



OHIO VALLEY ELECTRIC CORPORATION

3932 U. S. Route 23
P. O. Box 468
Piketon, Ohio 45661
740-289-7200

WRITER'S DIRECT DIAL NO:
740-897-7768

January 17, 2019

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Bruno Pigott, Commissioner
Indiana Department of Environmental Management
100 N. Senate Avenue
Mail Code 50-01
Indianapolis, IN 46204-2251

Dear Mr. Pigott:

Re: Indiana-Kentucky Electric Corporation
Clifty Creek Station's 2018 Annual Landfill Inspection

As Required by 40 CFR 257.106(g)(7), the Indiana-Kentucky Electric Corporation (IKEC) is providing notification to the Commissioner (State Director) of the Indiana Department of Environmental Management that a qualified professional engineer has completed the 2018 CCR annual landfill inspection for OVEC's Kyger Creek Station. The inspection report has been placed in the facility's operating record as well as on the company's publically accessible internet site, which can be viewed at <https://www.ovec.com/CCRCompliance.php>

If you have any questions, or require any additional information, please contact me at (740) 897-7768.

Sincerely,

A handwritten signature in black ink that reads "Tim Fulk". The signature is written in a cursive, slightly slanted style.

Tim Fulk

Engineer II

TLF:klr



Stantec Consulting Services Inc.
11687 Lebanon Road, Cincinnati OH 45241-2012

January 16, 2019

File: 175534018, 200.209

Ohio Valley Electric Corporation
Indiana-Kentucky Electric Corporation
Attention: Mr. Gabriel Coriell
3932 U.S. Route 23
P.O. Box 468
Piketon, Ohio 45661

**Reference: 2018 CCR Rule Inspection
Annual Landfill Inspection
Clifty Creek Generating Station
Madison, Indiana**

Dear Mr. Coriell,

Attached is the 2018 annual landfill inspection for the Clifty Creek Generating Station's Type I Restricted Waste Landfill. The site visit was performed on December 4, 2018. Rainfall was not observed near the site on the day of the inspection and was 1.57 inches total during the three days prior. As a summary:

- In general, the slopes of the active coal combustion residual (CCR) landfill were uniform and well vegetated. Some areas of the northern slope appear to be covered with temporary fill soil containing gravel and cobbles. These areas generally were thinly vegetated. The vegetation height was relatively uniform, but relatively tall obscuring visual inspection of the slopes.
- Surface water channels were riprap lined with some maintenance needed to reduce vegetation obscuring visual inspection; however, flow was not impeded. Pipes and culverts were actively flowing during the inspection.
- Rock check dams for erosion and sediment control were in place. Continue maintenance as needed for the best management practices. Address erosion features as part of the maintenance activities.
- Signs of slope instability or excessive ponding within the active cells were not noted during the site visit.

Observations and recommendations are detailed in the attached annual landfill inspection report. See the included figure, GPS coordinate table, and photographic log to support and identify the locations of the noted observations.

Design with community in mind



January 16, 2019
Mr. Gabriel Coriell
Page 2 of 2

**Reference: 2018 CCR Rule Inspection
Annual Landfill Inspection
Clifty Creek Generating Station
Madison, Indiana**

Please contact us with any questions or concerns. We appreciate the opportunity to continue to work with the Clifty Creek Generating Station and the Indiana-Kentucky Electric Corporation.

Regards,

Stantec Consulting Services Inc.

A handwritten signature in blue ink that reads "Jacqueline S. Harmon".

Jacqueline S. Harmon, P.E.
Senior Associate
Phone: (513) 842-8200 ext 8220
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Jacqueline.Harmon@stantec.com

A handwritten signature in blue ink that reads "Kyle Blakley (SE)".

Kyle Blakley, P.E.
Senior Project Engineer
Phone: (317) 876-8375 ext 229
Fax: (317) 846-8382
Kyle.Blakley@stantec.com

Attachment: 2018 Annual Landfill Inspection Report

c. Stan Harris, Stantec

jsh v:\1755\active\175534018\geotechnical\report\2018 annual landfill inspection\175534018 let 20190116.docx



**2018 CCR Rule Inspection
Clifty Creek Landfill**



Clifty Creek Generating Station
Madison, Indiana
Jefferson County

January 16, 2019

Prepared for:

Indiana-Kentucky Electric Corporation
Piketon, Ohio

Prepared by:

Stantec Consulting Services Inc.
Cincinnati, Ohio

Sign-off Sheet

This document entitled 2018 CCR Rule Inspection Clifty Creek Landfill was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of Indiana-Kentucky Electric Corporation (IKEC) (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule, and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use that a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by *Jacqueline S. Harmon*
(signature)

Jacqueline S. Harmon, P.E.

Reviewed by *Kyle R. Blakley (SR)*
(signature)

Kyle R. Blakley, P.E.

Reviewed by *Stan A. Harris*
(signature)

Stan A. Harris, P.E.



Jacqueline S. Harmon
1/16/2019

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2018 CCR RULE INSPECTION CLIFTY CREEK LANDFILL

Overview

January 16, 2019

1.0 OVERVIEW

Stantec Consulting Services Inc. (Stantec) performed the annual inspection of the existing coal combustion residuals (CCR) landfill at the Clifty Creek Generating Station in Madison, Indiana on December 4, 2018.

This annual landfill inspection is intended to fulfill the requirements of 40 CFR 257.84(b) for the Disposal of Coal Combustion Residuals from Electric Utilities rule (CCR Rule) signed by the U.S. Environmental Protection Agency (EPA) Administrator on December 19, 2014 and published in the Federal Register on April 17, 2015.

The landfill is a Restricted Waste Site Type I, operating permit number 39-04, managed in accordance with the Indiana Department of Environmental Management's (IDEM's) regulations. Below is a summary of conditions for the day of the inspection:

Date performed:	December 4, 2018
Weather:	Overcast, breezy, 35°F - 40°F
Rainfall over previous 72 hours:	December 1, 2018 – 1.56 inches December 2, 2018 – 0.00 inches December 3, 2018 – 0.01 inches December 4, 2018 – 0.00 inches

Precipitation data was collected from the weather station at Bowman Field in Louisville, Kentucky (KLOU), which is located approximately 36.5 miles from the landfill.

Stantec's team that performed the fieldwork included:

- Jacqueline S. Harmon, P.E., Senior Associate/Geotechnical Engineer
21 years of experience in geotechnical engineering, including dams, levees, and CCR storage facility closure.
- Kyle R. Blakley, P.E., Senior Project Engineer/Geotechnical Engineer
9 years of geotechnical engineering experience for supervision of geotechnical field explorations, design of dams, landslide remediation, and CCR storage facility design, closure, and operation.

The estimated volume of CCRs contained in the landfill is 2,525,000 cubic yards.

IDEM regulations require monthly inspections of the landfill facility, which are performed by plant personnel. Inspections of the landfill facility have commenced in accordance with the CCR Rule as of October 17, 2015 and are being conducted at least once every seven days. Weekly and monthly inspection reports encompassing the 2018 calendar year were provided by plant personnel for review.

IDEM routinely inspects the facility on a quarterly basis through the year. The 2018 inspection reports dated January 18th, June 26th, July 30th, and October 16th were available for in IDEM's online virtual filing cabinet (IDEM, 2019).

2018 CCR RULE INSPECTION CLIFTY CREEK LANDFILL

Description of Clifty Creek Landfill
January 16, 2019

The plant provides annual submittals to IDEM, including drawings showing existing conditions and a five-year estimate of site conditions (Stantec, 2018a and 2018b).

Fieldwork was coordinated with Mr. Danny Hunt, Clifty Creek Station's Landfill Operator. Observations were briefly discussed with onsite personnel during and after completion of the field activities. Mr. Hunt tracks the maintenance needs and activities through the weekly and monthly inspections.

2.0 DESCRIPTION OF CLIFTY CREEK LANDFILL

The Clifty Creek Generating Station is a coal-combustion generating station located in Madison, Jefferson County, Indiana. It is owned and operated by Indiana-Kentucky Electric Corporation (IKEC), a wholly-owned subsidiary of Ohio Valley Electric Corporation (OVEC). The Clifty Creek Generating Station began operating in 1955. Currently it has six generating units with a total capacity of 1,304 megawatts.

In the late 1980s, IKEC converted the plant from ash sluicing to dry fly ash collection facilities. IKEC submitted a restricted waste construction/operation permit application to IDEM in 1986 to begin landfilling boiler slag and fly ash produced by the Clifty Creek Station. IDEM approved the fly ash landfill permit application as a Type III restricted waste landfill in 1988, and operations began in 1991.

In December 2006, IKEC applied for a major modification to its landfill permit to modify the existing Type III landfill to a Type I landfill. The modification would enable the landfill to accept synthetic gypsum materials generated by the newly constructed flue gas desulfurization (FGD) systems. IKEC's major permit modification application proposed repurposing 109 acres of the originally permitted 200-acre Type III facility as a Type I facility to accept fly ash, boiler slag, synthetic gypsum, and other miscellaneous gypsum-related materials. IDEM approved IKEC's major permit modification in April 2008.

The Type I landfill has a capacity of 13.9 million cubic yards (FMSM, 2006) and includes:

- A composite liner system consisting of a Type 3 geosynthetics clay liner and a 30-mil flexible polyvinyl chloride (PVC) geomembrane in all phases;
- A leachate collection system, directing flow eastward from part of Phase 1 to the West Boiler Slag Pond and the remainder flowing westward to the Landfill Runoff Collection Pond;
- A contact and non-contact surface water management system, including sedimentation ponds, multiple sediment traps, drainage channels, and chimney drains that segregates water that comes into contact with the CCRs and water that does not encounter the CCRs;
- A groundwater monitoring system, and
- A final closure cap design.

Initial site development and construction activities for Phase 1 of the new Type I landfill began in May 2008. The original Type III facility was soil capped during the site development. Subphases IA, 1B, and portions of 1C were constructed and certified for waste by late 2012. See Appendix A for a plan view of the CCR for the current constructed footprint. Other features associated with the landfill include:

2018 CCR RULE INSPECTION CLIFTY CREEK LANDFILL

Observations

January 16, 2019

- West Boiler Slag Pond – a permanent pond accepting sluiced boiler slag, which is periodically dredged and material is transported to the landfill for beneficial reuse. The pond also accepts most of the leachate from Subphases 1A and 1B, as well as surface water from the eastern side of the landfill.
- Landfill Runoff Collection Pond – a permanent pond at the southwestern end of the landfill that accepts the remainder of the leachate and surface water from Subphases 1A, 1B, 1C, and the area between Phase I and the pond.

At the time of this annual inspection, the landfill consisted of Subphases 1A, 1B, and 1C. Subphases 1A and 1B are subdivided into Areas 1A1, 1A2, 1B1, and 1B2. Areas 1A1 and 1B1 were approved for waste placement in 2008. Areas 1A2 and 1B2 were approved for waste placement in 2013. Area 1C was approved for waste placement in 2016. IKEC submitted a five-year permit renewal to IDEM in July 2018; the status remains pending. IKEC notified IDEM of the intent to begin construction of Subphase 1D in August 2018. IDEM attended a pre-construction meeting at the Clifty Creek Plant on August 28, 2018.

According to the fourth quarter waste placement survey plot for 2018, Subphases 1A and 1B are near permitted grade for CCRs and have been covered with temporary soil and vegetation. The Subphase 1C is actively receiving CCRs, which are being placed in one-foot lifts in accordance with the facility's Construction Quality Assurance/Quality Control Plan (FMSM, 2008). Bottom ash is being stockpiled southwest of the active cell to prepare for underdrain and subgrade placement within the Phase 2 footprint during 2019. Appendix C includes figures showing the recent survey plot and the final cover topography for the current constructed landfill.

3.0 OBSERVATIONS

The following observations were made during the site visit within the Type I active Subphase I (A through C) footprint and the applicable surface drainage features toward the West Boiler Slag Pond:

3.1 SURFACE CHANNELS TO WEST BOILER SLAG POND

Four riprap-lined surface water channels are constructed east of the Type I active landfill. See reference Drawing No. 16-30870-05 in Appendix C, provided to clarify the four surface water channels observed east of the Type I landfill. The channels nearest the paved haul road and the natural southern ridge (Devil's Backbone) control flow from the surrounding watershed. The two channels in the middle are intended to manage stormwater flow once final cover is placed in Phase I. Flow from the four channels moves eastward to the West Boiler Slag Pond and its associated National Pollutant Discharge Elimination System (NPDES)-permitted outfall.

This section includes the observations for only the two stormwater channels, one near the haul road and the other along the southern ridge. The two final grade channels are discussed in Section 3.2.

- Cracking, spalling, and deterioration was observed affecting the interior lining of the southernmost of the two culverts passing under the access road on the east end of the closed Type III landfill (Point 1, Appendix A; Photo 1, Appendix B). The deterioration has caused the corrugated metal to be exposed to flow. Both culverts were obscured by vegetation (Point 2, Appendix A; Photo 2, Appendix B).

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Observations

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- The riprap mattress in the north stormwater channel near the haul road was observed to be slightly displaced with bulging and was wavy in appearance (Point 3, Appendix A; Photo 3, Appendix B). This did not appear to impact functionality.
- The gabion and riprap mattresses appear to be functioning as designed and in acceptable condition.
- Within the riprap channel, approximately halfway between the culverts and the Conspan® near the West Boiler Slag Pond, a low spot with standing water was observed (Point 4, Appendix A; Photo 4, Appendix B). Heavy vegetation extended from the low spot toward the upstream side of the Conspan® (Point 4 to Point 5, Appendix A). The vegetation present did not appear to impact functionality of the channel, but hindered visual inspection.
- Some grass and vegetation was present in the channel on the upstream side of the West Boiler Slag Pond Conspan® outlet. The vegetation present did not impede proper function of the channel (Photo 5, Appendix B).
- CCR materials were not noted in the channel aside from backfill near the Conspan® headwall flowing into the West Boiler Slag Pond. The Conspan® is a precast concrete culvert and foundation represented on reference Drawing No. 16-30870-05 in Appendix C and is 72 feet long and 20 feet wide by 5 feet tall at a 1.25% slope.
- Dense grassy vegetation obscured visual inspection of the southern surface/storm water channel (Point 6, Appendix A; Photo 6, Appendix B). The western point is marked in Appendix A. Vegetation extends to the road crossing for the Type III landfill near the temporary construction trailer area.

3.2 FINAL GRADE SURFACE/STORM WATER CHANNELS – EAST OF PHASE I TYPE I LANDFILL

As discussed in Section 3.1, the final cover or grade surface/storm water channels are the two interior channels flowing eastward from the landfill into the West Boiler Slag Pond and discharging through its monitored NPDES-permitted outfall.

- The final grade surface/storm water channels include two headwalls and pipes passing under the access road past the temporary construction office trailers. A slight bow in the crown of the southern of the two pipes has been observed since 2015; however, no depression was noticed in the road, and flow is not impeded. The bow did not appear to have changed between 2015 and 2018.
- The cracks noted on the surface of the inlet headwall for the northwest final grade channel appear unchanged since 2015. Flow is not impeded; this is a maintenance observation for continued monitoring (Photo 7, Appendix B).
- Dense grassy vegetation obscured visual inspection of the sedimentation pond at the outlet the final grade channels and the two pipes passing under the access road near the temporary construction office trailers.

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Observations

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The vegetation density and height has increased since the 2017 inspection, but does not appear to impede flow (Points 7 to 8, Appendix A; Photo 8, Appendix B).

- Vegetation was sparse in a bare area (approximately 4 feet wide by 30 feet long) along the north side of the final grade surface/storm water channel adjacent to the riprap (Point 9, Appendix A; Photo 9, Appendix B). This appeared to be in the same condition as observed the previous two annual CCR Rule inspections.
- A potential slough was observed along the south side of the haul road at the toe of slope toward the northeast corner of the Type III landfill (Point 10, Appendix A; Photo 10, Appendix B). The scarp appeared to be semi-circular, approximately 15-20 feet in diameter. It did not appear to impact the integrity of the haul road. The 2017 photo is included due to denser vegetation during the 2018 site visit.
- An unmarked one-inch PVC standpipe appears to mark the end of a four-inch PVC pipe on the Type III cover (Point 11, Appendix A; Photo 11, Appendix B).
- An erosion rill (approximately 2.5 feet wide by 1.5 feet deep) has formed around the utility pole at the western edge of the truck wash area (Point 12, Appendix A; Photo 12, Appendix B).
- The drainage pipe from the truck wash area into the northern final grade storm/surface water channel on the Type III landfill appeared to be partially obstructed by sediment (Point 13, Appendix A; Photo 13, Appendix B).
- A bare area was noted in the northern final grade surface/storm water channel bed west of the truck wash and downstream of the landfill's check dams (Point 14, Appendix A; Photo 14, Appendix B).
- A bare area was noted along the western edge of the Type III landfill cap (Points 15 to 16, Appendix A; Photo 15, Appendix B).
- The Type III landfill cap appears uniform, mowed, and maintained (Photo 16, Appendix B).
- Inspections near the leachate pipe outlet headwalls at the northeast corner of the Type III landfill (Photos 17 through 20, Appendix A; Points 17 and 18, Appendix B) resulted in the following observations:
 - There was a seep approximately 15 feet north of the northern leachate pipe outlet. The seep was at approximately the same elevation as the invert of the pipe, and consisted of standing water with a sheen and exposed geotextile fabric (Point 17, Appendix A; Photo 20, Appendix B).
 - A sheen was seen above and beside the southern leachate pipe headwall (Point 18, Appendix A; Photo 20, Appendix B).
- Sediment was noted in the final grade southern surface/storm water channel (Point 19, Appendix A; Photo 21, Appendix B).
- One four-foot-tall, two-inch-diameter evergreen is present in the final grade southern surface/storm water channel (Point 20, Appendix A).

2018 CCR RULE INSPECTION CLIFTY CREEK LANDFILL

Observations

January 16, 2019

3.3 PHASE I TYPE I LANDFILL

The Phase I Type I landfill began accepting CCRs in 2008. No subphases within the waste footprint have been permanently capped and closed. Areas nearing final grades have temporary cover and are vegetated. The slopes are relatively uniform.

- Subphases 1A1 and 1B1 were observed to be nearly built to permitted final CCR grades. The subphases have been temporarily covered with approximately six inches of soil, and vegetation has generally been established.
- The temporary cover vegetation on the top of Subphases 1A1/1B1 (Points 21 and 22, Appendix A; Photos 22 and 23, Appendix B) was generally in one of two conditions: 1.5 feet or taller grasses that were typically laying down, or 4 feet or taller brushy vegetation. The dense vegetation obscured a visual inspection of the slopes for erosion rills. The slopes appeared fairly uniform and unchanged from previous inspections. Additional grading may be needed to prepare the slopes prior to final cover placement.
- Several bare or rocky areas were observed on the temporary cover slopes of Subphases 1A2/1B2. Several erosion rills were observed in the grassed areas downslope from the rocky/bare areas. These bare areas and rills were located as Points 23 through 30 in Appendix A. The edges of a large area of rocky, minimally vegetated temporary cover near the top of the slope was located with Point 31 in Appendix A. Photos 24 through 27 in Appendix B represent typical areas of thin vegetation, erosion rills/gullies, and rocky cover.
- Portions of the landfill near the active cell had recent temporary cover placement and were vegetated at the beginning of this winter season (Point 38, Appendix A; Photo 28, Appendix B).
- Active waste placement was ongoing in Cells 1C. Piles of bottom ash, used as chimney drains in the landfill, were visible (Photo 29, Appendix B).
- The storm water channel at the toe of the northern slope of the landfill was grassed, and the rock check dams were in place and functioning properly (Photo 30, Appendix B).
- The temporary cover outslopes of Subphase 1A/1B were consistent with the previous inspections and were generally flatter than and complying with the permitted final cover grades.
- Storm water within Subphase 1C is collected and directed towards the Landfill Runoff Collection Pond. Photo 31 (Appendix B) shows the storm water collection berm at the western edge of Subphase 1C.
- The temporary storm water channel along the southern edge of the landfill was riprap-lined and maintained (Point 36, Appendix A; Photo 32, Appendix B).
- The leachate pipe appeared unrestricted and actively flowing. Vegetation was maintained around the headwall to allow visual observation (Point 37, Appendix A; Photo 33, Appendix B).

2018 CCR RULE INSPECTION CLIFTY CREEK LANDFILL

Recommendations
January 16, 2019

4.0 RECOMMENDATIONS

The following recommendations are offered for the Clifty Creek Station's Type I Restricted Waste Landfill. The recommendations are not listed in order of priority.

Stability Issues:

None noted.

Operational Issues:

- Conduct field surveys to measure current topography and compare to design geometry. Regrade surface as needed to conform to design. Areas near permitted CCR grades are recommended to be capped, closed, and vegetated (Subphases 1A1, 1B1, 1A2, and 1B2).
- Monitor seeps from the northeast corner of the Type III landfill. Consider ways to segregate and reduce the various source of flows into the eastward stormwater and leachate collection channel.

Maintenance Issues:

- Continue to conduct weekly and monthly field inspections to schedule and maintain the necessary best management practices for the stormwater channels, sediment traps, and rock check dams serving the landfill.
- Maintain the vegetation along the exterior slopes and within the surface drainage channels to facilitate inspections by removing taller weeds and woody vegetation or reestablishing vegetation as needed. Particular attention should be given to the taller brushy vegetation on the top of the landfill and the rocky, bare areas on the northern slope. Temporary cover should be monitored and maintained as gradation specifications deviate from the final cover requirements.
- Remove excess vegetation from drainage channels, pipe inlets, and outlets. Flow was visible at the pipes observed by Stantec during the December site visit.
- Continue to repair erosion features, reestablish vegetation, and monitor in future inspections.
- Continue to monitor the surface water channel headwalls and culverts east of the landfill. Repair as needed.
- Monitor the integrity of the exposed corrugated metal in the southernmost of the culverts near the temporary construction trailers. If needed, remediation of the culvert should be considered to re-establish an internal liner for the pipe.
- Monitor the slough near the haul road on the north side of the Type III landfill. If the slough progresses toward the haul road and/or truck wash facility, remediation could be considered.

2018 CCR RULE INSPECTION CLIFTY CREEK LANDFILL

References

January 16, 2019

- Clean out sediment from the truck wash surface water drainage pipe outlet/headwall area and the surface water collection pipes.

5.0 REFERENCES

Fuller, Mossbarger, Scott & May Engineers, Inc. (FMSM) (2008). Clifty Creek Fly Coal Ash Landfill Construction. Construction Quality Assurance/Quality Control Plan. Coal Ash Landfill, Type I Restricted Waste Landfill. Attachment 21 (Revised). May 13.

Fuller, Mossbarger, Scott & May Engineers, Inc. (FMSM) (2006). Permit Drawings. Indiana-Kentucky Electric Corporation. Clifty Creek Coal Ash Landfill Modification. Jefferson County, Madison Township, Indiana. Prepared for American Electric Power, Columbus, Ohio. November. Cincinnati, Ohio.

Indiana Department of Environmental Management (2019). Virtual File Cabinet (<https://vfc.idem.in.gov/DocumentSearch.aspx>). Accessed January 8th.

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Indiana-Kentucky Electric Corporation (2018). "Clifty Creek Station. 4th Quarter, 2018. Quarterly Plot." Clifty Creek Landfill As-Built Map.

Indiana-Kentucky Electric Corporation (2006). "Type I Restricted Waste Landfill Permit Application, Coal Ash Landfill, Clifty Creek Power Plant, Madison, Jefferson County, Indiana, Attachment 22 – Design Report." Prepared by Fuller, Mossbarger, Scott, & May Engineers, Inc. November 2006.

Indiana-Kentucky Electric Corporation (2006). "Type I Restricted Waste Landfill Permit Application, Coal Ash Landfill, Clifty Creek Power Plant, Madison, Jefferson County, Indiana, Attachment 23 – Report of Geotechnical Exploration." Prepared by Fuller, Mossbarger, Scott, & May Engineers, Inc. November 2006. Indiana-Kentucky Electric Corporation (2017). "Landfill Site: Inspection Log." Clifty Creek Landfill. January.

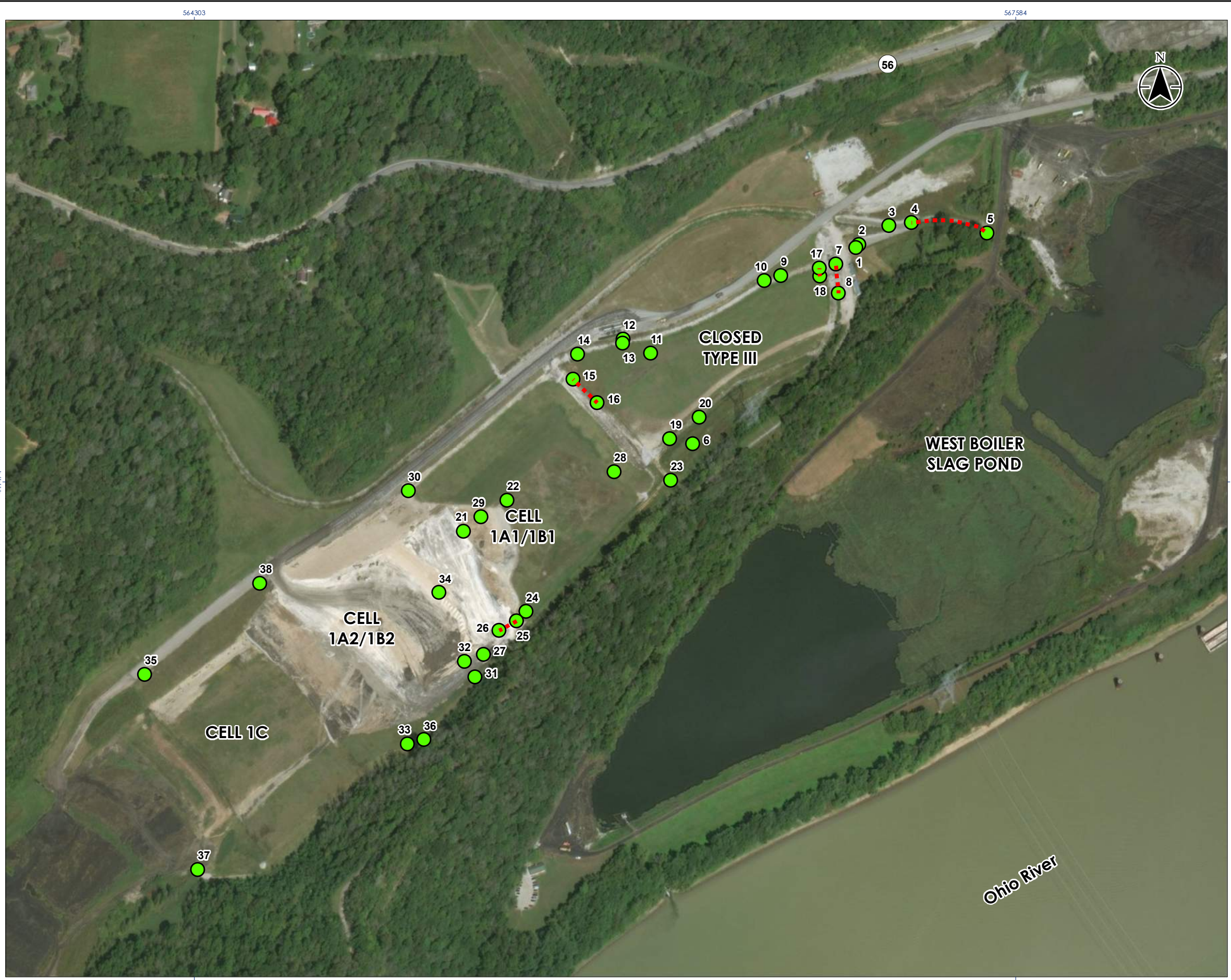
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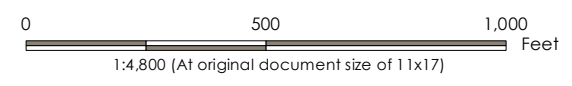
APPENDIX A
FIGURE 1 – PLAN VIEW

**Clifty Creek Ash Landfill
2018 Annual Inspection**

Point ID	Comment	Latitude	Longitude
1	Deterioration of culvert pipe lining	38.736714	-85.431933
2	Vegetation at downstream headwalls	38.736748	-85.431893
3	Displaced/bulging riprap mattress in north storm/surface water channel	38.736953	-85.431473
4	Low spot in riprap and upstream end of heavy vegetation	38.736985	-85.431156
5	Downstream end of heavy vegetation near conspan	38.736872	-85.430100
6	Upstream end of heavy vegetation in southern stormwater channel	38.734564	-85.434227
7	Beginning of heavy vegetation in final grade stormwater channel	38.736534	-85.432218
8	End of heavy vegetation in final grade stormwater channel	38.736213	-85.432181
9	Bare area along northern final grade stormwater channel	38.736408	-85.432986
10	Potential slough above channel, point near middle of scarp	38.736352	-85.433221
11	One-inch PVC standpipe marking end of four-inch PVC pipe	38.735561	-85.434812
12	Erosion rill next to wash area, 2.5' wide x 1.5' deep	38.735718	-85.435197
13	Drainage pipe invert from truck wash station. Sediment at outlet.	38.735671	-85.435208
14	Bare area along northern final grade stormwater channel	38.735554	-85.435838
15	Bare area, southwest side of Type III landfill, northern end	38.735275	-85.435904
16	Bare area, southwest side of Type III landfill, southern end	38.735020	-85.435567
17	Potential seep with sheen, approx. 15 feet north of northern leachate outlet	38.736489	-85.432449
18	Sheen on water beside southern leachate pipe headwall	38.736401	-85.432442
19	Sediment in southern final grade surface/storm water channel	38.734622	-85.434549
20	Woody vegetation, 4' tall and 2" diameter	38.734858	-85.434139
21	Taller vegetation, estimated 3'	38.733609	-85.437440
22	Vegetation change, brushy	38.733951	-85.436835
23	Erosion gully, 1' x 1'	38.734163	-85.434536
24	Erosion gully at temporary cover change, 2' wide x 1' deep	38.732728	-85.436568
25	Poor vegetation area, gravelly, rills	38.732626	-85.436701
26	Poor vegetation area, gravelly, rills	38.732522	-85.436951
27	Bare area, 15' x 11'	38.732260	-85.437170
28	Erosion rill zone with bare area (8' diameter), estimated top noted	38.734258	-85.435332
29	Erosion rill, 1' wide x 2' deep, 4 visible, estimated top noted	38.733770	-85.437200
30	Poor vegetation area, gravelly, rills (6" deep, 1' wide, 6 visible)	38.734055	-85.438213
31	End of Subphases 1A2 and 1B2 temporary cover	38.732013	-85.437284
32	Recently vegetated temporary cover	38.732181	-85.437435
33	Estimated edge of liner for Subphase 1C	38.731277	-85.438235
34	Estimated top elevation of active landfill	38.732938	-85.437786
35	Estimated extents of waste	38.732047	-85.441917
36	Estimated stormwater break along southern side of landfill	38.731324	-85.438001
37	Leachate pipe outlet	38.729903	-85.441178
38	Entrance to landfill access road	38.733047	-85.440300



- Legend
- Inspection Location
 - - - Impacted Area



- Notes
1. Coordinate System: Latitude/Longitude NAD83
 2. Base features - ESRI
 3. Ortho-imagery does not represent current conditions.



Project Location: Clifty Creek Plant, Jefferson County, IN
 Prepared by ANP on 2019-1-10
 Technical Review by JSH on 2019-1-10
 Independent Review by KRB on 2019-1-10

Client/Project: Indiana - Kentucky Electric Corporation, Clifty Creek Plant

Figure No. **1**

Title: **2018 Annual CCR Landfill Inspection**

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VA:175534018\volg\mtd\Report_Features.mxd - Revised: 2019-01-11 By: cproctor

APPENDIX B
PHOTOGRAPHIC LOG

**Photo 1**

Cracking, spalling, and deterioration of pipe lining in culvert. Photo looking west, from downstream to upstream in pipe.

**Photo 2**

Vegetation blocking visual inspection of the combined surface/storm water channels at the eastern edge of the landfill areas, flowing east to the West Boiler Slag Pond. Photo looking northwest, from downstream looking upstream.

**Photo 3**

Slight displacement of riprap mattress in combined storm/surface water channel. Bulging of mattress and wavy in appearance. Photo looking west, from downstream to upstream.



Photo 4

A low area in the combined surface/storm water channel upstream of the Conspan flowing into the West Boiler Slag Pond. Photo looking east, toward West Boiler Slag Pond.



Photo 5

Grass and vegetation in the channel upstream of the Conspan near the West Boiler Slag Pond. Photo looking southeast from upstream side of Conspan.



Photo 6

Upstream end of heavy vegetation in the southern surface/storm water channel. Photo looking east. See Point 6 in Appendix A.



Photo 7

The cracks in the inlet headwall for the northwest final grade channel appears unchanged since the 2015 visit. Photo looking east at upstream headwall.



Photo 8

Grassy vegetation in the sedimentation pond for the final grade channels. Photo looking northwest.



Photo 9

Bare area zone along northern final cover channel. See Point 9 in Appendix A. Photo looking south.

**Photo 10**

Potential slough observed on south side of haul road at toe of slope. Approximately 15-20 feet diameter, and did not appear to impact the haul road. See Point 10 in Appendix A. Photo looking north. (2017 photo provided due to denser vegetation in 2018.)

**Photo 11**

The one-inch PVC standpipe marking the end of the four-inch PVC pipe on the Type III landfill cover. See Point 11 in Appendix A. Photo looking southeast.

**Photo 12**

The erosion rill near the utility pole at the southeastern edge of the truck wash station into the northern storm/surface water drainage channel. See Point 12 in Appendix A. Photo looking south.

**Photo 13**

The surface drainage pipe from the truck wash station into the northern storm/surface water drainage channel on the Type III landfill cover was partially obstructed by sediment. See Point 13 in Appendix A. Photo looking north.

**Photo 14**

Bare area in the northern storm/surface water channel bed west of the truck wash. See Point 14 in Appendix A. Photo looking east.

**Photo 15**

Bare area noted along western edge of Type III landfill cap. See Points 15 to 16 in Appendix A.

**Photo 16**

The Type III landfill cap appears uniform, mowed, and maintained.

**Photo 17**

The two Type I landfill leachate pipe headwalls at the eastern edge of the Type III landfill. Photo looking west.

**Photo 18**

Flow out of the southern leachate pipe. Discoloration around outside circumference of pipe. Standing water and sheen above headwall.



Photo 19

Flow out of northern leachate pipe.
Photo looking south.



Photo 20

Seep at outlet of southern Type I landfill
leachate pipe. Standing water and
sheen above headwall. See Point 17 in
Appendix A.



Photo 21

Sediment in the final grade southern
surface/storm water channel. Photo
looking northeast. See Point 18 in
Appendix A.

**Photo 22**

Typical image of the northern temporary slope of Subphases 1A and 1B showing the uniformity of the slope and vegetation. Photo looking northwest.

**Photo 23**

Typical image of the northern temporary slope of Subphases 1A and 1B showing the uniformity of the slope and vegetation. Photo looking south toward the vegetation change.

**Photo 24**

Bare/rocky area of temporary cover, approximately 15 feet by 11 feet. See Point 27 in Appendix A. Photo looking north across the temporary soil cover of the landfill.

**Photo 25**

Erosion rill from top to bottom of northeastern slope of Subphases 1A1/1B1 near the north corner. Has been monitored since 2016 inspection. This rill runs downhill from Point 28 as shown in Appendix A.

**Photo 26**

Erosion rills above the check dam on the northern slope of the landfill. See Point 29 in Appendix A.

**Photo 27**

Poor vegetation areas with multiple erosion rills estimated as six-inches wide, one-foot deep, and six visible. See Point 30 in Appendix A. Photo looking north.

**Photo 28**

New temporary cover placed for 2018-2019 winter season near the active cell. See Point 32 in Appendix A. Photo looking south.

**Photo 29**

The active CCR cell, Subphase 1C. Photo looking north.

**Photo 30**

Stormwater check dam located in the grassed storm water channel along the northern toe of the landfill. Photo looking northwest.



Photo 31

Stormwater collection outlet on south side of Subphase 1C. Sediment collected at outlet. Photo looking west.



Photo 32

The temporary storm water channel along the southern edge of the landfill. Photo looking southeast. See Point 36 in Appendix A.



Photo 33

Leachate pipe outlet, west of Subphase 1C. See Point 37 in Appendix A.

APPENDIX C

REFERENCE DRAWINGS

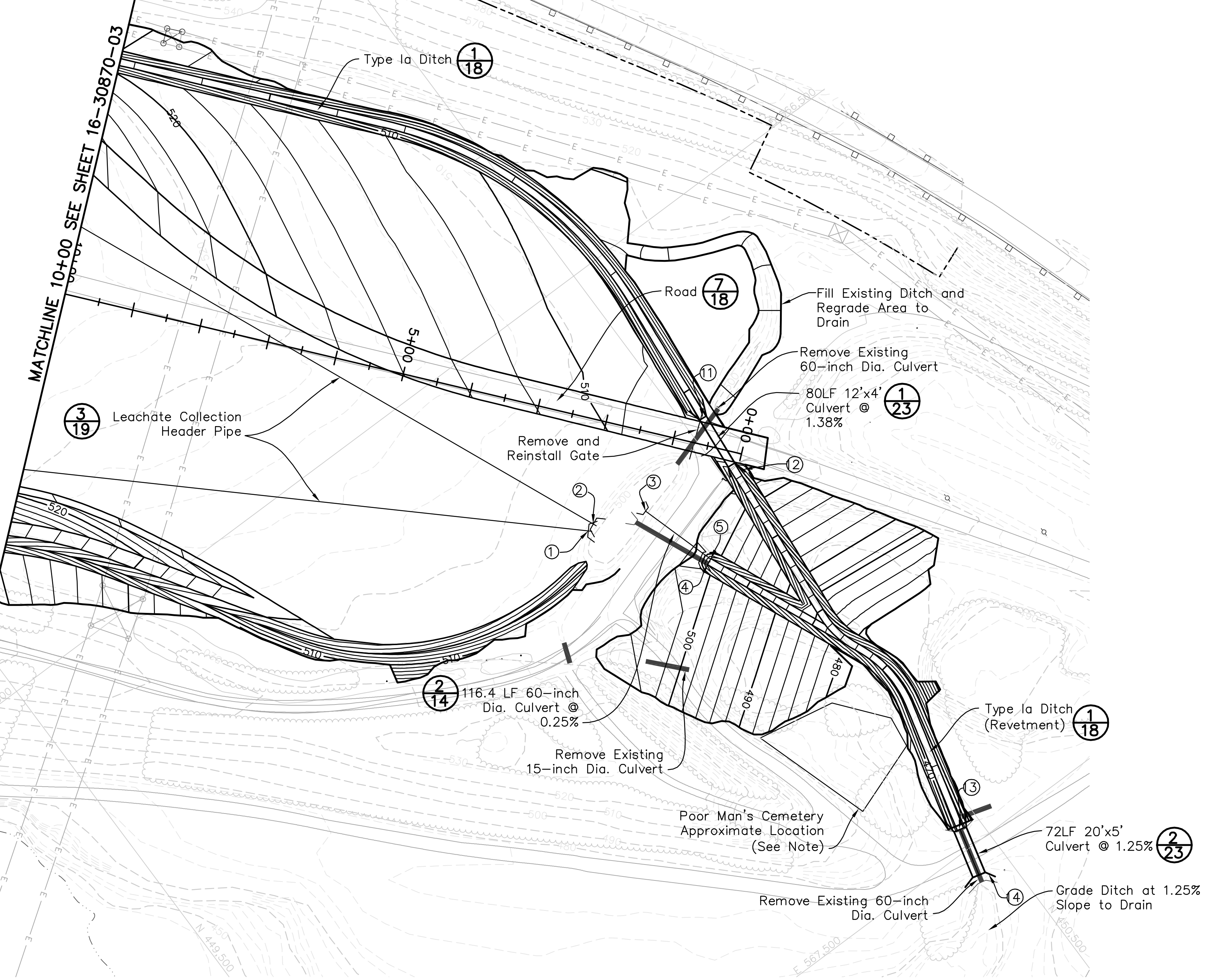
Notes:

1. Topographic mapping for the hill sides and areas east of the existing landfill are supplied by Photogrammetric Services, Inc., Reynoldsburg, Ohio (April 28, 1992). Topographic mapping for the surface of the existing ash pond and landfill was supplied by Henderson Aerial Surveys, Inc., Grove City, Ohio (April 16, 2005) and Bowen, Inc. (June, 2007). Hydrographic survey of existing fly ash pond performed on May 4, 2005.
2. Information presented in Indiana State Plane coordinate system (NAD27/NAVD88 Indiana East, feet).
3. IKEC will locate and stake the limits of the Poor Man's Cemetery. The Contractor shall not operate within the limits of the Cemetery.
4. The flow line of all surface ditches shall be adjusted to match headwalls and wingwalls.
5. See Drawing 16-30870-21 for Headwall Details. See Drawing 16-30870-23 for Culvert Details.

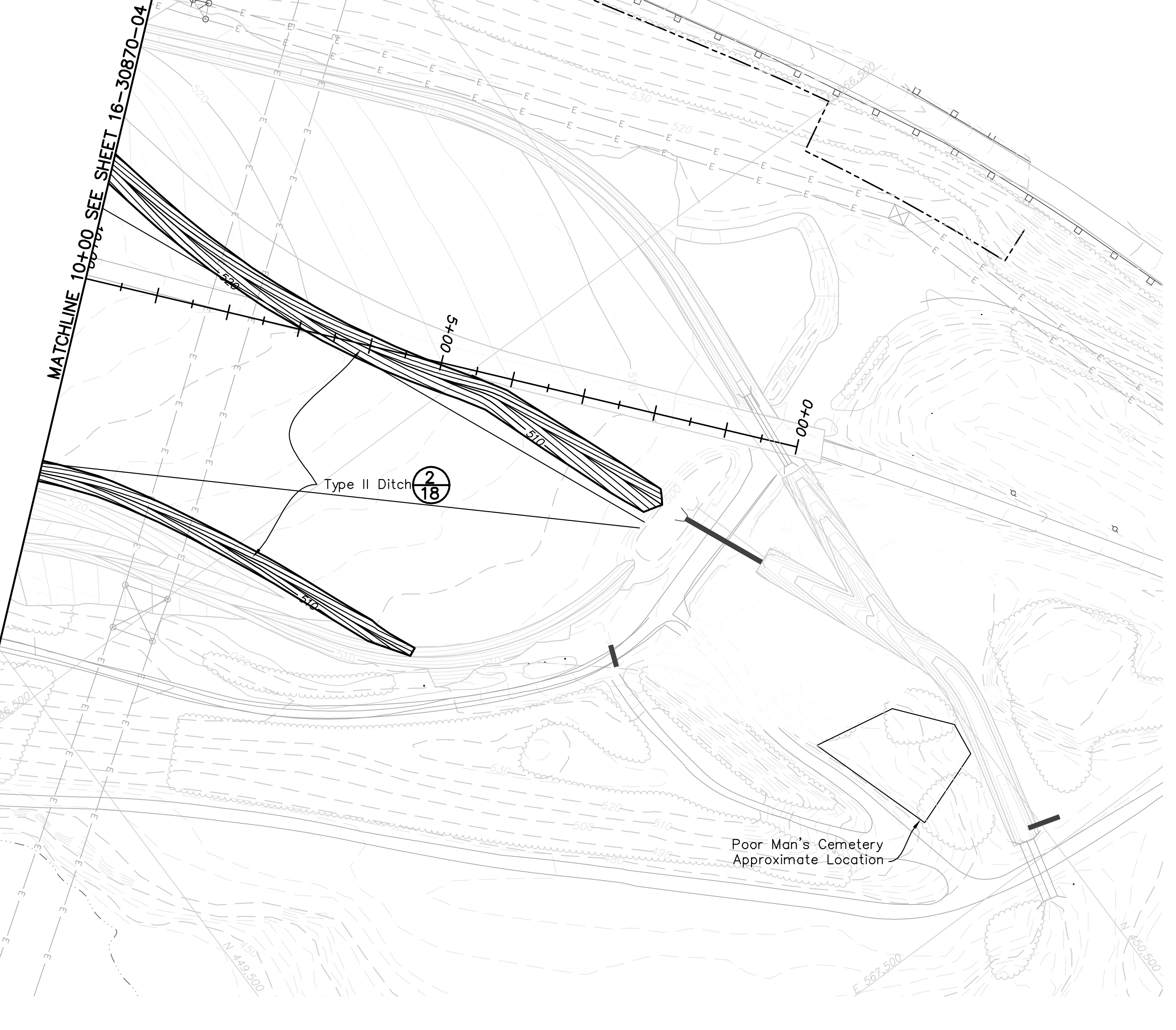
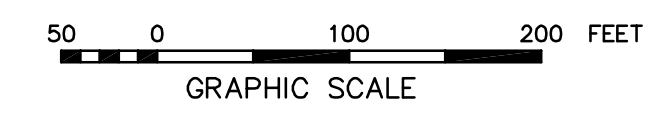
Legend

- Utility Pole
- Transmission Line
- Transmission Tower
- Vegetation
- Edge of Water
- Property Line
- Grading Limits
- Headwall

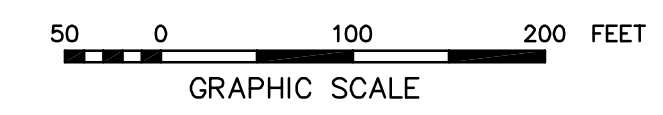
Structures							
Structure ID	Type	Size	Northing (Feet)	Eastng (Feet)	Rim Elevation (Feet)	Inlet Invert Elevation (Feet)	Elevation Outlet Invert (Feet)
1	Headwall	16-inch	450,297.83	566,806.52	-	-	502.49'
2	Headwall	16-inch	450,309.73	566,803.32	-	-	502.32'
3	Headwall	60-inch	450,380.92	566,832.97	-	496.00'	-
4	Headwall	60-inch	450,407.47	566,947.48	-	-	495.71'
5	Headwall	60-inch	450,414.75	566,944.34	-	-	495.71'
11	Culvert	12 x4' Inlet	450,527.17	566,774.52	-	499.38'	-
12	Culvert	12 x4' Outlet	450,519.57	566,854.16	-	-	498.28'
13	Culvert	20 x5' Inlet	450,470.28	567,470.12	-	466.90'	-
14	Culvert	20 x5' Outlet	450,452.61	567,539.92	-	-	466.00'



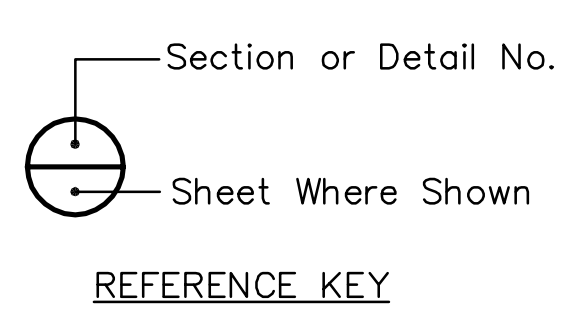
INITIAL CONSTRUCTION



FINAL GRADE



DATE	NO.	DESCRIPTION	APPR.
REVISIONS			
<p>THIS DRAWING IS THE PROPERTY OF THE AMERICAN ELECTRIC POWER SERVICE CORP. AND IS LOANED UPON CONDITION THAT IT IS NOT TO BE REPRODUCED, OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO ANY PERSON WITHOUT THE WRITTEN CONSENT OF THE AEP SERVICE CORP., OR FOR ANY PURPOSE DETRIMENTAL TO THEIR INTEREST, AND IS TO BE RETURNED UPON REQUEST.</p>			
INDIANA - KENTUCKY ELECTRIC CO. CLIFTY CREEK PLANT MADISON INDIANA COAL ASH LANDFILL SUBPHASE 1A INITIAL CONSTRUCTION AND FINAL GRADE			
DWG. NO. 16-30870-05			
CIVIL ENGINEERING DIVISION			
SCALE:	APPROVED BY		
DR: CW			
CH: DMD			
ENGR: DPG			
DATE: JAN., 2010			
AEP SERVICE CORP. 1 RIVERSIDE PLAZA COLUMBUS, OH 43215			



SCALE: AS SHOWN

DR: CW

CH: DMD

ENGR: DPG

DATE: JAN., 2010

Stantec Consulting Services Inc.
1001 Avenue H
Des Moines, Ore.
50314

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 Scale: 2018/06/11 11:10 AM Login: Sims, Blain
 Job: 175538039 Internal_production\Utility\Area\Area_180326.dwg



Legend

- Utility Pole
- Transmission Line
- Transmission Tower
- Vegetation
- Edge of Water
- Property Line
- Waste Boundary
- Grading Limits

Notes

1. Topographic mapping supplied by Henderson Aerial Surveys, Inc., Grove City, Ohio (November 10, 2008).
2. Information presented in Indiana State Plane coordinate system (NAD27/NAVD88 Indiana East, feet).
3. Other basemap information based on original design plan sheets.
4. Cells with temporary soil cover are mulched and seeded.
5. Waste cells at grade anticipated to have soil cover/closure activities.
6. Subphases 1A1, 1A2, 1B1, 1B2, 1C, 1D, and 1E at grade. Construction or active CCR placement in Subphase of Phase 2 anticipated. Phase 2 Top of Liner grade shown.

