distance from the toe of steep slopes to provide sediment storage and access for maintenance and cleanout.

Inspection and Maintenance

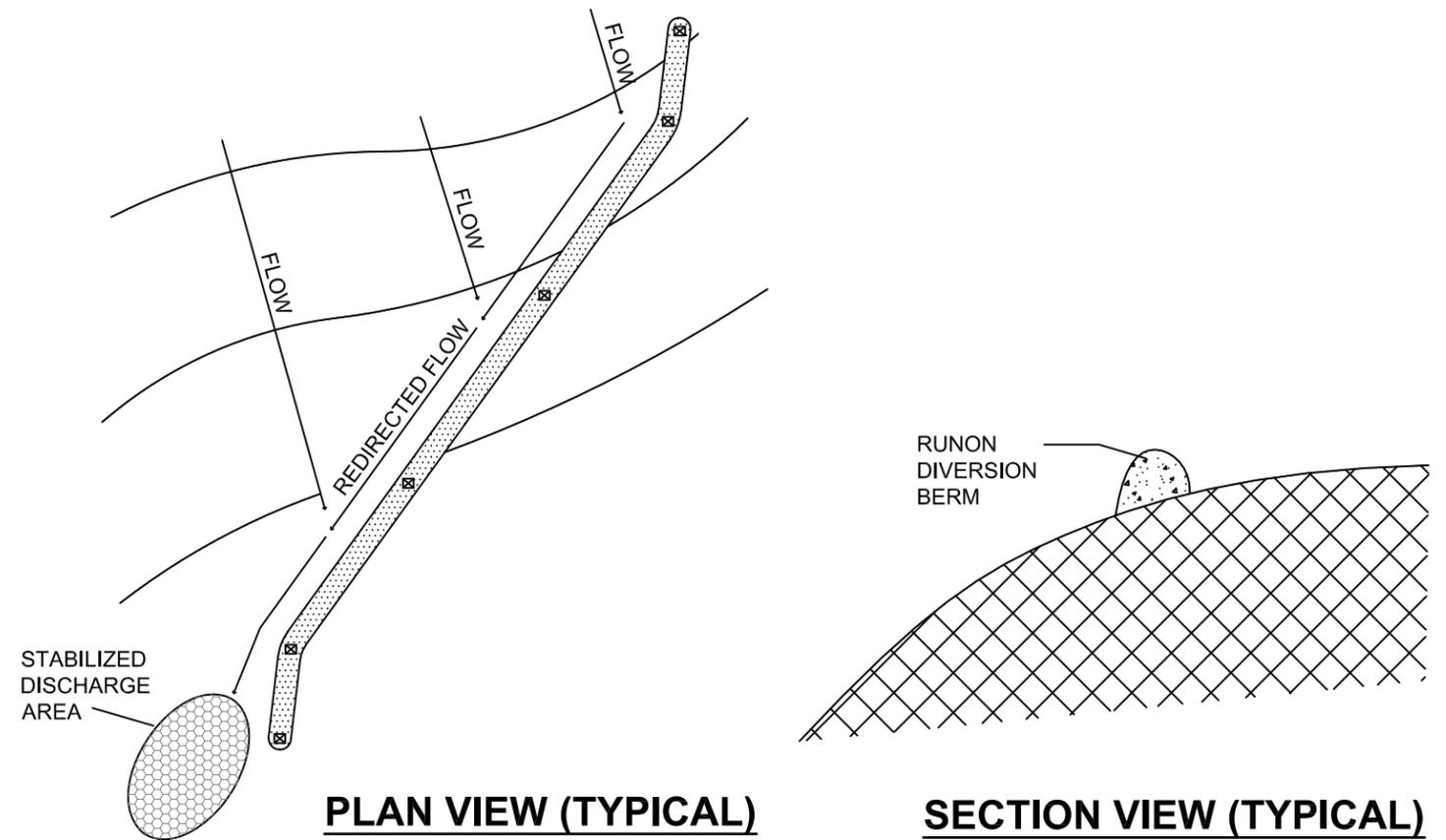
Inspect every seven calendar days and within 24-hours after each rainfall event that produces ½-inches or more of precipitation. Check for sediment buildup and fence integrity. Check where runoff has eroded a channel beneath the fence, or where the fence has sagged or collapsed by fence overtopping. If the fence fabric tears, begins to decompose, or in any way becomes ineffective, replace the section of fence immediately.

Remove sediment accumulated along the fence when it reaches 1/3 the height of the fence, especially if heavy rains are expected.

Remove trapped sediment from the site or stabilize it on site.

Remove silt fence within 30 days after final stabilization is achieved or after temporary best management practices (BMPs) are no longer needed.

Permanently stabilize disturbed areas resulting from fence removal.



RUNON DIVERSION BERM

NOTES:

1. Diversion berms shall be placed, maintained and adjusted as needed to control excess run-on from stormwater drainage.
2. Berms shall be composed of compost filter socks designed for runoff diversion (e.g., FILTREXX SILTSOXX), compacted soil, sandbags, plastic piping or other suitable material.
3. Runoff shall be directed to suitably stabilized areas or conveyance systems to prevent erosion.

SILT FENCE DETAIL

When and Where to Use It

Silt fence is applicable in areas:

Where the maximum sheet or overland flow path length to the fence is 100-feet.
 Where the maximum slope steepness (normal [perpendicular] to fence line) is 2H:1V.
 That do not receive concentrated flows greater than 0.5 cfs.

Do not place silt fence across channels or use it as a velocity control BMP.

Materials

Geotextile Filter Fabric

Filter fabric is:
 Composed of fibers consisting of long chain synthetic polymers composed of at least 85% by weight of polyolefins, polyesters, or polyamides.

Formed into a network such that the filaments or yarns retain dimensional stability relative to each other.

Free of any treatment or coating which might adversely alter its physical properties after installation. Free of defects or flaws that significantly affect its physical and/or filtering properties.

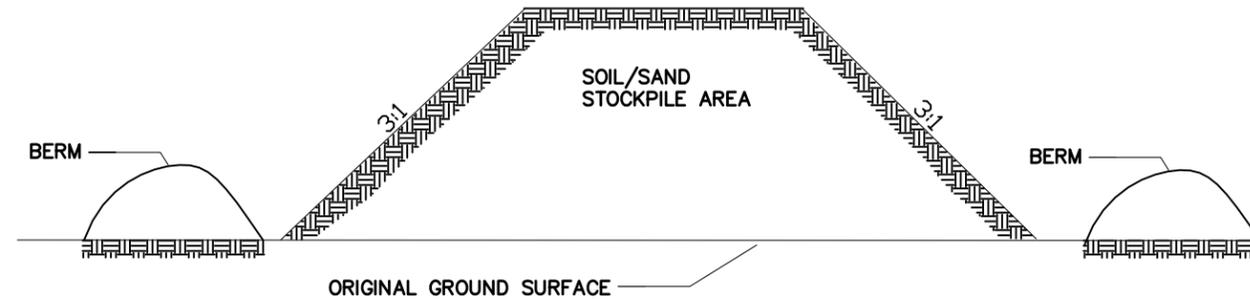
Use only fabric appearing on SCDOT Approval Sheet #34 meeting the requirements of the most current edition of the SCDOT Standard Specifications for Highway Construction.

Posts

Posts used for installation of the filter fabric shall be of wood or steel composition and meet industry standards.

FIGURE 6B	
DOMINION ENERGY SOUTH CAROLINA, INC.	
E&S CONTROL DETAILS	
CONGAREE RIVER MRA COLUMBIA, SOUTH CAROLINA	
DATE: 9/10/20	FILE NAME: CONG567
APEX COMPANIES, LLC	

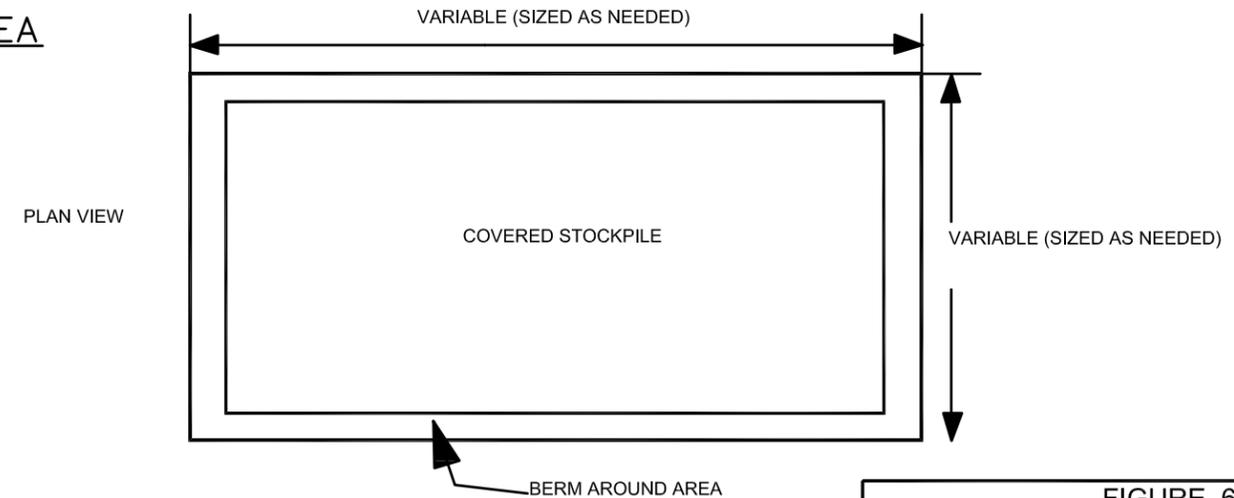
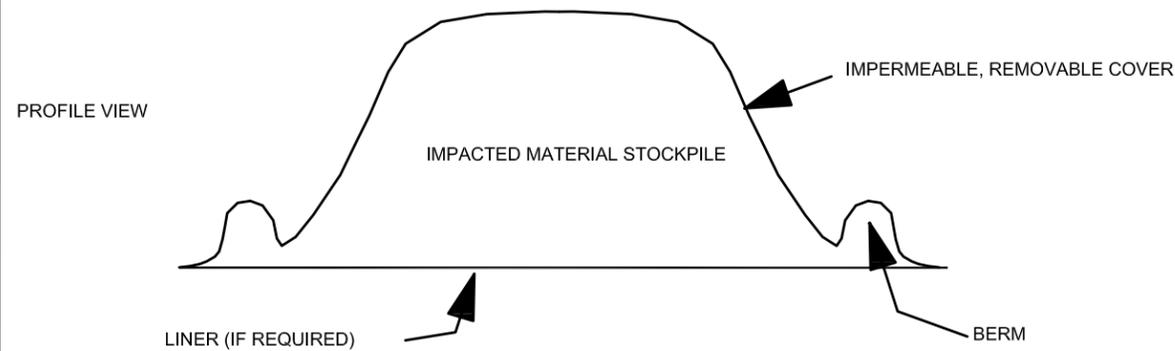
TYPICAL CLEAN MATERIAL TEMPORARY STOCKPILE AREA



NOTES:

1. BERM TO EXTEND AROUND ENTIRE PERIMETER OF STOCKPILE, OR IF STOCKPILE AREA IS LOCATED ON/NEAR A SLOPE THE BERM IS TO EXTEND ALONG CONTOURS OF THE DOWN-GRADIENT AREA.
2. BERMS MAY BE CONSTRUCTED USING UNIMPACTED MATERIAL (NATIVE OR IMPORTED), PLASTIC PIPES, LUMBER, SAND BAGS OR OTHER SUITABLE MATERIAL, DEPENDING ON THE SIZE OF THE STAGING AREA.
3. BERM SHALL BE MAINTAINED UNTIL STOCKPILE AREA HAS EITHER BEEN REMOVED OR PERMANENTLY STABILIZED.
4. THE KEY TO FUNCTIONAL TEMPORARY STOCKPILE AREAS IS WEEKLY INSPECTIONS, ROUTINE MAINTENANCE, AND REGULAR SEDIMENT REMOVAL.

TYPICAL IMPACTED MATERIAL TEMPORARY STOCKPILE AREA



NOTES:

1. TO THE EXTENT POSSIBLE, USE OF TEMPORARY STOCKPILES ON UNDISTURBED AREAS FOR IMPACTED MATERIAL SHOULD BE AVOIDED.
2. TEMPORARY STOCKPILES ON EXISTING GRADE MUST INCLUDE A BERM AND COVER TO CONTROL POTENTIAL MIGRATION OF IMPACTED MATERIAL.
3. STOCKPILES PLACED ON UNIMPACTED SURFACES THAT WILL NOT BE SUBSEQUENTLY EXCAVATED MUST INCLUDE A LINER (E.G., PLASTIC SHEETING), WITH PROPER GRADING OF THE SURFACE TO PROTECT THE LINER INTEGRITY.
4. COVERS MUST BE USED AT THE END OF EACH WORKDAY OR AS WEATHER CONDITIONS WARRANT TO PREVENT PRECIPITATION RUNOFF FROM THE IMPACTED MATERIAL. COVERS MUST BE SECURED AS NECESSARY, AND CONSIST OF A REMOVABLE, IMPERMEABLE MATERIAL (E.G., PLASTIC SHEETING).
5. BERMS MAY BE CONSTRUCTED USING UNIMPACTED MATERIAL (NATIVE OR IMPORTED), PLASTIC PIPES, LUMBER, SAND BAGS OR OTHER SUITABLE MATERIAL DEPENDING ON THE SIZE OF THE STAGING AREA.
6. INSPECTION AND MAINTENANCE OF TEMPORARY IMPACTED MATERIAL STOCKPILES IS REQUIRED THROUGHOUT THE PROJECT.

FIGURE 6C DOMINION ENERGY SOUTH CAROLINA, INC.	
E&S CONTROL DETAILS	
CONGAREE RIVER MRA COLUMBIA, SOUTH CAROLINA	
DATE: 8/18/20	FILE NAME: CONG568
APEX COMPANIES, LLC	

SEEDING SCHEDULE

1. All excavated areas will be seeded using a perennial and nurse crop mix within 14 days of construction activities ceasing.
2. Establishing a stand of perennial grasses is critical to controlling runoff and erosion of areas disturbed by construction and maintenance activities. Once the permanent grasses begin to establish underneath the nurse crop, a mowing may be required to prevent shading and to release them.
3. Seeding application rates and time frames are listed below.
4. If construction activities must temporarily cease for 14 days or more, then seeding must be initiated. If temporary seeding is required, apply only the nurse crops listed below at double the below listed application rates.

SEEDING PROCEDURES

1. Sub-soil/chisel plow/disk disturbed areas, as necessary
2. Apply lime, as necessary (based on soil sample) (2,000 lb./acre if soil sample not taken)
3. Disk in lime to incorporate into the soil
4. Apply seed based on application rates below (permanent grass and nurse crop mix)
5. Acquire a firm seed bed by rolling with cultipacker or equivalent
6. Apply hay straw at approximately 2,000 lb./acre and crimp into soil or hydramulch at approximately 1,200 lbs/acre
7. Once seed germinates, apply fertilizer as necessary (based on soil sample)

(Hydroseeding with the appropriate rates of lime, mulch, fertilizer, and seed may be applied if a well established seed bed is present (i.e. uncompacted and loosely disked soils)

Permanent Seeding Application Rates

Common Name of Seed / Planting Rate (pounds per acre) / Planting Dates

Warm Season (Spring and Summer)

Hulled Common Bermuda / 25 / March – August

Browntop Millet (nurse crop) / 20 / Mid March – September

Cool Season (Fall and Winter)

Unhulled Common Bermuda/ 30 / September – February

Annual Rye or Rye Grain (no rye grass) (nurse crop)/ 25 / October – Mid March

NOTE:

For significant slopes greater than 5 feet in height, add 10 lb./acre of Weeping Lovegrass and 50 lb./acre of sericea lespedeza to above rates.

For applications in the upper state (northwest of I-20 and US 1 (I-20 and US 1 meet in Columbia)) of SC, add 50 lb./acre of Kentucky 31 Fescue to above rates.

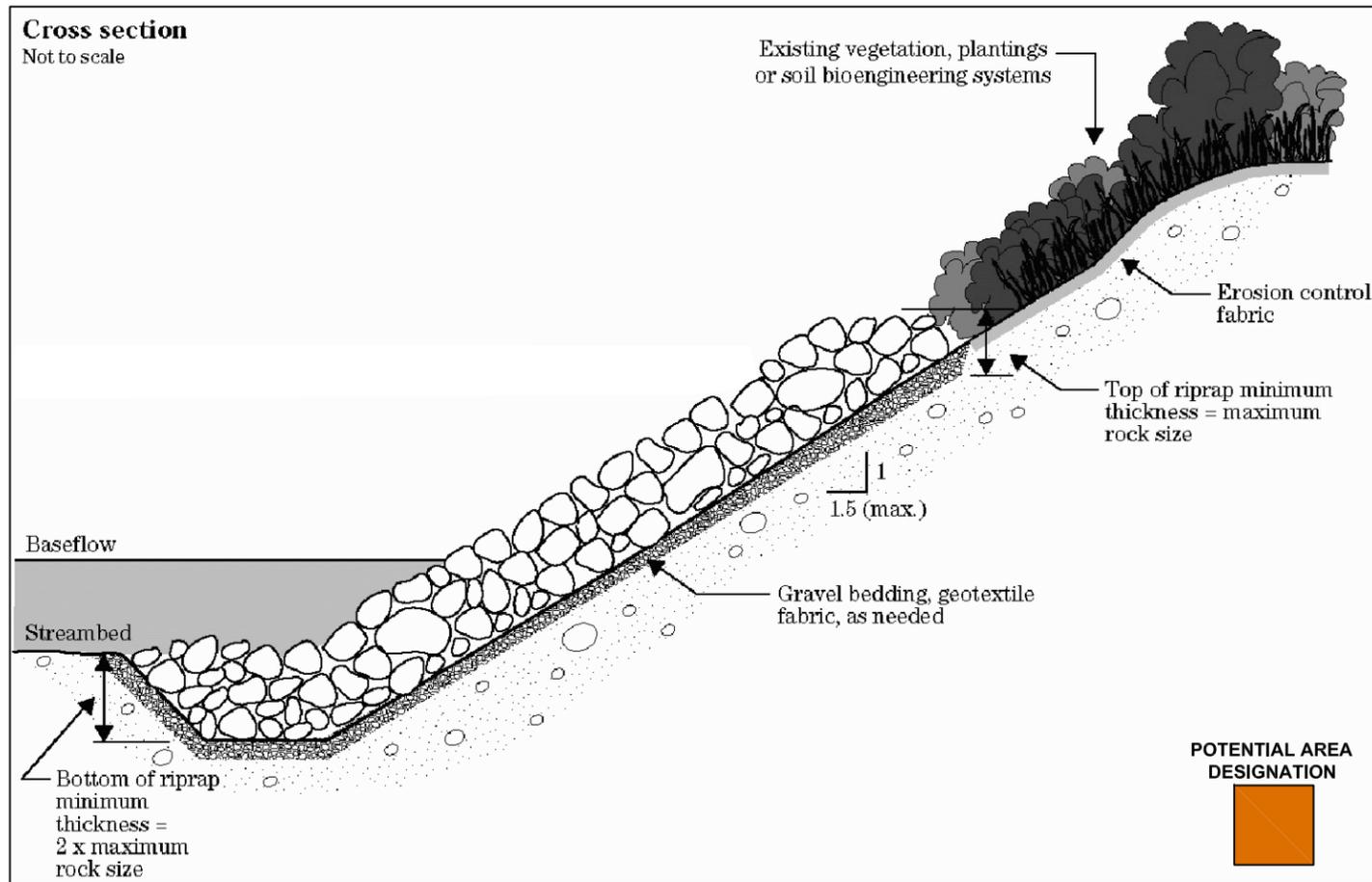
For wetland areas, only apply a light amount of nurse crop seed and no Bermuda or Kentucky 31 Fescue seed. Do not apply lime or fertilizer to wetland areas. These areas will rapidly revegetate in native wetland vegetation without seeding.

(deviations from these seed mixes allowed with prior approval)

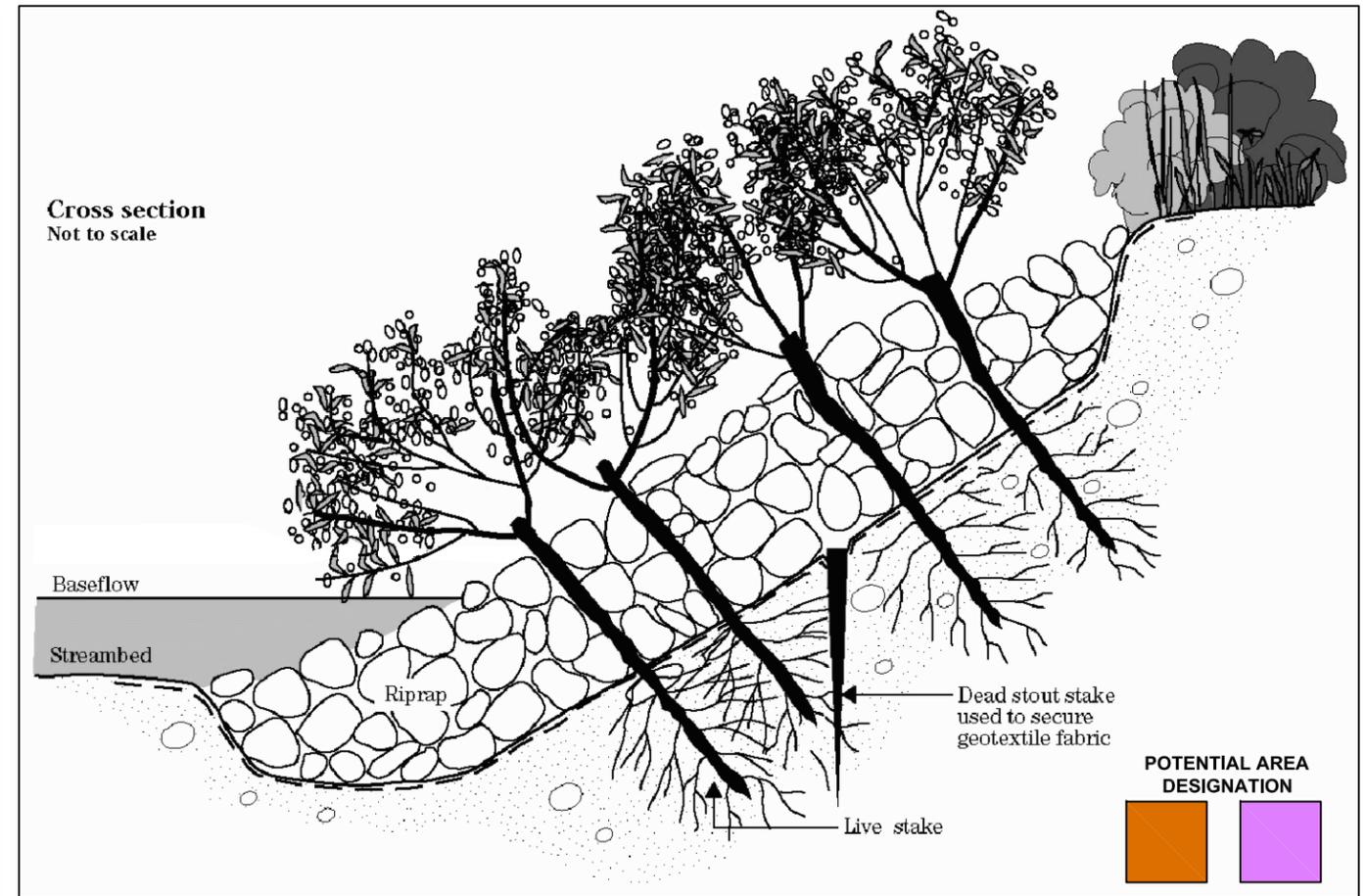
TEMPORARY MULCHING DETAILS

1. Temporary mulching or seeding will be conducted in areas where construction activities may cease for 14 days or more.
2. See seeding schedule for temporary and permanent seeding details.
3. Mulch materials can include clean, weed free hay or straw, wood chips or wood fibers.
4. Hay/straw application rates are approximately 2,000 lb./acre. There must be adequate mulch coverage to prevent erosion, washout and poor plant establishment.
5. Grading is not necessary before mulching but may be required if vegetation is expected to grow.
6. Straw or hay must be anchored on the surface via application of a tackifier, stapling netting over top, or crimping with a mulch crimping tool. Materials heavy enough to stay in place in low slope areas, such as bark and wood fibers, do not need anchoring.
7. Mechanical crimping is preferred for slopes less than 3:1. For slopes greater than 3:1 erosion control mats, blankets or nets are recommended. If netting and matting material is used, firm continuous contact between the materials and the soil is required to prevent erosion.
8. Rock can also be used as mulch. An aggregate base course can be spread on disturbed areas for temporary or permanent stabilization. The rock mulch layer should be thick enough to provide full coverage of exposed soil on the area it is applied.
9. Mulched areas will be regularly inspected as part of the E&S inspection routine (minimum every 7 calendar days and after rainfall event that produces 1/2-inch or more of precipitation).
10. Damaged areas will be repaired or replaced as soon as practicable.

FIGURE 6D DOMINION ENERGY SOUTH CAROLINA, INC.	
E&S CONTROL DETAILS	
CONGAREE RIVER MRA COLUMBIA, SOUTH CAROLINA	
DATE: 9/10/20	FILE NAME: CONG580
APEX COMPANIES, LLC	



7A-1 TYPICAL RIPRAP RIVER BANK STABILIZATION
(OR OTHER HARDSCAPE MATERIAL)

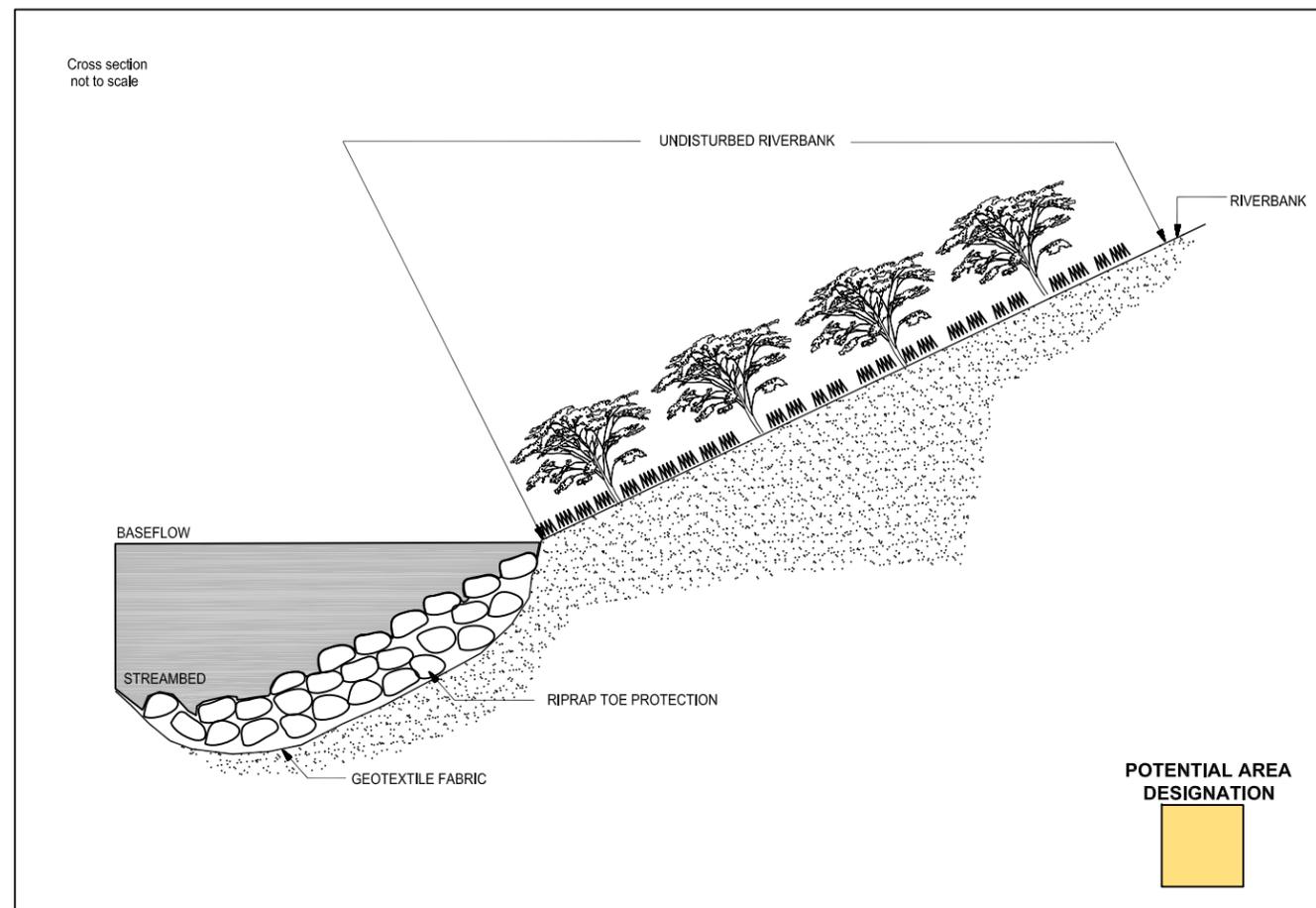


7A-2 TYPICAL RIPRAP RIVER BANK STABILIZATION WITH JOINT PLANTING
(OR OTHER HARDSCAPE MATERIAL)

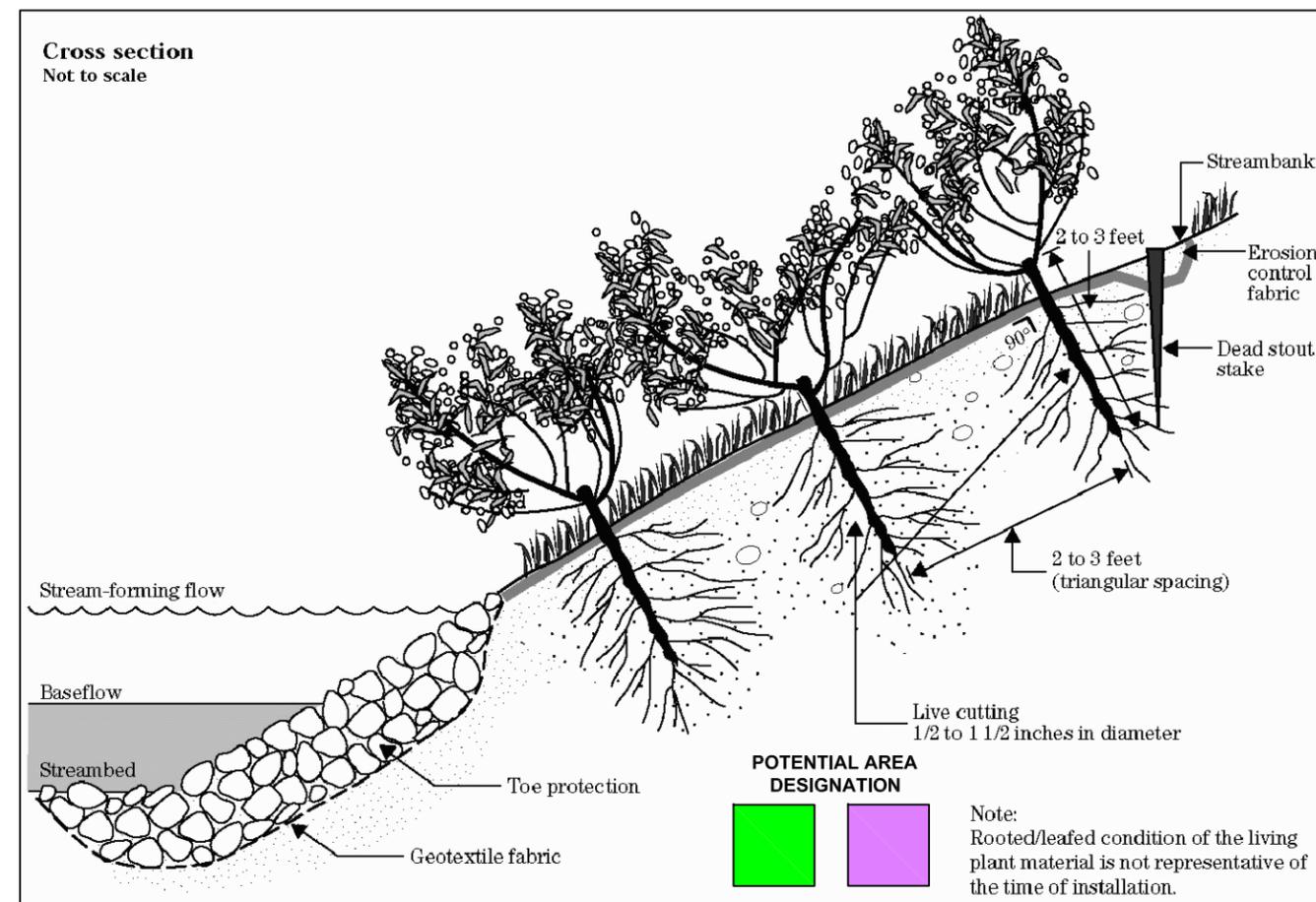
NOTES:

1. RIPRAP BANK STABILIZATION WILL BE UTILIZED IN AREAS WITH HIGH VELOCITY AND OR TURBULENT RIVER FLOWS TO GUARD AGAINST FUTURE RIVERBANK EROSION.
2. JOINT PLANTING (DETAIL 7A-2) WILL BE CONDUCTED, IF FEASIBLE, TO PROVIDE VEGETATIVE COVER IN RIPRAP AREAS AND TO PROVIDE A TRANSITION TO OTHER BIOENGINEERED AREAS.
3. DETAILS OBTAINED FROM UNITED STATES DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE ENGINEERING FIELD HANDBOOK (ISSUED 1996) - PART 650 - CHAPTER 16 STREAMBANK AND SHORELINE PROTECTION.
4. INSTALLATION OF SHORELINE RESTORATION COMPONENTS WILL BE CONDUCTED IN ACCORDANCE WITH ESTABLISHED STANDARDS AS OUTLINE IN THE ABOVE REFERENCE ENGINEERING FIELD HANDBOOK.
5. TABLES 1, 2 AND 3 ON FIGURE 7D PROVIDE PLANT SPECIFICATIONS.

FIGURE 7A DOMINION ENERGY SOUTH CAROLINA, INC.	
RIVERBANK STABILIZATION DETAILS	
CONGAREE RIVER MRA COLUMBIA, SOUTH CAROLINA	
DATE: 9/10/20	FILE NAME: CONG581
APEX COMPANIES, LLC	



7B-1 UNDISTURBED RIVER BANK TOE STABILIZATION

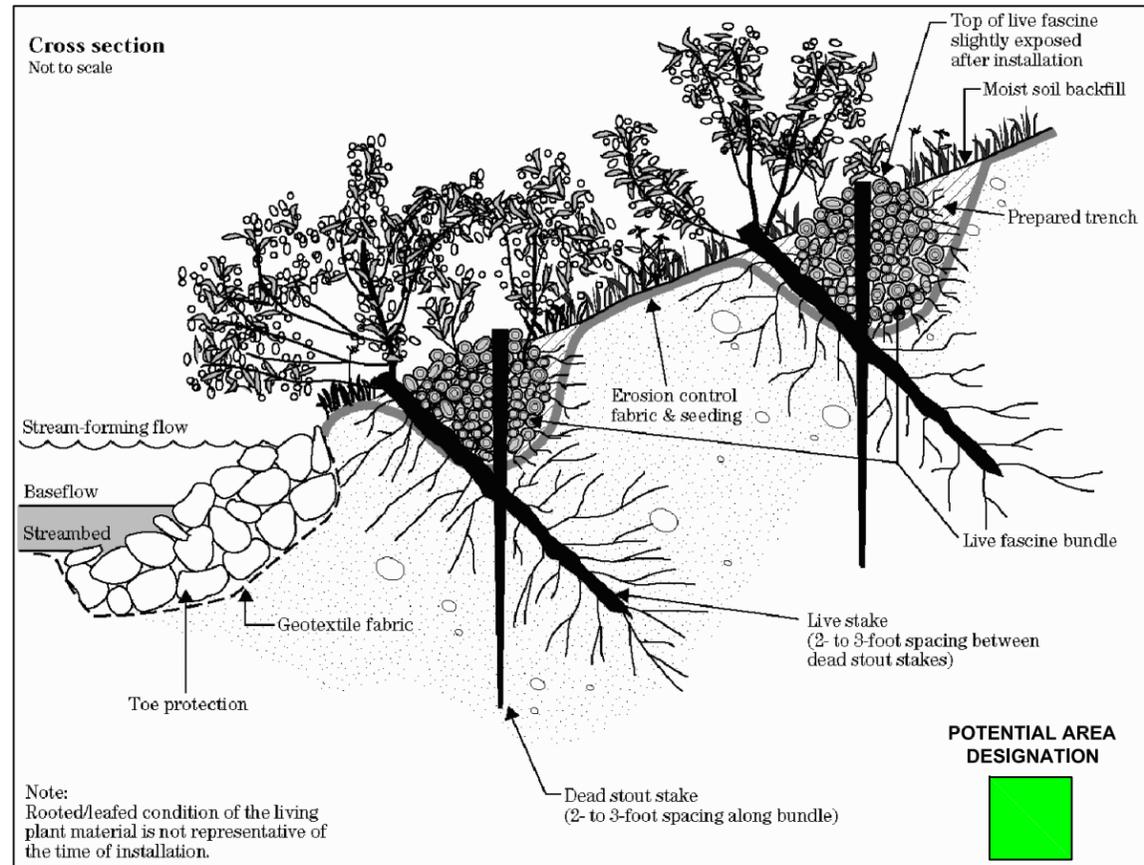


7B-2 JOINT PLANTING BIOENGINEERED BANK STABILIZATION OPTION DETAIL

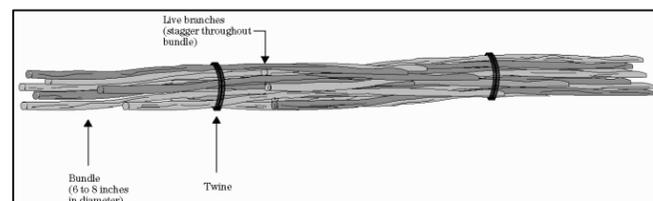
NOTES:

1. GEOTEXTILE AND RIPRAP (DETAIL 7B-1) WILL BE UTILIZED TO STABILIZE EXCAVATED AREAS AT THE TOE OF RIVERBANK SLOPES TO PREVENT SLOUGHING OR COLLAPSING. RIPRAP PLACEMENT WILL TERMINATE AT OR BELOW THE APPROXIMATE NORMAL WATERLINE.
2. LIVE STAKES (DETAIL 7B-2) WILL POTENTIALLY BE UTILIZED IN CONJUNCTION WITH OTHER BIOENGINEERED SOLUTIONS, AS NEEDED, IN AREAS WHERE RIVERBANK DISTURBANCE EXTENDS SIGNIFICANTLY ABOVE THE NORMAL WATERLINE AND RIVER FLOW VELOCITY AND TURBULENCE CONDITIONS DO NOT REQUIRE ADDITIONAL STABILIZATION MEASURES.
3. DETAILS OBTAINED FROM UNITED STATES DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE ENGINEERING FIELD HANDBOOK (ISSUED 1996) - PART 650 - CHAPTER 16 STREAMBANK AND SHORELINE PROTECTION.
4. INSTALLATION OF SHORELINE RESTORATION COMPONENTS WILL BE CONDUCTED IN ACCORDANCE WITH ESTABLISHED STANDARDS AS OUTLINE IN THE ABOVE REFERENCE ENGINEERING FIELD HANDBOOK.
5. TABLES 1, 2 AND 3 ON FIGURE 7D PROVIDE PLANT SPECIFICATIONS.

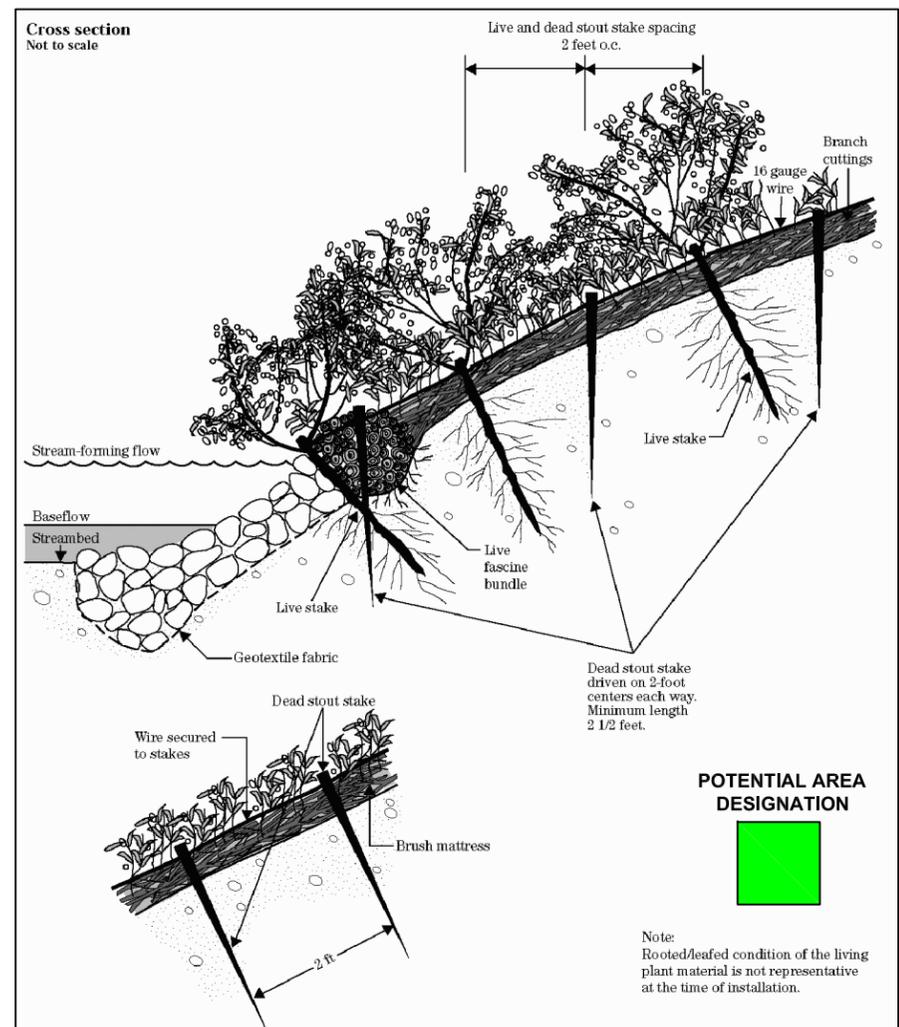
<p>FIGURE 7B DOMINION ENERGY SOUTH CAROLINA, INC.</p>	
<p>RIVERBANK TOE STABILIZATION AND BIOENGINEERING OPTION DETAILS</p>	
<p>CONGAREE RIVER MRA COLUMBIA, SOUTH CAROLINA</p>	
DATE: 9/10/20	FILE NAME: CONG582
<p>APEX COMPANIES, LLC</p>	



7C-1 LIVE FASCINE STABILIZATION OPTION



7C-2 LIVE FASCINE DETAIL

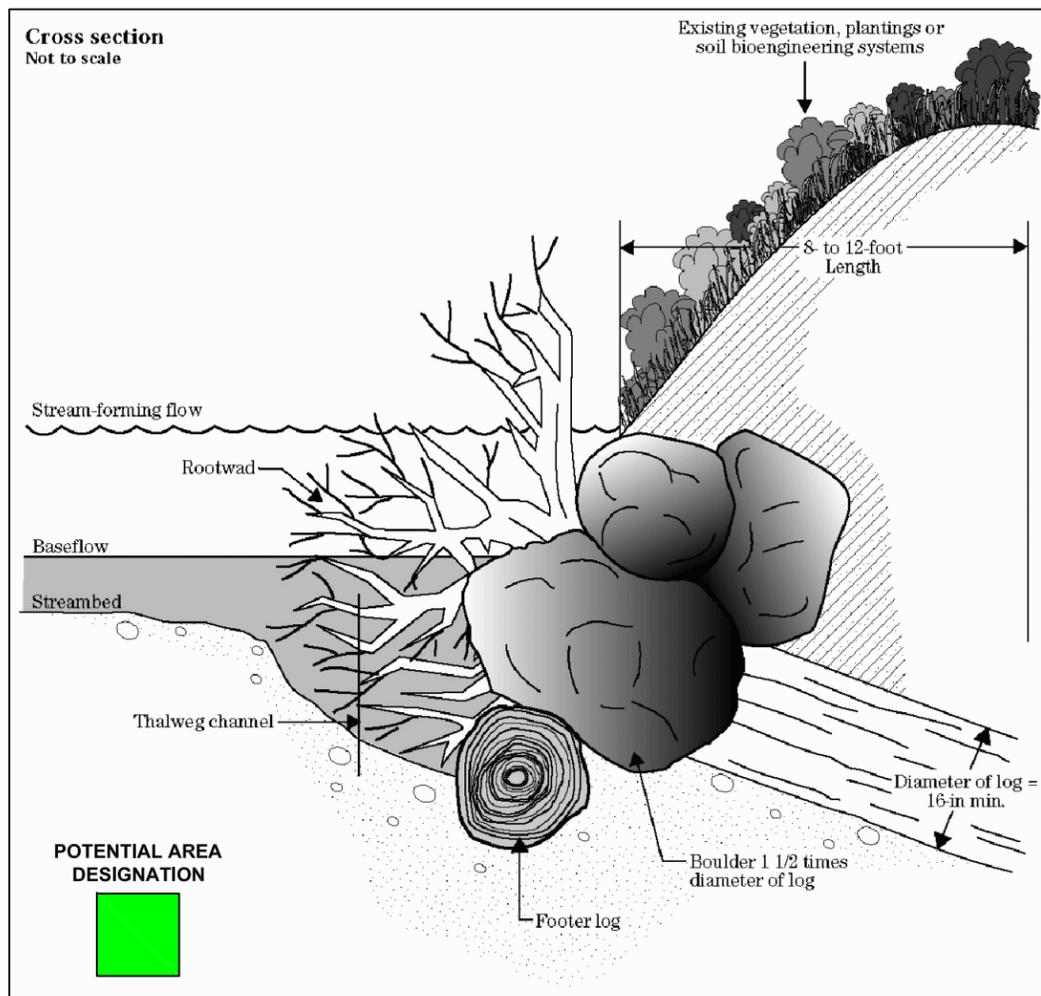


7C-3 BRUSHMATTRESS BANK STABILIZATION OPTION DETAIL

NOTES:

1. LIVE FASCINES (DETAIL 7C-1) ARE AN OPTION FOR FLATTER SLOPE (3:1 OR FLATTER) STABILIZATION IN AREAS WHERE RIVER VELOCITY AND TURBULENCE CONDITIONS DO NOT REQUIRE ADDITIONAL STABILIZATION MEASURES.
2. LIVE FASCINES (DETAIL 7C-2) ARE LONG BUNDLES OF BRANCH CUTTINGS THAT CONTAIN SOME LIVE BRANCHES.
3. BRUSHMATTRESS (DETAIL 7C-3) PROVIDE A COMBINATION OF LIVE STAKES, LIVE FASCINES AND BRANCH CUTTINGS AND PROVIDE MORE PROTECTION FROM EROSION OF STEEPER SLOPES OR AREAS OF HIGHER VELOCITY RIVER FLOW.
4. DETAILS OBTAINED FROM UNITED STATES DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE ENGINEERING FIELD HANDBOOK (ISSUED 1996) - PART 650 - CHAPTER 16 STREAMBANK AND SHORELINE PROTECTION.
5. INSTALLATION OF SHORELINE RESTORATION COMPONENTS WILL BE CONDUCTED IN ACCORDANCE WITH ESTABLISHED STANDARDS AS OUTLINE IN THE ABOVE REFERENCE ENGINEERING FIELD HANDBOOK.
6. TABLES 1, 2 AND 3 ON FIGURE 7D PROVIDE PLANT SPECIFICATIONS.

<p>FIGURE 7C DOMINION ENERGY SOUTH CAROLINA, INC.</p>	
<p>BIOENGINEERED STABILIZATION OPTION DETAILS</p>	
<p>CONGAREE RIVER MRA COLUMBIA, SOUTH CAROLINA</p>	
DATE: 9/8/20	FILE NAME: CONG583
<p>APEX COMPANIES, LLC</p>	



7D-1 LOG, ROOTWAD AND BOULDER REVETMENT STABILIZATION OPTION DETAIL

TABLE 1
GRASSES AND FORBES

Scientific Name	Common Name	Soil Preference	Drought Tolerance	Shade Tolerance	Flood Tolerance
<i>Ammophila breviligulata</i>	American beachgrass	sands	fair	poor	
<i>Andropogon gerardii</i>	Big bluestem	loams	good	poor	fair
<i>Arundo donax</i>	Giant reed	sandy	good	poor	poor
<i>Herarthria altissima</i>	Limpogress	sandy	poor	poor	good
<i>Panicum amarulum</i>	Coastal panicgrass	sands to loams	good	poor	good
<i>Panicum virgatum</i>	Switchgrass	loams to sands	good	poor	good
<i>Paspalum vaginatum</i>	Seashore paspalum	sandy		poor	good
<i>Pennisetum purpureum</i>	Elephant grass			poor	
<i>Spartina pectinata</i>	Prairie cordgrass	sands to loams	good	fair	fair
<i>Zizaniopsis miliacea</i>	Giant cutgrass	loam	poor	poor	good

TABLE 3
WOODY PLANTS

Scientific Name	Common Name	Plant Type	Establishment Speed
<i>Acer negundo</i>	Boxelder	small to medium tree	fast
<i>Acer rubrum</i>	Red maple	medium tree	fast
<i>Alnus serrulata</i>	Smooth alder	large shrub	medium
<i>Amorpha fruticosa</i>	False indigo	shrub	fast
<i>Aronia arbutifolia</i>	Red Chokeberry	shrub	fast
<i>Asimina triloba</i>	Pawpaw	small tree	
<i>Betula nigra</i>	River birch	medium to large tree	fast
<i>Carpinus caroliniana</i>	American hornbeam	small tree	slow
<i>Carya cordiformis</i>	Bitternut hickory	tree	
<i>Catalpa bignonioides</i>	Southern catalpa	tree	fair
<i>Celtis laevigata</i>	Sugarberry	medium tree	slow
<i>Celtis occidentalis</i>	Hackberry	medium tree	slow
<i>Cephalanthus occidentalis</i>	Buttonbush	large shrub	medium
<i>Chionanthus virginicus</i>	Fringe tree	small tree	
<i>Clethra alnifolia</i>	Sweet Pepperbush	shrub	
<i>Cornus amomum</i>	Silky dogwood	small shrub	medium
<i>Cornus florida</i>	Flowering dogwood	small tree	fair
<i>Diospyros virginiana</i>	Persimmon	medium tree	fair
<i>Fraxinus pennsylvanica</i>	Green ash	medium tree	fast
<i>Gleditsia triacanthos</i>	Honeylocust	medium tree	fast
<i>Ilex decidua</i>	Possomhaw	large shrub to small tree	
<i>Ilex opaca</i>	American holly	small tree	medium
<i>Ilex verticillata</i>	Winterberry	small to large shrub	
<i>Juglans nigra</i>	Black walnut	medium tree	fair
<i>Juniperus virginiana</i>	Eastern redcedar	large tree	medium
<i>Liquidambar styraciflua</i>	Sweetgum	large tree	
<i>Liriodendron tulipifera</i>	Tulip poplar	large tree	fast
<i>Magnolia virginiana</i>	Sweetbay	small tree	
<i>Nyssa sylvatica</i>	Blackgum	tall tree	slow
<i>Ostrya virginiana</i>	Hophornbean	small tree	slow
<i>Platanus occidentalis</i>	Sycamore	large tree	fast
<i>Populus deltoides</i>	Eastern cottonwood	tall tree	fast
<i>Quercus alba</i>	White oak	large tree	slow
<i>Quercus lyrata</i>	Overcup oak	medium tree	slow
<i>Quercus michauxii</i>	Swamp chestnut oak	medium tree	fair
<i>Quercus nigra</i>	Water oak	medium tree	slow
<i>Quercus phellos</i>	Willow oak	medium to large tree	medium
<i>Quercus shumardii</i>	Shumard oak	large tree	slow
<i>Rhododendron atlanticum</i>	Coast azalea	small shrub	
<i>Rhododendron viscosum</i>	Swamp azalea	shrub	
<i>Salix nigra</i>	Black willow	small to large tree	fast
<i>Viburnum nudum</i>	Swamp haw	large shrub	

TABLE 2
PLANTS SUITABLE FOR ROOTING

Scientific Name	Common Name	Plant Type	Rooting Ability (from cutting)
<i>Acer negundo</i>	Boxelder		
<i>Asimina triloba</i>	Pawpaw	small tree	poor to fair
<i>Baccharis balimifolia</i>	Groundsel bush	medium shrub	good
<i>Cephalanthus occidentalis</i>	Buttonbush	large shrub	fair to good
<i>Cornus amomum</i>	Silky dogwood	small shrub	fair
<i>Cornus sericia</i>	Red osier dogwood		
<i>Gleditsia triacanthos</i>	Honeylocust	medium tree	poor to fair
<i>Populus deltoides</i>	Eastern cottonwood	tall tree	very good
<i>Robinia sp.</i>	Black locust		
<i>Salix discolor</i>	Pussy willow	large shrub	very good
<i>Salix nigra</i>	Black willow	small to large tree	good to excel
<i>Salix purpurea</i>	Purpleosier willow	medium tree	excel
<i>Sambucus canadensis</i>	American elder	medium shrub	good
<i>Viburnum dentatum</i>	Arrowwood	medium to tall shrub	good
<i>Viburnum lentago</i>	Nannyberry	large shrub	fair to good

NOTES:

- LOG, ROOTWAD AND BOULDER REVETMENTS MAY BE UTILIZED SPORADICALLY TO PROVIDE OVERHEAD COVER AND HABITAT IMPROVEMENT ALONG THE DISTURBED SHORELINE.
- DETAILS OBTAINED FROM UNITED STATES DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE ENGINEERING FIELD HANDBOOK (ISSUED 1996) - PART 650 - CHAPTER 16 STREAMBANK AND SHORELINE PROTECTION.
- INSTALLATION OF SHORELINE RESTORATION COMPONENTS WILL BE CONDUCTED IN ACCORDANCE WITH ESTABLISHED STANDARDS AS OUTLINE IN THE ABOVE REFERENCE ENGINEERING FIELD HANDBOOK.
- PLANTING OPTIONS OBTAINED FROM THE "STREAMBANK AND SHORELINE STABILIZATION TECHNIQUES TO CONTROL EROSION AND PROTECT PROPERTY" - GEORGIA DEPARTMENT OF NATURAL RESOURCES.

FIGURE 7D
DOMINION ENERGY
SOUTH CAROLINA, INC.

BIOENGINEERED STABILIZATION
OPTION DETAILS

CONGAREE RIVER MRA
COLUMBIA, SOUTH CAROLINA

DATE: 9/8/20

FILE NAME: CONG584

APEX COMPANIES, LLC

CONSTRUCTION SEQUENCE

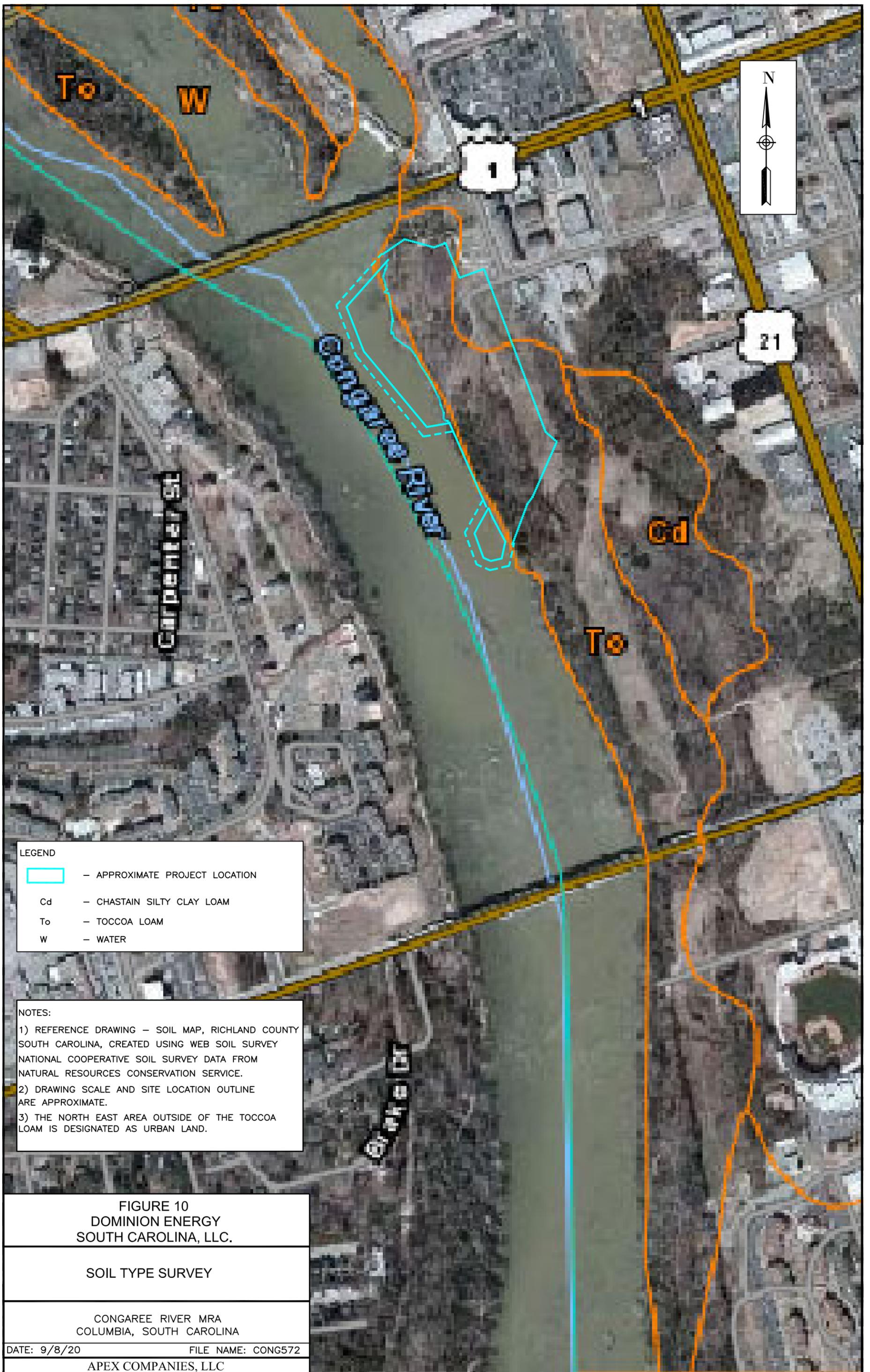
1. Receive approval from City of Columbia for NPDES coverage under SCDHEC General Permit.
2. Hold a pre-construction meeting on-site with DESC, contractor, engineer and City of Columbia Stormwater Management Staff.
3. Notify City of Columbia Utilities and Engineering Staff 48 hours prior to beginning land disturbing activities.
4. Mobilize office trailers to the site and place them in the same locations as utilized for previous site activities and reconnect utilities. Utility connections are already present for the trailers and should require minimal to no additional land disturbance to reestablish the connections.
5. Identify historical areas, plant species of concern areas, and other areas of the site that will be safeguarded from being disturbed by construction activities and demarcate them with high visibility fencing or equivalent visual barrier.
6. Install temporary perimeter fencing and access gate for site security.
7. Install initial perimeter control and other sediment and erosion control BMPs associated with the laydown area improvements, including the stabilized construction entrance.
8. Conduct clearing and grading activities in order to construct the material and water management area, laydown area(s) and access road(s). Stabilize disturbed areas through the addition of geotextile overlain by gravel (crusher run or similar material).
9. Grade and reseed with approved seed mixture any disturbed areas not stabilized via geotextile and gravel.
10. Identify additional access points to the river that will be required, if any, for the Area 1 removal area. Install sediment and erosion control BMPs in these areas to permit construction of the additional access road(s). The final road locations will be chosen in the field during implementation and will be based on field conditions, project requirements and the intent to minimize land disturbance and tree removal activities as much as practicable.
11. Demarcate the portions of the riverbank that are intended to be left undisturbed to limit the potential for disturbance during construction and sediment removal activities.
12. Mobilize cofferdam construction personnel and equipment and begin Area 1 cofferdam construction activities. Total Suspended Solids monitoring will be conducted in the river during active river construction operations.
13. Complete landside support zone construction including erecting temporary structure(s) and installing the water management system components.
14. Install run-on diversion controls, as necessary, to control run-on of stormwater from landside support zone into the Area 1 removal area.
15. After cofferdam is in place, dewater planned removal area and begin sediment removal operations. Utilize the river-based removal area for initial draining of entrained water within the excavated sediment and the water management system for collection and filtration of impacted water.
16. Move excavated material from river removal area to temporary structure for additional screening, conditioning and offsite transport to disposal location.
17. Complete Area 1 excavation activities and remove Area 1 cofferdam materials from the river.
18. Reconstruct disturbed areas of riverbank and remove the Area 1 access roads (except where left in place at request of landowner). Grade and reseed the areas with an approved seed mixture.
19. Complete items 8 through 19 for the Area 2 removal area.
20. Following reconstruction of the riverbank in Area 2, the landside support zone will be restored to pre-project conditions (except gravel roads left in place at request of landowner) by removing the temporary structures, geotextile and gravel from the access roads and laydown areas, and grading and reseeding the areas with an approved seed mixture.
21. Remove office trailer(s).
22. After stabilization has been achieved, DESC will submit the Notice of Termination (NOT) to City of Columbia.

FIGURE 8	
DOMINION ENERGY SOUTH CAROLINA, INC.	
CONSTRUCTION SEQUENCE	
CONGAREE RIVER MRA COLUMBIA, SOUTH CAROLINA	
DATE: 9/10/20	FILE NAME: CONG587
APEX COMPANIES, LLC	

STANDARD NOTES

1. If necessary, slopes, which exceed eight (8) vertical feet should be stabilized with synthetic or vegetative mats, in addition to hydroseeding. It may be necessary to install temporary slope drains during construction. Temporary berms may be needed until the slope is brought to grade.
2. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than fourteen (14) days after work has ceased, except as stated below.
 - a. Where stabilization by the 14th day is precluded by snow or frozen ground conditions stabilization measures must be initiated as soon as practicable.
 - b. Where construction activity on a portion of the Site is temporarily ceased, and earth-disturbing activities will be resumed within 14 days, temporary stabilization measures do not have to be initiated on that portion of the Site.
3. All sediment and erosion control devices shall be inspected once every calendar week. If periodic inspections or other information indicated that a BMP has been inappropriately or incorrectly installed, the Permittee must address the necessary replacement or modification required to correct the BMP within 48 hours of identification.
4. Provide silt fence and/or other control devices, as may be required, to control soil erosion during utility construction. All disturbed areas shall be cleaned, graded, and stabilized with grassing immediately after the utility installation. Fill, cover, and temporary seeding at the end of each day are recommended. If water is encountered while trenching, the water should be filtered to remove any sediments before being pumped back into any waters of the State.
5. All erosion control devices shall be properly maintained during all phases of construction until the completion of all construction activities and all disturbed areas have been stabilized. Additional control devices may be required during construction in order to control erosion and/or offsite sedimentation. All temporary control devices shall be removed once construction is complete and the site is stabilized.
6. The contractor must take necessary action to minimize the tracking of mud onto paved roadway(s) from construction areas and the generation of dust. The contractor shall daily remove mud/soil from pavement, as may be required.
7. Temporary diversion berms and/or ditches will be provided as needed during construction to protect work areas from upslope runoff and/or to divert sediment-laden water to appropriate traps or stable outlets.
8. All waters of the State (WoS), including wetlands, are to be flagged or otherwise clearly marked in the field. A double row of silt fence is to be installed in all areas where a 50-foot buffer can't be maintained between the disturbed area and all WoS. A 10-foot buffer should be maintained between the last row of silt fence and all WoS.
9. Litter, construction debris, oils, fuel and building products with significant potential for impact (such as stockpiles of freshly treated lumber) and construction chemicals that could be exposed to storm water must be prevented from becoming a pollutant source in storm water discharges.
10. A copy of the SWPPP, inspection records and rainfall data must be retained at the construction site or nearby location easily accessible during normal business hours, from the date of commencement of construction activities to the date that final stabilization has been reached.
11. Initiate stabilization measures on any exposed steep slope (3H:1V or greater) where land-disturbing activities have permanently or temporarily ceased, and will not resume from a period of 7 calendar days.
12. Minimize soil compaction and, unless infeasible, preserve topsoil.
13. Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge.
14. Minimize the discharge of pollutants from dewatering of trenches and excavated areas. These discharges are to be routed through appropriate BMPs (sediment basin, filter bags, etc.).
15. The following discharges from sites are prohibited:
 - a. Wastewater from washout of concrete, unless managed by appropriate control;
 - b. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;
 - c. Fuels, oils or other pollutants used in vehicle and equipment operation and maintenance; and
 - d. Soaps or solvents used in vehicle and equipment washing.
16. After construction activities begin, inspections must be conducted at a minimum of at least once every calendar week and must be conducted until final stabilization is reached on all areas of the construction site.
17. If existing BMPs need to be modified or if additional BMPs are necessary to comply with the requirements of this permit and/or SC's Water Quality Standards, implementation must be completed before the next storm event whenever practicable. If implementation before the next storm event is impracticable, the situation must be documented in the SWPPP and alternative BMPs must be implemented as soon as reasonable possible.
18. A Pre-Construction Conference must be held for each construction site with an approved On-site SWPPP prior to the implementation of construction activities. For non-linear projects that disturb 10 acres or more, this conference must be held on-site unless the Department (State) has approved otherwise.

FIGURE 9 DOMINION ENERGY SOUTH CAROLINA, INC.	
STANDARD NOTES	
CONGAREE RIVER MRA COLUMBIA, SOUTH CAROLINA	
DATE: 8/8/20	FILE NAME: CONG571
APEX COMPANIES, LLC	



LEGEND

	— APPROXIMATE PROJECT LOCATION
Cd	— CHASTAIN SILTY CLAY LOAM
To	— TOCCOA LOAM
W	— WATER

NOTES:

- 1) REFERENCE DRAWING — SOIL MAP, RICHLAND COUNTY SOUTH CAROLINA, CREATED USING WEB SOIL SURVEY NATIONAL COOPERATIVE SOIL SURVEY DATA FROM NATURAL RESOURCES CONSERVATION SERVICE.
- 2) DRAWING SCALE AND SITE LOCATION OUTLINE ARE APPROXIMATE.
- 3) THE NORTH EAST AREA OUTSIDE OF THE TOCCOA LOAM IS DESIGNATED AS URBAN LAND.

FIGURE 10 DOMINION ENERGY SOUTH CAROLINA, LLC.	
SOIL TYPE SURVEY	
CONGAREE RIVER MRA COLUMBIA, SOUTH CAROLINA	
DATE: 9/8/20	FILE NAME: CONG572
APEX COMPANIES, LLC	