REMARKS

DATE	REFERENCE	ACTION AND REMARKS

	J	F	M	A	M	J	J	A	S	O	N	D	

NAME OF AID

LIGHT LIST NO.

PRIVACY NOTICE

Authority: 14 U.S.C. 83, 14 U.S.C. 85.

Purpose: To obtain approval to establish a private aid to navigation, applicants must submit CG 2554 (Private Aids to Navigation Application). Information about the private aid to navigation (type, color, geographic position), as well as the applicant's contact information is stored in the U.S. Coast Guard's United States Aids to Navigation Information Management System (USAIMS). USAIMS is the U.S. Coast Guard's comprehensive database for managing information about aids to navigation. USAIMS has user access controls in place to govern who may view or access information.

Routine Uses: Authorized USCG personnel will utilize this information to contact owners in the event of a discrepancy or a mishap to a private aid to navigation. Any external disclosures of data within this record will be made in accordance with DHS/ALL-002, Department of Homeland Security (DHS) Mailing and Other Lists System, November 25, 2008, 73 FR 71659.

Consequences of Failure to Provide Information: Mandatory. Failure to provide the required contact information will prevent approval to establish a private aid to navigation.

U.S. COAST GUARD
PRIVATE AIDS TO NAVIGATION APPLICATION
INSTRUCTIONS

1. The rules, regulations, and procedures pertaining to private aids to navigation are set forth in the excerpt of the Code of Federal Regulations; Title 33, Chapter 1, Part 66 on the following pages.

2. One copy of the application for private aids to navigation shall be forwarded via postal mail, electronic mail, or facsimile to the Commander of the Coast Guard District in which the aids will be located. Sections of charts or sketches showing the work proposed should accompany each application.

3. When making application for private aids to navigation to mark structures and mooring buoys in navigable waters or to mark the excavating or depositing of material therein, evidence is required of the authorization obtained from the U.S. Army Corps of Engineers (USACE), Department of the Army, for such work, (Code of Federal Regulations; Title 33, Part 322.) and/or State Regulatory Agency.

4. The applicant shall complete all of Blocks 1, 2, 3, 4, 5, 9 and 10 for all new applications. When a private aid to navigation is being discontinued, Block 3 need not be completed. Block 6 shall be completed whenever authorization is required to be obtained from Corps of Engineers (See Instruction No. 3). Columns in Block 7 will be completed as follows:
   a. Unlighted buoy(s) - 7a, 7e, 7f, and 7j.
   b. Lighted buoy(s) - 7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, and 7j.
   c. Daybeacon(s) - 7a, 7e, 7f (if applicable), 7h, 7i, and 7j.
   d. Light(s) on a structure - 7a, 7b, 7c, 7d, 7e, 7f (if applicable), 7g, 7h, 7i, and 7j.

5. When a private aid to navigation is being changed, Block 8 shall be used to describe the nature of the change.

6. The required information for each column includes the following:
   (7a) Proposed number or letter to be assigned to the private aid to navigation.
   (7b) Period of light (time in seconds for one complete cycle).
   (7c) Flash length in seconds. For complex or multiple flashes, explain in column (7j).
   (7d) Color of light.
   (7e) Position as determined by Global Positioning System (GPS), differential GPS, professional surveyor, by two or more horizontal angles, or bearing and distance from a prominent charted landmark. If a prominent charted landmark is not available, show latitude and longitude as precisely as the chart permits.
   (7f) Depth of water at buoy or structure (if marine site). All depths are measured from mean lower low water except on Great Lakes where depths are measured from low water datum.
   (7g) Candela, if known; otherwise, include the following information in column (7j); lens size, lamp voltage and amperage if electric, or details of other illuminant to be used.
   (7h) If lighted, the height of the light's optic above the water.
   (7i) Include details of structure (type, color).
   (7j) Used for the following specific information, plus any other useful details: a. buoys - size, shape, color, and reflective material used; b. structures - dayboard shape and color; c. sound signal on a buoy or structure - type and model, audible range, and characteristic (number of strokes or blasts, period and blast length).

7. This form may be used to cover more than one private aid to navigation in the same geographic area. Draw a line between each aid as indicated in example below. Attach separate sheet if additional space is required.

8. Attach a section of chart showing the proposed location of the private aid(s) to navigation.

9. a. After receipt of the approved form, the applicant will advise the District Commander by telephone, postal mail, electronic mail, or facsimile when the authorized work is actually accomplished.
   b. If the private aid(s) to navigation have not been installed within one year of the approval date, the approved application is automatically cancelled.
   c. Any discrepancy in the operation of the private aid(s) to navigation at any time shall be reported to the District Commander by telephone, postal mail, electronic mail, or facsimile in order that Notices to Mariners may be issued. A discrepancy exists whenever the private aid to navigation is not operating as described in the approved application, i.e., lack of signal, incorrect light characteristic, or improper color, shape, or position of shore structure or buoy. The correction of the discrepancy will also be reported by the same method.

10. All classes of private aids to navigation shall be maintained in proper condition. They are subject to inspection by the Coast Guard at any time and without prior notice to the maintainer.

EXAMPLE OF USE OF APPLICATION

FOR DISTRICT COMMANDERS ONLY		7. APPLICANT WILL FILL IN APPLICABLE REMAINING COLUMNS									
LIGHT LIST NUMBER	NAME OF AID	NO. OR LTR (7a)	LIGHT			POSITION (7e)	DEPTH OF WATER (7f)	CANDELA (7g)	FOCAL PLANE HEIGHT (7h)	BUOY/STRUCTURE	REMARKS *(See instructions) (7j)*
			FLASH PERIOD (7b)	FLASH LENGTH (7c)	COLOR (7d)					TYPE, COLOR, AND HEIGHT ABOVE GROUND (7i)	
		1	4s	0.4s	Green	dd°mm'ss.sss"N ddd°mm'ss.sss"W	9 Ft			5' lighted buoy, Green	
		2				dd°mm'ss.sss"N ddd°mm'ss.sss"W	8 Ft			Nun buoy, Red	
		3				dd°mm'ss.sss"N ddd°mm'ss.sss"W	7 Ft			Single Pile	2' square dayboard, Green
		4	2.5s	0.5s	Red	dd°mm'ss.sss"N ddd°mm'ss.sss"W	9 Ft		14 Ft	Multi-Pile	3' triangular dayboard, Red

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number.

The U.S. Coast Guard estimates the average burden for this report is 1 hour. You may submit any comments concerning the accuracy of this burden estimate or any suggestions for reducing the burden to: COMMANDANT (CG-NAV-1), U.S. COAST GUARD STOP 7418, 2703 MARTIN LUTHER KING JR AVE SE, WASHINGTON DC 20593-7418 or OFFICE OF MANAGEMENT AND BUDGET, PAPERWORK REDUCTION PROJECT (1625-0011), WASHINGTON, DC 20590-0001.

§ 66.01-1 Basic provisions.

(a) No person, public body, or instrumentality not under the control of the Commandant, exclusive of the Armed Forces, will establish and maintain, discontinue, change or transfer ownership of any aid to maritime navigation, without first obtaining permission to do so from the Commandant.

(b) For the purposes of this subpart, the term private aids to navigation includes all marine aids to navigation operated in the navigable waters of the United States other than those operated by the Federal Government (part 62 of this subchapter) or those operated in State waters for private aids to navigation (subpart 66.05).

(c) Coast Guard authorization of a private aid to navigation does not authorize any invasion of private rights, nor grant any exclusive privileges, nor does it obviate the necessity of complying with any other Federal, State or local laws or regulations.

(d) With the exception of radar beacons (racons) and shore based radar stations, operation of electronic aids to navigation as private aids will not be authorized.

§ 66.01-3 Delegation of authority to District Commanders.

(a) Under Section 888 of Pub. L. 107-296, 116 Stat. 2135, the Commandant delegates to the District Commanders within the confines of their respective districts (see Part 3 of this chapter for descriptions) the authority to grant permission to establish and maintain, discontinue, change or transfer ownership of private aids to maritime navigation, and otherwise administer the requirements of this subpart.

(b) The decisions of the District Commander may be appealed within 30 days from the date of decision. The decision of the Commandant in any case is final.

§ 66.01-5 Application procedure.

To establish and maintain, discontinue, change, or transfer ownership of a private aid to navigation, you must apply to the Commander of the Coast Guard District in which the aid is or will be located. You can find application form CG-2554 at http://www.uscg.mil/forms/cg/CG_2554.pdf. You must complete all parts of the form applicable to the aid concerned, and must forward the application to the District Commander. You must include the following information:

(a) The proposed position of the aid to navigation by two or more horizontal angles, bearings and distance from charted landmarks, or the latitude and longitude as determined by GPS or differential GPS. Attach a section of chart or sketch showing the proposed position.

(b) The name and address of the person at whose expense the aid will be maintained.

(c) The name and address of the person who will maintain the aid to navigation.

(d) The time and dates during which it is proposed to operate the aid.

(e) The necessity for the aid.

(f) For lights: The color, characteristic, range, effective intensity, height above water, and description of illuminating apparatus. Attach a copy of the manufacturer's data sheet to the application.

(g) For sound signals: Type (whistle, horn, bell, etc.) and characteristic.

(h) For buoys or daybeacons: Shape, color, number, or letter, depth of water in which located or height above water.

(i) For racons: Manufacturer and model number of racon, height above water of desired installation, and requested coding characteristic. Equipment must have FCC authorization.

§ 66.01-10 Characteristics.

The characteristics of a private aid to navigation must conform to those prescribed by the United States Aids to Navigation System set forth in subpart B of part 62 of this subchapter.

§ 66.01-11 Lights.

(a) Except for range and sector lights, each light approved as a private aid to navigation must:

(1) Have at least the effective intensity required by this subpart omnidirectionally in the horizontal plane, except at the seams of its lens-mold.

(2) Have at least 50% of the effective intensity required by this subpart within ±2° of the horizontal plane.

(3) Have a minimum effective intensity of at least 1 candela for a range of 1 nautical mile, 3 candelas for one of 2 nautical miles, 10 candelas for one of 3 nautical miles, and 54 candelas for one of 5 nautical miles. The District Commander may change the requirements for minimum intensity to account for local environmental conditions. For a flashing light this intensity is determined by the following formula:

$Ie=G/(0.2+t_2-t_1)$

Where:
Ie = Effective intensity
G = The integral of the instantaneous intensity of the flashed light with respect to time
t_1 = Time in seconds at the beginning of the flash
t_2 = Time in seconds at the end of the flash
t_2-t_1 is greater than or equal to 0.2 seconds.

(4) Unless the light is a prefocused lantern, have a means of verifying that the source of the light is at the focal point of the lens.

(5) Emit a color within the angle of 50% effective intensity with color coordinates lying within the boundaries defined by the corner coordinates in Table 66.01-11(5) of this part when plotted on the Standard Observer Diagram of the International Commission on Illumination (CIE).

Table 66.01-11(5)--Coordinates of Chromaticity

Color	Coordinates of chromaticity	
	x axis	y axis
White	0.500	0.382
	0.440	0.382
	0.285	0.264
	0.285	0.332
	0.453	0.440
	0.500	0.440
Green	0.305	0.689
	0.321	0.494
	0.228	0.351
	0.028	0.385
Red	0.735	0.265
	0.721	0.259
	0.645	0.335
	0.665	0.335
Yellow	0.618	0.382
	0.612	0.382
	0.555	0.435
	0.560	0.440

(6) Have a recommended interval for replacement of the source of light that ensures that the lantern meets the minimal required intensity stated in paragraph (a)(3) of this section in case of degradation of either the source of light or the lens.

(7) Have autonomy of at least 10 days if the light has a self-contained power system. Power production for the prospective position should exceed the load during the worst average month of insolation. The literature concerning the light must clearly state the operating limits and service intervals. Low-voltage disconnects used to protect the battery must operate so as to prevent sporadic operation at night.

(b) The manufacturer of each light approved as a private aid to navigation must certify compliance by means of an indelible plate or label affixed to the aid that meets the requirements of § 66.01-14.

§ 66.01-12 May I continue to use the private aid to navigation I am currently using?

If, after March 8, 2004, you modify, replace, or install any light that requires a new application as described in § 66.01-5, you must comply with the rules in this part.

§ 66.01-13 When must my newly manufactured equipment comply with these rules?

After March 8, 2004, equipment manufactured for use as a private aid to navigation must comply with the rules in this part.

§ 66.01-14 Label affixed by manufacturer.

(a) Each light, intended or used as a private aid to navigation authorized by this part, must bear a legible, indelible label (or labels) affixed by the manufacturer and containing the following information:

(1) Name of the manufacturer.

(2) Model number.

(3) Serial number.

(4) Words to this effect: "This equipment complies with requirements of the U.S. Coast Guard in 33 CFR part 66."

(b) This label must last the service life of the equipment.

(c) The manufacturer must provide the purchaser a data sheet containing the following information:
(1) Recommended service life based on the degradation of either the source of light or the lamp.
(2) Range in nautical miles.
(3) Effective intensity in candela.
(4) Size of lamp (incandescent only).
(5) Interval, in days or years, for replacement of dry-cell or rechargeable battery.

§ 66.01-15 Action by Coast Guard.

(a) The District Commander receiving the application will review it for completeness and will assign the aid one of the following classifications:

Class I: Aids to navigation on marine structures or other works which the owners are legally obligated to establish, maintain and operate as prescribed by the Coast Guard.

Class II: Aids to navigation exclusive of Class I located in waters used by general navigation.

Class III: Aids to navigation exclusive of Class I located in waters not ordinarily used by general navigation.

(b) Upon approval by the District Commander, a signed copy of the application will be returned to the applicant. Approval for the operation of radar beacons (racons) will be effective for an initial two year period, then subject to annual review without further submission required of the owner.

§ 66.01-20 Inspection.

All classes of private aids to navigation shall be maintained in proper operating condition. They are subject to inspection by the Coast Guard at any time and without prior notice.

§ 66.01-25 Discontinuance and removal.

(a) No person, public body or instrumentality shall change, move or discontinue any authorized private aid to navigation required by statute or regulation (Class I, § 66.01-15) without first obtaining permission to do so from the District Commander.

(b) Any authorized private aid to navigation not required by statute or regulation (Classes II and III, § 66.01-15) may be discontinued and removed by the owner after 30 days' notice to the District Commander to whom the original request for authorization for establishment of the aid was submitted.

(c) Private aids to navigation which have been authorized pursuant to this part shall be discontinued and removed without expense to the United States by the person, public body or instrumentality establishing or maintaining such aids when so directed by the District Commander.

§ 66.01-30 Corps of Engineers' approval.

(a) Before any private aid to navigation consisting of a fixed structure is placed in the navigable waters of the United States, authorization to erect such structure shall first be obtained from the District Engineer, U.S. Army Corps of Engineers in whose district the aid will be located.

(b) The application to establish any private aid to navigation consisting of a fixed structure shall show evidence of the required permit having been issued by the Corps of Engineers.

§ 66.01-40 Exemptions.

(a) Nothing in the preceding sections of this subpart shall be construed to interfere with or nullify the requirements of existing laws and regulations pertaining to the marking of structures, vessels and other obstructions sunken in waters subject to the jurisdiction of the United States (Part 64 of this subchapter), the marking of artificial islands and structures which are erected on or over the seabed and subsoil of the Outer Continental Shelf (Part 67 of this subchapter), or the lighting of bridges over navigable waters of the United States (Subchapter J of this subchapter).

(b) Persons marking bridges pursuant to Subchapter J of this title are exempted from the provisions of § 66.01-5.

§ 66.01-45 Penalties.

Any person, public body or instrumentality, excluding the armed forces, who shall establish, erect or maintain any aid to maritime navigation without first obtaining authority to do so from the Coast Guard, with the exception of those established in accordance with § 64.11 of this chapter, or who shall violate the regulations relative thereto issued in this part, is subject to the provisions of 14 U.S.C. 83.

§ 66.01-50 Protection of private aids to navigation.

Private aids to navigation lawfully maintained under these regulations are entitled to the same protection against interference or obstruction as is afforded by law to Coast Guard aids to navigation (Part 70 of this subchapter). If interference or obstruction occurs, a prompt report containing all the evidence available should be made to the Commander of the Coast Guard District in which the aids are located.

§ 66.01-55 Transfer of ownership.

(a) When any private aid to navigation authorized by the District Commander, or the essential real estate or facility with which the aid is associated, is sold or transferred, both parties to the transaction shall submit application (§66.01-5) to the Commander of the Coast Guard District in which the aid is located requesting authority to transfer responsibility for maintenance of the aid.

(b) The party relinquishing responsibility for maintenance of the private aid to navigation shall indicate on the application form (CG-2554) both the discontinuance and the change of ownership of the aid sold or transferred.

(c) The party accepting responsibility for maintenance of the private aid to navigation shall indicate on the application form (CG-2554) both the establishment and the change of ownership of the aid sold or transferred.

(d) In the event the new owner of the essential real estate or facility with which the aid is associated refuses to accept responsibility for maintenance of the aid, the former owner shall be required to remove the aid without expense to the United States. This requirement shall not apply in the case of any authorized private aid to navigation required by statute or regulation (Class I, § 66.01-15) which shall be maintained by the new owner until the conditions which made the aid necessary have been eliminated.

DRAFT NAVIGATION PLAN

CONGAREE RIVER MODIFIED REMOVAL ACTION
COLUMBIA, SOUTH CAROLINA

August 2020

Prepared for:

Dominion Energy South Carolina, Inc.
400 Otarre Parkway
Cayce, SC 29033

Prepared by:

Apex Companies, LLC
1600 Commerce Circle
Trafford, PA 15085

DRAFT NAVIGATION PLAN

CONGAREE RIVER MODIFIED REMOVAL ACTION
COLUMBIA, SOUTH CAROLINA

INTRODUCTION

Dominion Energy South Carolina, Inc. (DESC), formerly South Carolina Electric and Gas Company (DESC), plans to complete a Stakeholder-developed Modified Removal Action (MRA) to address the occurrence of a tar-like material (TLM) that is commingled with sediment along the eastern shoreline of the Congaree River, just south of the Gervais Street Bridge in Columbia, South Carolina. The project area location is shown on Figure 1. The TLM is believed to be a coal tar material that originated from the Huger Street former manufactured gas plant (MGP) site, located approximately 1,000 feet to the northeast of the project area. The proposed work is being performed by DESC at the direction of South Carolina Department of Health and Environmental Control (SCDHEC) and is subject to permits and approvals from the U.S. Army Corps of Engineers (USACE) and other agencies. The USACE approval for this project is provided in Appendix A.

The overall objective of this project is to remove impacted sediment from the Congaree River within two areas. The plan is to construct temporary cofferdams around each area to facilitate removal of the impacted sediment. The temporary cofferdams will be constructed sequentially and the MRA will occur over several years. The construction and active remediation season will occur from approximately May through October of each year. Figure 2 illustrates the proposed cofferdam locations. After each cofferdam is constructed, the isolated area will be dewatered and the impacted sediment removed and transported off-site for disposal. Following completion of the removal activities in Area 1, the cofferdam will be removed and a cofferdam will be constructed around Area 2. After the removal activities are completed in Area 2, the cofferdam materials will be removed from the river.

DESC intends to complete the project with as minimal of an impact on navigation and recreational use of the Congaree River as possible. This Plan was developed based on the guidelines provided in the “U.S. Coast Guard Aids to Navigation System” publication and is a supplement to the U.S. Coast Guard (USCG) Private Aids to Navigation Application. DESC will consult with the USCG District Seven Aids to Navigation and Waterways Management Office as necessary, and will complete the required notifications and installation of appropriate navigational aids and safety measures as specified in this Plan or directed by the USCG during implementation of the project. The proposed Notice to Navigation Interests and example navigational aid specifications are provided in Appendix B and C, respectively.

NAVIGATION WITHIN THE PROJECT AREA

The USACE Charleston District completed a Navigability Study of the Congaree River Basin in 1977. Excerpts from this study are provided in Appendix D. This document classifies the Congaree River as “navigable waters of the U.S. from its confluence with the Wateree River (R.M. [River Mile] 125.3) to the Gervais Street Bridge, U.S. 378 (R.M. 175.9).” As a result, the MRA area is located at the extreme

upriver limit of the classified navigable waters (Figure 2). This study provides historical documentation of significant use of the Congaree River for navigation and commerce, especially during the time frame when the Columbia Canal was operational. However, the study states that use of the river for interstate commerce has not occurred since the 1950s due to the utilization of other forms of transportation.

Current conditions within the Congaree River and the project area are similar to those described in the 1977 study. The river in the vicinity of the Gervais Street Bridge is shallow and rocky with highly variable flow rates that preclude the operation of large watercraft. In fact, it was necessary to utilize multiple forms of small watercraft that ranged in size from a pontoon boat to a canoe to complete the sediment investigative activities within the project area. In some instances, areas were investigated by wading due to the shallow and rocky nature of the river bottom. In other areas, where sufficient water depth was present to allow for the small pontoon boat to operate, the flow rate of the river was too swift to permit safe operation of the watercraft.

Currently, only small personal watercraft such as inner tubes, kayaks, canoes and occasionally a small motorboat are seen operating in the vicinity of the Gervais Street Bridge and the project area. Wading for the purpose of fishing or swimming also occurs in this area.

Potential Impacts to Navigation

As seen on Figure 2, cofferdams will be constructed around Areas 1 and 2 to isolate the areas for dewatering and sediment removal. The actual project area is relatively small in comparison to the overall width of the river and more than half of the river's width will be available for continued navigation or other activities. The maximum width of the area within the river to be isolated by the cofferdams is approximately 280 feet in Area 1 and approximately 190 feet wide in Area 2, while the entire river width ranges from approximately 650 to 800 feet in the project area.

The aerial photograph in Figure 3 shows the open water area west of the proposed cofferdams, and the approximate navigation route is highlighted by the arrows. Watercraft of the type typically utilized in this area of the river will be able to continue unobstructed use of the resource during completion of the project by following this general route.

Due to safety requirements, landside support zone activities and MRA activities within the river, access by the general public to the Congaree River via the Senate Street Extension (Figure 3) must be restricted during implementation of the project. This area has been utilized as a boat launch and fishing area due to the access provided by the asphalt and gravel road (which is private property) and the gentle slope to the river's edge. Access restrictions in this area should not affect the general public access to the river since this is private property. DESC plans to secure the area with fencing to establish the landside operations.

Options for the general public to launch small watercraft and access the river include the Three Rivers Greenway located directly across the river from the project area (Figure 3) and a public boat ramp located approximately 1.8 miles downstream of the Blossom Street Bridge.

Overall, no significant impacts to navigation of small watercraft and use of the river for recreational purposes are expected during completion of the project. As Figure 3 illustrates, more than half of the river's width will be available for use by the general public at all times. Restrictions to river access at the private access point on the east side will be mitigated by the access points located directly across the

river at the Three Rivers Greenway and public boat ramp located downstream. Safety measures that will be installed and maintained to ensure safe navigation around the project area are described below.

SAFETY MEASURES (PRIVATE AIDS TO NAVIGATION)

The safety measures (private aids to navigation) and details listed below are provided to illustrate the current plan and will be modified as necessary to obtain USCG approval of the project. The three main objectives of the safety measures are:

1. Provide boaters and other users of the river with advance notice of the construction site and the need to take appropriate measures to avoid the cofferdam structure;
2. Demarcate the area to be avoided; and
3. Alert boaters and other users of the river that the cofferdam structure, isolated area (sediment removal area) and landside support zone are restricted areas and off limits to non-project related personnel.

These objectives will be accomplished by publication of a “Notice to Navigation Interests” (Notice) prior to initiation of the project. This Notice will provide specific details pertaining to the project area and the navigational requirements. A draft Notice is provided as Appendix B.

In addition, strategic placement of warning and restricted access signs, solar powered lights and regulatory buoys (Figures 4 and 5) will provide real-time notification to boaters as they enter and make their way through the project area from either direction. Table 1 provides a summary of the required quantities of aids to navigation as well as recommended manufacturer identification and model numbers. Proposed alternative aids to navigation that meet or exceed the criteria below will also be considered.

The warning signs will be placed up and down river and the sign locations will be determined in the field based on existing conditions. The signs will be located in areas that are readily visible to river users. The warning signs will be relatively large (approximately 4 feet by 4 feet) and state “Warning - River Construction Zone Ahead”. The signs placed in the river will be properly secured (e.g., bolted to metal posts and attached to a weighted base and secured in-place with concrete blocks or large boulders).

The signs will be placed in the river, on the cofferdam and along the shoreline, and will be placed at an appropriate height (i.e., eye level, or approximately 3 to 5 feet above the water or land surface). For boaters, the elevation of the signs will be based on average river flows when most recreational boating activity is expected to occur. The average river elevation is approximately 116.5 feet (NGVD 29) which equates to an approximate sign elevation of 120 feet (NGVD 29). During completion of the investigative activities, it was observed that river elevations above approximately 117 feet (NGVD 29) produced flows that were not conducive to the safe operation of small watercraft within the project area. As a result, the 120 feet elevation will place the signs above the water level at flows where most recreational boating and use of the river is expected to take place. For the landside sign installations, eye level or approximately 5 feet above the surface elevation will be used to establish the correct position of the sign.

The USCG Aids to Navigation System specifies the use of an information or regulatory buoy (white with an orange band) to designate areas that should be avoided by watercraft. For this project, the buoys will also be marked with a danger symbol that specifies the presence of the dam. Example specifications of

this type of buoy and markings are provided in Appendix C. The approximate locations for buoy moorings are shown on Figures 4 and 5 for Areas 1 and 2, respectively. Generally, the buoys will be properly secured approximately 5 to 10 feet away from the outboard toe of the cofferdam slope and alert river users to the presence of the dam. The buoys will direct both downstream and upstream traffic away from the cofferdam structure. They will be relocated as necessary as the project progresses.

Marine-application lights will also be positioned slightly above the top of the cofferdam to help identify the perimeter of the structure in the unlikely event that boating traffic is in the area during nighttime or low light conditions. As part of the aids to navigation, solar powered, LED lights will be placed on each corner (or bend) and midpoint of each leg of the cofferdam. The lights will have a standard flash rate of 60 flashes per minute (FPM) and will be visible for one mile, under clear conditions. The lights will be secured on posts and positioned on the outboard side of the cofferdam with the elevation set approximately two feet above the crest elevation of the cofferdam. This height was selected to provide optimum visibility from the waterside of the cofferdam, while attempting to minimize any potential adverse impacts to the inhabitants of the residential condominiums located on Gist Street. Nine (9) lights are currently planned for the Area 1 cofferdam and six (6) lights are planned for the Area 2 cofferdam. An example of solar powered nautical lights is provided in Appendix C. The operating period for lights is between sunset and sunrise.

“Restricted Area” signs will be positioned at regular intervals along the cofferdam structure to alert river users of the need to stay away from the cofferdam. No unauthorized access to or on the cofferdam structure will be permitted.

Project personnel will conduct regular inspections of the buoys, lights and signs to ensure that they are still visible, in the correct locations, securely moored in place and operating properly. The minimum inspection frequency will be once per week or as soon as possible following high water/high river flow events. Any issues identified during the inspections will be corrected as soon as possible.

TABLES AND FIGURES

APPENDICES

TABLES AND FIGURES

TABLE 1

SUMMARY OF AIDS TO NAVIGATION

Congaree River Sediments
Columbia, South Carolina

Quantity	Description	Model No.	Manufacturer
9 - Area 1 6 - Area 2	Regulatory buoys ABS type 9" diameter or equivalent, with required anchors and mandatory restricted area symbol, "Dam"	B1147R	Roylan
6	48" x 48" flourescent/reflective signs "Warning River Construction Zone Ahead" black message on white reflective background with orange border	B2211	Roylan
9 - Area 1 6 - Area 2	Solar lights (LEDs), clear, to be positioned on each "corner" of construction area, 60 FPM (flashes per minute) mounted on 4" x 4" treated posts or equivalent	One mile #101 Series	Roylan

Notes:
1. Signs, buoys and lights will be deployed during each phase of the project.
2. Proposed alternative aids to navigation that meet or exceed criteria listed in 33 CFR 66 are acceptable.

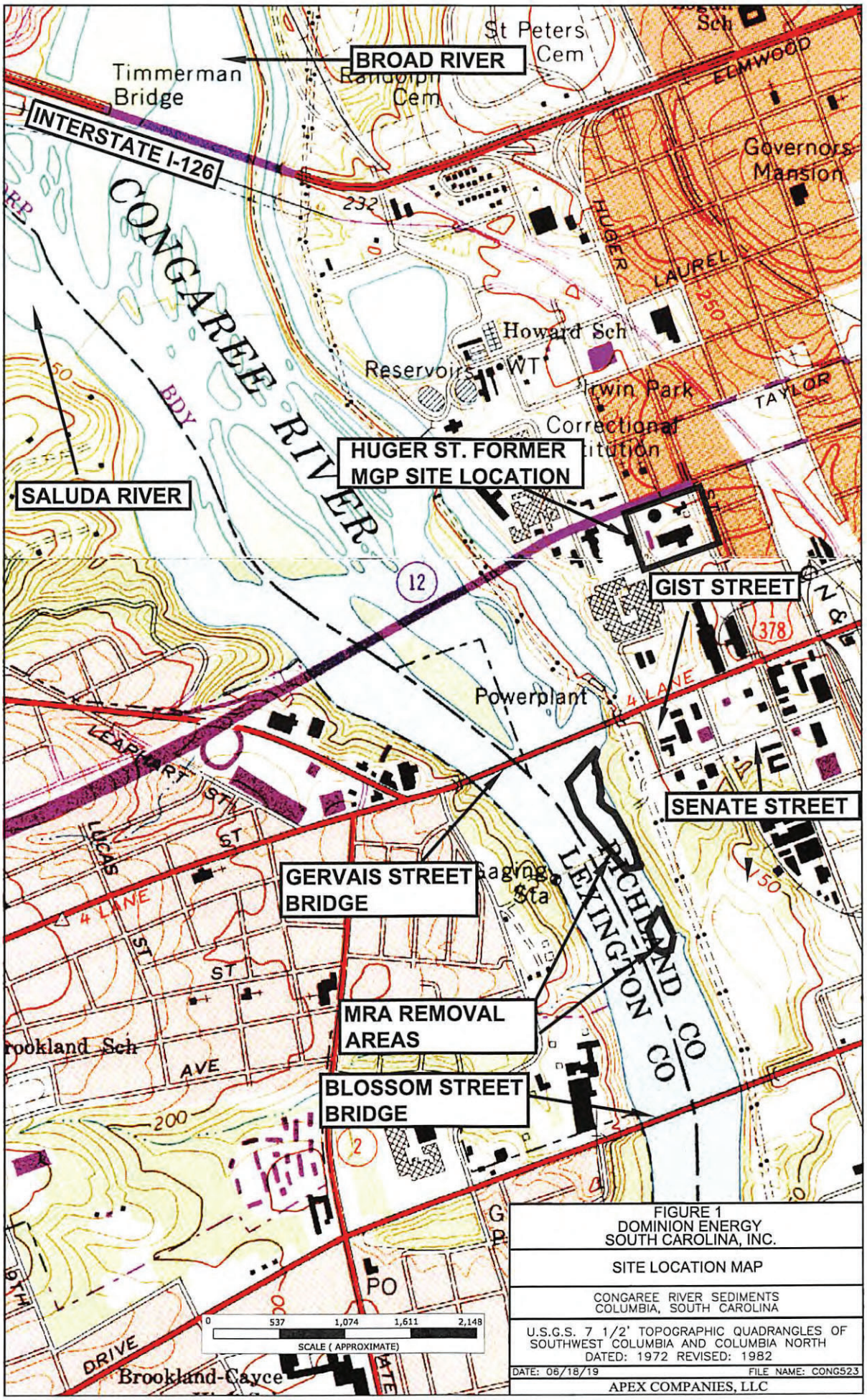


FIGURE 1
DOMINION ENERGY
SOUTH CAROLINA, INC.

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: CONG523

APEX COMPANIES, LLC

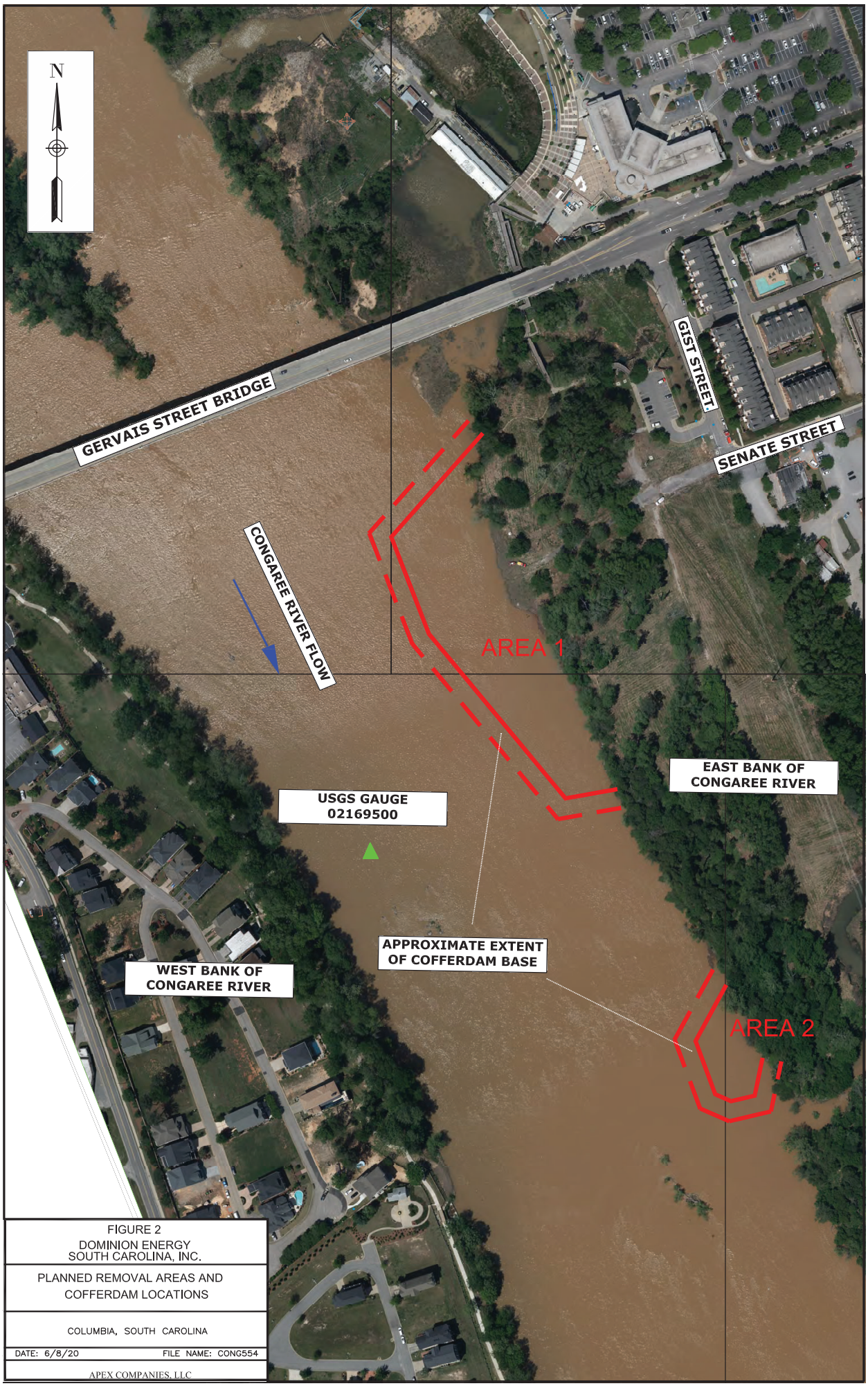


FIGURE 2
DOMINION ENERGY SOUTH CAROLINA, INC.

PLANNED REMOVAL AREAS AND COFFERDAM LOCATIONS

COLUMBIA, SOUTH CAROLINA

DATE: 6/8/20 FILE NAME: CONG554

APEX COMPANIES, LLC

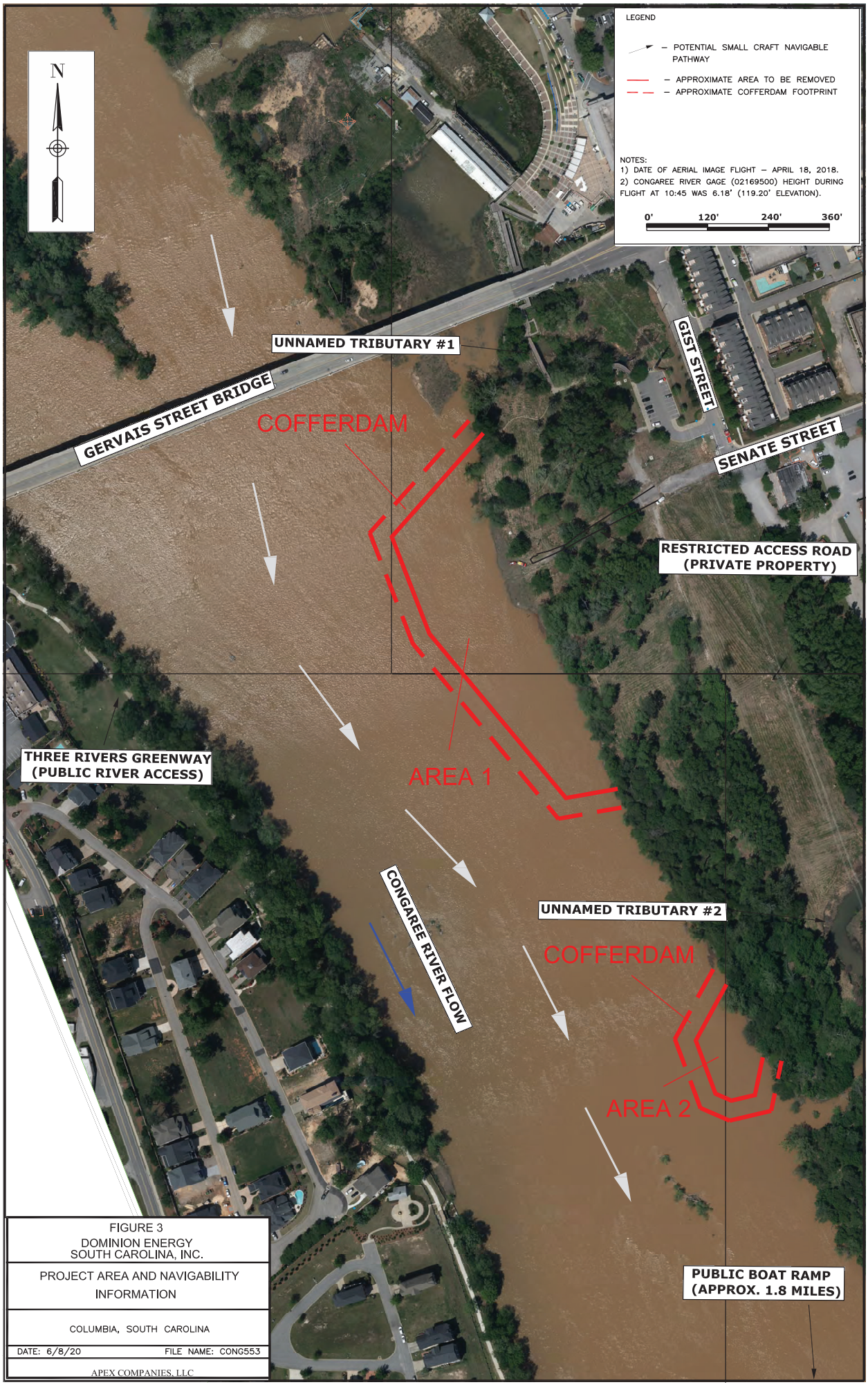


FIGURE 3
DOMINION ENERGY SOUTH CAROLINA, INC.

PROJECT AREA AND NAVIGABILITY INFORMATION

COLUMBIA, SOUTH CAROLINA

DATE: 6/8/20 FILE NAME: CONG553

APEX COMPANIES, LLC

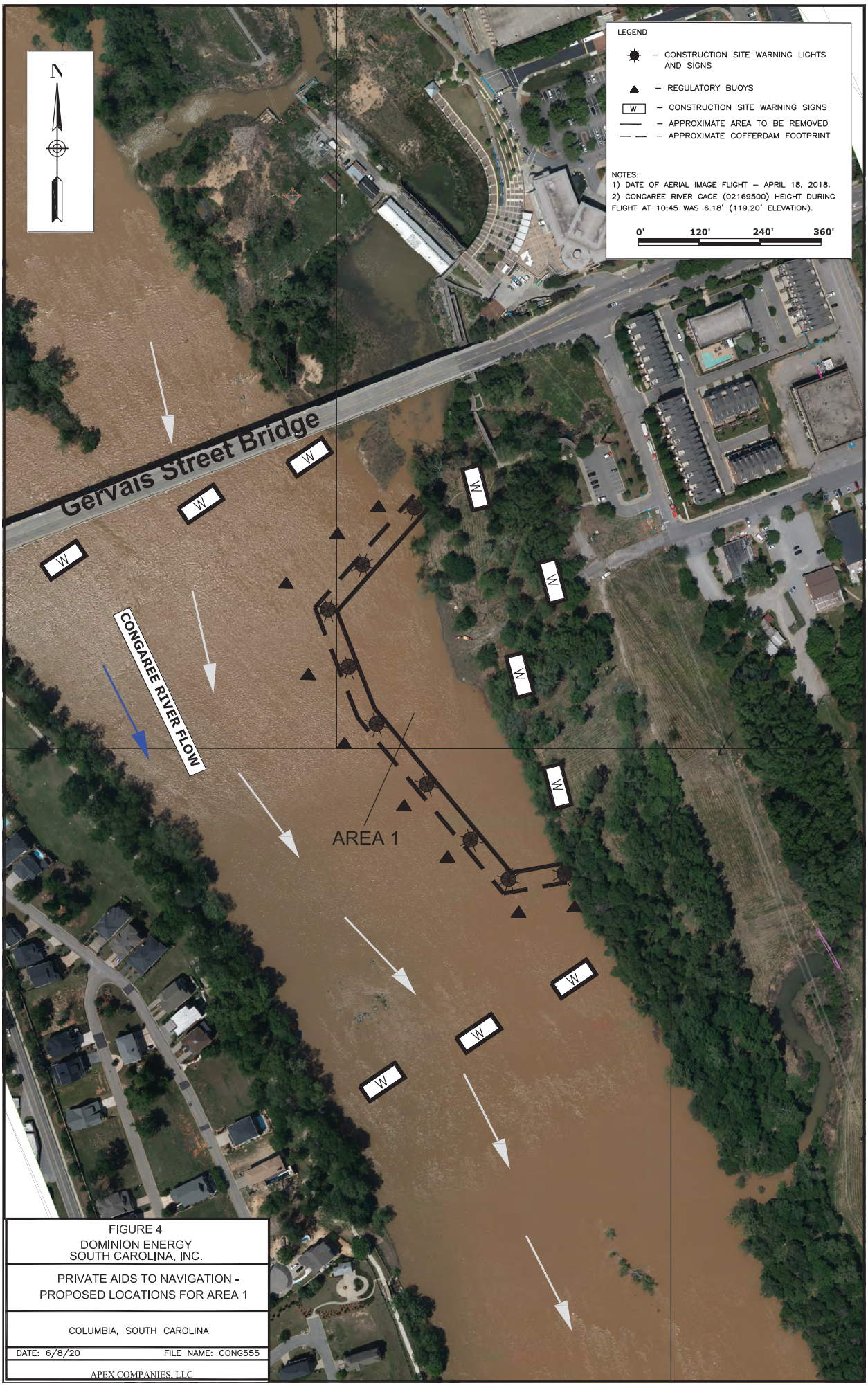


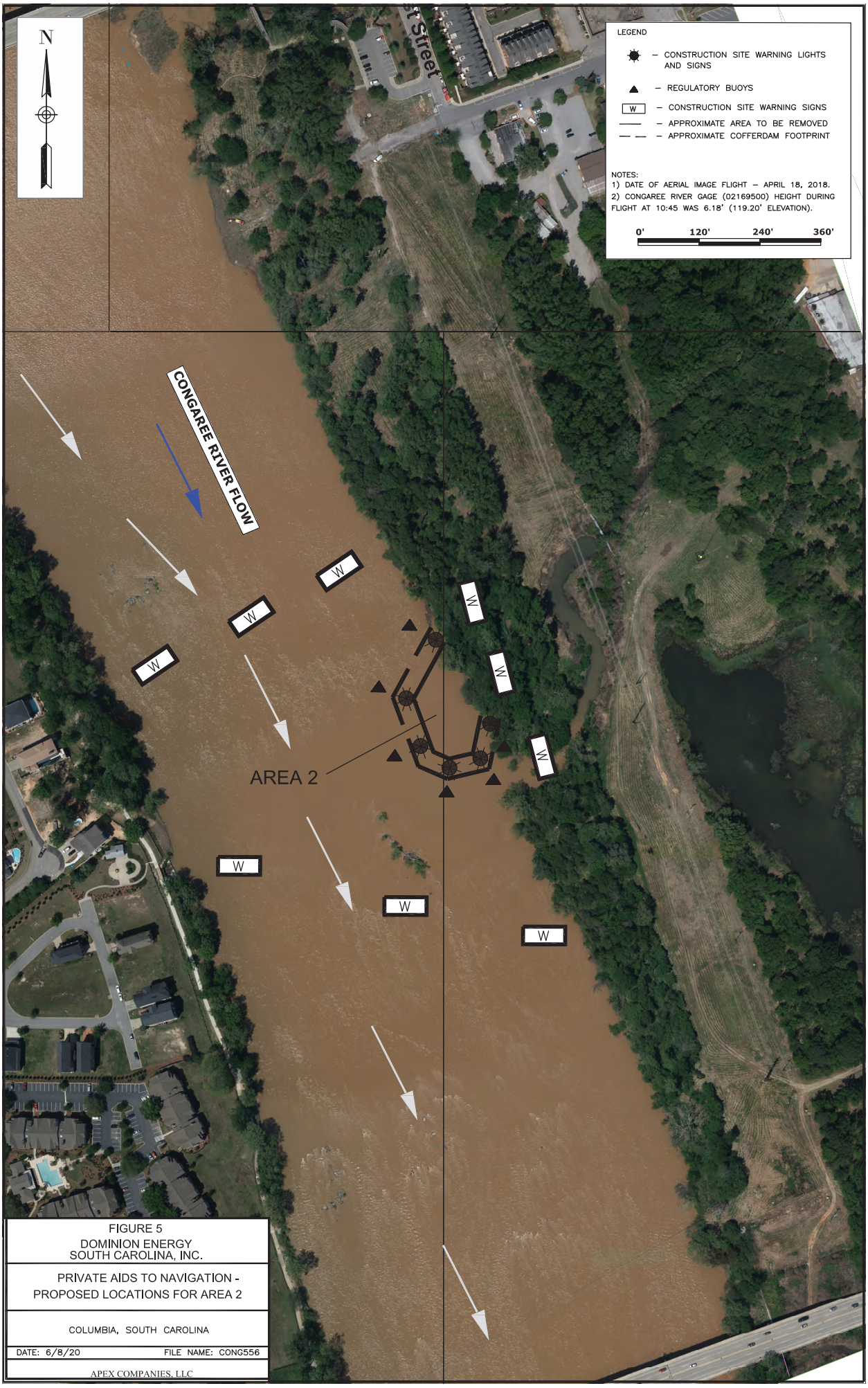
FIGURE 4
DOMINION ENERGY
SOUTH CAROLINA, INC.

PRIVATE AIDS TO NAVIGATION -
PROPOSED LOCATIONS FOR AREA 1

COLUMBIA, SOUTH CAROLINA

DATE: 6/8/20 FILE NAME: CONG555

APEX COMPANIES, LLC


N
LEGEND
– CONSTRUCTION SITE WARNING LIGHTS AND SIGNS
– REGULATORY BUOYS
W – CONSTRUCTION SITE WARNING SIGNS
– APPROXIMATE AREA TO BE REMOVED
– APPROXIMATE COFFERDAM FOOTPRINT
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).
0' 120' 240' 360'
CONGAREE RIVER FLOW
AREA 2
W
FIGURE 5
DOMINION ENERGY
SOUTH CAROLINA, INC.
PRIVATE AIDS TO NAVIGATION -
PROPOSED LOCATIONS FOR AREA 2
COLUMBIA, SOUTH CAROLINA
DATE: 6/8/20
FILE NAME: CONG556
APEX COMPANIES, LLC

APPENDIX A

USACE Project Approval (To Be Included After Receipt)

APPENDIX B

Notice to Navigation Interests

DRAFT

NOTICE TO NAVIGATION INTERESTS

CONGAREE RIVER MODIFED REMOVAL ACTION
COLUMBIA, SOUTH CAROLINA

Overview

Dominion Energy South Carolina, Inc. (DESC), formerly South Carolina Electric and Gas Company (DESC), plans to complete a Stakeholder-developed Modified Removal Action (MRA) to address the occurrence of a tar-like material (TLM) that is commingled with sediment along the eastern shoreline of the Congaree River, just south of the Gervais Street Bridge in Columbia, South Carolina. The project area location is shown on Figure 1. The TLM is believed to be a coal tar material that originated from the Huger Street former manufactured gas plant (MGP) site, located approximately 1,000 feet to the northeast of the project area. The proposed work is being performed by DESC at the direction of South Carolina Department of Health and Environmental Control (SCDHEC) and is subject to permits and approvals from the U.S. Army Corps of Engineers (USACE) and other agencies.

The overall objective of this project is to remove impacted sediment from the Congaree River within two areas. The plan is to construct temporary cofferdams around each area to facilitate removal of the impacted sediment. The temporary cofferdams will be constructed sequentially and the MRA will occur over several years. The construction and active remediation season will occur from approximately May through October of each year. Figure 2 illustrates the proposed cofferdam locations. After each cofferdam is constructed, the isolated area will be dewatered and the impacted sediment removed and transported off-site for disposal. Following completion of the removal activities in Area 1, the cofferdam will be removed and a cofferdam will be constructed around Area 2. After removal activities are completed in Area 2, the cofferdam materials will be removed from the river.

The actual project area is relatively small in comparison to the overall width of the river and more than half of the river's width will be available for continued navigation or other activities. Figure 2 shows the planned restricted areas and the area that will remain available for navigation during completion of project. Figures 3 and 4 provide illustrations of the planned Area 1 cofferdam and show the river portion available for continued navigation during this phase. Because Area 2 is smaller than Area 1, the cofferdam will have a similar appearance although smaller and not extending as far into the river.

Navigation Signage, Lighting and Signals

Prior to initiation of cofferdam construction activities, warning signs will be placed upriver and downriver of the cofferdam location. The final locations of the signs will be determined in the field based on existing conditions. The signs will be located in areas that are readily visible from the water. The warning signs will be approximately 4 feet by 4 feet and state "Warning - River Construction Zone Ahead". The signs will be bolted to metal posts and attached to a weighted base and secured in-place with concrete blocks or boulders.

Information buoys (white with a orange band) will be placed approximately 5 to 10 feet away from the outboard toe of the cofferdam as an aid to alert river users to the presence of the rock dam. The buoys will be marked with a danger symbol that specifies the presence of the dam. The buoys will direct both downstream and upstream traffic away from the cofferdam structure. They will be relocated as necessary

as the project progresses. Figures 3 and 4 provide illustrations of the planned cofferdam buoy and lighting scenario using Area 1 as an example.

Marine-application lights will also be positioned slightly above the top of the cofferdam to help identify the perimeter of the structure in the unlikely event that boating traffic is in the area during nighttime or low light conditions. As part of the aids to navigation, solar powered, LED lights will be placed on each corner (or bend) and midpoint of each leg of the cofferdam. The lights will have a standard flash rate of 60 flashes per minute (FPM) and will be visible for one mile, under clear conditions. The lights will be positioned on the outboard side of the cofferdam with the elevation set approximately two feet above the crest elevation of the cofferdam. Nine (9) lights are currently planned for the Area 1 cofferdam and six (6) lights are planned for the Area 2 cofferdam. The operating period for lights is between sunset and sunrise.

“Restricted Area” signs will be positioned at regular intervals along the cofferdam structure to alert river users of the need to stay away from the cofferdam. No unauthorized access to or on the cofferdam structure will be permitted. Users of the river are advised to remain a safe distance from the project area at all times and to obey all navigation aids and instructions.

List of Figures

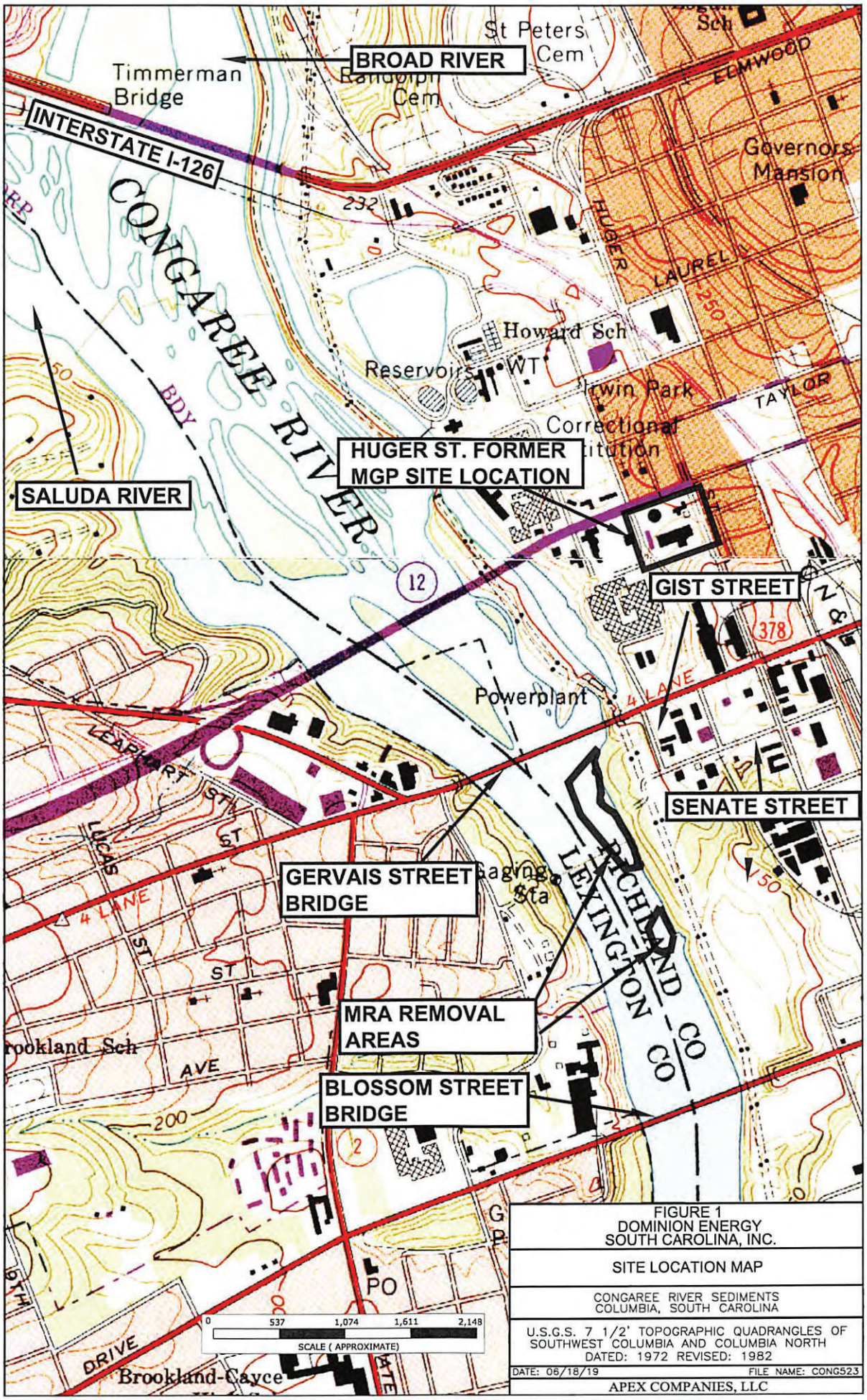


FIGURE 1
DOMINION ENERGY
SOUTH CAROLINA, INC.

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: CONG523

APEX COMPANIES, LLC

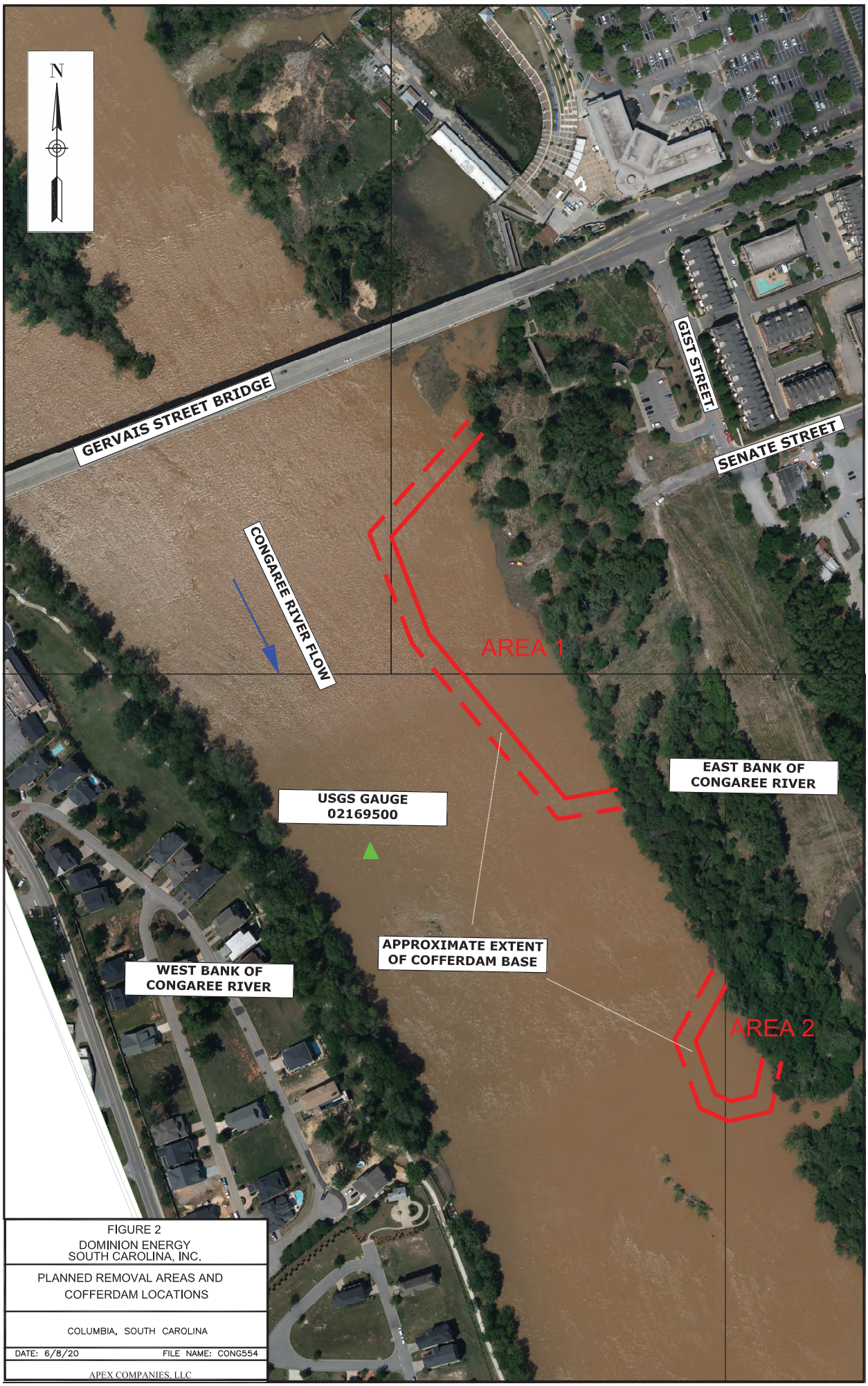


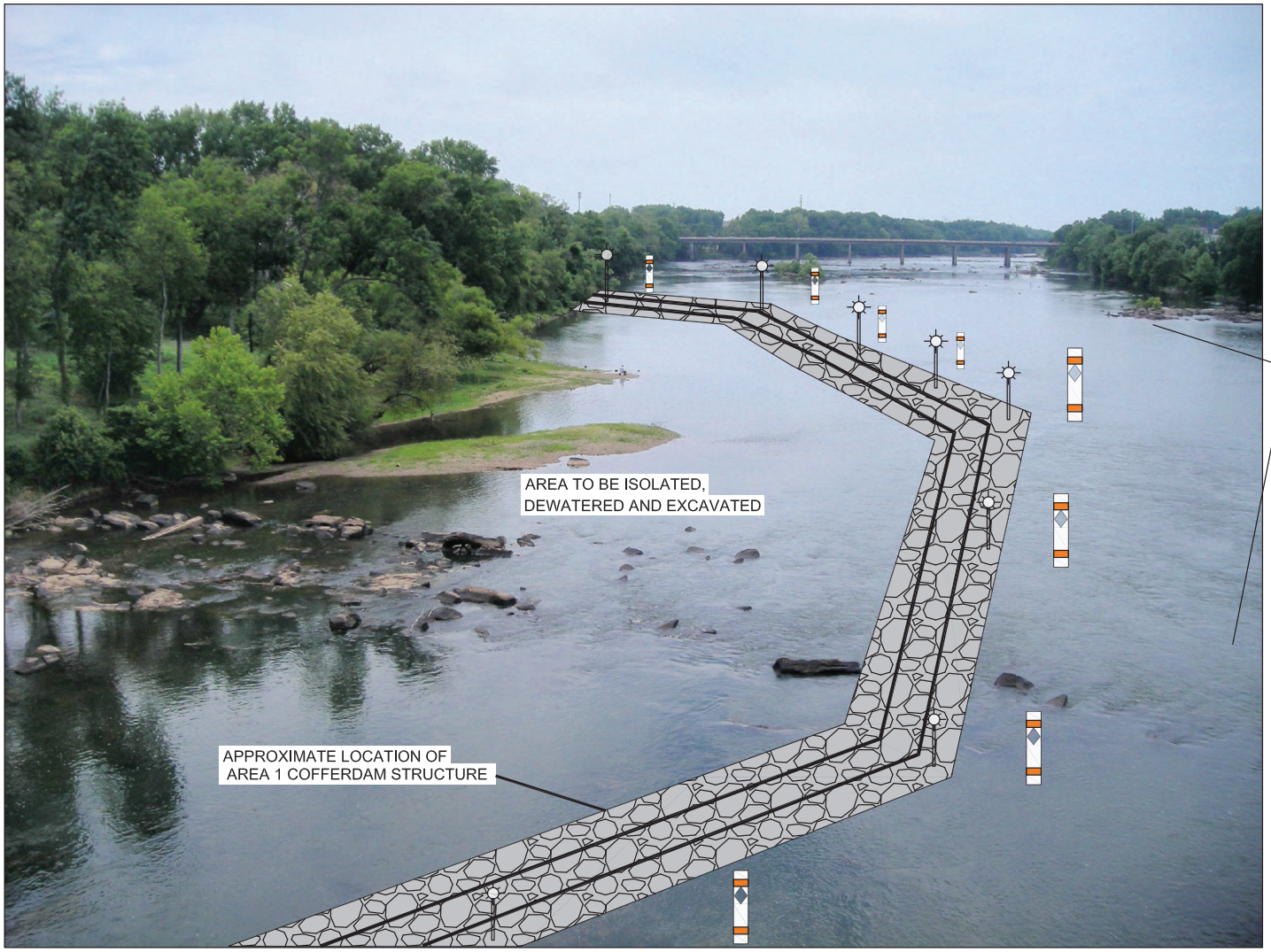
FIGURE 2
DOMINION ENERGY SOUTH CAROLINA, INC.

PLANNED REMOVAL AREAS AND COFFERDAM LOCATIONS

COLUMBIA, SOUTH CAROLINA

DATE: 6/8/20 FILE NAME: CONG554

APEX COMPANIES, LLC



- INFORMATION BUOY WITH DANGER OR OTHER SYMBOL TO ALERT BOATERS OF COFFERDAM

- OBSTRUCTION LIGHTS WILL BE PLACED IN ACCORDANCE WITH 33 C.F.R. 67.05-1.

REMAINDER OF RIVER AVAILABLE FOR NAVIGATION

NOTES:
- DRAWING NOT TO SCALE AND IS FOR ILLUSTRATIVE PURPOSES ONLY.
- COFFERDAM STRUCTURE LOCATION AND CONFIGURATION IS APPROXIMATE.
- PHOTOGRAPH TAKEN FROM THE GERVAIS ST. BRIDGE LOOKING SOUTH.

FIGURE 3
DOMINION ENERGY SOUTH CAROLINA, INC.

AREA 1 COFFERDAM ILLUSTRATION (1 OF 2)

CONGAREE RIVER SEDIMENTS
COLUMBIA, SOUTH CAROLINA

DATE: 7/6/20 FILE NAME: CONG557

APEX COMPANIES, LLC

- INFORMATION BUOY WITH DANGER OR OTHER SYMBOL TO ALERT BOATERS OF COFFERDAM

- OBSTRUCTION LIGHTS WILL BE PLACED IN ACCORDANCE WITH 33 C.F.R. 67.05-1.

NOTES:
- DRAWING NOT TO SCALE AND IS FOR ILLUSTRATIVE PURPOSES ONLY.
- COFFERDAM STRUCTURE LOCATION AND CONFIGURATION IS APPROXIMATE.
- PHOTOGRAPH TAKEN FROM THE WEST BANK OF THE RIVER LOOKING EAST.

FIGURE 4
DOMINION ENERGY SOUTH CAROLINA, INC.

AREA 1 COFFERDAM ILLUSTRATION (2 OF 2)

CONGAREE RIVER SEDIMENTS
COLUMBIA, SOUTH CAROLINA

DATE: 7/6/20 FILE NAME: CONG558

APEX COMPANIES, LLC

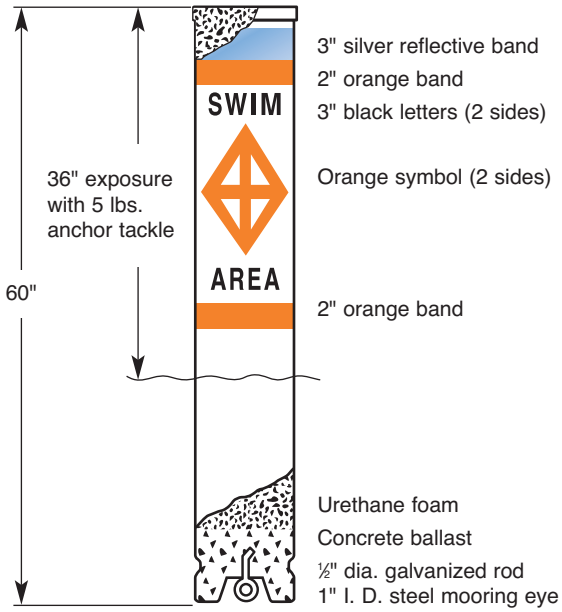
APPENDIX C

Example Navigational Aid Specifications

Regulatory Buoys • ABS type – 9" Dia.

Approved and universally used by local, state and federal agencies to ensure water safety. Ideal for private applications.

UNSINKABLE — filled with urethane foam



Specify desired symbols and messages when ordering.

Submerged buoyancy	84 lbs.
Net weight	49 lbs.
Shipping weight	56 lbs.

Refer to installation suggestions on page 21.
See warranty information on back cover.

Model B1147R

Features

- Easy reconditioning of weather-worn buoys with excellent adhesion of restoration materials. See page 18.
- 9" diameter, white, ABS plastic exterior. Will not rust, chip or peel. Ultraviolet inhibited.
- Completely urethane foam filled. Virtually unsinkable.
- 3"-wide reflective band at top provides excellent nighttime visibility.
- Self-righting without tackle.
- Recessed cap allows buoy to stand upright.
- Heavy steel galvanized anchoring eye cast in an internal concrete ballast.
- Includes choice of standard symbols and messages.

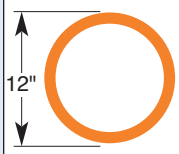
Available Options

- Pickup eye built into top.
- Stainless steel anchoring eye for salt water applications.
- Agency or name identification.
- Cone cap top.
- Special non-standard messages.
- Solar lights (see page 11).
- Available in yellow.
- Side mooring eyes for swim areas, float lines.

STANDARD INLAND WATERWAY SYMBOLS AND MESSAGES

Special messages are available. Request a quotation.

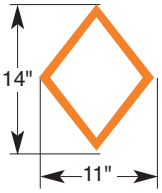
CONTROLLED AREA SYMBOL



2" band width

STANDARD MESSAGES
SLOW 5 MPH
SLOW NO WAKE
SKI AREA
NO SKI
SLOW 10 MPH
SPEED ZONE
NO WAKE IDLE SPEED

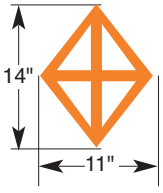
HAZARD WARNING SYMBOL



2" band width

STANDARD MESSAGES
ROCK
DANGER
RAPIDS
SHOAL
STUMP
SHALLOW AREA
HAZARD AREA
DANGER DAM

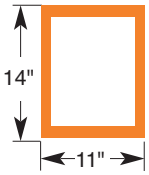
RESTRICTED AREA SYMBOL



2" band width

STANDARD MESSAGES
SWIM AREA
KEEP OUT
NO BOATS
BOATS KEEP OUT
CLOSED AREA
NO BOATING
DANGER DAM

INFORMATION SYMBOL



2" band width

STANDARD MESSAGES
REST ROOM 1 MILE
STATE PARK AHEAD
MARINA ENTRANCE
FISH ATTRACTOR

PERMAFLEX® CABLE

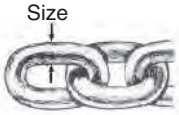
Lightweight
High strength
Safe to handle
Tough, durable, bright yellow, waterproof plastic covering is highly resistant to alkalis and salt

Covering O.D.	Part No.	Cable Dia.	Construction ①	Weight Lb./Ft.	Breaking Strength Lbs.	Standard Reel Size②	Reel Wt. Lbs.
5/32"	B1934	1/8"	7 x 7	.028	920	1000'	28
1/4"	B1936	3/16"	7 x 7	.065	3700	500'	37
5/16"	B1931	1/4"	7 x 7	.12	6100	500'	60
15/32"	B1933	3/8"	7 x 19	.28	14400	500'	180

Permaflex Cable – Galvanized steel wire rope coated & Impregnated with yellow polypropylene plastic.

CHAIN

Size



	Size	Part No.	Weight Lb./Ft.	Working Load Limit Lbs.	Standard Drum Size①
Proof Coil Heavy Duty	1/4"	B1828	.42	1300	400'
Steel Chain	3/8"	B1829	1.36	2650	200'
Hot Dipped Galv.	1/2"	B18210	2.3	4500	100'

NOTES: ① Chain may also be purchased by the foot. Subject to cut charge.

GALVANIZED HARDWARE

CABLE THIMBLES
Standard Electro Galvanized

Heavy Duty Hot Dipped Galvanized

Size	Part No.	Weight Lb./Ft.
3/16"	B2311	.03
1/4"	B2312	.04
5/16"	B2313	.05
1/2"	B2316	.15
1/4"	B2324	.08
5/16"	B2321	.11
1/2"	B2323	.47

CABLE CLAMPS
Standard Electro Galvanized

Heavy Duty Hot Dipped Galvanized

3/16"	B1831	.2
1/4"	B1832	.3
5/16"	B1833	.4
1/2"	B1835	.5
3/16"	B2331	.11
1/4"	B2332	.16
5/16"	B2333	.28
1/2"	B2335	.82

CONNECTING LINKS
Electro Galvanized

1/4"	B1891	.10
3/8"	B1892	.25
1/2"	B1893	.54

QUICK LINKS
Electro Galvanized

1/4"	B1801	.10
3/8"	B1803	.19
1/2"	B1804	.38

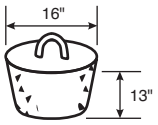
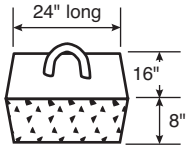
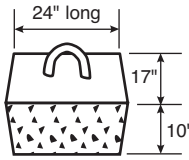
ANCHOR SHACKLES
Hot Dipped Galvanized

5/16"	B1900	.25
3/8"	B1901	.30
1/2"	B1902	.75

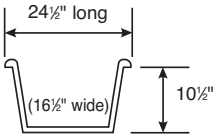
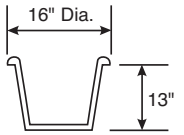
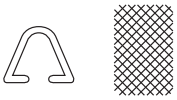
SWIVELS
Hot Dipped Galvanized

1/4"	B1921	.21
3/8"	B1922	.61
1/2"	B1923	.93

ANCHORS

ANCHORS CONCRETE		Avg. Wt. Lbs.	Under-water Wt. Lbs.
	B1842 1/2" Round Steel Eye Hot Dipped Galvanized	90	54
	B21620 1/2" Round Steel Eye Hot Dipped Galvanized	200	164
	B2152 1/2" Round Steel Eye Hot Dipped Galvanized	300	180

ANCHOR KITS

	**B2161** Tough, high-density polyethylene anchor form. Cast up to 300 lb. concrete anchors.
	**B2163** Plastic anchor form for 90 lb. concrete anchors.
	**B2162** 1/2" Steel anchor eye and steel wire mesh.

Stainless steel hardware available.
Call for pricing.

Warning and Portage Signs

Bold black message on white reflective background with orange border. .080" aluminum base material. Excellent visibility, day and night.

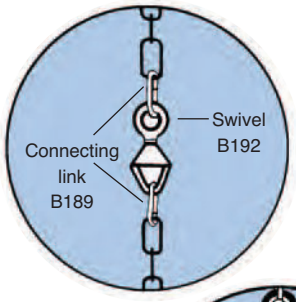
DAM	
SIZE (IN.)	PART NO.
24 x 24	B2011
30 x 30	B2021
36 x 36	B2031
48 x 48	B2211

THIN ICE	
24 x 24	B2013
30 x 30	B2023
36 x 36	B2033
48 x 48	B2213

SLOW NO WAKE	
SIZE (IN.)	PART NO.
24	B22258
30	B22259
36	B22260

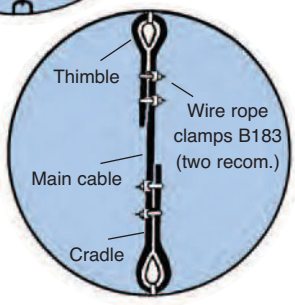
TAKE OUT		
SIZE (IN.)	PART NO.	RIGHT ARROW
24 x 24	B2012L	B2012R
30 x 30	B2022L	B2022R
36 x 36	B2032L	B2032R
48 x 48	B2212L	B2212R

Mooring Suggestions



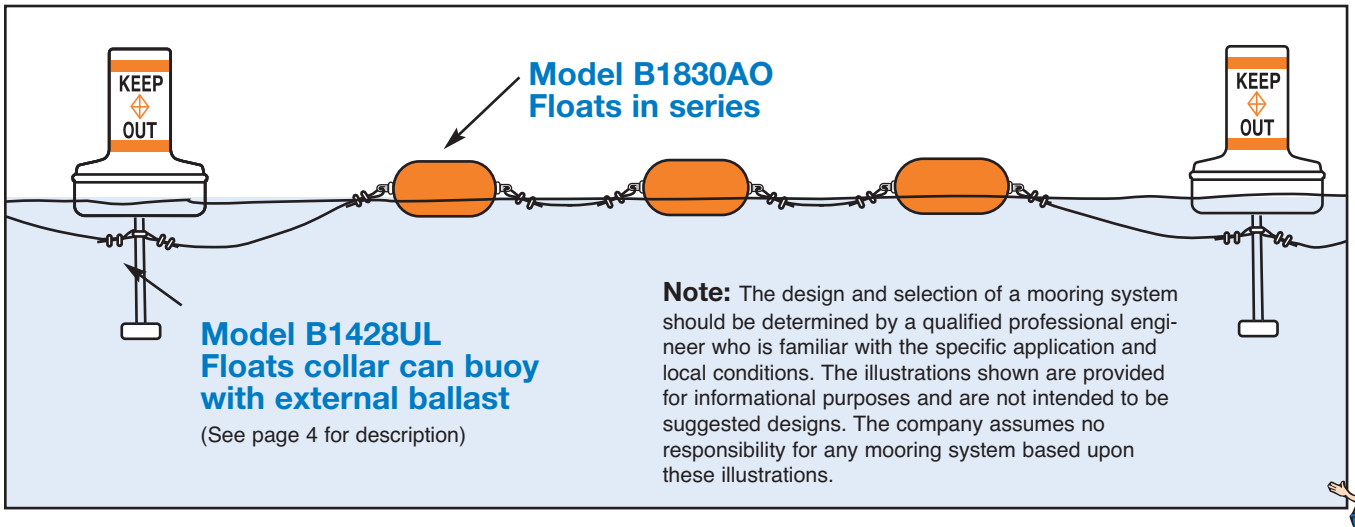
Use swivels to cut chain wear and increase buoy performance. Wind, wave, and current action causes buoys to rotate. This rotation, if severe, can cause chain or cable to twist, which will eventually submerge the buoy, increase chain wear, and increase the load on the anchor.

NOTE - The design and selection of a mooring system should be determined by a qualified professional engineer who is familiar with the specific application and local conditions. The illustrations shown are provided for informational purposes and are not intended to be suggested designs. The company assumes no responsibility for any mooring system based upon these illustrations.



Correct cable clamp assembly. Note from the sketch that the cradle is tightened against main cable. This is the correct assembly method to insure against the clamps, slipping while in service. Be sure to tighten nuts down, alternating from side to side frequently. Thimbles should be assembled so they are firmly trapped within the cable loop.

Typical Barrier Float System



Note: The design and selection of a mooring system should be determined by a qualified professional engineer who is familiar with the specific application and local conditions. The illustrations shown are provided for informational purposes and are not intended to be suggested designs. The company assumes no responsibility for any mooring system based upon these illustrations.

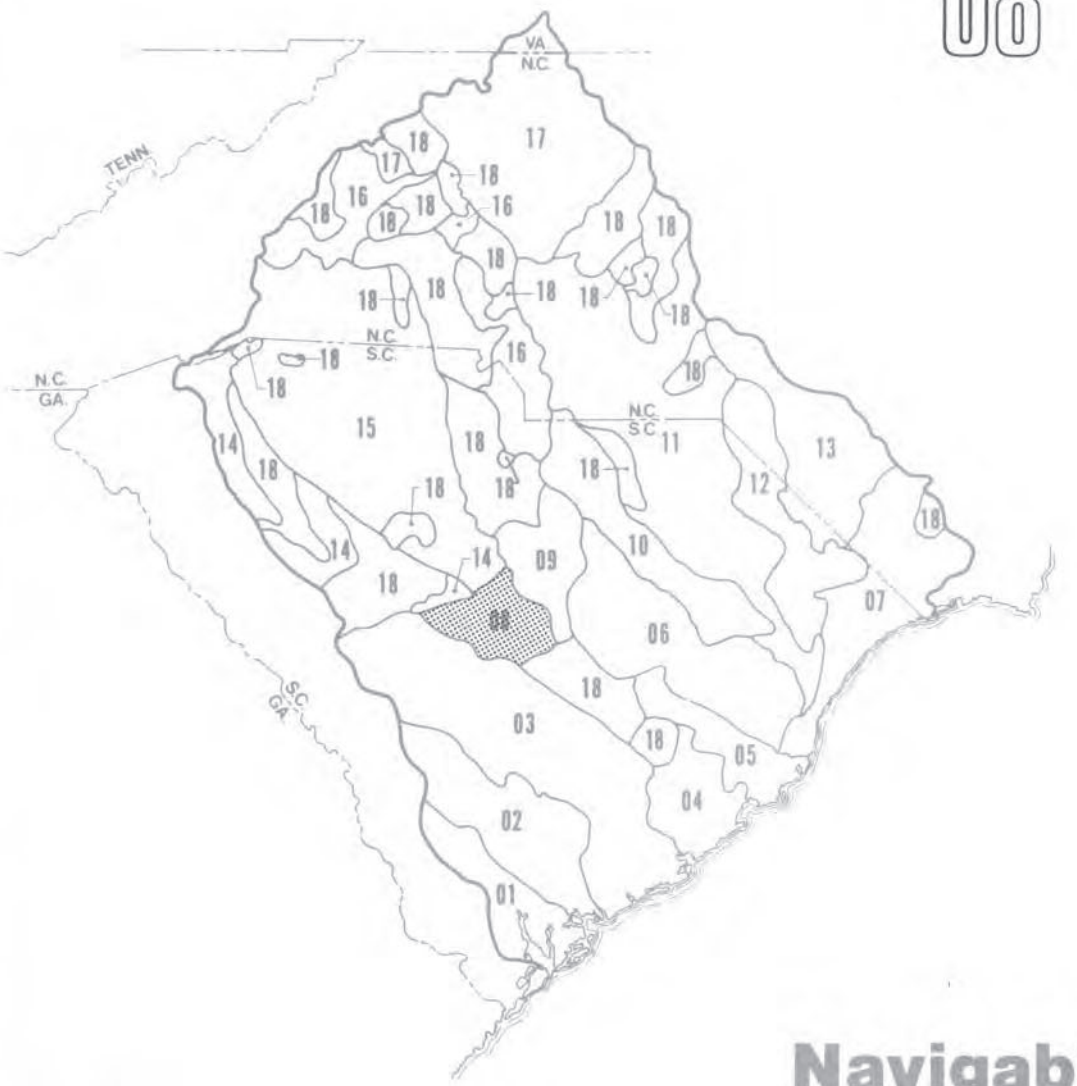
APPENDIX D

Excerpts from the 1977 Navigability Study of the Congaree River Basin

U.S. ARMY CORPS OF ENGINEERS
CHARLESTON DISTRICT
Charleston, South Carolina

CONGAREE RIVER BASIN

Report No. 08



Navigability Study
1977

STANLEY CONSULTANTS

Navigation Classification Categories

This study classifies streams into several different categories, each of which is discussed subsequently:

1. Present "navigable waters of the U. S." (by regulatory procedures).
2. Historically navigable waters (based on literature review).
3. Recommended "navigable waters of the U. S." (based upon data developed as a part of this investigation).
4. Recommended waters for practical navigation (within "navigable waters of the U. S.").
5. Headwaters for all waterbodies (five cfs points).

The first four navigation classifications are displayed on the plates presented later in this report. The headwater limits are summarized in Appendix A.

Present Navigable Waters of the U. S.

Currently, the Congaree River is classified as "navigable waters of the U. S." from its confluence with the Wateree River (R.M. 125.3) to the Gervais Street bridge, U. S. 378, (R.M. 175.9). (3)(4)(20) This classification is based on the limits of the Federally authorized project, as discussed in Section 3, as well as Federal and state court decisions, as discussed in Section 5. (See plate 08-2 for map location.)

Historically Navigable Waters

The Congaree River was extensively used for navigation throughout the earlier development of the state. After the construction of the Columbia Canal, as referred to in Section 4, navigation extended over the entire length of the Congaree River (R.M. 176.9), and continued up the Broad River (see Report 15).

Recommended and Practical Navigable Waters of the U. S.

The recommended and practical limit of "navigable waters of the U. S." is at the Gervais Street bridge (R.M. 175.9). This is the same limit as the present classification, and is based on the Federal court

decisions and authorized project limits that established the present classification, as well as observations and calculations, which establish the practicality of navigation at all six bridges crossing the river. Analysis at each of the locations resulted in an approximate mean water depth of at least 7 feet, approximate channel width of at least 50 feet, and an average slope within the ranges for practical navigation. The river extends upstream for about one mile beyond R.M. 175.9; however, it becomes shallower and spotted with sandbars as it nears the confluence of the Broad and Saluda Rivers and would require extensive improvements to be navigable. In addition, entrance to the Columbia Canal, used at one time to by-pass this shallow area, is no longer operational due to installation of electric generating turbines and would also require extensive renovation to become functional.

These conclusions on the navigation limit meet the criteria established for the Federal test of navigability that the body of water is used, or is capable of being used, in conjunction with other bodies of water to form a continuous highway upon which commerce with other states or countries might be conducted.

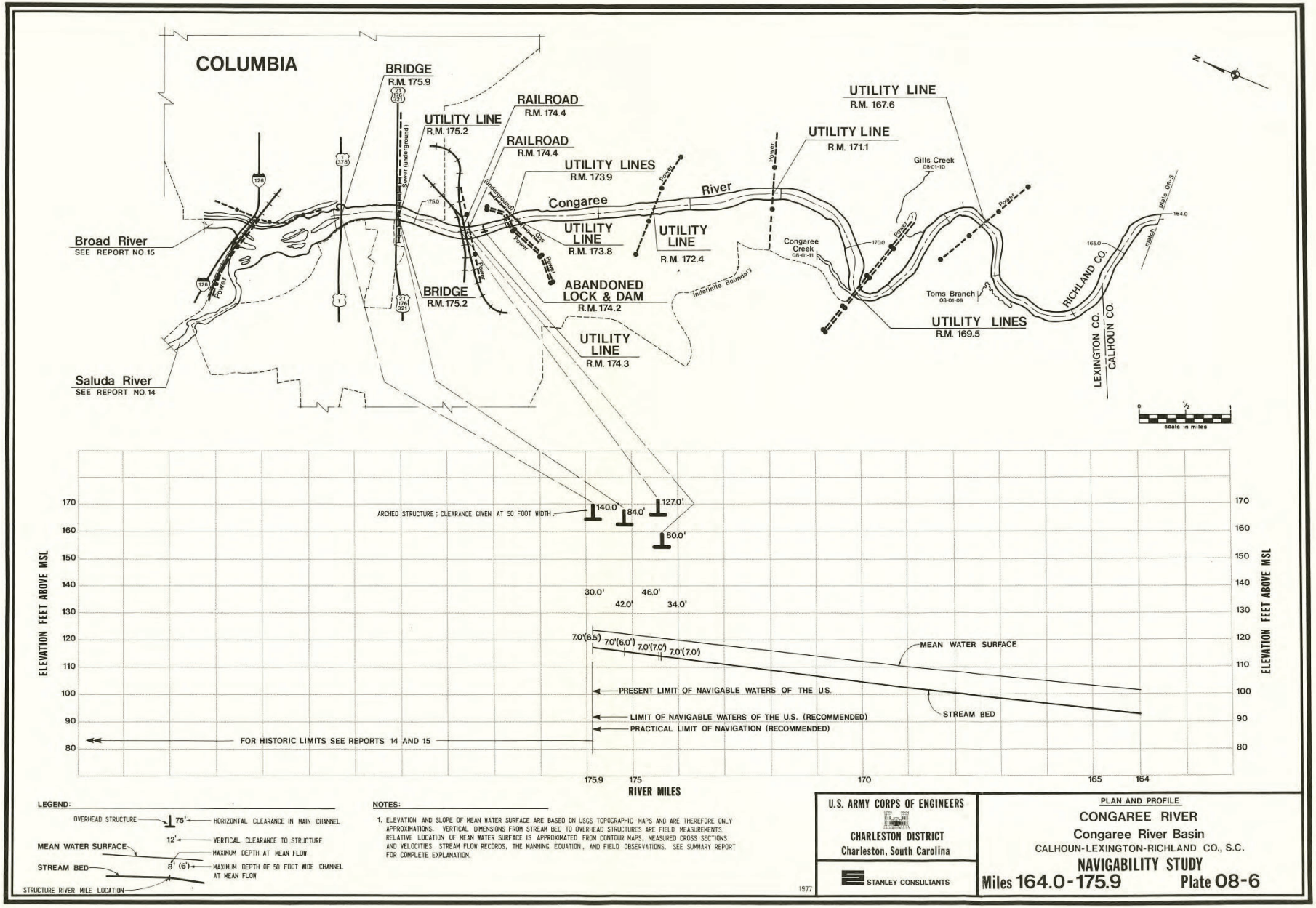
There are no significant tributaries to the Congaree River capable of supporting navigation.

Plates 08-4 through 08-6 are plan and profiles of the recommended "navigable waters of the U. S." The plan and profile plates show mean water surface as determined from USGS maps, stream bed depth, 50 feet wide navigable channel depth, pier spacing for bridges crossing the river, and vertical clearances at structures. Approximate vertical clearances for overhead utilities are shown later in this Section in Table 4. It is emphasized that all references to elevation are approximate since vertical control was established from USGS contour maps and not field instrument surveys. Water depth and structure vertical clearance measurements are also approximate due to the accuracy inherent in the field techniques. (See the Summary Report for a detailed description of field procedures and the methodology used to calculate water depth at mean flow.)

SECTION 7 - CONCLUSIONS AND RECOMMENDATIONS

Five classifications of navigation on streams in the Congaree River basin have been determined and are presented below. The first two are classifications developed from historical evidence and current Federal stream classifications. Classification 3 is based on field measurements, observations, and data analysis for the river. Classification 4 is based on review of all previously determined limits with a recommendation of the most upstream location with supporting evidence of navigability. The fifth classification accounts for all streams not otherwise classified and was determined based on the drainage area and hydrological aspects of the stream.

1. The Congaree River is presently classified "navigable waters of the U. S." between its mouth at the confluence with the Wateree River (R.M. 125.3) to the Gervais Street bridge in Columbia (R.M. 175.9).
2. The historical limit of navigation on the Congaree River is, with the use of the Columbia Canal, to R.M. 177. The classification extends beyond the Congaree basin boundary to the Broad River (see Report 15).
3. The recommended practical limit of navigation is at the Gervais Street bridge (R.M. 175.9). Reasonable channel improvements will be necessary for commercial river traffic to actually use the river up to this point.
4. It is recommended that the Congaree River be classified "navigable waters of the U. S." between its mouth at the confluence with the Wateree River (R.M. 125.3) to the Gervais Street bridge, U. S. 378 (R.M. 175.9) based on the analytical procedures and tests of navigability used in this study effort.
5. All streams not recommended for classification as "navigable waters of the U. S." are recommended for classification as "waters of the U. S." throughout their entire length.


COLUMBIA
BRIDGE
R.M. 175.9
RAILROAD
R.M. 174.4
UTILITY LINE
R.M. 175.2
RAILROAD
R.M. 174.4
UTILITY LINES
R.M. 173.9
UTILITY LINE
R.M. 167.6
UTILITY LINE
R.M. 171.1
Gills Creek
08-01-10
Congaree River
UTILITY LINE
R.M. 173.8
UTILITY LINE
R.M. 172.4
Congaree Creek
08-01-11
Toms Branch
08-01-09
UTILITY LINES
R.M. 169.5
Broad River
SEE REPORT NO.15
Saluda River
SEE REPORT NO.14
BRIDGE
R.M. 175.2
ABANDONED
LOCK & DAM
R.M. 174.2
UTILITY
LINE
R.M. 174.3
Indefinite Boundary
RICHLAND CO.
LEXINGTON CO.
CALHOUN CO.
match plate 08-5
scale in miles
ARCHED STRUCTURE ; CLEARANCE GIVEN AT 50 FOOT WIDTH
140.0'
84.0'
127.0'
80.0'
30.0'
46.0'
42.0'
34.0'
7.0'(6.5')
7.0'(6.0')
7.0'(7.0')
7.0'(7.0')
MEAN WATER SURFACE
PRESENT LIMIT OF NAVIGABLE WATERS OF THE U.S.
LIMIT OF NAVIGABLE WATERS OF THE U.S. (RECOMMENDED)
PRACTICAL LIMIT OF NAVIGATION (RECOMMENDED)
STREAM BED
FOR HISTORIC LIMITS SEE REPORTS 14 AND 15
ELEVATION FEET ABOVE MSL
RIVER MILES
175.9
175
170
165
164
LEGEND:
OVERHEAD STRUCTURE
75' HORIZONTAL CLEARANCE IN MAIN CHANNEL
12' VERTICAL CLEARANCE TO STRUCTURE
MEAN WATER SURFACE
MAXIMUM DEPTH AT MEAN FLOW
STREAM BED
8' (6') MAXIMUM DEPTH OF 50 FOOT WIDE CHANNEL AT MEAN FLOW
STRUCTURE RIVER MILE LOCATION
NOTES:
1. ELEVATION AND SLOPE OF MEAN WATER SURFACE ARE BASED ON USGS TOPOGRAPHIC MAPS AND ARE THEREFORE ONLY APPROXIMATIONS. VERTICAL DIMENSIONS FROM STREAM BED TO OVERHEAD STRUCTURES ARE FIELD MEASUREMENTS. RELATIVE LOCATION OF MEAN WATER SURFACE IS APPROXIMATED FROM CONTOUR MAPS, MEASURED CROSS SECTIONS AND VELOCITIES. STREAM FLOW RECORDS, THE MANNING EQUATION, AND FIELD OBSERVATIONS. SEE SUMMARY REPORT FOR COMPLETE EXPLANATION.
1977
U.S. ARMY CORPS OF ENGINEERS
CHARLESTON DISTRICT
Charleston, South Carolina
STANLEY CONSULTANTS
PLAN AND PROFILE
CONGAREE RIVER
Congaree River Basin
CALHOUN-LEXINGTON-RICHLAND CO., S.C.
NAVIGABILITY STUDY
Miles 164.0-175.9
Plate 08-6

ATTACHMENT H

MUSSEL RELOCATION PLAN

MUSSEL RELOCATION PLAN

CONGAREE RIVER SEDIMENTS
COLUMBIA, SOUTH CAROLINA

Elliptio complanata

Elliptio roanokensis

August 2020

Prepared for:

Dominion Energy South Carolina, Inc.
400 Otarre Parkway Cayce, SC 29033

Prepared by:

Apex Companies, LLC
1600 Commerce Circle
Trafford, PA 15085

MUSSEL RELOCATION PLAN

CONGAREE RIVER SEDIMENTS
COLUMBIA, SOUTH CAROLINA

INTRODUCTION

Dominion Energy South Carolina, Inc. (DESC), formerly South Carolina Electric and Gas Company (SCE&G), plans to complete a Modified Removal Action (MRA) to address the occurrence of a tar-like material (TLM) that is commingled with sediment along the eastern shoreline of the Congaree River, just south of the Gervais Street Bridge in Columbia, South Carolina. The project area location is shown on Figure 1. The TLM is believed to be a coal tar material that originated from the Huger Street former manufactured gas plant (MGP) site, located approximately 1,000 feet to the northeast of the project area. The proposed work is being performed by DESC at the direction of South Carolina Department of Health and Environmental Control (SCDHEC) and is subject to permits and approvals from the U.S. Army Corps of Engineers (USACE) and other agencies.

The overall objective of this project is to remove the impacted sediment from the Congaree River. The current plan is to construct two temporary cofferdams to facilitate removal of the impacted sediment. As currently envisioned, the temporary cofferdams would be constructed in two separate phases over two or three construction seasons. The construction seasons will range from approximately May through October of each year. Figure 2 illustrates the phased approach and the proposed cofferdam locations. After the temporary cofferdam is constructed for each phase, the isolated area will be dewatered and the impacted sediment removed and transported off-site for disposal. Following completion of the impacted sediment removal activities, the cofferdam materials will be completely removed from the river.

PROJECT AREA PREVIOUS MUSSEL SURVEY RESULTS

In 2006 a reconnaissance survey was conducted by Alderman Environmental Services, Inc. to assess the freshwater mussel populations within Lake Murray and the lower Saluda and upper Congaree Rivers in support of the Saluda Hydroelectric Project (FERC No. 516). The findings of the survey were summarized in the “Reconnaissance Survey of the Freshwater Mussel Fauna of the Lower Saluda and Congaree Rivers, Lake Murray, and Selected Tributaries (Alderman Environmental Services, Inc. 2006). The survey included two locations in the upper Congaree River that were within or directly adjacent to (downstream) the planned project area. Figure 2 shows these locations and Appendix B provides the applicable survey report excerpts taken from the Alderman Report.

The first survey area (Station: 20060711.5) was located in the vicinity of the Senate Street alluvial fan, which is within the planned Area 1 removal area. This location will be impacted by project operations. The second survey area (Station: 20060712.5) was located directly south (downstream) and outside of the planned Area 2 removal activities and is not expected to be impacted by the planned project activities.

Table 1 provides a summary of the live mussels encountered at these two locations and their current global and state NatureServe ranks as listed on the South Carolina Department of Natural Resources (SCDNR) Heritage Trust Program Rare, Threatened and Endangered Species and Communities List (Appendix C). No federal or state threatened, endangered or candidate mussel species were identified

within the Congaree River during completion of the survey. A combined total of five mussel species classified as rare by the SCDNR Heritage Trust Program were identified at the two survey locations that were within or adjacent to the project area. These rare species have no legal protection under the federal or state endangered species laws but are tracked by the SCDNR Heritage Trust Program at the request of the Program's biologists.

A total of 33 live mussels of four different species were observed at the first location (Station: 20060711.5). Of the four species, three (*Elliptio congaraea*, *Elliptio angustata and Elliptio roanokensis*) are considered rare by SCDNR. The most abundant species identified at this location (*Elliptio complananta*) is not on the Heritage Trust list.

A total of 21 live mussels of six different species were observed at the second location (Station: 20060712.5). Five of the six species observed (*Elliptio angustata, Elliptio congaraea, Elliptio icterina, Lampsilis splendida,* and *Elliptio roanokensis*) are designated as rare by SCDNR. Again, the unlisted *Elliptio complananta* was also identified.

MUSSEL RELOCATION PLAN

As a result of the previous findings from the Alderman survey conducted in 2006, DESC recognizes that no threatened or endangered mussels are likely present within the project area. However, a number of sensitive mussel species are likely located within the cofferdam locations and planned removal areas. In order to complete the project with as minimal of a negative impact to the Congaree River resources as practicable, DESC plans to conduct mussel relocation operations prior to initiating "in-river" construction activities. The mussel relocation activities will include:

- Utilizing qualified personnel to conduct mussel survey activities, finalize project details and complete/supervise the relocation field work;
- Conducting an initial reconnaissance and assessment of the planned project area (the planned footprint of each phase plus a small buffer zone) and immediately downstream;
- Locating a suitable relocation area(s) with acceptable habitat characteristics within the Congaree River as near as possible to the project site;
- Collecting and relocating the mussels identified within the footprint of each phase of the project, to the extent practicable; and
- Providing a summary of completed mussel relocation activities in the Removal Action Report (RAR).

The assessment and relocation activities will be conducted in phases by planned removal area in order to properly time the work with the actual construction windows.

Consultant Selection

DESC will procure the services of a qualified consultant with proven experience in successfully completing freshwater mussel surveys, habitat assessment and relocation activities. Once selected, this consultant will review project details and finalize the overall plan for mussel relocation.

Initial Reconnaissance and Assessment of the Project Area

The selected consultant will conduct an initial assessment of the project area to determine the approximate number, species and other characteristics of the mussels that can be realistically relocated prior to initiation of "in-river" construction activities. This initial assessment will likely be restricted to the area that will be impacted by the upcoming phase of work and will likely be conducted on at least two occasions. The surveyed project area will include the planned cofferdam footprint, the interior removal area and a small buffer on the outboard side of the cofferdam. This buffer will account for small changes in the final cofferdam shape or location and for changes in river currents and hydraulic characteristics that are expected to result from construction of the structure. The assessment will be extended some distance downstream of the phased project areas to account for changes in river hydraulics in these areas while the cofferdam is in place and for potential disturbance during cofferdam construction.

The initial assessments will be conducted during warmer months (generally April or later, prior to cofferdam installation). The information gathered from the assessment will be utilized to determine appropriate relocation areas and other logistical components associated with the collection/relocation phase of the project.

Determine Suitable Relocation Areas

Relocation site investigation will also take place during the warmer months. The relocation site(s) will be within the Congaree River and as near to the project area as possible. Selection will be based on a number of criteria, including:

- The presence and abundance of other mussels;
- Specific habitat characteristics such as substrate and adjacent land uses;
- Flow and gradient characteristics; and
- Potential for future threats.

The Alderman survey area (Station: 20060712.5) located directly downstream of the project area contains the same species of mussels found within the project area and may be a suitable relocation point for some or all of the project area mussels. This location would be ideal, if suitable, due to its close proximity to the project area.

Once the initial reconnaissance survey and relocation site identification have been completed, the consultant will prepare a brief report that outlines the results of the initial survey activities and describes the chosen relocation sites. This report will also contain the general plan for collecting and relocating the mussels. Separate reports for each MRA area are anticipated. The reports will be provided to the agencies for review.

Collect and Relocate Mussels

As stated above, the mussel relocation efforts will likely be conducted in phases corresponding with each MRA area. 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. 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 (see Figure 2). Again, a combination of wading and diving would be required to cover the area to be impacted by the cofferdam. The relocation team would then demobilize until the cofferdam is constructed and the isolated area is partially dewatered. As dewatering operations lower the water level, 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. With the water level sufficiently lowered the isolated area could be better surveyed through wading, visibility would most likely be improved in most areas and potentially more mussels will be collected.

Warmer months of the year are preferred for relocation and the mussel relocation expert will determine the appropriate timeframe for completion of these operations based on the specific requirements of the mussels identified in the project area. Spawning and glochidia release timeframes will be avoided.

DESC plans to conduct as complete of a relocation effort as possible. Several factors may limit the potential relocation activities. They include:

- The presence of significant TLM in the substrate surrounding mussel locations may necessitate not disturbing these locations;
- Mussels that are coated with TLM will most likely be left in place because adequate decontamination may not be feasible or will overly stress the animal. Tar coated mussels can not be relocated to new unimpacted areas; and
- Other project related constraints (logistical, safety, etc.) may limit the overall relocation effort.

The mussel relocation expert will conduct and supervise the collection of the mussels from within the specified area. An effort will be made to adequately survey all areas that will be impacted by the project. More than one pass will likely be conducted depending on the expert's recommendations and other project constraints.

The mussels will be gently removed, kept cool and moist and quickly transported to the relocation area. Extreme fluctuations in temperature or other environmental factors will be avoided. Mussels will be correctly placed within the relocation area. The number and species of mussels will be documented.

Reporting

The details of the mussel relocation activities will be provided in the Removal Action Report (RAR), which will document the entire sediment removal operations. The documented activities will include:

- Results of the initial project area surveying activities;
- The relocation area characteristics and details from the relocation area decision process;
- Mussel collection, transport and relocation activities; and
- Limiting factors, if any.

Progress reports for each phase of work may also be provided, if requested by the agencies.

Post Project Completion Activities

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 practicable. 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.

Current plans do not include replacing any removed material with backfill. The 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.

DESC anticipates that the same river hydraulic characteristics that created the current mussel habitat within the project area will naturally recreate similar habitat characteristics given an appropriate amount of time. As a result, mussel repopulation of the project area is expected to occur naturally as the project area substrate is reestablished.

REFERENCES

Alderman Environmental Services, Inc. 2006. Reconnaissance Survey of the Freshwater Mussel Fauna of the Lower Saluda and Congaree Rivers, Lake Murray, and Selected Tributaries. Alderman Survey Report.

Luzier, C. and S. Miller. 2009. Pacific Northwest Native Freshwater Mussel Workgroup. Freshwater Mussel Relocation Guidelines.

U.S. Fish and Wildlife Services and Virginia Dept. of Game and Inland Fisheries. 2013. Freshwater Mussel Guidelines for Virginia.

APPENDICES

A Tables and Figures

B Excerpts taken from “Reconnaissance Survey of the Freshwater Mussel Fauna of the Lower Saluda and Congaree Rivers, Lake Murray, and Selected Tributaries (Alderman Environmental Services, Inc. 2006)

C Tracked Rare, Threatened and Endangered Species Communities List

APPENDIX A

Tables and Figures

TABLE 1

2006 FRESHWATER MUSSEL SURVEY RESULTS FOR PROJECT AREA*

Congaree River Sediments
Columbia, South Carolina

Station	Species	Common Name	Number Identified	NatureServe Ranking	
				Global Rank	State Rank
20060711.5	*Elliptio complanata*	Common Elliptio	23	G5 - Secure	--
	Elliptio congaraea	Carolina Slabshell	1	G3 - Vulnerable	S3 - Vulnerable
	Elliptio roanokensis	Roanoke Slabshell	1	G3 - Vulnerable	S2 - Imperiled
	Elliptio angustata	Carolina Lance	8	G4 - Apparently Secure	S3 - Vulnerable
20060712.5	*Elliptio angustata*	Carolina Lance	2	G4 - Apparently Secure	S3 - Vulnerable
	Elliptio congaraea	Carolina Slabshell	1	G3 - Vulnerable	S3 - Vulnerable
	Elliptio icterina	Variable Spike	1	G5Q - Secure	S4 - Apparently Secure
	Elliptio complanata	Common Elliptio	3	G5 - Secure	--
	Lampsilis splendida	Rayed Pink Fatmucket	1	G3 - Vulnerable	S2 - Imperiled
	Elliptio roanokensis	Roanoke Slabshell	13	G3 - Vulnerable	S2 - Imperiled

Notes:

* - Information obtained from Reconnaissance Survey of the Freshwater Mussel Fauna of the Lower Saluda and Congaree Rivers, Lake Murray and Selected Tributaries by John M. Alderman, Alderman Environmental Services, Inc. (October 2006).
- NatureServe Ranks taken from Rare, Threatened and Endangered Species Communities Tracked by the SCDNR Heritage Trust Program (June 11, 2014). Verified on NatureServe website on 8/6/2020.
- No federal or state threatened, endangered or candidate species were identified in the Congaree River during the survey.
- Elliptio complanata is not included on the SCDNR Heritage Trust Program list.
- The "Q" qualifier for Elliptio icterina represents "questionable taxonomy that may reduce conservation priority."

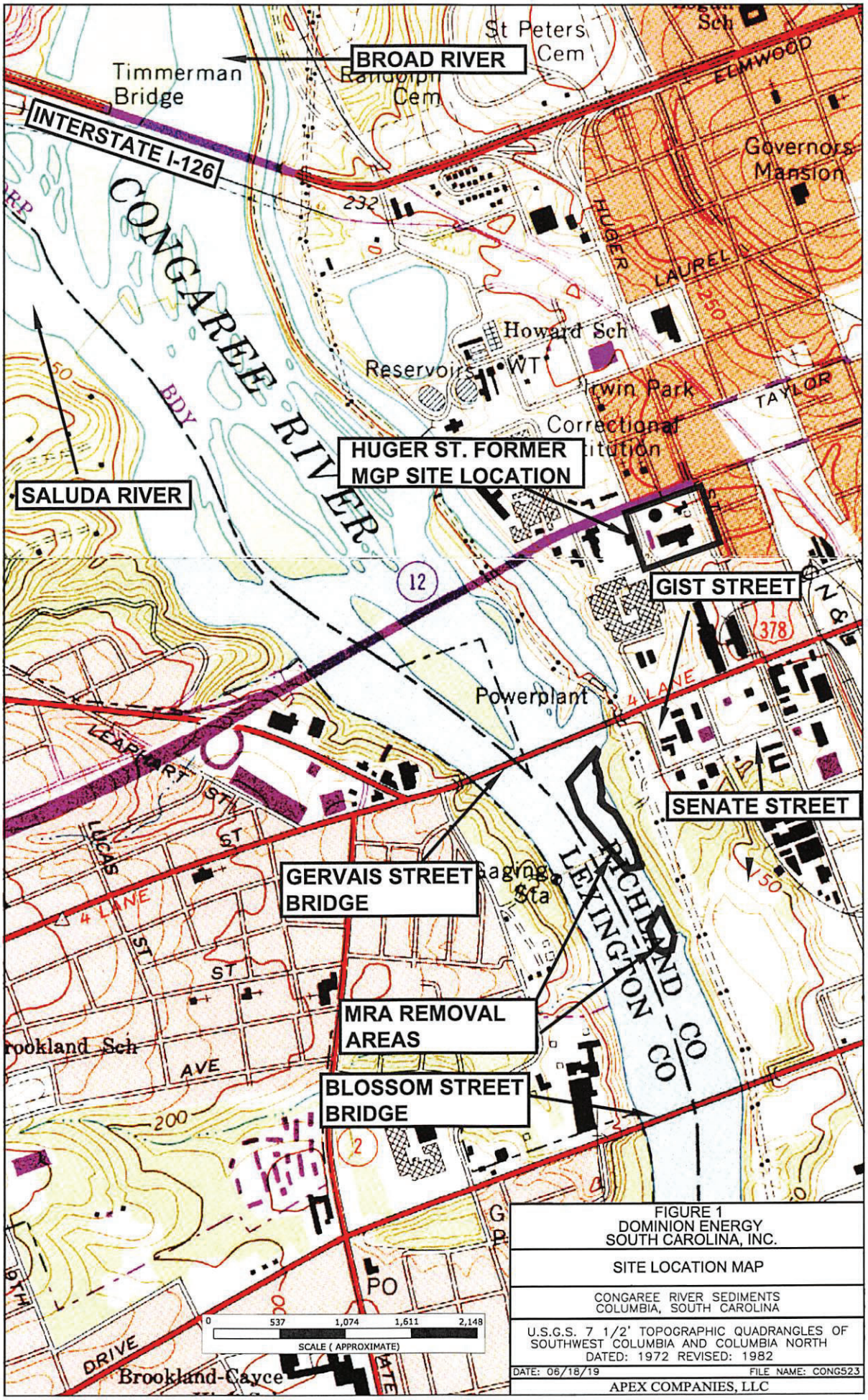


FIGURE 1
DOMINION ENERGY
SOUTH CAROLINA, INC.

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: CONG523

APEX COMPANIES, LLC

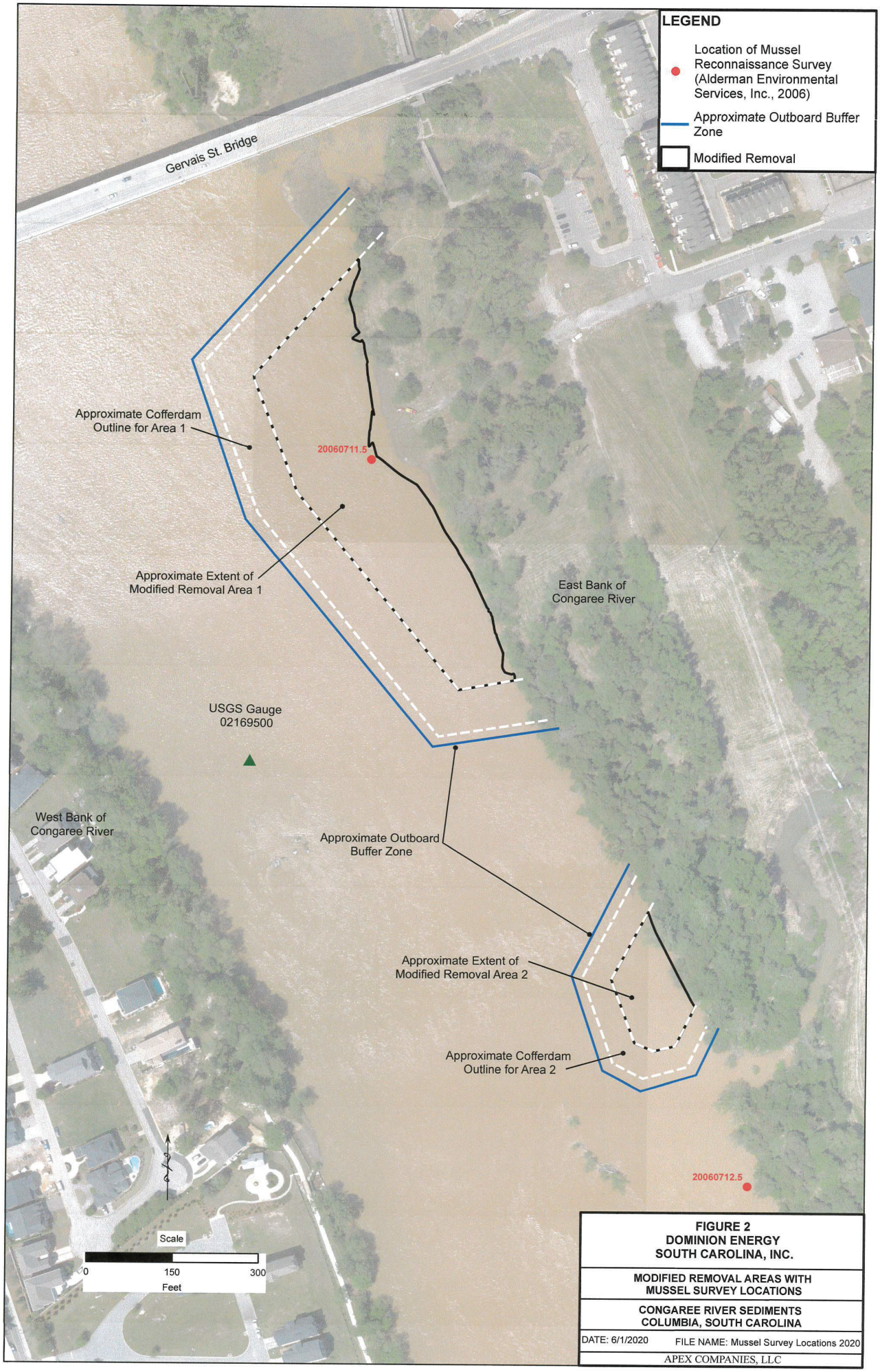


FIGURE 2
DOMINION ENERGY SOUTH CAROLINA, INC.

MODIFIED REMOVAL AREAS WITH MUSSEL SURVEY LOCATIONS

CONGAREE RIVER SEDIMENTS COLUMBIA, SOUTH CAROLINA

DATE: 6/1/2020 FILE NAME: Mussel Survey Locations 2020

APEX COMPANIES, LLC

APPENDIX B

Excerpts taken from “Reconnaissance Survey of the Freshwater Mussel Fauna of the Lower Saluda and Congaree Rivers, Lake Murray, and Selected Tributaries” (Alderman Environmental Services, Inc. 2006)

Table 3. Freshwater mussels of the Saluda River (below L. Murray Dam), lower Broad River, and upper Congaree River

Station	Latitude Longitude	Species	Live, Shells	Substrate*
20060711.1 Saluda R.	34.05037 N 81.20573 W	None		sa,g,Co,Bo
20060711.2 Saluda R.	34.04843 N 81.19653 W	None		s,Sa,G,co,bo,b
20060711.3 Saluda R.	34.02978 N 81.13944 W	None		s,Sa,G,co,bo
20060711.4 Saluda R.	34.00969 N 81.07800 W	None		s,sa,g,co,bo,b
20060712.1 Saluda R.	34.00639 N 81.06508 W	None		s,sa,g,co
20060712.2 Broad R.	34.00714 N 81.06232 W	*Elliptio roanokensis* *Elliptio complanata* *Villosa delumbis* *Elliptio angustata* *Lampsilis cariosa*	0,2 0,5 0,1 1,1 1,0	s,sa,g,co,bo,b
20060712.3 Saluda R. (Broad R. washout area)	34.00541 N 81.06282 W	*Elliptio angustata* *Villosa delumbis* *Strophitus undulatus*	1,2 0,2 0,1	s,Sa,g
20060712.4 Congaree R. (Saluda R. side)	33.98949 N 81.04859 W	*Elliptio complanata*	1,0	s,sa,g,co,bo,b
20060711.5 Congaree R. (Broad R. side)	33.99461 N 81.04913 W	*Elliptio complanata* *Elliptio congaraea* *Elliptio roanokensis* *Villosa delumbis* *Elliptio angustata*	23,-- 1,0 1,0 0,1 8,--	s,sa,g,co,bo

Table 3 (continued). Freshwater mussels of the Saluda River (below L. Murray Dam), lower Broad River, and upper Congaree River

Station	Latitude Longitude	Species	Live, Shells	Substrate*
20060712.5 Congaree R. (Broad R. side)	33.99111 N 81.04692 W	*Elliptio angustata* *Elliptio congaraea* *Elliptio icterina* *Elliptio complanata* *Lampsilis splendida* *Elliptio roanokensis*	2,0 1,0 1,0 3,0 1,0 13,0	s,sa,go,co,bo,b
20060712.6 Congaree R. (Saluda R. side)	33.97967 N 81.04757 W	*Elliptio roanokensis* *Elliptio angustata*	2,0 1,0	s,Sa,G,co,bo
20060712.7 Congaree R. (Borad R. side)	33.98031 N 81.04546 W	*Elliptio complanata* *Elliptio congaraea* *Strophitus undulatus* *Elliptio roanokensis* *Elliptio angustata* *Lampsilis splendida* *Lampsilis cariosa* *Villosa delumbis*	5,0 2,0 1,0 19,0 9,0 1,0 2,0 0,1	S,Sa,G,co,bo
20060712.8 Congaree R. (Saluda R. side)	33.96535 N 81.03777 W	None	--	s,sa,g
20060804.1 Saluda R.	34.02287 N 81.10009 W	None	--	s,sa,g,co,bo,B
20060804.2 Saluda R.	34.01835 N 81.09807 W	None	--	s,sa,g,co,bo,b
20060804.3 Rawls Cr.	34.07949 N 81.20251 W	None	--	c,s,sa,g,co,bo,b
20060804.4 12 Mile Cr.	34.03275 N 81.16173 W	None	--	s,sa,g,co,bo

* s-silt, sa- sand, c-clay, co-cobble, b-bedrock, bo-boulder, g-gravel, r-roots, v-vegetation, d-detritus, m-mud

PROJECT: Reconnaissance Survey of the Freshwater Mussel Fauna of the Lower Saluda and Congaree River, Lake Murray, and Selected Tributaries

STATION: 20060711.5jma

BIOLOGISTS: **John M. Alderman**
Joseph D. Alderman
Jennifer M. Summerlin

U.S. FISH AND WILDLIFE SERVICE ES PERMIT: **TE065756-0**

S.C. DEPARTMENT OF NATURAL RESOURCES AUTHORIZATION: November 25, 2002

LOCATION: Congaree River, Lexington/Richland county line, South Carolina; 33.99461 N, 81.04913 W; **see Figure 4**

SURVEY DATE: July 11, 2006

SITE COMMENTS: -

HABITAT:

WATERBODY TYPE:	River
FLOW:	Run, slack, pool
RELATIVE DEPTH:	Very shallow
DEPTH (%<2 FEET):	90
SUBSTRATE:	Silt, sand, gravel, cobble, boulder
COMPACTNESS:	Compact and normal
SAND/GRAVEL BARS:	Present
WOODY DEBRIS:	Low
BEAVER ACTIVITY:	None
WINDTHROW:	Low
TEMPORARY POOLS:	None
CHANNEL WIDTH:	300+ meters
BANK HEIGHT:	Varies

HABITAT (cont.):

BANK STABILITY:	Very stable
BUFFER WIDTH:	Narrow to moderate
RIPARIAN VEGETATION:	Wooded, shrub-brush, grass
LAND USE:	Urban
PERCENT COVER:	0
WOODLAND EXTENT:	Not extensive
NATURAL LEVEES:	-
VISIBILITY:	Slightly turbid
WATER LEVEL:	Low
WEATHER:	Sun-Cloud, hot

TECHNIQUES AND SURVEY TIME:

TECHNIQUES:	Visual
SURVEY TIME:	0.5 person-hours

FRESHWATER MUSSELS:

Elliptio roanokensis – 1 live (93 mm)
Elliptio complanata – 23 live (78, 74, 71, 53, 66, 76, 60, 58, 63, 56, 55, 61, 62, 53, 55, 59, 58, 56, 58, 62, 48, 50, 36 mm)
Elliptio congaraea – 1 live (55 mm)
Elliptio angustata – 8 live (80, 69, 58, 67, 67, 58, 57, 58 mm)
Villosa delumbis – 1 old shell

OTHER DOCUMENTED TAXA:

Elimia catenaria - common
Corbicula fluminea

PROJECT: Reconnaissance Survey of the Freshwater Mussel Fauna of the Lower Saluda and Congaree River, Lake Murray, and Selected Tributaries

STATION: 20060712.5jma

BIOLOGISTS: **John M. Alderman**
Jeffrey West
Joseph D. Alderman
Christopher S. Boring
Jennifer M. Summerlin

U.S. FISH AND WILDLIFE SERVICE ES PERMIT: **TE065756-0**

S.C. DEPARTMENT OF NATURAL RESOURCES AUTHORIZATION: November 25, 2002

LOCATION: Congaree River, Lexington/Richland county line, South Carolina; 33.99111 N, 81.04692 W; **see Figure 4**

SURVEY DATE: July 12, 2006

SITE COMMENTS: Broad River side of Congaree River

HABITAT:

WATERBODY TYPE:	River
FLOW:	Run, slack
RELATIVE DEPTH:	Very shallow
DEPTH (%<2 FEET):	75
SUBSTRATE:	Silt, sand, gravel, cobble, boulder, bedrock
COMPACTNESS:	Normal
SAND/GRAVEL BARS:	Present
WOODY DEBRIS:	Low
BEAVER ACTIVITY:	Evidence (gnawed sticks)
WINDTHROW:	Low
TEMPORARY POOLS:	-
CHANNEL WIDTH:	300+ meters
BANK HEIGHT:	2.5+ meters

HABITAT (cont.):

BANK STABILITY:	Very stable
BUFFER WIDTH:	Moderate to wide
RIPARIAN VEGETATION:	Wooded, shrub-brush
LAND USE:	Urban
PERCENT COVER:	1
WOODLAND EXTENT:	Intermediate
NATURAL LEVEES:	-
VISIBILITY:	Slightly turbid
WATER LEVEL:	Low
WEATHER:	Sun-Cloud, hot

TECHNIQUES AND SURVEY TIME:

TECHNIQUES:	Visual
SURVEY TIME:	0.83 person-hours

FRESHWATER MUSSELS:

Elliptio roanokensis – 13 live (100, 111, 89, 91, 95, 108, 105, 95, 102, 107, 110, 89, 91 mm)
Elliptio complanata –3 live (93, 78, 73 mm)
Elliptio congaraea – 1 live (61 mm)
Elliptio angustata –2 live (63, 66 mm)
Elliptio icterina – 1 live (72 mm)
Lampsilis splendida – 1 live male (67 mm)
Villosa delumbis – 1 old shell

OTHER DOCUMENTED TAXA:

Elimia catenaria - common
Corbicula fluminea

APPENDIX C

Tracked Rare, Threatened and Endangered Species Communities List

Rare, Threatened and Endangered Species and Communities Tracked by the SC DNR Heritage Trust Program

June 11, 2014

Scientific Name	Common Name	USESA Status	State Protection	GRank	SRank
Procambarus enoplosternum				G4G5	SNR
Procambarus hirsutus	a Crayfish			G4	S4
Procambarus lepidodactylus	Pee Dee Lotic Crayfish			G4	S4
Procambarus lunzi	a Crayfish			G4	S2S3
Procambarus pearsei	Sandhills Crayfish			G4	S3
Procambarus pubescens	a Crayfish			G4G5	S3?
Insects					
Agarodes griseus	a Caddisfly			G5	SNR
Amblyscirtes reversa	Reversed Roadside Skipper			G3G4	SNR
Atrytone arogos	Arogos Skipper			G3	SNR
Autochton cellus	Golden-banded Skipper			G4	S2S4
Cicindela dorsalis media	White Tiger Beetle			G3G4T3T4	S3S4
Dolania americana	American Sand Burrowing Mayfly			G4	S3
Macromia margarita	Margaret's River Cruiser			G3	SNR
Megaleuctra williamsae	Smokies Needlefly			G2	SNR
Polycentropus carlsoni	Carlson's Polycentropus Caddisfly			G2G3	S1S3
Protoptila morettii	Moretti's Caddisfly			G1G2	SNR
Pseudogoera singularis				G2G3	SNR
Psilotreta frontalis				G5	SNR
Somatochlora calverti	Calvert's Emerald			G3	SNR
Speyeria diana	Diana Fritillary			G3G4	S3?
Stylurus townesi	Townes' Clubtail			G3	S1S3
Wormaldia thyria				G3	SNR
Spiders					
Sphodros coylei	Coyle's Purseweb Spider			G4?	SNR
Mollusks					
Alasmidonta undulata	Triangle Floater			G4	S1
Alasmidonta varicosa	Brook Floater			G3	SNR
Anodonta couperiana	Barrel Floater			G4	S1
Elimia catenaria	Gravel Elimia			G4	SNR
Elliptio "angustata-producta" complex	Carolina Lance-Atlantic Spike complex			G3	S3
Elliptio angustata	Carolina Lance			G4	S3
Elliptio congaraea	Carolina Slabshell			G3	S3

Rare, Threatened and Endangered Species and Communities Tracked by the SC DNR Heritage Trust Program

June 11, 2014

Scientific Name	Common Name	USESA Status	State Protection	GRank	SRank
Elliptio fisheriana	Northern Lance			G4	SNR
Elliptio folliculata	Pod Lance			G2G3Q	S2S3
Elliptio fraterna	Brother Spike		SE-Endangered	G1G2	S1
Elliptio icterina	Variable Spike			G5Q	S4
Elliptio producta	Atlantic Spike			G3Q	S3
Elliptio roanokensis	Roanoke Slabshell			G3	S2
Elliptio waccamawensis	Waccamaw Spike			G2G3Q	S1
Fusconaia masoni	Atlantic Pigtoe		SE-Endangered	G2	SH
Gillia altilis	Buffalo Pebblesnail			G5	S1
Lampsilis cariosa	Yellow Lampmussel			G3G4	S2
Lampsilis radiata	Eastern Lampmussel			G5	S2
Lampsilis splendida	Rayed Pink Fatmucket			G3	S2
Lasmigona decorata	Carolina Heelsplitter	LE: Endangered	SE: Endangered	G1	S1
Leptodea ochracea	Tidewater Mucket			G3G4	S2
Ligumia nasuta	Eastern Pondmussel			G4	S2
Lioplax subcarinata	Ridged Lioplax			G4G5	S1
Pyganodon cataracta	Eastern Floater			G5	SNR
Somatogyrus virginicus	Panhandle Pebblesnail			G2G3	SNR
Strophitus undulatus	Creeper			G5	S2
Toxolasma pullus	Savannah Lilliput			G2	S1
Uniomerus caroliniana	Florida Pondhorn			G4	S3
Utterbackia imbecillis	Paper Pondshell			G5	SNR
Villosa constricta	Notched Rainbow			G3	S1
Villosa delumbis	Eastern Creekshell			G4	S4
Villosa vaughaniana	Carolina Creekshell			G2	S1
Villosa vibex	Southern Rainbow			G5Q	S2
Animal Assemblage					
Waterbird Colony				GNR	SNR
Vascular Plants					
Dicots					
Acer pensylvanicum	Striped Maple			G5	S2
Aconitum uncinatum	Blue Monkshood			G4	S2
Aesculus parviflora	Small-flowered Buckeye			G3	S1
Agalinis aphylla	Coastal Plain False-foxglove			G3G4	S1

ATTACHMENT I

CONGAREE RIVER BACKWATER ANALYSIS AND NO RISE CERTIFICATIONS WITH FLOODPLAIN COORDINATOR APPROVALS

COUNTY OF LEXINGTON
COMMUNITY DEVELOPMENT
FLOODPLAIN MANAGEMENT

April 7, 2020

Paul Biery
Dominion Energy
220 Operational Way, MC C221
Cayce, SC 29033

RE: Congaree River Cofferdam/No Impact Certification

Mr. Biery,

The County Hydrologist and I have reviewed and approved the No Rise/No Impact Certification for the Congaree River cleanup and removal project.

As I understand, this project and the responsibility for permitting falls under the jurisdiction of the City of Columbia. I concur a permit may be issued based upon the submitted documentation.

If you need additional assistance from me, please do not hesitate to call or email.

Christopher J. Stone, CFM
Lexington County Floodplain Manager
212 Southlake Drive Suite 401
Lexington, SC 29072
Phone 803-785-8121
Fax 803-785-5186

RICHLAND COUNTY
COMMUNITY PLANNING & DEVELOPMENT
2020 Hampton Street
Columbia, SC 29204

March 31, 2020

Paul Biery
Dominion Energy
220 Operational Way, MC C221
Cayce SC 29033

Re: Congaree River/No Impact Certification

Dear Mr. Biery:

The County Engineer and I have reviewed the submitted No Rise/ No Impact Certification for the Congaree River Cleanup and removal project. The information provided indicates that the project will meet the minimum provisions of section 26-106 of the Richland County Land Development Code.

The project falls under the jurisdiction of the City of Columbia who will give the final approval for permitting once the US Army Corp of Engineers permit has been issued. At that time, Richland County will concur with the determination of the City of Columbia.

If you have additional questions or need assistance, please do not hesitate to contact me at 803-576-2158 or by email at brown.heather@richlandcountysc.gov.

Sincerely,

Heather Brown

Heather Brown, CFM
Floodplain Manager
Richland County
2020 Hampton St
PO Box 192
Columbia SC 29204
(803) 576-2158

CITY OF COLUMBIA

Department of Utilities and Engineering
Division of Engineering
P.O. Box 147 | Columbia, South Carolina 29217
Phone: 803-545-3400 Fax: 803-988-8199

March 16, 2020

Paul Biery
Dominion Energy
220 Operational Way, MC C221
Cayce SC 29033

RE: **Congaree River/No-Impact Certification**

Dear Mr. Biery,

The No-Impact study submitted by Dominion Energy for Congaree River cleanup and removal project has been reviewed and is acceptable. An approval from the floodplain manager cannot be provided until the Army Corp of Engineers (ACOE) issues their permit.

As we discussed, once the ACOE permit is issued, the City of Columbia permit can be finalized. It is expected that the city floodplain approval will be issued for 4 years with active construction limited to May till October. In the event subject project has not been completed within given time, an update must be submitted for additional time and approval.

Should you require additional information, please feel free to contact me at 803-545-3386.

Sincerely,

Ali Khan, CFM
Flood Plain Manager

ENGINEERING "NO-RISE" CERTIFICATION

This is to certify that I am a duly qualified engineer licensed to practice in the State of South Carolina.

It is to further certify that the attached technical data supports the fact that proposed Congaree River Remediation Project (Name of Development) will not impact the 100-year flood elevations, floodway elevations and floodway widths on Congaree River (Name of Stream) at published sections in the Flood Insurance Study for Lexington County (Name of Community), dated July 5, 2018 and will not impact the 100-year flood elevations, floodway elevations, and floodway widths at unpublished cross-sections in the vicinity of the proposed development.

Attached are the following documents that support my findings:

Congaree River Remediation Project Hydraulic Analysis Memo - January 16, 2020

(Date) 1/16/2020

(Signature) John P. Osterle (Title) Project Manager

WSP USA

11 Stanwix, Suite 950

Pittsburgh, PA 15222

(Address)

(Seal)

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER No. 22631 JOHN P. OSTERLE

ENGINEERING "NO-RISE" CERTIFICATION

This is to certify that I am a duly qualified engineer licensed to practice in the State of South Carolina.

It is to further certify that the attached technical data supports the fact that proposed Congaree River Remediation Project (Name of Development) will not impact the 100-year flood elevations, floodway elevations and floodway widths on Congaree River (Name of Stream) at published sections in the Flood Insurance Study for Richland County (Name of Community), dated December 21, 2017 and will not impact the 100-year flood elevations, floodway elevations, and floodway widths at unpublished cross-sections in the vicinity of the proposed development.

Attached are the following documents that support my findings:

Congaree River Remediation Project Hydraulic Analysis Memo - January 16, 2020

(Date) 1/16/2020

(Signature) John P. Osterle (Title) Project Manager

WSP USA

11 Stanwix, Suite 950

Pittsburgh, PA 15222

(Address)

(Seal)

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER No. 22631 JOHN P. OSTERLE

Statement of Purpose

The purpose of this calculation is to perform a hydraulic analysis for the affected area along the Congaree River in Columbia, South Carolina, due to the separate installation of two rock fill cofferdams around Areas 1 and 2. The purpose of performing a hydraulic analysis is to determine the impact of the proposed cofferdam structures on the Base Flood Elevations (BFE) for existing conditions.

A plan view showing the extents of the cofferdams is included on ***Figure 1***, based on Apex Drawing "Stakeholder Approved MRA Plan Sediment Remediation Areas" ***(Apex, 2019a)***.

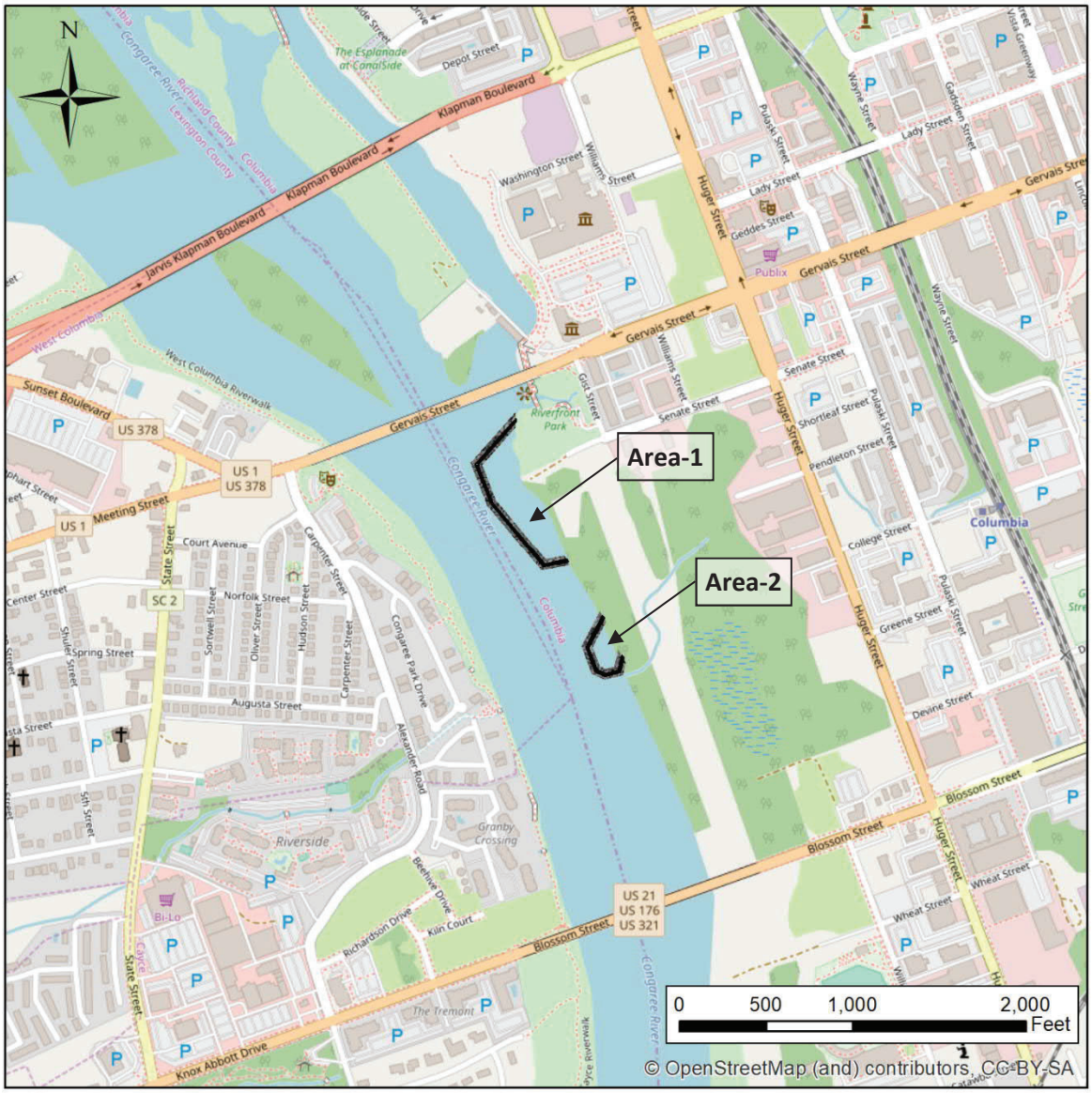


Figure 1: Plan View of Proposed Cofferdams

The typical section of the proposed cofferdam structures is shown in ***Figure 2***. This is an assumed design concept based on discussions with Apex Companies LLC.

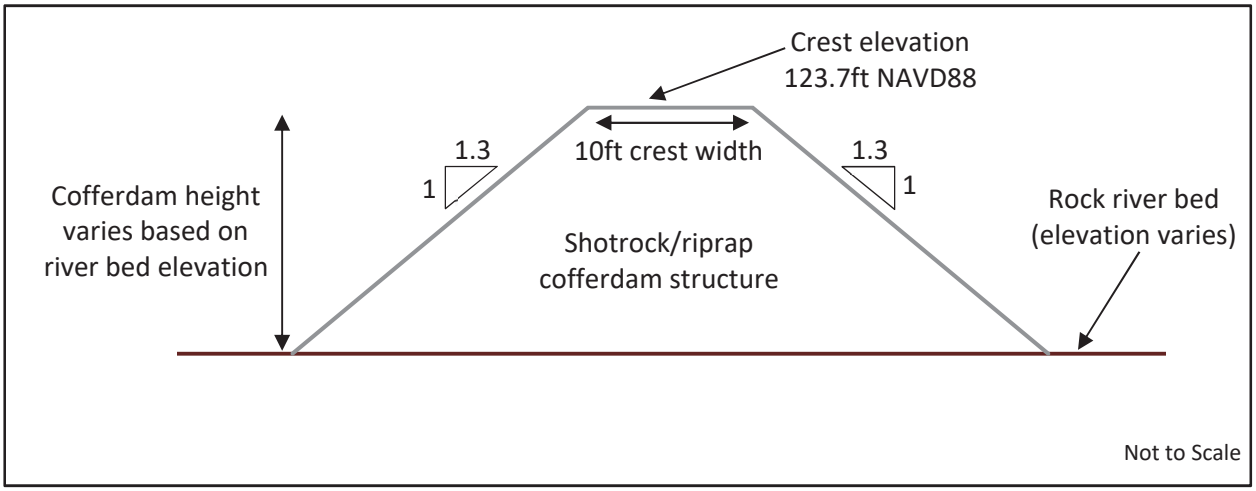


Figure 2: Typical Section of Proposed Cofferdams

Description of Methodology Used

The installation of a rock fill berm cofferdam is proposed along the east bank of the Congaree River, starting just downstream of the Gervais Street Bridge. The proposed cofferdam will be constructed in two separate phases; therefore, each phase is modeled separately for the proposed conditions. The total cofferdam influence area runs approximately 1,650 feet along the east bank, starting downstream of the Gervais Street Bridge and terminating at the inlet of a small unnamed tributary, referred to as Tributary No. 2 for this analysis.

The hydraulic study follows procedures set forth by the Federal Emergency Management Agency (FEMA) in their "Procedures for No-Rise Certification" (***FEMA, 2013***), which is included in ***Appendix A***. The No-Rise procedures follow several distinct steps:

1. Current Effective Model: Obtain a copy of the current effective hydraulic model for the specified stream from FEMA;
2. Duplicate Effective Model: Upon receipt of the effective model, run the model to duplicate the data in the effective FEMA Flood Insurance Study (FIS; ***FEMA, 2017/2018***).
3. Corrected Effective Model: The model that corrects any errors that occur in the duplicate effective model, adds any additional cross sections, or incorporates more detailed topographic information than that used in the current effective model;
4. Existing Conditions Model: Revise the duplicate effective or the corrected effective model to reflect any modifications that have occurred within the floodplain since the date of the effective model but prior to the construction of the project. If no modifications have occurred since the date of the effective model, then the model would be identical to the duplicate effective or corrected effective model. The results of this Existing Conditions analysis will indicate the 100-yr elevations at the project site;
5. Proposed, or Post-Project Conditions Model: Modify the existing condition or pre-project conditions model (or duplicate effective model or corrected effective model, as appropriate) to

reflect proposed or post-project conditions. (*this analysis looks at two separate proposed conditions models*) The results of this analysis will indicate the 100-year elevation for proposed conditions at the project site.

Current Effective Model

The current effective model was requested from FEMA by following the procedure outlined in the "Procedures for No-Rise Certification" (***FEMA, 2013***). The latest hydraulic model used in developing the current FIS for the Congaree River was requested. The hydraulic analyses in the FIS were carried out to estimate flood elevations of the selected recurrence interval. In this case, the recurrence interval is the 100-year flood. This means that the flood has a 1 percent chance of being equaled or exceeded during any given year.

The Congaree River flows along the boundary between Lexington and Richland Counties. A Flood Insurance Rate Map (FIRM) is available for both Lexington County (***FEMA, 2018***), and Richland County (***FEMA, 2017***) which includes the location of the cross-sections used to develop the hydraulic model. The two FIRMs are presented on ***Figure 3*** and ***Figure 4*** respectively.

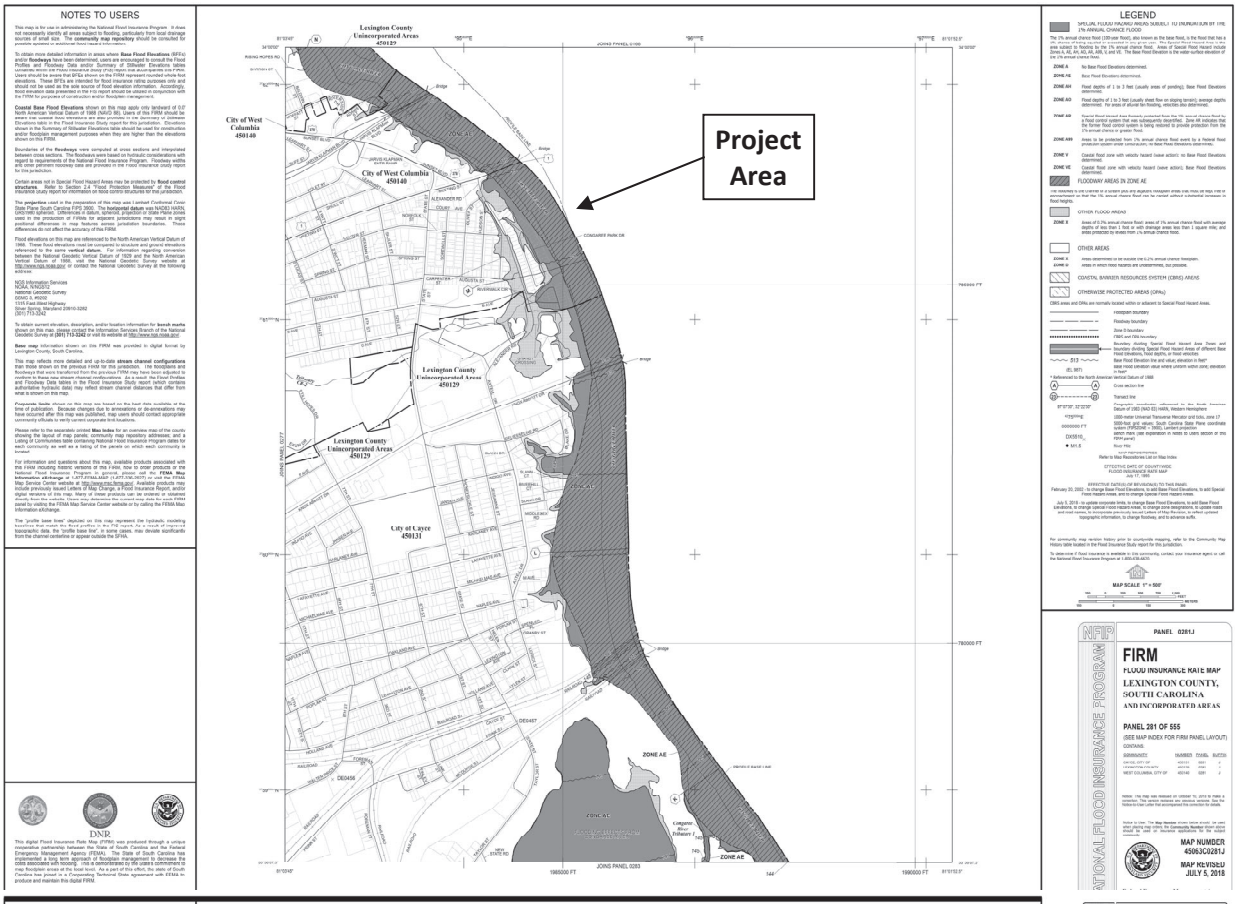


Figure 3: Lexington County Flood Insurance Rate Map (FEMA, 2018)

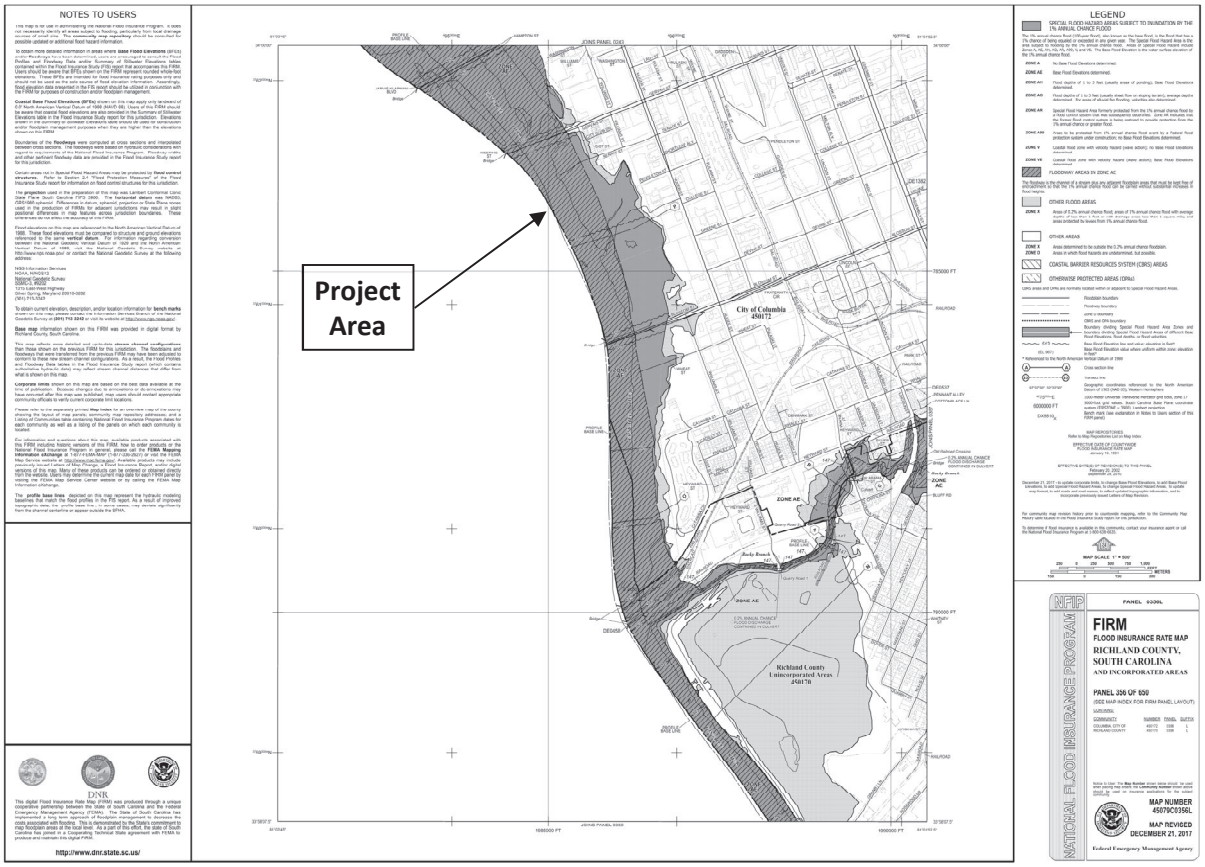


Figure 4: Richland County Flood Insurance Rate Map (FEMA, 2017)

The current effective model for the Congaree River was provided to WSP USA by FEMA in the form of electronic HEC-RAS (***USACE, 2010***) input and output files. The model is an unsteady flow model covering approximately 14 miles of the Congaree River. The vertical datum of the model is to the North American Vertical Datum of 1988 (NAVD88). The electronic files for all models are included in ***Appendix B***.

Duplicate Effective Model

HEC-RAS Version 4.1 (***USACE, 2010***) was used to develop the current effective model. HEC-RAS 4.1 is a hydraulic modeling program used for simulating one-dimensional steady and unsteady flows in river channels. The same software version was also used for the duplicate effective model, and all other models used in this hydraulic analysis, to maintain consistency with the current effective model.

Unsteady model simulations for the 10-year, 50-year, and 100-year flood return periods were completed for the duplicate effective model. No changes were made to the current effective model provided by FEMA; the model was not truncated or modified in any way. The results obtained were identical to the current effective model. The current/duplicate effective HEC-RAS model schematic is shown on ***Figure 5*** (full model extent) and ***Figure 6*** (project area).

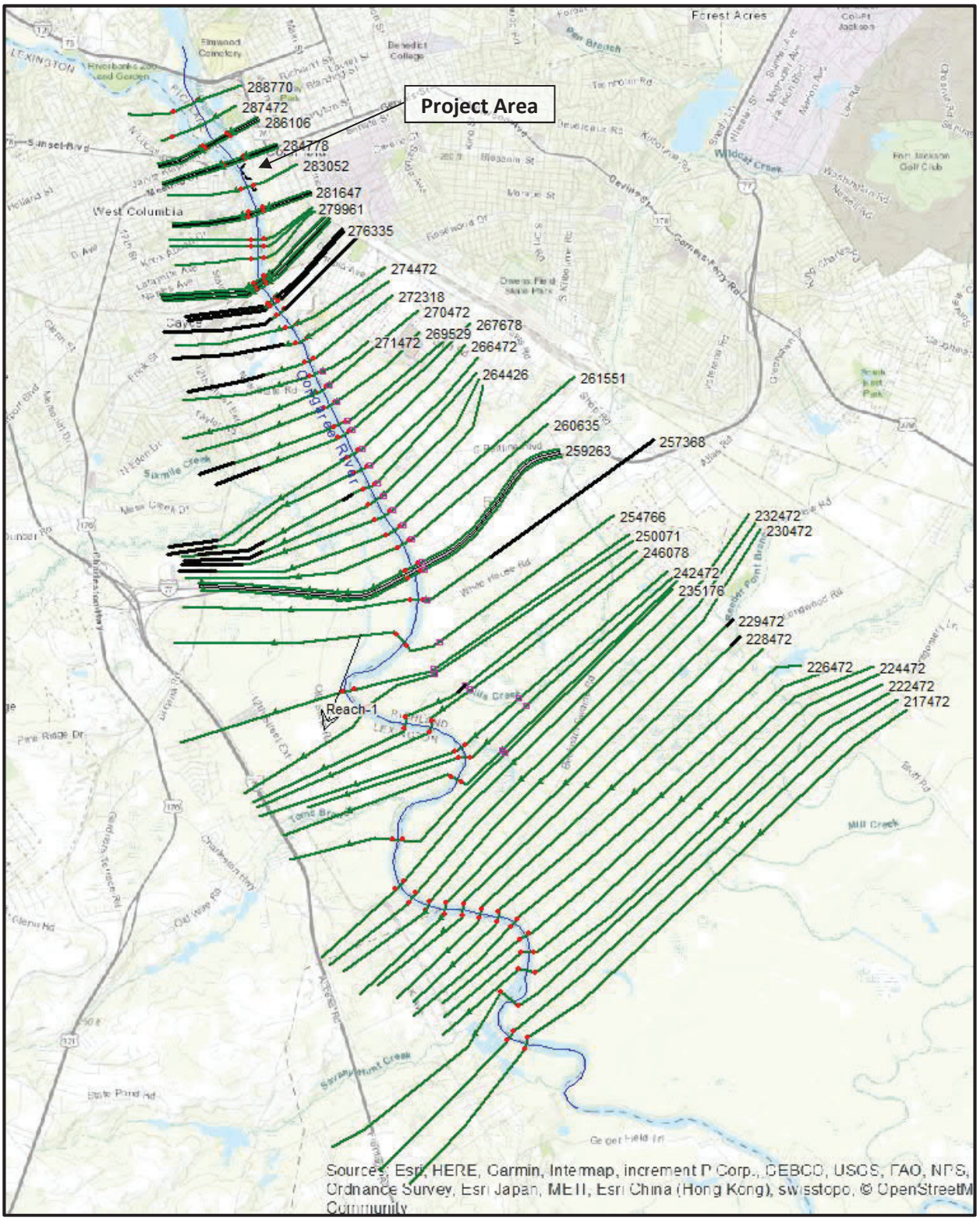


Figure 5: Current/Duplicate Effective HEC-RAS Model Schematic (Full Model Extent)

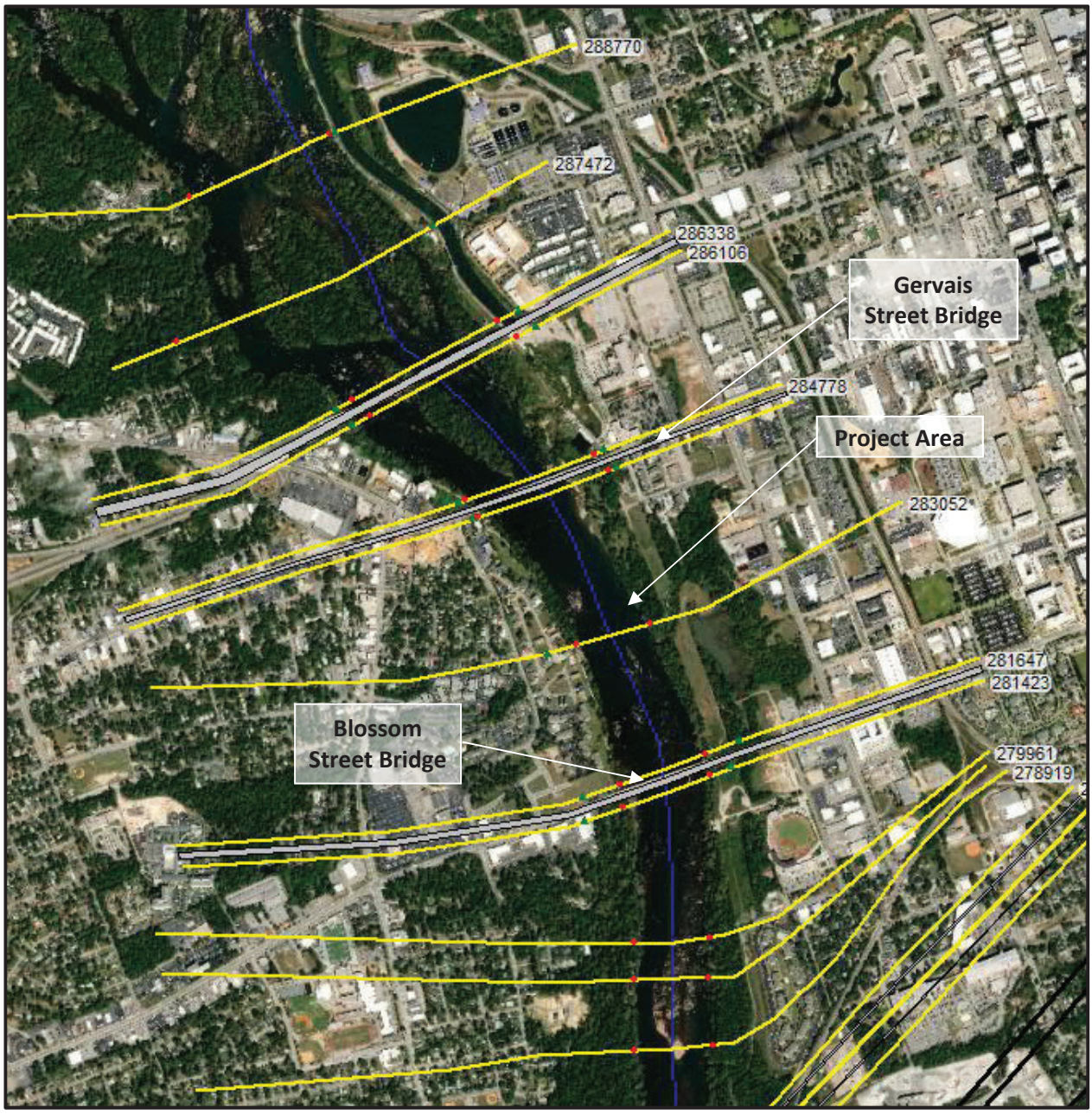


Figure 6: Current/Duplicate Effective HEC-RAS Model Schematic (Project Area)

Corrected Effective Model

No errors were detected in the current/duplicate effective models, but additional topographic data was available for the project area which was used to update the corrected model between Gervais Street and Blossom Street bridges. Additional cross sections were also added in order to provide a more accurate representation of the channel conveyance and floodplain storage throughout the project area. The cross sections were specified in appropriate locations to allow representation of the cofferdams structures in the proposed conditions model.

Figure 7 shows the locations of the cross sections in the corrected effective model throughout the project area. A total of twenty-six additional cross sections were included between Gervais Street and Blossom Street bridges.

This number of sections was required to ensure accurate representation of the upstream and downstream extents of the cofferdams at Area-1 and Area-2.

Figure 7: Corrected Effective HEC-RAS Model Schematic (Project Area)

A bathymetric and topographic survey was completed for the project area in April through July 2018, which was provided to WSP as Drawing ACAD-13951-COMBINED.dwg ***(Apex, 2019b)***. The original data is referenced to the National Geodetic Vertical Datum of 1929 (NGVD29) and was converted to NAVD88 by applying the -0.787ft conversion determined from the National Oceanic and Atmospheric Administration (NOAA) Vertcon tool ***(NOAA, 2019)***. This process was necessary to ensure that the corrected effective model was updated with data referenced to a consistent datum.

LiDAR data downloaded from South Carolina Department of Natural Resources ***(SCDNR, 2010)*** was used to supplement the updated 2018 topographic and bathymetric data provided for the project. This was required to complete the Digital Elevation Model (DEM) for extended floodplain areas that the 2018 data did not cover. ***Figure 8*** shows the updated DEM used to update the corrected effective hydraulic model. The area marked with a white dashed box is the extent of the 2018 project specific data, other parts of the DEM are based on the SCDNR LiDAR data, which was provided referenced to NAVD88.

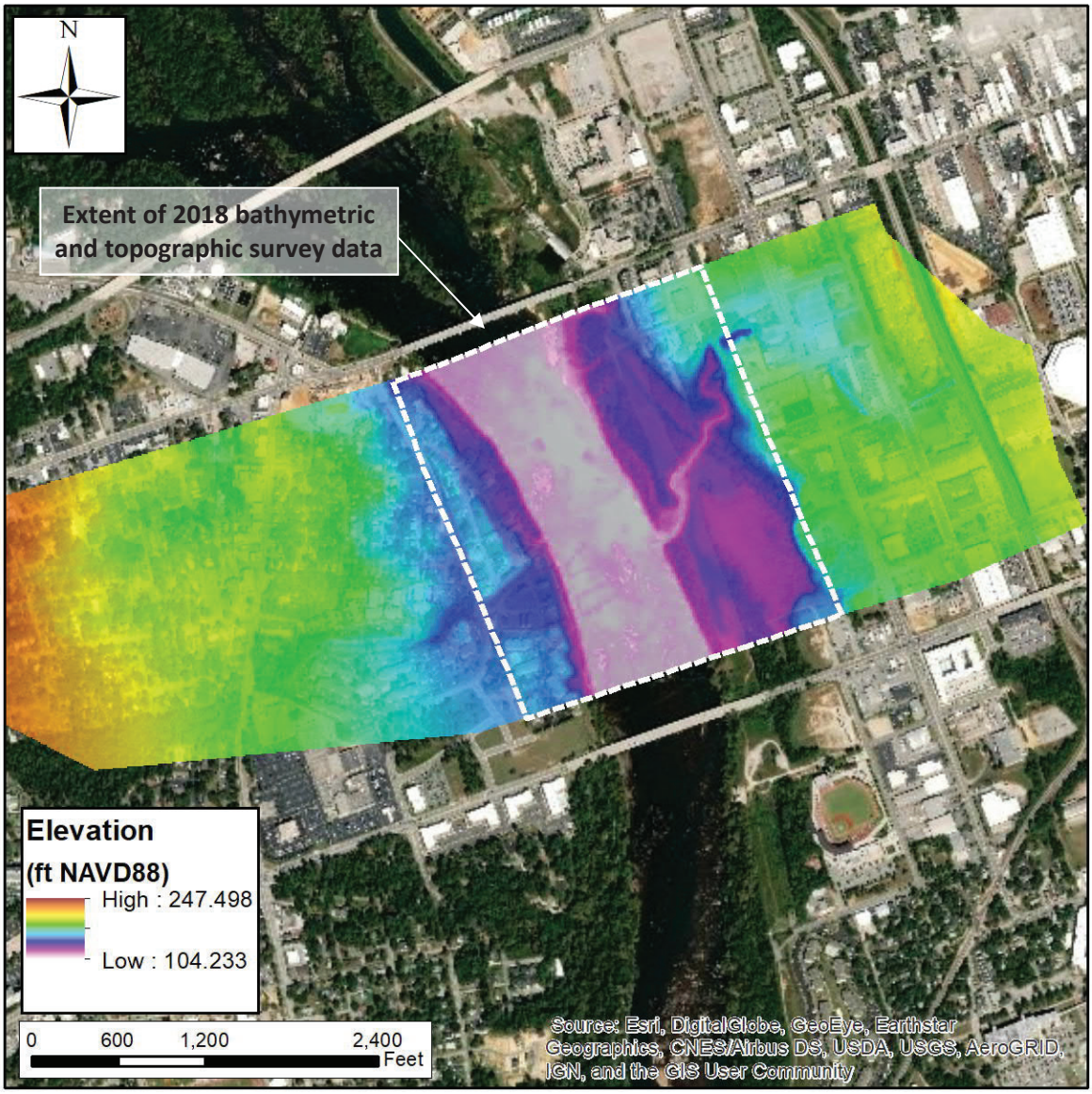


Figure 8: Updated Topographic and Bathymetric Data Extents

The twenty-six new cross sections along with the one existing cross section (River Station 283342) shown on ***Figure 7***, were cut from the DEM to create the corrected effective model. The cross-sections from the corrected model are shown in ***Appendix C***, which also includes the existing cross sections immediately upstream (River Station 284565) and downstream (River Station 281647) of the project area, which were not modified for this analysis.

Existing Conditions Model

No additional changes from the corrected model were required to represent the existing conditions. Therefore, an existing conditions model was not used for this analysis and the results from the corrected model are used to define the existing BFEs at the project site, and for subsequent comparison with the proposed conditions model.

Proposed Conditions Model

The proposed conditions model includes modified cross-sections where the proposed cofferdams will be located. In this case, the proposed cofferdam is along the east bank of the Congaree River. As shown in the typical section (***Figure 2***), the proposed rockfill cofferdam has a 10-ft wide crest at elevation 123.7 ft (NAVD88) and a side slope of 1.3H:1.0V on both the inboard and outboard slopes.

The cofferdam is to be installed in two separate phases. Therefore, for the purposes of this analysis two separate proposed conditions models are analyzed; one for each of the two phases (Area-1 and Area-2, shown on ***Figure 1***).

Each model is run and the results are compared to those of the corrected effective model to determine if the proposed conditions satisfy the No-Rise condition. Cross-sections updated for the proposed condition models are included in ***Appendix D***.

Assumptions and Justification

1. All elevations are referenced to NAVD88. Topographic survey data and USGS gage data was originally provided referenced to NGVD29, and was converted by applying the -0.787ft conversion determined from the NOAA Vertcon tool (NOAA, 2019).
2. The proposed Area-1 and Area-2 cofferdams are analyzed as a separate proposed conditions model, to reflect the phased approach being followed for the project.
3. The cross section of the proposed cofferdam structures is shown in ***Figure 2***. This is an assumed design concept based on discussions with Apex Companies LLC.

Calculation Input

The current effective model for the Congaree River was provided to WSP USA by FEMA in the form of electronic HEC-RAS (***USACE, 2010***) input and output files. The model is an unsteady flow model covering approximately 14 miles of the Congaree River. HEC-RAS Version 4.1 (***USACE, 2010***) was used to develop the current effective model. The same software version was also used for the duplicate effective model, and all other models used in this hydraulic analysis, to maintain consistency with the current effective model.

As discussed in previous sections, changes have been made to the duplicate effective model to create the corrected model. Further specific details are included in the following sections. No changes have been made to the hydraulic model outside of the project area, i.e., no changes have been made to cross sections between River Stations 288770 to 284565, and River Stations 281647 to 216472 (inclusive).

Channel Cross Section and Structure Geometry

The geometric data for the twenty-six additional cross sections that were included between Gervais Street and Blossom Street bridges (shown on ***Figure 7***) was extracted from the DEM developed for the project (shown on ***Figure 8***). The geometry for one existing cross section, River Station 283042, was also extracted from the DEM and updated. No changes were made to the bridge structures, as the cross sections immediately upstream and downstream of these structures were not modified.

The cross section geometry was manually modified to represent the cofferdam structures within Area-1 and Area-2, based on Apex Drawing "Stakeholder Approved MRA Plan Sediment Remediation Areas" ***(Apex, 2019a)***. The upstream and downstream extents of the cofferdams are represented using four cross sections each. For the

upstream extent, the first cross section defines the geometry immediately upstream of the start of the cofferdam, and represents conditions at the upstream toe of the structure. No changes are made to this section for the proposed models. The next two cross section represent the crest of the structure that is perpendicular to the flow in the river channel. These sections are located 10ft apart to represent the 10ft crest width of the cofferdam. The crest of the upstream end of the cofferdam is intended to act as an overtopping structure, and it has a crest level set 1ft lower than the rest of the structure, at Elevation 122.7ft NAVD. The fourth cross section represents the topography at the downstream toe of the upstream cofferdam extent. This section also defines the geometry of the cofferdam that runs parallel to the river flow direction.

A series of cross sections is then used to represent the parts of the cofferdam(s) that are aligned parallel to the flow in the river. These sections define the crest of the cofferdam at Elevation 123.7ft NAVD88. This elevation is also defined as a levee crest feature; meaning that the area behind the cofferdam remains dry until the water rises above the crest and flows over the top of the structure. The storage and conveyance associated with the area behind the cofferdams is therefore not accounted for until the levee is overtopped. The dry area behind the cofferdams is also specified as an ineffective flow area to ensure that the additional cross-sectional area and wetted perimeter are not accounted for until the water level rises above the crest of the cofferdam.

The downstream extent of the cofferdam is also represented using the four cross section approach outlined above, with a cross section to represent the topography immediately upstream and downstream of the cofferdam, and two sections located 10ft apart to represent the crest width of the structure.

Ineffective Flow Areas

The FEMA model uses ineffective flow areas to represent areas of the floodplain which only provide flood storage and not flow conveyance. The same approach has been applied for the new cross sections, with areas of the right and left overbanks specified as ineffective flow areas until the water level rises above specified elevations.

Manning's Roughness Coefficient

The FEMA model uses a Manning's roughness coefficient of 0.038 for the main channel. For the left and right overbanks, a Manning's roughness coefficient of 0.1 or 0.125 is used to represent buildings in urban areas, and values of 0.08 to 0.04 to represent vegetated floodplain areas. These roughness coefficients were applied throughout the new cross sections; with a 0.038 value used to represent the main channel, 0.08 used to represent densely vegetated floodplain areas, and 0.125 used for urban areas with buildings. No changes were made to the roughness values between River Stations 288770 to 284565, and River Stations 281647 to 216472 (inclusive).

Contraction and Expansion Coefficients

The FEMA model uses a contraction coefficient of 0.3 and expansion coefficient of 0.5 at the cross-sections just prior to or after any bridges in the model. Coefficients of 0.1 and 0.3, respectively, are used elsewhere throughout the model, and were applied to all new cross sections in the model.

Boundary Conditions

The boundary conditions from the current effective model have been used for all model runs completed for this hydraulic analysis without modification. Time varying flow vs time inflow boundaries are used as the upstream model boundary, and a normal depth boundary based on a channel slope of 0.0004 is specified as the downstream boundary. The downstream boundary is approximately 13 miles downstream of the project area and will not be controlling the model results throughout the area of interest.

The peak flow values for the 100-year, 50-year, and 10-year flood events are provided in ***Table 1***, and the full inflow hydrographs are shown on ***Figure 9***. The table and figure also includes the November 2018 event information ***(USGS, 2019)***, which is used as a model calibration event.

Table 1: Peak Boundary Condition Inflows

Flood Event	Peak Inflow (cfs)
100-year	286,000
50-year	239,400
10-year	147,600
Nov 2018[a]	62,100

Notes: [a]***(USGS, 2019)***

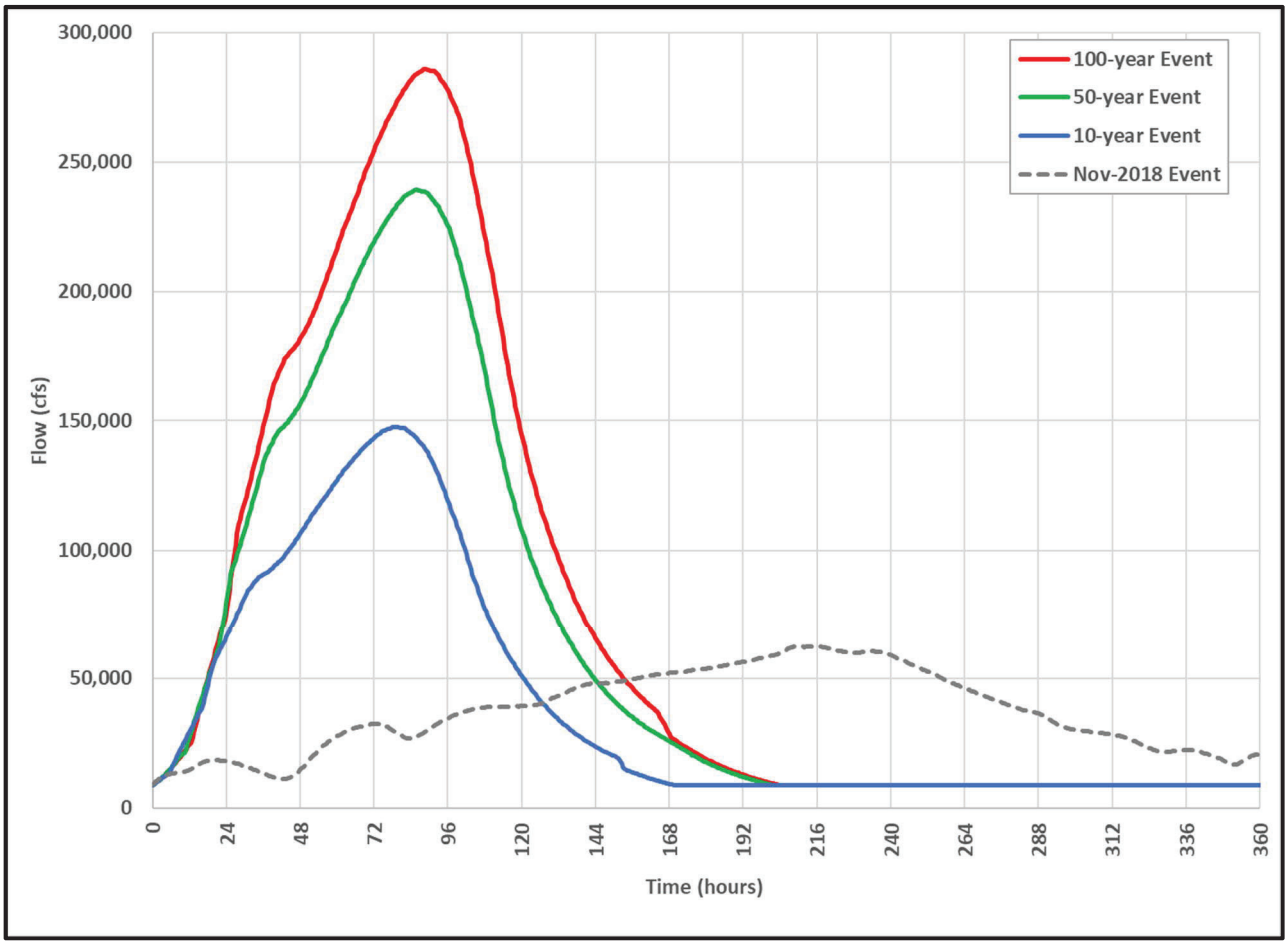


Figure 9: Upstream Inflow Boundaries

Numerical Calculations

All hydraulic analysis calculations are performed within the HEC-RAS Version 4.1 ***(USACE, 2010)***. The unsteady flow analysis parameters such as start/end time, computational interval, and hydrograph output interval were not

modified i.e., the parameters used are identical to the parameters for the current effective model provided by FEMA.

Calculation Output

The HEC-RAS Output Tables are provided in ***Appendix E***. The electronic input and output files for all hydraulic models are provided in ***Appendix B***.

Results

Table 2 summarizes the results of the current effective and duplicate effective hydraulic model runs for the 100-year, 50-year, and 10-year flood events. As shown in the table, the results from the two models are identical.

Table 2: Comparison of Current Effective and Duplicate Effective Model Water Surface Elevations; 100-year, 50-year, and 10-year Flood Events

Cross Section/ River Station	100-year Event			50-year Event			10-year Event		
	W.S. Elev (ft NAVD88)			W.S. Elev (ft NAVD88)			W.S. Elev (ft NAVD88)		
	Current	Duplicate	*Change*	Current	Duplicate	*Change*	Current	Duplicate	*Change*
288770	153.97	153.97	***0.0***	150.86	150.86	***0.0***	144.37	144.37	***0.0***
287472	153.85	153.85	***0.0***	150.61	150.61	***0.0***	143.69	143.69	***0.0***
286338	153.60	153.60	***0.0***	150.36	150.36	***0.0***	143.39	143.39	***0.0***
286106	153.36	153.36	***0.0***	150.11	150.11	***0.0***	143.14	143.14	***0.0***
284778	153.02	153.02	***0.0***	149.81	149.81	***0.0***	142.92	142.92	***0.0***
284565[a]	151.27	151.27	***0.0***	148.10	148.10	***0.0***	141.24	141.24	***0.0***
283052[b]	150.62	150.62	***0.0***	147.46	147.46	***0.0***	140.70	140.70	***0.0***
281647[c]	150.19	150.19	***0.0***	147.08	147.08	***0.0***	140.44	140.44	***0.0***
281423	149.95	149.95	***0.0***	146.88	146.88	***0.0***	140.31	140.31	***0.0***
279961	149.29	149.29	***0.0***	146.28	146.28	***0.0***	139.90	139.90	***0.0***
279605	149.18	149.18	***0.0***	146.18	146.18	***0.0***	139.81	139.81	***0.0***
278919	149.03	149.03	***0.0***	146.03	146.03	***0.0***	139.70	139.70	***0.0***

Notes:

a. Located downstream of Gervais Street bridge
b. Cross section 'P' on Richland County FIRM (FEMA, 2017) and cross section 'M' on Lexington County FIRM (FEMA, 2018)
c. Located upstream of Blossom Street bridge

Table 3 summarizes the results of the duplicate effective and corrected effective hydraulic model runs for the 100-year, 50-year, and 10-year flood events. For the 100-year and 50-year flood events, the corrected model results are approximately 0.4ft higher in the vicinity of the Gervais Street bridge and further upstream. Throughout the project area towards the Blossom Street bridge and further downstream, the corrected model results are typically less than 0.05ft higher for the 100-year and 50-year flood events.

For the 10-year flood event, the corrected model results are approximately 0.1ft lower in the vicinity of the Gervais Street bridge and further upstream. Throughout the project area towards the Blossom Street bridge and further downstream, the corrected model results are approximately 0.6ft lower for the 10-year flood event.

Table 3: Comparison of Duplicate Effective and Corrected Effective Model Water Surface Elevations; 100-year, 50-year, and 10-year Flood Events

Cross Section/ River Station	100-year Event			50-year Event			10-year Event		
	W.S. Elev (ft NAVD88)			W.S. Elev (ft NAVD88)			W.S. Elev (ft NAVD88)		
	Duplicate	Corrected	*Change*[a]	Duplicate	Corrected	*Change*[a]	Duplicate	Corrected	*Change*[a]
288770	153.97	154.37	***0.4***	150.86	151.24	***0.4***	144.37	144.31	***-0.1***
287472	153.85	154.28	***0.4***	150.61	151.01	***0.4***	143.69	143.61	***-0.1***
286338	153.60	154.04	***0.4***	150.36	150.78	***0.4***	143.39	143.31	***-0.1***
286106	153.36	153.80	***0.4***	150.11	150.54	***0.4***	143.14	143.06	***-0.1***
284778	153.02	153.47	***0.5***	149.81	150.23	***0.4***	142.92	142.83	***-0.1***
284565[b]	151.27	151.72	***0.5***	148.10	148.53	***0.4***	141.24	141.14	***-0.1***
283052[c]	150.62	150.65	***0.0***	147.46	147.51	***0.1***	140.70	140.26	***-0.4***
281647[d]	150.19	150.20	***0.0***	147.08	147.09	***0.0***	140.44	139.89	***-0.6***
281423	149.95	149.96	***0.0***	146.88	146.89	***0.0***	140.31	139.75	***-0.6***
279961	149.29	149.30	***0.0***	146.28	146.29	***0.0***	139.90	139.30	***-0.6***
279605	149.18	149.19	***0.0***	146.18	146.18	***0.0***	139.81	139.22	***-0.6***
278919	149.03	149.04	***0.0***	146.03	146.03	***0.0***	139.70	139.09	***-0.6***

Notes:

a. 'Change' is calculated by subtracting 'Proposed' from 'Corrected' and rounding to one decimal place
b. Located downstream of Gervais Street bridge
c. Cross section 'P' on Richland County FIRM ***(FEMA, 2017)*** and cross section 'M' on Lexington County FIRM ***(FEMA, 2018)***
d. Located upstream of Blossom Street bridge

The localized changes to peak water surface elevations is the result of the updated topographic data and additional cross sections that provide a more accurate representation of the channel conveyance and floodplain storage throughout the project area. However, the changes do not result in any changes to the 100-year flood level published on the FEMA FIRM ***(FEMA, 2017/2018)*** at River Station 283052.

The United States Geological Survey (USGS) gage 02169500 is located on the Congaree River corrected on the west bank opposite the locations of the proposed cofferdams. The USGS gage data ***(USGS, 2019)*** was reviewed to select a high flow event that could be simulated using to model, to determine how accurately the HEC-RAS model results matched the gage data. A high flow event from November 2018 was selected for calibration, with a peak flow of 62,100 cfs. A comparison of the corrected effective HEC-RAS results and the USGS gage data from this event is shown in ***Figure 10***.

Figure 10 shows good correlation between the corrected effective model results and the USGS gage data. The peak water surface elevation predicted by the corrected effective HEC-RAS model is 0.26ft lower than the value reported by the USGS gage.

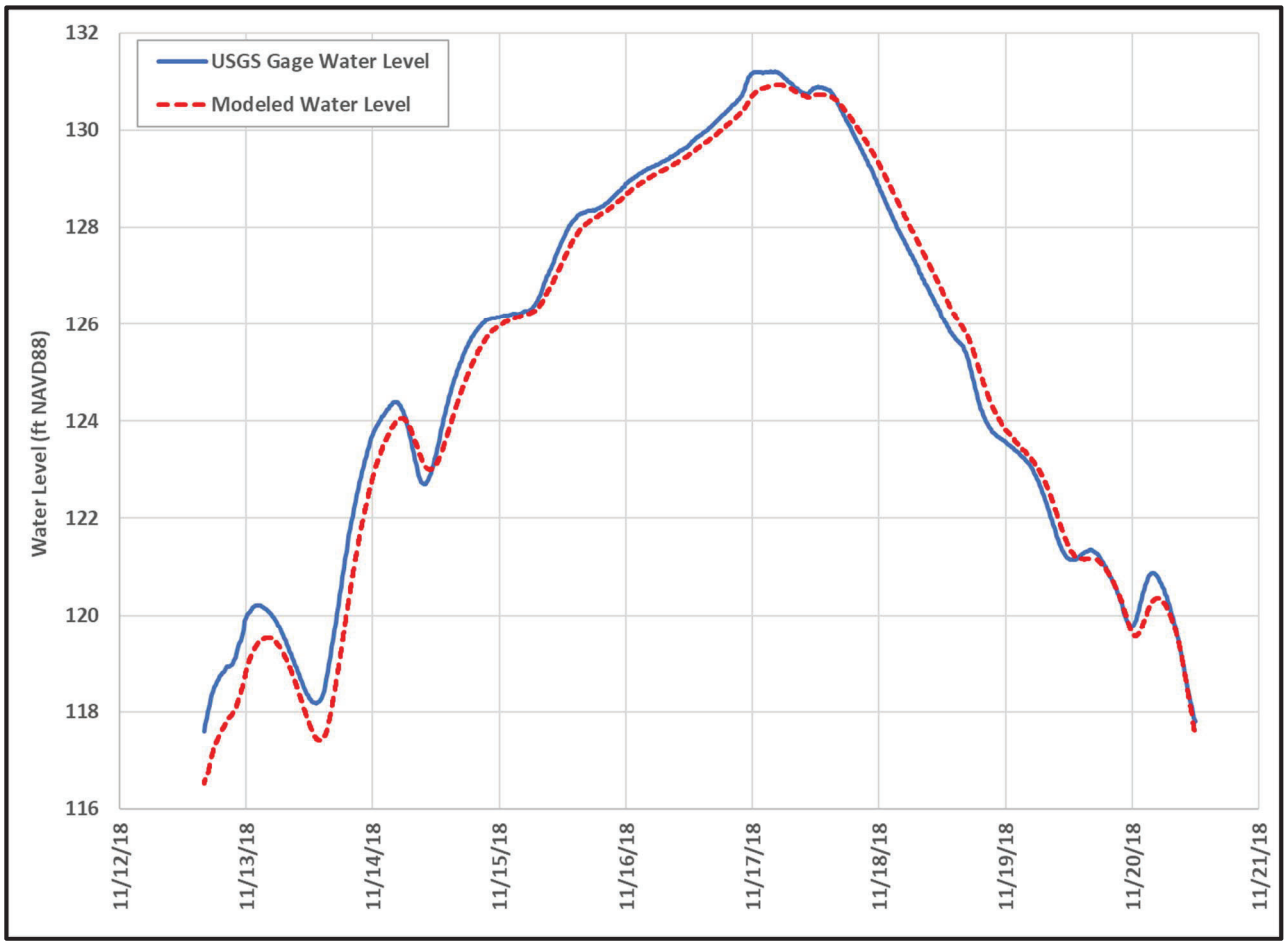


Figure 10: Comparison of HEC-RAS Corrected Effective Model Results and USGS Gage Data for November 2018 High Flow Event

The corrected model is used as a baseline for comparison with the proposed models, which have been developed to represent the conditions incorporating the Area-1 and Area 2 cofferdam structures (each area is represented in a separate model, as the work will be completed using a phased approach).

Table 4 summarizes the results of the corrected effective and proposed Area-1 hydraulic model runs for the 100-year, 50-year, and 10-year flood events at representative cross sections in the project area. Full results tables are provided in ***Appendix F***. The results demonstrate that the impact of the proposed Area-1 cofferdam structure is relatively consistent for the 100-year, 50-year, and 10-year flood events. It is standard industry practice to report hydraulic model results to the nearest tenth of a foot. Reporting model results or changes in model results to a greater number of decimal places implies a level of accuracy that is simply not practical to achieve. When the changes in water surface elevations are reported to the nearest tenth of a foot, all increases are rounded to 0.0 feet. Therefore, the proposed Area-1 cofferdam structure will result in no-rise and no-impact for the 100-year BFE within the extents of the model.

Table 4: Comparison of Corrected Effective and Proposed Area-1 Model Water Surface Elevations; 100-year, 50-year, and 10-year Flood Events

Cross Section/ River Station	100-year Event			50-year Event			10-year Event		
	W.S. Elev (ft NAVD88)			W.S. Elev (ft NAVD88)			W.S. Elev (ft NAVD88)		
	Corrected	Proposed	*Change*[a]	Corrected	Proposed	*Change*[a]	Corrected	Proposed	*Change*[a]
288770	154.374	154.412	***0.0***	151.235	151.273	***0.0***	144.313	144.341	***0.0***
284565[b]	151.716	151.759	***0.0***	148.525	148.569	***0.0***	141.140	141.180	***0.0***
284372[c]	151.418	151.449	***0.0***	148.248	148.282	***0.0***	140.922	140.953	***0.0***
283820[c]	150.852	150.850	***0.0***	147.724	147.724	***0.0***	140.537	140.535	***0.0***
283490	150.711	150.711	***0.0***	147.558	147.558	***0.0***	140.268	140.268	***0.0***
283203	150.668	150.668	***0.0***	147.525	147.525	***0.0***	140.257	140.257	***0.0***
283139	150.642	150.642	***0.0***	147.500	147.500	***0.0***	140.204	140.204	***0.0***
283052[d]	150.652	150.652	***0.0***	147.506	147.506	***0.0***	140.257	140.257	***0.0***
282874	150.641	150.641	***0.0***	147.498	147.498	***0.0***	140.157	140.157	***0.0***
281647[e]	150.199	150.199	***0.0***	147.087	147.087	***0.0***	139.888	139.888	***0.0***
278919	149.039	149.039	***0.0***	146.033	146.033	***0.0***	139.088	139.088	***0.0***

Notes:

a. 'Change' is calculated by subtracting 'Proposed' from 'Corrected' and rounding to one decimal place
b. Located downstream of Gervais Street bridge
c. Area-1 cofferdam
d. Cross section 'P' on Richland County FIRM ***(FEMA, 2017)*** and cross section 'M' on Lexington County FIRM ***(FEMA, 2018)***
e. Located upstream of Blossom Street bridge

Table 5 summarizes the results of the corrected effective and proposed Area-2 hydraulic model runs for the 100-year, 50-year, and 10-year flood events at representative cross sections in the project area. Full results tables are provided in ***Appendix F***. The results demonstrate that the impact of the proposed Area-2 cofferdam structure is relatively consistent for the 100-year, 50-year, and 10-year flood events. Consistent with standard industry practice, hydraulic model results should be reported to the nearest tenth of a foot. When the changes in water surface elevations are reported to the nearest tenth of a foot, all increases are rounded to 0.0 feet. Therefore, the proposed Area-2 cofferdam structure will result in no-rise and no-impact for the 100-year BFE within the extents of the model.

Table 5: Comparison of Corrected Effective and Proposed Area-2 Model Water Surface Elevations; 100-year, 50-year, and 10-year Flood Events

Cross Section/ River Station	100-year Event			50-year Event			10-year Event		
	W.S. Elev (ft NAVD88)			W.S. Elev (ft NAVD88)			W.S. Elev (ft NAVD88)		
	Corrected	Proposed	*Change*[a]	Corrected	Proposed	*Change*[a]	Corrected	Proposed	*Change*[a]
288770	154.374	154.389	***0.0***	151.235	151.251	***0.0***	144.313	144.320	***0.0***
284565[b]	151.716	151.733	***0.0***	148.525	148.544	***0.0***	141.140	141.151	***0.0***
284372	151.418	151.436	***0.0***	148.248	148.267	***0.0***	140.922	140.933	***0.0***
283820	150.852	150.870	***0.0***	147.724	147.744	***0.0***	140.537	140.549	***0.0***
283490	150.711	150.730	***0.0***	147.558	147.578	***0.0***	140.268	140.279	***0.0***
283203	150.668	150.686	***0.0***	147.525	147.544	***0.0***	140.257	140.268	***0.0***
283139[c]	150.642	150.639	***0.0***	147.500	147.498	***0.0***	140.204	140.182	***0.0***
283052[c+d]	150.652	150.651	***0.0***	147.506	147.503	***0.0***	140.257	140.242	***0.0***
282874	150.641	150.641	***0.0***	147.498	147.498	***0.0***	140.157	140.157	***0.0***
281647[e]	150.199	150.199	***0.0***	147.087	147.087	***0.0***	139.888	139.888	***0.0***
278919	149.039	149.039	***0.0***	146.033	146.033	***0.0***	139.088	139.088	***0.0***

Notes:

a. 'Change' is calculated by subtracting 'Proposed' from 'Corrected' and rounding to one decimal place
b. Located downstream of Gervais Street bridge
c. Area-2 cofferdam
d. Cross section 'P' on Richland County FIRM ***(FEMA, 2017)*** and cross section 'M' on Lexington County FIRM ***(FEMA, 2018)***
e. Located upstream of Blossom Street bridge

Conclusion/Summary

The results in ***Table 4 and Table 5*** show the addition of the proposed Area-1 and Area-2 cofferdam structures result in negligible changes to water surface elevations, that are considered to be within the accuracy limits of the hydraulic model.

The proposed Area-1 and Area-2 cofferdam structures will result in no-rise and no-impact for the 100-year BFE within the extents of the model.

References

1. ***Apex, 2019a***: Apex Companies LLC, "Figure 1, Stakeholder Approved MRA Plan Sediment Remediation Areas, Congaree River, Columbia, South Carolina", February 8, 2019.

2. ***Apex, 2019b***: Apex Companies LLC, "Congaree River Topographic and Bathymetric Survey Data" Drawing Name: ACAD-13951-COMBINED.dwg, issued January 2019.

3. ***FEMA, 2013***: Federal Emergency Management Agency, "Procedures for "No-Rise" Certification for Proposed Developments in the Regulatory Floodway," Federal Emergency Management Agency, October 2013.

4. ***FEMA, 2017***: Federal Emergency Management Agency, "Flood Insurance Rate Map, Richland County, South Carolina and Incorporated Areas," Map No. 45079C0356L, Federal Emergency Management Agency, December 21, 2017.

5. ***FEMA, 2018***: Federal Emergency Management Agency, "Flood Insurance Rate Map, Lexington County, South Carolina and Incorporated Areas," Map No. 45063C0281J, Federal Emergency Management Agency, July 5, 2018.

6. ***NOAA, 2019***: National Oceanic and Atmospheric Administration, "VERTCON - North American Vertical Datum Conversion" https://www.ngs.noaa.gov/cgi-bin/VERTCON/vert_con.prl, Accessed March 2019.

7. ***SCDNR, 2010:*** South Carolina Department of Natural Resources, LiDAR Data Products by County, <http://www.dnr.sc.gov/GIS/lidarstatus.html>, Montana DNRC, Date Accessed: January 30, 2019.

8. ***USACE, 2010***: USACE, "HEC-RAS River Analysis System, User's Manual, Version 4.1" Document No. CPD-68, Hydraulic Engineering Center, United States Army Corps of Engineers, January 2010.

9. ***USGS, 2019:*** United States Geological Survey, "USGS Gage 02169500 Congaree River at Columbia, SC" <https://waterdata.usgs.gov/usa/nwis/uv?02169500>, Date Accessed: February 5, 2019.

APPENDICES

Appendix A: FEMA Procedures for "No-Rise" Certification for Proposed Developments in the Regulatory Floodway

US Department of Homeland Security
Region X
130 228th Street, SW
Bothell, WA 98021

Procedures for "No-Rise" Certification
For Proposed Developments in the Regulatory Floodway

Section 60.3 (d) (3) of the National Flood Insurance Program (NFIP) regulations states that a community shall "prohibit encroachments, including fill, new construction, substantial improvements and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base (100-year) flood discharge."

Prior to issuing any building, grading or development permits involving activities in a regulatory floodway the community must obtain a certification stating the proposed development will not impact the pre-project base flood elevations, floodway elevations, or floodway data widths. The certification should be obtained from the applicant and be signed and sealed by a professional engineer.

The engineering or "no-rise" certification must be supported by technical data.

The supporting technical data should be based upon hydraulic analyses that utilize the same model used to prepare the effective Flood Insurance Study (FIS) report and Flood Insurance Rate Map (FIRM) unless it is demonstrated that the 'effective' hydraulic model is unavailable or its use is inappropriate. If an alternative hydraulic model is used, the new model must be calibrated to reproduce the FIS profiles within 0.5 feet. Hydraulic model used in the analysis must be on FEMA's accepted models list, or documentation must be provided showing the model meets the requirements of NFIP regulation 65.6(a)(6).

October 2013

Although communities are required to review and approve the "no-rise" submittals, they may request, in writing, technical assistance and review from the FEMA regional office. However, if this alternative is chosen, the community must review the technical submittal package and verify that all supporting data, listed in the following paragraphs, are included in the package before forwarding to FEMA.

To support a "no-rise" certification for proposed developments encroaching into the regulatory floodway, a community will require that the following procedures be followed:

1. Current Effective Model: Submit a written request for the effective model for the specified stream and community, identifying the limits of the requested data. A fee will be assessed for providing the data. Data request forms and instructions can obtained at:

   http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/how-order-technical-administrative-support

   or by writing to:

   FEMA Engineering Library
   847 S. Pickett Street
   Alexandria, VA 22304
   Phone: 1-877-336-2627
   Facsimile: 1-703-212-4090

2. Duplicate Effective Model: Upon receipt of the effective computer model, the engineer should run the original model to duplicate the output in the effective (FIS).

3. Corrected Effective Model: The model that corrects any errors that occur in the Duplicate Effective model, adds any additional cross sections, or incorporates more detailed topographic information than that used in the current effective model. Floodway limits should be manually set at the new cross-section locations by measuring from the effective FIRM or FBFM. The cumulative reach lengths of the stream should also remain unchanged. The Corrected Effective model must not reflect any man-made physical changes since the date of the effective model.

4. Existing, or Pre-Project Conditions Model: Revise the Duplicate Effective or the Corrected Effective model to reflect any modifications that have occurred within the floodplain since the date of the Effective model but prior to the construction of the project. If no modifications have occurred since the date of the effective model, then the model would be identical to the Duplicate Effective or Corrected Effective model. The results of this

Existing Conditions analysis will indicate the 100-yr elevations at the project site.

5. Proposed, or Post-Project Conditions Model: Modify the Existing Condition or Pre-Project Conditions Model (or Duplicate Effective model or Corrected Effective model, as appropriate) to reflect revised or post-project conditions. The overbank roughness coefficients should remain the same unless a reasonable explanation of how the proposed development will impact Manning's "n" values is included with the supporting data. The results of this analysis will indicate the 100-year elevation for proposed conditions at the project site. These results must indicate NO impact on the 100-year floodway elevations when compared to the Existing Conditions or Pre-Project Conditions model. If an increase results the project will require the submittal of a CLOMR prior to the start of the project.

The "no-rise" supporting data and a copy of the engineering certification must be submitted to and reviewed by the appropriate community official prior to issuing a permit.

The "no-rise" supporting data should include, but may not be limited to:

1) Copy of the Duplicate Effective model;

2) Copy of the Corrected Effective model;

3) Existing conditions, or Pre-Project conditions model

4) Proposed conditions or Post-Project conditions model.

5) FIRM and topographic map, showing floodplain and floodway, the additional cross-sections, the site location with the proposed topographic modification superimposed onto the maps, and a copy of the effective FIRM or FBFM showing the current regulatory floodway.

6) Documentation clearly stating analysis procedures. All modifications made to the original FIS model to represent revised existing conditions, as well as those made to the revised existing conditions model to represent proposed conditions, should be well documented and submitted with all supporting data.

7) Copy of effective Floodway Data Table copied from the (FIS) report.

8) Statement defining source of additional cross-section topographic data and supporting information.

9) Cross-section plots, of the added cross sections, for revised existing and proposed conditions.

10) Certified planimetric (boundary survey) information indicating the location of structures on the property.

11) Copy of the source from which input for original FIS model was taken.

12) CD with all input and output files.

13) Printout of output files from EDIT runs for all three floodway models.

The engineering "no-rise" certification and-supporting technical data must stipulate NO impact on the 100-year flood or floodway elevations at the new cross-sections and at all existing cross-sections anywhere in the model. Therefore, the revised computer model should be run for a sufficient distance (usually one mile, depending on hydraulic slope of the stream) upstream and downstream of the development site to insure proper "no-rise" certification.

Attached is a sample "no-rise" certification form that can be completed by a registered professional engineer and supplied to the community along with the supporting technical data when applying for a development permit.

ENGINEERING "NO-RISE" CERTIFICATION

This is to certify that I am a duly qualified engineer licensed to practice in the State of _____.

It is to further certify that the attached technical data supports the fact that proposed _____ will
(Name of Development)
not impact the 100-year flood elevations, floodway elevations and floodway widths on _____ at published sections
(Name of Stream)
in the Flood Insurance Study for _____,
(Name of Community)
dated _____ and will not impact the 100-year flood elevations, floodway elevations, and floodway widths at unpublished cross-sections in the vicinity of the proposed development.

Attached are the following documents that support my findings:

_____

_____

_____

_____

_____

_____

(Date) _____

(Signature) (Title)

_____

_____

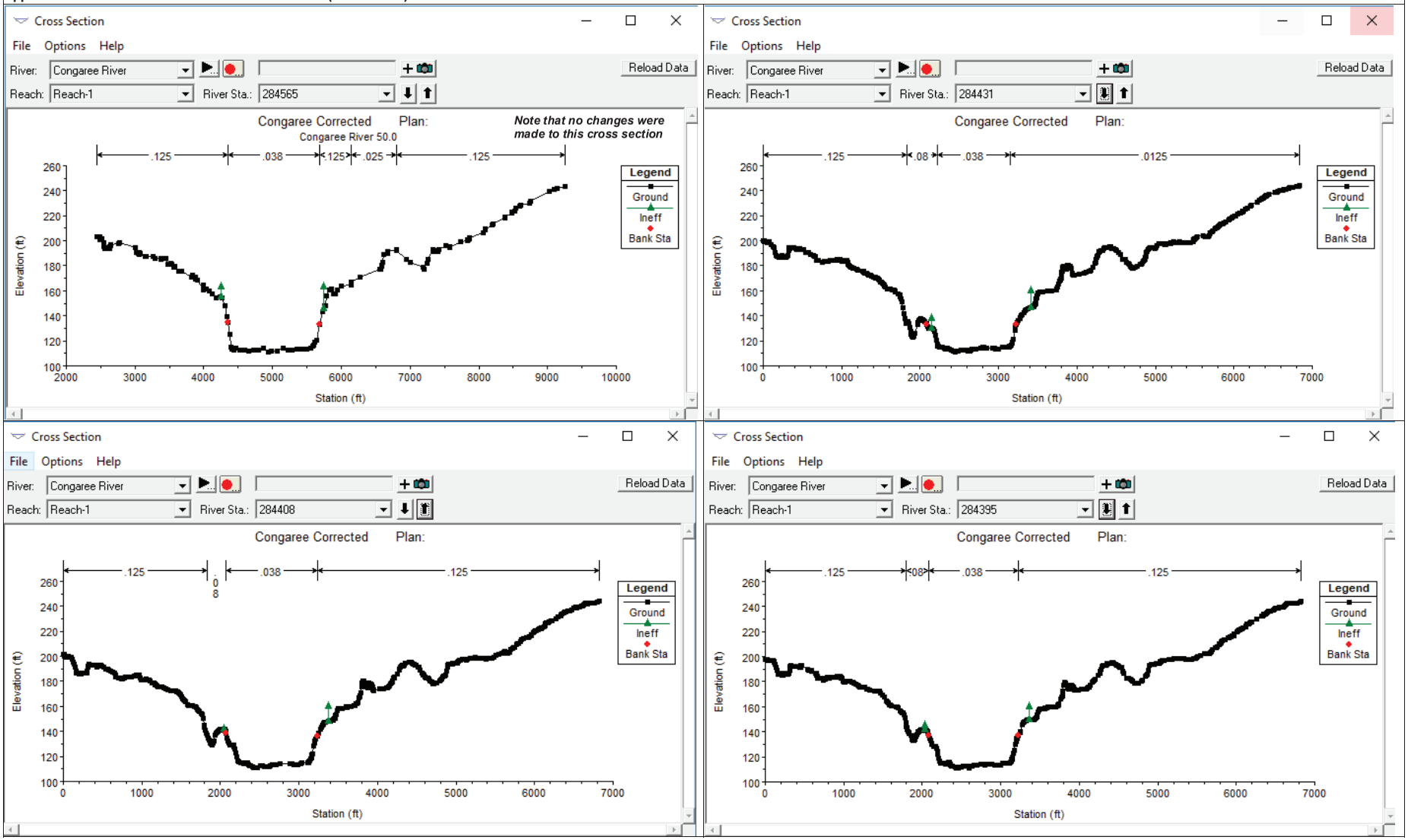
_____
(Address)

(Seal)

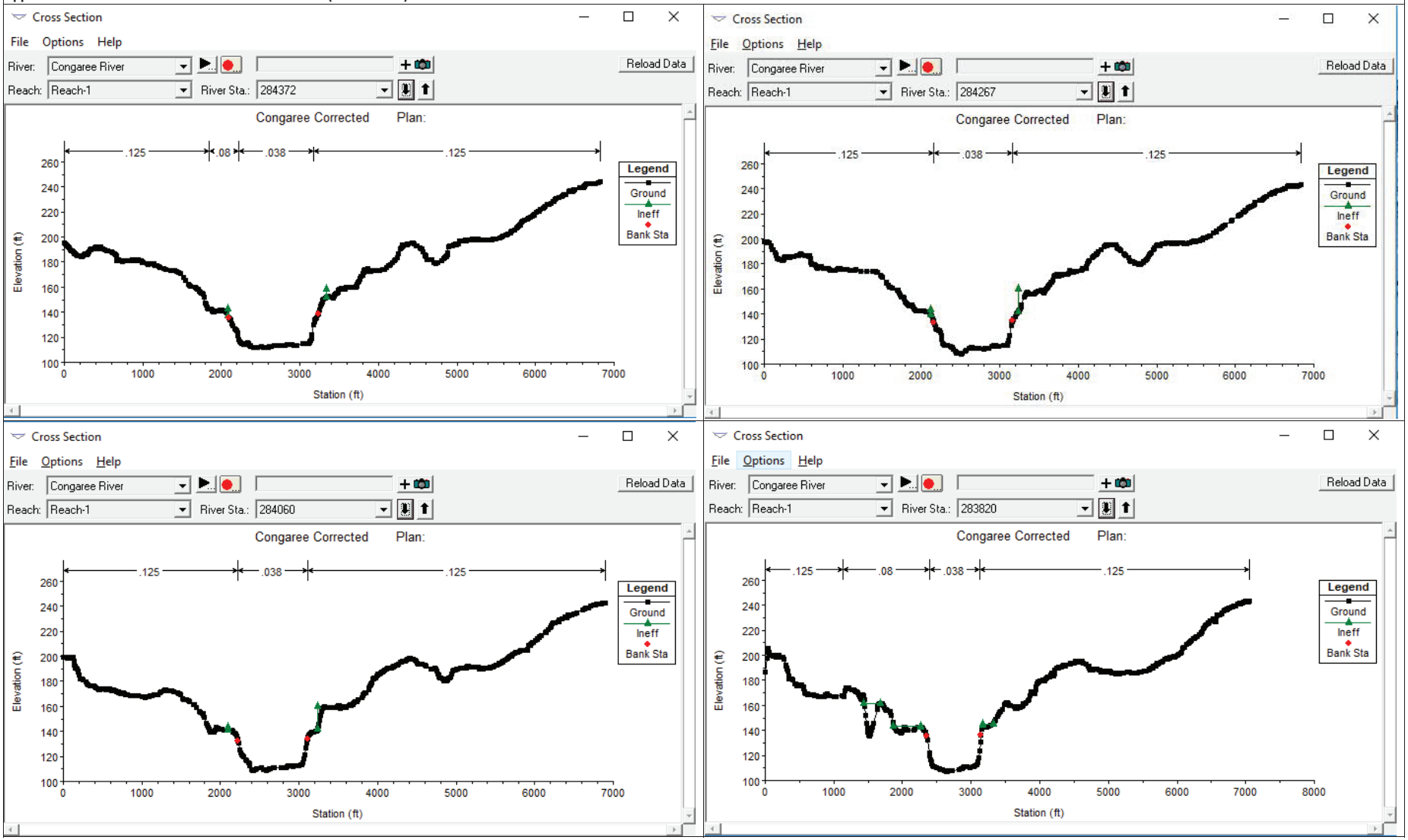
Appendix B: Electronic Files

Appendix C: Corrected Effective Model Cross Sections

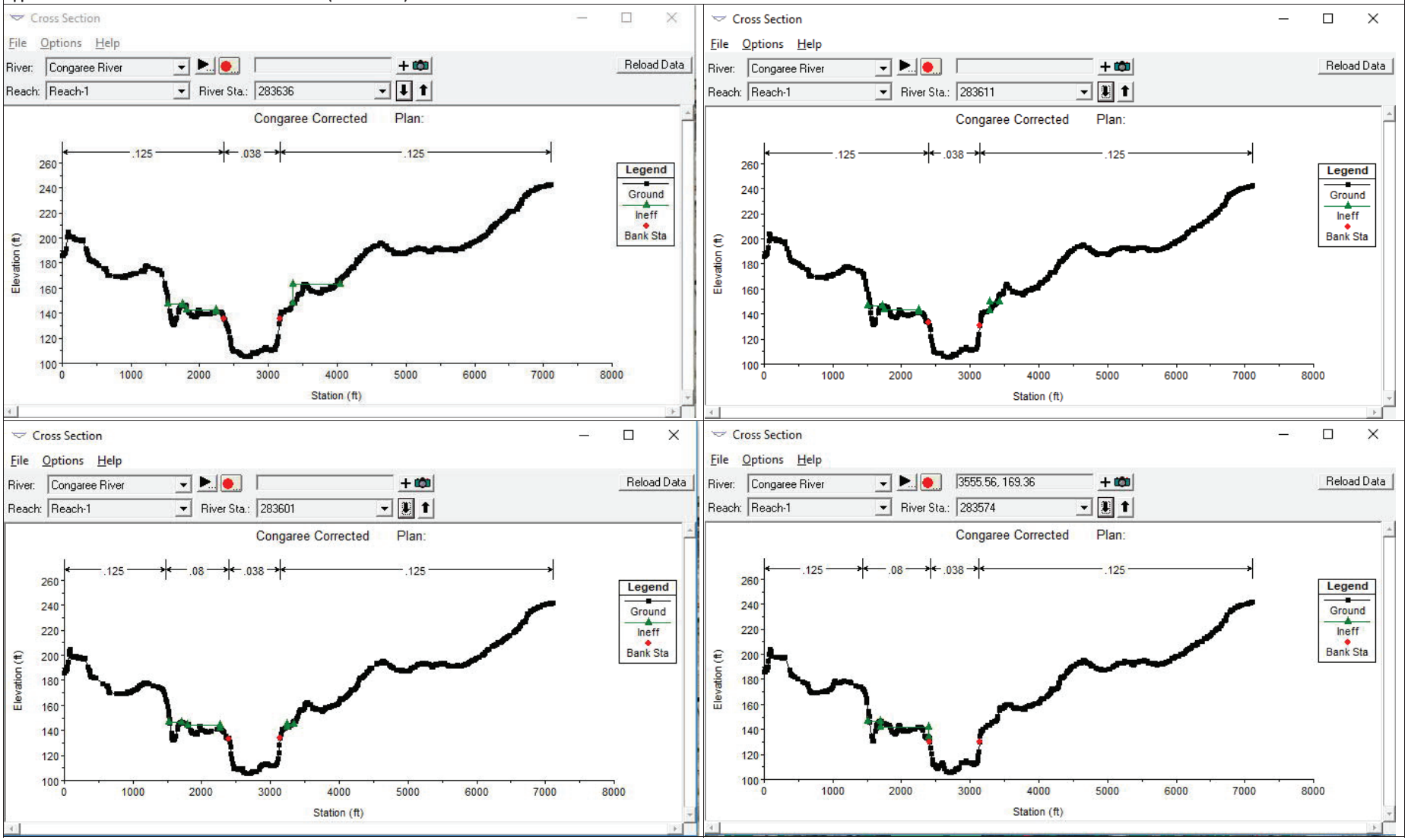
Appendix C: Corrected Effective Model Cross Sections (Sheet 1 of 8)



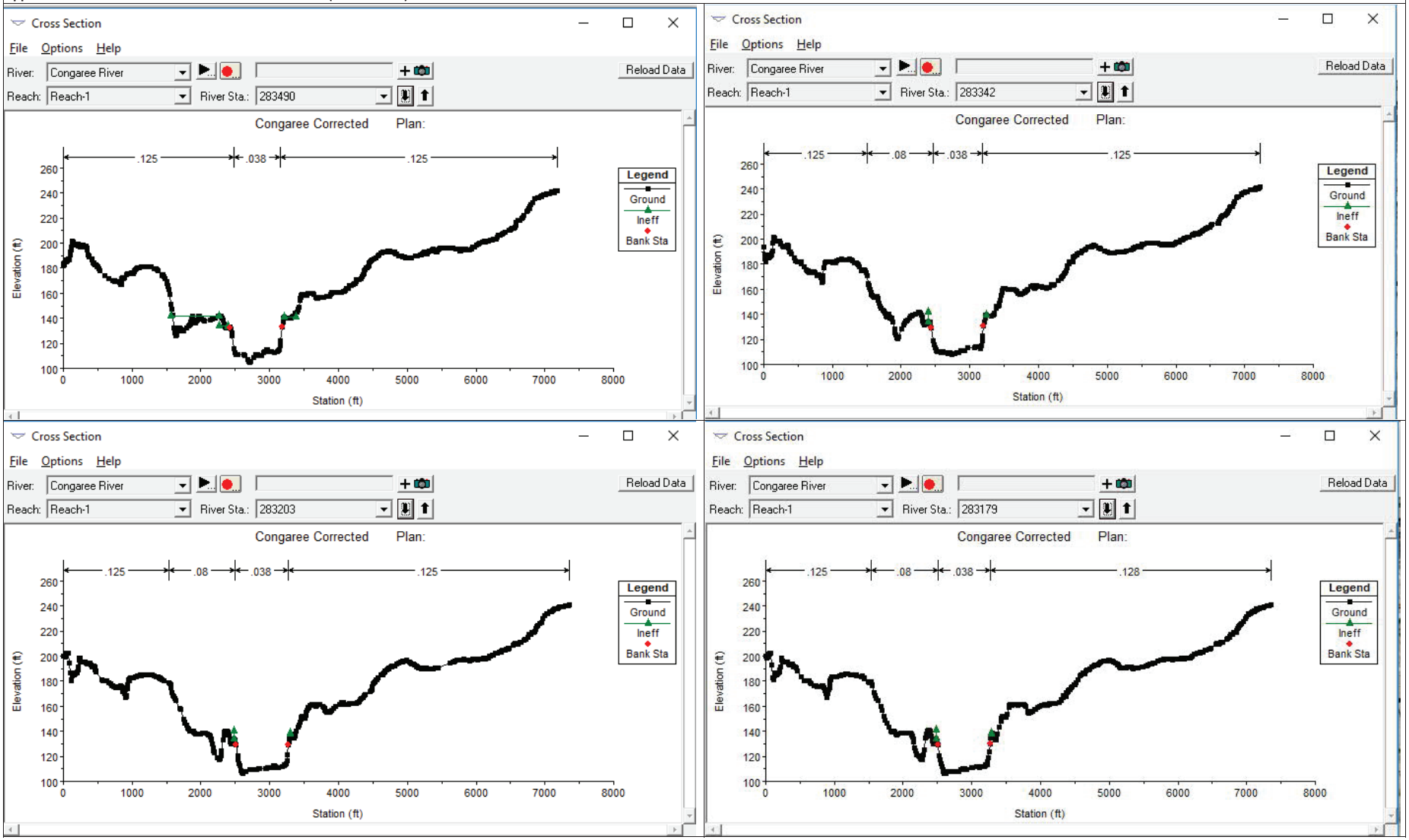
Appendix C: Corrected Effective Model Cross Sections (Sheet 2 of 8)



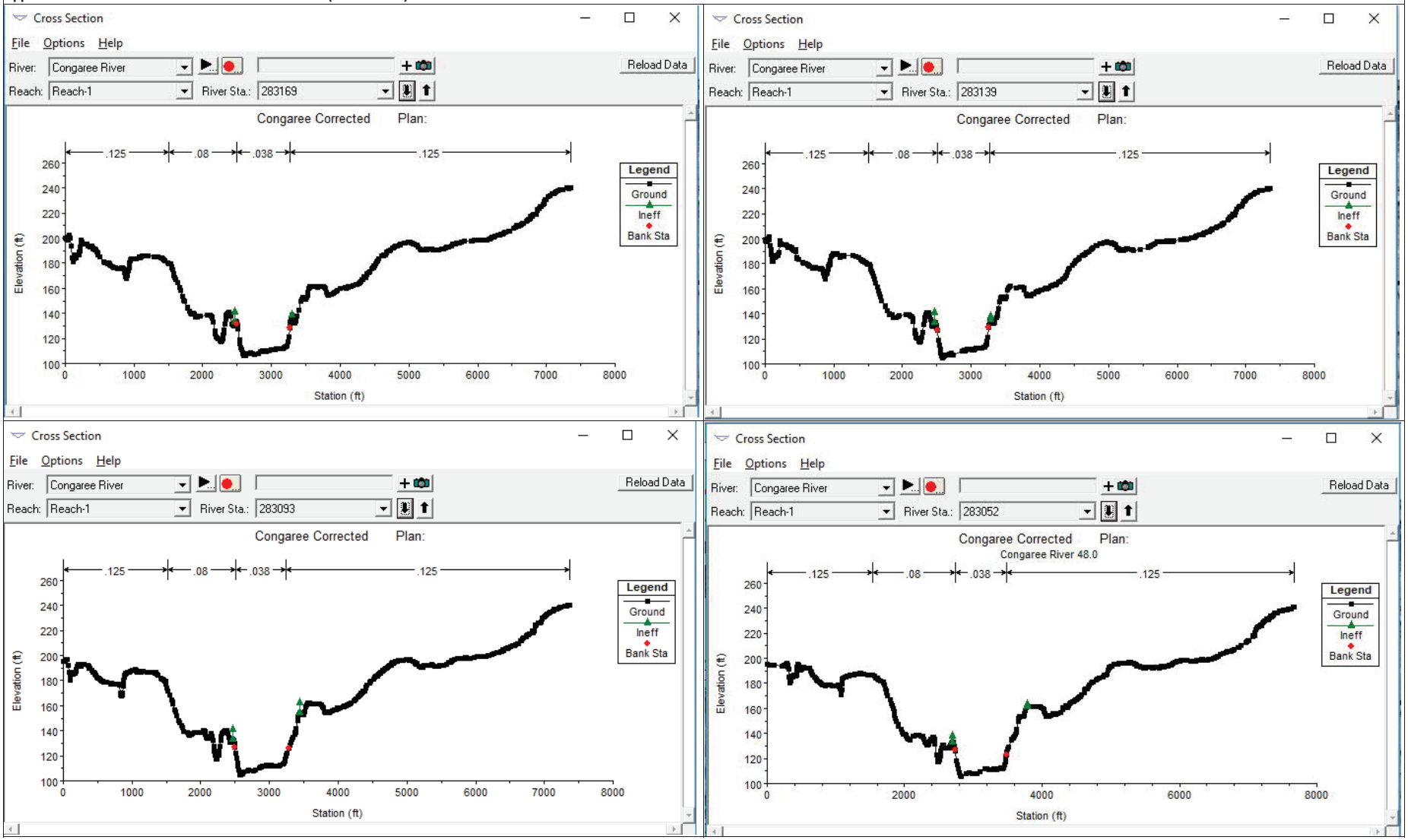
Appendix C: Corrected Effective Model Cross Sections (Sheet 3 of 8)



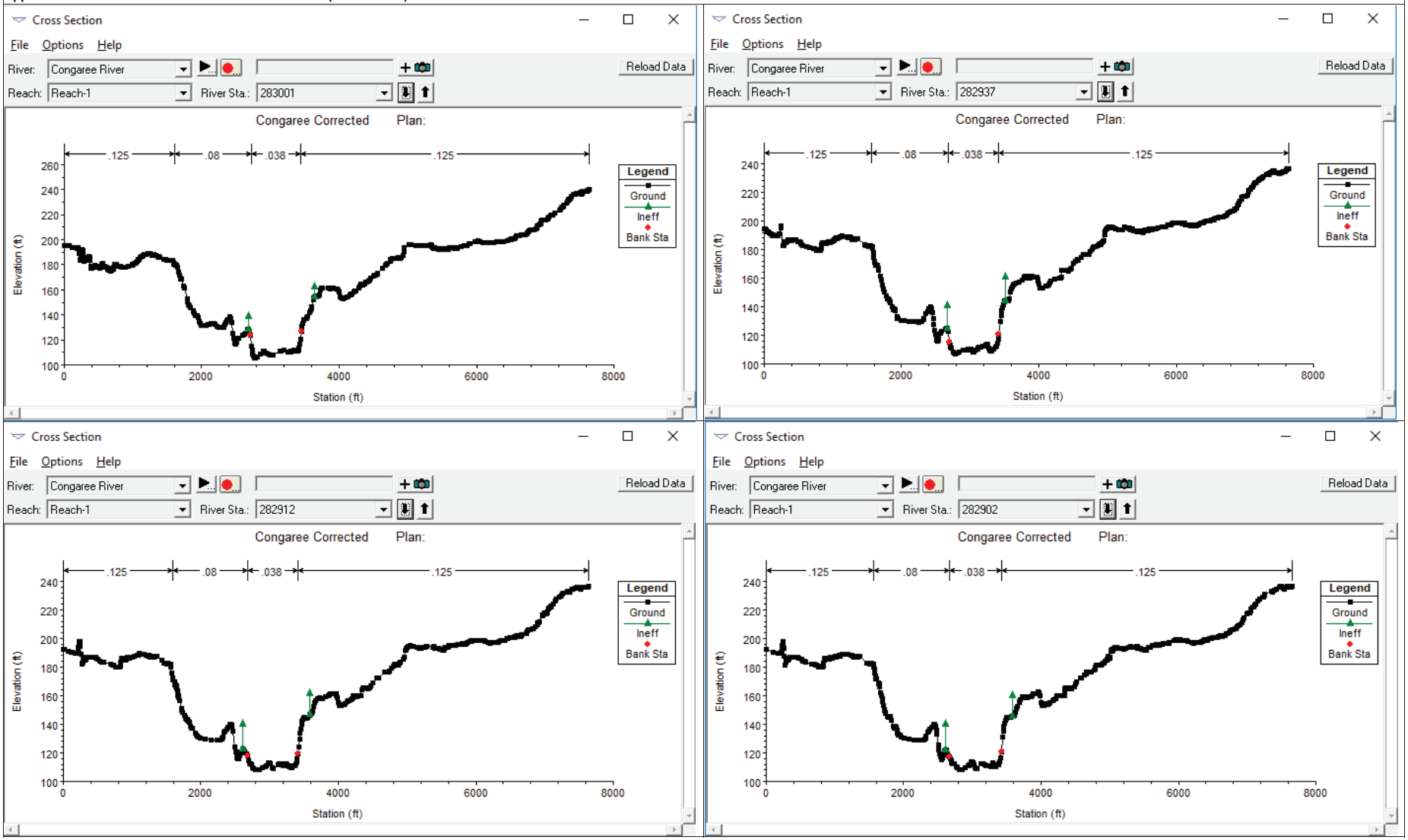
Appendix C: Corrected Effective Model Cross Sections (Sheet 4 of 8)



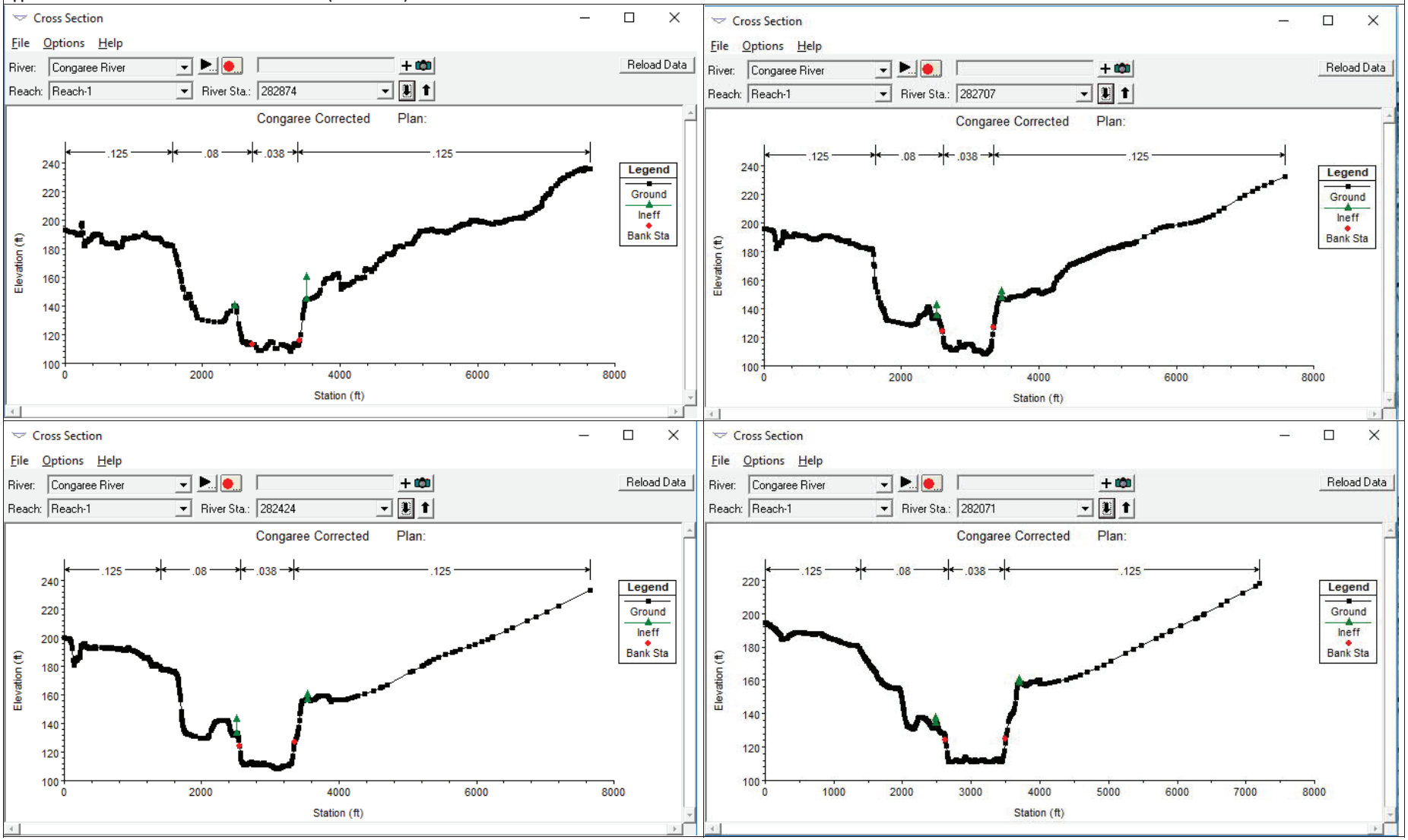
Appendix C: Corrected Effective Model Cross Sections (Sheet 5 of 8)



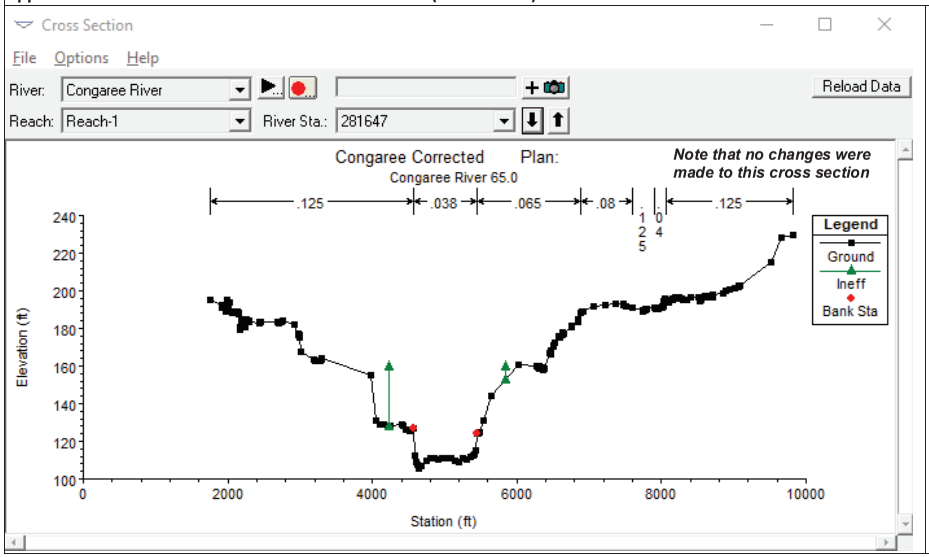
Appendix C: Corrected Effective Model Cross Sections (Sheet 6 of 8)



Appendix C: Corrected Effective Model Cross Sections (Sheet 7 of 8)

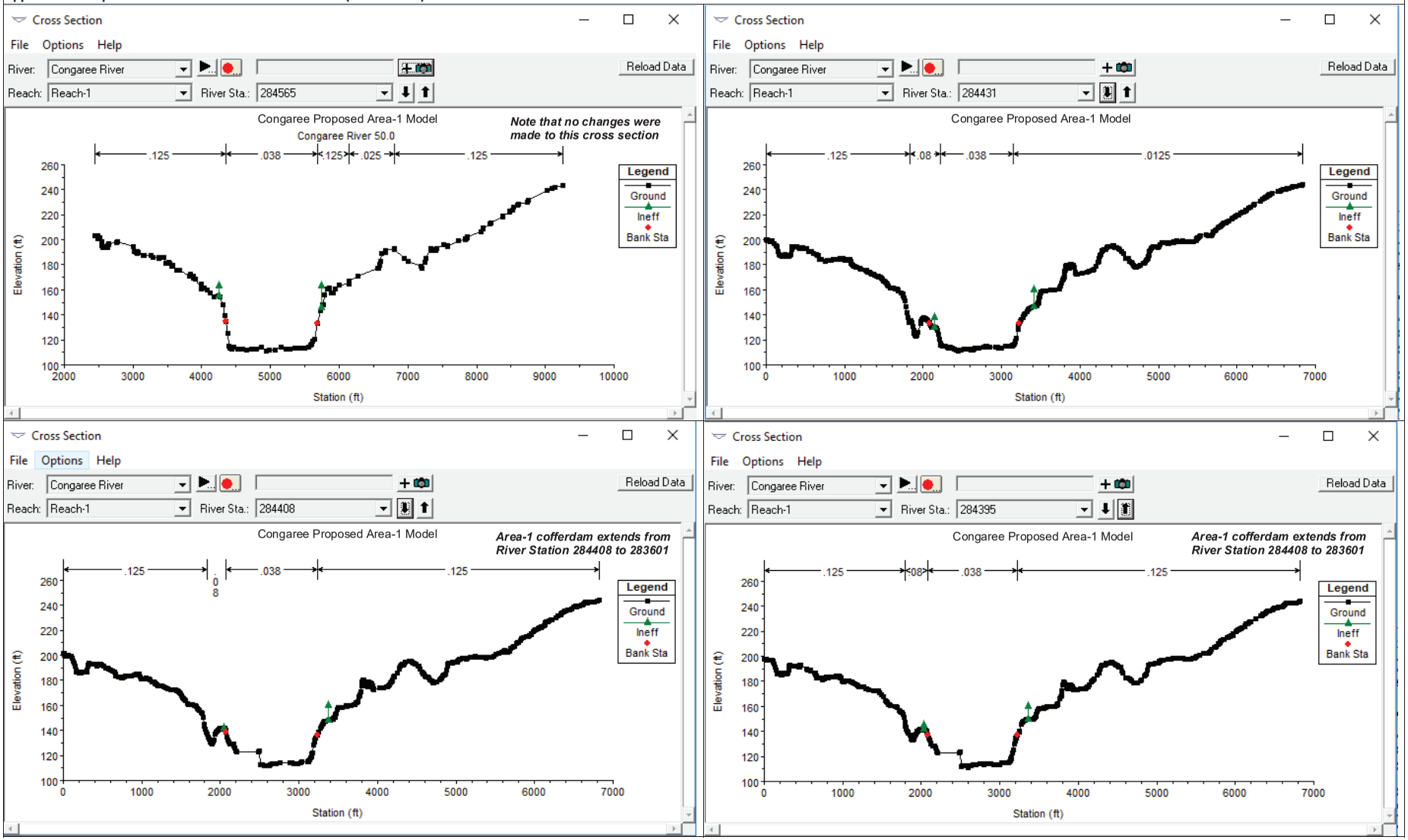


Appendix C: Corrected Effective Model Cross Sections (Sheet 8 of 8)

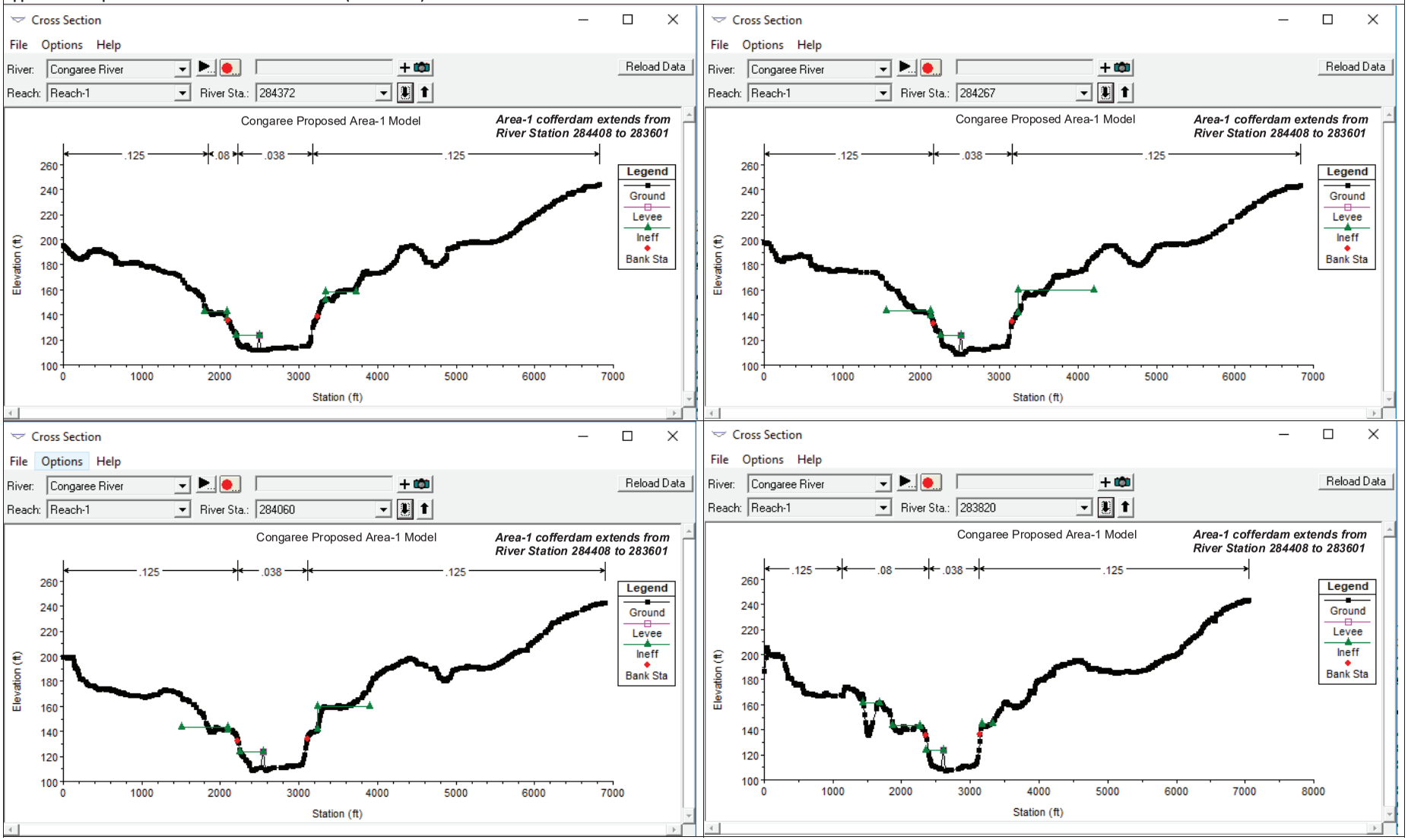


Appendix D: Proposed Condition Models Cross Sections

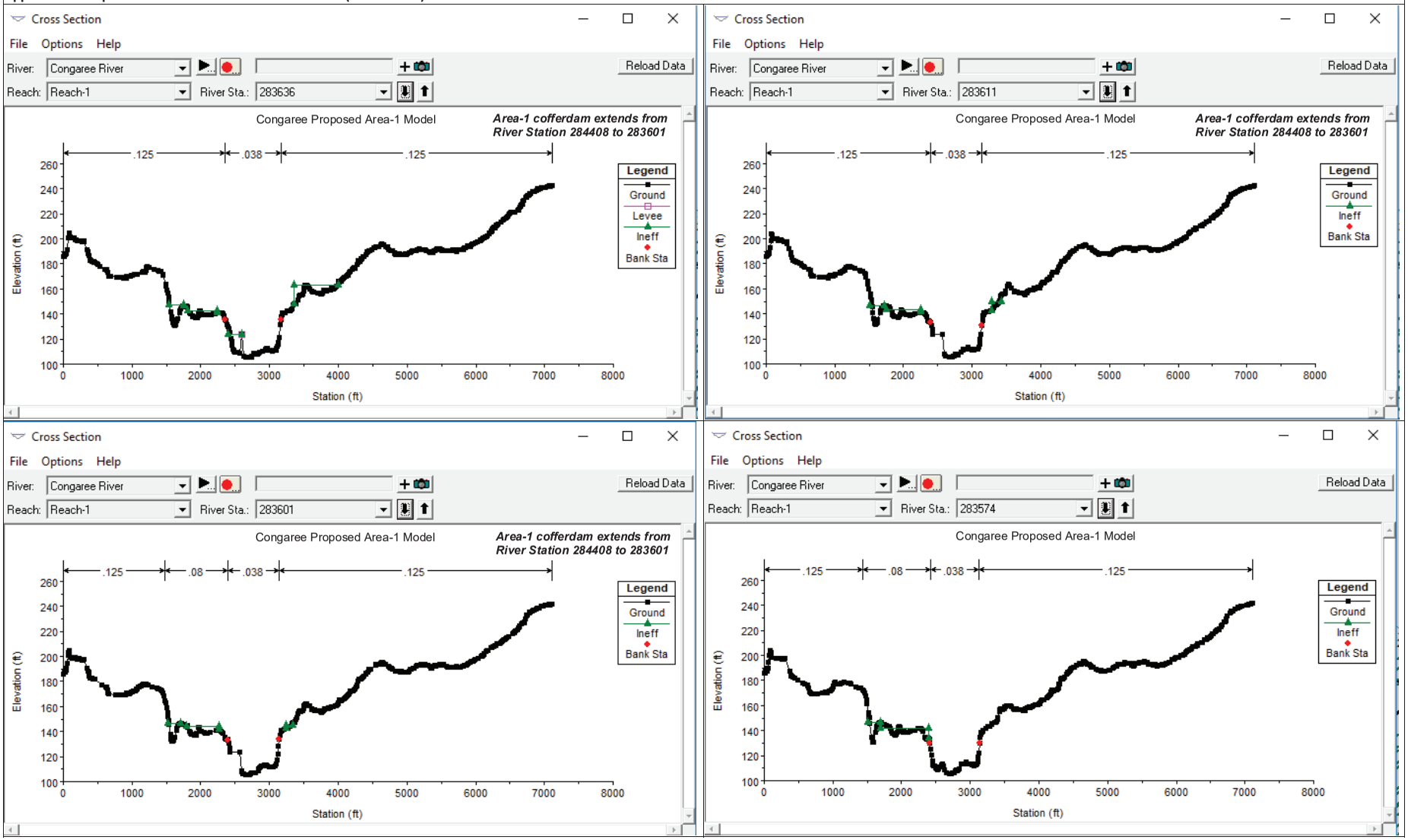
Appendix D: Proposed Conditions Models Cross Sections (Sheet 1 of 8)



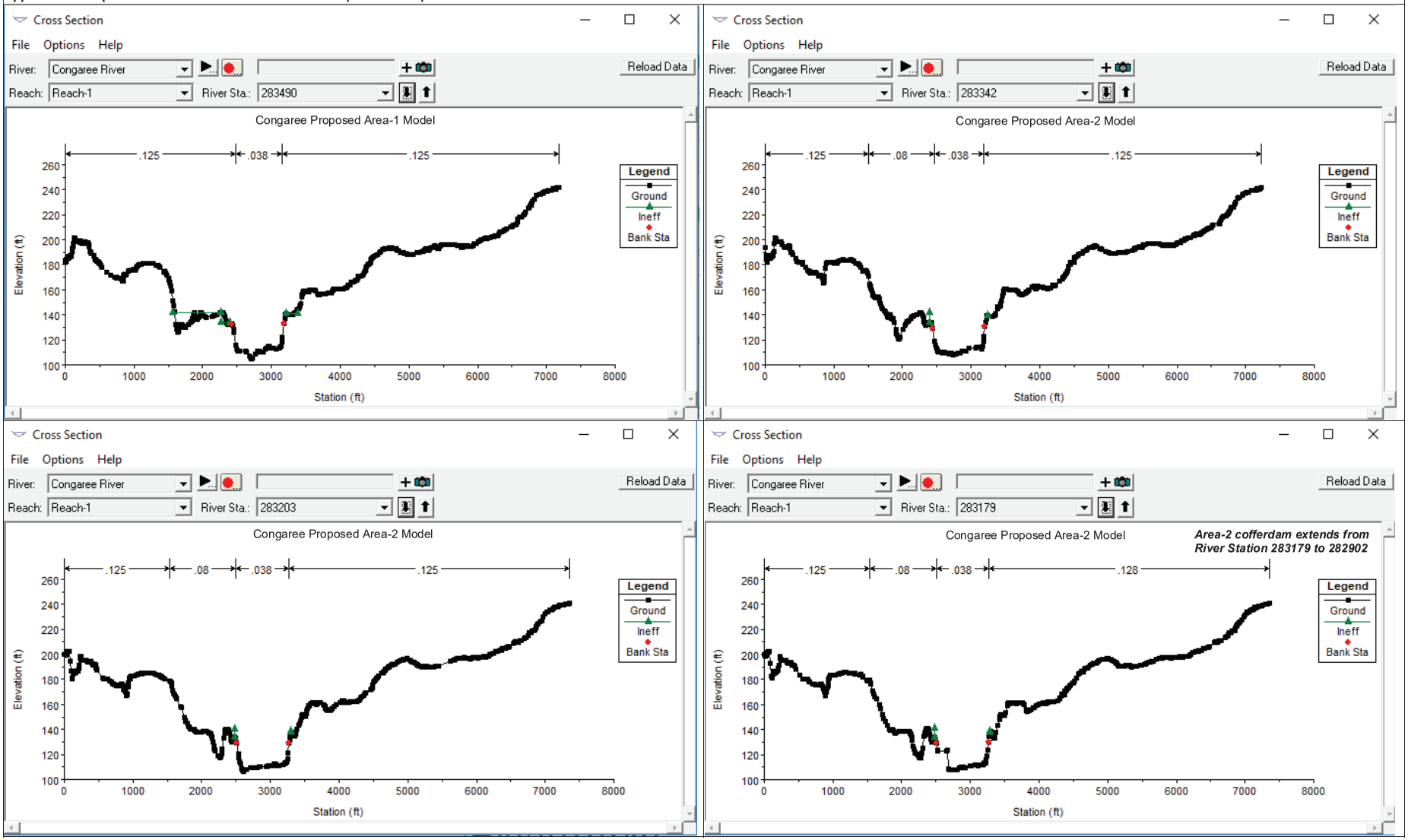
Appendix D: Proposed Conditions Models Cross Sections (Sheet 2 of 8)



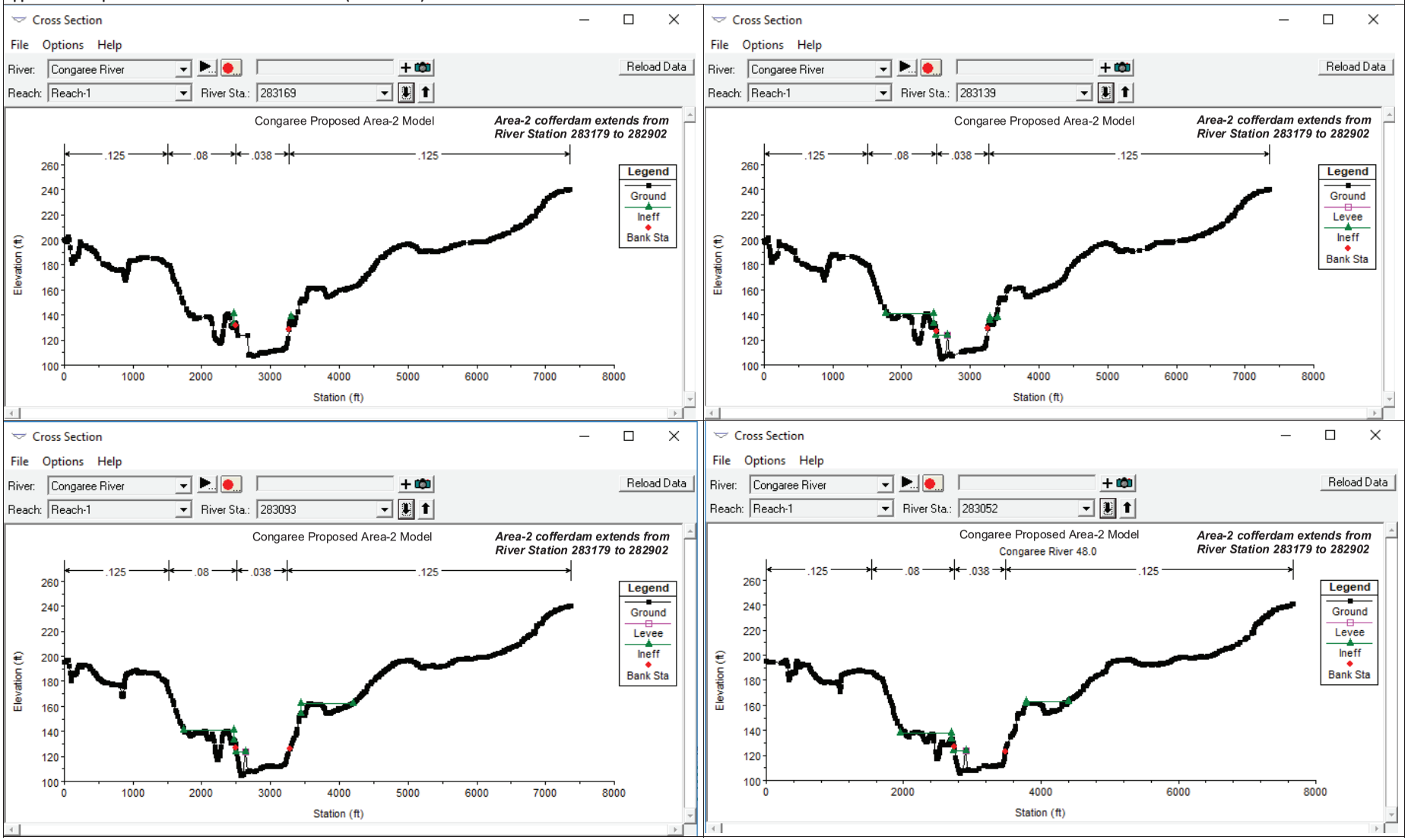
Appendix D: Proposed Conditions Models Cross Sections (Sheet 3 of 8)



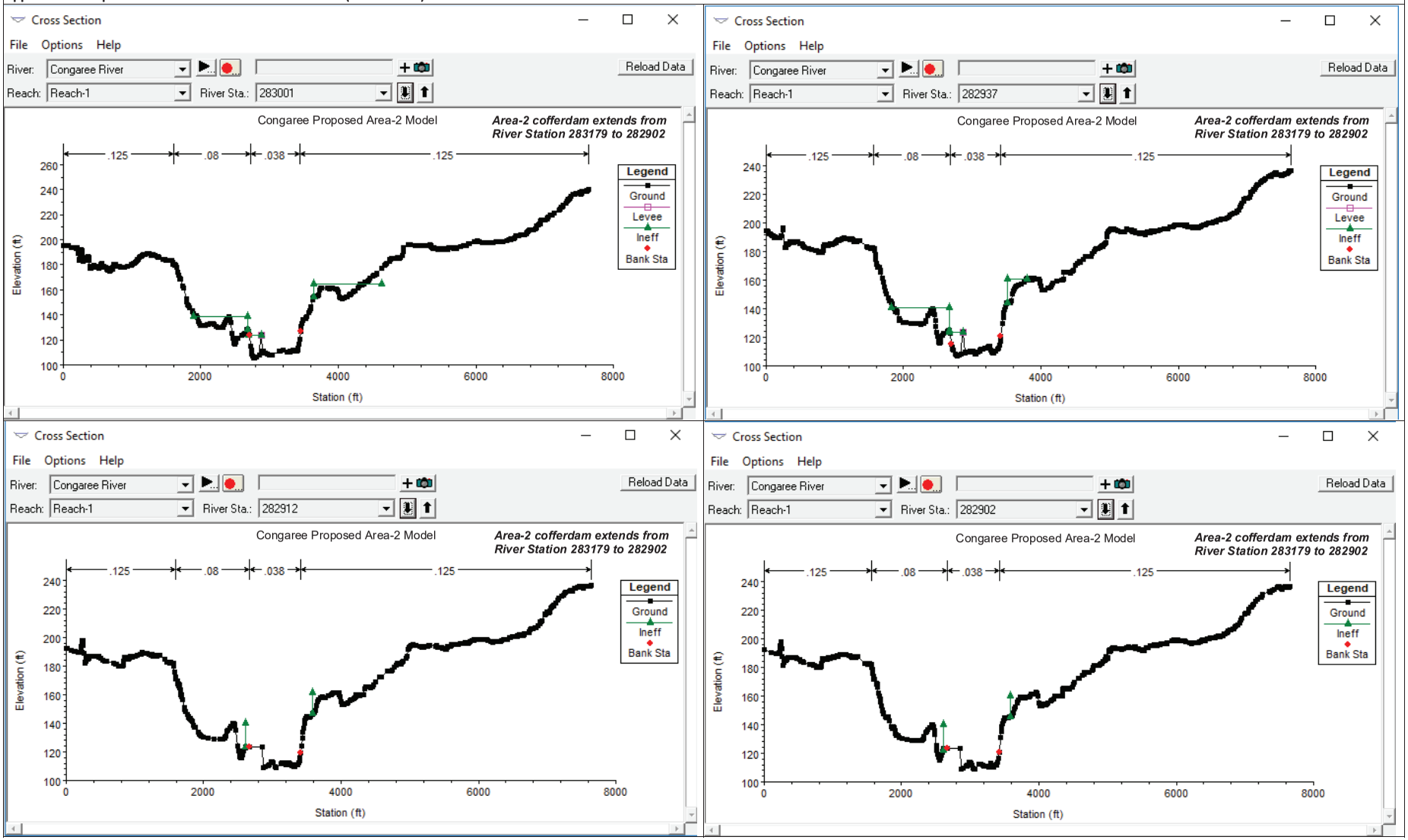
Appendix D: Proposed Conditions Models Cross Sections (Sheet 4 of 8)



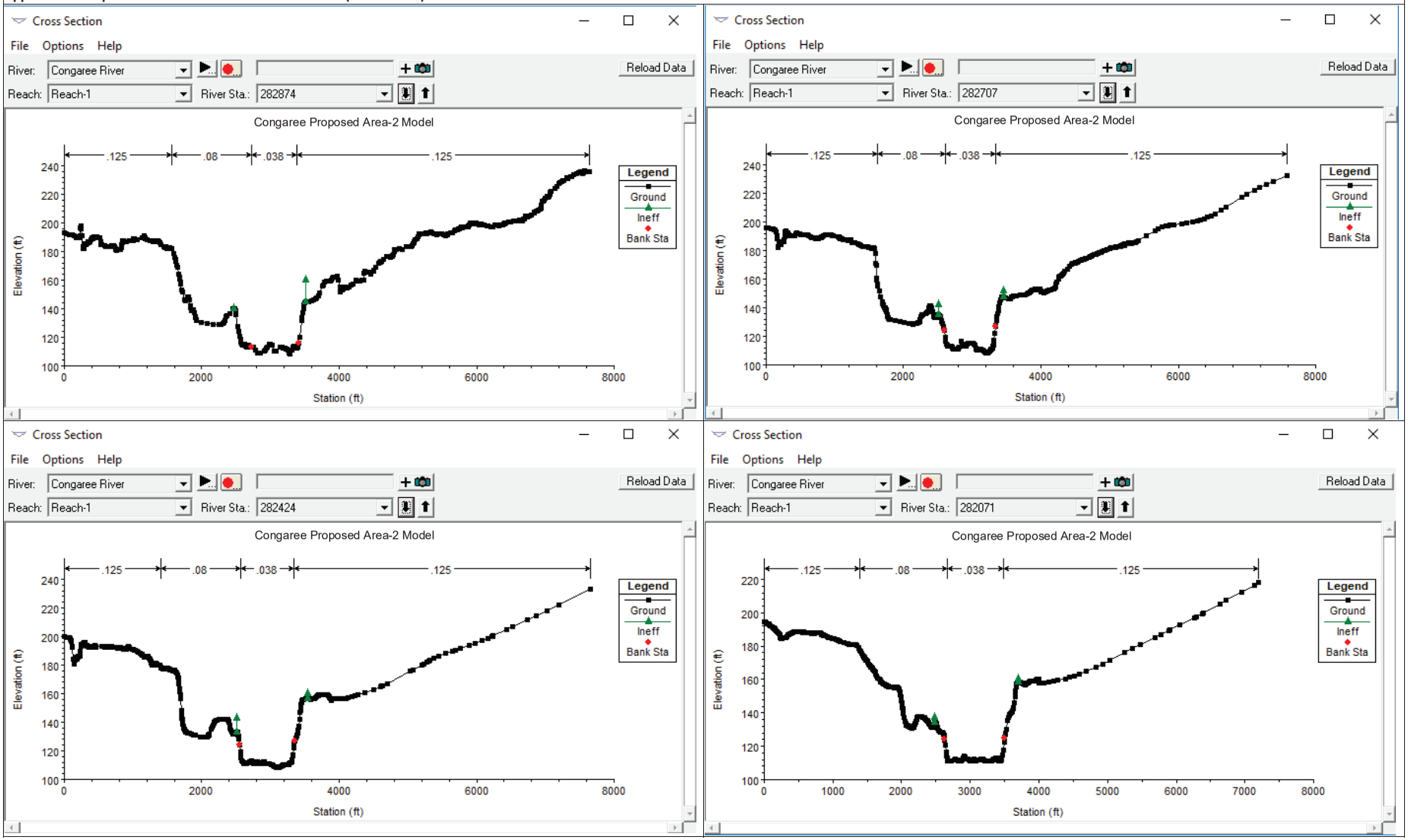
Appendix D: Proposed Conditions Models Cross Sections (Sheet 5 of 8)



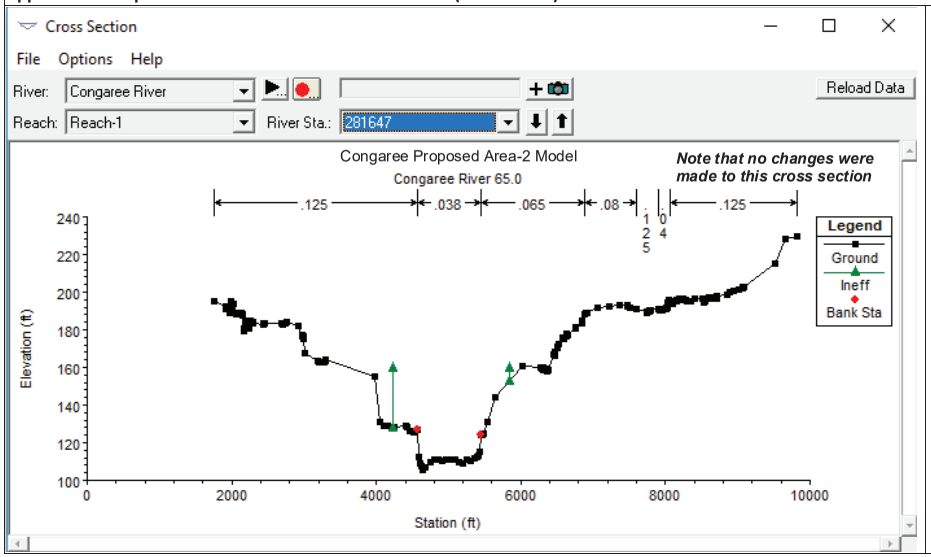
Appendix D: Proposed Conditions Models Cross Sections (Sheet 6 of 8)



Appendix D: Proposed Conditions Models Cross Sections (Sheet 7 of 8)



Appendix D: Proposed Conditions Models Cross Sections (Sheet 8 of 8)



Appendix E: HEC-RAS Output Tables

HEC-RAS River: Congaree River Reach: Reach-1 Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	288770	Max WS	010yr-CorrectedC	147479.80	128.14	144.313		144.95	0.000713	6.43	23011.70	1517.14	0.29
Reach-1	288770	Max WS	050yr-CorrectedC	239223.40	128.14	151.235		152.03	0.000541	7.17	33605.70	1544.14	0.27
Reach-1	288770	Max WS	100yr-CorrectedC	285861.90	128.14	154.374		155.25	0.000497	7.51	38474.13	1733.32	0.26
Reach-1	287472	Max WS	010yr-CorrectedC	147458.70	125.74	143.609		144.05	0.000680	5.31	27755.09	2367.87	0.27
Reach-1	287472	Max WS	050yr-CorrectedC	239221.90	125.74	151.011		151.43	0.000365	5.21	45898.80	2531.94	0.22
Reach-1	287472	Max WS	100yr-CorrectedC	285863.80	125.74	154.278		154.71	0.000303	5.27	54217.72	2875.12	0.20
Reach-1	286338	Max WS	010yr-CorrectedC	147444.60	117.29	143.308	127.02	143.56	0.000175	4.06	38203.61	2033.90	0.15
Reach-1	286338	Max WS	050yr-CorrectedC	239218.50	117.29	150.776	129.77	151.13	0.000170	4.87	52469.90	2182.61	0.16
Reach-1	286338	Max WS	100yr-CorrectedC	285856.10	117.29	154.040	130.99	154.45	0.000170	5.21	59001.70	2414.95	0.16
Reach-1	286221			Bridge									
Reach-1	286106	Max WS	010yr-CorrectedC	147447.40	117.10	143.055		143.30	0.000172	3.91	38086.05	2033.36	0.15
Reach-1	286106	Max WS	050yr-CorrectedC	239220.80	117.10	150.535		150.88	0.000163	4.59	52321.38	2168.36	0.15
Reach-1	286106	Max WS	100yr-CorrectedC	285857.90	117.10	153.804		154.20	0.000161	4.89	58592.41	2387.70	0.15
Reach-1	284778	Max WS	010yr-CorrectedC	147445.50	112.83	142.829	122.38	143.09	0.000134	4.07	36392.65	1384.32	0.14
Reach-1	284778	Max WS	050yr-CorrectedC	239216.70	112.83	150.234	125.29	150.65	0.000157	5.18	46909.77	1474.37	0.16
Reach-1	284778	Max WS	100yr-CorrectedC	285852.90	112.83	153.465	126.61	153.96	0.000166	5.65	51628.45	1498.76	0.16
Reach-1	284668			Bridge									
Reach-1	284565	Max WS	010yr-CorrectedC	147443.50	111.22	141.140		141.40	0.000135	4.08	36283.32	1383.69	0.14
Reach-1	284565	Max WS	050yr-CorrectedC	239212.50	111.22	148.525		148.94	0.000159	5.19	46751.21	1473.63	0.16
Reach-1	284565	Max WS	100yr-CorrectedC	285851.40	111.22	151.716		152.21	0.000168	5.67	51386.67	1497.71	0.16
Reach-1	284431	Max WS	010yr-CorrectedC	147434.30	111.36	140.999		141.38	0.000281	5.01	31276.15	1505.19	0.18
Reach-1	284431	Max WS	050yr-CorrectedC	239205.70	111.36	148.398		148.95	0.000284	5.99	42910.18	1679.99	0.19
Reach-1	284431	Max WS	100yr-CorrectedC	285850.80	111.36	151.610		152.25	0.000280	6.33	48156.30	1705.94	0.19
Reach-1	284408	Max WS	010yr-CorrectedC	147429.00	111.06	140.947		141.37	0.000253	5.22	28350.43	1374.72	0.19
Reach-1	284408	Max WS	050yr-CorrectedC	239202.00	111.06	148.301		148.92	0.000266	6.38	40381.47	1625.74	0.20
Reach-1	284408	Max WS	100yr-CorrectedC	285851.10	111.06	151.479		152.20	0.000273	6.89	45439.73	1687.00	0.21
Reach-1	284395	Max WS	010yr-CorrectedC	147428.90	111.13	140.937		141.37	0.000257	5.27	28084.23	1347.81	0.19
Reach-1	284395	Max WS	050yr-CorrectedC	239206.00	111.13	148.279		148.92	0.000273	6.47	39440.89	1515.22	0.20
Reach-1	284395	Max WS	100yr-CorrectedC	285843.00	111.13	151.453		152.19	0.000280	6.98	44392.82	1676.59	0.21
Reach-1	284372	Max WS	010yr-CorrectedC	147428.90	111.51	140.922		141.36	0.000257	5.33	27713.86	1253.50	0.19
Reach-1	284372	Max WS	050yr-CorrectedC	239201.90	111.51	148.248		148.91	0.000292	6.58	38306.66	1485.00	0.21
Reach-1	284372	Max WS	100yr-CorrectedC	285845.50	111.51	151.418		152.19	0.000305	7.11	43090.73	1542.98	0.21
Reach-1	284267	Max WS	010yr-CorrectedC	147428.70	108.23	140.827		141.33	0.000282	5.71	26123.84	1132.60	0.20
Reach-1	284267	Max WS	050yr-CorrectedC	239203.30	108.23	148.092		148.89	0.000320	7.18	35631.09	1471.01	0.22
Reach-1	284267	Max WS	100yr-CorrectedC	285844.30	108.23	151.234		152.16	0.000334	7.79	40145.26	1511.37	0.23
Reach-1	284060	Max WS	010yr-CorrectedC	147426.50	108.45	140.691		141.27	0.000304	6.13	24495.76	1157.47	0.21
Reach-1	284060	Max WS	050yr-CorrectedC	239196.10	108.45	147.912		148.83	0.000354	7.74	34480.16	1444.19	0.23
Reach-1	284060	Max WS	100yr-CorrectedC	285843.90	108.45	151.035		152.11	0.000373	8.42	38941.79	1469.03	0.24
Reach-1	283820	Max WS	010yr-CorrectedC	147419.30	107.22	140.537		141.18	0.000431	6.46	22922.52	1125.47	0.21
Reach-1	283820	Max WS	050yr-CorrectedC	239195.80	107.22	147.724		148.74	0.000515	8.19	32810.90	1606.76	0.24
Reach-1	283820	Max WS	100yr-CorrectedC	285843.80	107.22	150.852		152.02	0.000539	8.86	37549.43	1664.50	0.25
Reach-1	283636	Max WS	010yr-CorrectedC	147414.60	105.24	140.467		141.12	0.000321	6.47	22917.94	1310.82	0.21
Reach-1	283636	Max WS	050yr-CorrectedC	239188.20	105.24	147.654		148.66	0.000377	8.15	35818.50	1802.28	0.24
Reach-1	283636	Max WS	100yr-CorrectedC	285843.10	105.24	150.781		151.94	0.000395	8.82	41481.13	1865.29	0.25
Reach-1	283611	Max WS	010yr-CorrectedC	147412.90	105.38	140.406		141.11	0.000332	6.74	22346.18	1272.32	0.22
Reach-1	283611	Max WS	050yr-CorrectedC	239190.40	105.38	147.566		148.67	0.000401	8.56	34650.35	1803.27	0.25
Reach-1	283611	Max WS	100yr-CorrectedC	285840.50	105.38	150.683		151.96	0.000422	9.27	40574.50	1864.84	0.26
Reach-1	283601	Max WS	010yr-CorrectedC	147406.10	105.38	140.392		141.11	0.000345	6.80	22108.90	1263.41	0.22
Reach-1	283601	Max WS	050yr-CorrectedC	239190.50	105.38	147.593		148.67	0.000400	8.49	34531.10	1833.07	0.25
Reach-1	283601	Max WS	100yr-CorrectedC	285843.00	105.38	150.739		151.95	0.000413	9.12	40358.35	1868.29	0.26
Reach-1	283574	Max WS	010yr-CorrectedC	147406.10	105.18	140.323		141.10	0.000452	7.08	21088.56	1241.47	0.23
Reach-1	283574	Max WS	050yr-CorrectedC	239191.30	105.18	147.536		148.67	0.000513	8.76	33880.45	1848.42	0.26
Reach-1	283574	Max WS	100yr-CorrectedC	285833.80	105.18	150.696		151.96	0.000523	9.35	39766.20	1875.26	0.26
Reach-1	283490	Max WS	010yr-CorrectedC	147405.90	104.94	140.268		141.05	0.000710	7.11	21416.96	1505.14	0.24
Reach-1	283490	Max WS	050yr-CorrectedC	239188.00	104.94	147.558		148.61	0.000744	8.52	37011.75	1844.76	0.25
Reach-1	283490	Max WS	100yr-CorrectedC	285842.20	104.94	150.711		151.89	0.000758	9.11	42859.13	1864.14	0.26
Reach-1	283342	Max WS	010yr-CorrectedC	147406.80	107.64	140.233		140.96	0.000489	6.84	22101.73	1495.23	0.23
Reach-1	283342	Max WS	050yr-CorrectedC	239192.70	107.64	147.570		148.49	0.000497	8.05	37797.59	1738.80	0.24
Reach-1	283342	Max WS	100yr-CorrectedC	285834.60	107.64	150.727		151.76	0.000508	8.61	43342.07	1770.32	0.24
Reach-1	283203	Max WS	010yr-CorrectedC	147407.30	106.22	140.257		140.94	0.000332	6.67	22703.93	1535.90	0.22
Reach-1	283203	Max WS	050yr-CorrectedC	239187.30	106.22	147.525		148.43	0.000350	7.94	38751.61	1678.91	0.23
Reach-1	283203	Max WS	100yr-CorrectedC	285836.10	106.22	150.668		151.69	0.000363	8.55	44088.63	1731.46	0.24
Reach-1	283179	Max WS	010yr-CorrectedC	147406.60	106.20	140.206		140.89	0.000325	6.64	22874.14	1527.94	0.22
Reach-1	283179	Max WS	050yr-CorrectedC	239187.50	106.20	147.518		148.42	0.000344	7.92	38980.86	1667.22	0.23
Reach-1	283179	Max WS	100yr-CorrectedC	285837.10	106.20	150.658		151.69	0.000358	8.55	44286.83	1711.10	0.24

HEC-RAS River: Congaree River Reach: Reach-1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	283169	Max WS	010yr-CorrectedC	147407.70	106.15	140.211		140.88	0.000323	6.60	22959.34	1533.57	0.22
Reach-1	283169	Max WS	050yr-CorrectedC	239192.00	106.15	147.524		148.41	0.000341	7.88	39065.69	1670.43	0.23
Reach-1	283169	Max WS	100yr-CorrectedC	285835.70	106.15	150.665		151.68	0.000355	8.49	44383.46	1714.61	0.24
Reach-1	283139	Max WS	010yr-CorrectedC	147406.60	104.58	140.204		140.89	0.000328	6.66	22922.75	1544.79	0.22
Reach-1	283139	Max WS	050yr-CorrectedC	239192.00	104.58	147.500		148.41	0.000348	7.96	38816.03	1678.74	0.23
Reach-1	283139	Max WS	100yr-CorrectedC	285836.10	104.58	150.642		151.67	0.000362	8.59	44158.17	1723.14	0.24
Reach-1	283093	Max WS	010yr-CorrectedC	147399.20	104.60	140.206		140.86	0.000431	6.51	23487.11	1609.32	0.21
Reach-1	283093	Max WS	050yr-CorrectedC	239191.60	104.60	147.533		148.37	0.000446	7.71	39572.72	1724.33	0.23
Reach-1	283093	Max WS	100yr-CorrectedC	285836.30	104.60	150.688		151.64	0.000459	8.27	45064.88	1756.15	0.23
Reach-1	283052	Max WS	010yr-CorrectedC	147408.00	105.26	140.257		140.85	0.000291	6.36	28615.12	1643.79	0.21
Reach-1	283052	Max WS	050yr-CorrectedC	239192.40	105.26	147.506		148.37	0.000331	7.84	40905.25	1748.19	0.23
Reach-1	283052	Max WS	100yr-CorrectedC	285835.90	105.26	150.652		151.64	0.000344	8.45	46462.37	1783.10	0.24
Reach-1	283001	Max WS	010yr-CorrectedC	147407.60	105.29	140.320		140.83	0.000315	5.99	31219.39	1658.84	0.19
Reach-1	283001	Max WS	050yr-CorrectedC	239191.60	105.29	147.594		148.33	0.000357	7.37	43774.77	1792.21	0.21
Reach-1	283001	Max WS	100yr-CorrectedC	285835.50	105.29	150.753		151.59	0.000370	7.93	49489.82	1824.05	0.22
Reach-1	282937	Max WS	010yr-CorrectedC	147397.60	107.24	140.110		140.81	0.000360	6.76	22438.40	1615.61	0.22
Reach-1	282937	Max WS	050yr-CorrectedC	239189.30	107.24	147.552		148.31	0.000335	7.57	43194.55	1801.50	0.22
Reach-1	282937	Max WS	100yr-CorrectedC	285837.60	107.24	150.706		151.57	0.000348	8.15	48722.18	1844.88	0.23
Reach-1	282912	Max WS	010yr-CorrectedC	147404.50	108.10	140.209		140.89	0.000327	6.69	23251.98	1628.88	0.22
Reach-1	282912	Max WS	050yr-CorrectedC	239192.90	108.10	147.525		148.31	0.000317	7.64	43436.47	1864.73	0.22
Reach-1	282912	Max WS	100yr-CorrectedC	285837.60	108.10	150.679		151.57	0.000328	8.22	49272.49	1914.44	0.23
Reach-1	282902	Max WS	010yr-CorrectedC	147407.20	108.28	140.194		140.87	0.000328	6.65	23324.50	1628.35	0.22
Reach-1	282902	Max WS	050yr-CorrectedC	239190.90	108.28	147.521		148.31	0.000319	7.62	43264.79	1880.63	0.22
Reach-1	282902	Max WS	100yr-CorrectedC	285835.80	108.28	150.676		151.57	0.000329	8.19	49130.20	1927.46	0.23
Reach-1	282874	Max WS	010yr-CorrectedC	147404.40	108.58	140.157		140.82	0.000369	6.78	25316.47	1625.17	0.22
Reach-1	282874	Max WS	050yr-CorrectedC	239191.00	108.58	147.498		148.32	0.000371	7.93	42667.48	1912.09	0.23
Reach-1	282874	Max WS	100yr-CorrectedC	285835.80	108.58	150.641		151.58	0.000386	8.56	48261.62	1994.34	0.24
Reach-1	282707	Max WS	010yr-CorrectedC	147387.60	108.26	139.929		140.73	0.000446	7.22	21250.83	1618.78	0.24
Reach-1	282707	Max WS	050yr-CorrectedC	239183.70	108.26	147.358		148.26	0.000408	8.11	39795.35	1864.88	0.24
Reach-1	282707	Max WS	100yr-CorrectedC	285837.70	108.26	150.511		151.52	0.000414	8.67	45446.73	2184.92	0.25
Reach-1	282424	Max WS	010yr-CorrectedC	147396.40	108.13	139.966		140.60	0.000386	6.44	23642.37	1488.32	0.21
Reach-1	282424	Max WS	050yr-CorrectedC	239183.50	108.13	147.299		148.12	0.000395	7.59	40152.38	1727.45	0.22
Reach-1	282424	Max WS	100yr-CorrectedC	285838.70	108.13	150.448		151.37	0.000406	8.14	45614.16	1740.70	0.23
Reach-1	282071	Max WS	010yr-CorrectedC	147395.10	111.09	139.950		140.47	0.000353	5.91	28582.36	1563.68	0.20
Reach-1	282071	Max WS	050yr-CorrectedC	239178.80	111.09	147.204		147.96	0.000390	7.25	40286.44	1643.15	0.22
Reach-1	282071	Max WS	100yr-CorrectedC	285831.30	111.09	150.344		151.21	0.000403	7.81	45479.27	1664.80	0.22
Reach-1	281647	Max WS	010yr-CorrectedC	147387.50	105.74	139.888	120.14	140.34	0.000225	5.53	31337.71	1583.23	0.18
Reach-1	281647	Max WS	050yr-CorrectedC	239172.00	105.74	147.087	123.91	147.81	0.000272	7.05	41614.27	1712.98	0.21
Reach-1	281647	Max WS	100yr-CorrectedC	285832.00	105.74	150.199	125.64	151.05	0.000290	7.69	46370.62	1794.68	0.22
Reach-1	281538			Bridge									
Reach-1	281423	Max WS	010yr-CorrectedC	147387.50	105.74	139.748		140.20	0.000220	5.46	31335.64	1498.51	0.18
Reach-1	281423	Max WS	050yr-CorrectedC	239172.30	105.74	146.886		147.61	0.000269	6.99	41296.05	1643.80	0.20
Reach-1	281423	Max WS	100yr-CorrectedC	285833.30	105.74	149.960		150.82	0.000289	7.65	45634.39	1717.47	0.22
Reach-1	279961	Max WS	010yr-CorrectedC	147374.00	101.65	139.302		139.87	0.000255	6.13	28465.23	1340.31	0.19
Reach-1	279961	Max WS	050yr-CorrectedC	239158.20	101.65	146.289		147.22	0.000328	7.95	38346.32	1459.87	0.23
Reach-1	279961	Max WS	100yr-CorrectedC	285824.10	101.65	149.301		150.41	0.000357	8.72	42795.31	1504.64	0.24
Reach-1	279605	Max WS	010yr-CorrectedC	147373.70	101.65	139.215		139.78	0.000253	6.15	29451.02	1429.05	0.19
Reach-1	279605	Max WS	050yr-CorrectedC	239159.30	101.65	146.183		147.11	0.000325	7.96	40006.07	1564.21	0.23
Reach-1	279605	Max WS	100yr-CorrectedC	285821.60	101.65	149.191		150.29	0.000353	8.72	44761.06	1594.05	0.24
Reach-1	278919	Max WS	010yr-CorrectedC	147363.80	101.65	139.088		139.61	0.000239	5.92	31344.63	1594.19	0.19
Reach-1	278919	Max WS	050yr-CorrectedC	239159.90	101.65	146.033		146.88	0.000305	7.65	43202.07	1766.93	0.22
Reach-1	278919	Max WS	100yr-CorrectedC	285823.60	101.65	149.039		150.03	0.000329	8.36	48551.63	1809.62	0.23
Reach-1	277724	Max WS	010yr-CorrectedC	147357.40	100.07	138.800	115.50	139.33	0.000213	5.90	29059.61	1369.78	0.18
Reach-1	277724	Max WS	050yr-CorrectedC	239141.20	100.07	145.606	119.83	146.51	0.000293	7.81	38124.52	1756.21	0.22
Reach-1	277724	Max WS	100yr-CorrectedC	285818.90	100.07	148.547	121.81	149.64	0.000325	8.62	42182.76	1774.79	0.23
Reach-1	277625			Bridge									
Reach-1	277512	Max WS	010yr-CorrectedC	147349.40	100.07	138.620		139.16	0.000218	5.97	28410.94	1319.09	0.18
Reach-1	277512	Max WS	050yr-CorrectedC	239132.60	100.07	145.280		146.23	0.000305	7.97	37004.13	1689.61	0.22
Reach-1	277512	Max WS	100yr-CorrectedC	285808.50	100.07	148.129		149.28	0.000341	8.82	40997.18	1804.24	0.24
Reach-1	277500	Max WS	010yr-CorrectedC	147335.90	101.08	138.560	115.95	139.16	0.000246	6.26	25663.64	1165.42	0.19
Reach-1	277500	Max WS	050yr-CorrectedC	239132.40	101.08	145.180	120.50	146.24	0.000343	8.35	32834.86	1700.17	0.23
Reach-1	277500	Max WS	100yr-CorrectedC	285811.20	101.08	147.998	122.60	149.29	0.000385	9.26	35887.39	1769.42	0.25
Reach-1	277397			Bridge									

HEC-RAS River: Congaree River Reach: Reach-1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	277287	Max WS	010yr-CorrectedC	147320.90	102.92	138.031		138.74	0.000322	6.77	22414.45	903.83	0.22
Reach-1	277287	Max WS	050yr-CorrectedC	239086.30	102.92	144.241		145.50	0.000449	9.05	28701.46	1626.61	0.26
Reach-1	277287	Max WS	100yr-CorrectedC	285750.10	102.92	146.828		148.38	0.000506	10.06	31435.46	1725.74	0.28
Reach-1	276335	Max WS	010yr-CorrectedC	147302.20	101.04	137.508		138.41	0.000384	7.63	19603.96	647.53	0.24
Reach-1	276335	Max WS	050yr-CorrectedC	239047.60	101.04	143.337		145.03	0.000578	10.46	23434.90	666.84	0.30
Reach-1	276335	Max WS	100yr-CorrectedC	285626.10	101.04	145.707		147.84	0.000674	11.75	25023.84	673.87	0.33
Reach-1	276088	Max WS	010yr-CorrectedC	147290.80	101.04	137.260		138.31	0.000432	8.25	18302.92	597.82	0.25
Reach-1	276088	Max WS	050yr-CorrectedC	239001.90	101.04	142.870		144.89	0.000673	11.43	21695.58	611.54	0.32
Reach-1	276088	Max WS	100yr-CorrectedC	285562.40	101.04	145.113		147.68	0.000795	12.90	23073.35	616.90	0.35
Reach-1	275472	Max WS	010yr-CorrectedC	147262.40	101.04	137.067		138.06	0.000420	8.11	21016.67	856.48	0.25
Reach-1	275472	Max WS	050yr-CorrectedC	239014.90	101.04	142.670		144.51	0.000639	11.10	25861.11	872.85	0.31
Reach-1	275472	Max WS	100yr-CorrectedC	285545.70	101.04	144.929		147.24	0.000747	12.46	27840.06	879.45	0.34
Reach-1	274472	Max WS	010yr-CorrectedC	147263.60	101.04	136.884		137.64	0.000357	6.98	22011.79	1010.20	0.23
Reach-1	274472	Max WS	050yr-CorrectedC	238970.80	101.04	142.474		143.84	0.000518	9.44	27645.11	1095.46	0.28
Reach-1	274472	Max WS	100yr-CorrectedC	285519.20	101.04	144.744		146.45	0.000596	10.55	29985.68	1107.77	0.30
Reach-1	273472	Max WS	010yr-CorrectedC	147249.70	99.91	136.557		137.30	0.000328	6.91	21942.79	781.55	0.22
Reach-1	273472	Max WS	050yr-CorrectedC	238957.50	99.91	141.927		143.33	0.000505	9.53	26197.81	802.46	0.28
Reach-1	273472	Max WS	100yr-CorrectedC	285407.20	99.91	144.070		145.85	0.000594	10.74	27926.57	810.34	0.30
Reach-1	272318	Max WS	010yr-CorrectedC	147200.00	99.91	135.785		136.85	0.000464	8.33	18735.01	784.12	0.26
Reach-1	272318	Max WS	050yr-CorrectedC	238872.70	99.91	140.722		142.72	0.000728	11.49	27272.14	3121.76	0.33
Reach-1	272318	Max WS	100yr-CorrectedC	285196.20	99.91	142.748		145.18	0.000838	12.77	31836.61	3193.62	0.36
Reach-1	271472	Max WS	010yr-CorrectedC	147190.30	99.91	135.697		136.51	0.000328	7.22	20706.56	1217.79	0.24
Reach-1	271472	Max WS	050yr-CorrectedC	238867.00	99.91	140.599		142.09	0.000500	9.88	30067.37	4083.93	0.30
Reach-1	271472	Max WS	100yr-CorrectedC	285160.20	99.91	142.597		144.41	0.000572	10.97	35141.74	4211.40	0.32
Reach-1	270472	Max WS	010yr-CorrectedC	147160.00	99.91	135.366		136.18	0.000326	7.26	23098.06	2529.72	0.23
Reach-1	270472	Max WS	050yr-CorrectedC	238840.90	99.91	140.170		141.58	0.000482	9.75	36089.37	3549.20	0.29
Reach-1	270472	Max WS	100yr-CorrectedC	285073.50	99.91	142.118		143.81	0.000549	10.80	41561.01	3830.24	0.31
Reach-1	269529	Max WS	010yr-CorrectedC	147149.80	100.75	135.092		135.87	0.000308	7.12	23902.15	2427.62	0.23
Reach-1	269529	Max WS	050yr-CorrectedC	238805.30	100.75	139.737		141.10	0.000463	9.60	38689.80	4454.92	0.29
Reach-1	269529	Max WS	100yr-CorrectedC	284970.70	100.75	141.634		143.25	0.000526	10.60	45279.05	4786.65	0.31
Reach-1	268320	Max WS	010yr-CorrectedC	147129.40	100.75	134.779		135.50	0.000308	6.94	29501.03	4034.90	0.23
Reach-1	268320	Max WS	050yr-CorrectedC	238779.50	100.75	139.320		140.52	0.000445	9.18	46654.06	5410.89	0.28
Reach-1	268320	Max WS	100yr-CorrectedC	284889.80	100.75	141.182		142.58	0.000497	10.06	54227.17	5525.28	0.30
Reach-1	267678	Max WS	010yr-CorrectedC	147124.20	100.75	134.680		135.29	0.000283	6.50	36886.72	4603.25	0.22
Reach-1	267678	Max WS	050yr-CorrectedC	238764.00	100.75	139.198		140.17	0.000394	8.47	56222.45	5471.77	0.26
Reach-1	267678	Max WS	100yr-CorrectedC	284885.00	100.75	141.053		142.17	0.000435	9.25	64528.61	5478.37	0.28
Reach-1	266472	Max WS	010yr-CorrectedC	147108.80	100.75	134.462		134.88	0.000227	5.73	53612.21	7843.55	0.19
Reach-1	266472	Max WS	050yr-CorrectedC	238751.80	100.75	138.883		139.55	0.000314	7.45	76763.93	9109.70	0.23
Reach-1	266472	Max WS	100yr-CorrectedC	284869.50	100.75	140.709		141.46	0.000344	8.09	86539.19	9221.11	0.25
Reach-1	265472	Max WS	010yr-CorrectedC	147094.40	100.76	134.330		134.65	0.000188	5.22	60975.20	6827.86	0.17
Reach-1	265472	Max WS	050yr-CorrectedC	238734.40	100.76	138.730		139.19	0.000246	6.59	83242.39	7375.45	0.20
Reach-1	265472	Max WS	100yr-CorrectedC	284850.80	100.76	140.545		141.07	0.000268	7.14	92660.09	7511.22	0.22
Reach-1	264426	Max WS	010yr-CorrectedC	147089.90	100.76	134.024		134.50	0.000245	5.98	51096.71	5902.00	0.20
Reach-1	264426	Max WS	050yr-CorrectedC	238718.70	100.76	138.320		139.03	0.000328	7.62	73477.94	6339.98	0.24
Reach-1	264426	Max WS	100yr-CorrectedC	284691.40	100.76	140.090		140.90	0.000363	8.30	82970.76	6428.58	0.25
Reach-1	263569	Max WS	010yr-CorrectedC	147077.50	100.76	133.818		134.28	0.000242	5.75	49273.84	7021.54	0.20
Reach-1	263569	Max WS	050yr-CorrectedC	238691.50	100.76	138.067		138.73	0.000311	7.20	75564.52	7103.31	0.23
Reach-1	263569	Max WS	100yr-CorrectedC	284664.40	100.76	139.819		140.56	0.000339	7.81	86418.59	13542.00	0.24
Reach-1	262577	Max WS	010yr-CorrectedC	147067.70	100.76	133.753		134.02	0.000162	4.61	68471.43	6716.41	0.16
Reach-1	262577	Max WS	050yr-CorrectedC	238696.40	100.76	137.963		138.37	0.000218	5.93	94394.10	8420.51	0.19
Reach-1	262577	Max WS	100yr-CorrectedC	284671.00	100.76	139.700		140.18	0.000241	6.48	105356.40	8792.22	0.20
Reach-1	261551	Max WS	010yr-CorrectedC	147062.70	97.61	133.495		133.87	0.000206	5.22	57392.20	8411.56	0.18
Reach-1	261551	Max WS	050yr-CorrectedC	238678.20	97.61	137.642		138.17	0.000265	6.56	84939.59	9668.16	0.21
Reach-1	261551	Max WS	100yr-CorrectedC	284655.40	97.61	139.352		139.95	0.000289	7.11	96319.00	10643.66	0.22
Reach-1	260635	Max WS	010yr-CorrectedC	147052.50	97.61	133.238		133.71	0.000242	5.97	55668.54	8663.70	0.20
Reach-1	260635	Max WS	050yr-CorrectedC	238666.90	97.61	137.318		137.98	0.000316	7.47	83237.05	10211.08	0.23
Reach-1	260635	Max WS	100yr-CorrectedC	284634.80	97.61	139.002		139.74	0.000346	8.08	94631.17	10651.24	0.24
Reach-1	259263	Max WS	010yr-CorrectedC	147039.90	97.61	132.916	114.28	133.35	0.000242	5.75	50292.25	11611.55	0.20
Reach-1	259263	Max WS	050yr-CorrectedC	238643.00	97.61	136.819	118.95	137.52	0.000347	7.56	67293.16	12250.86	0.24
Reach-1	259263	Max WS	100yr-CorrectedC	284589.90	97.61	138.420	121.11	139.26	0.000394	8.34	74319.13	12366.44	0.26
Reach-1	259032			Bridge									
Reach-1	258805	Max WS	010yr-CorrectedC	147035.70	98.28	132.766		133.18	0.000249	5.71	53363.28	11101.31	0.20
Reach-1	258805	Max WS	050yr-CorrectedC	238639.80	98.28	136.615		137.28	0.000354	7.49	70815.92	11506.80	0.24
Reach-1	258805	Max WS	100yr-CorrectedC	284565.30	98.28	138.198		138.99	0.000400	8.25	78027.05	11659.79	0.26
Reach-1	257368	Max WS	010yr-CorrectedC	147027.40	97.61	132.390		132.46	0.000700	2.85	83743.14	11632.18	0.10

HEC-RAS River: Congaree River Reach: Reach-1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	257368	Max WS	050yr-CorrectedC	238620.20	97.61	136.266		136.35	0.000748	3.21	113507.90	11970.58	0.10
Reach-1	257368	Max WS	100yr-CorrectedC	284553.20	97.61	137.862		137.96	0.000775	3.38	125787.50	16456.71	0.10
Reach-1	254766	Max WS	010yr-CorrectedC	147009.20	99.27	131.486		131.67	0.000148	4.31	93477.11	13304.67	0.15
Reach-1	254766	Max WS	050yr-CorrectedC	238589.50	99.27	135.288		135.52	0.000177	5.20	130374.40	13505.33	0.17
Reach-1	254766	Max WS	100yr-CorrectedC	284494.60	99.27	136.844		137.10	0.000189	5.58	145552.30	13538.36	0.18
Reach-1	250071	Max WS	010yr-CorrectedC	146979.30	84.54	130.192		131.11	0.000583	8.25	45395.07	9221.38	0.30
Reach-1	250071	Max WS	050yr-CorrectedC	238550.70	84.54	133.974		134.96	0.000626	9.44	80188.63	9859.23	0.32
Reach-1	250071	Max WS	100yr-CorrectedC	284415.70	84.54	135.497		136.52	0.000643	9.93	94218.60	10466.64	0.33
Reach-1	248531	Max WS	010yr-CorrectedC	146952.30	84.54	129.238		130.51	0.000580	10.10	47025.89	8104.17	0.32
Reach-1	248531	Max WS	050yr-CorrectedC	238515.70	84.54	132.874		134.37	0.000719	12.09	77893.71	8922.63	0.36
Reach-1	248531	Max WS	100yr-CorrectedC	284343.90	84.54	134.362		135.90	0.000756	12.74	91127.08	9296.53	0.37
Reach-1	246078	Max WS	010yr-CorrectedC	146942.90	98.13	128.829		129.29	0.000322	6.32	47051.42	8654.22	0.23
Reach-1	246078	Max WS	050yr-CorrectedC	238501.10	98.13	132.384		132.91	0.000355	7.26	73213.32	9759.91	0.24
Reach-1	246078	Max WS	100yr-CorrectedC	284303.00	98.13	133.838		134.41	0.000368	7.65	84569.50	10275.57	0.25
Reach-1	244614	Max WS	010yr-CorrectedC	146925.60	98.13	128.191		129.00	0.000449	7.76	45493.01	8811.87	0.27
Reach-1	244614	Max WS	050yr-CorrectedC	238467.50	98.13	131.577		132.69	0.000599	9.73	70959.34	9720.39	0.32
Reach-1	244614	Max WS	100yr-CorrectedC	284208.10	98.13	132.973		134.20	0.000652	10.48	81662.14	9879.45	0.33
Reach-1	242472	Max WS	010yr-CorrectedC	146850.20	94.20	126.807		126.97	0.001465	3.97	49998.58	9572.66	0.14
Reach-1	242472	Max WS	050yr-CorrectedC	238407.50	94.20	130.469		130.64	0.001163	3.86	75533.43	10980.13	0.12
Reach-1	242472	Max WS	100yr-CorrectedC	284083.50	94.20	131.938		132.12	0.001074	3.83	86331.13	11515.22	0.12
Reach-1	241833	Max WS	010yr-CorrectedC	146783.90	93.70	126.015		126.72	0.000407	7.48	52566.25	9546.80	0.26
Reach-1	241833	Max WS	050yr-CorrectedC	238346.50	93.70	129.678		130.59	0.000514	9.17	80769.97	11403.21	0.30
Reach-1	241833	Max WS	100yr-CorrectedC	283965.20	93.70	131.143		132.14	0.000555	9.83	93239.11	11750.53	0.31
Reach-1	240531	Max WS	010yr-CorrectedC	146776.10	93.60	125.797		126.20	0.000269	5.96	76837.30	9951.34	0.21
Reach-1	240531	Max WS	050yr-CorrectedC	238322.20	93.60	129.422		129.92	0.000325	7.15	112790.40	24494.30	0.23
Reach-1	240531	Max WS	100yr-CorrectedC	283922.50	93.60	130.868		131.40	0.000350	7.67	127149.50	24652.89	0.24
Reach-1	235176	Max WS	010yr-CorrectedC	146656.80	92.80	124.905		125.67	0.000405	7.76	56945.58	9949.48	0.26
Reach-1	235176	Max WS	050yr-CorrectedC	238250.00	92.80	128.482		129.38	0.000492	9.25	93623.69	10671.59	0.29
Reach-1	235176	Max WS	100yr-CorrectedC	283758.90	92.80	129.903		130.85	0.000523	9.82	109015.60	23827.55	0.30
Reach-1	232472	Max WS	010yr-CorrectedC	146568.30	91.70	124.206		124.79	0.000309	6.78	63469.26	22623.85	0.23
Reach-1	232472	Max WS	050yr-CorrectedC	238158.30	91.70	127.616		128.35	0.000392	8.25	98795.27	23089.54	0.26
Reach-1	232472	Max WS	100yr-CorrectedC	283652.30	91.70	128.968		129.76	0.000427	8.85	112897.10	23128.65	0.27
Reach-1	231472	Max WS	010yr-CorrectedC	146506.70	91.70	123.683		124.53	0.000516	7.97	48221.88	22378.70	0.29
Reach-1	231472	Max WS	050yr-CorrectedC	238098.50	91.70	126.998		128.02	0.000626	9.57	80727.70	22666.15	0.32
Reach-1	231472	Max WS	100yr-CorrectedC	283562.50	91.70	128.312		129.40	0.000668	10.19	93749.85	22712.27	0.33
Reach-1	230472	Max WS	010yr-CorrectedC	146439.10	91.60	123.115		124.06	0.000540	8.38	45831.73	20661.80	0.29
Reach-1	230472	Max WS	050yr-CorrectedC	238035.40	91.60	126.293		127.47	0.000684	10.20	76995.58	22383.29	0.33
Reach-1	230472	Max WS	100yr-CorrectedC	283458.10	91.60	127.558		128.82	0.000736	10.89	89420.69	22464.31	0.35
Reach-1	229472	Max WS	010yr-CorrectedC	146406.90	89.34	122.810		123.42	0.000349	6.90	51205.07	20783.54	0.23
Reach-1	229472	Max WS	050yr-CorrectedC	237999.70	89.34	125.902		126.61	0.000425	8.19	83647.25	22014.37	0.26
Reach-1	229472	Max WS	100yr-CorrectedC	283410.80	89.34	127.141		127.87	0.000450	8.66	96687.50	22198.49	0.27
Reach-1	228472	Max WS	010yr-CorrectedC	146380.40	90.08	122.560		123.10	0.000304	6.65	59467.36	19532.06	0.22
Reach-1	228472	Max WS	050yr-CorrectedC	237968.90	90.08	125.600		126.21	0.000371	7.86	94975.97	23245.78	0.25
Reach-1	228472	Max WS	100yr-CorrectedC	283380.80	90.08	126.821		127.46	0.000394	8.32	109246.90	23497.86	0.26
Reach-1	227472	Max WS	010yr-CorrectedC	146344.20	90.79	122.155		122.83	0.000390	7.45	56976.79	21484.16	0.25
Reach-1	227472	Max WS	050yr-CorrectedC	237930.70	90.79	125.164		125.86	0.000444	8.49	96225.02	24386.51	0.27
Reach-1	227472	Max WS	100yr-CorrectedC	283323.30	90.79	126.374		127.06	0.000460	8.87	112200.90	24515.88	0.27
Reach-1	226472	Max WS	010yr-CorrectedC	146318.30	91.17	121.834		122.41	0.000353	6.96	64267.22	20649.90	0.24
Reach-1	226472	Max WS	050yr-CorrectedC	237900.80	91.17	124.793		125.38	0.000398	7.93	106354.30	24783.48	0.26
Reach-1	226472	Max WS	100yr-CorrectedC	283288.50	91.17	125.989		126.58	0.000411	8.27	123509.00	24876.49	0.26
Reach-1	225472	Max WS	010yr-CorrectedC	146292.80	89.79	121.540		122.06	0.000324	6.85	72556.38	23178.75	0.23
Reach-1	225472	Max WS	050yr-CorrectedC	237871.00	89.79	124.433		125.00	0.000388	8.01	114393.10	23483.93	0.26
Reach-1	225472	Max WS	100yr-CorrectedC	283259.30	89.79	125.607		126.19	0.000410	8.45	131598.70	23607.86	0.26
Reach-1	224472	Max WS	010yr-CorrectedC	146269.10	90.65	121.080		121.85	0.000489	7.80	60382.95	24053.47	0.28
Reach-1	224472	Max WS	050yr-CorrectedC	237844.00	90.65	123.943		124.74	0.000553	8.93	108070.90	25289.26	0.30
Reach-1	224472	Max WS	100yr-CorrectedC	283226.70	90.65	125.111		125.90	0.000566	9.29	127691.80	25312.95	0.31
Reach-1	223472	Max WS	010yr-CorrectedC	146241.50	91.51	120.629		121.31	0.000632	7.71	67204.45	21375.91	0.30
Reach-1	223472	Max WS	050yr-CorrectedC	237820.00	91.51	123.525		124.09	0.000582	8.09	118050.40	25708.02	0.30
Reach-1	223472	Max WS	100yr-CorrectedC	283206.00	91.51	124.701		125.23	0.000566	8.25	138759.20	25794.03	0.30
Reach-1	222472	Max WS	010yr-CorrectedC	146226.40	90.62	120.243		120.66	0.000361	5.91	76158.17	21541.10	0.23
Reach-1	222472	Max WS	050yr-CorrectedC	237796.30	90.62	123.098		123.54	0.000396	6.77	127897.70	23333.19	0.25
Reach-1	222472	Max WS	100yr-CorrectedC	283187.70	90.62	124.265		124.72	0.000406	7.09	149088.80	24059.21	0.26
Reach-1	220272	Max WS	010yr-CorrectedC	146209.30	93.07	119.811		120.18	0.000428	5.53	73950.73	25550.86	0.25
Reach-1	220272	Max WS	050yr-CorrectedC	237789.60	93.07	122.715		123.06	0.000417	5.99	129736.50	27277.00	0.24
Reach-1	220272	Max WS	100yr-CorrectedC	283166.40	93.07	123.892		124.23	0.000414	6.18	152394.70	27395.77	0.24

HEC-RAS River: Congaree River Reach: Reach-1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	217472	Max WS	010yr-CorrectedC	146193.00	91.92	118.856		119.15	0.000447	6.10	99399.62	23068.22	0.25
Reach-1	217472	Max WS	050yr-CorrectedC	237774.00	91.92	121.830		122.08	0.000407	6.42	153134.90	25855.44	0.24
Reach-1	217472	Max WS	100yr-CorrectedC	283154.70	91.92	123.014		123.26	0.000405	6.63	174644.70	26117.52	0.24
Reach-1	216472	Max WS	010yr-CorrectedC	146191.90	91.48	118.365	107.27	118.80	0.000400	6.45	86861.05	25810.94	0.25
Reach-1	216472	Max WS	050yr-CorrectedC	237772.00	91.48	121.364	115.99	121.76	0.000400	7.02	145766.00	27383.30	0.25
Reach-1	216472	Max WS	100yr-CorrectedC	283153.30	91.48	122.551	117.03	122.94	0.000400	7.25	169405.90	27458.83	0.25

HEC-RAS River: Congaree River Reach: Reach-1 Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	288770	Max WS	010yr-ProposedD1	147484.60	128.14	144.341		144.98	0.000708	6.41	23054.02	1517.26	0.29
Reach-1	288770	Max WS	050yr-ProposedD1	239229.50	128.14	151.273		152.07	0.000538	7.16	33664.70	1544.29	0.27
Reach-1	288770	Max WS	100yr-ProposedD1	285866.40	128.14	154.412		155.28	0.000495	7.49	38533.95	1734.23	0.26
Reach-1	287472	Max WS	010yr-ProposedD1	147451.70	125.74	143.644		144.08	0.000673	5.30	27838.46	2368.63	0.27
Reach-1	287472	Max WS	050yr-ProposedD1	239226.20	125.74	151.052		151.47	0.000362	5.20	46003.12	2532.22	0.22
Reach-1	287472	Max WS	100yr-ProposedD1	285865.30	125.74	154.318		154.75	0.000302	5.26	54320.93	2879.78	0.20
Reach-1	286338	Max WS	010yr-ProposedD1	147454.30	117.29	143.345	127.02	143.60	0.000174	4.05	38275.05	2034.23	0.15
Reach-1	286338	Max WS	050yr-ProposedD1	239220.00	117.29	150.819	129.76	151.17	0.000170	4.86	52553.97	2184.18	0.16
Reach-1	286338	Max WS	100yr-ProposedD1	285861.50	117.29	154.081	130.99	154.49	0.000169	5.21	59084.10	2415.82	0.16
Reach-1	286221			Bridge									
Reach-1	286106	Max WS	010yr-ProposedD1	147450.10	117.10	143.094		143.33	0.000171	3.90	38158.44	2033.69	0.15
Reach-1	286106	Max WS	050yr-ProposedD1	239225.10	117.10	150.578		150.92	0.000162	4.58	52403.38	2169.18	0.15
Reach-1	286106	Max WS	100yr-ProposedD1	285858.30	117.10	153.846		154.24	0.000160	4.89	58672.67	2389.78	0.15
Reach-1	284778	Max WS	010yr-ProposedD1	147443.00	112.83	142.869	122.38	143.12	0.000133	4.06	36447.06	1384.63	0.14
Reach-1	284778	Max WS	050yr-ProposedD1	239217.90	112.83	150.278	125.29	150.69	0.000157	5.17	46973.34	1474.70	0.16
Reach-1	284778	Max WS	100yr-ProposedD1	285853.50	112.83	153.508	126.60	154.00	0.000166	5.64	51691.20	1499.09	0.16
Reach-1	284668			Bridge									
Reach-1	284565	Max WS	010yr-ProposedD1	147446.10	111.22	141.180		141.44	0.000135	4.07	36338.11	1384.00	0.14
Reach-1	284565	Max WS	050yr-ProposedD1	239216.50	111.22	148.569		148.99	0.000158	5.18	46814.73	1473.96	0.16
Reach-1	284565	Max WS	100yr-ProposedD1	285851.40	111.22	151.759		152.26	0.000168	5.66	51449.25	1498.04	0.16
Reach-1	284431	Max WS	010yr-ProposedD1	147431.60	111.36	141.039		141.42	0.000279	5.00	31336.95	1505.77	0.18
Reach-1	284431	Max WS	050yr-ProposedD1	239209.60	111.36	148.443		148.99	0.000282	5.98	42983.49	1680.60	0.18
Reach-1	284431	Max WS	100yr-ProposedD1	285850.60	111.36	151.653		152.29	0.000278	6.32	48227.57	1706.22	0.19
Reach-1	284408	Max WS	010yr-ProposedD1	147431.80	111.58	140.888		141.41	0.000362	5.80	25489.67	1372.81	0.22
Reach-1	284408	Max WS	050yr-ProposedD1	239202.30	111.58	148.248		148.97	0.000348	6.90	37508.03	1623.81	0.22
Reach-1	284408	Max WS	100yr-ProposedD1	285844.70	111.58	151.423		152.25	0.000347	7.38	42561.29	1686.53	0.23
Reach-1	284395	Max WS	010yr-ProposedD1	147431.70	111.37	140.876		141.41	0.000367	5.85	25272.61	1346.07	0.22
Reach-1	284395	Max WS	050yr-ProposedD1	239201.70	111.37	148.222		148.97	0.000357	7.00	36615.23	1514.50	0.23
Reach-1	284395	Max WS	100yr-ProposedD1	285844.30	111.37	151.393		152.24	0.000357	7.49	41558.41	1675.85	0.23
Reach-1	284372	Max WS	010yr-ProposedD1	147434.90	111.51	140.953		141.40	0.000269	5.38	27461.49	1257.22	0.19
Reach-1	284372	Max WS	050yr-ProposedD1	239205.40	111.51	148.282		148.96	0.000302	6.63	38068.23	1485.31	0.21
Reach-1	284372	Max WS	100yr-ProposedD1	285844.60	111.51	151.449		152.23	0.000315	7.15	42850.68	1543.84	0.21
Reach-1	284267	Max WS	010yr-ProposedD1	147432.10	108.30	140.847		141.37	0.000303	5.81	25682.09	1133.35	0.20
Reach-1	284267	Max WS	050yr-ProposedD1	239203.40	108.30	148.113		148.93	0.000339	7.27	35197.77	1471.40	0.22
Reach-1	284267	Max WS	100yr-ProposedD1	285845.10	108.30	151.251		152.20	0.000353	7.89	39708.36	1511.57	0.23
Reach-1	284060	Max WS	010yr-ProposedD1	147424.30	108.45	140.705		141.31	0.000325	6.23	24112.05	1160.52	0.21
Reach-1	284060	Max WS	050yr-ProposedD1	239196.20	108.45	147.928		148.87	0.000374	7.84	34103.82	1444.32	0.24
Reach-1	284060	Max WS	100yr-ProposedD1	285843.50	108.45	151.048		152.15	0.000393	8.51	38561.97	1469.13	0.25
Reach-1	283820	Max WS	010yr-ProposedD1	147423.50	107.22	140.535		141.21	0.000470	6.60	22434.69	1124.98	0.22
Reach-1	283820	Max WS	050yr-ProposedD1	239196.80	107.22	147.724		148.77	0.000552	8.32	32325.04	1606.76	0.25
Reach-1	283820	Max WS	100yr-ProposedD1	285844.30	107.22	150.850		152.06	0.000575	8.99	37062.04	1664.47	0.26
Reach-1	283636	Max WS	010yr-ProposedD1	147406.60	105.24	140.306		141.12	0.000481	7.26	20415.04	1292.84	0.25
Reach-1	283636	Max WS	050yr-ProposedD1	239189.80	105.24	147.503		148.70	0.000517	8.89	33182.77	1800.18	0.28
Reach-1	283636	Max WS	100yr-ProposedD1	285833.80	105.24	150.641		151.99	0.000524	9.53	38864.38	1863.63	0.28
Reach-1	283611	Max WS	010yr-ProposedD1	147406.60	105.38	140.255		141.12	0.000468	7.45	20228.79	1252.46	0.25
Reach-1	283611	Max WS	050yr-ProposedD1	239188.60	105.38	147.423		148.71	0.000523	9.24	32415.56	1799.75	0.28
Reach-1	283611	Max WS	100yr-ProposedD1	285835.40	105.38	150.546		152.00	0.000537	9.93	38333.07	1863.66	0.29
Reach-1	283601	Max WS	010yr-ProposedD1	147406.40	105.38	140.236		141.11	0.000485	7.52	20006.43	1246.11	0.26
Reach-1	283601	Max WS	050yr-ProposedD1	239188.40	105.38	147.459		148.70	0.000520	9.16	32318.01	1830.97	0.28
Reach-1	283601	Max WS	100yr-ProposedD1	285835.30	105.38	150.618		151.99	0.000521	9.74	38164.18	1867.17	0.28
Reach-1	283574	Max WS	010yr-ProposedD1	147406.00	105.18	140.323		141.10	0.000452	7.08	21088.56	1241.47	0.23
Reach-1	283574	Max WS	050yr-ProposedD1	239190.40	105.18	147.536		148.67	0.000513	8.76	33880.45	1848.42	0.26
Reach-1	283574	Max WS	100yr-ProposedD1	285842.30	105.18	150.696		151.96	0.000523	9.35	39766.20	1875.26	0.26
Reach-1	283490	Max WS	010yr-ProposedD1	147407.60	104.94	140.268		141.05	0.000710	7.11	21416.96	1505.14	0.24
Reach-1	283490	Max WS	050yr-ProposedD1	239188.40	104.94	147.558		148.61	0.000744	8.52	37011.75	1844.76	0.25
Reach-1	283490	Max WS	100yr-ProposedD1	285836.10	104.94	150.711		151.89	0.000758	9.11	42859.30	1864.14	0.26
Reach-1	283342	Max WS	010yr-ProposedD1	147407.80	107.64	140.233		140.96	0.000489	6.84	22101.73	1495.23	0.23
Reach-1	283342	Max WS	050yr-ProposedD1	239187.60	107.64	147.570		148.49	0.000497	8.05	37797.77	1738.80	0.24
Reach-1	283342	Max WS	100yr-ProposedD1	285842.00	107.64	150.727		151.76	0.000508	8.61	43342.07	1770.32	0.24
Reach-1	283203	Max WS	010yr-ProposedD1	147404.10	106.22	140.257		140.94	0.000332	6.66	22703.93	1535.90	0.22
Reach-1	283203	Max WS	050yr-ProposedD1	239187.80	106.22	147.525		148.43	0.000350	7.94	38751.76	1678.91	0.23
Reach-1	283203	Max WS	100yr-ProposedD1	285837.30	106.22	150.668		151.69	0.000363	8.55	44088.63	1731.46	0.24
Reach-1	283179	Max WS	010yr-ProposedD1	147404.00	106.20	140.206		140.89	0.000325	6.64	22874.23	1527.95	0.22
Reach-1	283179	Max WS	050yr-ProposedD1	239188.80	106.20	147.518		148.42	0.000344	7.92	38981.01	1667.22	0.23
Reach-1	283179	Max WS	100yr-ProposedD1	285835.50	106.20	150.658		151.69	0.000358	8.55	44286.83	1711.10	0.24

HEC-RAS River: Congaree River Reach: Reach-1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	283169	Max WS	010yr-ProposedD1	147407.30	106.15	140.211		140.88	0.000323	6.60	22959.34	1533.57	0.22
Reach-1	283169	Max WS	050yr-ProposedD1	239190.90	106.15	147.524		148.41	0.000341	7.88	39065.69	1670.43	0.23
Reach-1	283169	Max WS	100yr-ProposedD1	285837.30	106.15	150.665		151.68	0.000355	8.50	44383.46	1714.61	0.24
Reach-1	283139	Max WS	010yr-ProposedD1	147407.50	104.58	140.204		140.89	0.000328	6.66	22922.75	1544.79	0.22
Reach-1	283139	Max WS	050yr-ProposedD1	239191.20	104.58	147.500		148.41	0.000348	7.96	38816.03	1678.74	0.23
Reach-1	283139	Max WS	100yr-ProposedD1	285837.40	104.58	150.642		151.67	0.000362	8.59	44158.17	1723.14	0.24
Reach-1	283093	Max WS	010yr-ProposedD1	147407.20	104.60	140.206		140.86	0.000432	6.51	23487.11	1609.32	0.21
Reach-1	283093	Max WS	050yr-ProposedD1	239191.40	104.60	147.533		148.37	0.000446	7.71	39572.72	1724.33	0.23
Reach-1	283093	Max WS	100yr-ProposedD1	285837.50	104.60	150.688		151.64	0.000459	8.27	45064.88	1756.15	0.23
Reach-1	283052	Max WS	010yr-ProposedD1	147407.30	105.26	140.257		140.85	0.000291	6.36	28615.12	1643.79	0.21
Reach-1	283052	Max WS	050yr-ProposedD1	239186.40	105.26	147.506		148.37	0.000331	7.84	40905.25	1748.19	0.23
Reach-1	283052	Max WS	100yr-ProposedD1	285836.80	105.26	150.652		151.64	0.000344	8.45	46462.37	1783.10	0.24
Reach-1	283001	Max WS	010yr-ProposedD1	147407.20	105.29	140.320		140.83	0.000315	5.99	31219.39	1658.84	0.19
Reach-1	283001	Max WS	050yr-ProposedD1	239191.50	105.29	147.594		148.33	0.000357	7.37	43774.77	1792.21	0.21
Reach-1	283001	Max WS	100yr-ProposedD1	285836.90	105.29	150.753		151.59	0.000370	7.93	49489.82	1824.05	0.22
Reach-1	282937	Max WS	010yr-ProposedD1	147404.10	107.24	140.110		140.81	0.000360	6.76	22438.40	1615.61	0.22
Reach-1	282937	Max WS	050yr-ProposedD1	239188.00	107.24	147.552		148.31	0.000335	7.57	43194.55	1801.50	0.22
Reach-1	282937	Max WS	100yr-ProposedD1	285835.30	107.24	150.706		151.57	0.000348	8.15	48722.18	1844.88	0.23
Reach-1	282912	Max WS	010yr-ProposedD1	147407.10	108.10	140.209		140.89	0.000327	6.69	23251.98	1628.88	0.22
Reach-1	282912	Max WS	050yr-ProposedD1	239187.10	108.10	147.525		148.31	0.000317	7.64	43436.47	1864.73	0.22
Reach-1	282912	Max WS	100yr-ProposedD1	285835.80	108.10	150.679		151.57	0.000328	8.22	49272.70	1914.44	0.23
Reach-1	282902	Max WS	010yr-ProposedD1	147403.50	108.28	140.194		140.87	0.000328	6.65	23324.50	1628.35	0.22
Reach-1	282902	Max WS	050yr-ProposedD1	239190.20	108.28	147.521		148.31	0.000319	7.62	43264.79	1880.63	0.22
Reach-1	282902	Max WS	100yr-ProposedD1	285838.20	108.28	150.676		151.57	0.000329	8.19	49130.20	1927.46	0.23
Reach-1	282874	Max WS	010yr-ProposedD1	147407.00	108.58	140.157		140.82	0.000369	6.78	25316.47	1625.17	0.22
Reach-1	282874	Max WS	050yr-ProposedD1	239190.10	108.58	147.498		148.32	0.000371	7.93	42667.64	1912.10	0.23
Reach-1	282874	Max WS	100yr-ProposedD1	285837.90	108.58	150.641		151.58	0.000386	8.56	48261.62	1994.34	0.24
Reach-1	282707	Max WS	010yr-ProposedD1	147395.30	108.26	139.929		140.73	0.000446	7.22	21250.83	1618.78	0.24
Reach-1	282707	Max WS	050yr-ProposedD1	239184.30	108.26	147.358		148.26	0.000408	8.11	39795.35	1864.88	0.24
Reach-1	282707	Max WS	100yr-ProposedD1	285836.20	108.26	150.511		151.52	0.000414	8.67	45446.93	2184.92	0.25
Reach-1	282424	Max WS	010yr-ProposedD1	147398.20	108.13	139.966		140.60	0.000386	6.44	23642.37	1488.32	0.21
Reach-1	282424	Max WS	050yr-ProposedD1	239187.70	108.13	147.299		148.12	0.000395	7.59	40152.38	1727.45	0.22
Reach-1	282424	Max WS	100yr-ProposedD1	285836.50	108.13	150.448		151.37	0.000406	8.14	45614.16	1740.70	0.23
Reach-1	282071	Max WS	010yr-ProposedD1	147400.80	111.09	139.950		140.47	0.000353	5.91	28582.36	1563.68	0.20
Reach-1	282071	Max WS	050yr-ProposedD1	239184.70	111.09	147.204		147.96	0.000390	7.25	40286.44	1643.15	0.22
Reach-1	282071	Max WS	100yr-ProposedD1	285833.20	111.09	150.344		151.21	0.000403	7.81	45479.27	1664.80	0.22
Reach-1	281647	Max WS	010yr-ProposedD1	147384.10	105.74	139.888	120.14	140.34	0.000225	5.53	31337.71	1583.23	0.18
Reach-1	281647	Max WS	050yr-ProposedD1	239180.30	105.74	147.087	123.91	147.81	0.000272	7.05	41614.27	1712.98	0.21
Reach-1	281647	Max WS	100yr-ProposedD1	285832.40	105.74	150.199	125.63	151.05	0.000290	7.69	46370.62	1794.68	0.22
Reach-1	281538			Bridge									
Reach-1	281423	Max WS	010yr-ProposedD1	147384.60	105.74	139.748		140.20	0.000220	5.46	31335.79	1498.51	0.18
Reach-1	281423	Max WS	050yr-ProposedD1	239174.00	105.74	146.886		147.61	0.000269	6.99	41296.05	1643.80	0.20
Reach-1	281423	Max WS	100yr-ProposedD1	285831.40	105.74	149.960		150.82	0.000289	7.65	45634.39	1717.47	0.22
Reach-1	279961	Max WS	010yr-ProposedD1	147373.50	101.65	139.302		139.87	0.000255	6.13	28465.23	1340.31	0.19
Reach-1	279961	Max WS	050yr-ProposedD1	239158.40	101.65	146.289		147.22	0.000328	7.95	38346.32	1459.87	0.23
Reach-1	279961	Max WS	100yr-ProposedD1	285820.60	101.65	149.301		150.41	0.000357	8.72	42795.31	1504.64	0.24
Reach-1	279605	Max WS	010yr-ProposedD1	147362.90	101.65	139.215		139.78	0.000253	6.15	29451.02	1429.05	0.19
Reach-1	279605	Max WS	050yr-ProposedD1	239152.10	101.65	146.183		147.11	0.000325	7.96	40006.07	1564.21	0.23
Reach-1	279605	Max WS	100yr-ProposedD1	285820.80	101.65	149.191		150.29	0.000353	8.72	44761.06	1594.05	0.24
Reach-1	278919	Max WS	010yr-ProposedD1	147364.30	101.65	139.088		139.61	0.000239	5.92	31344.63	1594.19	0.19
Reach-1	278919	Max WS	050yr-ProposedD1	239156.40	101.65	146.033		146.88	0.000305	7.65	43202.07	1766.93	0.22
Reach-1	278919	Max WS	100yr-ProposedD1	285823.30	101.65	149.039		150.03	0.000329	8.36	48551.63	1809.62	0.23
Reach-1	277724	Max WS	010yr-ProposedD1	147347.10	100.07	138.800	115.50	139.33	0.000213	5.90	29059.61	1369.78	0.18
Reach-1	277724	Max WS	050yr-ProposedD1	239137.00	100.07	145.606	119.82	146.51	0.000293	7.81	38124.52	1756.21	0.22
Reach-1	277724	Max WS	100yr-ProposedD1	285820.40	100.07	148.547	121.78	149.64	0.000325	8.62	42182.76	1774.79	0.23
Reach-1	277625			Bridge									
Reach-1	277512	Max WS	010yr-ProposedD1	147347.40	100.07	138.620		139.16	0.000218	5.97	28410.94	1319.09	0.18
Reach-1	277512	Max WS	050yr-ProposedD1	239138.50	100.07	145.280		146.23	0.000305	7.97	37004.13	1689.61	0.22
Reach-1	277512	Max WS	100yr-ProposedD1	285811.60	100.07	148.129		149.28	0.000341	8.82	40997.18	1804.24	0.24
Reach-1	277500	Max WS	010yr-ProposedD1	147347.00	101.08	138.560	115.95	139.16	0.000246	6.26	25663.64	1165.42	0.19
Reach-1	277500	Max WS	050yr-ProposedD1	239137.10	101.08	145.180	120.49	146.24	0.000343	8.35	32834.86	1700.17	0.23
Reach-1	277500	Max WS	100yr-ProposedD1	285805.00	101.08	147.998	122.59	149.29	0.000385	9.26	35887.39	1769.42	0.25
Reach-1	277397			Bridge									

HEC-RAS River: Congaree River Reach: Reach-1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	277287	Max WS	010yr-ProposedD1	147322.50	102.92	138.031		138.74	0.000322	6.77	22414.54	903.86	0.22
Reach-1	277287	Max WS	050yr-ProposedD1	239086.00	102.92	144.241		145.50	0.000449	9.05	28701.46	1626.61	0.26
Reach-1	277287	Max WS	100yr-ProposedD1	285750.50	102.92	146.828		148.38	0.000506	10.06	31435.46	1725.74	0.28
Reach-1	276335	Max WS	010yr-ProposedD1	147294.60	101.04	137.508		138.41	0.000384	7.63	19603.96	647.53	0.24
Reach-1	276335	Max WS	050yr-ProposedD1	239039.90	101.04	143.337		145.03	0.000578	10.46	23434.90	666.84	0.30
Reach-1	276335	Max WS	100yr-ProposedD1	285637.80	101.04	145.707		147.84	0.000674	11.75	25023.84	673.87	0.33
Reach-1	276088	Max WS	010yr-ProposedD1	147279.80	101.04	137.260		138.31	0.000432	8.25	18302.92	597.82	0.25
Reach-1	276088	Max WS	050yr-ProposedD1	239003.40	101.04	142.870		144.89	0.000673	11.43	21695.58	611.54	0.32
Reach-1	276088	Max WS	100yr-ProposedD1	285589.50	101.04	145.113		147.68	0.000795	12.90	23073.28	616.90	0.35
Reach-1	275472	Max WS	010yr-ProposedD1	147271.80	101.04	137.067		138.06	0.000421	8.11	21016.67	856.48	0.25
Reach-1	275472	Max WS	050yr-ProposedD1	239004.60	101.04	142.670		144.51	0.000639	11.10	25861.11	872.85	0.31
Reach-1	275472	Max WS	100yr-ProposedD1	285523.80	101.04	144.929		147.24	0.000747	12.46	27840.06	879.45	0.34
Reach-1	274472	Max WS	010yr-ProposedD1	147258.40	101.04	136.884		137.64	0.000357	6.98	22011.79	1010.20	0.23
Reach-1	274472	Max WS	050yr-ProposedD1	239001.90	101.04	142.474		143.84	0.000519	9.44	27645.11	1095.46	0.28
Reach-1	274472	Max WS	100yr-ProposedD1	285519.30	101.04	144.744		146.45	0.000596	10.55	29985.78	1107.77	0.30
Reach-1	273472	Max WS	010yr-ProposedD1	147233.10	99.91	136.557		137.30	0.000328	6.91	21942.79	781.55	0.22
Reach-1	273472	Max WS	050yr-ProposedD1	238966.60	99.91	141.927		143.33	0.000505	9.53	26197.81	802.46	0.28
Reach-1	273472	Max WS	100yr-ProposedD1	285416.00	99.91	144.070		145.85	0.000594	10.74	27926.57	810.34	0.30
Reach-1	272318	Max WS	010yr-ProposedD1	147187.10	99.91	135.785		136.85	0.000464	8.33	18735.01	784.12	0.26
Reach-1	272318	Max WS	050yr-ProposedD1	238866.00	99.91	140.722		142.72	0.000728	11.49	27272.14	3121.76	0.33
Reach-1	272318	Max WS	100yr-ProposedD1	285195.90	99.91	142.748		145.18	0.000838	12.77	31836.61	3193.62	0.36
Reach-1	271472	Max WS	010yr-ProposedD1	147180.10	99.91	135.697		136.51	0.000328	7.22	20706.56	1217.79	0.24
Reach-1	271472	Max WS	050yr-ProposedD1	238860.90	99.91	140.599		142.09	0.000500	9.88	30067.37	4083.93	0.30
Reach-1	271472	Max WS	100yr-ProposedD1	285158.80	99.91	142.597		144.41	0.000572	10.97	35141.74	4211.40	0.32
Reach-1	270472	Max WS	010yr-ProposedD1	147159.80	99.91	135.366		136.18	0.000326	7.26	23098.06	2529.72	0.23
Reach-1	270472	Max WS	050yr-ProposedD1	238832.30	99.91	140.170		141.58	0.000482	9.75	36089.37	3549.20	0.29
Reach-1	270472	Max WS	100yr-ProposedD1	285078.70	99.91	142.118		143.81	0.000549	10.80	41561.01	3830.24	0.31
Reach-1	269529	Max WS	010yr-ProposedD1	147153.80	100.75	135.092		135.87	0.000308	7.12	23902.15	2427.62	0.23
Reach-1	269529	Max WS	050yr-ProposedD1	238809.30	100.75	139.737		141.10	0.000463	9.60	38689.80	4454.92	0.29
Reach-1	269529	Max WS	100yr-ProposedD1	284971.10	100.75	141.634		143.25	0.000526	10.60	45279.05	4786.65	0.31
Reach-1	268320	Max WS	010yr-ProposedD1	147130.90	100.75	134.779		135.50	0.000308	6.94	29501.03	4034.90	0.23
Reach-1	268320	Max WS	050yr-ProposedD1	238774.80	100.75	139.320		140.52	0.000445	9.18	46654.06	5410.89	0.28
Reach-1	268320	Max WS	100yr-ProposedD1	284891.10	100.75	141.182		142.58	0.000497	10.06	54227.17	5525.28	0.30
Reach-1	267678	Max WS	010yr-ProposedD1	147112.20	100.75	134.680		135.29	0.000283	6.50	36886.72	4603.25	0.22
Reach-1	267678	Max WS	050yr-ProposedD1	238773.30	100.75	139.198		140.17	0.000394	8.47	56222.45	5471.77	0.26
Reach-1	267678	Max WS	100yr-ProposedD1	284885.30	100.75	141.053		142.17	0.000435	9.25	64528.61	5478.37	0.28
Reach-1	266472	Max WS	010yr-ProposedD1	147111.30	100.75	134.462		134.88	0.000227	5.73	53612.21	7843.55	0.19
Reach-1	266472	Max WS	050yr-ProposedD1	238747.60	100.75	138.883		139.55	0.000314	7.45	76763.93	9109.70	0.23
Reach-1	266472	Max WS	100yr-ProposedD1	284872.50	100.75	140.709		141.46	0.000344	8.09	86539.19	9221.11	0.25
Reach-1	265472	Max WS	010yr-ProposedD1	147102.20	100.76	134.330		134.65	0.000188	5.22	60975.20	6827.86	0.17
Reach-1	265472	Max WS	050yr-ProposedD1	238734.50	100.76	138.730		139.19	0.000246	6.59	83242.39	7375.45	0.20
Reach-1	265472	Max WS	100yr-ProposedD1	284839.30	100.76	140.545		141.07	0.000268	7.14	92660.09	7511.22	0.22
Reach-1	264426	Max WS	010yr-ProposedD1	147087.70	100.76	134.024		134.50	0.000245	5.98	51096.71	5902.00	0.20
Reach-1	264426	Max WS	050yr-ProposedD1	238713.80	100.76	138.320		139.03	0.000328	7.62	73477.94	6339.98	0.24
Reach-1	264426	Max WS	100yr-ProposedD1	284701.20	100.76	140.090		140.90	0.000363	8.30	82970.76	6428.58	0.25
Reach-1	263569	Max WS	010yr-ProposedD1	147078.90	100.76	133.818		134.28	0.000242	5.75	49273.84	7021.54	0.20
Reach-1	263569	Max WS	050yr-ProposedD1	238702.40	100.76	138.067		138.73	0.000311	7.20	75564.52	7103.31	0.23
Reach-1	263569	Max WS	100yr-ProposedD1	284672.70	100.76	139.819		140.56	0.000339	7.81	86418.59	13542.00	0.24
Reach-1	262577	Max WS	010yr-ProposedD1	147069.60	100.76	133.753		134.02	0.000162	4.61	68471.43	6716.41	0.16
Reach-1	262577	Max WS	050yr-ProposedD1	238697.50	100.76	137.963		138.37	0.000218	5.93	94394.10	8420.51	0.19
Reach-1	262577	Max WS	100yr-ProposedD1	284675.30	100.76	139.700		140.18	0.000241	6.48	105356.40	8792.22	0.20
Reach-1	261551	Max WS	010yr-ProposedD1	147064.20	97.61	133.495		133.87	0.000206	5.22	57392.20	8411.56	0.18
Reach-1	261551	Max WS	050yr-ProposedD1	238683.50	97.61	137.642		138.17	0.000265	6.56	84939.59	9668.16	0.21
Reach-1	261551	Max WS	100yr-ProposedD1	284646.60	97.61	139.352		139.95	0.000289	7.11	96319.00	10643.66	0.22
Reach-1	260635	Max WS	010yr-ProposedD1	147052.50	97.61	133.238		133.71	0.000242	5.97	55668.54	8663.70	0.20
Reach-1	260635	Max WS	050yr-ProposedD1	238668.10	97.61	137.318		137.98	0.000316	7.47	83237.05	10211.08	0.23
Reach-1	260635	Max WS	100yr-ProposedD1	284632.50	97.61	139.002		139.74	0.000346	8.08	94631.17	10651.24	0.24
Reach-1	259263	Max WS	010yr-ProposedD1	147043.60	97.61	132.916	114.28	133.35	0.000242	5.75	50292.25	11611.55	0.20
Reach-1	259263	Max WS	050yr-ProposedD1	238642.90	97.61	136.819	118.94	137.52	0.000347	7.56	67293.16	12250.86	0.24
Reach-1	259263	Max WS	100yr-ProposedD1	284593.70	97.61	138.420	121.11	139.26	0.000394	8.34	74319.13	12366.44	0.26
Reach-1	259032			Bridge									
Reach-1	258805	Max WS	010yr-ProposedD1	147036.20	98.28	132.766		133.18	0.000249	5.71	53363.28	11101.31	0.20
Reach-1	258805	Max WS	050yr-ProposedD1	238639.60	98.28	136.615		137.28	0.000354	7.49	70815.92	11506.80	0.24
Reach-1	258805	Max WS	100yr-ProposedD1	284575.50	98.28	138.198		138.99	0.000400	8.25	78027.05	11659.79	0.26
Reach-1	257368	Max WS	010yr-ProposedD1	147028.70	97.61	132.390		132.46	0.000700	2.85	83743.14	11632.18	0.10

HEC-RAS River: Congaree River Reach: Reach-1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	257368	Max WS	050yr-ProposedD1	238623.40	97.61	136.266		136.35	0.000748	3.21	113507.90	11970.58	0.10
Reach-1	257368	Max WS	100yr-ProposedD1	284554.50	97.61	137.862		137.96	0.000775	3.38	125787.50	16456.71	0.10
Reach-1	254766	Max WS	010yr-ProposedD1	147003.20	99.27	131.486		131.67	0.000148	4.31	93477.11	13304.67	0.15
Reach-1	254766	Max WS	050yr-ProposedD1	238589.40	99.27	135.288		135.52	0.000177	5.20	130374.40	13505.33	0.17
Reach-1	254766	Max WS	100yr-ProposedD1	284484.10	99.27	136.844		137.10	0.000189	5.58	145552.30	13538.36	0.18
Reach-1	250071	Max WS	010yr-ProposedD1	146979.20	84.54	130.192		131.11	0.000583	8.25	45395.07	9221.38	0.30
Reach-1	250071	Max WS	050yr-ProposedD1	238545.70	84.54	133.974		134.96	0.000626	9.44	80188.63	9859.23	0.32
Reach-1	250071	Max WS	100yr-ProposedD1	284418.20	84.54	135.497		136.52	0.000643	9.93	94218.60	10466.64	0.33
Reach-1	248531	Max WS	010yr-ProposedD1	146951.00	84.54	129.238		130.51	0.000580	10.10	47025.89	8104.17	0.32
Reach-1	248531	Max WS	050yr-ProposedD1	238515.70	84.54	132.874		134.37	0.000719	12.09	77893.71	8922.63	0.36
Reach-1	248531	Max WS	100yr-ProposedD1	284333.40	84.54	134.362		135.90	0.000756	12.74	91127.08	9296.53	0.37
Reach-1	246078	Max WS	010yr-ProposedD1	146938.00	98.13	128.829		129.29	0.000322	6.32	47051.42	8654.22	0.23
Reach-1	246078	Max WS	050yr-ProposedD1	238490.20	98.13	132.384		132.91	0.000355	7.26	73213.32	9759.91	0.24
Reach-1	246078	Max WS	100yr-ProposedD1	284292.70	98.13	133.838		134.41	0.000368	7.65	84569.50	10275.57	0.25
Reach-1	244614	Max WS	010yr-ProposedD1	146920.40	98.13	128.191		129.00	0.000449	7.76	45493.01	8811.87	0.27
Reach-1	244614	Max WS	050yr-ProposedD1	238458.10	98.13	131.577		132.69	0.000599	9.73	70960.05	9720.40	0.32
Reach-1	244614	Max WS	100yr-ProposedD1	284215.10	98.13	132.973		134.20	0.000652	10.48	81662.14	9879.45	0.33
Reach-1	242472	Max WS	010yr-ProposedD1	146846.90	94.20	126.808		126.97	0.001465	3.97	49999.21	9572.70	0.14
Reach-1	242472	Max WS	050yr-ProposedD1	238407.90	94.20	130.469		130.64	0.001163	3.86	75533.43	10980.13	0.12
Reach-1	242472	Max WS	100yr-ProposedD1	284089.10	94.20	131.938		132.12	0.001074	3.83	86331.13	11515.22	0.12
Reach-1	241833	Max WS	010yr-ProposedD1	146788.30	93.70	126.015		126.72	0.000407	7.48	52566.25	9546.80	0.26
Reach-1	241833	Max WS	050yr-ProposedD1	238347.90	93.70	129.678		130.59	0.000514	9.17	80769.97	11403.21	0.30
Reach-1	241833	Max WS	100yr-ProposedD1	283977.30	93.70	131.143		132.14	0.000555	9.83	93239.11	11750.53	0.31
Reach-1	240531	Max WS	010yr-ProposedD1	146770.20	93.60	125.797		126.20	0.000269	5.96	76837.30	9951.34	0.21
Reach-1	240531	Max WS	050yr-ProposedD1	238325.60	93.60	129.422		129.92	0.000325	7.15	112790.40	24494.30	0.23
Reach-1	240531	Max WS	100yr-ProposedD1	283928.80	93.60	130.868		131.40	0.000350	7.67	127149.50	24652.89	0.24
Reach-1	235176	Max WS	010yr-ProposedD1	146655.60	92.80	124.905		125.67	0.000405	7.76	56945.58	9949.48	0.26
Reach-1	235176	Max WS	050yr-ProposedD1	238253.80	92.80	128.482		129.38	0.000492	9.25	93623.69	10671.59	0.29
Reach-1	235176	Max WS	100yr-ProposedD1	283770.70	92.80	129.903		130.85	0.000523	9.82	109015.60	23827.55	0.30
Reach-1	232472	Max WS	010yr-ProposedD1	146565.60	91.70	124.206		124.79	0.000309	6.78	63469.26	22623.85	0.23
Reach-1	232472	Max WS	050yr-ProposedD1	238168.00	91.70	127.616		128.35	0.000392	8.25	98795.27	23089.54	0.26
Reach-1	232472	Max WS	100yr-ProposedD1	283659.90	91.70	128.968		129.76	0.000427	8.85	112897.10	23128.65	0.27
Reach-1	231472	Max WS	010yr-ProposedD1	146503.30	91.70	123.683		124.53	0.000516	7.97	48221.88	22378.70	0.29
Reach-1	231472	Max WS	050yr-ProposedD1	238109.30	91.70	126.998		128.02	0.000627	9.57	80727.70	22666.15	0.32
Reach-1	231472	Max WS	100yr-ProposedD1	283568.30	91.70	128.312		129.40	0.000668	10.19	93749.85	22712.27	0.33
Reach-1	230472	Max WS	010yr-ProposedD1	146433.90	91.60	123.115		124.06	0.000540	8.38	45831.73	20661.80	0.29
Reach-1	230472	Max WS	050yr-ProposedD1	238039.80	91.60	126.293		127.47	0.000685	10.20	76995.58	22383.29	0.33
Reach-1	230472	Max WS	100yr-ProposedD1	283467.70	91.60	127.558		128.82	0.000736	10.89	89420.69	22464.31	0.35
Reach-1	229472	Max WS	010yr-ProposedD1	146406.60	89.34	122.810		123.42	0.000349	6.90	51205.07	20783.54	0.23
Reach-1	229472	Max WS	050yr-ProposedD1	237993.60	89.34	125.902		126.61	0.000425	8.19	83647.25	22014.37	0.26
Reach-1	229472	Max WS	100yr-ProposedD1	283401.80	89.34	127.141		127.87	0.000450	8.66	96687.50	22198.49	0.27
Reach-1	228472	Max WS	010yr-ProposedD1	146382.50	90.08	122.560		123.10	0.000304	6.65	59467.36	19532.06	0.22
Reach-1	228472	Max WS	050yr-ProposedD1	237964.30	90.08	125.600		126.21	0.000371	7.86	94975.97	23245.78	0.25
Reach-1	228472	Max WS	100yr-ProposedD1	283383.10	90.08	126.821		127.46	0.000394	8.32	109246.90	23497.86	0.26
Reach-1	227472	Max WS	010yr-ProposedD1	146338.80	90.79	122.155		122.83	0.000390	7.45	56976.79	21484.16	0.25
Reach-1	227472	Max WS	050yr-ProposedD1	237921.20	90.79	125.164		125.86	0.000444	8.49	96225.02	24386.51	0.27
Reach-1	227472	Max WS	100yr-ProposedD1	283324.70	90.79	126.374		127.06	0.000460	8.87	112200.90	24515.88	0.27
Reach-1	226472	Max WS	010yr-ProposedD1	146315.20	91.17	121.834		122.41	0.000353	6.96	64267.22	20649.90	0.24
Reach-1	226472	Max WS	050yr-ProposedD1	237897.40	91.17	124.793		125.38	0.000398	7.93	106354.30	24783.48	0.26
Reach-1	226472	Max WS	100yr-ProposedD1	283281.60	91.17	125.989		126.58	0.000411	8.27	123509.00	24876.49	0.26
Reach-1	225472	Max WS	010yr-ProposedD1	146297.50	89.79	121.540		122.06	0.000324	6.85	72556.38	23178.75	0.23
Reach-1	225472	Max WS	050yr-ProposedD1	237871.00	89.79	124.433		125.00	0.000388	8.01	114393.10	23483.93	0.26
Reach-1	225472	Max WS	100yr-ProposedD1	283265.00	89.79	125.607		126.19	0.000410	8.45	131598.70	23607.86	0.26
Reach-1	224472	Max WS	010yr-ProposedD1	146266.00	90.65	121.080		121.85	0.000489	7.80	60382.95	24053.47	0.28
Reach-1	224472	Max WS	050yr-ProposedD1	237846.40	90.65	123.943		124.74	0.000553	8.93	108070.90	25289.26	0.30
Reach-1	224472	Max WS	100yr-ProposedD1	283231.20	90.65	125.111		125.90	0.000566	9.29	127691.80	25312.95	0.31
Reach-1	223472	Max WS	010yr-ProposedD1	146237.00	91.51	120.629		121.31	0.000632	7.71	67204.45	21375.91	0.30
Reach-1	223472	Max WS	050yr-ProposedD1	237820.10	91.51	123.525		124.09	0.000582	8.09	118050.40	25708.02	0.30
Reach-1	223472	Max WS	100yr-ProposedD1	283201.30	91.51	124.701		125.23	0.000566	8.25	138759.20	25794.03	0.30
Reach-1	222472	Max WS	010yr-ProposedD1	146222.40	90.62	120.243		120.66	0.000361	5.91	76158.17	21541.10	0.23
Reach-1	222472	Max WS	050yr-ProposedD1	237801.00	90.62	123.098		123.54	0.000396	6.77	127897.70	23333.19	0.25
Reach-1	222472	Max WS	100yr-ProposedD1	283185.60	90.62	124.265		124.72	0.000406	7.09	149088.80	24059.21	0.26
Reach-1	220272	Max WS		146206.80	93.07	119.811		120.18	0.000428	5.53	73950.73	25550.86	0.25
Reach-1	220272	Max WS	050yr-ProposedD1	237785.20	93.07	122.715		123.06	0.000417	5.99	129736.50	27277.00	0.24
Reach-1	220272	Max WS	100yr-ProposedD1	283170.50	93.07	123.892		124.23	0.000414	6.18	152394.70	27395.77	0.24

HEC-RAS River: Congaree River Reach: Reach-1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	217472	Max WS	010yr-ProposedD1	146193.30	91.92	118.856		119.15	0.000447	6.10	99399.62	23068.22	0.25
Reach-1	217472	Max WS	050yr-ProposedD1	237772.00	91.92	121.830		122.08	0.000407	6.42	153136.70	25855.44	0.24
Reach-1	217472	Max WS	100yr-ProposedD1	283156.60	91.92	123.014		123.26	0.000405	6.63	174644.70	26117.52	0.25
Reach-1	216472	Max WS	010yr-ProposedD1	146192.00	91.48	118.365	107.27	118.80	0.000400	6.45	86862.89	25811.07	0.25
Reach-1	216472	Max WS	050yr-ProposedD1	237772.20	91.48	121.364	115.98	121.76	0.000400	7.02	145766.00	27383.30	0.25
Reach-1	216472	Max WS	100yr-ProposedD1	283153.70	91.48	122.551	117.03	122.94	0.000400	7.25	169405.90	27458.83	0.25

HEC-RAS River: Congaree River Reach: Reach-1 Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	288770	Max WS	010yr-ProposedD2	147475.10	128.14	144.320		144.96	0.000711	6.42	23023.06	1517.17	0.29
Reach-1	288770	Max WS	050yr-ProposedD2	239238.80	128.14	151.251		152.05	0.000540	7.17	33629.95	1544.20	0.27
Reach-1	288770	Max WS	100yr-ProposedD2	285868.00	128.14	154.389		155.26	0.000496	7.50	38498.34	1733.69	0.26
Reach-1	287472	Max WS	010yr-ProposedD2	147451.00	125.74	143.619		144.06	0.000678	5.31	27777.35	2368.07	0.27
Reach-1	287472	Max WS	050yr-ProposedD2	239227.50	125.74	151.028		151.45	0.000364	5.21	45941.84	2532.05	0.22
Reach-1	287472	Max WS	100yr-ProposedD2	285865.80	125.74	154.294		154.73	0.000303	5.27	54259.29	2877.00	0.20
Reach-1	286338	Max WS	010yr-ProposedD2	147445.60	117.29	143.318	127.02	143.57	0.000175	4.06	38222.70	2033.99	0.15
Reach-1	286338	Max WS	050yr-ProposedD2	239220.50	117.29	150.794	129.77	151.15	0.000170	4.87	52504.49	2183.26	0.16
Reach-1	286338	Max WS	100yr-ProposedD2	285856.40	117.29	154.057	130.99	154.46	0.000170	5.21	59035.05	2415.30	0.16
Reach-1	286221			Bridge									
Reach-1	286106	Max WS	010yr-ProposedD2	147444.20	117.10	143.066		143.31	0.000172	3.91	38105.31	2033.45	0.15
Reach-1	286106	Max WS	050yr-ProposedD2	239224.00	117.10	150.553		150.90	0.000162	4.59	52355.08	2168.70	0.15
Reach-1	286106	Max WS	100yr-ProposedD2	285856.80	117.10	153.821		154.22	0.000161	4.89	58624.95	2388.54	0.15
Reach-1	284778	Max WS	010yr-ProposedD2	147438.80	112.83	142.840	122.38	143.10	0.000134	4.07	36407.20	1384.40	0.14
Reach-1	284778	Max WS	050yr-ProposedD2	239210.80	112.83	150.253	125.28	150.67	0.000157	5.17	46936.05	1474.51	0.16
Reach-1	284778	Max WS	100yr-ProposedD2	285856.20	112.83	153.482	126.61	153.98	0.000166	5.65	51653.88	1498.90	0.16
Reach-1	284668			Bridge									
Reach-1	284565	Max WS	010yr-ProposedD2	147434.10	111.22	141.151		141.41	0.000135	4.08	36298.00	1383.77	0.14
Reach-1	284565	Max WS	050yr-ProposedD2	239206.10	111.22	148.544		148.96	0.000158	5.19	46777.34	1473.76	0.16
Reach-1	284565	Max WS	100yr-ProposedD2	285851.30	111.22	151.733		152.23	0.000168	5.67	51411.97	1497.84	0.16
Reach-1	284431	Max WS	010yr-ProposedD2	147433.70	111.36	141.009		141.39	0.000280	5.01	31292.38	1505.34	0.18
Reach-1	284431	Max WS	050yr-ProposedD2	239211.30	111.36	148.416		148.96	0.000283	5.99	42940.30	1680.24	0.19
Reach-1	284431	Max WS	100yr-ProposedD2	285850.40	111.36	151.627		152.27	0.000279	6.33	48185.13	1706.05	0.19
Reach-1	284408	Max WS	010yr-ProposedD2	147428.80	111.06	140.958		141.38	0.000252	5.21	28363.45	1375.07	0.19
Reach-1	284408	Max WS	050yr-ProposedD2	239206.50	111.06	148.319		148.94	0.000266	6.38	40410.99	1626.41	0.20
Reach-1	284408	Max WS	100yr-ProposedD2	285850.40	111.06	151.496		152.21	0.000272	6.88	45468.00	1687.15	0.21
Reach-1	284395	Max WS	010yr-ProposedD2	147429.20	111.13	140.947		141.38	0.000257	5.26	28097.25	1348.12	0.19
Reach-1	284395	Max WS	050yr-ProposedD2	239209.40	111.13	148.297		148.94	0.000273	6.47	39469.09	1515.46	0.20
Reach-1	284395	Max WS	100yr-ProposedD2	285845.90	111.13	151.470		152.21	0.000280	6.98	44420.91	1676.80	0.21
Reach-1	284372	Max WS	010yr-ProposedD2	147429.30	111.51	140.933		141.37	0.000257	5.33	27726.37	1254.80	0.19
Reach-1	284372	Max WS	050yr-ProposedD2	239206.00	111.51	148.267		148.93	0.000291	6.58	38334.45	1485.18	0.21
Reach-1	284372	Max WS	100yr-ProposedD2	285846.10	111.51	151.436		152.21	0.000304	7.10	43118.21	1543.33	0.21
Reach-1	284267	Max WS	010yr-ProposedD2	147425.40	108.23	140.838		141.34	0.000282	5.71	26135.50	1133.02	0.20
Reach-1	284267	Max WS	050yr-ProposedD2	239206.20	108.23	148.111		148.90	0.000320	7.17	35658.01	1471.37	0.22
Reach-1	284267	Max WS	100yr-ProposedD2	285841.90	108.23	151.252		152.18	0.000334	7.79	40171.30	1511.57	0.23
Reach-1	284060	Max WS	010yr-ProposedD2	147423.90	108.45	140.702		141.28	0.000304	6.12	24507.64	1159.90	0.21
Reach-1	284060	Max WS	050yr-ProposedD2	239196.40	108.45	147.931		148.85	0.000354	7.74	34507.45	1444.35	0.23
Reach-1	284060	Max WS	100yr-ProposedD2	285845.00	108.45	151.053		152.13	0.000372	8.41	38968.07	1469.17	0.24
Reach-1	283820	Max WS	010yr-ProposedD2	147414.90	107.22	140.549		141.20	0.000430	6.46	22932.07	1126.85	0.21
Reach-1	283820	Max WS	050yr-ProposedD2	239196.00	107.22	147.744		148.76	0.000514	8.18	32840.24	1607.18	0.24
Reach-1	283820	Max WS	100yr-ProposedD2	285844.10	107.22	150.870		152.04	0.000538	8.85	37578.12	1664.83	0.25
Reach-1	283636	Max WS	010yr-ProposedD2	147415.70	105.24	140.479		141.13	0.000321	6.46	22928.57	1312.20	0.21
Reach-1	283636	Max WS	050yr-ProposedD2	239192.80	105.24	147.675		148.68	0.000377	8.14	35856.70	1802.58	0.24
Reach-1	283636	Max WS	100yr-ProposedD2	285843.80	105.24	150.800		151.96	0.000394	8.81	41517.27	1865.53	0.25
Reach-1	283611	Max WS	010yr-ProposedD2	147413.70	105.38	140.418		141.12	0.000332	6.74	22356.08	1273.82	0.22
Reach-1	283611	Max WS	050yr-ProposedD2	239188.40	105.38	147.586		148.69	0.000400	8.55	34685.29	1806.89	0.25
Reach-1	283611	Max WS	100yr-ProposedD2	285835.30	105.38	150.702		151.98	0.000421	9.27	40610.30	1865.01	0.26
Reach-1	283601	Max WS	010yr-ProposedD2	147406.10	105.38	140.403		141.12	0.000344	6.79	22118.89	1264.73	0.22
Reach-1	283601	Max WS	050yr-ProposedD2	239188.20	105.38	147.613		148.69	0.000399	8.49	34568.13	1833.38	0.25
Reach-1	283601	Max WS	100yr-ProposedD2	285843.70	105.38	150.758		151.97	0.000412	9.11	40394.24	1868.47	0.26
Reach-1	283574	Max WS	010yr-ProposedD2	147409.20	105.18	140.334		141.11	0.000452	7.08	21097.75	1243.17	0.23
Reach-1	283574	Max WS	050yr-ProposedD2	239187.70	105.18	147.557		148.69	0.000512	8.75	33919.25	1848.62	0.26
Reach-1	283574	Max WS	100yr-ProposedD2	285833.10	105.18	150.716		151.97	0.000522	9.35	39802.77	1875.41	0.26
Reach-1	283490	Max WS	010yr-ProposedD2	147406.30	104.94	140.279		141.06	0.000709	7.10	21427.46	1509.98	0.24
Reach-1	283490	Max WS	050yr-ProposedD2	239187.30	104.94	147.578		148.63	0.000742	8.51	37049.38	1844.90	0.25
Reach-1	283490	Max WS	100yr-ProposedD2	285836.30	104.94	150.730		151.90	0.000757	9.10	42895.28	1864.25	0.26
Reach-1	283342	Max WS	010yr-ProposedD2	147406.70	107.64	140.245		140.97	0.000488	6.84	22113.11	1496.40	0.23
Reach-1	283342	Max WS	050yr-ProposedD2	239187.30	107.64	147.590		148.51	0.000496	8.04	37833.25	1739.05	0.24
Reach-1	283342	Max WS	100yr-ProposedD2	285842.80	107.64	150.747		151.78	0.000507	8.61	43376.24	1770.49	0.24
Reach-1	283203	Max WS	010yr-ProposedD2	147407.70	106.22	140.268		140.95	0.000332	6.66	22714.64	1538.60	0.22
Reach-1	283203	Max WS	050yr-ProposedD2	239187.80	106.22	147.544		148.44	0.000349	7.94	38784.51	1679.13	0.23
Reach-1	283203	Max WS	100yr-ProposedD2	285836.90	106.22	150.686		151.71	0.000362	8.55	44120.68	1732.19	0.24
Reach-1	283179	Max WS	010yr-ProposedD2	147399.30	107.82	140.085		140.91	0.000448	7.29	20856.00	1507.46	0.25
Reach-1	283179	Max WS	050yr-ProposedD2	239189.20	107.82	147.452		148.46	0.000432	8.44	36962.81	1666.24	0.26
Reach-1	283179	Max WS	100yr-ProposedD2	285836.10	107.82	150.594		151.73	0.000441	9.04	42270.18	1710.14	0.26

HEC-RAS River: Congaree River Reach: Reach-1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	283169	Max WS	010yr-ProposedD2	147399.60	107.38	140.081		140.90	0.000454	7.30	20806.22	1527.22	0.25
Reach-1	283169	Max WS	050yr-ProposedD2	239189.00	107.38	147.453		148.46	0.000435	8.42	36912.44	1669.41	0.26
Reach-1	283169	Max WS	100yr-ProposedD2	285836.00	107.38	150.597		151.72	0.000442	9.01	42232.02	1713.82	0.26
Reach-1	283139	Max WS	010yr-ProposedD2	147405.50	104.58	140.182		140.90	0.000362	6.82	22399.93	1543.80	0.23
Reach-1	283139	Max WS	050yr-ProposedD2	239188.50	104.58	147.498		148.43	0.000375	8.09	38308.50	1678.70	0.24
Reach-1	283139	Max WS	100yr-ProposedD2	285835.10	104.58	150.639		151.70	0.000387	8.70	43651.39	1723.10	0.25
Reach-1	283093	Max WS	010yr-ProposedD2	147396.70	104.60	140.183		140.87	0.000476	6.68	22929.51	1608.13	0.22
Reach-1	283093	Max WS	050yr-ProposedD2	239187.60	104.60	147.529		148.40	0.000480	7.83	39029.63	1724.28	0.23
Reach-1	283093	Max WS	100yr-ProposedD2	285836.90	104.60	150.685		151.66	0.000491	8.38	44523.08	1756.13	0.24
Reach-1	283052	Max WS	010yr-ProposedD2	147407.50	105.26	140.242		140.86	0.000319	6.49	28096.19	1643.56	0.21
Reach-1	283052	Max WS	050yr-ProposedD2	239185.90	105.26	147.503		148.39	0.000355	7.95	40406.89	1748.16	0.23
Reach-1	283052	Max WS	100yr-ProposedD2	285835.50	105.26	150.651		151.65	0.000367	8.55	45965.34	1783.08	0.24
Reach-1	283001	Max WS	010yr-ProposedD2	147407.80	105.29	140.312		140.84	0.000337	6.08	30806.07	1658.68	0.20
Reach-1	283001	Max WS	050yr-ProposedD2	239190.60	105.29	147.598		148.34	0.000376	7.44	43381.66	1792.25	0.22
Reach-1	283001	Max WS	100yr-ProposedD2	285835.70	105.29	150.757		151.60	0.000389	8.00	49097.55	1824.09	0.22
Reach-1	282937	Max WS	010yr-ProposedD2	147397.10	107.24	139.906		140.84	0.000608	7.80	19496.13	1600.84	0.27
Reach-1	282937	Max WS	050yr-ProposedD2	239190.00	107.24	147.477		148.35	0.000475	8.19	40287.49	1800.48	0.25
Reach-1	282937	Max WS	100yr-ProposedD2	285836.70	107.24	150.636		151.61	0.000478	8.73	45822.02	1843.95	0.25
Reach-1	282912	Max WS	010yr-ProposedD2	147397.50	108.80	140.046		140.92	0.000502	7.58	20468.07	1617.68	0.26
Reach-1	282912	Max WS	050yr-ProposedD2	239188.50	108.80	147.447		148.35	0.000422	8.23	40643.31	1862.96	0.25
Reach-1	282912	Max WS	100yr-ProposedD2	285835.70	108.80	150.605		151.61	0.000425	8.77	46485.43	1913.50	0.26
Reach-1	282902	Max WS	010yr-ProposedD2	147397.70	108.80	139.945		140.82	0.000508	7.57	20464.64	1612.30	0.26
Reach-1	282902	Max WS	050yr-ProposedD2	239190.90	108.80	147.439		148.34	0.000425	8.23	40466.94	1878.71	0.25
Reach-1	282902	Max WS	100yr-ProposedD2	285837.40	108.80	150.598		151.60	0.000426	8.76	46338.98	1926.71	0.26
Reach-1	282874	Max WS	010yr-ProposedD2	147404.20	108.58	140.157		140.82	0.000369	6.78	25316.38	1625.17	0.22
Reach-1	282874	Max WS	050yr-ProposedD2	239191.00	108.58	147.498		148.32	0.000371	7.93	42667.48	1912.09	0.23
Reach-1	282874	Max WS	100yr-ProposedD2	285837.70	108.58	150.641		151.58	0.000386	8.56	48261.62	1994.34	0.24
Reach-1	282707	Max WS	010yr-ProposedD2	147393.00	108.26	139.929		140.73	0.000446	7.22	21250.75	1618.78	0.24
Reach-1	282707	Max WS	050yr-ProposedD2	239188.40	108.26	147.358		148.26	0.000408	8.11	39795.35	1864.88	0.24
Reach-1	282707	Max WS	100yr-ProposedD2	285837.00	108.26	150.511		151.52	0.000414	8.67	45446.93	2184.92	0.25
Reach-1	282424	Max WS	010yr-ProposedD2	147397.50	108.13	139.966		140.60	0.000386	6.44	23642.37	1488.32	0.21
Reach-1	282424	Max WS	050yr-ProposedD2	239184.40	108.13	147.299		148.12	0.000395	7.59	40152.38	1727.45	0.22
Reach-1	282424	Max WS	100yr-ProposedD2	285837.60	108.13	150.448		151.37	0.000406	8.14	45614.16	1740.70	0.23
Reach-1	282071	Max WS	010yr-ProposedD2	147397.50	111.09	139.950		140.47	0.000353	5.91	28582.36	1563.68	0.20
Reach-1	282071	Max WS	050yr-ProposedD2	239180.00	111.09	147.204		147.96	0.000390	7.25	40286.44	1643.15	0.22
Reach-1	282071	Max WS	100yr-ProposedD2	285837.60	111.09	150.344		151.21	0.000403	7.81	45479.27	1664.80	0.22
Reach-1	281647	Max WS	010yr-ProposedD2	147395.60	105.74	139.888	120.13	140.34	0.000225	5.53	31337.56	1583.23	0.18
Reach-1	281647	Max WS	050yr-ProposedD2	239182.00	105.74	147.087	123.90	147.81	0.000272	7.05	41614.27	1712.98	0.21
Reach-1	281647	Max WS	100yr-ProposedD2	285834.10	105.74	150.199	125.64	151.05	0.000290	7.69	46370.62	1794.68	0.22
Reach-1	281538			Bridge									
Reach-1	281423	Max WS	010yr-ProposedD2	147394.60	105.74	139.748		140.20	0.000220	5.46	31335.64	1498.51	0.18
Reach-1	281423	Max WS	050yr-ProposedD2	239180.10	105.74	146.886		147.61	0.000269	6.99	41296.05	1643.80	0.20
Reach-1	281423	Max WS	100yr-ProposedD2	285832.40	105.74	149.960		150.82	0.000289	7.65	45634.39	1717.47	0.22
Reach-1	279961	Max WS	010yr-ProposedD2	147373.90	101.65	139.302		139.87	0.000255	6.13	28465.23	1340.31	0.19
Reach-1	279961	Max WS	050yr-ProposedD2	239157.80	101.65	146.289		147.22	0.000328	7.95	38346.32	1459.87	0.23
Reach-1	279961	Max WS	100yr-ProposedD2	285824.00	101.65	149.301		150.41	0.000357	8.72	42795.31	1504.64	0.24
Reach-1	279605	Max WS	010yr-ProposedD2	147374.20	101.65	139.214		139.78	0.000253	6.15	29450.89	1429.04	0.19
Reach-1	279605	Max WS	050yr-ProposedD2	239160.30	101.65	146.183		147.11	0.000325	7.96	40006.07	1564.21	0.23
Reach-1	279605	Max WS	100yr-ProposedD2	285824.50	101.65	149.191		150.29	0.000353	8.72	44761.06	1594.05	0.24
Reach-1	278919	Max WS	010yr-ProposedD2	147367.70	101.65	139.088		139.61	0.000239	5.92	31344.63	1594.19	0.19
Reach-1	278919	Max WS	050yr-ProposedD2	239153.30	101.65	146.033		146.88	0.000305	7.65	43202.07	1766.93	0.22
Reach-1	278919	Max WS	100yr-ProposedD2	285823.00	101.65	149.039		150.03	0.000329	8.36	48551.63	1809.62	0.23
Reach-1	277724	Max WS	010yr-ProposedD2	147344.70	100.07	138.800	115.50	139.33	0.000213	5.90	29059.61	1369.78	0.18
Reach-1	277724	Max WS	050yr-ProposedD2	239140.90	100.07	145.606	119.83	146.51	0.000293	7.81	38124.52	1756.21	0.22
Reach-1	277724	Max WS	100yr-ProposedD2	285820.60	100.07	148.547	121.80	149.64	0.000325	8.62	42182.76	1774.79	0.23
Reach-1	277625			Bridge									
Reach-1	277512	Max WS	010yr-ProposedD2	147346.90	100.07	138.620		139.16	0.000218	5.97	28410.82	1319.09	0.18
Reach-1	277512	Max WS	050yr-ProposedD2	239131.90	100.07	145.280		146.23	0.000305	7.97	37004.13	1689.61	0.22
Reach-1	277512	Max WS	100yr-ProposedD2	285808.40	100.07	148.129		149.28	0.000341	8.82	40997.18	1804.24	0.24
Reach-1	277500	Max WS	010yr-ProposedD2	147344.50	101.08	138.560	115.95	139.16	0.000246	6.26	25663.64	1165.42	0.19
Reach-1	277500	Max WS	050yr-ProposedD2	239131.80	101.08	145.180	120.51	146.24	0.000343	8.35	32834.86	1700.17	0.23
Reach-1	277500	Max WS	100yr-ProposedD2	285806.10	101.08	147.998	122.61	149.29	0.000385	9.26	35887.39	1769.42	0.25
Reach-1	277397			Bridge									

HEC-RAS River: Congaree River Reach: Reach-1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	277287	Max WS	010yr-ProposedD2	147319.40	102.92	138.031		138.74	0.000322	6.77	22414.45	903.83	0.22
Reach-1	277287	Max WS	050yr-ProposedD2	239086.40	102.92	144.241		145.50	0.000449	9.05	28701.46	1626.61	0.26
Reach-1	277287	Max WS	100yr-ProposedD2	285750.30	102.92	146.828		148.38	0.000506	10.06	31435.46	1725.74	0.28
Reach-1	276335	Max WS	010yr-ProposedD2	147291.90	101.04	137.508		138.41	0.000384	7.63	19603.96	647.53	0.24
Reach-1	276335	Max WS	050yr-ProposedD2	239038.20	101.04	143.337		145.03	0.000578	10.46	23434.96	666.84	0.30
Reach-1	276335	Max WS	100yr-ProposedD2	285665.70	101.04	145.707		147.84	0.000674	11.76	25023.84	673.87	0.33
Reach-1	276088	Max WS	010yr-ProposedD2	147281.60	101.04	137.260		138.31	0.000432	8.25	18302.92	597.82	0.25
Reach-1	276088	Max WS	050yr-ProposedD2	239002.00	101.04	142.870		144.89	0.000673	11.43	21695.58	611.54	0.32
Reach-1	276088	Max WS	100yr-ProposedD2	285562.60	101.04	145.113		147.68	0.000795	12.90	23073.35	616.90	0.35
Reach-1	275472	Max WS	010yr-ProposedD2	147269.60	101.04	137.067		138.06	0.000420	8.11	21016.67	856.48	0.25
Reach-1	275472	Max WS	050yr-ProposedD2	239003.10	101.04	142.670		144.51	0.000639	11.10	25861.11	872.85	0.31
Reach-1	275472	Max WS	100yr-ProposedD2	285516.10	101.04	144.929		147.24	0.000747	12.46	27840.06	879.45	0.34
Reach-1	274472	Max WS	010yr-ProposedD2	147256.60	101.04	136.884		137.64	0.000357	6.98	22011.79	1010.20	0.23
Reach-1	274472	Max WS	050yr-ProposedD2	238980.60	101.04	142.474		143.84	0.000518	9.44	27645.11	1095.46	0.28
Reach-1	274472	Max WS	100yr-ProposedD2	285531.10	101.04	144.744		146.45	0.000596	10.55	29985.68	1107.77	0.30
Reach-1	273472	Max WS	010yr-ProposedD2	147236.50	99.91	136.557		137.30	0.000328	6.91	21942.79	781.55	0.22
Reach-1	273472	Max WS	050yr-ProposedD2	238944.10	99.91	141.927		143.33	0.000505	9.53	26197.81	802.46	0.28
Reach-1	273472	Max WS	100yr-ProposedD2	285405.60	99.91	144.070		145.85	0.000594	10.74	27926.57	810.34	0.30
Reach-1	272318	Max WS	010yr-ProposedD2	147188.00	99.91	135.785		136.85	0.000464	8.33	18735.01	784.12	0.26
Reach-1	272318	Max WS	050yr-ProposedD2	238876.10	99.91	140.722		142.72	0.000728	11.49	27272.14	3121.76	0.33
Reach-1	272318	Max WS	100yr-ProposedD2	285196.40	99.91	142.748		145.18	0.000838	12.77	31836.61	3193.62	0.36
Reach-1	271472	Max WS	010yr-ProposedD2	147179.00	99.91	135.698		136.51	0.000328	7.22	20706.67	1217.83	0.24
Reach-1	271472	Max WS	050yr-ProposedD2	238859.40	99.91	140.599		142.09	0.000500	9.88	30067.37	4083.93	0.30
Reach-1	271472	Max WS	100yr-ProposedD2	285160.10	99.91	142.597		144.41	0.000572	10.97	35141.74	4211.40	0.32
Reach-1	270472	Max WS	010yr-ProposedD2	147160.10	99.91	135.366		136.18	0.000326	7.26	23098.06	2529.72	0.23
Reach-1	270472	Max WS	050yr-ProposedD2	238836.80	99.91	140.170		141.58	0.000482	9.75	36089.37	3549.20	0.29
Reach-1	270472	Max WS	100yr-ProposedD2	285079.20	99.91	142.118		143.81	0.000549	10.80	41561.01	3830.24	0.31
Reach-1	269529	Max WS	010yr-ProposedD2	147141.90	100.75	135.092		135.87	0.000308	7.12	23902.35	2427.67	0.23
Reach-1	269529	Max WS	050yr-ProposedD2	238810.80	100.75	139.737		141.10	0.000463	9.60	38689.80	4454.92	0.29
Reach-1	269529	Max WS	100yr-ProposedD2	284970.20	100.75	141.634		143.25	0.000526	10.60	45279.05	4786.65	0.31
Reach-1	268320	Max WS	010yr-ProposedD2	147130.20	100.75	134.779		135.50	0.000308	6.94	29501.03	4034.90	0.23
Reach-1	268320	Max WS	050yr-ProposedD2	238772.80	100.75	139.320		140.52	0.000445	9.18	46654.06	5410.89	0.28
Reach-1	268320	Max WS	100yr-ProposedD2	284890.10	100.75	141.182		142.58	0.000497	10.06	54227.17	5525.28	0.30
Reach-1	267678	Max WS	010yr-ProposedD2	147124.10	100.75	134.680		135.29	0.000283	6.50	36886.72	4603.25	0.22
Reach-1	267678	Max WS	050yr-ProposedD2	238766.30	100.75	139.198		140.17	0.000394	8.47	56222.45	5471.77	0.26
Reach-1	267678	Max WS	100yr-ProposedD2	284885.60	100.75	141.053		142.17	0.000435	9.25	64528.61	5478.37	0.28
Reach-1	266472	Max WS	010yr-ProposedD2	147110.50	100.75	134.462		134.88	0.000227	5.73	53612.21	7843.55	0.19
Reach-1	266472	Max WS	050yr-ProposedD2	238751.10	100.75	138.883		139.55	0.000314	7.45	76763.93	9109.70	0.23
Reach-1	266472	Max WS	100yr-ProposedD2	284869.40	100.75	140.709		141.46	0.000344	8.09	86539.19	9221.11	0.25
Reach-1	265472	Max WS	010yr-ProposedD2	147102.80	100.76	134.330		134.65	0.000188	5.22	60975.20	6827.86	0.17
Reach-1	265472	Max WS	050yr-ProposedD2	238731.70	100.76	138.730		139.19	0.000246	6.59	83242.39	7375.45	0.20
Reach-1	265472	Max WS	100yr-ProposedD2	284848.50	100.76	140.545		141.07	0.000268	7.14	92660.09	7511.22	0.22
Reach-1	264426	Max WS	010yr-ProposedD2	147082.50	100.76	134.024		134.50	0.000245	5.98	51096.71	5902.00	0.20
Reach-1	264426	Max WS	050yr-ProposedD2	238721.30	100.76	138.320		139.03	0.000328	7.62	73477.94	6339.98	0.24
Reach-1	264426	Max WS	100yr-ProposedD2	284700.70	100.76	140.090		140.90	0.000363	8.30	82970.76	6428.58	0.25
Reach-1	263569	Max WS	010yr-ProposedD2	147079.80	100.76	133.818		134.28	0.000242	5.75	49273.84	7021.54	0.20
Reach-1	263569	Max WS	050yr-ProposedD2	238695.40	100.76	138.067		138.73	0.000311	7.20	75564.52	7103.31	0.23
Reach-1	263569	Max WS	100yr-ProposedD2	284672.90	100.76	139.819		140.56	0.000339	7.81	86418.59	13542.00	0.24
Reach-1	262577	Max WS	010yr-ProposedD2	147071.20	100.76	133.753		134.02	0.000162	4.61	68471.43	6716.41	0.16
Reach-1	262577	Max WS	050yr-ProposedD2	238696.90	100.76	137.963		138.37	0.000218	5.93	94394.10	8420.51	0.19
Reach-1	262577	Max WS	100yr-ProposedD2	284661.70	100.76	139.700		140.18	0.000241	6.48	105356.40	8792.22	0.20
Reach-1	261551	Max WS	010yr-ProposedD2	147064.60	97.61	133.495		133.87	0.000206	5.22	57392.20	8411.56	0.18
Reach-1	261551	Max WS	050yr-ProposedD2	238677.70	97.61	137.642		138.17	0.000265	6.56	84939.59	9668.16	0.21
Reach-1	261551	Max WS	100yr-ProposedD2	284646.20	97.61	139.352		139.95	0.000289	7.11	96319.00	10643.66	0.22
Reach-1	260635	Max WS	010yr-ProposedD2	147043.60	97.61	133.238		133.71	0.000242	5.97	55668.54	8663.70	0.20
Reach-1	260635	Max WS	050yr-ProposedD2	238667.40	97.61	137.318		137.98	0.000316	7.47	83237.05	10211.08	0.23
Reach-1	260635	Max WS	100yr-ProposedD2	284632.30	97.61	139.002		139.74	0.000346	8.08	94631.17	10651.24	0.24
Reach-1	259263	Max WS	010yr-ProposedD2	147035.70	97.61	132.916	114.27	133.35	0.000242	5.75	50292.65	11611.58	0.20
Reach-1	259263	Max WS	050yr-ProposedD2	238643.00	97.61	136.819	118.95	137.52	0.000347	7.56	67293.16	12250.86	0.24
Reach-1	259263	Max WS	100yr-ProposedD2	284592.00	97.61	138.420	121.10	139.26	0.000394	8.34	74319.13	12366.44	0.26
Reach-1	259032			Bridge									
Reach-1	258805	Max WS	010yr-ProposedD2	147036.90	98.28	132.766		133.18	0.000249	5.71	53363.28	11101.31	0.20
Reach-1	258805	Max WS	050yr-ProposedD2	238636.50	98.28	136.615		137.28	0.000354	7.48	70815.92	11506.80	0.24
Reach-1	258805	Max WS	100yr-ProposedD2	284572.70	98.28	138.198		138.99	0.000400	8.25	78027.05	11659.79	0.26
Reach-1	257368	Max WS	010yr-ProposedD2	147032.70	97.61	132.390		132.46	0.000700	2.85	83743.14	11632.18	0.10

HEC-RAS River: Congaree River Reach: Reach-1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	257368	Max WS	050yr-ProposedD2	238622.00	97.61	136.266		136.35	0.000748	3.21	113507.90	11970.58	0.10
Reach-1	257368	Max WS	100yr-ProposedD2	284554.20	97.61	137.862		137.96	0.000775	3.38	125787.50	16456.71	0.10
Reach-1	254766	Max WS	010yr-ProposedD2	147008.80	99.27	131.486		131.67	0.000148	4.31	93477.11	13304.67	0.15
Reach-1	254766	Max WS	050yr-ProposedD2	238589.10	99.27	135.288		135.52	0.000177	5.20	130374.40	13505.33	0.17
Reach-1	254766	Max WS	100yr-ProposedD2	284480.80	99.27	136.844		137.10	0.000189	5.57	145552.30	13538.36	0.18
Reach-1	250071	Max WS	010yr-ProposedD2	146976.10	84.54	130.192		131.11	0.000583	8.25	45395.07	9221.38	0.30
Reach-1	250071	Max WS	050yr-ProposedD2	238545.80	84.54	133.974		134.96	0.000626	9.44	80188.63	9859.23	0.32
Reach-1	250071	Max WS	100yr-ProposedD2	284416.10	84.54	135.497		136.52	0.000643	9.93	94218.60	10466.64	0.33
Reach-1	248531	Max WS	010yr-ProposedD2	146950.80	84.54	129.238		130.51	0.000580	10.10	47025.89	8104.17	0.32
Reach-1	248531	Max WS	050yr-ProposedD2	238515.40	84.54	132.874		134.37	0.000719	12.09	77893.71	8922.63	0.36
Reach-1	248531	Max WS	100yr-ProposedD2	284334.60	84.54	134.362		135.90	0.000756	12.74	91127.08	9296.53	0.37
Reach-1	246078	Max WS	010yr-ProposedD2	146943.00	98.13	128.829		129.29	0.000322	6.32	47051.42	8654.22	0.23
Reach-1	246078	Max WS	050yr-ProposedD2	238495.50	98.13	132.384		132.91	0.000355	7.26	73213.32	9759.91	0.24
Reach-1	246078	Max WS	100yr-ProposedD2	284286.10	98.13	133.838		134.41	0.000368	7.65	84569.50	10275.57	0.25
Reach-1	244614	Max WS	010yr-ProposedD2	146925.20	98.13	128.191		129.00	0.000449	7.76	45493.01	8811.87	0.27
Reach-1	244614	Max WS	050yr-ProposedD2	238458.00	98.13	131.577		132.69	0.000599	9.73	70960.05	9720.40	0.32
Reach-1	244614	Max WS	100yr-ProposedD2	284215.40	98.13	132.973		134.20	0.000652	10.48	81662.14	9879.45	0.33
Reach-1	242472	Max WS	010yr-ProposedD2	146847.30	94.20	126.808		126.97	0.001465	3.97	49999.21	9572.70	0.14
Reach-1	242472	Max WS	050yr-ProposedD2	238407.00	94.20	130.469		130.64	0.001163	3.86	75533.43	10980.13	0.12
Reach-1	242472	Max WS	100yr-ProposedD2	284089.80	94.20	131.938		132.12	0.001074	3.83	86331.13	11515.22	0.12
Reach-1	241833	Max WS	010yr-ProposedD2	146790.50	93.70	126.015		126.72	0.000407	7.48	52566.25	9546.80	0.26
Reach-1	241833	Max WS	050yr-ProposedD2	238347.10	93.70	129.678		130.59	0.000514	9.17	80769.97	11403.21	0.30
Reach-1	241833	Max WS	100yr-ProposedD2	283973.60	93.70	131.143		132.14	0.000555	9.83	93239.11	11750.53	0.31
Reach-1	240531	Max WS	010yr-ProposedD2	146760.90	93.60	125.797		126.20	0.000268	5.96	76838.35	9951.36	0.21
Reach-1	240531	Max WS	050yr-ProposedD2	238323.20	93.60	129.422		129.92	0.000325	7.15	112790.40	24494.30	0.23
Reach-1	240531	Max WS	100yr-ProposedD2	283922.70	93.60	130.868		131.40	0.000350	7.67	127149.50	24652.89	0.24
Reach-1	235176	Max WS	010yr-ProposedD2	146666.20	92.80	124.905		125.67	0.000405	7.76	56945.58	9949.48	0.26
Reach-1	235176	Max WS	050yr-ProposedD2	238255.90	92.80	128.482		129.38	0.000492	9.25	93623.69	10671.59	0.29
Reach-1	235176	Max WS	100yr-ProposedD2	283767.60	92.80	129.903		130.85	0.000523	9.82	109015.60	23827.55	0.30
Reach-1	232472	Max WS	010yr-ProposedD2	146572.00	91.70	124.206		124.79	0.000309	6.78	63469.26	22623.85	0.23
Reach-1	232472	Max WS	050yr-ProposedD2	238165.10	91.70	127.616		128.35	0.000392	8.25	98795.27	23089.54	0.26
Reach-1	232472	Max WS	100yr-ProposedD2	283653.60	91.70	128.968		129.76	0.000427	8.85	112897.10	23128.65	0.27
Reach-1	231472	Max WS	010yr-ProposedD2	146512.50	91.70	123.683		124.53	0.000516	7.97	48221.88	22378.70	0.29
Reach-1	231472	Max WS	050yr-ProposedD2	238106.40	91.70	126.998		128.02	0.000627	9.57	80727.70	22666.15	0.32
Reach-1	231472	Max WS	100yr-ProposedD2	283564.80	91.70	128.312		129.40	0.000668	10.19	93749.85	22712.27	0.33
Reach-1	230472	Max WS	010yr-ProposedD2	146434.80	91.60	123.115		124.06	0.000540	8.38	45832.69	20661.90	0.29
Reach-1	230472	Max WS	050yr-ProposedD2	238037.30	91.60	126.293		127.47	0.000684	10.20	76995.58	22383.29	0.33
Reach-1	230472	Max WS	100yr-ProposedD2	283463.30	91.60	127.558		128.82	0.000736	10.89	89420.69	22464.31	0.35
Reach-1	229472	Max WS	010yr-ProposedD2	146404.80	89.34	122.810		123.42	0.000349	6.90	51205.07	20783.54	0.23
Reach-1	229472	Max WS	050yr-ProposedD2	237992.60	89.34	125.902		126.61	0.000425	8.19	83647.25	22014.37	0.26
Reach-1	229472	Max WS	100yr-ProposedD2	283416.00	89.34	127.141		127.87	0.000450	8.66	96687.50	22198.49	0.27
Reach-1	228472	Max WS	010yr-ProposedD2	146377.90	90.08	122.560		123.10	0.000303	6.64	59467.36	19532.06	0.22
Reach-1	228472	Max WS	050yr-ProposedD2	237963.80	90.08	125.600		126.21	0.000371	7.86	94975.97	23245.78	0.25
Reach-1	228472	Max WS	100yr-ProposedD2	283381.10	90.08	126.821		127.46	0.000394	8.32	109246.90	23497.86	0.26
Reach-1	227472	Max WS	010yr-ProposedD2	146343.30	90.79	122.155		122.83	0.000390	7.45	56976.79	21484.16	0.25
Reach-1	227472	Max WS	050yr-ProposedD2	237931.20	90.79	125.164		125.86	0.000444	8.49	96225.02	24386.51	0.27
Reach-1	227472	Max WS	100yr-ProposedD2	283325.60	90.79	126.374		127.06	0.000460	8.87	112200.90	24515.88	0.27
Reach-1	226472	Max WS	010yr-ProposedD2	146315.90	91.17	121.834		122.41	0.000353	6.96	64267.22	20649.90	0.24
Reach-1	226472	Max WS	050yr-ProposedD2	237895.50	91.17	124.793		125.38	0.000398	7.93	106354.30	24783.48	0.26
Reach-1	226472	Max WS	100yr-ProposedD2	283290.70	91.17	125.989		126.58	0.000411	8.27	123509.00	24876.49	0.26
Reach-1	225472	Max WS	010yr-ProposedD2	146299.10	89.79	121.540		122.06	0.000324	6.85	72556.38	23178.75	0.23
Reach-1	225472	Max WS	050yr-ProposedD2	237872.80	89.79	124.433		125.00	0.000388	8.01	114393.10	23483.93	0.26
Reach-1	225472	Max WS	100yr-ProposedD2	283260.40	89.79	125.607		126.19	0.000410	8.45	131598.70	23607.86	0.26
Reach-1	224472	Max WS	010yr-ProposedD2	146266.20	90.65	121.080		121.85	0.000489	7.80	60382.95	24053.47	0.28
Reach-1	224472	Max WS	050yr-ProposedD2	237844.80	90.65	123.943		124.74	0.000553	8.93	108070.90	25289.26	0.30
Reach-1	224472	Max WS	100yr-ProposedD2	283229.80	90.65	125.111		125.90	0.000566	9.29	127691.80	25312.95	0.31
Reach-1	223472	Max WS	010yr-ProposedD2	146238.70	91.51	120.629		121.31	0.000632	7.71	67204.45	21375.91	0.30
Reach-1	223472	Max WS	050yr-ProposedD2	237820.10	91.51	123.525		124.09	0.000582	8.09	118050.40	25708.02	0.30
Reach-1	223472	Max WS	100yr-ProposedD2	283206.70	91.51	124.701		125.23	0.000566	8.25	138759.20	25794.03	0.30
Reach-1	222472	Max WS	010yr-ProposedD2	146227.20	90.62	120.243		120.66	0.000361	5.91	76158.17	21541.10	0.23
Reach-1	222472	Max WS	050yr-ProposedD2	237800.40	90.62	123.098		123.54	0.000396	6.77	127897.70	23333.19	0.25
Reach-1	222472	Max WS	100yr-ProposedD2	283183.40	90.62	124.265		124.72	0.000406	7.09	149088.80	24059.21	0.26
Reach-1	220272	Max WS	010yr-ProposedD2	146205.80	93.07	119.811		120.18	0.000428	5.53	73950.73	25550.86	0.25
Reach-1	220272	Max WS	050yr-ProposedD2	237783.30	93.07	122.715		123.06	0.000417	5.99	129736.50	27277.00	0.24
Reach-1	220272	Max WS	100yr-ProposedD2	283172.90	93.07	123.892		124.23	0.000414	6.18	152394.70	27395.77	0.24

HEC-RAS River: Congaree River Reach: Reach-1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	217472	Max WS	010yr-ProposedD2	146193.80	91.92	118.856		119.15	0.000447	6.10	99399.62	23068.22	0.25
Reach-1	217472	Max WS	050yr-ProposedD2	237774.50	91.92	121.830		122.08	0.000407	6.42	153134.90	25855.44	0.24
Reach-1	217472	Max WS	100yr-ProposedD2	283156.70	91.92	123.014		123.26	0.000405	6.63	174644.70	26117.52	0.25
Reach-1	216472	Max WS	010yr-ProposedD2	146192.40	91.48	118.365	107.27	118.80	0.000400	6.45	86862.89	25811.07	0.25
Reach-1	216472	Max WS	050yr-ProposedD2	237772.20	91.48	121.364	115.98	121.76	0.000400	7.02	145766.00	27383.30	0.25
Reach-1	216472	Max WS	100yr-ProposedD2	283153.70	91.48	122.551	117.03	122.94	0.000400	7.25	169405.90	27458.83	0.25

Appendix F: HEC-RAS Results Tables

Table F-1: Comparison of Corrected Effective and Proposed Area-1 Model Water Surface Elevations; 100-year, 50-year, and 10-year Flood Events

Cross Section/ River Station	100-year Event			50-year Event			10-year Event		
	W.S. Elev (ft NAVD88)			W.S. Elev (ft NAVD88)			W.S. Elev (ft NAVD88)		
	Corrected	Proposed	*Change*[a]	Corrected	Proposed	*Change*[a]	Corrected	Proposed	*Change*[a]
288770	154.374	154.412	***0.0***	151.235	151.273	***0.0***	144.313	144.341	***0.0***
287472	154.278	154.318	***0.0***	151.011	151.052	***0.0***	143.609	143.644	***0.0***
286338	154.040	154.081	***0.0***	150.776	150.819	***0.0***	143.308	143.345	***0.0***
286106	153.804	153.846	***0.0***	150.535	150.578	***0.0***	143.055	143.094	***0.0***
284778	153.465	153.508	***0.0***	150.234	150.278	***0.0***	142.829	142.869	***0.0***
284565[b]	151.716	151.759	***0.0***	148.525	148.569	***0.0***	141.140	141.180	***0.0***
284431	151.610	151.653	***0.0***	148.398	148.443	***0.0***	140.999	141.039	***0.0***
284408[c]	151.479	151.423	***-0.1***	148.301	148.248	***-0.1***	140.947	140.888	***-0.1***
284395[c]	151.453	151.393	***-0.1***	148.279	148.222	***-0.1***	140.937	140.876	***-0.1***
284372[c]	151.418	151.449	***0.0***	148.248	148.282	***0.0***	140.922	140.953	***0.0***
284267[c]	151.234	151.251	***0.0***	148.092	148.113	***0.0***	140.827	140.847	***0.0***
284060[c]	151.035	151.048	***0.0***	147.912	147.928	***0.0***	140.691	140.705	***0.0***
283820[c]	150.852	150.850	***0.0***	147.724	147.724	***0.0***	140.537	140.535	***0.0***
283636[c]	150.781	150.641	***-0.1***	147.654	147.503	***-0.2***	140.467	140.306	***-0.2***
283611[c]	150.683	150.546	***-0.1***	147.566	147.423	***-0.1***	140.406	140.255	***-0.2***
283601[c]	150.739	150.618	***-0.1***	147.593	147.459	***-0.1***	140.392	140.236	***-0.2***
283574	150.696	150.696	***0.0***	147.536	147.536	***0.0***	140.323	140.323	***0.0***
283490	150.711	150.711	***0.0***	147.558	147.558	***0.0***	140.268	140.268	***0.0***
283342	150.727	150.727	***0.0***	147.570	147.570	***0.0***	140.233	140.233	***0.0***
283203	150.668	150.668	***0.0***	147.525	147.525	***0.0***	140.257	140.257	***0.0***
283179	150.658	150.658	***0.0***	147.518	147.518	***0.0***	140.206	140.206	***0.0***
283169	150.665	150.665	***0.0***	147.524	147.524	***0.0***	140.211	140.211	***0.0***
283139	150.642	150.642	***0.0***	147.500	147.500	***0.0***	140.204	140.204	***0.0***
283093	150.688	150.688	***0.0***	147.533	147.533	***0.0***	140.206	140.206	***0.0***
283052[d]	150.652	150.652	***0.0***	147.506	147.506	***0.0***	140.257	140.257	***0.0***
283001	150.753	150.753	***0.0***	147.594	147.594	***0.0***	140.320	140.320	***0.0***
282937	150.706	150.706	***0.0***	147.552	147.552	***0.0***	140.110	140.110	***0.0***
282912	150.679	150.679	***0.0***	147.525	147.525	***0.0***	140.209	140.209	***0.0***
282902	150.676	150.676	***0.0***	147.521	147.521	***0.0***	140.194	140.194	***0.0***
282874	150.641	150.641	***0.0***	147.498	147.498	***0.0***	140.157	140.157	***0.0***
282707	150.511	150.511	***0.0***	147.358	147.358	***0.0***	139.929	139.929	***0.0***
282424	150.448	150.448	***0.0***	147.299	147.299	***0.0***	139.966	139.966	***0.0***
282071	150.344	150.344	***0.0***	147.204	147.204	***0.0***	139.950	139.950	***0.0***
281647[e]	150.199	150.199	***0.0***	147.087	147.087	***0.0***	139.888	139.888	***0.0***
281423	149.960	149.960	***0.0***	146.886	146.886	***0.0***	139.748	139.748	***0.0***
279961	149.301	149.301	***0.0***	146.289	146.289	***0.0***	139.302	139.302	***0.0***
279605	149.191	149.191	***0.0***	146.183	146.183	***0.0***	139.215	139.215	***0.0***
278919	149.039	149.039	***0.0***	146.033	146.033	***0.0***	139.088	139.088	***0.0***

Notes:

a. 'Change' is calculated by subtracting 'Proposed' from 'Corrected' and rounding to one decimal place
b. Located downstream of Gervais Street bridge
c. Area-1 cofferdam
d. Cross section 'P' on Richland County FIRM ***(FEMA, 2017)*** and cross section 'M' on Lexington County FIRM ***(FEMA, 2018)***
e. Located upstream of Blossom Street bridge

Table F-2: Comparison of Corrected Effective and Proposed Area-2 Model Water Surface Elevations; 100-year, 50-year, and 10-year Flood Events

Cross Section/ River Station	100-year Event			50-year Event			10-year Event		
	W.S. Elev (ft NAVD88)			W.S. Elev (ft NAVD88)			W.S. Elev (ft NAVD88)		
	Corrected	Proposed	*Change*[a]	Corrected	Proposed	*Change*[a]	Corrected	Proposed	*Change*[a]
288770	154.374	154.389	***0.0***	151.235	151.251	***0.0***	144.313	144.320	***0.0***
287472	154.278	154.294	***0.0***	151.011	151.028	***0.0***	143.609	143.619	***0.0***
286338	154.040	154.057	***0.0***	150.776	150.794	***0.0***	143.308	143.318	***0.0***
286106	153.804	153.821	***0.0***	150.535	150.553	***0.0***	143.055	143.066	***0.0***
284778	153.465	153.482	***0.0***	150.234	150.253	***0.0***	142.829	142.840	***0.0***
284565[b]	151.716	151.733	***0.0***	148.525	148.544	***0.0***	141.140	141.151	***0.0***
284431	151.610	151.627	***0.0***	148.398	148.416	***0.0***	140.999	141.009	***0.0***
284408	151.479	151.496	***0.0***	148.301	148.319	***0.0***	140.947	140.958	***0.0***
284395	151.453	151.470	***0.0***	148.279	148.297	***0.0***	140.937	140.947	***0.0***
284372	151.418	151.436	***0.0***	148.248	148.267	***0.0***	140.922	140.933	***0.0***
284267	151.234	151.252	***0.0***	148.092	148.111	***0.0***	140.827	140.838	***0.0***
284060	151.035	151.053	***0.0***	147.912	147.931	***0.0***	140.691	140.702	***0.0***
283820	150.852	150.870	***0.0***	147.724	147.744	***0.0***	140.537	140.549	***0.0***
283636	150.781	150.800	***0.0***	147.654	147.675	***0.0***	140.467	140.479	***0.0***
283611	150.683	150.702	***0.0***	147.566	147.586	***0.0***	140.406	140.418	***0.0***
283601	150.739	150.758	***0.0***	147.593	147.613	***0.0***	140.392	140.403	***0.0***
283574	150.696	150.716	***0.0***	147.536	147.557	***0.0***	140.323	140.334	***0.0***
283490	150.711	150.730	***0.0***	147.558	147.578	***0.0***	140.268	140.279	***0.0***
283342	150.727	150.747	***0.0***	147.570	147.590	***0.0***	140.233	140.245	***0.0***
283203	150.668	150.686	***0.0***	147.525	147.544	***0.0***	140.257	140.268	***0.0***
283179[c]	150.658	150.594	***-0.1***	147.518	147.452	***-0.1***	140.206	140.085	***-0.1***
283169[c]	150.665	150.597	***-0.1***	147.524	147.453	***-0.1***	140.211	140.081	***-0.1***
283139[c]	150.642	150.639	***0.0***	147.500	147.498	***0.0***	140.204	140.182	***0.0***
283093[c]	150.688	150.685	***0.0***	147.533	147.529	***0.0***	140.206	140.183	***0.0***
283052[c+d]	150.652	150.651	***0.0***	147.506	147.503	***0.0***	140.257	140.242	***0.0***
283001[c]	150.753	150.757	***0.0***	147.594	147.598	***0.0***	140.320	140.312	***0.0***
282937[c]	150.706	150.636	***-0.1***	147.552	147.477	***-0.1***	140.110	139.906	***-0.2***
282912[c]	150.679	150.605	***-0.1***	147.525	147.447	***-0.1***	140.209	140.046	***-0.2***
282902[c]	150.676	150.598	***-0.1***	147.521	147.439	***-0.1***	140.194	139.945	***-0.2***
282874	150.641	150.641	***0.0***	147.498	147.498	***0.0***	140.157	140.157	***0.0***
282707	150.511	150.511	***0.0***	147.358	147.358	***0.0***	139.929	139.929	***0.0***
282424	150.448	150.448	***0.0***	147.299	147.299	***0.0***	139.966	139.966	***0.0***
282071	150.344	150.344	***0.0***	147.204	147.204	***0.0***	139.950	139.950	***0.0***
281647[e]	150.199	150.199	***0.0***	147.087	147.087	***0.0***	139.888	139.888	***0.0***
281423	149.960	149.960	***0.0***	146.886	146.886	***0.0***	139.748	139.748	***0.0***
279961	149.301	149.301	***0.0***	146.289	146.289	***0.0***	139.302	139.302	***0.0***
279605	149.191	149.191	***0.0***	146.183	146.183	***0.0***	139.215	139.214	***0.0***
278919	149.039	149.039	***0.0***	146.033	146.033	***0.0***	139.088	139.088	***0.0***

Notes:

a. 'Change' is calculated by subtracting 'Proposed' from 'Corrected' and rounding to one decimal place
b. Located downstream of Gervais Street bridge
c. Area-2 cofferdam
d. Cross section 'P' on Richland County FIRM ***(FEMA, 2017)*** and cross section 'M' on Lexington County FIRM ***(FEMA, 2018)***
e. Located upstream of Blossom Street bridge

ATTACHMENT J

LOWER FLOW SENSITIVITY STUDY

VIA ELECTRONIC MAIL

July 30, 2019

William Zeli, P.E., Environment Program Manager
Apex Companies, LLC
1600 Commerce Circle
Trafford, PA 15085

Subject: **Low Flow Sensitivity Analysis**
Congaree River Remediation Project
Columbia, South Carolina

Dear Mr. Zeli:

This letter presents a summary of the results of WSP USA's (WSP) Low Flow Sensitivity Analysis Memo; dated July 26, 2019.

The analysis was completed to determine changes in water surface elevation and floodplain widths in the Congaree River due to construction of the proposed Area-1 and Area-2 cofferdam structures, during low flow conditions. The following three flow rates were considered in the analysis:

- Approximate normal flow rate = 8,564 cfs (average based on USGS data analysis)
- Flow rate that results in water just below the cofferdam crest elevation = 26,000 cfs
- Flow rate that results in water level midway between normal flow level and cofferdam crest = 17,000 cfs

The HEC-RAS model results summarized in Table 1 show the addition of the proposed Area-1 cofferdam structure results in maximum increases in water surface elevation of 0.5 ft, 0.4 ft, and 0.3 ft for the normal, mid-point, and cofferdam crest flows, respectively. The maximum increase in floodplain width of 8.1 ft is experienced on the right (west) bank, 100 ft downstream of Gervais Street bridge for mid-point conditions. The maximum increases in floodplain width for the normal and crest flows are 3.6 ft and 1.4 ft, respectively. However, the typical increase in floodplain width upstream of the Area-1 structure is less than 1.5 ft for the three low flow conditions considered.

The HEC-RAS model results show the addition of the proposed Area-2 cofferdam structure results in maximum increases in water surface elevation of 0.1 ft for the three low flow conditions considered. The maximum increase in floodplain extent of 1.8 ft is experienced on the right (west) bank, 100 ft downstream of Gervais Street bridge for mid-point conditions. The maximum increases in floodplain width for the normal and crest flows are 1.3 ft and 0.6 ft, respectively. However, the typical increase in floodplain width upstream of the Area-2 structure is less than 1 ft for the three low flow conditions considered.

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Table 1: Summary of Low Flow Sensitivity Analysis Results

Cofferdam	Variable	Normal Flow	Mid-Point Flow	Crest Flow
Area-1	Maximum change in W.S. Elevation (ft)	0.5	0.4	0.3
	Maximum change in Left (East) Bank Floodplain (ft)	3.5	1.2	1.1
	Maximum change in Right (West) Bank Floodplain (ft)	3.6	8.1	1.4
Area-2	Maximum change in W.S. Elevation (ft)	0.1	0.1	0.1
	Maximum change in Left (East) Bank Floodplain (ft)	1.3	1.3	0.6
	Maximum change in Right (West) Bank Floodplain (ft)	1.0	1.8	0.4

The HEC-RAS model results have been used to create floodplain extent maps, to compare the extents for the three low flow conditions considered with and without the Area-1 and Area-2 cofferdams (modeled separately). These maps show that the change in floodplain extent due to construction of the cofferdams is negligible. Based on a review of aerial photographs, no additional properties are impacted by floodwater due to construction of the Area-1 or Area-2 cofferdams.

If you have any questions or need any additional information, please contact John Osterle at 412-535-9823 or john.osterle@wsp.com.

Kind regards,

John P. Osterle, P.E.
Project Manager

JPO:TE:

Statement of Purpose

The purpose of this calculation is to perform a low flow sensitivity analysis for the affected area along the Congaree River in Columbia, South Carolina, due to the separate installation of two rock fill cofferdams around Areas 1 and 2.

A hydraulic analysis was previously completed to determine the impact of the proposed cofferdam structures on the Base Flood Elevations (BFE) for existing conditions as detailed in WSP's Hydraulic Analysis Memo, completed in April 2019 ***(WSP, 2019)***. This calculation uses the HEC-RAS model developed for the previous hydraulic analysis to simulate low flow conditions for the Corrected Effective, Proposed (Area-1), and Proposed (Area-2) models.

A plan view showing the extents of the cofferdams is included on ***Figure 1***, based on Apex Drawing "Stakeholder Approved MRA Plan Sediment Remediation Areas" ***(Apex, 2019)***.

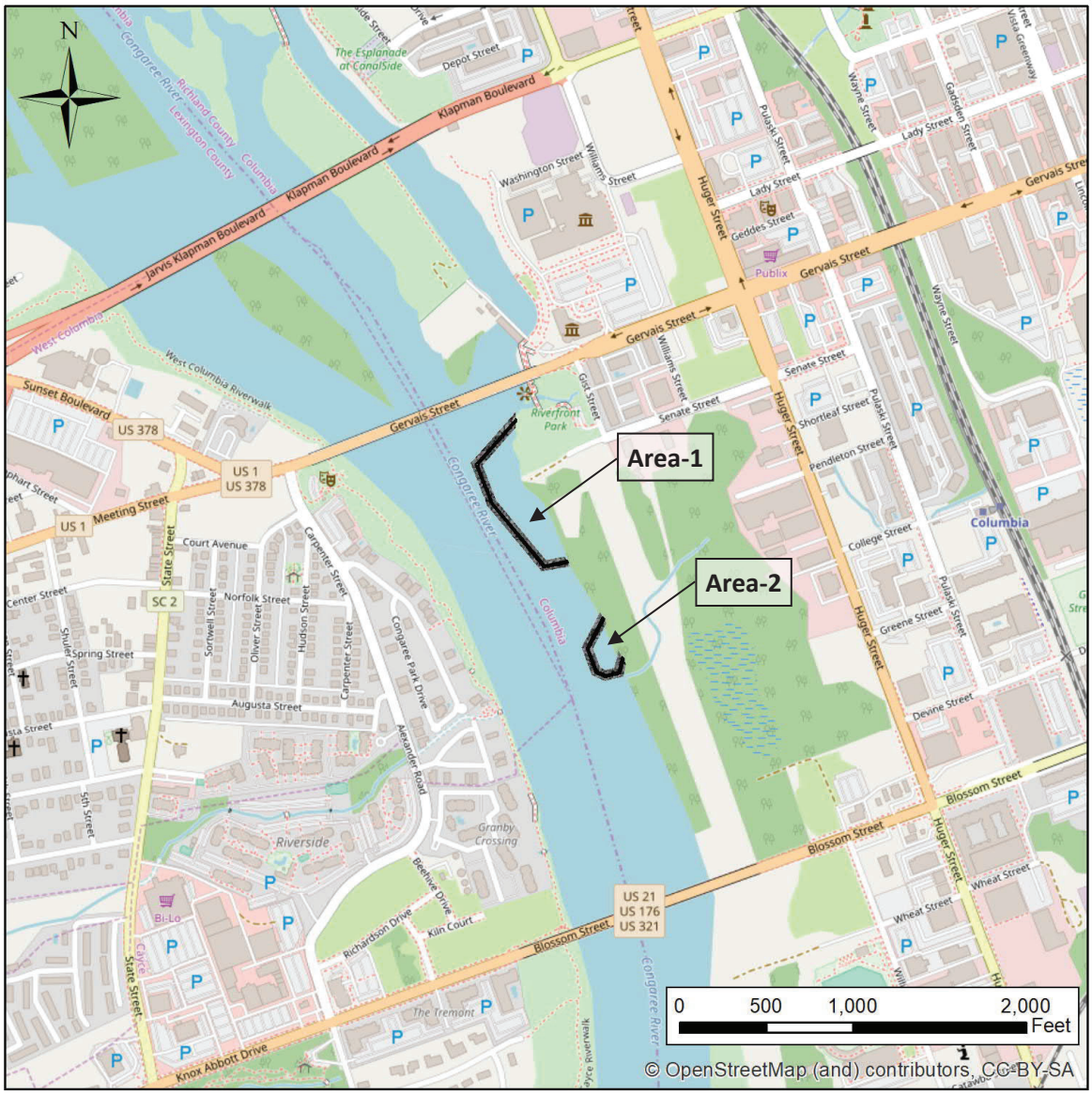


Figure 1: Plan View of Proposed Cofferdams

Description of Methodology Used

WSP ***(2019)*** provides full details of the HEC-RAS models developed for the previous hydraulic analysis, which considered the 10-year, 50-year, and 100-year flood events. No changes have been made to the HEC-RAS models for this low flow sensitivity analysis apart from to update the inflow boundary conditions to represent low flow conditions.

The following key characteristics of the HEC-RAS model are repeated below for clarity. Full details can be obtained from WSP ***(2019)***.

- The HEC-RAS model was developed from FEMA's Current Effective Model of the Congaree River, and was used to complete unsteady state simulations using HEC-RAS Version 4.1 ***(USACE, 2010)***.
- The HEC-RAS model is referenced to the North American Vertical Datum of 1988 (NAVD88). The United States Geological Survey (USGS) gage data is referenced to the National Geodetic Vertical Datum of 1929 (NGVD29). All elevations in this calculation are referenced to NAVD88, unless specifically stated otherwise. The datum shift to convert from NAVD88 to NGVD29 is +0.787 ft, as determined by the National Oceanic and Atmospheric Administration (NOAA) Vertcon tool ***(NOAA, 2019)***.
- The typical crest elevation of the rockfill berm cofferdam structures is 123.7 ft NAVD88. To control the locations of overtopping during high river levels, spillway sections are included in the cofferdam design which are 1 ft lower than the typical crest elevation. The level of protection provided by the cofferdam structures is therefore 122.7 ft NAVD88, and when water levels in the river exceed this elevation the areas behind the cofferdams will begin to flood.
- The proposed Area-1 and Area-2 cofferdams are analyzed as separate proposed conditions models, to reflect the phased approach being followed for the project.
- The cofferdams are represented in the model using the HEC-RAS 'levee' feature. This ensures that the storage volume within the river channel behind the cofferdam is only taken into account when the water level exceeds the crest elevation. Therefore, during low flow conditions the area behind the cofferdams remains dry.

Calculation Input

The HEC-RAS model developed in WSP's previous hydraulic analysis ***(WSP, 2019)*** was used to complete low flow simulations. The only change made to the model is to update the boundary conditions to represent low flow conditions as detailed below.

Boundary Conditions

Boundary conditions were required to represent the following conditions, as specified in WSP's scope of work:

- Approximate normal flow rate (based on USGS data analysis)
- Flow rate that results in water just below the cofferdam crest elevation
- Flow rate that results in water level midway between normal flow level and cofferdam crest

The United States Geological Survey (USGS) gage 02169500 is located on the Congaree River on the west bank opposite the locations of the proposed cofferdams. The USGS gage data ***(USGS, 2019)*** was reviewed and all

approved daily-mean flow data was downloaded, covering the period from May 1984 through March 2019, i.e. approximately 35 years of data as shown in ***Figure 2***.

The average of the approved mean-daily flow values was calculated as 8,564 cfs and this was adopted as the approximate normal flow rate for the purposes of this calculation. This flow rate results in a water level of approximately 116.6 ft NAVD88 at the upstream end of the Area-1 cofferdam.

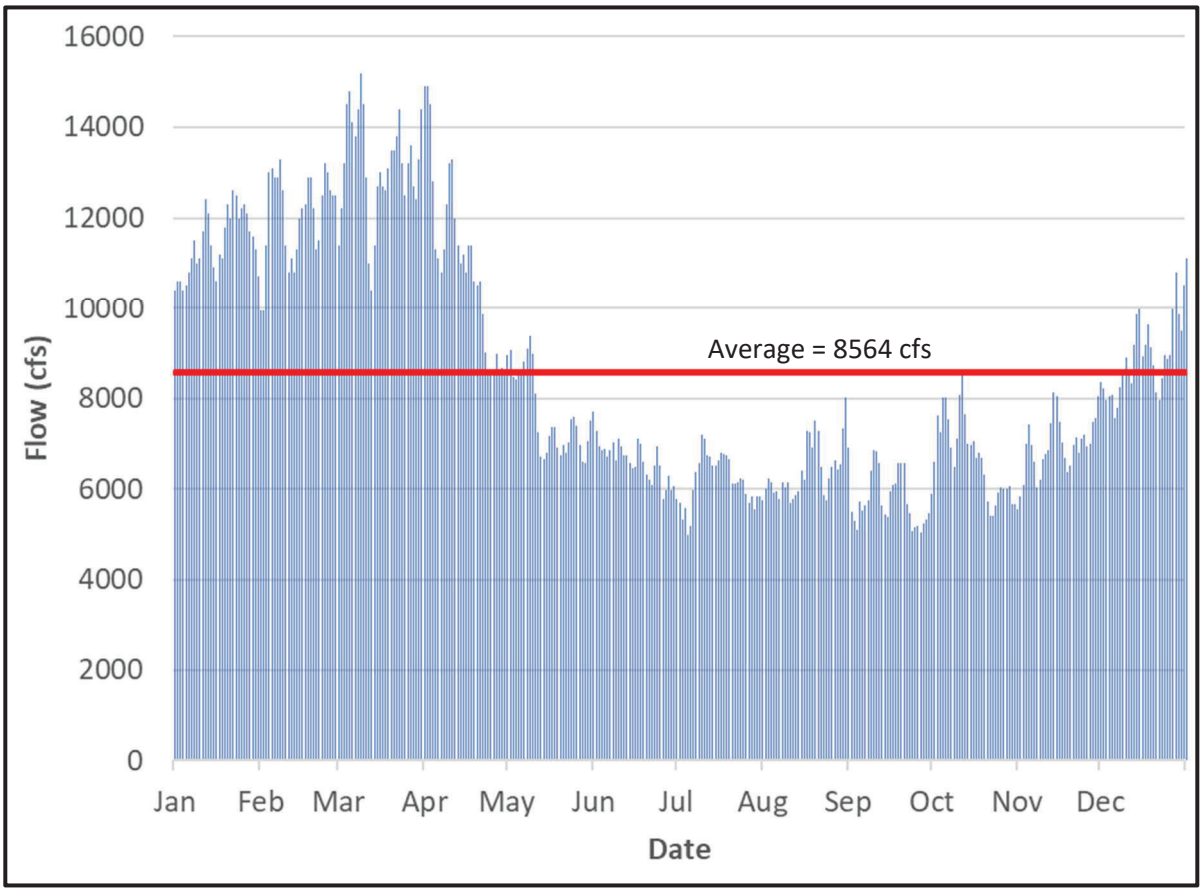


Figure 2: USGS Gage 02169500 Daily-Mean Flow Data, May 1984 through March 2019

Initial test runs were completed to determine the flow rate that would result in a water level just below the cofferdam crest elevation, i.e. the crest elevation of 122.7 ft NAVD88 at the overtopping spillways, above which water starts to flood the area behind the cofferdams.

The normal flow rate of 8,564 cfs was used as the initial flow in the river and the flow rate was increased over time. The water levels from the test runs were reviewed at the upstream end of the Area-1 cofferdam to determine the flow that resulted in a water level just below 122.7 ft NAVD88. The 'crest flow' was determined to be approximately 26,000 cfs.

Results were also reviewed to determine the flow that resulted in a water level midway between the cofferdam crest and normal water levels, i.e. approximately 119.5 ft NAVD88. The 'mid-point flow' was determined to be approximately 17,000 cfs.

Unsteady state (time-varying) inflow boundary conditions were developed for the three low flow scenarios to be analyzed. All boundary conditions begin at the normal flow value (8,564 cfs), and for the midpoint and crest flow

conditions the flow rate is increased by approximately 1,500 cfs every 30 mins until the desired flow rate (17,000 or 26,000 cfs) is achieved. The inflow is then held constant until the end of the 47 hour model run, which allows the flows and velocities in the model to stabilize at the specified flow rate. The results are taken at the end of the run, 47 hours after the simulation begins. The inflow boundaries were developed to ensure there were no model instabilities associated with rapidly changing inflow conditions.

The final inflow boundary conditions are shown on ***Figure 3***.

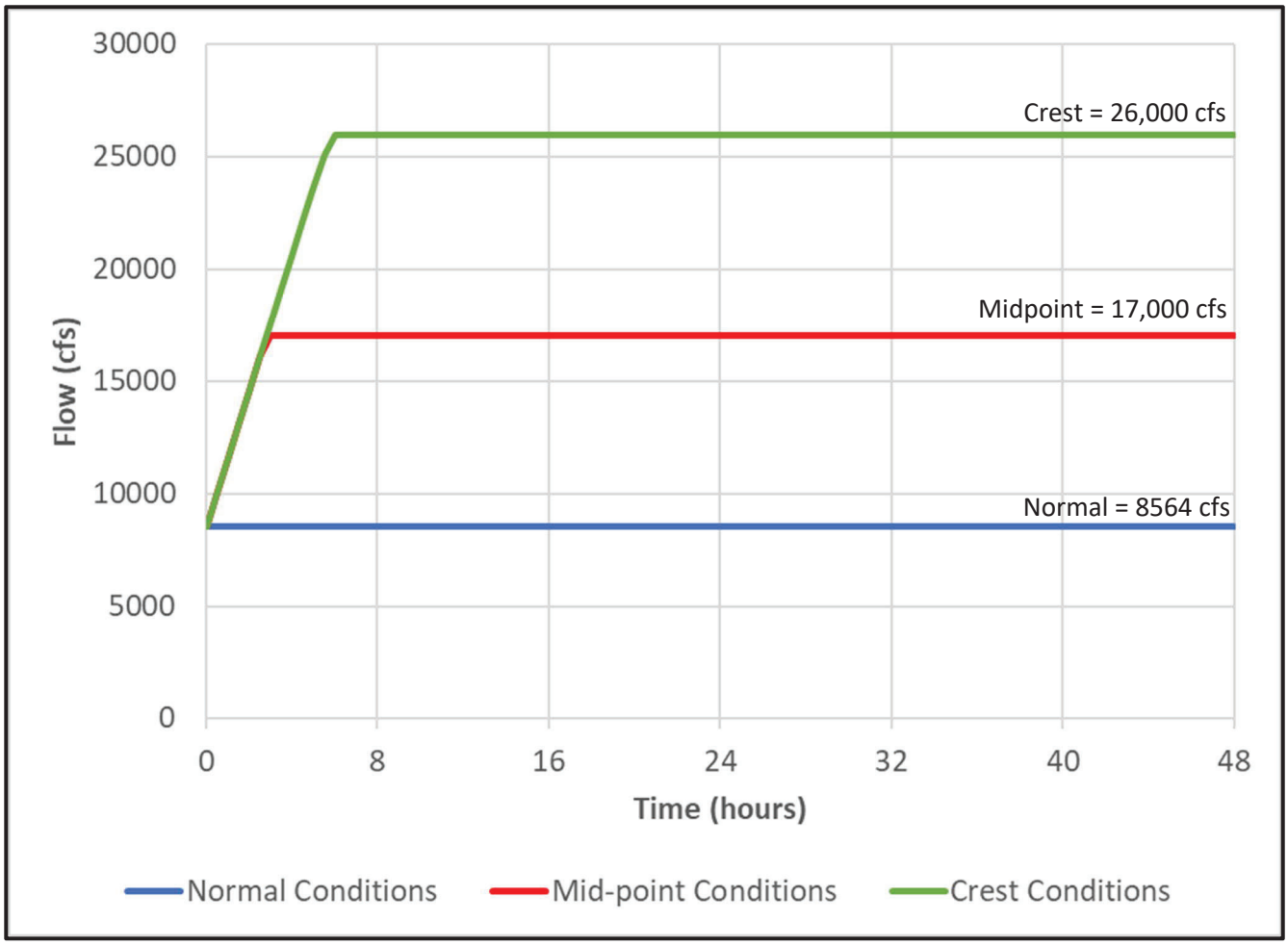


Figure 3: Low Flow Upstream Inflow Boundary Conditions

Numerical Calculations

All hydraulic analysis calculations are performed within the HEC-RAS Version 4.1 ***(USACE, 2010)***. The unsteady flow analysis parameters such as computational interval and hydrograph output interval were not modified i.e., the parameters used are identical to the parameters for the current effective model provided by FEMA and used in the previous hydraulic analysis ***(WSP, 2019)***.

Calculation Output

The electronic input and output files for all hydraulic models are provided in ***Appendix A***. The HEC-RAS Output Tables are provided in ***Appendix B***.

Figure 4 shows the HEC-RAS model schematic zoomed into the project area for the Corrected Effective model. The purpose of this figure is to provide the Cross Section/River Station numbering when reviewing results output. A full size/resolution version of ***Figure 4*** is also provided in ***Appendix C***.

Figure 4: Corrected Effective HEC-RAS Model Schematic (Project Area)

Results

The model results have been extracted at the end of the run (after 47 hours) when the flow conditions in the model have stabilized after the inflow boundary condition ramps up at the start of the run.

Table 1 and ***Table 2*** summarize the water surface elevations and change in floodplain widths, respectively, of the corrected effective and proposed Area-1 hydraulic model runs for the normal, mid-point, and crest flow conditions. The results demonstrate that the impact of the proposed Area-1 cofferdam structure is greatest for lower flow rates, when the cross-sectional area loss due to the structure accounts for a bigger proportion of the total flow in the channel.

Table 1 shows that for the normal flow rate an increase in water level of up to 0.5 ft is experienced immediately upstream of the Area-1 cofferdam structure, with no increases predicted in the middle of the structure and further downstream. For the mid-point and cofferdam crest flow conditions, the increase upstream of the Area-1 structure is up to 0.4 ft and 0.3 ft, respectively. No increases are also predicted in the middle of the structure and further downstream.

Table 2 shows that a maximum increase in floodplain width of 8.1 ft is experienced on the right (west) bank approximately 100 ft downstream of Gervais Street bridge for mid-point conditions. This is the location where the greatest increase in water level occurs, and the topography of the river bank is also inclined at a shallower gradient than the typical section at flood elevations around 119.5-120.0 ft NAVD88. These two factors combined explain why this is the location of the maximum change in floodplain extent.

However, the increase in floodplain width upstream of the Area-1 structure is typically less than 1.5 ft for the three low flow conditions considered. The increase in floodplain width is determined by the specific topography at the flood level experienced at each specific cross section, i.e. if the topography is flat and low-lying then a small increase in water level can result in a greater increase in width. Therefore, the change in width does not necessarily correlate to the total flow in the river channel (as does the change in water surface elevation).

Construction of the Area-1 cofferdam structure reduces the width of the floodplain adjacent to the cofferdam, as shown by the negative values in ***Table 2***.

Figures C1 through C3 (in ***Appendix C***) show the floodplain extents for the three low flow conditions considered with and without the Area-1 cofferdam. These maps show that the changes in floodplain extent due to construction of the cofferdam is negligible. Based on a review of aerial photographs, no additional properties are impacted by floodwater due to construction of the Area-1 cofferdam.

Table 1: Comparison of Corrected Effective and Proposed Area-1 Model Water Surface Elevations; Normal, Mid-Point, and Cofferdam Crest Flow Rates

Cross Section/ River Station	Water Surface Elevation (ft NAVD88)								
	Normal Flow			Mid-Point Flow			Cofferdam Crest Flow		
	Corrected	Proposed	*Change*[a]	Corrected	Proposed	*Change*[a]	Corrected	Proposed	*Change*[a]
288770	136.540	136.555	***0.0***	137.689	137.656	***0.0***	138.115	138.010	***-0.1***
287472	128.954	128.952	***0.0***	130.051	130.055	***0.0***	130.904	130.924	***0.0***
286338	121.996	122.045	***0.0***	123.764	123.833	***0.1***	125.468	125.624	***0.2***
286106	121.259	121.327	***0.1***	122.764	122.899	***0.1***	124.919	125.103	***0.2***
284778	118.632	119.015	***0.4***	121.319	121.646	***0.3***	124.310	124.559	***0.2***
284565[b]	116.856	117.284	***0.4***	119.631	119.972	***0.3***	122.657	122.912	***0.3***
284431	116.638	117.143	***0.5***	119.496	119.856	***0.4***	122.553	122.815	***0.3***
284408[c]	116.613	116.953	***0.3***	119.481	119.662	***0.2***	122.543	122.631	***0.1***
284395[c]	116.596	116.932	***0.3***	119.474	119.651	***0.2***	122.537	122.620	***0.1***
284372[c]	116.579	116.915	***0.3***	119.464	119.642	***0.2***	122.530	122.613	***0.1***
284267[c]	116.480	116.666	***0.2***	119.407	119.492	***0.1***	122.486	122.506	***0.0***
284060[c]	116.379	116.401	***0.0***	119.329	119.289	***0.0***	122.425	122.331	***-0.1***
283820[c]	116.336	116.312	***0.0***	119.286	119.218	***-0.1***	122.384	122.278	***-0.1***
283636[c]	116.310	116.279	***0.0***	119.253	119.187	***-0.1***	122.350	122.258	***-0.1***
283611[c]	116.302	116.271	***0.0***	119.241	119.180	***-0.1***	122.337	122.256	***-0.1***
283601[c]	116.295	116.260	***0.0***	119.233	119.166	***-0.1***	122.329	122.241	***-0.1***
283574	116.270	116.270	***0.0***	119.202	119.202	***0.0***	122.301	122.301	***0.0***
283490	116.205	116.205	***0.0***	119.138	119.138	***0.0***	122.247	122.247	***0.0***
283342	116.147	116.147	***0.0***	119.093	119.093	***0.0***	122.213	122.213	***0.0***
283203	116.114	116.114	***0.0***	119.064	119.064	***0.0***	122.190	122.190	***0.0***
283179	116.116	116.116	***0.0***	119.067	119.067	***0.0***	122.192	122.192	***0.0***
283169	116.115	116.115	***0.0***	119.066	119.066	***0.0***	122.191	122.191	***0.0***
283139	116.104	116.104	***0.0***	119.054	119.054	***0.0***	122.180	122.180	***0.0***
283093	116.089	116.089	***0.0***	119.038	119.038	***0.0***	122.168	122.168	***0.0***
283052	116.085	116.085	***0.0***	119.035	119.035	***0.0***	122.164	122.164	***0.0***
283001	116.078	116.078	***0.0***	119.028	119.028	***0.0***	122.159	122.159	***0.0***
282937	116.050	116.050	***0.0***	118.996	118.997	***0.0***	122.130	122.130	***0.0***
282912	116.030	116.030	***0.0***	118.977	118.977	***0.0***	122.116	122.116	***0.0***
282902	116.018	116.018	***0.0***	118.968	118.968	***0.0***	122.110	122.110	***0.0***
282874	115.973	115.973	***0.0***	118.941	118.941	***0.0***	122.096	122.096	***0.0***
282707	115.673	115.673	***0.0***	118.760	118.760	***0.0***	121.964	121.964	***0.0***
282424	115.453	115.453	***0.0***	118.674	118.674	***0.0***	121.923	121.923	***0.0***
282071	115.004	115.004	***0.0***	118.490	118.490	***0.0***	121.804	121.804	***0.0***
281647[d]	114.654	114.654	***0.0***	118.370	118.370	***0.0***	121.726	121.726	***0.0***
281423	114.343	114.343	***0.0***	118.226	118.226	***0.0***	121.538	121.538	***0.0***
279961	113.809	113.809	***0.0***	117.951	117.951	***0.0***	121.306	121.306	***0.0***
279605	113.744	113.744	***0.0***	117.900	117.900	***0.0***	121.257	121.257	***0.0***
278919	113.612	113.612	***0.0***	117.801	117.801	***0.0***	121.166	121.166	***0.0***

Notes:

a. 'Change' is calculated by subtracting 'Proposed' from 'Corrected' and rounding to one decimal place
b. Located downstream of Gervais Street bridge
c. Area-1 cofferdam
d. Located upstream of Blossom Street bridge

Table 2: Comparison of Corrected Effective and Proposed Area-1 Model Floodplain Widths; Normal, Mid-Point, and Cofferdam Crest Flow Rates

Cross Section/ River Station	Change in Floodplain Width (ft)					
	Normal Flow		Mid-Point Flow		Cofferdam Crest Flow	
	Left (East) Bank	Right (West) Bank	Left (East) Bank	Right (West) Bank	Left (East) Bank	Right (West) Bank
288770	0.1	0.1	0.0	-0.2	0.0	-0.3
287472	0.0	0.0	0.0	0.0	0.0	0.0
286338	0.6	0.5	0.4	0.3	1.0	1.2
286106	0.3	0.5	0.8	1.5	1.1	1.4
284778	0.7	1.2	0.6	7.7	0.4	1.0
284565[a]	0.8	1.3	0.3	8.1	0.4	1.0
284431	3.5	3.6	1.2	1.3	0.7	0.8
284408[b]	-37.5	3.6	-50.0	0.8	-59.5	0.3
284395[b]	-58.2	3.0	-71.0	0.8	-80.8	0.3
284372[b]	-95.8	2.7	-110.6	0.6	-122.7	0.2
284267[b]	-229.3	1.1	-242.2	0.3	-252.2	0.1
284060[b]	-206.6	0.1	-250.7	-0.1	-281.3	-0.2
283820[b]	-198.3	0.0	-210.7	-0.1	-219.4	-0.2
283636[b]	-133.1	-0.1	-142.9	-0.2	-152.8	-0.2
283611[b]	-126.6	-0.1	-134.4	-0.2	-141.5	-0.2
283601[b]	-124.8	-0.1	-131.9	-0.2	-138.9	-0.1
283574	0.0	0.0	0.0	0.0	0.0	0.0
283490	0.0	0.0	0.0	0.0	0.0	0.0
283342	0.0	0.0	0.0	0.0	0.0	0.0
283203	0.0	0.0	0.0	0.0	0.0	0.0
283179	0.0	0.0	0.0	0.0	0.0	0.0
283169	0.0	0.0	0.0	0.0	0.0	0.0
283139	0.0	0.0	0.0	0.0	0.0	0.0
283093	0.0	0.0	0.0	0.0	0.0	0.0
283052	0.0	0.0	0.0	0.0	0.0	0.0
283001	0.0	0.0	0.0	0.0	0.0	0.0
282937	0.0	0.0	0.0	0.0	0.0	0.0
282912	0.0	0.0	0.0	0.0	0.0	0.0
282902	0.0	0.0	0.0	0.0	0.0	0.0
282874	0.0	0.0	0.0	0.0	0.0	0.0
282707	0.0	0.0	0.0	0.0	0.0	0.0
282424	0.0	0.0	0.0	0.0	0.0	0.0
282071	0.0	0.0	0.0	0.0	0.0	0.0
281647[c]	0.0	0.0	0.0	0.0	0.0	0.0
281423	0.0	0.0	0.0	0.0	0.0	0.0
279961	0.0	0.0	0.0	0.0	0.0	0.0
279605	0.0	0.0	0.0	0.0	0.0	0.0
278919	0.0	0.0	0.0	0.0	0.0	0.0

Notes:

a. Located downstream of Gervais Street bridge
b. Area-1 cofferdam
c. Located upstream of Blossom Street bridge

Table 3 and ***Table 4*** summarize the water surface elevations and change in floodplain widths, respectively, of the corrected effective and proposed Area-2 hydraulic model runs for the normal, mid-point, and crest flow conditions. The results demonstrate that the impact of the proposed Area-2 cofferdam structure is relatively consistent for the normal, mid-point, and cofferdam crest flow conditions.

Table 3 shows that for the three low flow conditions considered, an increase in water level of 0.1 ft is experienced immediately upstream of the Area-2 cofferdam structure, with no increases predicted adjacent to the structure and further downstream.

Table 4 shows that a maximum increase in floodplain width of 1.8 ft is experienced on the right (west) bank approximately 100 ft downstream of Gervais Street bridge for mid-point conditions. As previously discussed the topography of the river bank is inclined at a shallower gradient than the typical section at flood elevations around 119.5-120.0 ft NAVD88, which explains why the maximum change is experienced at this location. However, the increase in floodplain width upstream of the Area-2 structure is typically less than 1 ft for the three low flow conditions considered.

Construction of the Area-2 cofferdam structure reduces the width of the floodplain adjacent to the cofferdam, as shown by the negative values in ***Table 4***.

Figures C1 through C3 (in ***Appendix C***) show the floodplain extents for the three low flow conditions considered with and without the Area-2 cofferdam. These maps show that the changes in floodplain extent due to construction of the cofferdam is negligible. Based on a review of aerial photographs, no additional properties are impacted by floodwater due to construction of the Area-2 cofferdam.

Table 3: Comparison of Corrected Effective and Proposed Area-2 Model Water Surface Elevations; Normal, Mid-Point, and Cofferdam Crest Flow Rates

Cross Section/ River Station	Water Surface Elevation (ft NAVD88)								
	Normal Flow			Mid-Point Flow			Cofferdam Crest Flow		
	Corrected	Proposed	Change[a]	Corrected	Proposed	Change[a]	Corrected	Proposed	Change[a]
288770	136.540	136.542	***0.0***	137.689	137.682	***0.0***	138.115	138.086	***0.0***
287472	128.954	128.954	***0.0***	130.051	130.052	***0.0***	130.904	130.909	***0.0***
286338	121.996	122.002	***0.0***	123.764	123.779	***0.0***	125.468	125.511	***0.0***
286106	121.259	121.268	***0.0***	122.764	122.794	***0.0***	124.919	124.970	***0.1***
284778	118.632	118.687	***0.1***	121.319	121.394	***0.1***	124.310	124.380	***0.1***
284565[b]	116.856	116.917	***0.1***	119.631	119.710	***0.1***	122.657	122.729	***0.1***
284431	116.638	116.713	***0.1***	119.496	119.579	***0.1***	122.553	122.627	***0.1***
284408	116.613	116.691	***0.1***	119.481	119.565	***0.1***	122.543	122.617	***0.1***
284395	116.596	116.675	***0.1***	119.474	119.558	***0.1***	122.537	122.611	***0.1***
284372	116.579	116.660	***0.1***	119.464	119.549	***0.1***	122.530	122.604	***0.1***
284267	116.480	116.568	***0.1***	119.407	119.494	***0.1***	122.486	122.562	***0.1***
284060	116.379	116.473	***0.1***	119.329	119.419	***0.1***	122.425	122.502	***0.1***
283820	116.336	116.433	***0.1***	119.286	119.378	***0.1***	122.384	122.462	***0.1***
283636	116.310	116.409	***0.1***	119.253	119.346	***0.1***	122.350	122.429	***0.1***
283611	116.302	116.400	***0.1***	119.241	119.334	***0.1***	122.337	122.416	***0.1***
283601	116.295	116.394	***0.1***	119.233	119.326	***0.1***	122.329	122.408	***0.1***
283574	116.270	116.370	***0.1***	119.202	119.296	***0.1***	122.301	122.380	***0.1***
283490	116.205	116.309	***0.1***	119.138	119.235	***0.1***	122.247	122.327	***0.1***
283342	116.147	116.256	***0.1***	119.093	119.191	***0.1***	122.213	122.294	***0.1***
283203	116.114	116.224	***0.1***	119.064	119.163	***0.1***	122.190	122.271	***0.1***
283179[c]	116.116	116.179	***0.1***	119.067	119.090	***0.0***	122.192	122.182	***0.0***
283169[c]	116.115	116.176	***0.1***	119.066	119.088	***0.0***	122.191	122.181	***0.0***
283139[c]	116.104	116.126	***0.0***	119.054	119.028	***0.0***	122.180	122.124	***-0.1***
283093[c]	116.089	116.106	***0.0***	119.038	119.021	***0.0***	122.168	122.129	***0.0***
283052[c]	116.085	116.083	***0.0***	119.035	118.991	***0.0***	122.164	122.093	***-0.1***
283001[c]	116.078	116.061	***0.0***	119.028	118.967	***-0.1***	122.159	122.070	***-0.1***
282937[c]	116.050	115.985	***-0.1***	118.996	118.886	***-0.1***	122.130	121.997	***-0.1***
282912[c]	116.030	115.957	***-0.1***	118.977	118.867	***-0.1***	122.116	121.988	***-0.1***
282902[c]	116.018	115.936	***-0.1***	118.968	118.850	***-0.1***	122.110	121.977	***-0.1***
282874	115.973	115.973	***0.0***	118.941	118.941	***0.0***	122.096	122.096	***0.0***
282707	115.673	115.673	***0.0***	118.760	118.760	***0.0***	121.964	121.964	***0.0***
282424	115.453	115.453	***0.0***	118.674	118.674	***0.0***	121.923	121.923	***0.0***
282071	115.004	115.004	***0.0***	118.490	118.490	***0.0***	121.804	121.804	***0.0***
281647[d]	114.654	114.654	***0.0***	118.370	118.370	***0.0***	121.726	121.726	***0.0***
281423	114.343	114.343	***0.0***	118.226	118.226	***0.0***	121.538	121.538	***0.0***
279961	113.809	113.809	***0.0***	117.951	117.951	***0.0***	121.306	121.306	***0.0***
279605	113.744	113.744	***0.0***	117.900	117.900	***0.0***	121.257	121.257	***0.0***
278919	113.612	113.612	***0.0***	117.801	117.801	***0.0***	121.166	121.166	***0.0***

Notes:

a. 'Change' is calculated by subtracting 'Proposed' from 'Corrected' and rounding to one decimal place
b. Located downstream of Gervais Street bridge
c. Area-2 cofferdam
d. Located upstream of Blossom Street bridge

Table 4: Comparison of Corrected Effective and Proposed Area-2 Model Floodplain Widths; Normal, Mid-Point, and Cofferdam Crest Flow Rates

Cross Section/ River Station	Change in Floodplain Width (ft)					
	Normal Flow		Mid-Point Flow		Cofferdam Crest Flow	
	Left (East) Bank	Right (West) Bank	Left (East) Bank	Right (West) Bank	Left (East) Bank	Right (West) Bank
288770	0.0	0.0	0.0	0.0	0.0	0.0
287472	0.0	0.0	0.0	0.0	0.0	0.0
286338	0.0	0.1	0.1	0.1	0.3	0.3
286106	0.0	0.3	0.2	0.3	0.3	0.4
284778	0.1	0.2	0.1	1.8	0.1	0.3
284565[a]	0.1	0.2	0.1	1.8	0.1	0.3
284431	0.6	1.0	0.3	0.3	0.2	0.2
284408	0.6	1.0	0.3	0.4	0.2	0.2
284395	0.4	0.7	0.3	0.4	0.3	0.3
284372	0.5	0.6	0.3	0.3	0.4	0.2
284267	0.7	0.7	0.3	0.3	0.2	0.2
284060	1.3	0.4	1.3	0.2	0.6	0.2
283820	0.6	0.3	0.3	0.2	0.2	0.2
283636	0.3	0.3	0.3	0.2	0.3	0.2
283611	0.3	0.3	0.2	0.2	0.2	0.2
283601	0.3	0.3	0.2	0.2	0.2	0.2
283574	0.3	0.3	0.2	0.2	0.2	0.2
283490	0.2	0.4	0.2	0.2	0.2	0.2
283342	0.4	0.3	0.4	0.2	0.2	0.2
283203	0.4	0.5	0.3	0.3	0.2	0.2
283179[b]	-40.5	0.2	-49.8	0.1	-58.2	0.0
283169[b]	-51.9	0.3	-60.6	0.1	-68.7	0.0
283139[b]	-83.1	0.1	-91.4	-0.1	-99.3	-0.1
283093[b]	-141.2	0.1	-149.6	-0.1	-157.1	-0.2
283052[b]	-148.2	0.0	-156.3	-0.1	-163.9	-0.2
283001[b]	-156.2	-0.1	-163.9	-0.2	-171.8	-0.2
282937[b]	-161.7	-0.2	-170.6	-0.3	-179.8	-0.3
282912[b]	-145.2	-0.2	-164.7	-0.3	-205.9	-0.3
282902[b]	-139.0	-0.3	-179.4	-0.3	-206.1	-0.3
282874	0.0	0.0	0.0	0.0	0.0	0.0
282707	0.0	0.0	0.0	0.0	0.0	0.0
282424	0.0	0.0	0.0	0.0	0.0	0.0
282071	0.0	0.0	0.0	0.0	0.0	0.0
281647[c]	0.0	0.0	0.0	0.0	0.0	0.0
281423	0.0	0.0	0.0	0.0	0.0	0.0
279961	0.0	0.0	0.0	0.0	0.0	0.0
279605	0.0	0.0	0.0	0.0	0.0	0.0
278919	0.0	0.0	0.0	0.0	0.0	0.0

Notes:

a. Located downstream of Gervais Street bridge
b. Area-2 cofferdam
c. Located upstream of Blossom Street bridge

Conclusion/Summary

The results in ***Table 1*** and ***Table 2*** show the addition of the proposed Area-1 cofferdam structure results in maximum increases in water surface elevation of 0.5 ft, 0.4 ft, and 0.3 ft for the normal, mid-point, and cofferdam crest flows, respectively. The maximum increases in floodplain width of 8.1 ft is experienced on the right (west) bank, 100 ft downstream of Gervais Street bridge for mid-point conditions. However, the typical increase in floodplain width upstream of the Area-1 structure is less than 1.5 ft for the three low flow conditions considered.

The results in ***Table 3*** and ***Table 4*** show the addition of the proposed Area-2 cofferdam structure results in maximum increases in water surface elevation of 0.1 ft for the three low flow conditions considered. The maximum increase in floodplain extent of 1.8 ft is experienced on the right (west) bank, 100 ft downstream of Gervais Street bridge for mid-point conditions. However, the typical increase in floodplain width upstream of the Area-2 structure is less than 1 ft for the three low flow conditions considered.

Figures C1 through C3 (in ***Appendix C***) show the floodplain extents for the three low flow conditions considered with and without the Area-1 and Area-2 cofferdams (modeled separately). These maps show that the changes in floodplain extent due to construction of the cofferdams is negligible. Based on a review of aerial photographs, no additional properties are impacted by floodwater due to construction of the Area-1 or Area-2 cofferdam.

References

1. ***Apex, 2019***: Apex Companies LLC, "Figure 1, Stakeholder Approved MRA Plan Sediment Remediation Areas, Congaree River, Columbia, South Carolina", February 8, 2019.

2. ***NOAA, 2019***: National Oceanic and Atmospheric Administration, "VERTCON - North American Vertical Datum Conversion" https://www.ngs.noaa.gov/cgi-bin/VERTCON/vert_con.prl, Accessed March 2019.

3. ***USACE, 2010***: USACE, "HEC-RAS River Analysis System, User's Manual, Version 4.1" Document No. CPD-68, Hydraulic Engineering Center, United States Army Corps of Engineers, January 2010.

4. ***USGS, 2019:*** United States Geological Survey, "USGS Gage 02169500 Congaree River at Columbia, SC" <https://waterdata.usgs.gov/usa/nwis/uv?02169500>, Date Accessed: June 25, 2019.

5. ***WSP, 2019:*** WSP, "Hydraulic Analysis Memo, Congaree River Remediation Project", April 12, 2019.

APPENDICES

Appendix A: Electronic Files

Appendix B: HEC-RAS Output Tables

HEC-RAS River: Congaree River Reach: Reach-1 Profile: 02JAN2012 2300

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	288770	02JAN2012 2300	Norm-CorrectedC	8564.00	128.14	136.540		136.55	0.000023	0.75	11429.79	1432.68	0.05
Reach-1	288770	02JAN2012 2300	Norm-ProposedD1	8564.00	128.14	136.555		136.56	0.000023	0.75	11452.57	1432.86	0.05
Reach-1	288770	02JAN2012 2300	Norm-ProposedD2	8564.00	128.14	136.542		136.55	0.000023	0.75	11433.37	1432.70	0.05
Reach-1	288770	02JAN2012 2300	MidPt-CorrectedC	17000.00	128.14	137.689		137.72	0.000059	1.30	13085.65	1449.88	0.08
Reach-1	288770	02JAN2012 2300	MidPt-ProposedD1	17000.00	128.14	137.656		137.68	0.000060	1.30	13037.56	1448.52	0.08
Reach-1	288770	02JAN2012 2300	MidPt-ProposedD2	17000.00	128.14	137.682		137.71	0.000059	1.30	13075.07	1449.44	0.08
Reach-1	288770	02JAN2012 2300	Crest-CorrectedC	26000.00	128.14	138.115		138.17	0.000121	1.90	13709.11	1470.83	0.11
Reach-1	288770	02JAN2012 2300	Crest-ProposedD1	26000.00	128.14	138.010		138.07	0.000125	1.92	13554.22	1467.96	0.11
Reach-1	288770	02JAN2012 2300	Crest-ProposedD2	26000.00	128.14	138.086		138.14	0.000122	1.90	13666.75	1470.32	0.11
Reach-1	287472	02JAN2012 2300	Norm-CorrectedC	8564.14	125.74	128.954		129.59	0.011438	6.38	1342.39	729.33	0.83
Reach-1	287472	02JAN2012 2300	Norm-ProposedD1	8564.17	125.74	128.952		129.59	0.011465	6.39	1341.23	729.04	0.83
Reach-1	287472	02JAN2012 2300	Norm-ProposedD2	8564.00	125.74	128.954		129.59	0.011441	6.38	1342.25	729.29	0.83
Reach-1	287472	02JAN2012 2300	MidPt-CorrectedC	16999.96	125.74	130.051		130.91	0.011248	7.42	2292.41	990.28	0.86
Reach-1	287472	02JAN2012 2300	MidPt-ProposedD1	16999.97	125.74	130.055		130.91	0.011188	7.40	2296.68	990.95	0.86
Reach-1	287472	02JAN2012 2300	MidPt-ProposedD2	16999.99	125.74	130.052		130.91	0.011235	7.41	2293.30	990.42	0.86
Reach-1	287472	02JAN2012 2300	Crest-CorrectedC	25999.98	125.74	130.904		131.94	0.010029	8.15	3190.56	1112.98	0.85
Reach-1	287472	02JAN2012 2300	Crest-ProposedD1	26000.00	125.74	130.924		131.94	0.009817	8.09	3212.72	1114.52	0.84
Reach-1	287472	02JAN2012 2300	Crest-ProposedD2	25999.96	125.74	130.909		131.94	0.009971	8.13	3196.57	1113.39	0.85
Reach-1	286338	02JAN2012 2300	Norm-CorrectedC	8563.95	117.29	121.996	120.57	122.12	0.001751	2.85	3003.08	1303.62	0.33
Reach-1	286338	02JAN2012 2300	Norm-ProposedD1	8563.93	117.29	122.045	120.58	122.17	0.001633	2.79	3067.51	1304.76	0.32
Reach-1	286338	02JAN2012 2300	Norm-ProposedD2	8563.99	117.29	122.002	120.58	122.13	0.001735	2.84	3011.55	1303.77	0.33
Reach-1	286338	02JAN2012 2300	MidPt-CorrectedC	17000.01	117.29	123.764	121.38	123.92	0.001054	3.17	5356.62	1352.41	0.28
Reach-1	286338	02JAN2012 2300	MidPt-ProposedD1	17000.01	117.29	123.833	121.38	123.98	0.000996	3.12	5449.31	1353.48	0.27
Reach-1	286338	02JAN2012 2300	MidPt-ProposedD2	16999.99	117.29	123.779	121.38	123.93	0.001041	3.16	5376.64	1352.64	0.28
Reach-1	286338	02JAN2012 2300	Crest-CorrectedC	25999.99	117.29	125.468	122.01	125.65	0.000762	3.38	7683.68	1380.70	0.25
Reach-1	286338	02JAN2012 2300	Crest-ProposedD1	26000.01	117.29	125.624	122.01	125.79	0.000697	3.29	7899.15	1383.62	0.24
Reach-1	286338	02JAN2012 2300	Crest-ProposedD2	26000.00	117.29	125.511	122.00	125.69	0.000743	3.36	7743.20	1381.51	0.25
Reach-1	286221			Bridge									
Reach-1	286106	02JAN2012 2300	Norm-CorrectedC	8563.95	117.10	121.259		121.47	0.003939	3.72	2302.79	1236.51	0.48
Reach-1	286106	02JAN2012 2300	Norm-ProposedD1	8563.93	117.10	121.327		121.53	0.003549	3.59	2388.20	1252.96	0.46
Reach-1	286106	02JAN2012 2300	Norm-ProposedD2	8563.99	117.10	121.268		121.48	0.003885	3.70	2313.94	1238.77	0.48
Reach-1	286106	02JAN2012 2300	MidPt-CorrectedC	17000.01	117.10	122.764		123.01	0.002208	3.98	4266.62	1338.19	0.39
Reach-1	286106	02JAN2012 2300	MidPt-ProposedD1	17000.01	117.10	122.899		123.13	0.001929	3.82	4447.35	1341.19	0.37
Reach-1	286106	02JAN2012 2300	MidPt-ProposedD2	16999.99	117.10	122.794		123.04	0.002142	3.95	4306.11	1338.85	0.39
Reach-1	286106	02JAN2012 2300	Crest-CorrectedC	25999.99	117.10	124.919		125.12	0.000944	3.62	7189.63	1373.99	0.28
Reach-1	286106	02JAN2012 2300	Crest-ProposedD1	26000.01	117.10	125.103		125.29	0.000844	3.49	7443.04	1377.44	0.26
Reach-1	286106	02JAN2012 2300	Crest-ProposedD2	26000.00	117.10	124.970		125.17	0.000914	3.58	7259.73	1374.94	0.27
Reach-1	284778	02JAN2012 2300	Norm-CorrectedC	8564.04	112.83	118.632	115.67	118.68	0.000319	1.76	4858.66	1209.35	0.15
Reach-1	284778	02JAN2012 2300	Norm-ProposedD1	8564.07	112.83	119.015	115.67	119.06	0.000235	1.61	5322.92	1211.20	0.14
Reach-1	284778	02JAN2012 2300	Norm-ProposedD2	8564.02	112.83	118.687	115.67	118.73	0.000304	1.74	4925.30	1209.61	0.15
Reach-1	284778	02JAN2012 2300	MidPt-CorrectedC	16999.98	112.83	121.319	116.39	121.39	0.000232	2.09	8129.80	1234.66	0.14
Reach-1	284778	02JAN2012 2300	MidPt-ProposedD1	16999.98	112.83	121.646	116.39	121.71	0.000199	1.99	8534.85	1242.76	0.13
Reach-1	284778	02JAN2012 2300	MidPt-ProposedD2	16999.99	112.83	121.394	116.39	121.46	0.000224	2.07	8222.84	1236.53	0.14
Reach-1	284778	02JAN2012 2300	Crest-CorrectedC	26000.01	112.83	124.310	117.01	124.38	0.000158	2.19	11874.89	1261.23	0.13
Reach-1	284778	02JAN2012 2300	Crest-ProposedD1	26000.01	112.83	124.559	117.01	124.63	0.000145	2.13	12188.86	1262.61	0.12
Reach-1	284778	02JAN2012 2300	Crest-ProposedD2	25999.98	112.83	124.380	117.01	124.45	0.000154	2.17	11963.32	1261.62	0.12
Reach-1	284668			Bridge									
Reach-1	284565	02JAN2012 2300	Norm-CorrectedC	8564.04	111.22	116.856		116.91	0.000366	1.84	4658.09	1208.55	0.17
Reach-1	284565	02JAN2012 2300	Norm-ProposedD1	8564.07	111.22	117.284		117.33	0.000258	1.65	5175.79	1210.61	0.14
Reach-1	284565	02JAN2012 2300	Norm-ProposedD2	8564.02	111.22	116.917		116.97	0.000347	1.81	4732.55	1208.84	0.16
Reach-1	284565	02JAN2012 2300	MidPt-CorrectedC	16999.98	111.22	119.631		119.70	0.000241	2.12	8033.82	1232.74	0.15
Reach-1	284565	02JAN2012 2300	MidPt-ProposedD1	16999.98	111.22	119.972		120.03	0.000205	2.01	8455.12	1241.17	0.14
Reach-1	284565	02JAN2012 2300	MidPt-ProposedD2	16999.99	111.22	119.710		119.78	0.000232	2.09	8130.54	1234.68	0.14
Reach-1	284565	02JAN2012 2300	Crest-CorrectedC	26000.01	111.22	122.657		122.73	0.000161	2.20	11820.54	1260.99	0.13
Reach-1	284565	02JAN2012 2300	Crest-ProposedD1	26000.01	111.22	122.912		122.98	0.000147	2.14	12141.77	1262.40	0.12
Reach-1	284565	02JAN2012 2300	Crest-ProposedD2	25999.98	111.22	122.729		122.80	0.000157	2.18	11910.97	1261.39	0.13
Reach-1	284431	02JAN2012 2300	Norm-CorrectedC	8564.04	111.36	116.638		116.79	0.001507	3.11	2751.40	944.38	0.32
Reach-1	284431	02JAN2012 2300	Norm-ProposedD1	8564.03	111.36	117.143		117.25	0.000889	2.65	3230.30	951.53	0.25
Reach-1	284431	02JAN2012 2300	Norm-ProposedD2	8563.99	111.36	116.713		116.86	0.001385	3.03	2822.85	945.86	0.31
Reach-1	284431	02JAN2012 2300	MidPt-CorrectedC	17000.00	111.36	119.496		119.64	0.000620	3.09	5493.63	971.06	0.23
Reach-1	284431	02JAN2012 2300	MidPt-ProposedD1	16999.99	111.36	119.856		119.99	0.000508	2.91	5844.25	973.58	0.21
Reach-1	284431	02JAN2012 2300	MidPt-ProposedD2	17000.00	111.36	119.579		119.72	0.000591	3.05	5574.74	971.64	0.22
Reach-1	284431	02JAN2012 2300	Crest-CorrectedC	26000.01	111.36	122.553		122.70	0.000354	3.06	8493.24	990.85	0.18
Reach-1	284431	02JAN2012 2300	Crest-ProposedD1	26000.00	111.36	122.815		122.95	0.000322	2.97	8753.26	998.52	0.18
Reach-1	284431	02JAN2012 2300	Crest-ProposedD2	26000.02	111.36	122.627		122.77	0.000345	3.04	8566.55	993.01	0.18
Reach-1	284408	02JAN2012 2300	Norm-CorrectedC	8564.00	111.06	116.613		116.76	0.001426	3.10	2766.91	911.46	0.31
Reach-1	284408	02JAN2012 2300	Norm-ProposedD1	8564.00	111.58	116.953		117.23	0.002471	4.24	2020.89	626.09	0.42
Reach-1	284408	02JAN2012 2300	Norm-ProposedD2	8563.98	111.06	116.691		116.83	0.001314	3.02	2837.71	913.08	0.30
Reach-1	284408	02JAN2012 2300	MidPt-CorrectedC	16999.99	111.06	119.481		119.63	0.000625	3.13	5437.98	950.22	0.23
Reach-1	284408	02JAN2012 2300	MidPt-ProposedD1	16999.97	111.58	119.662		119.98	0.001310	4.53	3754.86	653.42	0.33
Reach-1	284408	02JAN2012 2300	MidPt-ProposedD2	16999.99	111.06	119.565		119.71	0.000596	3.08	5517.82	950.85	0.23
Reach-1	284408	02JAN2012 2300	Crest-CorrectedC	25999.99	111.06	122.543		122.69	0.000357	3.10	8381.25	971.93	0.19
Reach-1	284408	02JAN2012 2300	Crest-ProposedD1	25999.98	111.58	122.631		122.95	0.000779	4.55	5719.24	668.95	0.27
Reach-1	284408	02JAN2012 2300	Crest-ProposedD2	26000.01	111.06	122.617		122.76	0.000347	3.08	8453.38	972.40	0.18
Reach-1	284395	02JAN2012 2300	Norm-CorrectedC	8564.00	111.13	116.596		116.75	0.001460	3.12	2744.09	908.60	0.32
Reach-1	284395	02JAN2012 2300	Norm-ProposedD1	8564.00	111.37	116.932		117.21	0.002416	4.21	2033.81	625.39	0.41
Reach-1	284395	02JAN2012 2300	Norm-ProposedD2	8563.98	111.13	116.675		116.82	0.001342	3.04	2815.91	909.68	0.30
Reach-1	284395	02JAN2012 2300	MidPt-CorrectedC	17000.00	111.13	119.474		119.63	0.000628	3.14	5409.67	940.69	0.23
Reach-1	284395	02JAN2012 2300	MidPt-ProposedD1	16999.98	111.37	119.651		119.97	0.001278	4.51	3766.09	646.28	0.33
Reach-1	284395	02JAN2012 2300	MidPt-ProposedD2	16999.99	111.13	119.558		119.71	0.000599	3.10	5489.00	941.36	0.23
Reach-1	284395	02JAN2012 2300	Crest-CorrectedC	26000.00	111.13	122.537		122.69	0.000360	3.12	8324.91	962.65	0.19
Reach-1	284395	02JAN2012 2300	Crest-ProposedD1	25999.99	111.37	122.620		122.94	0.000773	4.56	5706.62	660.92	0.27
Reach-1	284395	02JAN2012 2300	Crest-ProposedD2	25999.98	111.13	122.611		122.76	0.000350	3.10	8396.45	963.23	0.18

HEC-RAS River: Congaree River Reach: Reach-1 Profile: 02JAN2012 2300 (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	284372	02JAN2012 2300	Norm-CorrectedC	8563.98	111.51	116.579		116.73	0.001351	3.07	2790.75	894.28	0.31
Reach-1	284372	02JAN2012 2300	Norm-ProposedD1	8563.99	111.51	116.915		117.17	0.002136	4.06	2107.57	623.40	0.39
Reach-1	284372	02JAN2012 2300	Norm-ProposedD2	8564.01	111.51	116.660		116.80	0.001243	2.99	2862.79	895.41	0.29
Reach-1	284372	02JAN2012 2300	MidPt-CorrectedC	17000.01	111.51	119.464		119.62	0.000607	3.14	5418.79	924.21	0.23
Reach-1	284372	02JAN2012 2300	MidPt-ProposedD1	16999.98	111.51	119.642		119.95	0.001192	4.44	3831.39	639.96	0.32
Reach-1	284372	02JAN2012 2300	MidPt-ProposedD2	16999.99	111.51	119.549		119.70	0.000579	3.09	5497.09	924.79	0.22
Reach-1	284372	02JAN2012 2300	Crest-CorrectedC	26000.01	111.51	122.530		122.68	0.000354	3.14	8285.23	946.43	0.19
Reach-1	284372	02JAN2012 2300	Crest-ProposedD1	25999.99	111.51	122.613		122.93	0.000741	4.52	5752.89	653.41	0.27
Reach-1	284372	02JAN2012 2300	Crest-ProposedD2	25999.95	111.51	122.604		122.75	0.000344	3.11	8355.67	946.99	0.18
Reach-1	284267	02JAN2012 2300	Norm-CorrectedC	8563.92	108.23	116.480		116.60	0.000891	2.80	3063.61	826.22	0.26
Reach-1	284267	02JAN2012 2300	Norm-ProposedD1	8563.98	108.30	116.666		116.93	0.002106	4.15	2065.23	585.05	0.39
Reach-1	284267	02JAN2012 2300	Norm-ProposedD2	8564.00	108.23	116.568		116.68	0.000826	2.73	3136.38	827.60	0.25
Reach-1	284267	02JAN2012 2300	MidPt-CorrectedC	17000.01	108.23	119.407		119.55	0.000513	3.08	5520.86	850.68	0.21
Reach-1	284267	02JAN2012 2300	MidPt-ProposedD1	17000.02	108.30	119.492		119.81	0.001187	4.54	3741.26	599.92	0.32
Reach-1	284267	02JAN2012 2300	MidPt-ProposedD2	17000.00	108.23	119.494		119.64	0.000491	3.04	5594.98	851.28	0.21
Reach-1	284267	02JAN2012 2300	Crest-CorrectedC	26000.00	108.23	122.486		122.64	0.000335	3.18	8170.70	869.99	0.18
Reach-1	284267	02JAN2012 2300	Crest-ProposedD1	26000.02	108.30	122.506		122.84	0.000761	4.67	5568.86	612.86	0.27
Reach-1	284267	02JAN2012 2300	Crest-ProposedD2	26000.03	108.23	122.562		122.72	0.000327	3.16	8236.31	870.46	0.18
Reach-1	284060	02JAN2012 2300	Norm-CorrectedC	8564.05	108.45	116.379		116.47	0.000421	2.36	3626.01	716.56	0.19
Reach-1	284060	02JAN2012 2300	Norm-ProposedD1	8564.00	108.45	116.401		116.60	0.001065	3.61	2369.41	494.38	0.29
Reach-1	284060	02JAN2012 2300	Norm-ProposedD2	8564.00	108.45	116.473		116.56	0.000397	2.32	3693.95	718.23	0.18
Reach-1	284060	02JAN2012 2300	MidPt-CorrectedC	17000.02	108.45	119.329		119.46	0.000377	2.92	5823.44	770.95	0.19
Reach-1	284060	02JAN2012 2300	MidPt-ProposedD1	17000.00	108.45	119.289		119.60	0.000890	4.45	3817.53	507.95	0.29
Reach-1	284060	02JAN2012 2300	MidPt-ProposedD2	17000.02	108.45	119.419		119.55	0.000363	2.88	5892.90	772.45	0.18
Reach-1	284060	02JAN2012 2300	Crest-CorrectedC	26000.01	108.45	122.425		122.58	0.000292	3.14	8276.19	809.11	0.17
Reach-1	284060	02JAN2012 2300	Crest-ProposedD1	25999.99	108.45	122.331		122.69	0.000687	4.83	5381.69	520.06	0.26
Reach-1	284060	02JAN2012 2300	Crest-ProposedD2	25999.98	108.45	122.502		122.65	0.000285	3.12	8338.35	809.82	0.17
Reach-1	283820	02JAN2012 2300	Norm-CorrectedC	8563.97	107.22	116.336		116.39	0.000192	1.89	4538.03	697.66	0.13
Reach-1	283820	02JAN2012 2300	Norm-ProposedD1	8564.00	107.22	116.312		116.43	0.000401	2.71	3156.71	485.85	0.19
Reach-1	283820	02JAN2012 2300	Norm-ProposedD2	8563.99	107.22	116.433		116.49	0.000183	1.86	4605.95	698.51	0.13
Reach-1	283820	02JAN2012 2300	MidPt-CorrectedC	16999.98	107.22	119.286		119.39	0.000223	2.57	6626.93	717.15	0.15
Reach-1	283820	02JAN2012 2300	MidPt-ProposedD1	17000.00	107.22	119.218		119.43	0.000471	3.71	4585.43	496.80	0.22
Reach-1	283820	02JAN2012 2300	MidPt-ProposedD2	16999.97	107.22	119.378		119.48	0.000216	2.54	6692.57	717.67	0.15
Reach-1	283820	02JAN2012 2300	Crest-CorrectedC	25999.98	107.22	122.384		122.52	0.000210	2.93	8871.71	731.91	0.15
Reach-1	283820	02JAN2012 2300	Crest-ProposedD1	26000.03	107.22	122.278		122.56	0.000434	4.25	6120.85	506.84	0.22
Reach-1	283820	02JAN2012 2300	Crest-ProposedD2	26000.01	107.22	122.462		122.59	0.000206	2.91	8928.51	732.25	0.15
Reach-1	283636	02JAN2012 2300	Norm-CorrectedC	8563.95	105.24	116.310		116.36	0.000153	1.79	4783.16	669.06	0.12
Reach-1	283636	02JAN2012 2300	Norm-ProposedD1	8564.00	105.24	116.279		116.37	0.000269	2.36	3628.06	510.39	0.16
Reach-1	283636	02JAN2012 2300	Norm-ProposedD2	8564.02	105.24	116.409		116.46	0.000146	1.77	4849.23	669.71	0.12
Reach-1	283636	02JAN2012 2300	MidPt-CorrectedC	17000.02	105.24	119.253		119.35	0.000195	2.51	6778.98	686.60	0.14
Reach-1	283636	02JAN2012 2300	MidPt-ProposedD1	16999.99	105.24	119.187		119.36	0.000346	3.31	5129.71	521.96	0.19
Reach-1	283636	02JAN2012 2300	MidPt-ProposedD2	17000.04	105.24	119.346		119.44	0.000189	2.48	6842.71	687.11	0.14
Reach-1	283636	02JAN2012 2300	Crest-CorrectedC	26000.02	105.24	122.350		122.48	0.000188	2.91	8931.81	703.61	0.14
Reach-1	283636	02JAN2012 2300	Crest-ProposedD1	25999.98	105.24	122.258		122.49	0.000335	3.85	6750.30	533.27	0.19
Reach-1	283636	02JAN2012 2300	Crest-ProposedD2	26000.00	105.24	122.429		122.56	0.000185	2.89	8987.13	704.03	0.14
Reach-1	283611	02JAN2012 2300	Norm-CorrectedC	8563.96	105.38	116.302		116.36	0.000176	1.87	4572.01	664.33	0.13
Reach-1	283611	02JAN2012 2300	Norm-ProposedD1	8564.00	105.38	116.271		116.36	0.000288	2.38	3604.28	528.48	0.16
Reach-1	283611	02JAN2012 2300	Norm-ProposedD2	8564.00	105.38	116.400		116.45	0.000168	1.85	4637.67	664.84	0.12
Reach-1	283611	02JAN2012 2300	MidPt-CorrectedC	17000.00	105.38	119.241		119.35	0.000216	2.60	6547.38	679.52	0.15
Reach-1	283611	02JAN2012 2300	MidPt-ProposedD1	17000.00	105.38	119.180		119.35	0.000355	3.30	5158.39	539.82	0.19
Reach-1	283611	02JAN2012 2300	MidPt-ProposedD2	17000.02	105.38	119.334		119.44	0.000210	2.57	6610.40	679.97	0.15
Reach-1	283611	02JAN2012 2300	Crest-CorrectedC	26000.00	105.38	122.337		122.48	0.000204	3.00	8673.12	693.33	0.15
Reach-1	283611	02JAN2012 2300	Crest-ProposedD1	25999.99	105.38	122.256		122.48	0.000335	3.80	6835.24	550.54	0.19
Reach-1	283611	02JAN2012 2300	Crest-ProposedD2	26000.00	105.38	122.416		122.55	0.000200	2.98	8727.49	693.68	0.15
Reach-1	283601	02JAN2012 2300	Norm-CorrectedC	8563.96	105.38	116.295		116.35	0.000200	1.95	4398.66	662.93	0.13
Reach-1	283601	02JAN2012 2300	Norm-ProposedD1	8563.99	105.38	116.260		116.36	0.000328	2.48	3457.88	525.20	0.17
Reach-1	283601	02JAN2012 2300	Norm-ProposedD2	8563.99	105.38	116.394		116.45	0.000190	1.92	4464.38	663.54	0.13
Reach-1	283601	02JAN2012 2300	MidPt-CorrectedC	17000.00	105.38	119.233		119.34	0.000236	2.67	6369.65	677.91	0.15
Reach-1	283601	02JAN2012 2300	MidPt-ProposedD1	17000.00	105.38	119.166		119.35	0.000390	3.40	5002.15	537.02	0.20
Reach-1	283601	02JAN2012 2300	MidPt-ProposedD2	17000.03	105.38	119.326		119.43	0.000229	2.64	6432.71	678.32	0.15
Reach-1	283601	02JAN2012 2300	Crest-CorrectedC	26000.00	105.38	122.329		122.47	0.000218	3.06	8490.08	691.69	0.15
Reach-1	283601	02JAN2012 2300	Crest-ProposedD1	26000.01	105.38	122.241		122.48	0.000360	3.90	6670.32	548.01	0.20
Reach-1	283601	02JAN2012 2300	Crest-ProposedD2	26000.02	105.38	122.408		122.55	0.000214	3.04	8544.47	692.03	0.15
Reach-1	283574	02JAN2012 2300	Norm-CorrectedC	8563.97	105.18	116.270		116.35	0.000329	2.26	3785.97	662.64	0.17
Reach-1	283574	02JAN2012 2300	Norm-ProposedD1	8563.98	105.18	116.270		116.35	0.000329	2.26	3785.97	662.64	0.17
Reach-1	283574	02JAN2012 2300	Norm-ProposedD2	8563.99	105.18	116.370		116.45	0.000311	2.22	3852.53	663.17	0.16
Reach-1	283574	02JAN2012 2300	MidPt-CorrectedC	17000.01	105.18	119.202		119.34	0.000332	2.96	5751.79	677.66	0.18
Reach-1	283574	02JAN2012 2300	MidPt-ProposedD1	16999.99	105.18	119.202		119.34	0.000332	2.96	5751.79	677.66	0.18
Reach-1	283574	02JAN2012 2300	MidPt-ProposedD2	17000.04	105.18	119.296		119.43	0.000320	2.92	5815.51	678.09	0.18
Reach-1	283574	02JAN2012 2300	Crest-CorrectedC	26000.01	105.18	122.301		122.47	0.000281	3.30	7872.33	690.91	0.17
Reach-1	283574	02JAN2012 2300	Crest-ProposedD1	26000.03	105.18	122.301		122.47	0.000281	3.30	7872.33	690.91	0.17
Reach-1	283574	02JAN2012 2300	Crest-ProposedD2	26000.02	105.18	122.380		122.55	0.000274	3.28	7926.99	691.24	0.17
Reach-1	283490	02JAN2012 2300	Norm-CorrectedC	8564.04	104.94	116.205		116.31	0.000525	2.60	3297.06	662.92	0.21
Reach-1	283490	02JAN2012 2300	Norm-ProposedD1	8564.02	104.94	116.205		116.31	0.000525	2.60	3297.06	662.92	0.21
Reach-1	283490	02JAN2012 2300	Norm-ProposedD2	8563.99	104.94	116.309		116.41	0.000492	2.54	3366.17	663.61	0.20
Reach-1	283490	02JAN2012 2300	MidPt-CorrectedC	17000.00	104.94	119.138		119.30	0.000483	3.23	5268.69	679.98	0.20
Reach-1	283490	02JAN2012 2300	MidPt-ProposedD1	17000.01	104.94	119.138		119.30	0.000483	3.23	5268.69	679.98	0.20
Reach-1	283490	02JAN2012 2300	MidPt-ProposedD2	17000.00	104.94	119.235		119.39	0.000465	3.19	5334.27	680.45	0.20
Reach-1	283490	02JAN2012 2300	Crest-CorrectedC	26000.02	104.94	122.247		122.44	0.000402	3.51	7405.77	695.04	0.19
Reach-1	283490	02JAN2012 2300	Crest-ProposedD1	25999.99	104.94	122.247		122.44	0.000402	3.51	7405.77	695.04	0.19
Reach-1	283490	02JAN2012 2300	Crest-ProposedD2	25999.99	104.94	122.327		122.52	0.000394	3.48	7461.60	695.38	0.19
Reach-1	283342	02JAN2012 2300	Norm-CorrectedC	8564.03	107.64	116.147		116.24	0.000433	2.42	3541.01	690.43	0.19
Reach-1	283342	02JAN2012 2300	Norm-ProposedD1	8564.01	107.64	116.147		116.24	0.000433	2.42	3541.01	690.43	0.19

HEC-RAS River: Congaree River Reach: Reach-1 Profile: 02JAN2012 2300 (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	283342	02JAN2012 2300	Norm-ProposedD2	8563.99	107.64	116.256		116.34	0.000405	2.37	3615.82	691.15	0.18
Reach-1	283342	02JAN2012 2300	MidPt-CorrectedC	16999.99	107.64	119.093		119.24	0.000386	3.03	5603.11	709.81	0.19
Reach-1	283342	02JAN2012 2300	MidPt-ProposedD1	17000.00	107.64	119.093		119.24	0.000386	3.03	5603.11	709.81	0.19
Reach-1	283342	02JAN2012 2300	MidPt-ProposedD2	16999.99	107.64	119.191		119.33	0.000371	3.00	5672.91	710.38	0.19
Reach-1	283342	02JAN2012 2300	Crest-CorrectedC	26000.01	107.64	122.213		122.38	0.000335	3.32	7842.52	761.87	0.18
Reach-1	283342	02JAN2012 2300	Crest-ProposedD1	25999.96	107.64	122.213		122.38	0.000335	3.32	7842.52	761.87	0.18
Reach-1	283342	02JAN2012 2300	Crest-ProposedD2	26000.02	107.64	122.294		122.46	0.000327	3.29	7901.46	763.39	0.18
Reach-1	283203	02JAN2012 2300	Norm-CorrectedC	8564.01	106.22	116.114		116.19	0.000299	2.15	3974.19	697.17	0.16
Reach-1	283203	02JAN2012 2300	Norm-ProposedD1	8563.98	106.22	116.114		116.19	0.000299	2.15	3974.19	697.17	0.16
Reach-1	283203	02JAN2012 2300	Norm-ProposedD2	8564.00	106.22	116.224		116.29	0.000281	2.11	4050.92	698.06	0.15
Reach-1	283203	02JAN2012 2300	MidPt-CorrectedC	17000.02	106.22	119.064		119.19	0.000299	2.80	6061.01	764.84	0.17
Reach-1	283203	02JAN2012 2300	MidPt-ProposedD1	16999.99	106.22	119.064		119.19	0.000299	2.80	6061.01	764.84	0.17
Reach-1	283203	02JAN2012 2300	MidPt-ProposedD2	17000.01	106.22	119.163		119.28	0.000288	2.77	6131.76	766.85	0.17
Reach-1	283203	02JAN2012 2300	Crest-CorrectedC	26000.00	106.22	122.190		122.34	0.000251	3.12	8323.98	824.68	0.16
Reach-1	283203	02JAN2012 2300	Crest-ProposedD1	26000.00	106.22	122.190		122.34	0.000251	3.12	8323.98	824.68	0.16
Reach-1	283203	02JAN2012 2300	Crest-ProposedD2	25999.98	106.22	122.271		122.42	0.000245	3.10	8383.41	826.12	0.16
Reach-1	283179	02JAN2012 2300	Norm-CorrectedC	8564.00	106.20	116.116		116.18	0.000241	2.02	4232.75	693.67	0.14
Reach-1	283179	02JAN2012 2300	Norm-ProposedD1	8564.01	106.20	116.116		116.18	0.000241	2.02	4232.68	693.67	0.14
Reach-1	283179	02JAN2012 2300	Norm-ProposedD2	8564.01	107.82	116.179		116.29	0.000436	2.62	3264.91	564.42	0.19
Reach-1	283179	02JAN2012 2300	MidPt-CorrectedC	17000.00	106.20	119.067		119.18	0.000260	2.70	6307.53	756.49	0.16
Reach-1	283179	02JAN2012 2300	MidPt-ProposedD1	16999.98	106.20	119.067		119.18	0.000260	2.70	6307.53	756.49	0.16
Reach-1	283179	02JAN2012 2300	MidPt-ProposedD2	17000.01	107.82	119.090		119.27	0.000451	3.45	4926.68	622.05	0.21
Reach-1	283179	02JAN2012 2300	Crest-CorrectedC	26000.01	106.20	122.192		122.34	0.000227	3.04	8556.81	834.29	0.16
Reach-1	283179	02JAN2012 2300	Crest-ProposedD1	26000.01	106.20	122.192		122.34	0.000227	3.04	8556.81	834.29	0.16
Reach-1	283179	02JAN2012 2300	Crest-ProposedD2	25999.99	107.82	122.182		122.41	0.000384	3.86	6727.78	694.81	0.20
Reach-1	283169	02JAN2012 2300	Norm-CorrectedC	8564.00	106.15	116.115		116.18	0.000232	2.00	4277.10	692.45	0.14
Reach-1	283169	02JAN2012 2300	Norm-ProposedD1	8564.01	106.15	116.115		116.18	0.000232	2.00	4277.10	692.45	0.14
Reach-1	283169	02JAN2012 2300	Norm-ProposedD2	8564.01	107.38	116.176		116.28	0.000423	2.60	3295.96	564.31	0.19
Reach-1	283169	02JAN2012 2300	MidPt-CorrectedC	16999.99	106.15	119.066		119.18	0.000254	2.68	6348.98	755.29	0.16
Reach-1	283169	02JAN2012 2300	MidPt-ProposedD1	16999.98	106.15	119.066		119.18	0.000254	2.68	6348.98	755.29	0.16
Reach-1	283169	02JAN2012 2300	MidPt-ProposedD2	17000.00	107.38	119.088		119.27	0.000441	3.43	4959.15	622.09	0.21
Reach-1	283169	02JAN2012 2300	Crest-CorrectedC	26000.01	106.15	122.191		122.33	0.000223	3.02	8595.31	832.19	0.15
Reach-1	283169	02JAN2012 2300	Crest-ProposedD1	26000.01	106.15	122.191		122.33	0.000223	3.02	8595.31	832.19	0.15
Reach-1	283169	02JAN2012 2300	Crest-ProposedD2	26000.00	107.38	122.181		122.41	0.000378	3.84	6762.90	694.52	0.20
Reach-1	283139	02JAN2012 2300	Norm-CorrectedC	8564.00	104.58	116.104		116.17	0.000257	2.07	4136.81	687.25	0.15
Reach-1	283139	02JAN2012 2300	Norm-ProposedD1	8564.00	104.58	116.104		116.17	0.000257	2.07	4136.81	687.25	0.15
Reach-1	283139	02JAN2012 2300	Norm-ProposedD2	8564.01	104.58	116.126		116.27	0.000661	3.02	2831.38	539.44	0.23
Reach-1	283139	02JAN2012 2300	MidPt-CorrectedC	17000.03	104.58	119.054		119.17	0.000275	2.74	6198.25	749.77	0.16
Reach-1	283139	02JAN2012 2300	MidPt-ProposedD1	17000.00	104.58	119.054		119.17	0.000275	2.74	6198.25	749.77	0.16
Reach-1	283139	02JAN2012 2300	MidPt-ProposedD2	17000.00	104.58	119.028		119.26	0.000615	3.84	4423.94	556.65	0.24
Reach-1	283139	02JAN2012 2300	Crest-CorrectedC	25999.98	104.58	122.180		122.33	0.000237	3.08	8442.55	816.17	0.16
Reach-1	283139	02JAN2012 2300	Crest-ProposedD1	25999.98	104.58	122.180		122.33	0.000237	3.08	8442.55	816.17	0.16
Reach-1	283139	02JAN2012 2300	Crest-ProposedD2	25999.99	104.58	122.124		122.40	0.000492	4.22	6168.05	569.78	0.23
Reach-1	283093	02JAN2012 2300	Norm-CorrectedC	8564.00	104.60	116.089		116.16	0.000283	2.12	4046.23	698.49	0.15
Reach-1	283093	02JAN2012 2300	Norm-ProposedD1	8563.99	104.60	116.089		116.16	0.000283	2.12	4046.23	698.49	0.15
Reach-1	283093	02JAN2012 2300	Norm-ProposedD2	8564.01	104.60	116.106		116.24	0.000637	2.92	2934.51	573.89	0.23
Reach-1	283093	02JAN2012 2300	MidPt-CorrectedC	17000.03	104.60	119.038		119.16	0.000290	2.77	6143.54	758.65	0.17
Reach-1	283093	02JAN2012 2300	MidPt-ProposedD1	16999.99	104.60	119.038		119.16	0.000290	2.77	6143.54	758.65	0.17
Reach-1	283093	02JAN2012 2300	MidPt-ProposedD2	17000.01	104.60	119.021		119.23	0.000572	3.67	4636.93	593.19	0.23
Reach-1	283093	02JAN2012 2300	Crest-CorrectedC	26000.01	104.60	122.168		122.32	0.000272	3.08	8439.90	809.38	0.16
Reach-1	283093	02JAN2012 2300	Crest-ProposedD1	25999.99	104.60	122.168		122.32	0.000272	3.08	8439.90	809.38	0.16
Reach-1	283093	02JAN2012 2300	Crest-ProposedD2	26000.02	104.60	122.129		122.38	0.000508	3.99	6509.41	612.58	0.22
Reach-1	283052	02JAN2012 2300	Norm-CorrectedC	8564.04	105.26	116.085		116.15	0.000237	2.01	4262.93	696.67	0.14
Reach-1	283052	02JAN2012 2300	Norm-ProposedD1	8563.98	105.26	116.085		116.15	0.000237	2.01	4262.93	696.67	0.14
Reach-1	283052	02JAN2012 2300	Norm-ProposedD2	8563.99	105.26	116.083		116.21	0.000578	2.90	2957.28	543.85	0.22
Reach-1	283052	02JAN2012 2300	MidPt-CorrectedC	16999.99	105.26	119.035		119.15	0.000256	2.68	6344.11	743.63	0.16
Reach-1	283052	02JAN2012 2300	MidPt-ProposedD1	16999.99	105.26	119.035		119.15	0.000256	2.68	6344.11	743.63	0.16
Reach-1	283052	02JAN2012 2300	MidPt-ProposedD2	17000.01	105.26	118.991		119.21	0.000557	3.73	4558.02	556.65	0.23
Reach-1	283052	02JAN2012 2300	Crest-CorrectedC	26000.01	105.26	122.164		122.31	0.000224	3.02	8602.51	781.20	0.16
Reach-1	283052	02JAN2012 2300	Crest-ProposedD1	26000.01	105.26	122.164		122.31	0.000224	3.02	8602.51	781.20	0.16
Reach-1	283052	02JAN2012 2300	Crest-ProposedD2	26000.02	105.26	122.093		122.36	0.000457	4.12	6303.89	569.16	0.22
Reach-1	283001	02JAN2012 2300	Norm-CorrectedC	8564.02	105.29	116.078		116.14	0.000214	1.93	4430.36	704.19	0.14
Reach-1	283001	02JAN2012 2300	Norm-ProposedD1	8564.01	105.29	116.078		116.14	0.000214	1.93	4430.36	704.19	0.14
Reach-1	283001	02JAN2012 2300	Norm-ProposedD2	8563.99	105.29	116.061		116.19	0.000521	2.83	3029.70	535.36	0.21
Reach-1	283001	02JAN2012 2300	MidPt-CorrectedC	17000.02	105.29	119.028		119.13	0.000246	2.60	6530.69	759.40	0.15
Reach-1	283001	02JAN2012 2300	MidPt-ProposedD1	17000.01	105.29	119.028		119.13	0.000246	2.60	6530.69	759.40	0.15
Reach-1	283001	02JAN2012 2300	MidPt-ProposedD2	17000.00	105.29	118.967		119.18	0.000526	3.69	4602.84	546.89	0.22
Reach-1	283001	02JAN2012 2300	Crest-CorrectedC	26000.01	105.29	122.159		122.29	0.000232	2.95	8807.43	832.29	0.15
Reach-1	283001	02JAN2012 2300	Crest-ProposedD1	25999.96	105.29	122.159		122.29	0.000232	2.95	8807.43	832.29	0.15
Reach-1	283001	02JAN2012 2300	Crest-ProposedD2	26000.03	105.29	122.070		122.33	0.000460	4.12	6317.95	558.36	0.22
Reach-1	282937	02JAN2012 2300	Norm-CorrectedC	8564.01	107.24	116.050		116.12	0.000281	2.11	4065.43	705.10	0.15
Reach-1	282937	02JAN2012 2300	Norm-ProposedD1	8563.99	107.24	116.050		116.12	0.000281	2.11	4065.43	705.10	0.15
Reach-1	282937	02JAN2012 2300	Norm-ProposedD2	8564.00	107.24	115.985		116.14	0.000745	3.17	2697.45	522.35	0.25
Reach-1	282937	02JAN2012 2300	MidPt-CorrectedC	16999.99	107.24	118.996		119.11	0.000298	2.76	6169.95	774.14	0.17
Reach-1	282937	02JAN2012 2300	MidPt-ProposedD1	17000.02	107.24	118.997		119.11	0.000298	2.76	6170.02	774.14	0.17
Reach-1	282937	02JAN2012 2300	MidPt-ProposedD2	16999.99	107.24	118.886		119.14	0.000724	4.02	4232.25	535.41	0.25
Reach-1	282937	02JAN2012 2300	Crest-CorrectedC	26000.02	107.24	122.130		122.28	0.000260	3.09	8463.36	823.94	0.16
Reach-1	282937	02JAN2012 2300	Crest-ProposedD1	25999.96	107.24	122.130		122.28	0.000260	3.09	8463.36	823.94	0.16
Reach-1	282937	02JAN2012 2300	Crest-ProposedD2	26000.01	107.24	121.997		122.30	0.000605	4.39	5917.74	547.76	0.24
Reach-1	282912	02JAN2012 2300	Norm-CorrectedC	8564.01	108.10	116.030		116.11	0.000393	2.31	3706.02	729.71	0.18
Reach-1	282912	02JAN2012 2300	Norm-ProposedD1	8563.98	108.10	116.030		116.11	0.000393	2.31	3706.02	729.71	0.18
Reach-1	282912	02JAN2012 2300	Norm-ProposedD2	8564.01	108.80	115.957		116.13	0.000886	3.29	2599.86	548.82	0.27
Reach-1	282912	02JAN2012 2300	MidPt-CorrectedC	16999.99	108.10	118.977		119.11	0.000349	2.90	5861.55	795.32	0.18
Reach-1	282912	02JAN2012 2300	MidPt-ProposedD1	17000.01	108.10	118.977		119.11	0.000349	2.90	5861.55	795.32	0.18

HEC-RAS River: Congaree River Reach: Reach-1 Profile: 02JAN2012 2300 (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	282912	02JAN2012 2300	MidPt-ProposedD2	17000.02	108.80	118.867		119.12	0.000731	4.05	4196.85	603.81	0.26
Reach-1	282912	02JAN2012 2300	Crest-CorrectedC	25999.99	108.10	122.116		122.27	0.000268	3.17	8291.11	888.71	0.17
Reach-1	282912	02JAN2012 2300	Crest-ProposedD1	25999.98	108.10	122.116		122.27	0.000268	3.17	8291.11	888.71	0.17
Reach-1	282912	02JAN2012 2300	Crest-ProposedD2	26000.01	108.80	121.988		122.29	0.000546	4.38	5947.65	657.57	0.24
Reach-1	282902	02JAN2012 2300	Norm-CorrectedC	8563.99	108.28	116.018		116.11	0.000464	2.42	3539.06	740.52	0.19
Reach-1	282902	02JAN2012 2300	Norm-ProposedD1	8563.99	108.28	116.018		116.11	0.000464	2.42	3539.06	740.52	0.19
Reach-1	282902	02JAN2012 2300	Norm-ProposedD2	8564.01	108.80	115.936		116.12	0.001005	3.41	2511.03	560.91	0.28
Reach-1	282902	02JAN2012 2300	MidPt-CorrectedC	17000.01	108.28	118.968		119.10	0.000383	2.97	5746.26	824.81	0.19
Reach-1	282902	02JAN2012 2300	MidPt-ProposedD1	17000.01	108.28	118.968		119.10	0.000383	2.97	5746.26	824.81	0.19
Reach-1	282902	02JAN2012 2300	MidPt-ProposedD2	17000.02	108.80	118.850		119.11	0.000784	4.12	4124.07	608.67	0.27
Reach-1	282902	02JAN2012 2300	Crest-CorrectedC	26000.00	108.28	122.110		122.27	0.000285	3.21	8230.68	907.36	0.17
Reach-1	282902	02JAN2012 2300	Crest-ProposedD1	25999.98	108.28	122.110		122.27	0.000285	3.21	8230.68	907.36	0.17
Reach-1	282902	02JAN2012 2300	Crest-ProposedD2	26000.01	108.80	121.977		122.28	0.000572	4.41	5891.90	662.64	0.24
Reach-1	282874	02JAN2012 2300	Norm-CorrectedC	8564.00	108.58	115.973		116.10	0.000809	2.87	3154.52	835.26	0.25
Reach-1	282874	02JAN2012 2300	Norm-ProposedD1	8563.98	108.58	115.973		116.10	0.000809	2.87	3154.52	835.26	0.25
Reach-1	282874	02JAN2012 2300	Norm-ProposedD2	8564.00	108.58	115.973		116.10	0.000809	2.87	3154.52	835.26	0.25
Reach-1	282874	02JAN2012 2300	MidPt-CorrectedC	17000.02	108.58	118.941		119.10	0.000520	3.25	5674.05	860.88	0.21
Reach-1	282874	02JAN2012 2300	MidPt-ProposedD1	17000.00	108.58	118.941		119.10	0.000520	3.25	5674.05	860.88	0.21
Reach-1	282874	02JAN2012 2300	MidPt-ProposedD2	16999.98	108.58	118.941		119.10	0.000520	3.25	5674.05	860.88	0.21
Reach-1	282874	02JAN2012 2300	Crest-CorrectedC	25999.99	108.58	122.096		122.27	0.000353	3.40	8424.30	881.67	0.19
Reach-1	282874	02JAN2012 2300	Crest-ProposedD1	25999.99	108.58	122.096		122.27	0.000353	3.40	8424.30	881.67	0.19
Reach-1	282874	02JAN2012 2300	Crest-ProposedD2	26000.01	108.58	122.096		122.27	0.000353	3.40	8424.30	881.67	0.19
Reach-1	282707	02JAN2012 2300	Norm-CorrectedC	8564.01	108.26	115.673		115.89	0.001724	3.69	2319.18	674.60	0.35
Reach-1	282707	02JAN2012 2300	Norm-ProposedD1	8564.01	108.26	115.673		115.89	0.001724	3.69	2319.18	674.60	0.35
Reach-1	282707	02JAN2012 2300	Norm-ProposedD2	8563.99	108.26	115.673		115.89	0.001724	3.69	2319.18	674.60	0.35
Reach-1	282707	02JAN2012 2300	MidPt-CorrectedC	16999.97	108.26	118.760		118.98	0.000815	3.79	4485.51	714.48	0.27
Reach-1	282707	02JAN2012 2300	MidPt-ProposedD1	16999.98	108.26	118.760		118.98	0.000815	3.79	4485.51	714.48	0.27
Reach-1	282707	02JAN2012 2300	MidPt-ProposedD2	17000.02	108.26	118.760		118.98	0.000815	3.79	4485.51	714.48	0.27
Reach-1	282707	02JAN2012 2300	Crest-CorrectedC	26000.01	108.26	121.964		122.19	0.000507	3.82	6802.06	731.57	0.22
Reach-1	282707	02JAN2012 2300	Crest-ProposedD1	26000.02	108.26	121.964		122.19	0.000507	3.82	6802.06	731.57	0.22
Reach-1	282707	02JAN2012 2300	Crest-ProposedD2	25999.97	108.26	121.964		122.19	0.000507	3.82	6802.06	731.57	0.22
Reach-1	282424	02JAN2012 2300	Norm-CorrectedC	8564.01	108.13	115.453		115.56	0.000605	2.59	3307.79	748.11	0.22
Reach-1	282424	02JAN2012 2300	Norm-ProposedD1	8564.01	108.13	115.453		115.56	0.000605	2.59	3307.79	748.11	0.22
Reach-1	282424	02JAN2012 2300	Norm-ProposedD2	8564.02	108.13	115.453		115.56	0.000605	2.59	3307.79	748.11	0.22
Reach-1	282424	02JAN2012 2300	MidPt-CorrectedC	17000.02	108.13	118.674		118.81	0.000403	2.96	5747.38	766.11	0.19
Reach-1	282424	02JAN2012 2300	MidPt-ProposedD1	17000.04	108.13	118.674		118.81	0.000403	2.96	5747.38	766.11	0.19
Reach-1	282424	02JAN2012 2300	MidPt-ProposedD2	16999.97	108.13	118.674		118.81	0.000403	2.96	5747.38	766.11	0.19
Reach-1	282424	02JAN2012 2300	Crest-CorrectedC	26000.00	108.13	121.923		122.08	0.000298	3.15	8262.86	782.18	0.17
Reach-1	282424	02JAN2012 2300	Crest-ProposedD1	26000.00	108.13	121.923		122.08	0.000298	3.15	8262.86	782.18	0.17
Reach-1	282424	02JAN2012 2300	Crest-ProposedD2	26000.01	108.13	121.923		122.08	0.000298	3.15	8262.86	782.18	0.17
Reach-1	282071	02JAN2012 2300	Norm-CorrectedC	8564.00	111.09	115.004		115.17	0.001574	3.31	2588.79	816.79	0.33
Reach-1	282071	02JAN2012 2300	Norm-ProposedD1	8563.99	111.09	115.004		115.17	0.001574	3.31	2588.79	816.79	0.33
Reach-1	282071	02JAN2012 2300	Norm-ProposedD2	8563.99	111.09	115.004		115.17	0.001574	3.31	2588.79	816.79	0.33
Reach-1	282071	02JAN2012 2300	MidPt-CorrectedC	16999.97	111.09	118.490		118.64	0.000559	3.11	5470.89	836.35	0.21
Reach-1	282071	02JAN2012 2300	MidPt-ProposedD1	16999.94	111.09	118.490		118.64	0.000559	3.11	5470.89	836.35	0.21
Reach-1	282071	02JAN2012 2300	MidPt-ProposedD2	17000.01	111.09	118.490		118.64	0.000559	3.11	5470.89	836.35	0.21
Reach-1	282071	02JAN2012 2300	Crest-CorrectedC	26000.02	111.09	121.804		121.96	0.000373	3.14	8272.55	854.24	0.18
Reach-1	282071	02JAN2012 2300	Crest-ProposedD1	26000.00	111.09	121.804		121.96	0.000373	3.14	8272.55	854.24	0.18
Reach-1	282071	02JAN2012 2300	Crest-ProposedD2	25999.96	111.09	121.804		121.96	0.000373	3.14	8272.55	854.24	0.18
Reach-1	281647	02JAN2012 2300	Norm-CorrectedC	8564.00	105.74	114.654	111.56	114.74	0.000475	2.31	3703.20	827.16	0.19
Reach-1	281647	02JAN2012 2300	Norm-ProposedD1	8563.99	105.74	114.654	111.56	114.74	0.000475	2.31	3703.20	827.16	0.19
Reach-1	281647	02JAN2012 2300	Norm-ProposedD2	8564.00	105.74	114.654	111.56	114.74	0.000475	2.31	3703.20	827.16	0.19
Reach-1	281647	02JAN2012 2300	MidPt-CorrectedC	17000.05	105.74	118.370	112.48	118.47	0.000253	2.49	6813.68	844.96	0.15
Reach-1	281647	02JAN2012 2300	MidPt-ProposedD1	17000.05	105.74	118.370	112.48	118.47	0.000253	2.49	6813.68	844.96	0.15
Reach-1	281647	02JAN2012 2300	MidPt-ProposedD2	17000.01	105.74	118.370	112.48	118.47	0.000253	2.49	6813.68	844.96	0.15
Reach-1	281647	02JAN2012 2300	Crest-CorrectedC	25999.97	105.74	121.726	113.28	121.84	0.000189	2.69	9672.72	858.73	0.14
Reach-1	281647	02JAN2012 2300	Crest-ProposedD1	26000.02	105.74	121.726	113.28	121.84	0.000189	2.69	9672.72	858.73	0.14
Reach-1	281647	02JAN2012 2300	Crest-ProposedD2	26000.04	105.74	121.726	113.28	121.84	0.000189	2.69	9672.72	858.73	0.14
Reach-1	281538			Bridge									
Reach-1	281423	02JAN2012 2300	Norm-CorrectedC	8564.00	105.74	114.343		114.44	0.000613	2.47	3473.23	852.85	0.22
Reach-1	281423	02JAN2012 2300	Norm-ProposedD1	8563.99	105.74	114.343		114.44	0.000613	2.47	3473.23	852.85	0.22
Reach-1	281423	02JAN2012 2300	Norm-ProposedD2	8564.00	105.74	114.343		114.44	0.000613	2.47	3473.31	852.85	0.22
Reach-1	281423	02JAN2012 2300	MidPt-CorrectedC	17000.05	105.74	118.226		118.32	0.000261	2.48	6870.60	919.36	0.16
Reach-1	281423	02JAN2012 2300	MidPt-ProposedD1	17000.05	105.74	118.226		118.32	0.000261	2.48	6870.60	919.36	0.16
Reach-1	281423	02JAN2012 2300	MidPt-ProposedD2	17000.01	105.74	118.226		118.32	0.000261	2.48	6870.60	919.36	0.16
Reach-1	281423	02JAN2012 2300	Crest-CorrectedC	25999.97	105.74	121.538		121.65	0.000190	2.65	9845.03	960.91	0.14
Reach-1	281423	02JAN2012 2300	Crest-ProposedD1	26000.02	105.74	121.538		121.65	0.000190	2.65	9845.03	960.91	0.14
Reach-1	281423	02JAN2012 2300	Crest-ProposedD2	26000.04	105.74	121.538		121.65	0.000190	2.65	9845.03	960.91	0.14
Reach-1	279961	02JAN2012 2300	Norm-CorrectedC	8564.01	101.65	113.809		113.86	0.000177	1.83	4680.74	706.16	0.13
Reach-1	279961	02JAN2012 2300	Norm-ProposedD1	8564.01	101.65	113.809		113.86	0.000177	1.83	4680.74	706.16	0.13
Reach-1	279961	02JAN2012 2300	Norm-ProposedD2	8564.00	101.65	113.809		113.86	0.000177	1.83	4680.74	706.16	0.13
Reach-1	279961	02JAN2012 2300	MidPt-CorrectedC	16999.96	101.65	117.951		118.03	0.000140	2.23	7626.85	715.48	0.12
Reach-1	279961	02JAN2012 2300	MidPt-ProposedD1	16999.96	101.65	117.951		118.03	0.000140	2.23	7626.85	715.48	0.12
Reach-1	279961	02JAN2012 2300	MidPt-ProposedD2	16999.99	101.65	117.951		118.03	0.000140	2.23	7626.85	715.48	0.12
Reach-1	279961	02JAN2012 2300	Crest-CorrectedC	26000.02	101.65	121.306		121.41	0.000134	2.59	10038.52	722.39	0.12
Reach-1	279961	02JAN2012 2300	Crest-ProposedD1	25999.99	101.65	121.306		121.41	0.000134	2.59	10038.52	722.39	0.12
Reach-1	279961	02JAN2012 2300	Crest-ProposedD2	25999.96	101.65	121.306		121.41	0.000134	2.59	10038.52	722.39	0.12
Reach-1	279605	02JAN2012 2300	Norm-CorrectedC	8563.98	101.65	113.744		113.80	0.000183	1.85	4634.85	705.91	0.13
Reach-1	279605	02JAN2012 2300	Norm-ProposedD1	8563.98	101.65	113.744		113.80	0.000183	1.85	4634.85	705.91	0.13
Reach-1	279605	02JAN2012 2300	Norm-ProposedD2	8564.00	101.65	113.744		113.80	0.000183	1.85	4634.85	705.91	0.13
Reach-1	279605	02JAN2012 2300	MidPt-CorrectedC	17000.04	101.65	117.900		117.98	0.000142	2.24	7590.29	715.38	0.12
Reach-1	279605	02JAN2012 2300	MidPt-ProposedD1	17000.03	101.65	117.900		117.98	0.000142	2.24	7590.29	715.38	0.12
Reach-1	279605	02JAN2012 2300	MidPt-ProposedD2	16999.98	101.65	117.900		117.98	0.000142	2.24	7590.29	715.38	0.12

HEC-RAS River: Congaree River Reach: Reach-1 Profile: 02JAN2012 2300 (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	279605	02JAN2012 2300	Crest-CorrectedC	26000.00	101.65	121.257		121.36	0.000135	2.60	10003.48	722.29	0.12
Reach-1	279605	02JAN2012 2300	Crest-ProposedD1	26000.03	101.65	121.257		121.36	0.000135	2.60	10003.48	722.29	0.12
Reach-1	279605	02JAN2012 2300	Crest-ProposedD2	26000.02	101.65	121.257		121.36	0.000135	2.60	10003.48	722.29	0.12
Reach-1	278919	02JAN2012 2300	Norm-CorrectedC	8564.01	101.65	113.612		113.67	0.000196	1.88	4551.09	711.45	0.13
Reach-1	278919	02JAN2012 2300	Norm-ProposedD1	8564.01	101.65	113.612		113.67	0.000196	1.88	4551.09	711.45	0.13
Reach-1	278919	02JAN2012 2300	Norm-ProposedD2	8564.00	101.65	113.612		113.67	0.000196	1.88	4551.09	711.45	0.13
Reach-1	278919	02JAN2012 2300	MidPt-CorrectedC	16999.98	101.65	117.801		117.88	0.000148	2.24	7589.33	735.92	0.12
Reach-1	278919	02JAN2012 2300	MidPt-ProposedD1	16999.98	101.65	117.801		117.88	0.000148	2.24	7589.33	735.92	0.12
Reach-1	278919	02JAN2012 2300	MidPt-ProposedD2	17000.02	101.65	117.801		117.88	0.000148	2.24	7589.33	735.92	0.12
Reach-1	278919	02JAN2012 2300	Crest-CorrectedC	26000.01	101.65	121.166		121.27	0.000137	2.58	10092.63	788.00	0.12
Reach-1	278919	02JAN2012 2300	Crest-ProposedD1	25999.95	101.65	121.166		121.27	0.000137	2.58	10092.63	788.00	0.12
Reach-1	278919	02JAN2012 2300	Crest-ProposedD2	25999.98	101.65	121.166		121.27	0.000137	2.58	10092.63	788.00	0.12
Reach-1	277724	02JAN2012 2300	Norm-CorrectedC	8564.00	100.07	113.484	104.57	113.51	0.000061	1.35	6362.60	684.93	0.08
Reach-1	277724	02JAN2012 2300	Norm-ProposedD1	8563.99	100.07	113.484	104.57	113.51	0.000061	1.35	6362.60	684.93	0.08
Reach-1	277724	02JAN2012 2300	Norm-ProposedD2	8563.99	100.07	113.484	104.57	113.51	0.000061	1.35	6362.60	684.93	0.08
Reach-1	277724	02JAN2012 2300	MidPt-CorrectedC	17000.02	100.07	117.696	106.06	117.75	0.000071	1.83	9271.30	696.31	0.09
Reach-1	277724	02JAN2012 2300	MidPt-ProposedD1	17000.01	100.07	117.696	106.06	117.75	0.000071	1.83	9271.30	696.31	0.09
Reach-1	277724	02JAN2012 2300	MidPt-ProposedD2	16999.99	100.07	117.696	106.06	117.75	0.000071	1.83	9271.23	696.31	0.09
Reach-1	277724	02JAN2012 2300	Crest-CorrectedC	25999.98	100.07	121.062	107.38	121.14	0.000079	2.24	11630.46	705.41	0.10
Reach-1	277724	02JAN2012 2300	Crest-ProposedD1	26000.05	100.07	121.062	107.38	121.14	0.000079	2.24	11630.46	705.41	0.10
Reach-1	277724	02JAN2012 2300	Crest-ProposedD2	26000.01	100.07	121.062	107.38	121.14	0.000079	2.24	11630.46	705.41	0.10
Reach-1	277625			Bridge									
Reach-1	277512	02JAN2012 2300	Norm-CorrectedC	8564.00	100.07	113.463		113.49	0.000062	1.35	6347.94	684.88	0.08
Reach-1	277512	02JAN2012 2300	Norm-ProposedD1	8563.99	100.07	113.463		113.49	0.000062	1.35	6347.94	684.88	0.08
Reach-1	277512	02JAN2012 2300	Norm-ProposedD2	8563.99	100.07	113.463		113.49	0.000062	1.35	6347.94	684.88	0.08
Reach-1	277512	02JAN2012 2300	MidPt-CorrectedC	17000.02	100.07	117.668		117.72	0.000071	1.84	9251.67	696.24	0.09
Reach-1	277512	02JAN2012 2300	MidPt-ProposedD1	17000.01	100.07	117.668		117.72	0.000071	1.84	9251.67	696.24	0.09
Reach-1	277512	02JAN2012 2300	MidPt-ProposedD2	16999.99	100.07	117.668		117.72	0.000071	1.84	9251.67	696.24	0.09
Reach-1	277512	02JAN2012 2300	Crest-CorrectedC	25999.98	100.07	121.025		121.10	0.000080	2.24	11604.01	705.31	0.10
Reach-1	277512	02JAN2012 2300	Crest-ProposedD1	26000.05	100.07	121.025		121.10	0.000080	2.24	11604.01	705.31	0.10
Reach-1	277512	02JAN2012 2300	Crest-ProposedD2	26000.01	100.07	121.025		121.10	0.000080	2.24	11604.01	705.31	0.10
Reach-1	277500	02JAN2012 2300	Norm-CorrectedC	8563.99	101.08	113.459	104.50	113.49	0.000068	1.43	5992.40	637.49	0.08
Reach-1	277500	02JAN2012 2300	Norm-ProposedD1	8563.99	101.08	113.459	104.50	113.49	0.000068	1.43	5992.40	637.49	0.08
Reach-1	277500	02JAN2012 2300	Norm-ProposedD2	8564.00	101.08	113.459	104.50	113.49	0.000068	1.43	5992.40	637.49	0.08
Reach-1	277500	02JAN2012 2300	MidPt-CorrectedC	16999.99	101.08	117.660	105.87	117.72	0.000080	1.95	8714.85	658.43	0.09
Reach-1	277500	02JAN2012 2300	MidPt-ProposedD1	17000.02	101.08	117.660	105.87	117.72	0.000080	1.95	8714.85	658.43	0.09
Reach-1	277500	02JAN2012 2300	MidPt-ProposedD2	16999.99	101.08	117.660	105.87	117.72	0.000080	1.95	8714.85	658.43	0.09
Reach-1	277500	02JAN2012 2300	Crest-CorrectedC	25999.96	101.08	121.014	107.01	121.10	0.000091	2.37	10951.31	673.52	0.10
Reach-1	277500	02JAN2012 2300	Crest-ProposedD1	26000.05	101.08	121.014	107.01	121.10	0.000091	2.37	10951.31	673.52	0.10
Reach-1	277500	02JAN2012 2300	Crest-ProposedD2	26000.00	101.08	121.014	107.01	121.10	0.000091	2.37	10951.31	673.52	0.10
Reach-1	277397			Bridge									
Reach-1	277287	02JAN2012 2300	Norm-CorrectedC	8563.99	102.92	113.365		113.41	0.000140	1.79	4771.50	620.40	0.11
Reach-1	277287	02JAN2012 2300	Norm-ProposedD1	8563.99	102.92	113.365		113.41	0.000140	1.79	4771.50	620.40	0.11
Reach-1	277287	02JAN2012 2300	Norm-ProposedD2	8564.00	102.92	113.365		113.41	0.000140	1.79	4771.50	620.40	0.11
Reach-1	277287	02JAN2012 2300	MidPt-CorrectedC	16999.99	102.92	117.549		117.63	0.000133	2.29	7439.68	648.70	0.12
Reach-1	277287	02JAN2012 2300	MidPt-ProposedD1	17000.02	102.92	117.549		117.63	0.000133	2.29	7439.68	648.70	0.12
Reach-1	277287	02JAN2012 2300	MidPt-ProposedD2	16999.99	102.92	117.549		117.63	0.000133	2.29	7439.68	648.70	0.12
Reach-1	277287	02JAN2012 2300	Crest-CorrectedC	25999.96	102.92	120.889		121.00	0.000137	2.70	9635.60	665.97	0.13
Reach-1	277287	02JAN2012 2300	Crest-ProposedD1	26000.05	102.92	120.889		121.00	0.000137	2.70	9635.60	665.97	0.13
Reach-1	277287	02JAN2012 2300	Crest-ProposedD2	26000.00	102.92	120.889		121.00	0.000137	2.70	9635.60	665.97	0.13
Reach-1	276335	02JAN2012 2300	Norm-CorrectedC	8564.02	101.04	113.260		113.30	0.000094	1.67	5134.59	554.22	0.10
Reach-1	276335	02JAN2012 2300	Norm-ProposedD1	8564.02	101.04	113.260		113.30	0.000094	1.67	5134.59	554.22	0.10
Reach-1	276335	02JAN2012 2300	Norm-ProposedD2	8564.00	101.04	113.260		113.30	0.000094	1.67	5134.59	554.22	0.10
Reach-1	276335	02JAN2012 2300	MidPt-CorrectedC	17000.00	101.04	117.434		117.51	0.000110	2.27	7481.58	566.88	0.11
Reach-1	276335	02JAN2012 2300	MidPt-ProposedD1	16999.99	101.04	117.434		117.51	0.000110	2.27	7481.58	566.88	0.11
Reach-1	276335	02JAN2012 2300	MidPt-ProposedD2	17000.02	101.04	117.434		117.51	0.000110	2.27	7481.58	566.88	0.11
Reach-1	276335	02JAN2012 2300	Crest-CorrectedC	26000.03	101.04	120.759		120.88	0.000123	2.77	9375.14	572.14	0.12
Reach-1	276335	02JAN2012 2300	Crest-ProposedD1	25999.97	101.04	120.759		120.88	0.000123	2.77	9375.14	572.14	0.12
Reach-1	276335	02JAN2012 2300	Crest-ProposedD2	26000.02	101.04	120.759		120.88	0.000123	2.77	9375.14	572.14	0.12
Reach-1	276088	02JAN2012 2300	Norm-CorrectedC	8563.99	101.04	113.236		113.28	0.000089	1.69	5055.75	511.75	0.09
Reach-1	276088	02JAN2012 2300	Norm-ProposedD1	8563.97	101.04	113.236		113.28	0.000089	1.69	5055.75	511.75	0.09
Reach-1	276088	02JAN2012 2300	Norm-ProposedD2	8564.03	101.04	113.236		113.28	0.000089	1.69	5055.75	511.75	0.09
Reach-1	276088	02JAN2012 2300	MidPt-CorrectedC	17000.02	101.04	117.401		117.49	0.000111	2.36	7214.73	522.44	0.11
Reach-1	276088	02JAN2012 2300	MidPt-ProposedD1	17000.04	101.04	117.401		117.49	0.000111	2.36	7214.73	522.44	0.11
Reach-1	276088	02JAN2012 2300	MidPt-ProposedD2	17000.02	101.04	117.401		117.49	0.000111	2.36	7214.73	522.44	0.11
Reach-1	276088	02JAN2012 2300	Crest-CorrectedC	25999.96	101.04	120.717		120.85	0.000130	2.90	8955.90	527.89	0.12
Reach-1	276088	02JAN2012 2300	Crest-ProposedD1	26000.02	101.04	120.717		120.85	0.000130	2.90	8955.90	527.89	0.12
Reach-1	276088	02JAN2012 2300	Crest-ProposedD2	25999.99	101.04	120.717		120.85	0.000130	2.90	8955.90	527.89	0.12
Reach-1	275472	02JAN2012 2300	Norm-CorrectedC	8564.01	101.04	113.180		113.23	0.000091	1.70	5027.15	511.50	0.10
Reach-1	275472	02JAN2012 2300	Norm-ProposedD1	8564.02	101.04	113.180		113.23	0.000091	1.70	5027.15	511.50	0.10
Reach-1	275472	02JAN2012 2300	Norm-ProposedD2	8563.98	101.04	113.180		113.23	0.000091	1.70	5027.15	511.50	0.10
Reach-1	275472	02JAN2012 2300	MidPt-CorrectedC	17000.00	101.04	117.331		117.42	0.000113	2.37	7243.83	553.51	0.11
Reach-1	275472	02JAN2012 2300	MidPt-ProposedD1	16999.99	101.04	117.331		117.42	0.000113	2.37	7243.83	553.51	0.11
Reach-1	275472	02JAN2012 2300	MidPt-ProposedD2	17000.00	101.04	117.331		117.42	0.000113	2.37	7243.83	553.51	0.11
Reach-1	275472	02JAN2012 2300	Crest-CorrectedC	26000.02	101.04	120.636		120.77	0.000131	2.91	9103.04	570.71	0.12
Reach-1	275472	02JAN2012 2300	Crest-ProposedD1	25999.98	101.04	120.636		120.77	0.000131	2.91	9103.04	570.71	0.12
Reach-1	275472	02JAN2012 2300	Crest-ProposedD2	26000.05	101.04	120.636		120.77	0.000131	2.91	9103.04	570.71	0.12
Reach-1	274472	02JAN2012 2300	Norm-CorrectedC	8564.00	101.04	113.085		113.13	0.000103	1.67	5121.91	585.85	0.10
Reach-1	274472	02JAN2012 2300	Norm-ProposedD1	8563.98	101.04	113.085		113.13	0.000103	1.67	5121.91	585.85	0.10
Reach-1	274472	02JAN2012 2300	Norm-ProposedD2	8564.02	101.04	113.085		113.13	0.000103	1.67	5121.91	585.85	0.10
Reach-1	274472	02JAN2012 2300	MidPt-CorrectedC	16999.99	101.04	117.227		117.30	0.000115	2.22	7644.07	620.90	0.11
Reach-1	274472	02JAN2012 2300	MidPt-ProposedD1	17000.04	101.04	117.227		117.30	0.000115	2.22	7644.07	620.90	0.11

HEC-RAS River: Congaree River Reach: Reach-1 Profile: 02JAN2012 2300 (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	274472	02JAN2012 2300	MidPt-ProposedD2	17000.01	101.04	117.227		117.30	0.000115	2.22	7644.07	620.90	0.11
Reach-1	274472	02JAN2012 2300	Crest-CorrectedC	25999.99	101.04	120.527		120.64	0.000126	2.68	9719.59	662.25	0.12
Reach-1	274472	02JAN2012 2300	Crest-ProposedD1	26000.03	101.04	120.527		120.64	0.000126	2.68	9719.59	662.25	0.12
Reach-1	274472	02JAN2012 2300	Crest-ProposedD2	25999.97	101.04	120.527		120.64	0.000126	2.68	9719.59	662.25	0.12
Reach-1	273472	02JAN2012 2300	Norm-CorrectedC	8564.01	99.91	113.001		113.04	0.000080	1.53	5579.25	599.29	0.09
Reach-1	273472	02JAN2012 2300	Norm-ProposedD1	8564.02	99.91	113.001		113.04	0.000080	1.53	5579.25	599.29	0.09
Reach-1	273472	02JAN2012 2300	Norm-ProposedD2	8563.99	99.91	113.001		113.04	0.000080	1.53	5579.25	599.29	0.09
Reach-1	273472	02JAN2012 2300	MidPt-CorrectedC	17000.01	99.91	117.129		117.20	0.000098	2.09	8128.34	635.67	0.10
Reach-1	273472	02JAN2012 2300	MidPt-ProposedD1	16999.98	99.91	117.129		117.20	0.000098	2.09	8128.34	635.67	0.10
Reach-1	273472	02JAN2012 2300	MidPt-ProposedD2	17000.02	99.91	117.129		117.20	0.000098	2.09	8128.34	635.67	0.10
Reach-1	273472	02JAN2012 2300	Crest-CorrectedC	26000.03	99.91	120.420		120.52	0.000112	2.53	10267.85	664.66	0.11
Reach-1	273472	02JAN2012 2300	Crest-ProposedD1	25999.98	99.91	120.420		120.52	0.000112	2.53	10267.85	664.66	0.11
Reach-1	273472	02JAN2012 2300	Crest-ProposedD2	26000.03	99.91	120.420		120.52	0.000112	2.53	10267.85	664.66	0.11
Reach-1	272318	02JAN2012 2300	Norm-CorrectedC	8564.00	99.91	112.905		112.95	0.000079	1.63	5245.50	508.71	0.09
Reach-1	272318	02JAN2012 2300	Norm-ProposedD1	8563.99	99.91	112.905		112.95	0.000079	1.63	5245.50	508.71	0.09
Reach-1	272318	02JAN2012 2300	Norm-ProposedD2	8564.01	99.91	112.905		112.95	0.000079	1.63	5245.50	508.71	0.09
Reach-1	272318	02JAN2012 2300	MidPt-CorrectedC	17000.00	99.91	116.998		117.08	0.000104	2.31	7349.23	519.31	0.11
Reach-1	272318	02JAN2012 2300	MidPt-ProposedD1	17000.03	99.91	116.998		117.08	0.000104	2.31	7349.23	519.31	0.11
Reach-1	272318	02JAN2012 2300	MidPt-ProposedD2	16999.99	99.91	116.998		117.08	0.000104	2.31	7349.23	519.31	0.11
Reach-1	272318	02JAN2012 2300	Crest-CorrectedC	25999.98	99.91	120.255		120.38	0.000125	2.87	9054.51	527.75	0.12
Reach-1	272318	02JAN2012 2300	Crest-ProposedD1	26000.02	99.91	120.255		120.38	0.000125	2.87	9054.51	527.75	0.12
Reach-1	272318	02JAN2012 2300	Crest-ProposedD2	25999.99	99.91	120.255		120.38	0.000125	2.87	9054.51	527.75	0.12
Reach-1	271472	02JAN2012 2300	Norm-CorrectedC	8564.00	99.91	112.845		112.88	0.000071	1.57	5438.75	583.70	0.09
Reach-1	271472	02JAN2012 2300	Norm-ProposedD1	8564.00	99.91	112.845		112.88	0.000071	1.57	5438.75	583.70	0.09
Reach-1	271472	02JAN2012 2300	Norm-ProposedD2	8563.99	99.91	112.845		112.88	0.000071	1.57	5438.75	583.70	0.09
Reach-1	271472	02JAN2012 2300	MidPt-CorrectedC	17000.02	99.91	116.928		117.00	0.000086	2.16	7885.50	608.79	0.11
Reach-1	271472	02JAN2012 2300	MidPt-ProposedD1	16999.96	99.91	116.928		117.00	0.000086	2.16	7885.50	608.79	0.11
Reach-1	271472	02JAN2012 2300	MidPt-ProposedD2	17000.02	99.91	116.928		117.00	0.000086	2.16	7885.50	608.79	0.11
Reach-1	271472	02JAN2012 2300	Crest-CorrectedC	26000.01	99.91	120.181		120.29	0.000099	2.63	9893.55	628.55	0.12
Reach-1	271472	02JAN2012 2300	Crest-ProposedD1	25999.96	99.91	120.181		120.29	0.000099	2.63	9893.55	628.55	0.12
Reach-1	271472	02JAN2012 2300	Crest-ProposedD2	26000.03	99.91	120.181		120.29	0.000099	2.63	9893.55	628.55	0.12
Reach-1	270472	02JAN2012 2300	Norm-CorrectedC	8563.99	99.91	112.775		112.81	0.000071	1.55	5526.32	607.39	0.09
Reach-1	270472	02JAN2012 2300	Norm-ProposedD1	8564.00	99.91	112.775		112.81	0.000071	1.55	5526.32	607.39	0.09
Reach-1	270472	02JAN2012 2300	Norm-ProposedD2	8564.02	99.91	112.775		112.81	0.000071	1.55	5526.32	607.39	0.09
Reach-1	270472	02JAN2012 2300	MidPt-CorrectedC	16999.99	99.91	116.846		116.92	0.000083	2.12	8029.71	620.86	0.10
Reach-1	270472	02JAN2012 2300	MidPt-ProposedD1	17000.03	99.91	116.846		116.92	0.000083	2.12	8029.71	620.86	0.10
Reach-1	270472	02JAN2012 2300	MidPt-ProposedD2	16999.98	99.91	116.846		116.92	0.000083	2.12	8029.71	620.86	0.10
Reach-1	270472	02JAN2012 2300	Crest-CorrectedC	25999.98	99.91	120.088		120.19	0.000094	2.59	10055.06	628.79	0.11
Reach-1	270472	02JAN2012 2300	Crest-ProposedD1	26000.04	99.91	120.088		120.19	0.000094	2.59	10055.06	628.79	0.11
Reach-1	270472	02JAN2012 2300	Crest-ProposedD2	25999.96	99.91	120.088		120.19	0.000094	2.59	10055.06	628.79	0.11
Reach-1	269529	02JAN2012 2300	Norm-CorrectedC	8564.01	100.75	112.708		112.74	0.000073	1.53	5584.18	640.43	0.09
Reach-1	269529	02JAN2012 2300	Norm-ProposedD1	8564.02	100.75	112.708		112.74	0.000073	1.53	5584.18	640.43	0.09
Reach-1	269529	02JAN2012 2300	Norm-ProposedD2	8563.98	100.75	112.708		112.74	0.000073	1.53	5584.18	640.43	0.09
Reach-1	269529	02JAN2012 2300	MidPt-CorrectedC	17000.01	100.75	116.771		116.84	0.000082	2.07	8203.98	649.07	0.10
Reach-1	269529	02JAN2012 2300	MidPt-ProposedD1	16999.99	100.75	116.771		116.84	0.000082	2.07	8203.98	649.07	0.10
Reach-1	269529	02JAN2012 2300	MidPt-ProposedD2	17000.01	100.75	116.771		116.84	0.000082	2.07	8203.98	649.07	0.10
Reach-1	269529	02JAN2012 2300	Crest-CorrectedC	26000.05	100.75	120.006		120.10	0.000091	2.52	10314.88	656.36	0.11
Reach-1	269529	02JAN2012 2300	Crest-ProposedD1	25999.98	100.75	120.006		120.10	0.000091	2.52	10314.88	656.36	0.11
Reach-1	269529	02JAN2012 2300	Crest-ProposedD2	26000.01	100.75	120.006		120.10	0.000091	2.52	10314.88	656.36	0.11
Reach-1	268320	02JAN2012 2300	Norm-CorrectedC	8563.99	100.75	112.617		112.65	0.000076	1.55	5525.97	640.24	0.09
Reach-1	268320	02JAN2012 2300	Norm-ProposedD1	8563.97	100.75	112.617		112.65	0.000076	1.55	5525.97	640.24	0.09
Reach-1	268320	02JAN2012 2300	Norm-ProposedD2	8564.02	100.75	112.617		112.65	0.000076	1.55	5525.97	640.24	0.09
Reach-1	268320	02JAN2012 2300	MidPt-CorrectedC	16999.99	100.75	116.669		116.74	0.000084	2.09	8137.92	648.85	0.10
Reach-1	268320	02JAN2012 2300	MidPt-ProposedD1	17000.02	100.75	116.669		116.74	0.000084	2.09	8137.92	648.85	0.10
Reach-1	268320	02JAN2012 2300	MidPt-ProposedD2	16999.97	100.75	116.669		116.74	0.000084	2.09	8137.92	648.85	0.10
Reach-1	268320	02JAN2012 2300	Crest-CorrectedC	25999.97	100.75	119.893		119.99	0.000094	2.54	10241.57	658.00	0.11
Reach-1	268320	02JAN2012 2300	Crest-ProposedD1	26000.00	100.75	119.893		119.99	0.000094	2.54	10241.57	658.00	0.11
Reach-1	268320	02JAN2012 2300	Crest-ProposedD2	25999.99	100.75	119.893		119.99	0.000094	2.54	10241.57	658.00	0.11
Reach-1	267678	02JAN2012 2300	Norm-CorrectedC	8564.01	100.75	112.568		112.61	0.000078	1.54	5556.48	661.08	0.09
Reach-1	267678	02JAN2012 2300	Norm-ProposedD1	8563.99	100.75	112.568		112.61	0.000078	1.54	5556.48	661.08	0.09
Reach-1	267678	02JAN2012 2300	Norm-ProposedD2	8563.99	100.75	112.568		112.61	0.000078	1.54	5556.48	661.08	0.09
Reach-1	267678	02JAN2012 2300	MidPt-CorrectedC	16999.99	100.75	116.617		116.68	0.000084	2.06	8252.54	671.08	0.10
Reach-1	267678	02JAN2012 2300	MidPt-ProposedD1	16999.98	100.75	116.617		116.68	0.000084	2.06	8252.54	671.08	0.10
Reach-1	267678	02JAN2012 2300	MidPt-ProposedD2	17000.02	100.75	116.617		116.68	0.000084	2.06	8252.54	671.08	0.10
Reach-1	267678	02JAN2012 2300	Crest-CorrectedC	26000.00	100.75	119.836		119.93	0.000092	2.49	10458.02	756.40	0.11
Reach-1	267678	02JAN2012 2300	Crest-ProposedD1	25999.97	100.75	119.836		119.93	0.000092	2.49	10458.02	756.40	0.11
Reach-1	267678	02JAN2012 2300	Crest-ProposedD2	26000.06	100.75	119.836		119.93	0.000092	2.49	10458.02	756.40	0.11
Reach-1	266472	02JAN2012 2300	Norm-CorrectedC	8563.99	100.75	112.472		112.51	0.000081	1.56	5485.41	657.57	0.10
Reach-1	266472	02JAN2012 2300	Norm-ProposedD1	8564.02	100.75	112.472		112.51	0.000081	1.56	5485.41	657.57	0.10
Reach-1	266472	02JAN2012 2300	Norm-ProposedD2	8564.02	100.75	112.472		112.51	0.000081	1.56	5485.41	657.57	0.10
Reach-1	266472	02JAN2012 2300	MidPt-CorrectedC	16999.99	100.75	116.513		116.58	0.000086	2.08	8157.94	665.11	0.10
Reach-1	266472	02JAN2012 2300	MidPt-ProposedD1	17000.02	100.75	116.513		116.58	0.000086	2.08	8157.94	665.11	0.10
Reach-1	266472	02JAN2012 2300	MidPt-ProposedD2	16999.97	100.75	116.513		116.58	0.000086	2.08	8157.94	665.11	0.10
Reach-1	266472	02JAN2012 2300	Crest-CorrectedC	25999.98	100.75	119.722		119.82	0.000095	2.52	10878.28	1208.58	0.11
Reach-1	266472	02JAN2012 2300	Crest-ProposedD1	26000.04	100.75	119.722		119.82	0.000095	2.52	10878.28	1208.58	0.11
Reach-1	266472	02JAN2012 2300	Crest-ProposedD2	25999.94	100.75	119.722		119.82	0.000095	2.52	10878.28	1208.58	0.11
Reach-1	265472	02JAN2012 2300	Norm-CorrectedC	8564.00	100.76	112.400		112.43	0.000070	1.49	5759.35	666.65	0.09
Reach-1	265472	02JAN2012 2300	Norm-ProposedD1	8563.98	100.76	112.400		112.43	0.000070	1.49	5759.35	666.65	0.09
Reach-1	265472	02JAN2012 2300	Norm-ProposedD2	8563.99	100.76	112.400		112.43	0.000070	1.49	5759.35	666.65	0.09
Reach-1	265472	02JAN2012 2300	MidPt-CorrectedC	17000.00	100.76	116.435		116.50	0.000078	2.01	8458.63	671.19	0.10
Reach-1	265472	02JAN2012 2300	MidPt-ProposedD1	16999.96	100.76	116.435		116.50	0.000078	2.01	8458.63	671.19	0.10
Reach-1	265472	02JAN2012 2300	MidPt-ProposedD2	17000.02	100.76	116.435		116.50	0.000078	2.01	8458.63	671.19	0.10
Reach-1	265472	02JAN2012 2300	Crest-CorrectedC	26000.04	100.76	119.637		119.73	0.000087	2.44	11296.32	1532.27	0.11
Reach-1	265472	02JAN2012 2300	Crest-ProposedD1	25999.97	100.76	119.637		119.73	0.000087	2.44	11296.32	1532.27	0.11

HEC-RAS River: Congaree River Reach: Reach-1 Profile: 02JAN2012 2300 (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	265472	02JAN2012 2300	Crest-ProposedD2	26000.07	100.76	119.637		119.73	0.000087	2.44	11296.32	1532.27	0.11
Reach-1	264426	02JAN2012 2300	Norm-CorrectedC	8564.00	100.76	112.325		112.36	0.000072	1.50	5710.33	667.58	0.09
Reach-1	264426	02JAN2012 2300	Norm-ProposedD1	8564.01	100.76	112.325		112.36	0.000072	1.50	5710.33	667.58	0.09
Reach-1	264426	02JAN2012 2300	Norm-ProposedD2	8564.03	100.76	112.325		112.36	0.000072	1.50	5710.33	667.58	0.09
Reach-1	264426	02JAN2012 2300	MidPt-CorrectedC	16999.99	100.76	116.352		116.42	0.000080	2.02	8472.33	953.02	0.10
Reach-1	264426	02JAN2012 2300	MidPt-ProposedD1	17000.02	100.76	116.352		116.42	0.000080	2.02	8472.33	953.02	0.10
Reach-1	264426	02JAN2012 2300	MidPt-ProposedD2	16999.98	100.76	116.352		116.42	0.000080	2.02	8472.33	953.02	0.10
Reach-1	264426	02JAN2012 2300	Crest-CorrectedC	25999.98	100.76	119.551		119.64	0.000086	2.42	12357.42	1295.18	0.11
Reach-1	264426	02JAN2012 2300	Crest-ProposedD1	26000.01	100.76	119.551		119.64	0.000086	2.42	12357.42	1295.18	0.11
Reach-1	264426	02JAN2012 2300	Crest-ProposedD2	25999.96	100.76	119.551		119.64	0.000086	2.42	12357.42	1295.18	0.11
Reach-1	263569	02JAN2012 2300	Norm-CorrectedC	8564.01	100.76	112.266		112.30	0.000071	1.44	5933.83	729.88	0.09
Reach-1	263569	02JAN2012 2300	Norm-ProposedD1	8564.00	100.76	112.266		112.30	0.000071	1.44	5933.83	729.88	0.09
Reach-1	263569	02JAN2012 2300	Norm-ProposedD2	8563.98	100.76	112.266		112.30	0.000071	1.44	5933.83	729.88	0.09
Reach-1	263569	02JAN2012 2300	MidPt-CorrectedC	17000.01	100.76	116.293		116.35	0.000075	1.91	8990.92	830.05	0.10
Reach-1	263569	02JAN2012 2300	MidPt-ProposedD1	16999.98	100.76	116.293		116.35	0.000075	1.91	8990.92	830.05	0.10
Reach-1	263569	02JAN2012 2300	MidPt-ProposedD2	17000.03	100.76	116.293		116.35	0.000075	1.91	8990.92	830.05	0.10
Reach-1	263569	02JAN2012 2300	Crest-CorrectedC	26000.01	100.76	119.488		119.57	0.000081	2.28	12006.79	1008.33	0.10
Reach-1	263569	02JAN2012 2300	Crest-ProposedD1	25999.99	100.76	119.488		119.57	0.000081	2.28	12006.79	1008.33	0.10
Reach-1	263569	02JAN2012 2300	Crest-ProposedD2	26000.06	100.76	119.488		119.57	0.000081	2.28	12006.79	1008.33	0.10
Reach-1	262577	02JAN2012 2300	Norm-CorrectedC	8564.00	100.76	112.198		112.23	0.000073	1.38	6228.78	953.77	0.09
Reach-1	262577	02JAN2012 2300	Norm-ProposedD1	8564.00	100.76	112.198		112.23	0.000073	1.38	6228.78	953.77	0.09
Reach-1	262577	02JAN2012 2300	Norm-ProposedD2	8564.01	100.76	112.198		112.23	0.000073	1.38	6228.78	953.77	0.09
Reach-1	262577	02JAN2012 2300	MidPt-CorrectedC	16999.99	100.76	116.234		116.28	0.000067	1.75	11540.56	1800.80	0.09
Reach-1	262577	02JAN2012 2300	MidPt-ProposedD1	17000.01	100.76	116.234		116.28	0.000067	1.75	11540.56	1800.80	0.09
Reach-1	262577	02JAN2012 2300	MidPt-ProposedD2	16999.97	100.76	116.234		116.28	0.000067	1.75	11540.56	1800.80	0.09
Reach-1	262577	02JAN2012 2300	Crest-CorrectedC	25999.96	100.76	119.439		119.50	0.000065	2.00	17804.12	2096.26	0.09
Reach-1	262577	02JAN2012 2300	Crest-ProposedD1	26000.01	100.76	119.439		119.50	0.000065	2.00	17804.12	2096.26	0.09
Reach-1	262577	02JAN2012 2300	Crest-ProposedD2	25999.94	100.76	119.439		119.50	0.000065	2.00	17804.12	2096.26	0.09
Reach-1	261551	02JAN2012 2300	Norm-CorrectedC	8564.00	97.61	112.134		112.16	0.000055	1.34	6440.27	773.62	0.08
Reach-1	261551	02JAN2012 2300	Norm-ProposedD1	8563.99	97.61	112.134		112.16	0.000055	1.34	6440.27	773.62	0.08
Reach-1	261551	02JAN2012 2300	Norm-ProposedD2	8563.99	97.61	112.134		112.16	0.000055	1.34	6440.27	773.62	0.08
Reach-1	261551	02JAN2012 2300	MidPt-CorrectedC	17000.02	97.61	116.162		116.21	0.000063	1.82	9613.74	806.68	0.09
Reach-1	261551	02JAN2012 2300	MidPt-ProposedD1	17000.00	97.61	116.162		116.21	0.000063	1.82	9613.74	806.68	0.09
Reach-1	261551	02JAN2012 2300	MidPt-ProposedD2	17000.03	97.61	116.162		116.21	0.000063	1.82	9613.74	806.68	0.09
Reach-1	261551	02JAN2012 2300	Crest-CorrectedC	26000.04	97.61	119.348		119.42	0.000088	2.21	12466.72	1157.40	0.11
Reach-1	261551	02JAN2012 2300	Crest-ProposedD1	26000.00	97.61	119.348		119.42	0.000088	2.21	12466.72	1157.40	0.11
Reach-1	261551	02JAN2012 2300	Crest-ProposedD2	26000.04	97.61	119.348		119.42	0.000088	2.21	12466.72	1157.40	0.11
Reach-1	260635	02JAN2012 2300	Norm-CorrectedC	8564.01	97.61	112.083		112.11	0.000054	1.37	6358.23	755.96	0.08
Reach-1	260635	02JAN2012 2300	Norm-ProposedD1	8564.02	97.61	112.083		112.11	0.000054	1.37	6358.23	755.96	0.08
Reach-1	260635	02JAN2012 2300	Norm-ProposedD2	8564.02	97.61	112.083		112.11	0.000054	1.37	6358.23	755.96	0.08
Reach-1	260635	02JAN2012 2300	MidPt-CorrectedC	16999.99	97.61	116.100		116.15	0.000065	1.88	9416.42	767.69	0.09
Reach-1	260635	02JAN2012 2300	MidPt-ProposedD1	17000.01	97.61	116.100		116.15	0.000065	1.88	9416.42	767.69	0.09
Reach-1	260635	02JAN2012 2300	MidPt-ProposedD2	16999.97	97.61	116.100		116.15	0.000065	1.88	9416.42	767.69	0.09
Reach-1	260635	02JAN2012 2300	Crest-CorrectedC	25999.99	97.61	119.271		119.35	0.000075	2.31	11876.59	786.48	0.10
Reach-1	260635	02JAN2012 2300	Crest-ProposedD1	25999.99	97.61	119.271		119.35	0.000075	2.31	11876.59	786.48	0.10
Reach-1	260635	02JAN2012 2300	Crest-ProposedD2	25999.94	97.61	119.271		119.35	0.000075	2.31	11876.59	786.48	0.10
Reach-1	259263	02JAN2012 2300	Norm-CorrectedC	8563.98	97.61	112.008	104.11	112.04	0.000056	1.38	6354.44	762.01	0.08
Reach-1	259263	02JAN2012 2300	Norm-ProposedD1	8563.99	97.61	112.008	104.11	112.04	0.000056	1.38	6354.44	762.01	0.08
Reach-1	259263	02JAN2012 2300	Norm-ProposedD2	8564.00	97.61	112.008	104.11	112.04	0.000056	1.38	6354.44	762.01	0.08
Reach-1	259263	02JAN2012 2300	MidPt-CorrectedC	17000.01	97.61	116.010	105.36	116.06	0.000066	1.88	9711.80	1013.31	0.09
Reach-1	259263	02JAN2012 2300	MidPt-ProposedD1	16999.99	97.61	116.010	105.37	116.06	0.000066	1.88	9711.80	1013.31	0.09
Reach-1	259263	02JAN2012 2300	MidPt-ProposedD2	17000.02	97.61	116.010	105.37	116.06	0.000066	1.88	9711.80	1013.31	0.09
Reach-1	259263	02JAN2012 2300	Crest-CorrectedC	26000.00	97.61	119.171	106.29	119.25	0.000074	2.28	13394.22	1280.79	0.10
Reach-1	259263	02JAN2012 2300	Crest-ProposedD1	26000.00	97.61	119.171	106.29	119.25	0.000074	2.28	13394.22	1280.79	0.10
Reach-1	259263	02JAN2012 2300	Crest-ProposedD2	26000.08	97.61	119.171	106.30	119.25	0.000074	2.28	13394.22	1280.79	0.10
Reach-1	259032			Bridge									
Reach-1	258805	02JAN2012 2300	Norm-CorrectedC	8563.98	98.28	111.958		111.99	0.000073	1.50	5915.27	917.15	0.09
Reach-1	258805	02JAN2012 2300	Norm-ProposedD1	8563.99	98.28	111.958		111.99	0.000073	1.50	5915.27	917.15	0.09
Reach-1	258805	02JAN2012 2300	Norm-ProposedD2	8564.00	98.28	111.958		111.99	0.000073	1.50	5915.27	917.15	0.09
Reach-1	258805	02JAN2012 2300	MidPt-CorrectedC	17000.01	98.28	115.959		116.02	0.000076	1.95	10588.84	1355.93	0.10
Reach-1	258805	02JAN2012 2300	MidPt-ProposedD1	16999.99	98.28	115.959		116.02	0.000076	1.95	10588.84	1355.93	0.10
Reach-1	258805	02JAN2012 2300	MidPt-ProposedD2	17000.02	98.28	115.959		116.02	0.000076	1.95	10588.84	1355.93	0.10
Reach-1	258805	02JAN2012 2300	Crest-CorrectedC	26000.00	98.28	119.117		119.19	0.000079	2.29	15174.03	1574.47	0.10
Reach-1	258805	02JAN2012 2300	Crest-ProposedD1	26000.00	98.28	119.117		119.19	0.000079	2.29	15174.03	1574.47	0.10
Reach-1	258805	02JAN2012 2300	Crest-ProposedD2	26000.08	98.28	119.117		119.19	0.000079	2.29	15174.03	1574.47	0.10
Reach-1	257368	02JAN2012 2300	Norm-CorrectedC	8564.01	97.61	111.206		111.24	0.000977	1.51	5656.95	684.66	0.09
Reach-1	257368	02JAN2012 2300	Norm-ProposedD1	8563.99	97.61	111.206		111.24	0.000977	1.51	5656.95	684.66	0.09
Reach-1	257368	02JAN2012 2300	Norm-ProposedD2	8564.00	97.61	111.206		111.24	0.000977	1.51	5656.95	684.66	0.09
Reach-1	257368	02JAN2012 2300	MidPt-CorrectedC	16999.98	97.61	115.215		115.27	0.001003	1.94	9453.12	1193.39	0.10
Reach-1	257368	02JAN2012 2300	MidPt-ProposedD1	17000.01	97.61	115.215		115.27	0.001003	1.94	9453.12	1193.39	0.10
Reach-1	257368	02JAN2012 2300	MidPt-ProposedD2	16999.97	97.61	115.215		115.27	0.001003	1.94	9453.12	1193.39	0.10
Reach-1	257368	02JAN2012 2300	Crest-CorrectedC	25999.99	97.61	118.438		118.50	0.000943	2.15	13761.24	1485.62	0.10
Reach-1	257368	02JAN2012 2300	Crest-ProposedD1	25999.99	97.61	118.438		118.50	0.000943	2.15	13761.24	1485.62	0.10
Reach-1	257368	02JAN2012 2300	Crest-ProposedD2	25999.92	97.61	118.438		118.50	0.000943	2.15	13761.24	1485.62	0.10
Reach-1	254766	02JAN2012 2300	Norm-CorrectedC	8563.99	99.27	109.444		109.54	0.000334	2.51	3411.78	585.00	0.18
Reach-1	254766	02JAN2012 2300	Norm-ProposedD1	8564.00	99.27	109.444		109.54	0.000334	2.51	3411.78	585.00	0.18
Reach-1	254766	02JAN2012 2300	Norm-ProposedD2	8564.01	99.27	109.444		109.54	0.000334	2.51	3411.78	585.00	0.18
Reach-1	254766	02JAN2012 2300	MidPt-CorrectedC	17000.02	99.27	113.537		113.66	0.000265	2.83	6000.67	771.44	0.17
Reach-1	254766	02JAN2012 2300	MidPt-ProposedD1	16999.99	99.27	113.537		113.66	0.000265	2.83	6000.59	771.44	0.17
Reach-1	254766	02JAN2012 2300	MidPt-ProposedD2	17000.04	99.27	113.537		113.66	0.000265	2.83	6000.67	771.44	0.17
Reach-1	254766	02JAN2012 2300	Crest-CorrectedC	26000.01	99.27	116.932		117.07	0.000216	3.01	9215.00	1403.83	0.16
Reach-1	254766	02JAN2012 2300	Crest-ProposedD1	26000.02	99.27	116.932		117.07	0.000216	3.01	9215.00	1403.83	0.16
Reach-1	254766	02JAN2012 2300	Crest-ProposedD2	26000.07	99.27	116.932		117.07	0.000216	3.01	9215.00	1403.83	0.16

HEC-RAS River: Congaree River Reach: Reach-1 Profile: 02JAN2012 2300 (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	250071	02JAN2012 2300	Norm-CorrectedC	8564.02	84.54	108.520		108.59	0.000074	2.05	4177.63	307.52	0.10
Reach-1	250071	02JAN2012 2300	Norm-ProposedD1	8564.00	84.54	108.520		108.59	0.000074	2.05	4177.63	307.52	0.10
Reach-1	250071	02JAN2012 2300	Norm-ProposedD2	8564.00	84.54	108.520		108.59	0.000074	2.05	4177.63	307.52	0.10
Reach-1	250071	02JAN2012 2300	MidPt-CorrectedC	16999.99	84.54	112.575		112.72	0.000139	3.08	5517.10	352.79	0.14
Reach-1	250071	02JAN2012 2300	MidPt-ProposedD1	17000.01	84.54	112.575		112.72	0.000139	3.08	5517.10	352.79	0.14
Reach-1	250071	02JAN2012 2300	MidPt-ProposedD2	16999.96	84.54	112.575		112.72	0.000139	3.08	5517.10	352.79	0.14
Reach-1	250071	02JAN2012 2300	Crest-CorrectedC	25999.98	84.54	115.898		116.13	0.000197	3.84	6765.52	402.91	0.17
Reach-1	250071	02JAN2012 2300	Crest-ProposedD1	25999.99	84.54	115.898		116.13	0.000197	3.84	6765.52	402.91	0.17
Reach-1	250071	02JAN2012 2300	Crest-ProposedD2	25999.94	84.54	115.898		116.13	0.000197	3.84	6765.52	402.91	0.17
Reach-1	248531	02JAN2012 2300	Norm-CorrectedC	8563.99	84.54	108.404		108.47	0.000076	2.07	4141.94	306.25	0.10
Reach-1	248531	02JAN2012 2300	Norm-ProposedD1	8564.01	84.54	108.404		108.47	0.000076	2.07	4141.94	306.25	0.10
Reach-1	248531	02JAN2012 2300	Norm-ProposedD2	8564.01	84.54	108.404		108.47	0.000076	2.07	4141.94	306.25	0.10
Reach-1	248531	02JAN2012 2300	MidPt-CorrectedC	16999.99	84.54	112.358		112.51	0.000142	3.11	5739.93	472.11	0.14
Reach-1	248531	02JAN2012 2300	MidPt-ProposedD1	17000.00	84.54	112.358		112.51	0.000142	3.11	5739.93	472.11	0.14
Reach-1	248531	02JAN2012 2300	MidPt-ProposedD2	17000.03	84.54	112.358		112.51	0.000142	3.11	5739.93	472.11	0.14
Reach-1	248531	02JAN2012 2300	Crest-CorrectedC	26000.01	84.54	115.610		115.84	0.000181	3.87	7349.84	522.39	0.16
Reach-1	248531	02JAN2012 2300	Crest-ProposedD1	25999.99	84.54	115.610		115.84	0.000181	3.87	7349.84	522.39	0.16
Reach-1	248531	02JAN2012 2300	Crest-ProposedD2	26000.05	84.54	115.610		115.84	0.000181	3.87	7349.84	522.39	0.16
Reach-1	246078	02JAN2012 2300	Norm-CorrectedC	8564.01	98.13	108.035		108.12	0.000212	2.31	3712.56	510.19	0.15
Reach-1	246078	02JAN2012 2300	Norm-ProposedD1	8564.00	98.13	108.035		108.12	0.000212	2.31	3712.56	510.19	0.15
Reach-1	246078	02JAN2012 2300	Norm-ProposedD2	8563.98	98.13	108.035		108.12	0.000212	2.31	3712.56	510.19	0.15
Reach-1	246078	02JAN2012 2300	MidPt-CorrectedC	17000.01	98.13	111.969		112.10	0.000199	2.91	5975.25	605.01	0.16
Reach-1	246078	02JAN2012 2300	MidPt-ProposedD1	17000.00	98.13	111.969		112.10	0.000199	2.91	5975.25	605.01	0.16
Reach-1	246078	02JAN2012 2300	MidPt-ProposedD2	16999.97	98.13	111.969		112.10	0.000199	2.91	5975.19	605.01	0.16
Reach-1	246078	02JAN2012 2300	Crest-CorrectedC	26000.00	98.13	115.223		115.39	0.000193	3.35	7978.48	626.19	0.16
Reach-1	246078	02JAN2012 2300	Crest-ProposedD1	26000.00	98.13	115.223		115.39	0.000193	3.35	7978.48	626.19	0.16
Reach-1	246078	02JAN2012 2300	Crest-ProposedD2	25999.95	98.13	115.223		115.39	0.000193	3.35	7978.48	626.19	0.16
Reach-1	244614	02JAN2012 2300	Norm-CorrectedC	8564.00	98.13	107.712		107.79	0.000233	2.27	3765.14	570.04	0.16
Reach-1	244614	02JAN2012 2300	Norm-ProposedD1	8564.00	98.13	107.712		107.79	0.000233	2.27	3765.14	570.04	0.16
Reach-1	244614	02JAN2012 2300	Norm-ProposedD2	8564.01	98.13	107.712		107.79	0.000233	2.27	3765.14	570.04	0.16
Reach-1	244614	02JAN2012 2300	MidPt-CorrectedC	17000.01	98.13	111.690		111.81	0.000195	2.80	6078.49	659.78	0.15
Reach-1	244614	02JAN2012 2300	MidPt-ProposedD1	17000.01	98.13	111.690		111.81	0.000195	2.80	6078.49	659.78	0.15
Reach-1	244614	02JAN2012 2300	MidPt-ProposedD2	17000.01	98.13	111.690		111.81	0.000195	2.80	6078.49	659.78	0.15
Reach-1	244614	02JAN2012 2300	Crest-CorrectedC	26000.00	98.13	114.953		115.12	0.000187	3.24	8027.28	698.65	0.16
Reach-1	244614	02JAN2012 2300	Crest-ProposedD1	25999.98	98.13	114.953		115.12	0.000187	3.24	8027.28	698.65	0.16
Reach-1	244614	02JAN2012 2300	Crest-ProposedD2	26000.03	98.13	114.953		115.12	0.000187	3.24	8027.28	698.65	0.16
Reach-1	242472	02JAN2012 2300	Norm-CorrectedC	8564.00	94.20	105.289		105.36	0.002043	2.09	4093.20	530.79	0.13
Reach-1	242472	02JAN2012 2300	Norm-ProposedD1	8564.00	94.20	105.289		105.36	0.002043	2.09	4093.20	530.79	0.13
Reach-1	242472	02JAN2012 2300	Norm-ProposedD2	8564.00	94.20	105.289		105.36	0.002043	2.09	4093.20	530.79	0.13
Reach-1	242472	02JAN2012 2300	MidPt-CorrectedC	16999.99	94.20	109.097		109.21	0.002231	2.75	6192.33	569.52	0.15
Reach-1	242472	02JAN2012 2300	MidPt-ProposedD1	17000.00	94.20	109.097		109.21	0.002231	2.75	6192.33	569.52	0.15
Reach-1	242472	02JAN2012 2300	MidPt-ProposedD2	16999.99	94.20	109.097		109.21	0.002231	2.75	6192.33	569.52	0.15
Reach-1	242472	02JAN2012 2300	Crest-CorrectedC	25999.98	94.20	112.226		112.39	0.002360	3.24	8019.31	638.12	0.16
Reach-1	242472	02JAN2012 2300	Crest-ProposedD1	26000.00	94.20	112.226		112.39	0.002360	3.24	8019.31	638.12	0.16
Reach-1	242472	02JAN2012 2300	Crest-ProposedD2	25999.96	94.20	112.226		112.39	0.002359	3.24	8019.31	638.12	0.16
Reach-1	241833	02JAN2012 2300	Norm-CorrectedC	8564.01	93.70	104.574		104.65	0.000177	2.19	3915.26	509.97	0.14
Reach-1	241833	02JAN2012 2300	Norm-ProposedD1	8563.99	93.70	104.574		104.65	0.000177	2.19	3915.26	509.97	0.14
Reach-1	241833	02JAN2012 2300	Norm-ProposedD2	8563.99	93.70	104.574		104.65	0.000177	2.19	3915.26	509.97	0.14
Reach-1	241833	02JAN2012 2300	MidPt-CorrectedC	17000.01	93.70	108.309		108.44	0.000190	2.91	5846.18	523.96	0.15
Reach-1	241833	02JAN2012 2300	MidPt-ProposedD1	16999.98	93.70	108.309		108.44	0.000190	2.91	5846.18	523.96	0.15
Reach-1	241833	02JAN2012 2300	MidPt-ProposedD2	17000.03	93.70	108.309		108.44	0.000190	2.91	5846.18	523.96	0.15
Reach-1	241833	02JAN2012 2300	Crest-CorrectedC	26000.04	93.70	111.383		111.57	0.000203	3.48	7473.59	534.38	0.16
Reach-1	241833	02JAN2012 2300	Crest-ProposedD1	26000.01	93.70	111.383		111.57	0.000203	3.48	7473.59	534.38	0.16
Reach-1	241833	02JAN2012 2300	Crest-ProposedD2	26000.03	93.70	111.383		111.57	0.000203	3.48	7473.59	534.38	0.16
Reach-1	240531	02JAN2012 2300	Norm-CorrectedC	8564.00	93.60	104.388		104.45	0.000135	1.92	4458.48	577.71	0.12
Reach-1	240531	02JAN2012 2300	Norm-ProposedD1	8564.00	93.60	104.388		104.45	0.000135	1.92	4458.48	577.71	0.12
Reach-1	240531	02JAN2012 2300	Norm-ProposedD2	8564.02	93.60	104.388		104.45	0.000135	1.92	4458.48	577.71	0.12
Reach-1	240531	02JAN2012 2300	MidPt-CorrectedC	16999.98	93.60	108.119		108.22	0.000147	2.56	6639.39	591.50	0.13
Reach-1	240531	02JAN2012 2300	MidPt-ProposedD1	17000.01	93.60	108.119		108.22	0.000147	2.56	6639.39	591.50	0.13
Reach-1	240531	02JAN2012 2300	MidPt-ProposedD2	16999.98	93.60	108.119		108.22	0.000147	2.56	6639.39	591.50	0.13
Reach-1	240531	02JAN2012 2300	Crest-CorrectedC	25999.96	93.60	111.190		111.34	0.000158	3.07	8473.39	602.85	0.14
Reach-1	240531	02JAN2012 2300	Crest-ProposedD1	25999.99	93.60	111.190		111.34	0.000158	3.07	8473.39	602.85	0.14
Reach-1	240531	02JAN2012 2300	Crest-ProposedD2	25999.96	93.60	111.190		111.34	0.000158	3.07	8473.39	602.85	0.14
Reach-1	235176	02JAN2012 2300	Norm-CorrectedC	8564.00	92.80	103.639		103.70	0.000142	2.05	4184.24	510.57	0.13
Reach-1	235176	02JAN2012 2300	Norm-ProposedD1	8564.00	92.80	103.639		103.70	0.000142	2.05	4184.24	510.57	0.13
Reach-1	235176	02JAN2012 2300	Norm-ProposedD2	8563.98	92.80	103.639		103.70	0.000142	2.05	4184.24	510.57	0.13
Reach-1	235176	02JAN2012 2300	MidPt-CorrectedC	17000.01	92.80	107.252		107.37	0.000169	2.82	6039.00	516.20	0.15
Reach-1	235176	02JAN2012 2300	MidPt-ProposedD1	17000.00	92.80	107.252		107.37	0.000169	2.82	6039.00	516.20	0.15
Reach-1	235176	02JAN2012 2300	MidPt-ProposedD2	17000.02	92.80	107.252		107.37	0.000169	2.82	6039.00	516.20	0.15
Reach-1	235176	02JAN2012 2300	Crest-CorrectedC	26000.02	92.80	110.228		110.41	0.000189	3.43	7611.30	550.45	0.16
Reach-1	235176	02JAN2012 2300	Crest-ProposedD1	26000.00	92.80	110.228		110.41	0.000189	3.43	7611.30	550.45	0.16
Reach-1	235176	02JAN2012 2300	Crest-ProposedD2	26000.05	92.80	110.228		110.41	0.000189	3.43	7611.30	550.45	0.16
Reach-1	232472	02JAN2012 2300	Norm-CorrectedC	8564.00	91.70	103.302		103.35	0.000117	1.83	4669.44	582.01	0.11
Reach-1	232472	02JAN2012 2300	Norm-ProposedD1	8564.00	91.70	103.302		103.35	0.000117	1.83	4669.44	582.01	0.11
Reach-1	232472	02JAN2012 2300	Norm-ProposedD2	8564.02	91.70	103.302		103.35	0.000117	1.83	4669.44	582.01	0.11
Reach-1	232472	02JAN2012 2300	MidPt-CorrectedC	16999.99	91.70	106.861		106.96	0.000138	2.51	6767.66	596.97	0.13
Reach-1	232472	02JAN2012 2300	MidPt-ProposedD1	17000.01	91.70	106.861		106.96	0.000138	2.51	6767.66	596.97	0.13
Reach-1	232472	02JAN2012 2300	MidPt-ProposedD2	16999.99	91.70	106.861		106.96	0.000138	2.51	6767.66	596.97	0.13
Reach-1	232472	02JAN2012 2300	Crest-CorrectedC	25999.96	91.70	109.804		109.95	0.000154	3.04	8559.90	626.76	0.14
Reach-1	232472	02JAN2012 2300	Crest-ProposedD1	25999.99	91.70	109.804		109.95	0.000154	3.04	8559.90	626.76	0.14
Reach-1	232472	02JAN2012 2300	Crest-ProposedD2	25999.96	91.70	109.804		109.95	0.000154	3.04	8559.90	626.76	0.14
Reach-1	231472	02JAN2012 2300	Norm-CorrectedC	8564.00	91.70	103.160		103.23	0.000139	2.07	4140.94	489.17	0.13
Reach-1	231472	02JAN2012 2300	Norm-ProposedD1	8563.99	91.70	103.160		103.23	0.000139	2.07	4140.94	489.17	0.13

HEC-RAS River: Congaree River Reach: Reach-1 Profile: 02JAN2012 2300 (Continued)

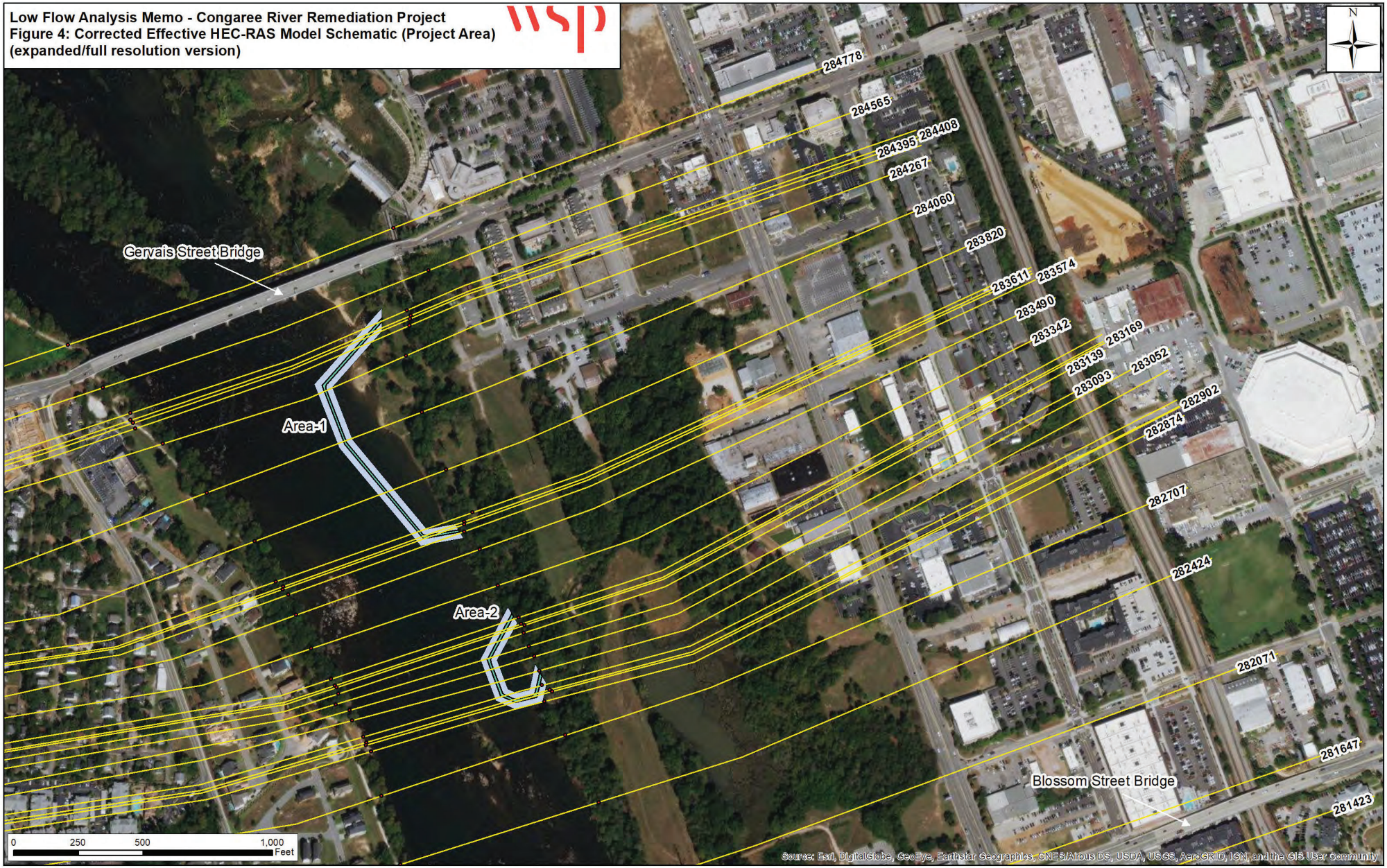
Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	231472	02JAN2012 2300	Norm-ProposedD2	8564.00	91.70	103.160		103.23	0.000139	2.07	4140.94	489.17	0.13
Reach-1	231472	02JAN2012 2300	MidPt-CorrectedC	17000.00	91.70	106.672		106.80	0.000177	2.89	5877.59	499.78	0.15
Reach-1	231472	02JAN2012 2300	MidPt-ProposedD1	17000.01	91.70	106.672		106.80	0.000177	2.89	5877.59	499.78	0.15
Reach-1	231472	02JAN2012 2300	MidPt-ProposedD2	17000.01	91.70	106.672		106.80	0.000177	2.89	5877.59	499.78	0.15
Reach-1	231472	02JAN2012 2300	Crest-CorrectedC	26000.02	91.70	109.576		109.77	0.000202	3.54	7338.09	506.49	0.16
Reach-1	231472	02JAN2012 2300	Crest-ProposedD1	26000.00	91.70	109.576		109.77	0.000202	3.54	7338.09	506.49	0.16
Reach-1	231472	02JAN2012 2300	Crest-ProposedD2	26000.03	91.70	109.576		109.77	0.000202	3.54	7338.09	506.49	0.16
Reach-1	230472	02JAN2012 2300	Norm-CorrectedC	8564.00	91.60	103.018		103.08	0.000144	2.07	4139.59	499.00	0.13
Reach-1	230472	02JAN2012 2300	Norm-ProposedD1	8564.00	91.60	103.018		103.08	0.000144	2.07	4139.59	499.00	0.13
Reach-1	230472	02JAN2012 2300	Norm-ProposedD2	8564.01	91.60	103.018		103.08	0.000144	2.07	4139.59	499.00	0.13
Reach-1	230472	02JAN2012 2300	MidPt-CorrectedC	16999.99	91.60	106.494		106.62	0.000180	2.89	5880.57	502.98	0.15
Reach-1	230472	02JAN2012 2300	MidPt-ProposedD1	17000.00	91.60	106.494		106.62	0.000180	2.89	5880.57	502.98	0.15
Reach-1	230472	02JAN2012 2300	MidPt-ProposedD2	16999.98	91.60	106.494		106.62	0.000180	2.89	5880.57	502.98	0.15
Reach-1	230472	02JAN2012 2300	Crest-CorrectedC	25999.98	91.60	109.372		109.57	0.000205	3.54	7335.92	508.38	0.16
Reach-1	230472	02JAN2012 2300	Crest-ProposedD1	25999.98	91.60	109.372		109.57	0.000205	3.54	7335.92	508.38	0.16
Reach-1	230472	02JAN2012 2300	Crest-ProposedD2	25999.97	91.60	109.372		109.57	0.000205	3.54	7335.92	508.38	0.16
Reach-1	229472	02JAN2012 2300	Norm-CorrectedC	8564.00	89.34	102.951		102.99	0.000053	1.49	5734.51	527.19	0.08
Reach-1	229472	02JAN2012 2300	Norm-ProposedD1	8564.00	89.34	102.951		102.99	0.000053	1.49	5734.51	527.19	0.08
Reach-1	229472	02JAN2012 2300	Norm-ProposedD2	8563.98	89.34	102.951		102.99	0.000053	1.49	5734.51	527.19	0.08
Reach-1	229472	02JAN2012 2300	MidPt-CorrectedC	17000.01	89.34	106.412		106.49	0.000085	2.25	7565.31	530.65	0.10
Reach-1	229472	02JAN2012 2300	MidPt-ProposedD1	16999.99	89.34	106.412		106.49	0.000085	2.25	7565.31	530.65	0.10
Reach-1	229472	02JAN2012 2300	MidPt-ProposedD2	17000.00	89.34	106.412		106.49	0.000085	2.25	7565.31	530.65	0.10
Reach-1	229472	02JAN2012 2300	Crest-CorrectedC	26000.01	89.34	109.282		109.41	0.000109	2.86	9092.23	533.52	0.12
Reach-1	229472	02JAN2012 2300	Crest-ProposedD1	25999.98	89.34	109.282		109.41	0.000109	2.86	9092.23	533.52	0.12
Reach-1	229472	02JAN2012 2300	Crest-ProposedD2	26000.03	89.34	109.282		109.41	0.000109	2.86	9092.23	533.52	0.12
Reach-1	228472	02JAN2012 2300	Norm-CorrectedC	8564.00	90.08	102.892		102.93	0.000063	1.52	5624.53	577.09	0.09
Reach-1	228472	02JAN2012 2300	Norm-ProposedD1	8564.00	90.08	102.892		102.93	0.000063	1.52	5624.53	577.09	0.09
Reach-1	228472	02JAN2012 2300	Norm-ProposedD2	8564.01	90.08	102.892		102.93	0.000063	1.52	5624.53	577.09	0.09
Reach-1	228472	02JAN2012 2300	MidPt-CorrectedC	16999.97	90.08	106.325		106.40	0.000092	2.23	7609.16	578.98	0.11
Reach-1	228472	02JAN2012 2300	MidPt-ProposedD1	17000.00	90.08	106.325		106.40	0.000092	2.23	7609.16	578.98	0.11
Reach-1	228472	02JAN2012 2300	MidPt-ProposedD2	16999.97	90.08	106.325		106.40	0.000092	2.23	7609.16	578.98	0.11
Reach-1	228472	02JAN2012 2300	Crest-CorrectedC	25999.98	90.08	109.176		109.30	0.000113	2.81	9261.84	580.55	0.12
Reach-1	228472	02JAN2012 2300	Crest-ProposedD1	26000.02	90.08	109.176		109.30	0.000113	2.81	9261.84	580.55	0.12
Reach-1	228472	02JAN2012 2300	Crest-ProposedD2	25999.99	90.08	109.176		109.30	0.000113	2.81	9261.84	580.55	0.12
Reach-1	227472	02JAN2012 2300	Norm-CorrectedC	8564.00	90.79	102.808		102.85	0.000085	1.71	4997.71	534.74	0.10
Reach-1	227472	02JAN2012 2300	Norm-ProposedD1	8564.01	90.79	102.808		102.85	0.000085	1.71	4997.71	534.74	0.10
Reach-1	227472	02JAN2012 2300	Norm-ProposedD2	8563.98	90.79	102.808		102.85	0.000085	1.71	4997.71	534.74	0.10
Reach-1	227472	02JAN2012 2300	MidPt-CorrectedC	17000.01	90.79	106.199		106.30	0.000121	2.50	6813.47	536.13	0.12
Reach-1	227472	02JAN2012 2300	MidPt-ProposedD1	17000.00	90.79	106.199		106.30	0.000121	2.50	6813.47	536.13	0.12
Reach-1	227472	02JAN2012 2300	MidPt-ProposedD2	17000.01	90.79	106.199		106.30	0.000121	2.50	6813.47	536.13	0.12
Reach-1	227472	02JAN2012 2300	Crest-CorrectedC	26000.02	90.79	109.016		109.17	0.000148	3.12	8325.78	540.64	0.14
Reach-1	227472	02JAN2012 2300	Crest-ProposedD1	25999.99	90.79	109.016		109.17	0.000148	3.12	8325.78	540.64	0.14
Reach-1	227472	02JAN2012 2300	Crest-ProposedD2	26000.01	90.79	109.016		109.17	0.000148	3.12	8325.78	540.64	0.14
Reach-1	226472	02JAN2012 2300	Norm-CorrectedC	8563.99	91.17	102.714		102.76	0.000099	1.75	4893.69	576.59	0.11
Reach-1	226472	02JAN2012 2300	Norm-ProposedD1	8564.00	91.17	102.714		102.76	0.000099	1.75	4893.69	576.59	0.11
Reach-1	226472	02JAN2012 2300	Norm-ProposedD2	8564.02	91.17	102.714		102.76	0.000099	1.75	4893.69	576.59	0.11
Reach-1	226472	02JAN2012 2300	MidPt-CorrectedC	16999.97	91.17	106.074		106.17	0.000130	2.49	6834.89	578.89	0.13
Reach-1	226472	02JAN2012 2300	MidPt-ProposedD1	17000.02	91.17	106.074		106.17	0.000130	2.49	6834.89	578.89	0.13
Reach-1	226472	02JAN2012 2300	MidPt-ProposedD2	16999.98	91.17	106.074		106.17	0.000130	2.49	6834.89	578.89	0.13
Reach-1	226472	02JAN2012 2300	Crest-CorrectedC	25999.98	91.17	108.871		109.02	0.000152	3.07	8460.48	583.51	0.14
Reach-1	226472	02JAN2012 2300	Crest-ProposedD1	25999.99	91.17	108.871		109.02	0.000152	3.07	8460.48	583.51	0.14
Reach-1	226472	02JAN2012 2300	Crest-ProposedD2	25999.97	91.17	108.871		109.02	0.000152	3.07	8460.48	583.51	0.14
Reach-1	225472	02JAN2012 2300	Norm-CorrectedC	8564.01	89.79	102.623		102.67	0.000084	1.74	4922.82	516.82	0.10
Reach-1	225472	02JAN2012 2300	Norm-ProposedD1	8564.00	89.79	102.623		102.67	0.000084	1.74	4922.82	516.82	0.10
Reach-1	225472	02JAN2012 2300	Norm-ProposedD2	8563.98	89.79	102.623		102.67	0.000084	1.74	4922.82	516.82	0.10
Reach-1	225472	02JAN2012 2300	MidPt-CorrectedC	17000.01	89.79	105.941		106.04	0.000125	2.55	6656.53	528.18	0.13
Reach-1	225472	02JAN2012 2300	MidPt-ProposedD1	17000.00	89.79	105.941		106.04	0.000125	2.55	6656.53	528.18	0.13
Reach-1	225472	02JAN2012 2300	MidPt-ProposedD2	17000.00	89.79	105.941		106.04	0.000125	2.55	6656.53	528.18	0.13
Reach-1	225472	02JAN2012 2300	Crest-CorrectedC	26000.01	89.79	108.706		108.86	0.000154	3.20	8128.62	535.90	0.14
Reach-1	225472	02JAN2012 2300	Crest-ProposedD1	25999.99	89.79	108.706		108.86	0.000154	3.20	8128.62	535.90	0.14
Reach-1	225472	02JAN2012 2300	Crest-ProposedD2	26000.02	89.79	108.706		108.86	0.000154	3.20	8128.62	535.90	0.14
Reach-1	224472	02JAN2012 2300	Norm-CorrectedC	8563.98	90.65	102.511		102.57	0.000120	1.93	4443.79	522.43	0.12
Reach-1	224472	02JAN2012 2300	Norm-ProposedD1	8564.00	90.65	102.511		102.57	0.000120	1.93	4443.79	522.43	0.12
Reach-1	224472	02JAN2012 2300	Norm-ProposedD2	8564.02	90.65	102.511		102.57	0.000120	1.93	4443.79	522.43	0.12
Reach-1	224472	02JAN2012 2300	MidPt-CorrectedC	16999.99	90.65	105.780		105.90	0.000166	2.75	6189.47	545.53	0.14
Reach-1	224472	02JAN2012 2300	MidPt-ProposedD1	17000.01	90.65	105.780		105.90	0.000166	2.75	6189.47	545.53	0.14
Reach-1	224472	02JAN2012 2300	MidPt-ProposedD2	17000.00	90.65	105.780		105.90	0.000166	2.75	6189.47	545.53	0.14
Reach-1	224472	02JAN2012 2300	Crest-CorrectedC	26000.01	90.65	108.513		108.69	0.000196	3.37	7706.89	564.83	0.16
Reach-1	224472	02JAN2012 2300	Crest-ProposedD1	26000.01	90.65	108.513		108.69	0.000196	3.37	7706.89	564.83	0.16
Reach-1	224472	02JAN2012 2300	Crest-ProposedD2	25999.98	90.65	108.513		108.69	0.000196	3.37	7706.89	564.83	0.16
Reach-1	223472	02JAN2012 2300	Norm-CorrectedC	8564.02	91.51	102.339		102.42	0.000182	2.26	3794.02	478.98	0.14
Reach-1	223472	02JAN2012 2300	Norm-ProposedD1	8564.00	91.51	102.339		102.42	0.000182	2.26	3794.02	478.98	0.14
Reach-1	223472	02JAN2012 2300	Norm-ProposedD2	8564.00	91.51	102.339		102.42	0.000182	2.26	3794.02	478.98	0.14
Reach-1	223472	02JAN2012 2300	MidPt-CorrectedC	17000.02	91.51	105.539		105.70	0.000236	3.18	5341.15	487.95	0.17
Reach-1	223472	02JAN2012 2300	MidPt-ProposedD1	16999.99	91.51	105.539		105.70	0.000236	3.18	5341.15	487.95	0.17
Reach-1	223472	02JAN2012 2300	MidPt-ProposedD2	17000.00	91.51	105.539		105.70	0.000236	3.18	5341.15	487.95	0.17
Reach-1	223472	02JAN2012 2300	Crest-CorrectedC	25999.98	91.51	108.220		108.46	0.000272	3.90	6659.20	495.45	0.19
Reach-1	223472	02JAN2012 2300	Crest-ProposedD1	25999.99	91.51	108.220		108.46	0.000272	3.90	6659.20	495.45	0.19
Reach-1	223472	02JAN2012 2300	Crest-ProposedD2	26000.00	91.51	108.220		108.46	0.000272	3.90	6659.20	495.45	0.19
Reach-1	222472	02JAN2012 2300	Norm-CorrectedC	8563.99	90.62	102.230		102.28	0.000100	1.73	4947.11	597.96	0.11
Reach-1	222472	02JAN2012 2300	Norm-ProposedD1	8564.00	90.62	102.230		102.28	0.000100	1.73	4947.11	597.96	0.11
Reach-1	222472	02JAN2012 2300	Norm-ProposedD2	8564.01	90.62	102.230		102.28	0.000100	1.73	4947.11	597.96	0.11
Reach-1	222472	02JAN2012 2300	MidPt-CorrectedC	17000.00	90.62	105.413		105.51	0.000143	2.45	6929.12	647.76	0.13
Reach-1	222472	02JAN2012 2300	MidPt-ProposedD1	16999.99	90.62	105.413		105.51	0.000143	2.45	6929.12	647.76	0.13

HEC-RAS River: Congaree River Reach: Reach-1 Profile: 02JAN2012 2300 (Continued)

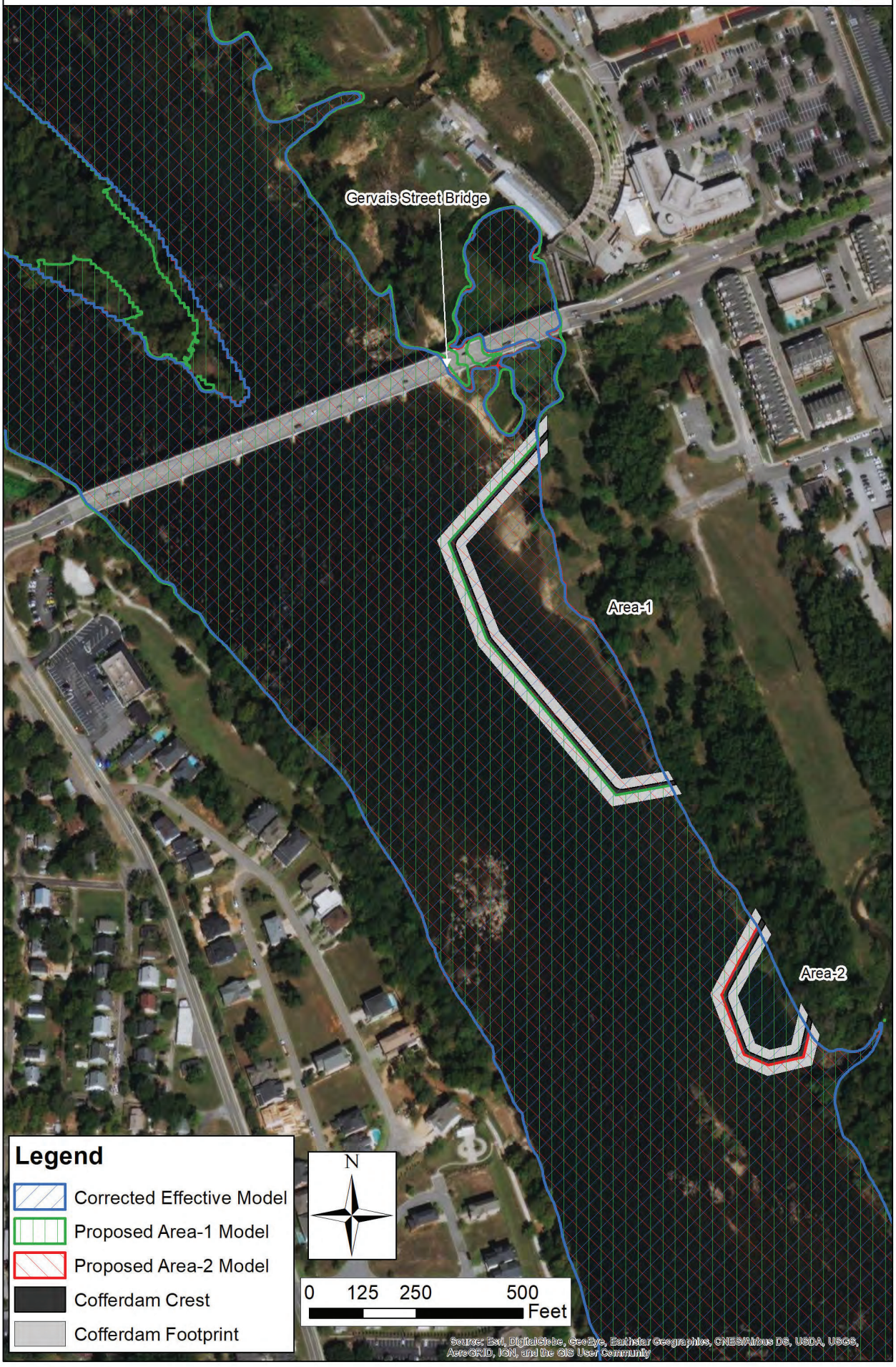
Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	222472	02JAN2012 2300	MidPt-ProposedD2	16999.98	90.62	105.413		105.51	0.000143	2.45	6929.12	647.76	0.13
Reach-1	222472	02JAN2012 2300	Crest-CorrectedC	26000.00	90.62	108.096		108.23	0.000169	2.98	8724.19	692.57	0.15
Reach-1	222472	02JAN2012 2300	Crest-ProposedD1	26000.00	90.62	108.096		108.23	0.000169	2.98	8724.19	692.57	0.15
Reach-1	222472	02JAN2012 2300	Crest-ProposedD2	25999.98	90.62	108.096		108.23	0.000169	2.98	8724.19	692.57	0.15
Reach-1	220272	02JAN2012 2300	Norm-CorrectedC	8564.01	93.07	101.621		101.73	0.000397	2.69	3182.72	559.77	0.20
Reach-1	220272	02JAN2012 2300	Norm-ProposedD1	8564.00	93.07	101.621		101.73	0.000397	2.69	3182.72	559.77	0.20
Reach-1	220272	02JAN2012 2300	Norm-ProposedD2	8563.99	93.07	101.621		101.73	0.000397	2.69	3182.72	559.77	0.20
Reach-1	220272	02JAN2012 2300	MidPt-CorrectedC	17000.00	93.07	104.723		104.90	0.000408	3.40	4994.89	629.66	0.21
Reach-1	220272	02JAN2012 2300	MidPt-ProposedD1	16999.99	93.07	104.723		104.90	0.000408	3.40	4994.89	629.66	0.21
Reach-1	220272	02JAN2012 2300	MidPt-ProposedD2	17000.02	93.07	104.723		104.90	0.000408	3.40	4994.89	629.66	0.21
Reach-1	220272	02JAN2012 2300	Crest-CorrectedC	26000.00	93.07	107.363		107.59	0.000417	3.83	6787.04	728.13	0.22
Reach-1	220272	02JAN2012 2300	Crest-ProposedD1	25999.99	93.07	107.363		107.59	0.000417	3.83	6787.04	728.13	0.22
Reach-1	220272	02JAN2012 2300	Crest-ProposedD2	26000.01	93.07	107.363		107.59	0.000417	3.83	6787.04	728.13	0.22
Reach-1	217472	02JAN2012 2300	Norm-CorrectedC	8564.00	91.92	100.415		100.55	0.000445	3.00	2858.77	458.88	0.21
Reach-1	217472	02JAN2012 2300	Norm-ProposedD1	8563.99	91.92	100.415		100.55	0.000445	3.00	2858.77	458.88	0.21
Reach-1	217472	02JAN2012 2300	Norm-ProposedD2	8564.01	91.92	100.415		100.55	0.000445	3.00	2858.77	458.88	0.21
Reach-1	217472	02JAN2012 2300	MidPt-CorrectedC	16999.99	91.92	103.407		103.66	0.000482	4.02	4233.46	460.02	0.23
Reach-1	217472	02JAN2012 2300	MidPt-ProposedD1	17000.00	91.92	103.407		103.66	0.000482	4.02	4233.46	460.02	0.23
Reach-1	217472	02JAN2012 2300	MidPt-ProposedD2	17000.00	91.92	103.407		103.66	0.000482	4.02	4233.46	460.02	0.23
Reach-1	217472	02JAN2012 2300	Crest-CorrectedC	26000.01	91.92	105.936		106.30	0.000509	4.82	5398.03	460.99	0.25
Reach-1	217472	02JAN2012 2300	Crest-ProposedD1	26000.02	91.92	105.936		106.30	0.000509	4.82	5398.03	460.99	0.25
Reach-1	217472	02JAN2012 2300	Crest-ProposedD2	25999.98	91.92	105.936		106.30	0.000509	4.82	5398.03	460.99	0.25
Reach-1	216472	02JAN2012 2300	Norm-CorrectedC	8564.00	91.48	100.018	95.60	100.13	0.000400	2.70	3175.67	559.64	0.20
Reach-1	216472	02JAN2012 2300	Norm-ProposedD1	8564.00	91.48	100.018	95.60	100.13	0.000400	2.70	3175.67	559.64	0.20
Reach-1	216472	02JAN2012 2300	Norm-ProposedD2	8563.99	91.48	100.018	95.59	100.13	0.000400	2.70	3175.67	559.64	0.20
Reach-1	216472	02JAN2012 2300	MidPt-CorrectedC	17000.00	91.48	103.029	97.23	103.22	0.000400	3.46	4909.70	593.40	0.21
Reach-1	216472	02JAN2012 2300	MidPt-ProposedD1	17000.00	91.48	103.029	97.23	103.22	0.000400	3.46	4909.70	593.40	0.21
Reach-1	216472	02JAN2012 2300	MidPt-ProposedD2	17000.00	91.48	103.029	97.23	103.22	0.000400	3.46	4909.70	593.40	0.21
Reach-1	216472	02JAN2012 2300	Crest-CorrectedC	25999.99	91.48	105.589	98.34	105.84	0.000400	4.02	6466.61	622.94	0.22
Reach-1	216472	02JAN2012 2300	Crest-ProposedD1	25999.98	91.48	105.589	98.34	105.84	0.000400	4.02	6466.61	622.94	0.22
Reach-1	216472	02JAN2012 2300	Crest-ProposedD2	26000.01	91.48	105.589	98.34	105.84	0.000400	4.02	6466.61	622.94	0.22

Appendix C: Full Size/Resolution Figures

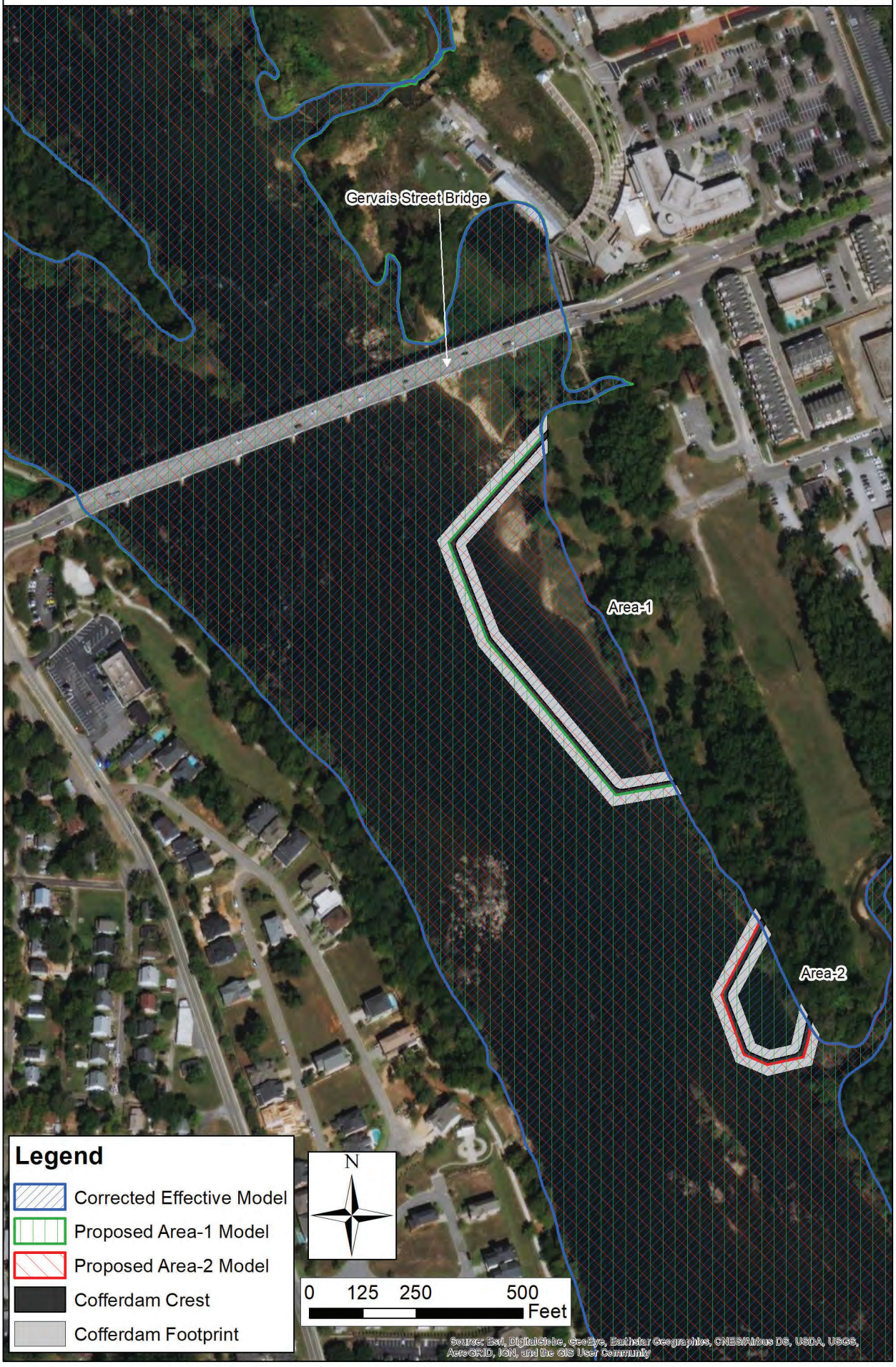
Low Flow Analysis Memo - Congaree River Remediation Project
Figure 4: Corrected Effective HEC-RAS Model Schematic (Project Area)
(expanded/full resolution version)



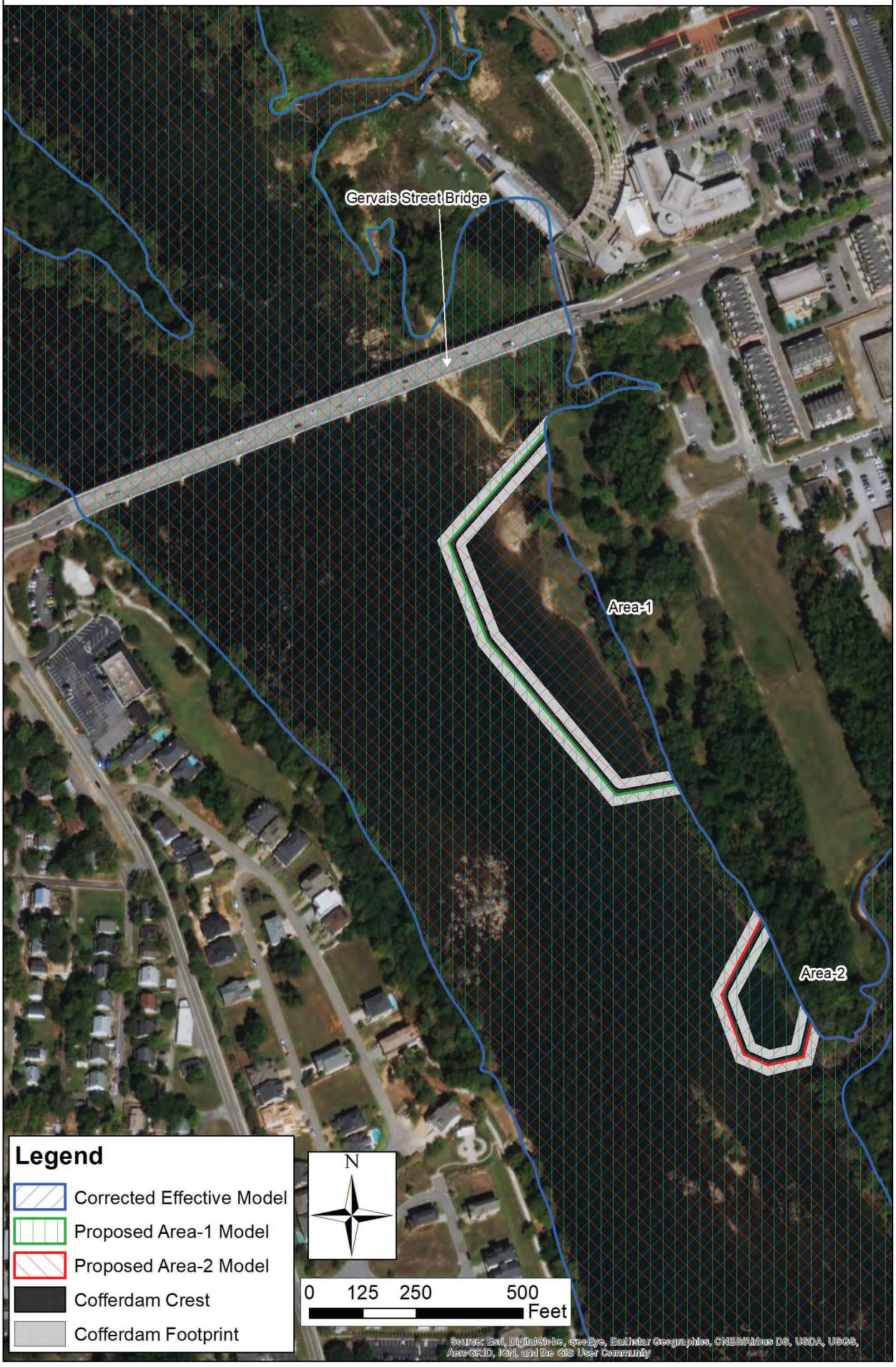
Low Flow Analysis Memo - Congaree River Remediation Project
Figure C1: Normal Flow (8,564 cfs) Flood Extents



Low Flow Analysis Memo - Congaree River Remediation Project
Figure C2: Mid-Point Flow (17,000 cfs) Flood Extents



Low Flow Analysis Memo - Congaree River Remediation Project
Figure C3: Crest Flow (26,000 cfs) Flood Extents

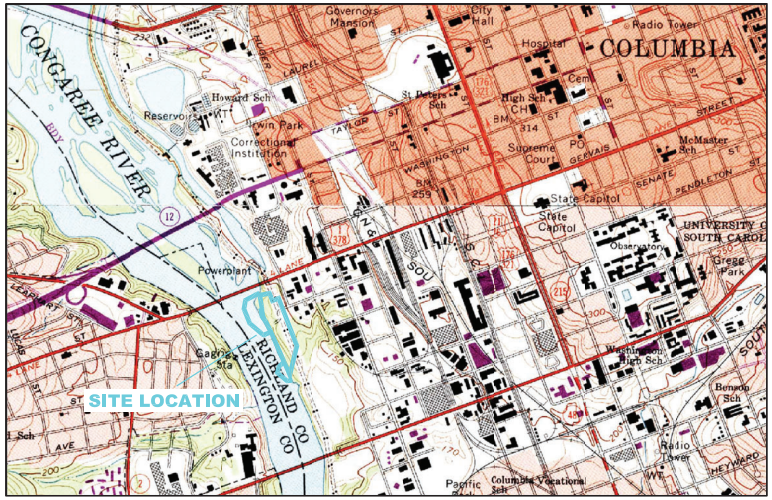


ATTACHMENT K

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

PREPARED FOR:

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

INDEX:

PREPARED BY:

APEX

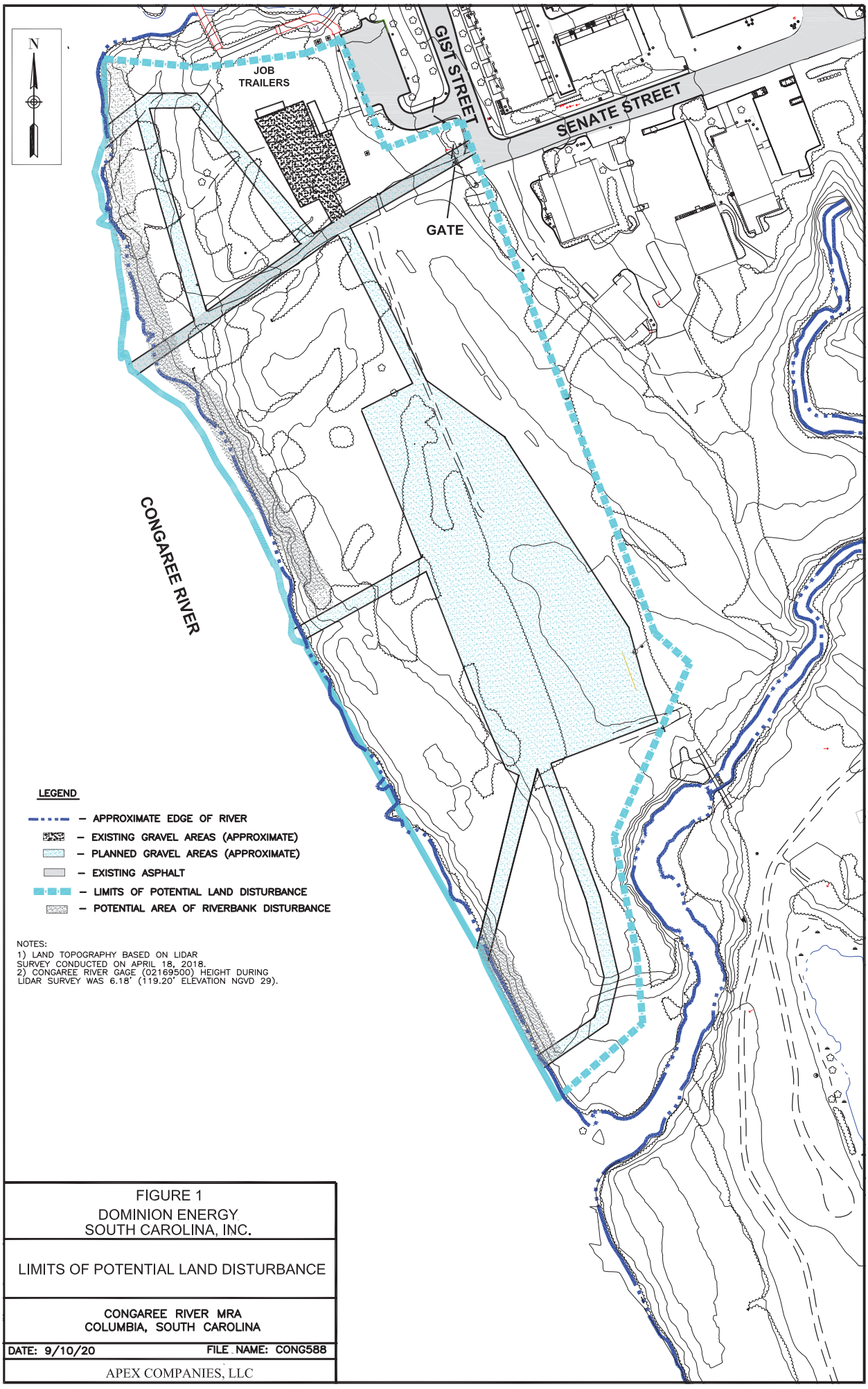


FIGURE 1
DOMINION ENERGY SOUTH CAROLINA, INC.

LIMITS OF POTENTIAL LAND DISTURBANCE

CONGAREE RIVER MRA
COLUMBIA, SOUTH CAROLINA

DATE: 9/10/20 FILE NAME: CONG588

APEX COMPANIES, LLC