



amec
foster
wheeler

January 28, 2015

Mr. Larry Frost and Ms. Elizabeth Werner
North Carolina Department of Environment and Natural Resources
Solid Waste Section
Provided via email to:
Larry.Frost@ncdenr.gov
Elizabeth.Werner@ncdenr.gov

Subject: Draft Subsurface Exploration Plan for Proposed Dan River Landfill

Dear Mr. Frost and Ms. Werner

Thank you for meeting with us recently to discuss upcoming solid waste permitting items. The preliminary subsurface exploration plan is attached for your consideration. The subsurface exploration plan drawing is consistent with what was submitted for Erosion and Sediment Control permitting. Please note that we are currently not proposing to perform test pits where shown due to potential impacts to cultural artifacts identified during a recent archaeological study. In addition to the attached plans, we propose to perform a geophysical survey, baseline geochemical evaluation, and laboratory soils testing. A groundwater sampling plan will be prepared prior to sampling. We currently anticipate beginning drilling work beginning in March 2015.

We greatly appreciate your preliminary review and comments to the proposed subsurface exploration plan.

Sincerely,

Amec Foster Wheeler

Cedric H. Ruhl, PE
Senior Engineer

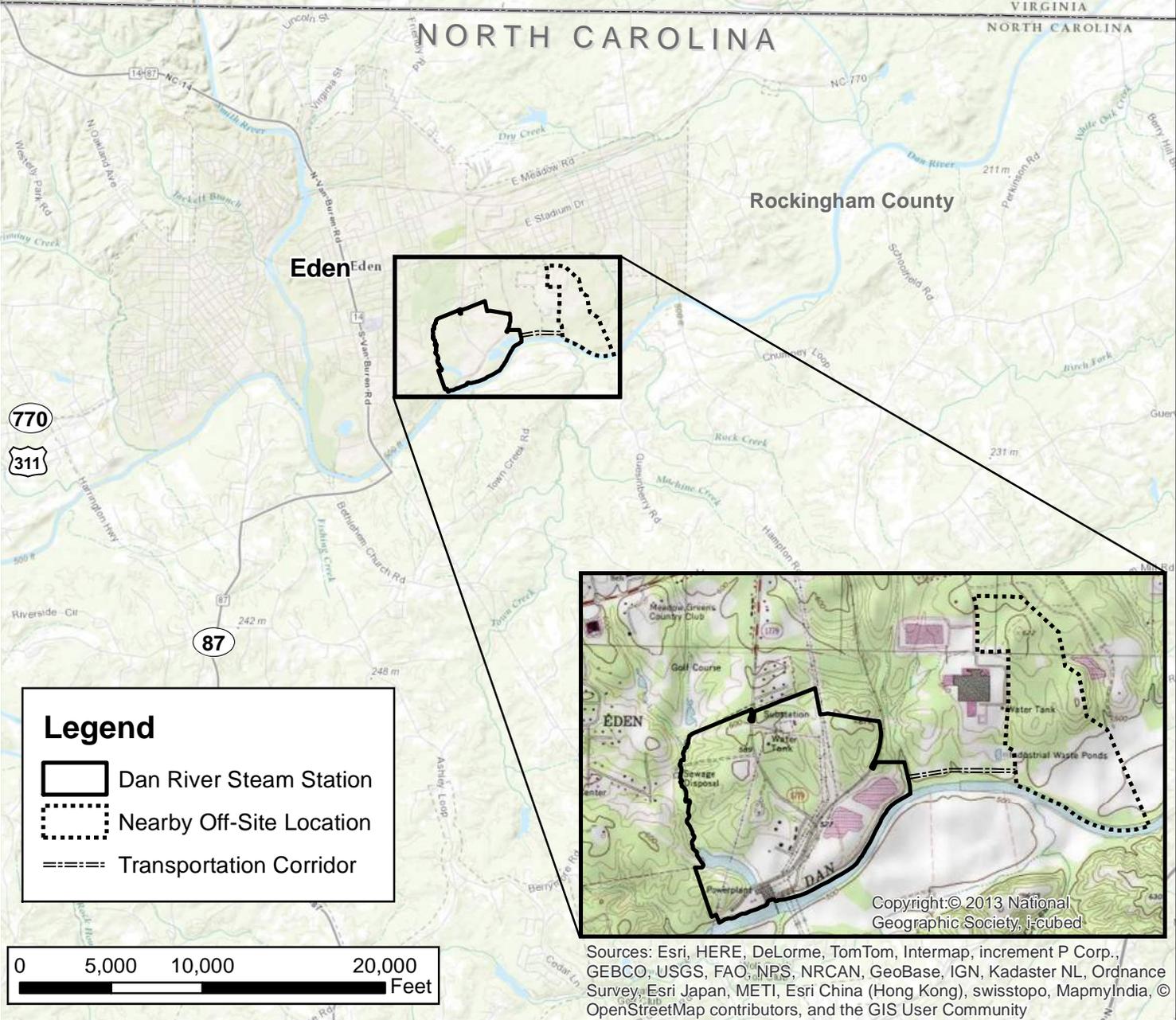
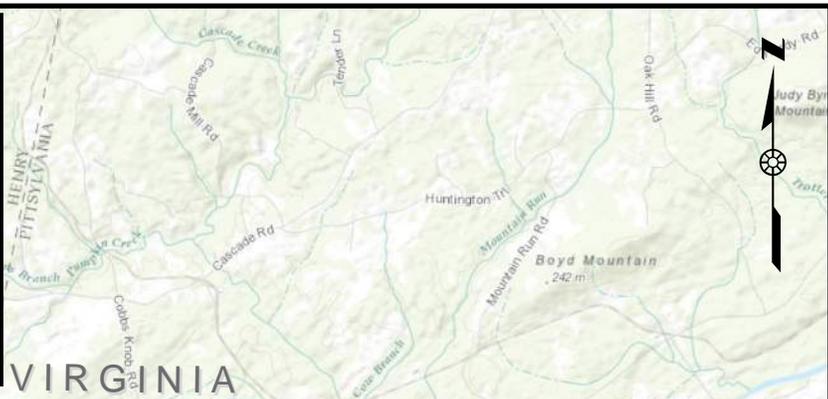
Ken Daly, PE
Senior Associate

Attachments:

- Subsurface Exploration Plan
- Drilling Work Packages
- Slug Testing Work Package
- Survey Work Package
- Well Abandonment Work Package
- Water Level Collection Work Package



Project Location

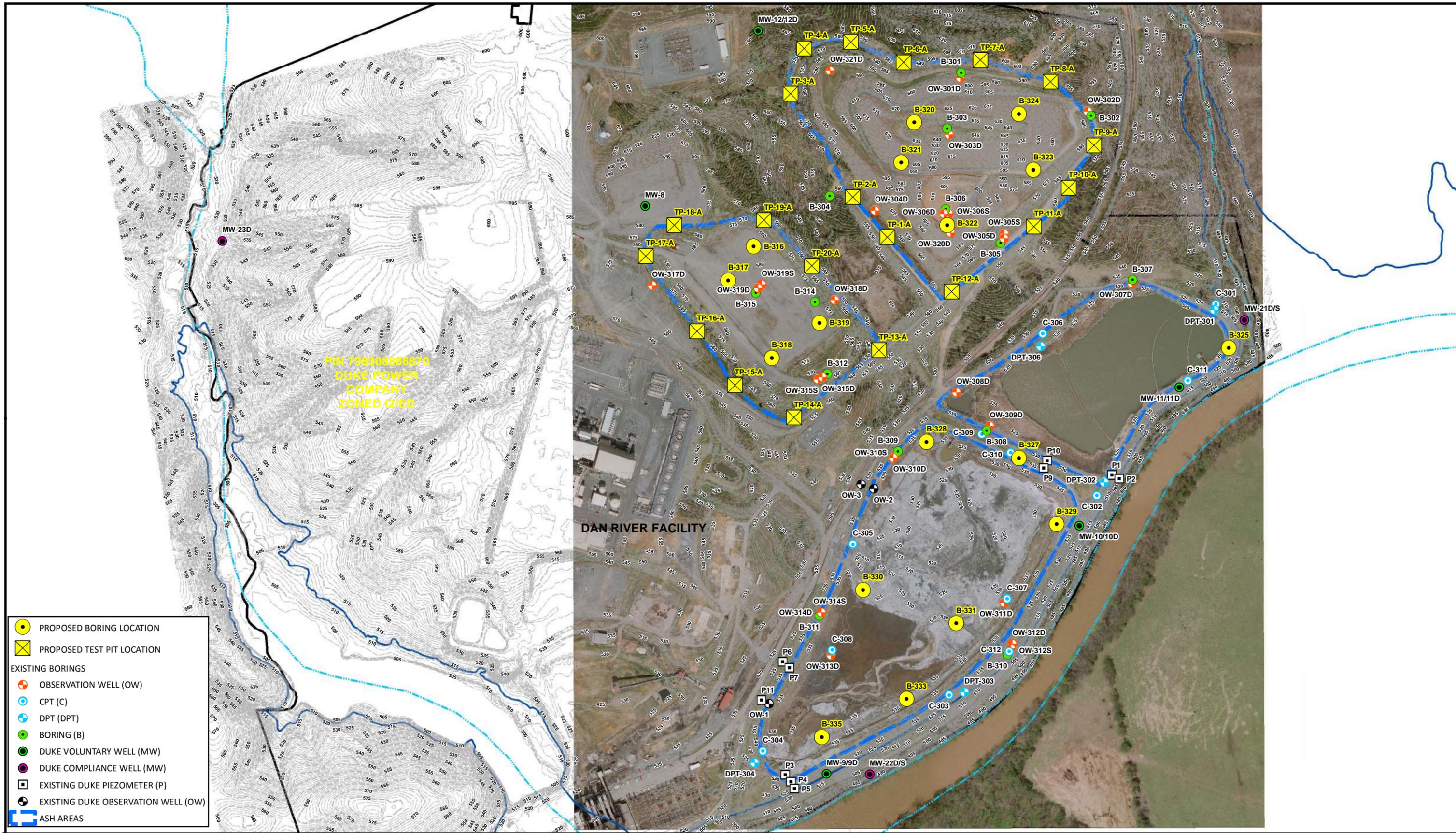


Source: USDA-NRCS Digital Raster Graph Mosaic, dated 2007.

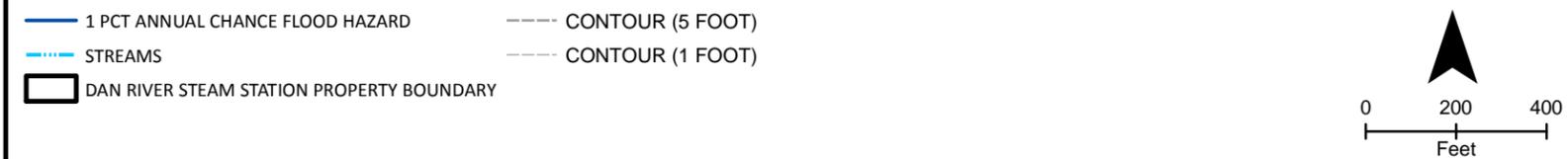


**SITE VICINITY MAP
ASH BASIN CLOSURE
DUKE ENERGY DAN RIVER STEAM STATION
ROCKINGHAM COUNTY, NORTH CAROLINA**

PREPARED BY	DATE	CHECKED BY	DATE	JOB NUMBER	FIGURE
CHR	9/22/2014	KD	9/22/2014	7810-14-0065	1



Source: Rockingham County GIS data, dated 2014. Aerial Photography flown May 5, 2014; Topographic Mapping from aerial photography dated February 7, 2014.

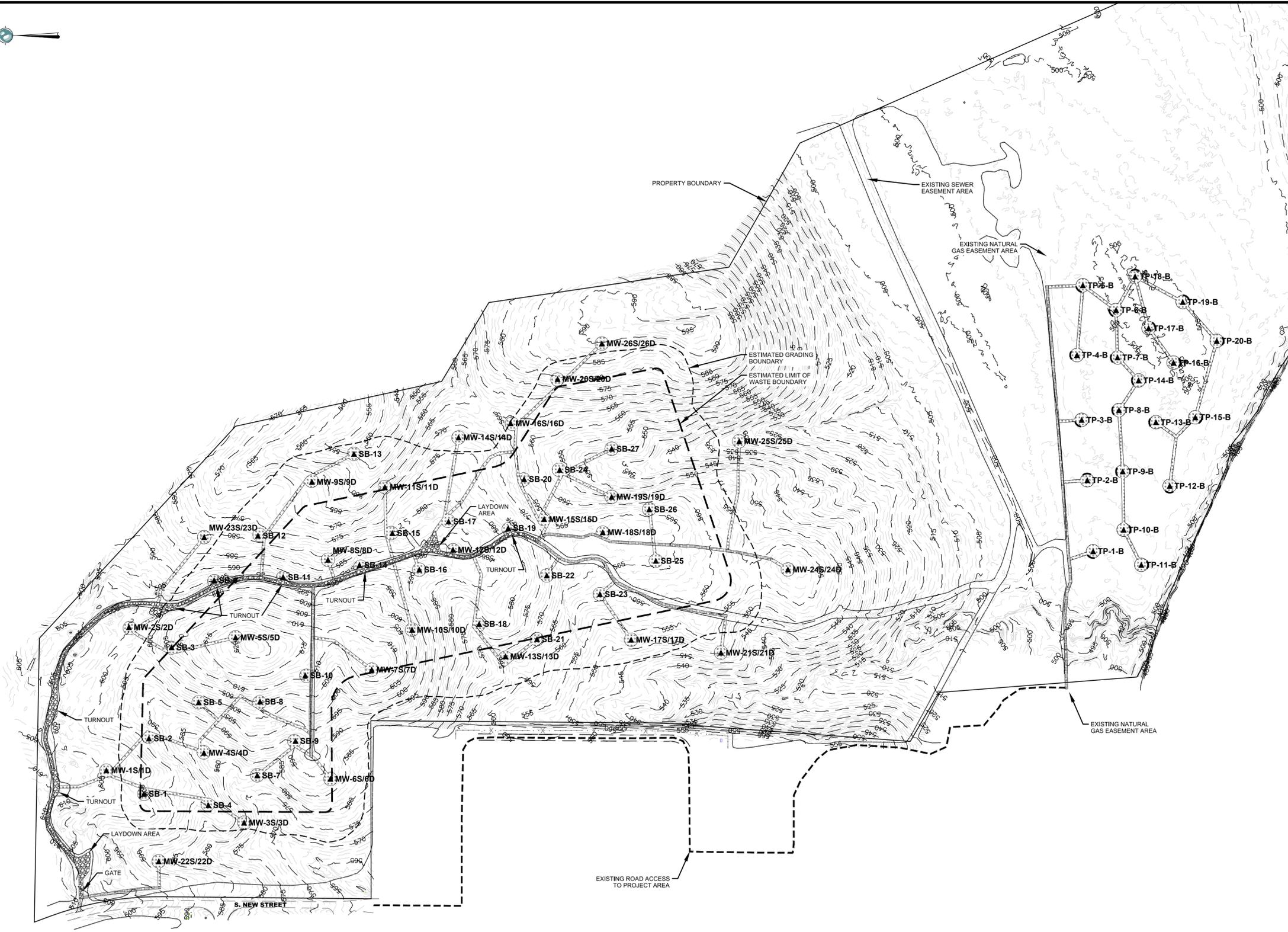


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PREPARED BY	CHR	DATE	10/2/2014	CHECKED BY	KRD	DATE	9/23/2014
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**DUKE ENERGY DAN RIVER STEAM STATION
ROCKINGHAM COUNTY, NORTH CAROLINA**

JOB NUMBER	7810-14-0065	FIGURE	2
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- LEGEND**
- EXISTING MAJOR CONTOUR (REF. 1)
 - EXISTING MINOR CONTOUR (REF. 1)
 - PROPERTY BOUNDARY (REF. 2)
 - ESTIMATED LIMIT OF WASTE BOUNDARY
 - ESTIMATED GRADING BOUNDARY
 - COMPOST SOCK
 - EXISTING CLEARED TRAIL STABILIZATION
 - EXISTING CLEARED TRAIL - NO IMPROVEMENTS
 - PROPOSED TRAIL CLEARED WITH NON-GROUND DISTURBING METHODS
 - ▲ SUBSURFACE EXPLORATION LOCATION
MW = MONITORING WELL
SB = SOIL BORING
TP = TEST PIT



DRAFT

REV	D	M	Y	ISSUE/REVISION DESCRIPTION	ENG.	APPR.



CLIENT: **DUKE ENERGY CAROLINAS**
ROCKINGHAM COUNTY, NC

CLIENT LOGO:

2801 YORKMONT ROAD, SUITE 100
CHARLOTTE, NC 28208
TEL: (704) 357-8600 FAX: (704) 357-8638
LICENSURE: NC ENG. F-1253 NC GEOLOGY: C-247

DATUM:
PROJECTION:
DRAWN BY: CHR
REVIEWED BY: KR D
ORIGINAL SCALE: AS SHOWN

PROJECT: **SUBSURFACE EXPLORATION PLAN**
PROPOSED DAN RIVER LANDFILL

TITLE:
DATE: 1/28/2015
DRAWING NO.: **3**

PROJECT NO.: 7810-14-0065
REVISION NO.:
DATE: 1/28/2015
DRAWING NO.: **3**

DRILLING WORK PACKAGE

Duke Energy - Dan River Steam Station: Landfill Development & Ash Basin Closure

Boring/Excavation No.	Scope of Work
SB-1; SB-2; SB-3; SB-4; SB-5; SB-6; SB-7; SB-8; SB-9; SB-10; SB-11; SB-12; SB-13; SB-14; SB-15; SB-16; SB-17; SB-18; SB-19; SB-20; SB-21; SB-22; SB-23; SB-24; SB-25; SB-26; SB-27	<ul style="list-style-type: none"> • Borings advanced at Off-Site Location. Boring locations are shown on Figure 3 - Proposed Landfill Subsurface Exploration Plan Dan River Steam Station (attached). • Auger drilling through residual soil to equipment refusal depths (estimated approx. 30' bgs) and collecting split-spoon samples and bulk samples as described below. • Abandon boring with boring grout mix to ground surface as described below. <p style="text-align: center;"><i>Refer to Figure 3 - Proposed Landfill Subsurface Exploration Plan Off-Site Location</i></p>

Boring Specifications			
Work Item	Anticipated	Actual	Comment
Drilling Setup	Standard (see below)		
Target Total Depth	30 ft bgs (approx.)		
Termination Criteria	Drill to equipment refusal depth		
Drill Methods	Hollow-Stem Auger		
Sampling	<ul style="list-style-type: none"> • Collect split-spoon samples using 1.5-ft sampler; samples collected every 2.5 ft starting at 1 ft bgs & every 5 ft starting at 13.5 ft bgs and continue until boring termination 		
	<ul style="list-style-type: none"> • Collect 1 bulk sample from 5 randomly selected locations in the field. Bulk samples will be collected from composite drill cuttings from 0-10 ft bgs in 5-gallon plastic buckets with lids 		
IDW Handling	Cuttings spread on ground near boring location		
Surface Casing Installation	Not Applicable		
Piezometer/Well Casing Installation	Not Applicable		
Piezometer/Well Installation Depth	Not Applicable		
Well Development	Not Applicable		
Boring Grout Mix (for borehole abandonment)	2.5 lbs bentonite; 94 lbs portland cement; 10 gallons water; Grout mix will be pumped to bottom of the boring through PVC tremie pipe.		
Emergency Grouting Mix	Not Applicable		
Bollards	Not Applicable		

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	Standard Setup; Drill borehole; Collect split-spoons (every location) and bulk samples (field selected locations)	5						
		6						
		7						
		9						
		11						
		12						
		13						
		14						
		15						
		16						
2	Abandon Borehole; Demobilize	18						
		24						
		6						
		7						
		9						
		11						
		12						
		13						
		14						
		15						
16								
18								
24								

Drilling Setup	
Standard	Verify boring ID and utility clearance
	Drill rig and grout equipment on Visquene plastic sheeting
	Emergency spill kit available
	Pumps with leak-free hoses
	Shovels, wrenches, saw horses

AHA No.	AHA Description
5	Drilling Operations and Well Installation
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
11	Haz Com
12	Housekeeping
13	Insect Stings and Bites and Poisonous Plants
14	Machine Guarding and Portable Hand Tools
15	Means of Egress, Fire Prevention and Protection
16	Mobilization/Demobilization
18	PPE Use
24	Vehicle Travel

DRILLING WORK PACKAGE

Duke Energy - Dan River Steam Station: Landfill Development & Ash Basin Closure

Boring/Excavation No.	Scope of Work
MW-2S; MW-3S; MW-5S; MW-6S; MW-8S; MW-9S; MW-11S; MW-12S; MW-14S; MW-15S; MW-17S; MW-18S; MW-20S; MW-21S; MW-23S; MW-24S; MW-26S	<ul style="list-style-type: none"> • Borings advanced at Off-Site Location. Boring locations are shown on Figure 3 - Proposed Landfill Subsurface Exploration Plan Dan River Steam Station (attached). • Auger drilling through residual soil to equipment refusal depths (estimated approx. 30' bgs), collecting undisturbed samples, installing Type II wells, and developing wells as described below. <p style="text-align: center;"><i>Refer to Figure 3 - Proposed Landfill Subsurface Exploration Plan Off-Site Location</i></p>

Boring Specifications			
Work Item	Anticipated	Actual	Comment
Drilling Setup	Standard (see below)		
Target Total Depth	30 ft bgs (approx.)		
Termination Criteria	Drill to equipment refusal depth		
Drill Methods	Hollow-Stem Auger		
Sampling	<ul style="list-style-type: none"> • Collect 1 undisturbed sample from each location from within anticipated saturated screened interval with piston sampler & 2-ft Shelby tube. Preserve Shelby tubes with was and sealed plastic caps. 		
IDW Handling	Cuttings spread on ground near boring location		
Surface Casing Installations	4"x 4" Steel Stick-Up		
Piezometer/Well Casing Installations	Type II-2" PVC		
Piezometer/Well Installation Depth	30 ft bgs (approx.)		
Piezometer/Well Screen Intervals	20-30 ft bgs (approx.)		
Well Development	Yes, with submersible pump		
Boring Grout Mix (for borehole abandonment)	Not Applicable		
Emergency Grouting Mix	Not Applicable		
Bollards	None		

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	Standard Setup; Drill borehole; Collect split-spoons and undisturbed samples	5						
		6						
		7						
		9						
		11						
		12						
		13						
		14						
		15						
		16						
2	Install Well; Demobilize	18						
		24						
		5						
		6						
		7						
		9						
		11						
		12						
		13						
		14						
15								
16								
18								
24								

Drilling Setup	
Standard	Verify boring ID and utility clearance
	Drill rig and grout equipment on Visquene plastic sheeting
	Emergency spill kit available
	Pumps with leak-free hoses
	Shovels, wrenches, saw horses

AHA No.	AHA Description
5	Drilling Operations and Well Installation
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
11	Haz Com
12	Housekeeping
13	Insect Stings and Bites and Poisonous Plants
14	Machine Guarding and Portable Hand Tools
15	Means of Egress, Fire Prevention and Protection
16	Mobilization/Demobilization
18	PPE Use
24	Vehicle Travel

DRILLING WORK PACKAGE

Duke Energy - Dan River Steam Station: Landfill Development & Ash Basin Closure

Boring/Excavation No.	Scope of Work
<p>MW-1S; MW-4S; MW-7S; MW-10S; MW-13S; MW-16S; MW-19S; MW-22S; MW-25S</p>	<ul style="list-style-type: none"> • Borings advanced at Off-Site Location. Boring locations are shown on Figure 3 - Proposed Landfill Subsurface Exploration Plan Dan River Steam Station (attached). • Auger drilling through residual soil to equipment refusal depths (estimated approx. 30' bgs), collecting undisturbed samples, installing Type II wells, and developing wells as described below. • Collect environmental groundwater samples for lab analysis as described below. <i>Refer to Figure 3 - Proposed Landfill Subsurface Exploration Plan Off-Site Location</i>

Boring Specifications			
Work Item	Anticipated	Actual	Comment
Drilling Setup	Standard (see below)		
Target Total Depth	30 ft bgs (approx.)		
Termination Criteria	Drill to equipment refusal depth		
Drill Methods	Hollow-Stem Auger		
Sampling	<ul style="list-style-type: none"> • Collect 1 undisturbed sample from each location from within anticipated saturated screened interval with piston sampler & 2-ft Shelby tube. Preserve Shelby tubes with was and sealed plastic caps. 		
	<ul style="list-style-type: none"> • Following well development, collect environmental groundwater samples for lab analysis of alkalinity, 22metals, bromide, chloride, fluoride, nitrateN, nitriteN, phosphorous, sulfate, mercury, total suspended solids 		
IDW Handling	Cuttings spread on ground near boring location		
Surface Casing Installations	4"x 4" Steel Stick-Up		
Piezometer/Well Casing Installations	Type II-2" PVC		
Piezometer/Well Installation Depth	30 ft bgs (approx.)		
Piezometer/Well Screen Intervals	20-30 ft bgs (approx.)		
Well Development	Yes, with submersible pump		
Boring Grout Mix (for borehole abandonment)	Not Applicable		
Emergency Grouting Mix	Not Applicable		
Bollards	None		

Assignments

No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	Standard Setup; Drill borehole; Collect undisturbed samples	5						
		6						
		7						
		9						
		11						
		12						
		13						
		14						
		15						
		16						
2	Install wells; Demobilize	5						
		6						
		7						
		9						
		11						
		12						
		13						
		14						
		15						
		16						
3	Sample Groundwater	6		N/A				
		7						
		9						
		11						
		12						
		13						
		14						
		15						
		16						
		18						
24								
31								

Drilling Setup

Standard	Verify boring ID and utility clearance
	Drill rig and grout equipment on Visquene plastic sheeting
	Emergency spill kit available
	Pumps with leak-free hoses
	Shovels, wrenches, saw horses

AHA No.	AHA Description
5	Drilling Operations and Well Installation
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
11	Haz Com
12	Housekeeping
13	Insect Stings and Bites and Poisonous Plants
14	Machine Guarding and Portable Hand Tools
15	Means of Egress, Fire Prevention and Protection
16	Mobilization/Demobilization
18	PPE Use
24	Vehicle Travel
31	Groundwater Sampling

DRILLING WORK PACKAGE

Duke Energy - Dan River Steam Station: Landfill Development & Ash Basin Closure

Boring/Excavation No.	Scope of Work
MW-2D; MW-3D; MW-5D; MW-6D; MW-8D; MW-9D; MW-11D; MW-12D; MW-14D; MW-15D; MW-17D; MW-18D; MW-20D; MW-21D; MW-23D; MW-24D; MW-26D	<ul style="list-style-type: none"> • Borings advanced at Off-Site Location. Boring locations are shown on Figure 3 - Proposed Landfill Subsurface Exploration Plan Dan River Steam Station (attached). • Auger drilling through residual soil to equipment refusal depths (estimated approx. 30' bgs) collecting split-spoon samples as described below, NQ rock coring (to approx. 40' bgs) collecting bulk samples, installing Type II wells, and developing wells as described below. <p style="text-align: center;"><i>Refer to Figure 3 - Proposed Landfill Subsurface Exploration Plan Off-Site Location</i></p>

Boring Specifications			
Work Item	Anticipated	Actual	Comment
Drilling Setup	Standard (see below)		
Target Total Depth	40 ft bgs (approx.)		
Termination Criteria	Drill approx. 10' into bedrock; looking for water-bearing fractures		
Drill Methods	Hollow-Stem Auger/NQ Core		
Water Hauling	Portable tanks or water truck filled from fire hydrant along South New Street		pending hydrant meter install from City of Eden
Sampling	<ul style="list-style-type: none"> • Collect split-spoon samples using 1.5-ft sampler; samples collected every 2.5 ft starting at 1 ft bgs & every 5 ft starting at 13.5 ft bgs and continue until boring termination 		
	<ul style="list-style-type: none"> • Collect 1 bulk sample from each location from composite drill cuttings from 0-10 ft bgs in 5-gallon plastic buckets with lids 		
IDW Handling	Cuttings spread on ground near boring location		
Surface Casing Installations	4"x 4" Steel Stick-Up		
Piezometer/Well Casing Installations	Type II-2" PVC		
Piezometer/Well Installation Depth	40 ft bgs (approx.)		
Piezometer/Well Screen Intervals	35-40 ft bgs (approx.)		
Well Development	Yes, with submersible pump		
Boring Grout Mix (for borehole abandonment)	Not Applicable		
Emergency Grouting Mix	Not Applicable		
Bollards	None		

Assignments

No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	Standard Setup; Water hauling; Drill borehole; Collect split-spoons and bulk samples	5						
		6						
		7						
		9						
		11						
		12						
		13						
		14						
		15						
		16						
		18						
2	Install wells; Demobilize	5						
		6						
		7						
		9						
		11						
		12						
		13						
		14						
		15						
		16						
		18						
24								

Drilling Setup

Standard	Verify boring ID and utility clearance
	Drill rig and grout equipment on Visquene plastic sheeting
	Emergency spill kit available
	Pumps with leak-free hoses
	Shovels, wrenches, saw horses

AHA No.	AHA Description
5	Drilling Operations and Well Installation
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
11	Haz Com
12	Housekeeping
13	Insect Stings and Bites and Poisonous Plants
14	Machine Guarding and Portable Hand Tools
15	Means of Egress, Fire Prevention and Protection
16	Mobilization/Demobilization
18	PPE Use
24	Vehicle Travel
33	Utilizing a Fire Hydrant to Fill a Water Tank

DRILLING WORK PACKAGE

Duke Energy - Dan River Steam Station: Landfill Development & Ash Basin Closure

Boring/Excavation No.	Scope of Work
MW-1D; MW-4D; MW-7D; MW-10D; MW-13D; MW-16D; MW-19D; MW-22D; MW-25D	<ul style="list-style-type: none"> • Borings advanced at Off-Site Location. Boring locations are shown on Figure 3 - Proposed Landfill Subsurface Exploration Plan Dan River Steam Station (attached). • Auger drilling through residual soil to equipment refusal depths (estimated approx. 30' bgs) collecting split-spoon samples as described below, installing 6" PVC Outer Casing, NQ rock coring (to approx. 40' bgs) collecting bulk samples, installing Type III wells, and developing wells as described below. • Collect environmental groundwater samples for lab analysis as described below. <p style="text-align: center;"><i>Refer to Figure 3 - Proposed Landfill Subsurface Exploration Plan Off-Site Location</i></p>

Boring Specifications			
Work Item	Anticipated	Actual	Comment
Drilling Setup	Standard (see below)		
Target Total Depth	40 ft bgs (approx.)		
Termination Criteria	Drill approx. 10' into bedrock; looking for water-bearing fractures		
Drill Methods	Hollow-Stem Auger/NQ Core		
Water Hauling	Portable tanks or water truck filled from fire hydrant along South New Street		pending hydrant meter install from City of Eden
Sampling	<ul style="list-style-type: none"> • Collect split-spoon samples using 1.5-ft sampler; samples collected every 2.5 ft starting at 1 ft bgs & every 5 ft starting at 13.5 ft bgs and continue until boring termination 		
	<ul style="list-style-type: none"> • Collect 1 bulk sample from each location from composite drill cuttings from 0-10 ft bgs in 5-gallon plastic buckets with lids 		
	<ul style="list-style-type: none"> • Following well development, collect environmental groundwater samples for lab analysis of alkalinity, 22 metals, bromide, chloride, fluoride, nitrateN, nitriteN, phosphorous, sulfate, mercury, total suspended solids 		
IDW Handling	Cuttings spread on ground near boring location		
Surface Casing Installations	6"x 6" Steel Stick-Up		
Piezometer/Well Casing Installations	Type III - 6" PVC Outer Casing; 2" PVC Well Casing		
Piezometer/Well Installation Depth	40 ft bgs (approx.)		
Piezometer/Well Screen Intervals	35-40 ft bgs (approx.)		
Well Development	Yes, with submersible pump		
Boring Grout Mix (for borehole abandonment)	Not Applicable		
Emergency Grouting Mix	Not Applicable		
Bollards	None		

Assignments

No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	Standard Setup; Water hauling; Drill borehole; Collect split-spoons and bulk samples	5						
		6						
		7						
		9						
		11						
		12						
		13						
		14						
		15						
		16						
		18						
2	Install wells; Demobilize	5						
		6						
		7						
		9						
		11						
		12						
		13						
		14						
		15						
		16						
		18						
3	Sample Groundwater	6		N/A				
		7						
		9						
		11						
		12						
		13						
		14						
		15						
		16						
		18						
		24						
31								

Drilling Setup

Standard	Verify boring ID and utility clearance
	Drill rig and grout equipment on Visquene plastic sheeting
	Emergency spill kit available
	Pumps with leak-free hoses
	Shovels, wrenches, saw horses

AHA No.

AHA Description

5	Drilling Operations and Well Installation
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
11	Haz Com
12	Housekeeping
13	Insect Stings and Bites and Poisonous Plants
14	Machine Guarding and Portable Hand Tools
15	Means of Egress, Fire Prevention and Protection
16	Mobilization/Demobilization
18	PPE Use
24	Vehicle Travel
31	Groundwater Sampling
33	Utilizing a Fire Hydrant to Fill a Water Tank

SLUG TESTING WORK PACKAGE

Duke Energy - Dan River Steam Station: Landfill Development & Ash Basin Closure

	Well No.			Scope of Work
Wells:	MW-1S	MW-11S	MW-21S	<ul style="list-style-type: none"> •Perform in-situ permeability tests "slug tests" in wells as described below. Refer to Figure 3 - Proposed Landfill Subsurface Exploration Plan Off-Site Location
	MW-1D	MW-11D	MW-21D	
	MW-2S	MW-12S	MW-22S	
	MW-2D	MW-12D	MW-22D	
	MW-3S	MW-13S	MW-23S	
	MW-3D	MW-13D	MW-23D	
	MW-4S	MW-14S	MW-24S	
	MW-4D	MW-14D	MW-24D	
	MW-5S	MW-15S	MW-25S	
	MW-5D	MW-15D	MW-25D	
	MW-6S	MW-16S	MW-26S	
	MW-6D	MW-16D	MW-26D	
	MW-7S	MW-17S		
	MW-7D	MW-17D		
	MW-8S	MW-18S		
	MW-8D	MW-18D		
	MW-9S	MW-19S		
	MW-9D	MW-19D		
	MW-10S	MW-20S		
	MW-10D	MW-20D		

Slug Testing Specifications			
Work Item	Anticipated	Actual	Comment
Setup	Standard Setup (see below)		
Record initial static water level	Use water level indicator probe to record initial static water level referenced to top of PVC casing and ground surface.		
Place slug testing equipment inside well	Data Logger on bottom of well; then pump and tubing on top of data logger (if using pump)		
Drawdown water level in well	If using pump: Turn pump on and drawdown water level in well to desired depth, then close check-valve on discharge end of tubing just prior to shutting pump off to prevent backflow. If using bailer: Drop bailer down until fully filled, then remove quickly. Water removed from wells by pump or by bailer can be disposed of on ground near well location.		
Wait for water recharge in well	Allow sufficient time for well to recharge to a minimum of 80% of the total drawdown. Check recharge periodically with water level indicator probe.		
Remove slug testing equipment	Remove pump and tubing (if applicable) and data logger from well and secure well cap and lock.		

Slug Test Setup	
Standard	Verify well ID
	Unlock well and remove expandable cap. If cap appeared to be under pressure (positive or negative) when removed, allow water level to stabilize before recording static water level. (Can check with water level indicator probe to see if water level is rising or falling prior to slug testing equipment being placed in well).
	Pump decontaminated with Liquinox/Dionized Water Solution OR new bailer
	Clean tubing
	Data logger turned on

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	Setup & Slug Test	6						
		7						
		9						
		12						
		13						
		16						
		18						
24								
2	End Test & Remove testing equipment	6						
		7						
		9						
		12						
		13						
		16						
		18						
24								

AHA No.	AHA Description
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
12	Housekeeping
13	Insect Stings and Bites and Poisonous Plants
16	Mobilization/Demobilization
18	PPE Use
24	Vehicle Travel

SURVEY WORK PACKAGE

Duke Energy - Dan River Steam Station: Landfill Development & Ash Basin Closure

Boring/Well/Excavation No.						Scope of Work
Borings/Wells:	B-316	SB-1	MW-1S	MW-11S	MW-21S	<ul style="list-style-type: none"> ● Establish vertical and horizontal control from established benchmark/datum ● Clear vegetation to establish line of sight for survey level/GPS as needed (most locations are in open areas or will have paths cleared to by time of survey) ● Collect horizontal and vertical points for boring, well, and test pit locations; Record vertical points for both ground surface and top of PVC casing at well locations <p>Refer to Figures 2 & 3 - Ash Basin Closure Subsurface Exploration Plan Dan River Steam Station, and Proposed Landfill Subsurface Exploration Plan Off-Site Location</p>
	B-317	SB-2	MW-1D	MW-11D	MW-21D	
	B-318	SB-3	MW-2S	MW-12S	MW-22S	
	B-319	SB-4	MW-2D	MW-12D	MW-22D	
	B-320	SB-5	MW-3S	MW-13S	MW-23S	
	B-321	SB-6	MW-3D	MW-13D	MW-23D	
	B-322	SB-7	MW-4S	MW-14S	MW-24S	
	B-323	SB-8	MW-4D	MW-14D	MW-24D	
	B-324	SB-9	MW-5S	MW-15S	MW-25S	
	B-325	SB-10	MW-5D	MW-15D	MW-25D	
	B-327	SB-11	MW-6S	MW-16S	MW-26S	
	B-328	SB-12	MW-6D	MW-16D	MW-26D	
	B-329	SB-13	MW-7S	MW-17S		
	B-330	SB-14	MW-7D	MW-17D		
	B-331	SB-15	MW-8S	MW-18S		
	B-333	SB-16	MW-8D	MW-18D		
	B-335	SB-17	MW-9S	MW-19S		
			SB-18	MW-9D	MW-19D	
			SB-19	MW-10S	MW-20S	
			SB-20	MW-10D	MW-20D	
Excavations:	TP-1-A	TP-11-A	TP-1-B	TP-11-B		
	TP-2-A	TP-12-A	TP-2-B	TP-12-B		
	TP-3-A	TP-13-A	TP-3-B	TP-13-B		
	TP-4-A	TP-14-A	TP-4-B	TP-14-B		
	TP-5-A	TP-15-A	TP-5-B	TP-15-B		
	TP-6-A	TP-16-A	TP-6-B	TP-16-B		
	TP-7-A	TP-17-A	TP-7-B	TP-17-B		
	TP-8-A	TP-18-A	TP-8-B	TP-18-B		
	TP-9-A	TP-19-A	TP-9-B	TP-19-B		
	TP-10-A	TP-20-A	TP-10-B	TP-20-B		

Surveying Specifications			
Work Item	Anticipated	Actual	Comment
Setup	Standard: Verify boring/excavation locations; Site clear for survey as needed		
Survey Method	Survey Level or GPS		

Assignments							
No.	Activity	AHA No.	Personnel Assigned	Date Assigned	Date Started	Date Completed	SSO Accepted
1	Standard Setup & Survey	3	Crew Chief				
		6					
		7					
		9					
		13	Technician (s)				
		16					
		18					
		20					
		24					
		26					

AHA No.	AHA Description
3	Clearing Brush and Trees
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
13	Insect Stings and Bites and Poisonous Plants
16	Mobilization/Demobilization
18	PPE Use
20	Surveying
24	Vehicle Travel
26	Working Over or Near Water

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WELL ABANDONMENT WORK PACKAGE

Duke Energy - Dan River Steam Station: Landfill Development & Ash Basin Closure

Well No.			Scope of Work	
Wells:	MW-1S	MW-11S	MW-21S	● Abandon wells by in-place tremie method; placing grout inside well PVC from bottom of well to ground surface. Refer to Figure 3 - Proposed Landfill Subsurface Exploration Plan Off-Site Location
	MW-1D	MW-11D	MW-21D	
	MW-2S	MW-12S	MW-22S	
	MW-2D	MW-12D	MW-22D	
	MW-3S	MW-13S	MW-23S	
	MW-3D	MW-13D	MW-23D	
	MW-4S	MW-14S	MW-24S	
	MW-4D	MW-14D	MW-24D	
	MW-5S	MW-15S	MW-25S	
	MW-5D	MW-15D	MW-25D	
	MW-6S	MW-16S	MW-26S	
	MW-6D	MW-16D	MW-26D	
	MW-7S	MW-17S		
	MW-7D	MW-17D		
	MW-8S	MW-18S		
	MW-8D	MW-18D		
	MW-9S	MW-19S		
	MW-9D	MW-19D		
	MW-10S	MW-20S		
	MW-10D	MW-20D		

Well Abandonment Specifications			
Work Item	Anticipated	Actual	Comment
Setup	Standard Setup (see below)		
Remove Well Pad & Surface Casing	Chain pull with support truck		
Abandonment Method	In-Place Tremie Grout		

Well Abandonment Setup	
Standard	Verify well ID
	Grout equipment on Visquene plastic sheeting
	Emergency spill kit available
	Pumps with leak-free hoses

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	Setup & Remove Well Pad and Surface Casing	6						
		7						
		9						
		12						
		13						
		15						
		16						
		18						
24								
2	Abandon Well	6						
		7						
		9						
		11						
		12						
		13						
		14						
		15						
16								
18								
24								

AHA No.	AHA Description
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
11	Haz Com
12	Housekeeping
13	Insect Stings and Bites and Poisonous Plants
14	Machine Guarding and Portable Hand Tools
15	Means of Egress, Fire Prevention and Protection
16	Mobilization/Demobilization
18	PPE Use
24	Vehicle Travel

WATER LEVEL COLLECTION WORK PACKAGE

Duke Energy - Dan River Steam Station: Landfill Development & Ash Basin Closure

Well No.				Scope of Work
<i>Off-Site Location Wells:</i>	MW-1S	MW-11S	MW-21S	•Measure and record depth to groundwater surface with respect to top of PVC casing of wells and Refer to Figures 2 & 3 - Ash Basin Closure Subsurface Exploration Plan Dan River Steam Station, and Proposed Landfill Subsurface Exploration Plan Off-Site Location
	MW-1D	MW-11D	MW-21D	
	MW-2S	MW-12S	MW-22S	
	MW-2D	MW-12D	MW-22D	
	MW-3S	MW-13S	MW-23S	
	MW-3D	MW-13D	MW-23D	
	MW-4S	MW-14S	MW-24S	
	MW-4D	MW-14D	MW-24D	
	MW-5S	MW-15S	MW-25S	
	MW-5D	MW-15D	MW-25D	
	MW-6S	MW-16S	MW-26S	
	MW-6D	MW-16D	MW-26D	
	MW-7S	MW-17S		
	MW-7D	MW-17D		
	MW-8S	MW-18S		
	MW-8D	MW-18D		
	MW-9S	MW-19S		
	MW-9D	MW-19D		
	MW-10S	MW-20S		
	MW-10D	MW-20D		
<i>Dan River Steam Station Site Wells & Piezometers:</i>	MW-12			
	MW-12D			
	MW-20S			
	MW-20D			
	MW-23D			

Water Level Collection Specifications			
Work Item	Anticipated	Actual	Comment
Setup	Standard: Verify well/piezometer location; unlock surface casing; remove well cap; decontaminate water level meter with alconox or liquinox solution and a deionized water rinse		
Water Level Collection Method	Electric Water Level Indicator Probe with 0.01-ft incremented tape		

Assignments							
No.	Activity	AHA No.	Personnel Assigned	Date Assigned	Date Started	Date Completed	SSO Accepted
			Field Technicians				
1	Setup and Collect Water Levels	6					
		7					
		9					
		13					
		16					
		18					
		24					
26							

AHA No.	AHA Description
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
13	Insect Stings and Bites and Poisonous Plants
16	Mobilization/Demobilization
18	PPE Use
24	Vehicle Travel
26	Working Over or Near Water