

1. Comments submitted by the South Carolina Department of Health and Environmental Control indicate Palmetto Railways has requested approval to use fly ash for construction of the railway embankment, particularly in the vicinity of the Diversion Canal. Please provide available information on the anticipated use of fly ash in construction of the proposed rail line.

Please see the attached Beneficial Use Demonstration (BUD) Work Plan prepared for Palmetto Railways and the letter from S.C. Department of Health and Environmental Control approving the Beneficial Use Demonstration (BUD) Work Plan dated December 20, 2017.

2. Please provide a list of the types of commodities that Palmetto Railways anticipates would be carried on trains operating over the proposed rail line.

At this time, finished automobiles are the only commodity that we anticipate will be transported on the Camp Hall Rail Line.

3. What type (Tier 1, 2, 3 or 4) of locomotives does Palmetto Railways anticipate using on the proposed rail line?

At this time, Palmetto Railways intends to use two (2) GP-40-2 locomotives. These locomotives do not have a Tier classification.

The Air Quality section of the Environmental Assessment was conducted using the appropriate screening level evaluation for the proposed Camp Hall Build-in. The results of this evaluation indicated that further study including detailed air quality modeling was not warranted due to the following site and project conditions. The proposed rail corridor is in an air quality attainment area, the number of locomotive is limited, the use of the locomotives is infrequent, the proposed project corridor is in a rural area, the rail is not proximate to sensitive receptors, and cumulative impacts including construction air quality impacts were determined to be minimal. The conclusions reached by the Environmental Assessment are further supported by the inference that proposed movement of freight by rail facilitated by this proposed project significantly reduces overall emissions and associated impacts on the environment compared to the alternative use of on-road trucks.

4. Please provide the estimated locomotive diesel fuel consumption per train round-trip on the proposed rail line.

Palmetto Railways estimates the fuel consumption to be approximately 300 gallons per day, which includes approximately four hours of switching operations, a trip from Camp Hall to Cross, and a return trip to Camp Hall.

5. Please provide the locations, in addition to the Diversion Canal, where Palmetto Railways anticipates that bridges would be constructed and indicate whether pile driving would be required at each location.

The bridge over the Diversion Canal is the only bridge that is planned for the Camp Hall Rail Line at this time. Current design anticipates the utilization of drilled shaft foundations, rather than driven piles. If driven piles are utilized, Best Management Practices will be utilized as referenced in Palmetto Railways Mitigation Plan.

6. For any anticipated bridges, please indicate likely elevations.

Please see attached Plan and Profile view for Diversion Canal Bridge.

7. For any anticipated bridges, please provide any design information available, or likely design information, including photos or drawings of a bridge or bridges with similar appearance.

Please see attached Plan and Profile view for Diversion Canal Bridge. The Diversion Canal Bridge is designed to mimic the look of the SC Hwy 45 bridge that crosses the diversion canal to the North.

8. If the proposed rail line were not to be constructed and operated, where would finished vehicles produced at the Volvo Cars plant and destined for domestic sale be trucked for subsequent transfer to rail?

The current conditions require over 50,000 finished vehicles each year to travel over 80 miles via truck to CSX Transportation's Dixiana auto distribution facility outside Columbia, South Carolina. Interstate 26, a federally identified portion of the Primary Highway Freight System (PHRS), would be the only feasible route to accommodate the additional trucks hauling automobiles. Interstate 26 is already a congested highway and accidents relating to high volumes of heavy truck traffic are a common occurrence. Pavement quality and maintenance costs on the highway are already deteriorating without the addition of thousands of auto trucks to its yearly throughput.

9. Please provide the estimated duration of rail line construction.

The estimated duration of construction of the Camp Hall Rail Line is 18-20 months.

10. Please provide the estimated average and maximum number of construction workers that would be employed to construct the rail line.

Palmetto Railways used multiple methodologies for evaluating the possible number of construction employees during the duration of the Camp Hall Rail Line. Conservatively, we estimate that there would be an average of 95-105 employees, with a maximum of

105-116, used to construct the line. Additional documentation can be provided as backup upon request.

11. Is construction during nighttime hours (10 PM to 6 AM) anticipated?

Work is not anticipated during nighttime hours, as defined above, at this time.

12. Please identify likely construction staging areas, if known.

Construction staging areas are not known at this time.

13. Are any project-related fixed lighting sources anticipated outside the commerce park other than proposed early warning signs on roadways and lights/flashers at grade crossings?

Palmetto Railways intends to construct a small maintenance and office facility, tentatively located between Stations 1190 and 1240, which will have minimal exterior lighting for safety and security. No other fixed lighting is anticipated.

14. Please explain the source and rationale for the equipment utilization factors used for the construction noise assessment presented in Table 5-2 of Section 5 of Environmental Report Appendix C: Noise and Vibration Assessment.

The utilization factors (UF) are defined as "usage factor that accounts for the fraction of time that the equipment is in use over the specified time period." Stated differently, the UF reflects the percentage of time that a piece of construction equipment is operating at full power during a set increment of time (e.g., one hour). These UF's are part of the Road Construction Noise Model (RCNM) published by the Federal Highway Administration. In the Noise and Vibration report, we reference the following document: H. Knauer, S. Pedersem, C. N. Rehman, J. L. Rochat, E. S. Thalheimer, M. C. Lau, G. G. Fleming, M. Ferroni and C. Corbisier, "FHWA Highway Construction Noise Handbook," U.S. Department of Transportation - Federal Highway Administration, Cambridge, August 2006. The published RCNM is a national model based on the noise calculations and extensive construction noise data compiled for the Central Artery/Tunnel (CA/T) project in Boston, Massachusetts. The UF factors used in the report are published within the RCNM model.

15. Please provide additional methodology details and information on the Protected Species Assessment (i.e. Appendix D of the Environmental Report).

- a. Please provide a map, and supporting GIS data, showing where biologists had access along the proposed rail route (i.e. show land parcels where access was granted and habitat physically surveyed within and adjacent to the rail corridor).

Please see attached report and supporting exhibits prepared on behalf of Palmetto Railways by third-party contractor Sabine and Waters.

- b. Please provide a map, and supporting GIS data, showing where biologists determined presence of suitable habitat for each species assessed.

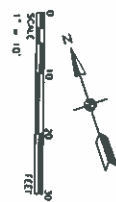
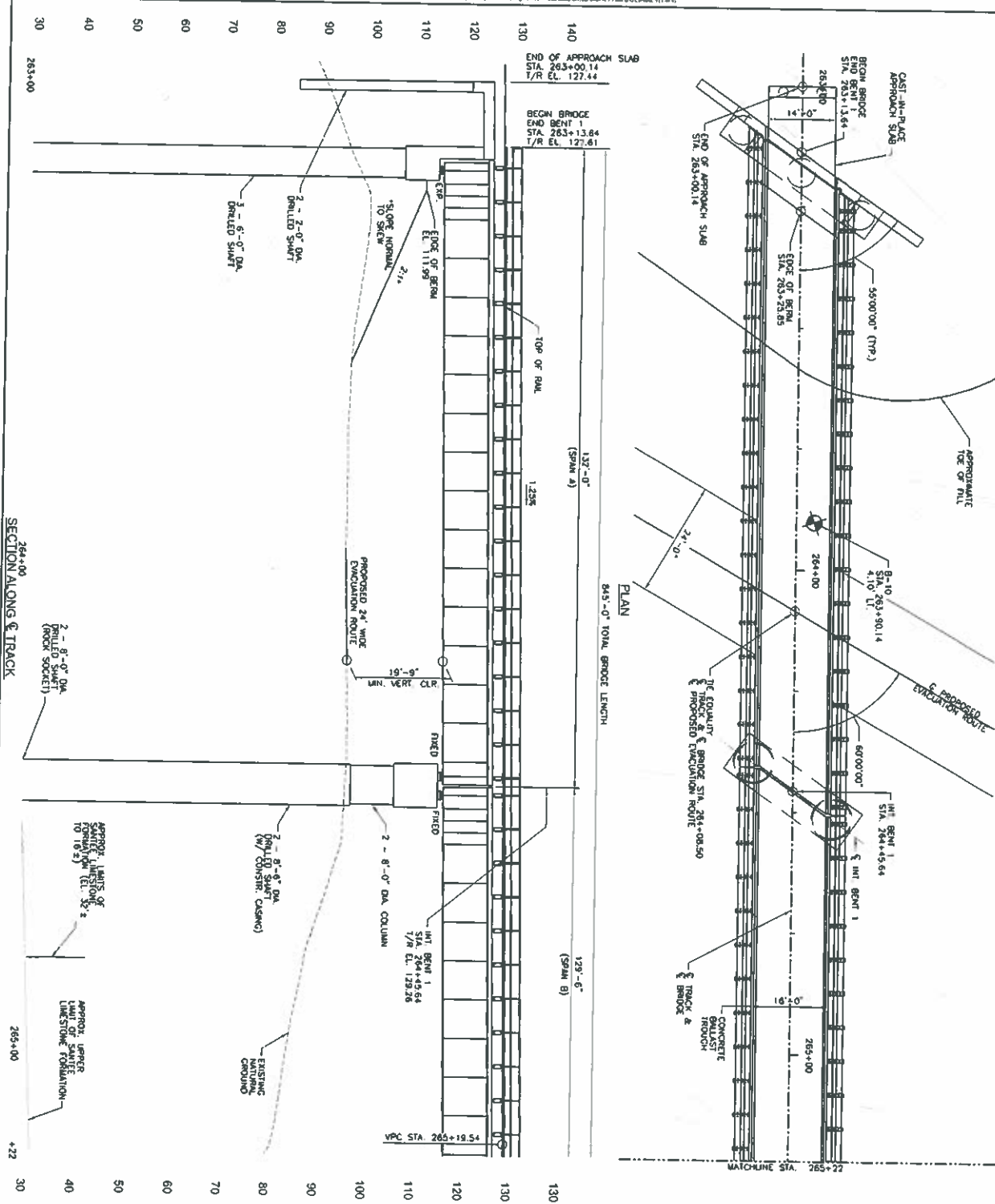
Please see attached report and supporting exhibits prepared on behalf of Palmetto Railways by third-party contractor Sabine and Waters.

- c. The Protected Species Assessment indicates that suitable foraging habitat was observed adjacent to the project area; please provide a map, and supporting GIS data, showing the location and area (size) of this habitat. Please provide any additional available details on the red-cockaded woodpecker habitat survey results.

Please see attached report and supporting exhibits prepared on behalf of Palmetto Railways by third-party contractor Sabine and Waters.

- d. Please review the three attached maps from South Carolina Department of Natural Resources and the U.S. Fish and Wildlife Service indicating two areas they have determined to have potential suitable red-cockaded woodpecker habitat. Please indicate if Palmetto Railways had access to these two areas and if habitat was physically surveyed in these two areas as part of the Protected Species Assessment. If so, please provide details on the survey methodology and the results of the surveys in these two areas (e.g., transect location and spacing, species and age of trees, nesting or foraging habitat identified, etc.). If Palmetto Railways did not have access to these two areas, please provide details on the methodology that assessed these two areas to determine whether or not red-cockaded woodpecker foraging or nesting habitat was present.

Please see attached report and supporting exhibits prepared on behalf of Palmetto Railways by Sabine and Waters.



$+1.25\%$
 $VP = 287 + 89.54$
 $EL = 133.31$
 -1.25%
 $VC = 300.00'$

PROJECT NO.: #20-05078		REVISIONS:	
DATE: 7-10-			
DRAWN BY: J. D. B.			
CHECKED BY: P. S.			
DESIGNED BY: A. S.			
DATE OF DRAWING: 1966			
SHEET TITLE: BRIDGE PLAN AND ELEVATION (1 OF 4)		MARK	DATE
SHEET NO. Sheet 1		DESCRIPTION	

SANTEE COOPER - CAMP HALL
BERKELEY COUNTY, SOUTH CAROLINA

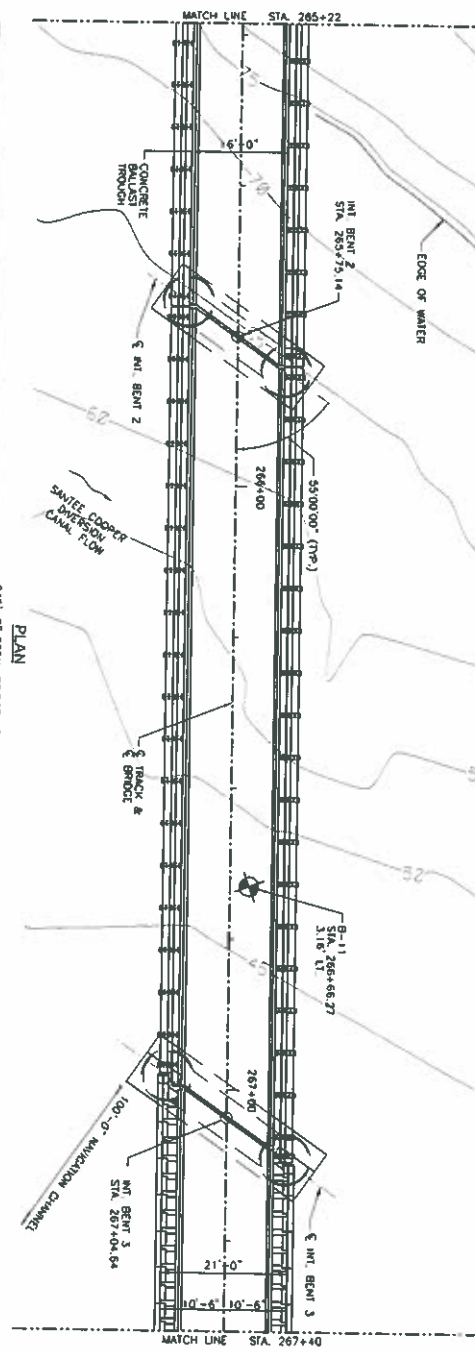


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3/1/2018



4400 LEEDS AVENUE
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NORTH CHARLESTON SC 29405
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FAX: (843) 528-9516



SANTEE COOPER - CAMP HALL
BERKELEY COUNTY, SOUTH CAROLINA

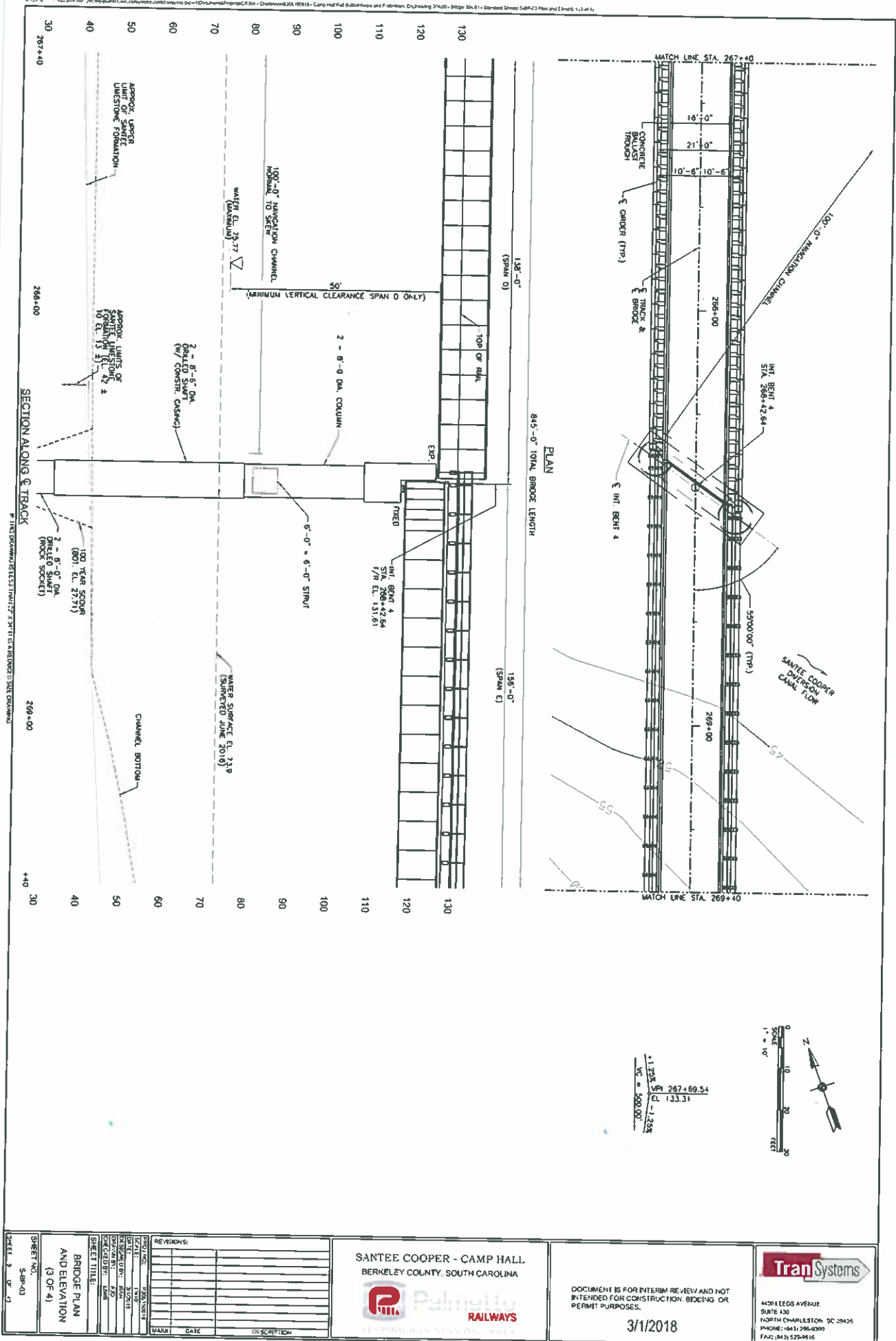
 Palmetto
RAILWAYS
KEEPING MOVING ON TRACK



Palmetto
RAILWAYS

3/1/2018

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SHEET NO. 389-04 OF 43	BRIDGE PLAN AND ELEVATION (4 OF 4)	SHEET TITLE:	REVISIONS:	Santee Cooper - Camp Hall Berkeley County, South Carolina  PALMETTO RAILWAYS KEEPING AMERICA ON TRACK	DOCUMENT IS FOR INTERIM REVIEW AND NOT INTENDED FOR CONSTRUCTION BIDDING OR PERMIT PURPOSES. 3/1/2018	 4420 BEECH AVENUE SUITE 200 NORTH CHARLESTON, SC 29405 PHONE 1 (843) 296-0300 FAX 1 (843) 296-0536
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SABINE & WATERS
ENVIRONMENTAL LAND MANAGEMENT CONSULTANTS

March 1, 2018

Mr. T Ravenel
Director of Special Projects
Palmetto Railways
540 East Bay Street
Charleston, SC 29403

**SUBJECT: Protected Species Assessment (Appendix D of the Environmental Report)
Camp Hall Railroad Project
Berkeley County, SC**

Dear Mr. Ravenel:

This letter responds to the request for additional information from the Surface Transportation Board (STB) and United States Army Corps of Engineers (USACE) pertaining to the Protected Species Assessment performed on the referenced project. These agencies requested:

- maps, and supporting GIS data, showing locations used to access the project area and conduct the evaluation;
- maps, and supporting GIS data, showing areas determined to contain suitable habitat for the species assessed;
- a map, and supporting GIS data, of the of an area adjacent to the corridor where suitable habitat was identified; and
- information pertaining to two nearby areas identified by natural resources agencies as having potentially suitable habitat.

Each of these topics are addressed below and indicated on the attached maps.

Enclosed are maps and shapefiles depicting the potentially suitable habitat identified as well as access to the different areas of the corridor. The entirety of the corridor was further assessed in the field for potential suitable habitat for all listed species during the wetland delineation process. The length and width of the corridor was traversed with transect spacing depending on habitat suitability, ground conditions and basal area of the forest. If habitat was considered unsuitable for an area, additional assessment was not completed. The corridor was re-visited many times

during subsequent site visits with USACE personnel, during which no threatened or endangered species were encountered.

Access to the corridor was granted from the property owners that the corridor crosses. Most access points were gated and locked, with access granted from Weyerhaeuser and a key provided. Some gated areas we had vehicular access (shown in red on attached map) and other areas we were required to walk in (shown in yellow on attached map). Access routes show gates, roads, and trails that were used to navigate around the corridor and large wetlands; however, the entirety of the corridor was traversed. Where potential suitable habitat was documented, the area was surveyed for listed species. We did not have legal access to some properties abutting and outside of the corridor in order to assess the habitat and survey for any listed species. Any adjacent properties without access were assessed from public right of ways and from properties we had permission to access. Further research was completed based on aerial imagery and coordination with SCDNR on species occurrences.

In the area identified as potentially suitable RCW foraging habitat adjacent to the corridor, Sabine & Waters obtained landowner permission to conduct a survey on August 2, 2017 to determine presence of RCWs in the area. No vocalizations, RCWs, natural starts, cavities, or any evidence of RCWs were observed. Per the United States Fish & Wildlife Service's (USFWS) RCW Recovery Plan, we confirmed there is not enough potentially suitable habitat on the adjacent property to support nesting habitat, but it does qualify as foraging habitat. This property is primarily loblolly pine and was thinned to its current state in 2013. The rail corridor is approximately 130-140 linear feet away from the property boundary that has the potentially suitable habitat. This area of potentially suitable habitat is surrounded by unsuitable habitat including fields, houses, wetlands, industrial timberlands, and roads.

USFWS and South Carolina Department of Natural Resources (SCDNR) further identified two areas near the Cross Generating Station as potentially suitable RCW habitat. Area 1 is not within the project area of the corridor we assessed and delineated; therefore, this area was not evaluated. An evaluation of Area 1 can be completed upon request.

Area 2 was surveyed and does not meet the suitable habitat guidelines outlined in the USFWS's RCW Recovery Plan. This area is loblolly pine approximately 20 - 40 years old, with a density above 70 basal area. An established understory of sweet gum, loblolly, red maple and hickory would also deter RCW's from using the area. There is evidence of a past prescribed fire on the landscape although it has been many years since this stand has seen fire. Because the habitat is considered unsuitable per the RCW recovery plan, a detailed survey was not completed in this area.

Mr. T Ravenel
March 1, 2018
Page 3

Based upon our habitat assessment, there are few areas along the corridor that could be considered potentially suitable habitat for any listed species due to the land use (i.e. industrial forestry) and the practices that are commonplace with forest management of these areas. Mechanical and herbicide site preparation treatments, short rotation harvests and lack of fire on the landscape do not provide the ecosystems necessary that would harbor listed species. Areas outside of the project impact area could only be assessed from the corridor where access was allowed and with the use of remote sensing technology.

Please contact me with any additional questions.

Respectfully,

Robert Strange
Sabine & Waters, Inc.

Copy: Tom Hutton GEL

Enclosure



December 20, 2017

Palmetto Railways
Attn: Tarek Ravenel
540 East Bay Street
Charleston, SC 29403

Approval of Beneficial Use Demonstration (BUD) Work Plan
RE: Revised Beneficial Use Demonstration Work Plan received via email on December 20, 2017
For a Specified Portion of the Camp Hall Rail Project
Bureau File #23449
Berkeley County

Dear Mr. Ravenel:

The Department received your request, submitted on your behalf by S&ME, Inc., to review the Beneficial Use Demonstration Work Plan for a specified portion of the Camp Hall Rail project. The intention of the Work Plan is to evaluate the use of bottom ash from Santee Cooper's Cross Electric Generating Station as a soil substitute in the rail embankments/approaches for the Diversion Canal crossing of the Camp Hall Rail Project.

After review, the Department approves the revised Beneficial Use Demonstration Work Plan. With this approval, you may commence implementation of the Work Plan.

If you have any questions regarding this approval letter, feel free to contact me at shealywi@dhec.sc.gov or (803) 898-2207.

Sincerely,

Wayne J. Shealy, P.E.
Engineer
Solid Waste Permitting and Monitoring Section
Division of Mining and Solid Waste Management
Bureau of Land & Waste Management

cc: Joan Litton, Director– Mining & SW Management
Juli Blalock, Manager – SW Permitting & Monitoring
Marty Lindler, Manager – SW Compliance
Jeff Schrag, Manager – Waste Assessment
Jon Summa – Lowcountry EA Office, Charleston
Chuck Black, P.E. – via email, cblack@smeinc.com
Mike Marcus, Ph.D. – via email, mmarcus@smeinc.com
Bureau File #23449



BENEFICIAL USE
DEMONSTRATION WORK PLAN
For a Specified Portion
of
The Camp Hall Rail Project
Berkeley County, South Carolina
S&ME Project No. 1134-11-233

PREPARED FOR:

Palmetto Railways
540 East Bay Street
Charleston, South Carolina 29403

PREPARED BY:

S&ME, Inc.
620 Wando Park Boulevard
Mount Pleasant, SC 29464

December 20, 2017



December 20, 2017

Mr. Wayne Shealy, P.E., Associate Engineer
Solid Waste Permitting and Monitoring Section
S.C. Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Transmitted via Electronic Mail (shealywj@dhec.sc.gov) and by Overnight Courier (paper & cd)

Reference: BENEFICIAL USE DEMONSTRATION WORK PLAN – REVISED --
For a Specified Portion of The Camp Hall Rail Project
Berkeley County, South Carolina
S&ME Project No. 1134-11-233

Dear Mr. Shealy:

On behalf of Palmetto Railways, we herewith submit this Revised Work Plan for the Department's review. The intention of the Plan is to evaluate the use of bottom ash from Santee Cooper's Cross Electric Generating Station as a soil substitute in the railway embankments/approached for the Diversion Canal crossing of the Camp Hall Rail project. This Revision is based on the Department's review comments of the November 9 Work Plan that were provided in your November 17 e-mail to us; our subsequent teleconference on November 20; our teleconference on December 11, 2017 to discuss the Department's comments on the November 22, 2017 Revision; and, the Department's December 14, 2017 electronic mail to us regarding radionuclide analyses.

Thank you for the review comments and guidance provided during development of the Plan. We are ready to commence implementation upon the Department's approval to proceed. Should you have questions about or wish to discuss the Work Plan, please advise at your convenience.

Best Regards,
S&ME, Inc.

Chuck Black, P.E.
Vice President
843.343.4647
cblack@smeinc.com

Mike Marcus, Ph.D.
Technical Principal/Vice President
864.915.5842
mmarcus@smeinc.com

cc: Mr. Tarek Ravenel/Palmetto Railways (TRavenel@palmettorail.com)
Ms. Joan Litton /SCDHEC (littonjf@dhec.sc.gov)
Ms. Susan Jackson/Santee Cooper (susan.jackson@santeecooper.com)
Mr. Adam Mims/Santee Cooper (adam.mims@santeecooper.com)
Ms. Denise Bunte-Bisnett (denise.bunte-bisnett@santeecooper.com)



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List of Acronyms

Figure 1 Camp Hall Rail Project Corridor and BUD Project Area
Figure 2 Conceptual Schematic – Railway Embankment for Diversion Canal Crossing

Table 1	Scheduled Supplemental Chemical Testing – Analytical Methods
Table 2	Scheduled Supplemental Chemical Testing – Sample Collection Containers, Preservatives and Holding Times
Table 3	Scheduled Physical Testing

BENEFICIAL USE DEMONSTRATION WORK PLAN
For a Specified Portion of The Camp Hall Rail Project
 Berkeley County, South Carolina
 S&ME Project No. 1134-11-233



LIST OF ACRONYMS

ASL	Analytical Support Level
BUD	Beneficial Use Demonstration
CCP	Coal Combustion Product
CCR	Coal Combustion Residuals
CCW	Coal Combustion Wastes
CGS	Cross Electric Generating Station
CHRP	Camp Hall Rail Project
COPC	Contaminant of Potential Concern
FFC	Fossil Fuel Combustion (wastes)
HASP	Health and Safety Plan
IDW	Investigation-Derived Waste
MW _e	Megawatts, electric
OSHA	Occupational Safety and Health Administration
PAH	Polynuclear Aromatic Hydrocarbon
PDWS	Primary Drinking Water Standard (State of South Carolina)
PC	Pulverized Coal
PR	Palmetto Railways
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level (USEPA)
SCDHEC	South Carolina Department of Health and Environmental Control; the Department
SCPSA	South Carolina Public Service Authority; Santee Cooper
SIM	Selective Ion Monitoring
SOP	Standard Operating Procedure
SPLP	Synthetic Precipitation Leaching Procedure
TAL	Target Analyte List
TCLP	Toxicity Characteristic Leaching Procedure
TW	Tapwater (RSL)
USEPA	United States Environmental Protection Agency
WP	Work Plan



1.0 Introduction

This Beneficial Use Demonstration (BUD) Work Plan (WP) addresses the development of a BUD decision document for a specified portion of the Palmetto Railways (PR) construction project that will cross the Santee River Diversion Canal adjacent to the South Carolina Public Service Authority (SCPSA; Santee Cooper) Cross Electric Generating Station (CGS) in Cross, Berkeley County, South Carolina.

1.1 The Camp Hall Rail Project

PR is presently planning a large capital construction economic development project for a new freight railway that will connect Camp Hall Commerce Park (the Park) in Berkeley County, South Carolina, to the nearby existing Class I CSX rail network (i.e., the Camp Hall Rail Project; CHRP) [Figure 1]. The connection to the CSX rail network is planned to occur near CGS, thence travel approximately 22.7 miles south and west to the Park. The new rail connection that will be realized from the project will provide regional rail connectivity to the Park. The CHRP is expected to improve transportation, distribution, and logistics for the Park tenants and to promote economic development in Berkeley County as well as for the entire State.

1.2 SCPSA Cross Generating Station

CGS is a pulverized coal (PC)-fired electric generating station in Berkeley County, South Carolina. The Station presently comprises three (3) units: Unit 1 [620 megawatts (MW_e)], Unit 3 (660 MW_e), and Unit 4 (660 MW_e); Unit 2 (540 MW_e) is idled. Units 1,3 and 4 generate approximately 54,000 tons of bottom ash annually. Historically, the bottom ash has been handled by a wet sluicing system. However, the wet handling system is being replaced by a dry handling system, which has already been installed on Units 1 and 4. The dry handling system will be installed on Unit 3 after the Spring 2018 outage. CGS presently provides ash to an in-state concrete block manufacturer for use in product formulation.

The bottom ash that is the subject of this WP will be sourced from the dry handling system.

1.3 Purpose

The purpose of this WP is to specify the approach, procedures, equipment, and analytical methodologies, consistent with applicable United States Environmental Protection Agency (USEPA) and/or South Carolina Department of Health and Environmental Control (SCDHEC) requirements and guidance that will be used to develop data for decision-making for the use of CGS bottom ash in the construction of embankments for the CHRP.

1.4 Limitation of Work Plan

This WP addresses only the portion of construction for the CHRP that comprises the embankments/approaches for the necessary rail crossing over the Diversion canal. Specifically, the intent of the work detailed herein is to develop documentation to demonstrate that bottom ash from the CGS can be used appropriately and beneficially in construction of the embankments/approaches. The CGS bottom ash is intended to be used in portions of the embankment construction that are:



- well above ambient groundwater level [i.e., greater than three (3) feet above the top of the groundwater surface];
- well away from the crown and downslope of the embankment relative to the Diversion Canal;
- not where deep foundations (e.g., drilled shafts) will be advanced or where deep foundations have already been installed;
- not in wetland areas; and,
- placed so as to have a native soil cover (i.e., non-amended by bottom ash) of a minimum of two (2) feet thick; thicker cover lens will be achieved when possible.

Design of the railway and embankments is underway; however, specific field distances for the noted exclusion zones cannot yet be established with certainty. However, Figure 2, included herein, depicts schematically the intended use of the ash for construction. Proposed specific exclusion distances will be developed by working with the designers, once the data and information proposed to be acquired by this WP have been developed. Those proposed exclusion distances will be submitted to the Department for review and approval before implementation into final design and subsequent construction documents.

1.5 Definitions

The following terms are used in this WP within the contexts of their specified meanings, as follows:

- *Bottom ash* -- the agglomerated, angular ash particles, produced during coal combustion in PC-fired furnaces that are too large to partition into and be transported away in the flue gases. Instead, this ash is deposited in an ash hopper at the bottom of the furnace.
- *Coal Combustion Products (CCPs)* -- fly ash, bottom ash, boiler slag, or flue gas desulfurization materials that are diverted from disposal as waste and beneficially used.
- *Coal Combustion Residuals (CCRs)* -- fly ash, bottom ash, boiler slag, and flue gas desulfurization materials scheduled for disposal. CCRs have also been referred to as coal combustion wastes (CCWs) and fossil fuel combustion (FFC) wastes (when scheduled for disposal).
- *Encapsulated Use* -- the CCR is bound within a product such as wallboard, concrete, roofing materials, or bricks in a way that minimizes the CCR from being released and transported into the surrounding environment.
- *Unencapsulated Use* -- the CCR is used in a loose particulate, sludge or other unbound form such as structural fills/embankments.

2.0 Regulatory Synopsis

USEPA published the Final Rule for Disposal of CCRs from electric utilities in the Federal Register on April 17, 2015, with an effective date of October 19, 2015 (USEPA 2015a). While the CCR Rule was intended for and focused on proper disposal of CCRs, it also addressed the long-standing practice of the beneficial use of CCRs.



Background -- Prior to Promulgation of the 2015 CCR Rule

Section 3001(b) (3) of the Resource Conservation and Recovery Act (RCRA) [hereafter referred to as the Bevill Exemption] was added to RCRA on October 12, 1980, as part of the 1980 Solid Waste Disposal Act Amendment. This Section exempted, among other things, FFC wastes from regulation as a hazardous waste under RCRA Subtitle C. The original exemption was temporary pending (a) *completion of a Report to Congress on the adverse effects on human health and the environment, if any, of the disposal and utilization of fossil fuel combustion wastes*; and (b) *a subsequent determination of whether regulation under Subtitle C would be warranted*.

In response to the 1980 RCRA amendments, USEPA published an interim final amendment to its hazardous waste regulations to reflect the provisions of the Bevill Exemption (40 CFR 261.4(b)(4)). FFC wastes were divided into two categories: (1) large volume wastes such as fly ash, bottom ash, boiler slag, and flue gas emission control waste from the combustion of coal by electric utilities and independent commercial power producers, and (2) all remaining wastes subject to RCRA Sections 3001(b)(3)(A)(i) and 8002(n). USEPA completed the first report to Congress on exemption of FFC wastes in February 1988 (USEPA 1988). This report addressed wastes generated only from the combustion of coal by electric utility power plants; it did not address co-managed utility coal combustion wastes, other fossil fuel combustion wastes or wastes from non-utility coal combustion sources. The general overview of the Agency's findings was:

- *First, EPA has concluded that coal combustion waste streams generally do not exhibit hazardous characteristics under current RCRA regulations. EPA does not intend to regulate under Subtitle C fly ash, bottom as, boiler slag, and flue gas desulfurization wastes.*
- *Second, EPA is concerned that several other wastes from coal-fired utilities may exhibit then hazardous characteristics of corrosivity or EP toxicity and merit regulation under Subtitle C. EPA intends to consider whether these waste streams should be regulated under Subtitle C of RCRA based on further study and information obtained during the public comment period.*
- *Third, EPA encourages the utilization of coal combustion wastes as one method for reducing the amount of these wastes that need to be disposed to the extent such utilization can be done in an environmentally-safe manner.*

On August 9, 1993, USEPA made the regulatory determination that the first category of wastes (large volume FFC wastes) did not warrant regulation under RCRA Subtitle C. To make an appropriate determination for the second category (remaining wastes), USEPA decided that additional study was necessary.

After completing a second report to Congress in 1999, USEPA affirmed the applicability of the Bevill Exemption in 2000, and confirmed that FFCs did not warrant regulation as a hazardous waste and, therefore, would remain exempt from regulation under Subtitle C of RCRA (USEPA 2000). The Agency also determined that beneficial uses of FFC wastes, other than for minefilling, posed no significant risk and no additional national regulations were needed. However, the Bevill Exemption notwithstanding, Federal or State action could be taken under RCRA if there was a finding of imminent or substantial endangerment in a specific circumstance of FFC usage/management.



2015 CCR Rule

Specifically, the 2015 CCR Rule:

- re-affirmed the USEPA's determination of the applicability of the Bevill Exemption for beneficial use;
- presented the differential concept of capsulated and unencapsulated forms of CCR; and,
- distinguished, by definition, between beneficial use and disposal.

Beneficial use of CCR must meet four (4) criteria to be approved for and designated as a CCP:

- the CCR must provide a functional benefit;
- the CCR must substitute for the use of a virgin material;
- the CCR must meet product specifications and/or design standards; and,
- when unencapsulated use of CCR involves placement on the land of 12,400 tons or more in non-roadway applications, the user must demonstrate and provide documentation upon request, that environmental releases to the environment are comparable to or lower than those from analogous products made without CCR, or that releases will be below relevant regulatory and health-based benchmarks for human and ecological receptors.

Requisite Regulatory-Based Demonstration Approach

USEPA has developed a framework for evaluating encapsulated beneficial uses of CCR (USEPA 2013a). This framework established a methodology that allows the user of the proposed CCP to demonstrate:

- whether releases from an encapsulated beneficial use of CCR are comparable to or lower than those from analogous products made without CCR, or
- are indicated to be equal to or less than relevant regulatory and health-based benchmarks during use.

In developing the framework for encapsulated uses of CCR (USEPA 2013a), USEPA determined that the principles of the methodology described by the framework were applicable and relevant to unencapsulated uses. Subsequently, USEPA published guidance for evaluation of both encapsulated uses and unencapsulated in a unified framework (USEPA 2016a).

The BUD Project represented by this WP will follow the unified framework (USEPA 2016a). The following areas will be addressed in the BUD and presented in the final documentation package.

Functional Benefit

An analysis will be made of the net benefits in the following areas by the use of the CGS bottom ash as a construction material:

- Environmental -- such as reduced greenhouse gas emissions; reduced impact on landfill space for disposal; reduced use of and impacts to natural resources
- Economic -- such as reduced costs for disposal; positive revenue stream from the sale as a usable product; cost savings by displacement other, more costly materials



- Product -- such as improved strength, durability or workability.

Substitution of Virgin Material

The CGS bottom ash will be a replacement for native borrow soil that would be obtained from local/regional sources.

Product Specification/Design Standards

Product specifications and design standards will be prepared for use of the CGS bottom ash in the railway embankments/approaches to the Diversion Canal crossing.

Unencapsulated Use

The planned beneficial use will:

- be of the unencapsulated form;
- require more than 12,400 tons to be used; and,
- will not be for roadway application, although the project contemplates a linear transportation (rail) corridor.

Consequently, for this unencapsulated attribute, the BUD will evince and document that ash-associated analyte release(s) to the environment will be less than relevant regulatory and health-based benchmarks for human and ecological receptors.

3.0 Statement of Intended Beneficial Use

The intended use of CGS bottom ash is as a CCP for fill in the construction of railway embankments/approaches over the Santee River Diversion Canal for that linear portion of the CHRP. The SCPSA CGS is the only source for bottom ash (or any other CCR) that will be used for the embankment construction; no other CCR source is planned for use or is covered under this BUD WP. It is anticipated that:

- the CCP will be placed on top of native borrow soil and then covered along the sides and top, also with native borrow soil so as not to present direct surface contact;
- the CCP will be placed:
 - well above ambient groundwater level (*i.e.*, greater than three (3) feet above the top of the groundwater surface);
 - well away from the crown and downslope of the embankment relative to the Diversion Canal;
 - not where deep foundations (e.g., drilled shafts) will be advanced or where deep foundations have already been installed;
 - not in wetland areas; and,
 - placed so as to have a native soil cover (*i.e.*, non-amended by bottom ash) of a minimum of two (2) feet thick; thicker cover lens will be achieved when possible. This minimum cover thickness and desire for thicker cover thickness will be a design criterion.



- up to 250,000 cubic yards (yd³) [317,500 tons at SCPSA-provided conversion of 1.27 tons/yd³] of CCP could be used in the specified project (yardage and tonnage use estimates are approximate and for general planning/evaluation purposes only);
- it is unlikely that Santee Cooper can deliver more than 100,000 tons based on CGS historical ash production figures and the exiting reuse of the ash by a concrete masonry unit manufacturer that is expected to continue during the CRRP;
- the conceptual design delta (217,500 tons) that will eventuate between the amount of ash SCPSA CGS can provide and the amount needed (e.g., 317,500 tons – 100,000 tons) will be fulfilled by use of normal borrow soil from local and regional sources; and,
- at this stage of inquiry and based on the long, accumulated period-of-record knowledge base about coal ash from large-scale utility electric generating stations, contaminants of potential concern (COPCs) are considered to be metals. An affirmation of this statement, or expansion of coverage otherwise, will be concluded and supported in the evaluation process described in Section 6.0.

4.0 Decision Rules

The following questions will be addressed in the conclusion(s) of the Final Characterization (see Section 6.3):

Functional Benefit

Will the use of CGS bottom ash perform a genuine function and provide demonstrable environmental, economic and product benefits?

Substitution of Virgin Material

Will the use of CGS bottom ash substitute for the use of a virgin material, conserving natural resources that would otherwise need to be obtained through practices, such as extraction?

Specification/Design Standard

Will the use of bottom ash meet relevant product specifications, regulatory standards or design standards when available, and when such standards are not available, the CCR is not used in excess quantities?

Unencapsulated Use

Does the evaluation support the conclusion that the potential for adverse impacts to human health and the environment is comparable to or lower than those from an analogous product, or at or below relevant benchmarks?

Affirmative responses to all four (4) questions will indicate that the beneficial use is appropriate as proposed. A negative response to any one (1) of the questions will indicate that the beneficial use is not appropriate as proposed.



5.0 Project Team

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6.0 Scope of Work

Per USEPA (2016a), the BUD for the use of CGS bottom ash in the construction of railway embankments/approaches for the Diversion Canal crossing will comprise the elements described below.

6.1 Planning and Scoping

- Development of an initial conceptual exposure model that addresses plausible potential adverse impacts to human health and the environment from the beneficial use of the CGS bottom ash.
- Identification and refinement of questions to be posed and answered by the BUD.
- Collate, review and summarize existing applicable analytical data. Ash data from routine operations testing by (and provided to PR by) Santee Cooper will be included in this task. These data have been used for submittal to the Department for compliance monitoring and reporting; consequently, their use in the BUD is reasonable.
- Per Section 6.4 below, this WP proposes the acquisition of supplemental chemical data along with physical testing.

6.2 Impact Analysis

Functional Benefits

Technical data will be developed from the readily-accessible peer-reviewed and governmental literature to demonstrate quantitatively the environmental, economic and use/product benefits of the CGS bottom ash as a construction material for the specified limited application.



Substitution of Virgin Material

Use of CGS bottom ash as a construction material for the specified limited application will be a significant substitute for native borrow soil that otherwise will have to be mined/extracted.

Specification/Design Standard

The geotechnical engineering analysis will deliver a decision, based on the physical attributes of the bottom ash, as to its applicability as a construction material for the specified limited application. Based on the technical physical data, if the bottom ash is shown to be a usable material, specifications for its limited intended use will be prepared.

Unencapsulated Use

Existing Evaluations

- Readily-accessible government and peer-reviewed literature will be surveyed to identify evaluations already completed that are applicable to the intended project.
- The applicable extant evaluations will be reviewed to ascertain if they sufficiently address the potential adverse impacts identified in the Planning and Scoping Phase.

Analogous Product Comparison

- The potential for adverse impacts from the designation of CGS bottom ash as a CCP will be compared with the potential for adverse impacts from an analogous product (i.e., native borrow soil).

Screening Analysis

- Demonstration that environmental releases from the CGS bottom ash to soil, groundwater, surface water, and air will be equal to or less than the following relevant regulatory and health-based benchmarks for human and ecological receptors during construction and use.
- Human Health
 - Soil -- current on-line version of USEPA Regional Screening Levels (RSLs), using levels set at carcinogenic risk of 1×10^{-6} and non-carcinogenic hazard of 0.1, (USEPA 2017c) for Industrial use for the total-form analyte data.
 - Groundwater -- current on-line version of USEPA RSLs, using levels set at carcinogenic risk of 1×10^{-6} and non-carcinogenic hazard of 0.1, (USEPA 2017c) for Protection of Groundwater will be used to evaluate the total-form analyte data. The State Primary Drinking Water Standards (PDWS) [SCDHEC 2014a], the USEPA RSLs for Tapwater (TW) and the 10XPDS/TW and 30XPDS/TW indices (SCDHEC 2008), will also be used to assist in interpretation of TCLP and SPLP data. If polynuclear aromatic hydrocarbons (PAHs) are detected for which no benchmarks are published, they may be evaluated by selection of appropriate surrogate PAHs.
 - Surface Water -- accounting for stormwater Best management Practices that and control systems that will be required to installed and maintained, plausible analyte releases to surface waters will be evaluated against the State Water Quality Standards (SCDHEC 2014b) for Classified Waters (SCDHEC 2012).



- Air – expected particulate emissions as well as associated analyte concentrations due to the physicochemical relationship will be evaluated by modeling/calculation of expected release concentrations and areal extent and then comparison to applicable OSHA Permissible Exposure Limits under 29 CFR 1910.1000 (Tables Z-1, Z-2 and Z-3) and applicable industrial air benchmarks per the current on-line version of USEPA RSLs, using levels set at carcinogenic risk of 1×10^{-6} and non-carcinogenic hazard of 0.1, (USEPA 2017c).
- Environment (Ecological) – potential impacts to ecological receptors due to releases to soil groundwater, surface water and air will be evaluated using analyte-specific numeric values by receptor trophic class in USEPA (2015d).
- Assistance in interpretation of metals levels obtained from ash samples will be obtained by a weight-of-evidence approach using Canova (1999), Franklin *et al.* (2003) and the United States Geological Survey (2001, 1984), in consultation with the Department.
- Radiological – the radionuclide analyses of the solid matrix bottom ash will be compared to the following screening benchmarks (SCDHEC 2017):
 - radium 226 and 228 – 5 picocuries/gram (pC/g)
 - uranium (233/234; 235/236; 238) – 150 pC/g

Risk Modeling

- The potential for adverse impacts to humans and the environment will be qualitatively and qualitatively characterized by estimating risk and hazard to receptors in plausibly-complete exposure pathways per the Conceptual Model. USEPA Superfund Baseline Risk Assessment Guidance and approach will be used to frame this evaluation. The accumulated historical data provided by SCPSA, principally TCLP data for 20 of the TAL metals, and the SPLP data planned to be acquired on the Supplemental Data Collection effort will be used to assist in the quantitative evaluation of plausible expectations for ash leaching on as-as-placed basis.

6.3 Final Characterization

A documentation package will be assembled to support the approval of CGS bottom ash for the specified beneficial use. This package will integrate and synthesize the findings from the efforts specified above and the supplemental data collection plan described below into final conclusion(s) regarding the potential for adverse impacts associated with the specified beneficial use. Assumptions, limitations and uncertainties identified during the work leading to and in the preparation of the package will be called out and their likely impact on the final conclusion(s) will be noted. The contents of the BUD documentation package will comprise the following topical areas:

- 1.0 Introduction
- 2.0 Project Overview
- 3.0 Purpose
- 4.0 Regulatory Synopsis
- 5.0 Decision Rule and Process
- 6.0 Environmental Evaluation
 - 6.1 Review of Applicable Literature
 - 6.2 Review of Accumulated Historical Data (from SCPSA CGS)



- 6.3 Results from Supplemental Data Collection
- 6.4 Conceptual Exposure Model
- 6.5 Exposure Screening Analysis
- 6.6 Risk Modeling
- 6.7 Analogous Product Comparison
- 6.8 Assumptions and Limitations
- 7.0 Engineering Evaluation
 - 7.1 Review of Applicable Literature
 - 7.2 Review of Accumulated Historical Data (from SCPSA CGS)
 - 7.3 Results from Supplemental Data Collection
 - 7.4 Analogous Product Comparison
 - 7.5 Construction Specifications
 - 7.6 CQA Requirements
 - 7.7 Assumptions and Limitations
- 8.0 Market Evaluation
 - 8.1 Functional Benefit
 - 8.2 Substitution of Virgin Material
 - 8.3 Economics
- 9.0 Summary and Conclusions
- 10.0 References Cited
- 11.0 Annexes
 - 11.1 Analytical Laboratory Reports from Supplemental Data Collection – Chemical
 - 11.2 Analytical Laboratory Reports from Supplemental Data Collection – Physical
 - 11.3 Provisional Drawings for Design Requirements
 - 11.4 Construction Specifications
 - 11.5 CQA Requirements (e.g., testing, observation, surveying, etc.)
 - 11.5 Ongoing Maintenance Plan/Requirements

6.4 Supplemental Data Collection

6.4.1 Health and Safety

Upon approval of this WP, a project-specific Health and Safety Plan (HASP) will be issued to address the work specified. S&ME personnel performing field or sampling work will comply with applicable Occupational Safety and Health (OSHA) safety precautions and specific CGS health and safety requirements. Modified Level D personal protective equipment [hard hat, high-visibility traffic vest, steel-toed safety boots, safety glasses; ear plugs or muffs] will apply at all times with the understanding that project- and site-specific conditions as directed by SCPSA may warrant upgrading to a higher level. The Project Manager is designated as the Project Health and Safety Officer.



6.4.2 *Analytical Data Objectives*

Data generated from this supplemental collection will be used to:

- add to the extant knowledge regarding the characterization of the chemical and radiological nature of the CGS bottom ash;
- add to the extant knowledge regarding the characterization of the physical nature (relative to use as a construction material) of the CGS bottom ash;
- evaluate the plausible exposure potential to human health and the environment relative to use of the bottom ash during construction and in its installed and maintained form (i.e., the risk-based future scenario); and,
- inform the discharge process of the Decision Rules (Section 4.0).

6.4.3 *Chemical Samples*

Samples of bottom ash from the CGS units will be collected from the dry handling system output and analyzed for USEPA Target Analyte List (TAL) metals and polynuclear aromatic hydrocarbons (PAHs). For the TAL metals, analyses will be performed for the total form, and the leachable forms by the Toxicity Characteristic Leaching Procedure (TCLP) and the Synthetic Precipitation Leaching Procedure (SPLP). Metals analyses by SPLP are proposed to gain more specific insight into the expected leachability of the bottom ash based on its planned placement as a soil amendment.

6.4.4 *Radiological Samples*

Two (2) samples of bottom ash from the CGS units will be collected from the dry handling system output and analyzed for gross alpha activity, gross beta activity, radium (226 and 228) activity, thorium (228, 230, 232) activity and total uranium (233/234; 235/236; 238) activity.

6.4.5 *Physical Testing*

A series of physical tests will be performed on the bottom ash samples that will be collected contemporaneously with the samples intended for chemical analyses to evaluate the geotechnical properties of the ash for use as embankment fill. This evaluation will use applicable procedures generally addressed in ASTM (1997).

7.0 Supplemental Data Collection Standard Operating Procedures

This section identifies the standard operating procedures (SOPs) to be implemented during field sampling in order to achieve an acceptable level of quality for the ensuing data commensurate with the intended decisions to be made. Applicable portions of the procedures outlined herein will be adhered to and followed throughout the field sampling. These SOPs have been adopted from the USEPA Region 4 Field Branches Quality System and Technical Procedures (USEPA 2017a).



7.1 Sampling Initiation

It is the responsibility of the Project Manager to ensure that proper coordination with the Department, field team and laboratories is accomplished in a timely and efficient manner before the sampling event occurs. This WP is herewith submitted to the Department for review, comment and approval. Once the Department is satisfied with the WP, the Department will provide written approval to PR. PR will then notify S&ME of approval after which S&ME will then coordinate sample collection timing with Santee Cooper.

The Project Manager will notify the analytical laboratory of the sampling event and anticipated schedule. The Project Manager, or his designee, will complete an analytical request that will specify the project name, schedule, laboratory, sample locations, matrix, number of samples, analytical parameters, quality control (QC) requirements and sample container delivery requirements.

Efforts in this phase will comply with the applicable sections of:

- Project Planning (USEPA 2016b)

7.2 Field Documentation

The specific information for each sample will be documented in a field logbook and on a laboratory-supplied chain-of-custody form. The sample identification will be correlated in the logbook and chain-of-custody by sample designation, sampling date and time. The analytical parameters for which a sample is to be analyzed and the respective number of sample containers will be provided on the chain-of-custody form. Field documentation will be in accordance with the guidelines outlined in:

- Logbooks (USEPA 2013b)

7.3 Field Quality Control

Field QC procedures will follow those applicable requirements in:

- Field Sampling Quality Control (USEPA 2017b)

7.4 Sample Labeling

Each sample container will be labeled using waterproof, non-erasable ink. The labels will record the date and times of sample collection, identification codes, parameters to be analyzed and, when applicable, preservatives used.

Each sample collected will be assigned a unique sample tracking number. Samples collected for QC purposes will also be labeled with a simple alphabetic code in order to remain blind to the analytical laboratory. The information regarding all sample identification will be recorded in field sampling logbooks. Samples will be labeled/marked in accordance with the applicable guidelines outlined in:

- Packing, Marking and Shipping of Environmental and Waste Samples (USEPA 2015c)



7.5 Sample Management

The possession of samples will be traceable from the time they are acquired until they have been submitted to the analytical laboratory. To simplify the documentation of possession that is maintained on the chain-of-custody form, the number of people who handle samples during the assessment will be minimized. Samples will be documented in the field records, on the chain-of-custody form and on the sample container labels.

Field personnel are responsible for proper handling and custody of samples collected until the samples are properly and formally transferred to another qualified person, transporter or laboratory. Sample containers will be closed upon collection; individual container custody seals attached; packaged properly; and, when required by the analytical method, placed on ice in a cooler for holding until being packaged for shipment. Chain-of-custody documentation will be included in each cooler. The samples will be dispatched to the laboratories on the day of collection in accordance with the applicable guidelines in:

- Packing, Marking and Shipping of Environmental and Waste Samples (USEPA 2015c)
- Sample and Evidence Management (USEPA 2013c)

7.6 Sampling Equipment Decontamination

Sample acquisition tools will be decontaminated prior to mobilizing to the field following in:

- Field Equipment Cleaning and Decontamination at the FEC (USEPA 2015b)

7.7 Bottom Ash Sampling

General procedures for collection of the bottom ash samples will follow those detailed in:

- Soil Sampling (USEPA 2014b)

7.8 Investigation-Derived Waste Management

Little, if any, investigative-derived waste (IDW) is expected to be generated from the sampling event. Materials that are expected to be generated and will be managed as IDW are:

- Disposable PPE (e.g., latex gloves)
- Disposable equipment (e.g., paper and plastic refuse, aluminum foil)

General procedures for management of IDW will follow those detailed in:

- Management of Investigation Derived Waste (USEPA 2014a)

7.9 Project Field Documentation

The Lead Field Technician will prepare a concise documentation package for the sampling event, as follows:

- Copy of field log book page(s)



- Copy of chain-of-custody sheet(s)
- Photodocumentation
- Other pertinent information, as applicable

8.0 Supplemental Data Collection Sampling and Analysis Plan

Scheduled chemical and radiological analyses of CGS bottom ash are summarized in Table 1. All samples will be collected as instantaneous grab samples.

8.1 Chemical Parametric Coverage and Analytical Methods

Metals are the presumptive COPCs associated with the CGS bottom ash. Consequently, samples of the bottom ash will be analyzed for USEPA TAL metals, as summarized in Table 1. PAHs will also be included in the coverage. Detection limits for TCLP analyses will be at or less than the USEPA analyte-specific regulatory limits. Detection limits for SPLP analyses will be at or near than the analyte-specific PDWS (primary benchmark) or TW-RSLs (for use when PDWS has not been promulgated). Selected Ion Monitoring methodology (SIM) is specified for PAHs in order to achieve low reporting limits.

8.2 Chemical Sampling Containers, Preservation and Holding Times

Table 2 summarizes the required sampling containers, preservation and holding times for the parametric suites.

8.3 Chemical Analytical Data Review

Analytical Support Level (ASL) II data packages will be specified. To ensure that analyte concentrations in the assessment dataset are of known quality:

- the Sample Receipt Condition Report will be reviewed;
- analytical data presented in the laboratory reports will be reviewed;
- laboratory-assigned data qualifiers will be evaluated to verify that rejected or unsupportable data, if any, are not included in the dataset;
- laboratory quality control data provided in the ASL II laboratory reports will be reviewed; and,
- field collection notes will be reviewed.

No data are scheduled for formal data validation by the National Functional Guidelines.



8.4 Radiological Sampling

Two (2) samples of bottom ash will be collected (Table 1) and submitted for analyses of gross alpha activity, gross beta activity, radium (226 and 228) activity, thorium (228, 230, 232) activity and total uranium (233/234; 235/236; 238) activity. Analytical methods, sample containers, preservation methods and holding times are specified in Table 2.

8.5 Physical Testing

The physical testing program will comprise the following steps:

1. Seven (7) 75-pound (lb.) samples of bottom ash will be collected. Four (4) of those samples will be analyzed as bottom ash alone (i.e., 100%); the remaining three (3) samples will be used for ash-native soil blends [75-lb. samples of native site soil, soil from a nearby borrow pit, or typical fill soil will also be collected]. The soil will be blended with the bottom ash in different proportions. The collected soil will be similar to the soils that will be used for fill purposes during construction of the embankments.
2. Three (3) sample blends will be prepared by mechanically mixing the bottom ash and soil in ratios of 3/1, 1/1, and 1/3 (i.e. 75%, 50% and 25% bottom ash) by weight.
3. Laboratory testing will then be performed on each 100% ash sample and each blended sample to determine the gradation, plasticity, moisture-density relationship, specific gravity, shear strength (direct shear and California Bearing Ratio), resistivity, pH, sulfate content, and chloride content on each sample (Table 3).
4. The results of this physical testing will be presented in the final BUD documentation package as per Section 6.3, above.

9.0 Schedule

Work specified herein will commence upon the Department's approval of this WP and after a five (5)-day notice to Santee Cooper. A three-week turnaround is anticipated by the laboratories for the supplemental samples, during which time the stepped progression of the evaluation method described in Sections 6.1 and 6.2 will be under execution.

The final BUD documentation package is anticipated to be delivered to the Department approximately 30 days after approval of this WP and contingent upon sample collection coordination with Santee Cooper.

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BENEFICIAL USE DEMONSTRATION WORK PLAN
For a Specified Portion of The Camp Hall Rail Project
Berkeley County, South Carolina
S&ME Project No. 1134-11-233



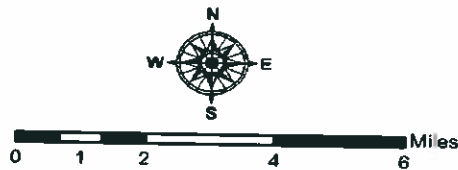
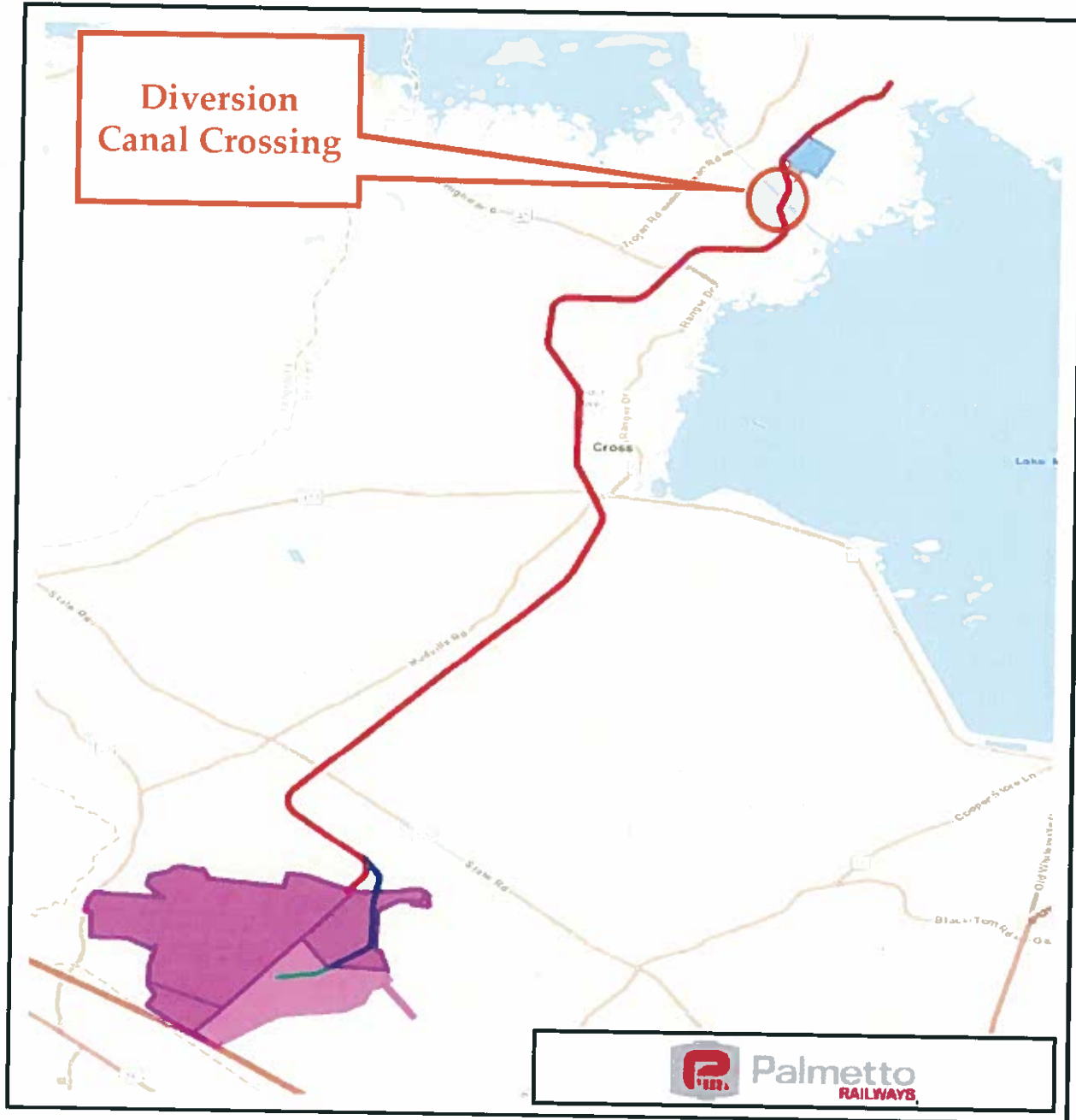
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Legend

- PHASE 1
- PHASE 2A
- PHASE 2B

- CAMP HALL COMMERCE PARK
- SANTEE COOPER CROSS GENERATING STATION

Note:
Figure provided by Palmetto Railways



Camp Hall Rail Project Corridor and BUD Project Area

**Camp Hall Rail Project
Berkeley County, South Carolina**

SCALE:
As Shown

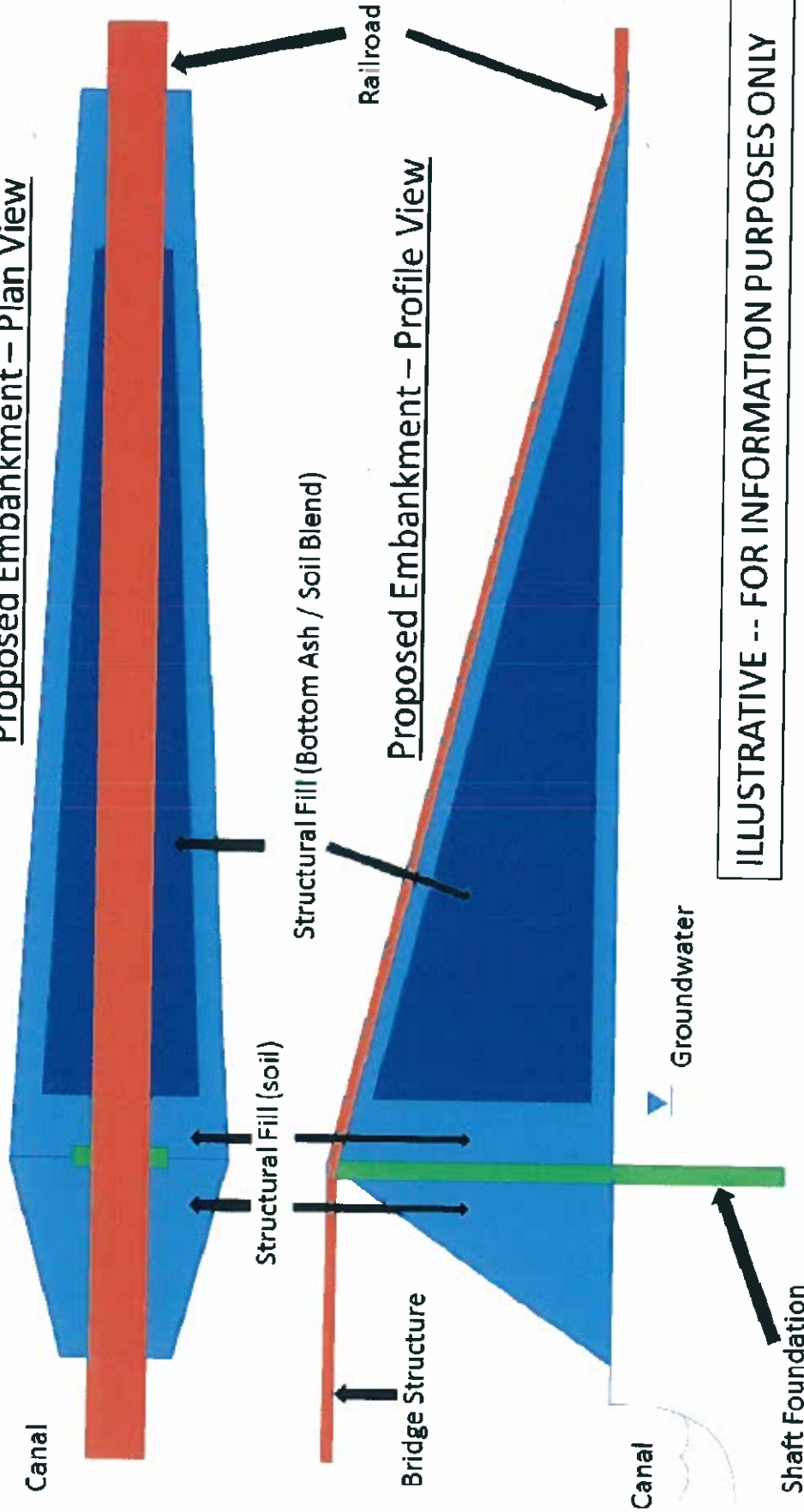
DATE:
11-9-17

PROJECT NUMBER
1134-11-233

FIGURE NO.

1

Proposed Embankment – Plan View



Conceptual Schematic – Railway Embankment for Diversion Canal Crossing

Camp Hall Rail Project
Berkeley County, South Carolina

SCALE:
None

DATE:
11-22-17

PROJECT NUMBER
1134-11-233

FIGURE NO

2

**Table 1 -- Scheduled Supplemental Chemical Testing: Analytical Methods -- SCPSA Cross Generating Station Bottom Ash
Beneficial Use Demonstration Work Plan
Palmetto Railways Camp Hall Rail Project, Berkeley County, South Carolina
S&ME Project No. 1134-11-233
December 20, 2017**

Analytical Suite ^a	Test Method	Sample Designation ^b							
		CSG1			CSG4				
		A	B	C	A	B	C		
TAL Metals -- Total Form	All but Mercury	SW-846 6010B							
	Mercury	SW-846 7471A							
	Extraction	None							
TAL Metals -- TCLP	All but Mercury	SW-846 6010B							
	Mercury	SW-846 7471B							
	Extraction	SW-846 1311							
TAL Metals -- SPLP	All but Mercury	SW-846 6010B							
	Mercury	SW-846 7471B							
	Extraction	SW-846 1312							
PAHs -- LL		SW-846 8270D, SIM ^a							
Radionuclides	Gross alpha	EPA 900.0 Modified							
	Gross beta								
	Radium 226 & 228	DOE EML HASL 300 4.5.2.3							
	Uranium-233/-234, -235/-236, -238	DOE EML HASL 300 U-02-RC Modified							
	Thorium 228, 230, 232	DOE EML HASL 300 Th-01-RC Modified							

a. TAL = Target Analyte List; PAHs-LL = polynuclear aromatic hydrocarbons, low-level; TCLP = Toxicity Characteristic Leaching Procedure; SPLP = Synthetic Precipitation Leaching Procedure; SIM = Selective Ion Monitoring

b. A, B, C denote replicate samples

Table 2 -- Scheduled Supplemental Chemical Testing: Sample Collection Containers, Preservatives and Holding Times -- SCPSA Cross Generating Station Bottom Ash Beneficial Use Demonstration Work Plan
Palmetto Railways Camp Hall Rail Project, Berkeley County, South Carolina
S&ME Project No. 1134-11-233
December 20, 2017

Analytical Suite		Container	Preservative	Holding Time ^c	Volume Required
Metals	PAHs-LL	4- or 8-ounce jar, glass w/ Teflon™-lined cap	Cool to < 6° C	14 days/40 days	100 grams
	Total			6 months	
	TCLP			180 days/180 days	100 grams each
Mercury	SPLP	4- or 8-ounce jar, glass w/ Teflon™-lined cap	None		
	Total				
	TCLP			28 days	
Radionuclides	SPLP	4- or 8-ounce jar, glass w/ Teflon™-lined cap	None	28 days/28 days	100 grams each
	Gross alpha				
	Gross beta				
	Radium				
	Uranium				
	Thorium	500 mL wide-mouth plastic container	None	180 days	150 grams total

a. TAL = Target Analyte List; PAHs-LL = polynuclear aromatic hydrocarbons, low-level; TCLP = Toxicity Characteristic Leaching Procedure; SPLP = Synthetic Precipitation Leaching Procedure; SIM = Selective Ion Monitoring

b. A, B, C denote replicate samples

c. when two (2) durations given = holding time limit for extraction/post-extraction holding time limit for analysis

Table 3 -- Scheduled Physical Testing -- SCPSA Cross Generating Station Bottom Ash

Beneficial Use Demonstration Work Plan

Palmetto Railways Camp Hill Rail Project, Berkeley County, South Carolina

S&ME Project No. 1134-11-233

December 20, 2017

Physical Test	Test Method	Unblended Ash					Ash/Soil Blend, % by weight			
		100%	100%	100%	100%	100%	75/25	50/50	25/75	
Gradation	ASTM 2017d	V	V	V	V	V	V	V	V	V
Plasticity	ASTM 2017b	V	V	V	V	V	V	V	V	V
Moisture-Density Relationship	ASTM 2017c,e; ASTM 2016a,b,c; ASTM 2015; ASTM 2012a,b; ASTM 2010	V	V	V	V	V	V	V	V	V
Specific Gravity	ASTM 2014	V	V	V	V	V	V	V	V	V
Shear Strength	Direct Shear California Bearing Ratio	V	V	V	V	V	V	V	V	V
Resistivity	ASTM 2017a; ASTM 2009 AASHTO T 288	V	V	V	V	V	V	V	V	V
pH	ASTM 2013; ASTM 2012c; ASHTO T 289	V	V	V	V	V	V	V	V	V
Sulfate Content	AASHTO T 290	V	V	V	V	V	V	V	V	V
Chloride Content	AASHTO T 291	V	V	V	V	V	V	V	V	V