

PRELIMINARY ENGINEERING
NOT FOR CONSTRUCTION

TECHNICAL MEMORANDUM



Coal Combustion Residual Pond Closure Evaluation: Mill Creek Generating Station

PREPARED FOR: Louisville Gas & Electric Company and Kentucky Utilities Company
PREPARED BY: CH2M HILL Engineers
DATE: September 29, 2015



1 Executive Summary

Louisville Gas & Electric Company and Kentucky Utilities Company (LG&E-KU) tasked CH2M HILL Engineers (CH2M) with performing coal combustion residuals (CCR) evaluations for eight sites to develop conceptual CCR ash pond closure approaches and cost estimates. The generating stations under evaluation are Ghent, Trimble County, Mill Creek, E.W. Brown, Cane Run, Green River, Tyrone, and Pineville.

This technical memorandum applies to Mill Creek Generating Station. The following scope activities were completed:

- Reviewed LG&E-KU provided historical CCR information and kickoff meeting workshop (June 2015).
- Developed a CCR pond closure approach that considers regulatory, civil, geotechnical, and stormwater aspects as it relates to CCR and ash ponds and associated cost estimates for the site. Discussion of the conceptual CCR pond closure approach is included in Section 2, and drawings are contained in Attachment 1.
- The Ash Treatment Basin (ATB), Construction Pond, Clearwell Pond, Emergency Pond, and Dead Storage Pond were identified as the applicable CCR units for Mill Creek. Other CCR units that may be affected by the CCR regulations at the site but that were not evaluated further include the Charah Gypsum Beneficial Reuse Facility, Gypsum Stockpile Area (80,000 tons), CCR Landfill, Fly Ash Silo and Loadout areas, Retired CCR Landfill, and Former Poz-O-Tec Fill Area.
- Construct new concrete process tanks (four) for management of wastewater that can no longer be managed in the ponds that will be closed; construct dewatering facility for removing water from solids.
- The estimated cost for closing the ponds is summarized in Table 1-1. Detailed cost information is included in Attachment 2.

Table 1-1. Mill Creek Proposed Conceptual Cost Estimate

Proposed Conceptual CCR Pond Closure Approach	Low (-30%)	Total Capital Cost	High (+30%)
ATB	\$26.1 M	\$37.3 M	\$48.4 M
Clearwell Pond	\$3.5 M	\$5.0 M	\$6.5 M
Emergency Pond	\$3.5 M	\$5.0 M	\$6.5 M
Dead Storage Pond	\$4.2 M	\$6.0 M	\$7.8 M
Construction Runoff Pond	\$4.6 M	\$6.5 M	\$8.5 M

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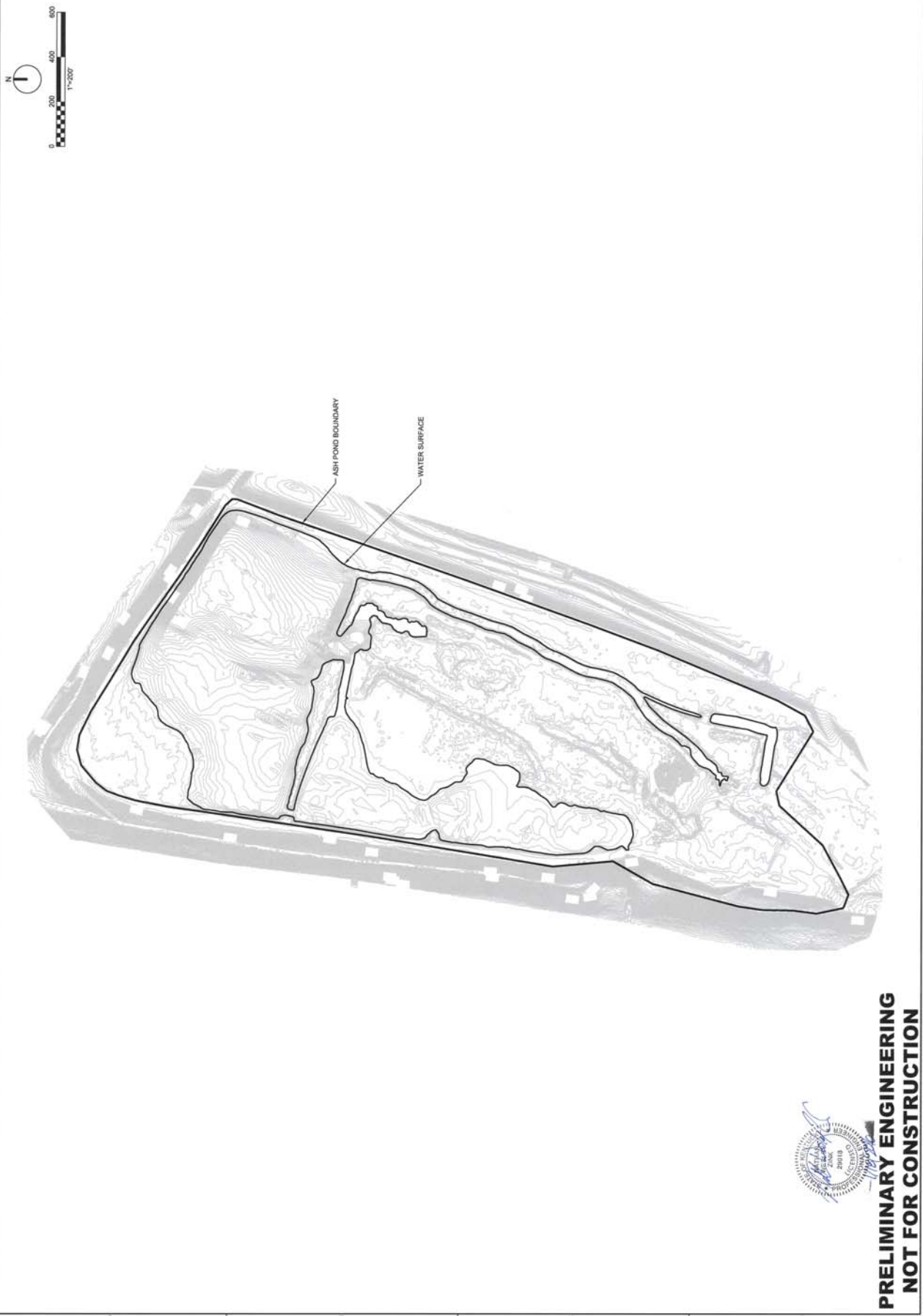
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COAL COMBUSTION RESIDUAL EVALUATION
LOUISVILLE GAS AND ELECTRIC COMPANY
LOUISVILLE, KENTUCKY

CH2MHILL
MILL CREEK
EXISTING CONDITIONS
ASH TREATMENT BASIN

VERIFY SCALE
DATE: JULY 2015
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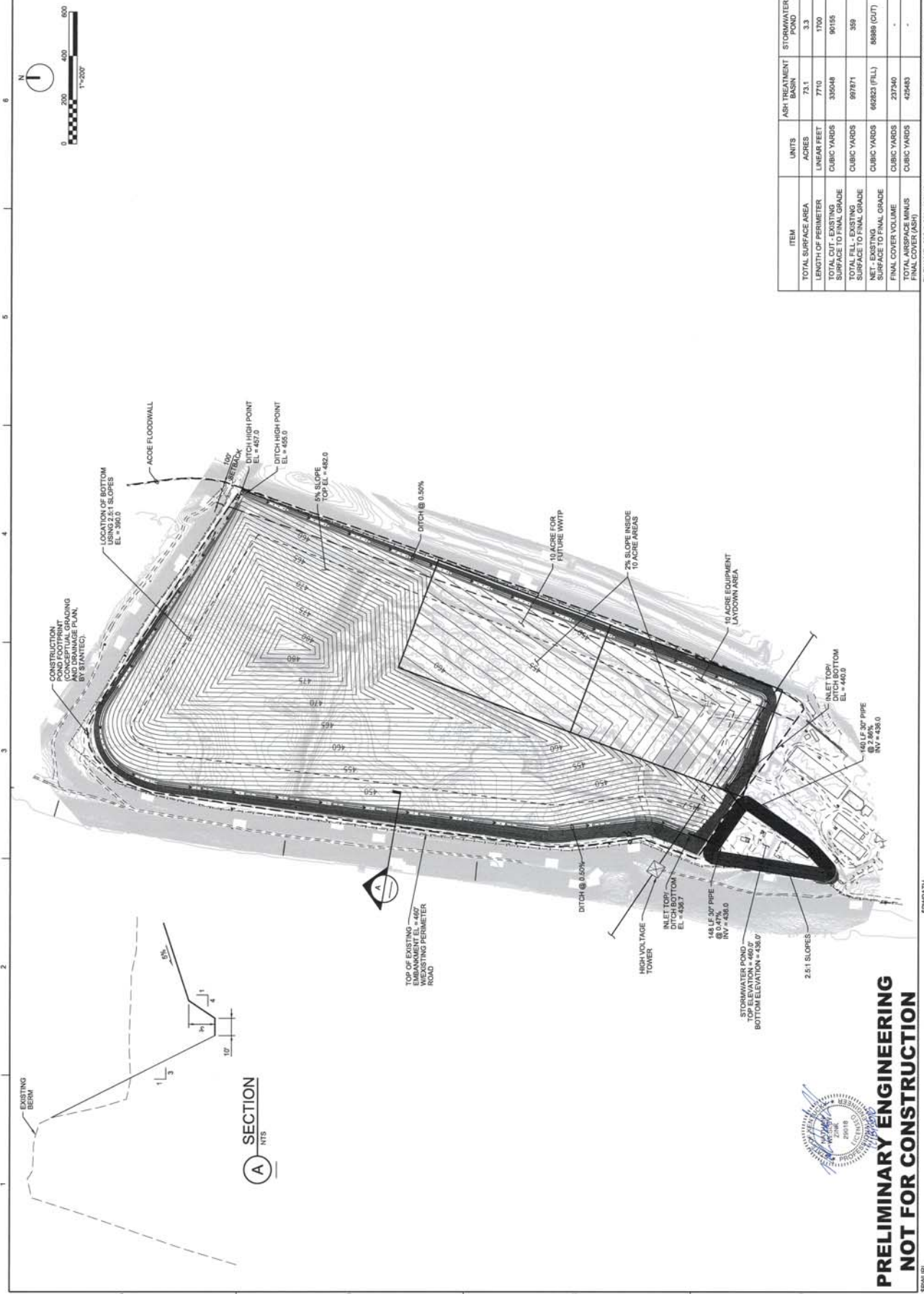
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COAL COMBUSTION RESIDUAL EVALUATION
LOUISVILLE GAS AND ELECTRIC COMPANY
LOUISVILLE, KENTUCKY

CH2MHILL
MILL CREEK
PROPOSED CONCEPTUAL
CLOSURE PLAN
ASH TREATMENT BASIN

ITEM	UNITS	ASH TREATMENT BASIN	STORMWATER POND
TOTAL SURFACE AREA	ACRES	73.1	3.3
LENGTH OF PERIMETER	LINEAR FEET	7710	1700
TOTAL CUT - EXISTING SURFACE TO EXISTING GRADE	CUBIC YARDS	335048	90155
TOTAL FILL - EXISTING SURFACE TO FINAL GRADE	CUBIC YARDS	997971	359
NET - EXISTING SURFACE TO FINAL GRADE	CUBIC YARDS	662823 (FILL)	88988 (CUT)
FINAL COVER VOLUME	CUBIC YARDS	237340	-
TOTAL AIRSPACE MINUS FINAL COVER (ASH)	CUBIC YARDS	429483	-

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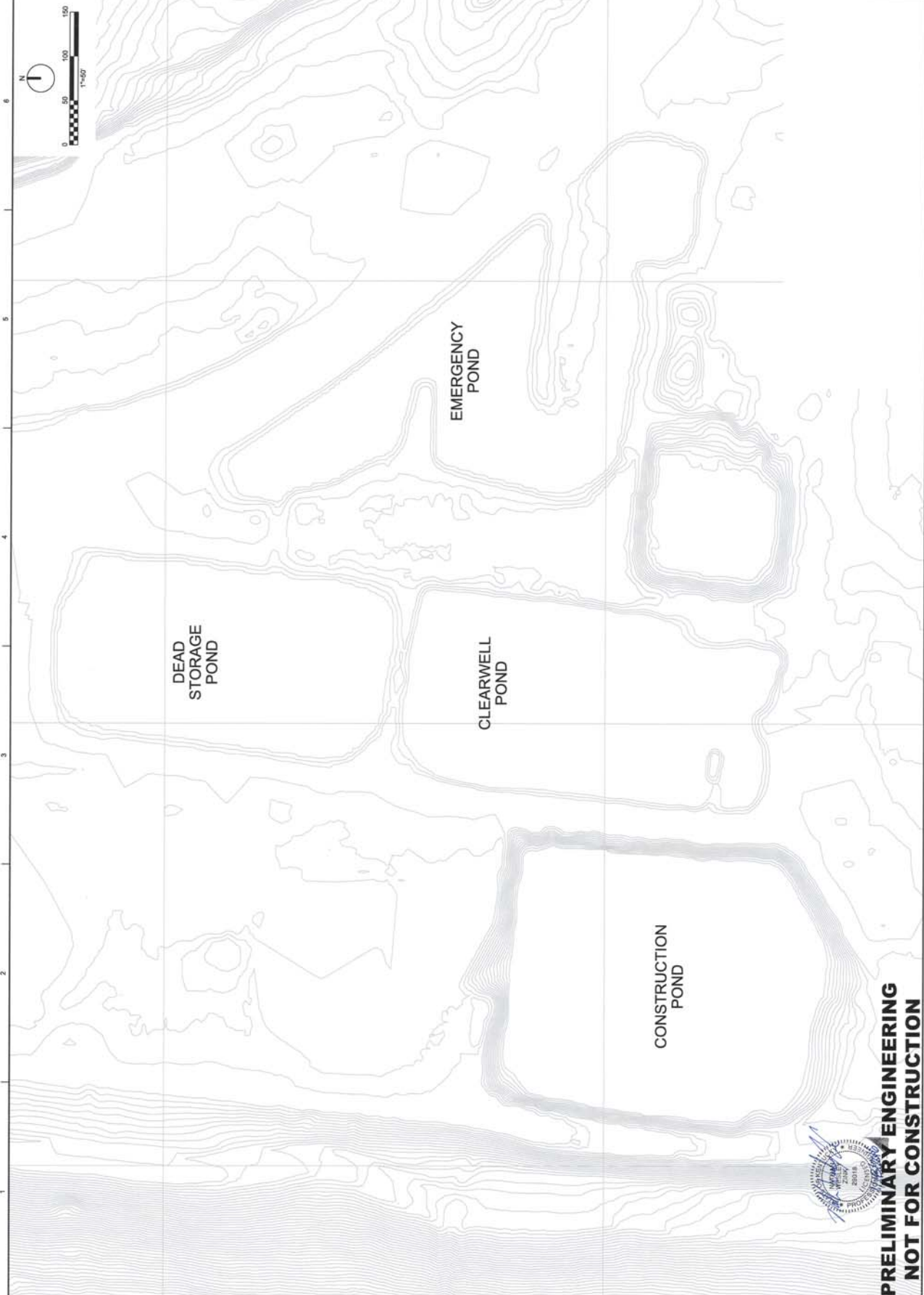
CH2MHILL
 MILL CREEK
 EXISTING CONDITIONS
 FOUR PROCESS PONDS

COAL COMBUSTION RESIDUAL EVALUATION
 LOUISVILLE GAS AND ELECTRIC COMPANY
 LOUISVILLE, KENTUCKY

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LOUISVILLE GAS AND ELECTRIC COMPANY
LOUISVILLE, KENTUCKY
AND KENTUCKY UTILITIES
LOUISVILLE, KENTUCKY

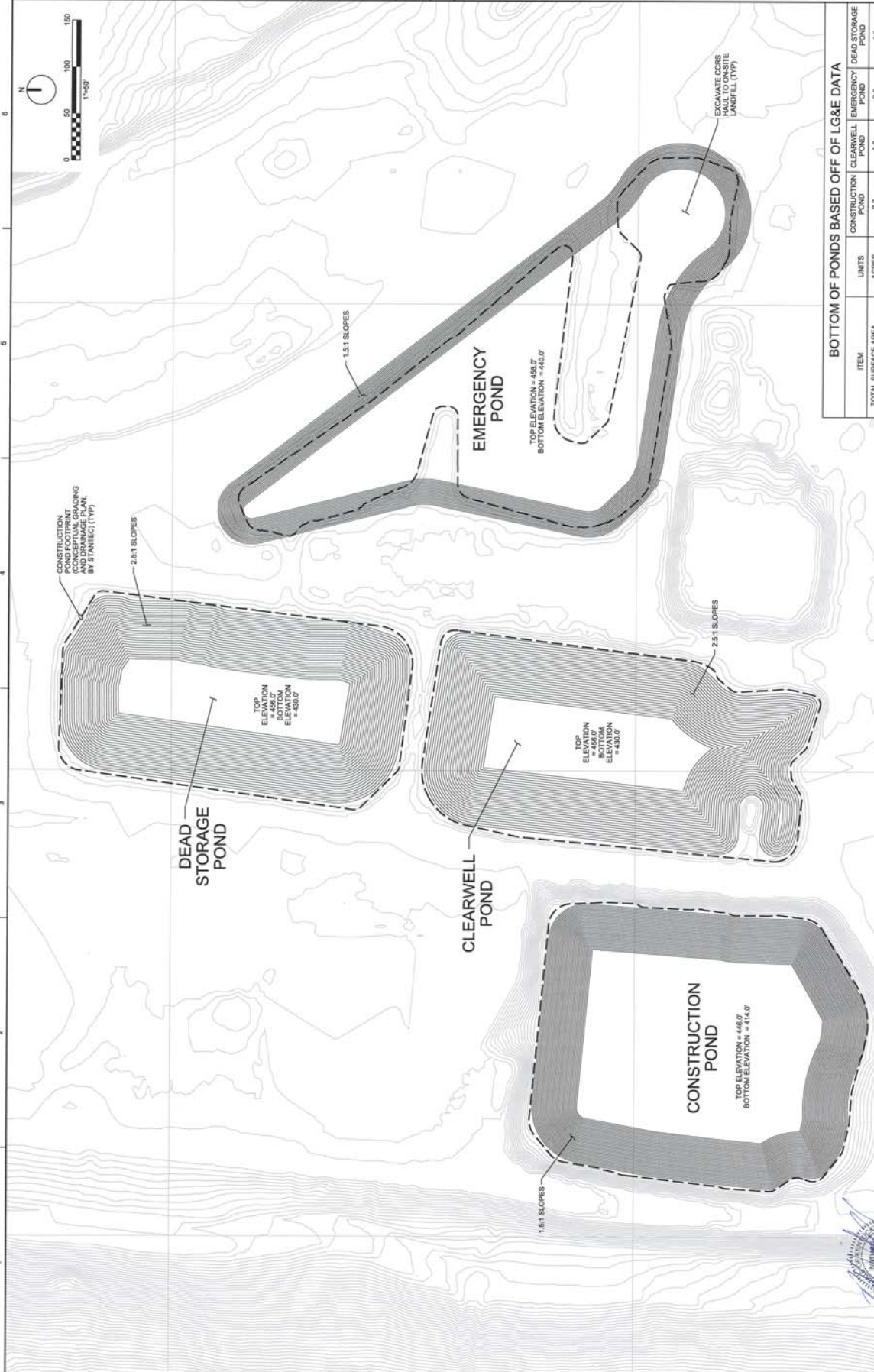
COAL COMBUSTION RESIDUAL EVALUATION
PROPOSED CONCEPTUAL
CLOSURE PLAN
FOUR PROCESS PODS

CH2MHILL

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DATE: JULY 2015
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DWG: EXHIBIT A
SHEET: 13 of 45

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BOTTOM OF PONDS BASED OFF OF LG&E DATA

ITEM	UNITS	CONSTRUCTION POND	CLEARWELL POND	EMERGENCY POND	DEAD STORAGE POND
TOTAL SURFACE AREA	ACRES	2.2	1.6	2.8	1.6
AREA OF POND	ACRES	2.3	1.6	2.8	1.6
LENGTH OF PERIMETER	LINEAR FEET	1100	1190	1620	1055
TOTAL CUT - EXISTING SURFACE TO FINAL GRADE	CUBIC YARDS	82435	42000	57510	38615
TOTAL FILL - EXISTING SURFACE TO FINAL GRADE	CUBIC YARDS	0	0	0	0
NET CUT - EXISTING SURFACE TO FINAL GRADE	CUBIC YARDS	82435	42000	57510	38615



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SPW/SL

PRELIMINARY ENGINEERING
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TECHNICAL MEMORANDUM



Coal Combustion Residual Evaluation: Trimble County Generating Station

PREPARED FOR: Louisville Gas & Electric Company and Kentucky Utilities Company
 PREPARED BY: CH2M HILL Engineers
 DATE: September 29, 2015



1 Executive Summary

Louisville Gas & Electric Company and Kentucky Utilities Company (LG&E-KU) tasked CH2M HILL Engineers. (CH2M) with performing coal combustion residuals (CCR) evaluations for seven generation stations to develop conceptual CCR ash pond closure approaches and capital cost estimates. The generating stations under evaluation are Ghent, Trimble County, Mill Creek, E.W. Brown, Green River, Tyrone, and Pineville. This report applies solely to Trimble County Generating Station. The following scope activities were completed:

- Review of LG&E-KU provided historical CCR information and kickoff meeting workshop (June 2015)
- Developed a CCR pond closure compliance alternative that considers regulatory, civil, geotechnical, and stormwater aspects as it relates to CCR ash ponds and associated cost estimates for the generating station. Discussion of the conceptual approach is included in Section 2, and drawings are contained in Attachment 1. The applicable ponds at Trimble County are the Bottom Ash Pond (BAP) and Gypsum Storage Pond.
- Construct new concrete process tanks (four) for management of wastewater that can no longer be managed in the ponds that will be closed; construct dewatering facility for removing water from solids.

The estimated cost for closing the two ponds is summarized in Exhibit 1-1. Cost information is included in Attachment 2.

Proposed Conceptual Closure Approach	Low (-30%)	Total Capital Cost	High (+30%)
BAP Closure	\$76.1 M	\$108.7 M	\$141.3 M
Gypsum Storage Closure	\$23.3 M	\$33.3 M	\$43.3 M
Concrete Process Tanks and Dewatering Facility	\$75.1 M	\$107.2 M	\$139.4 M

This cost estimate should be considered a Feasibility or Study (Class 4) cost estimate. A summary breakdown for CAPEX costs for each station for the selected design basis are provide Attachments section. Class 4 estimates are generally prepared based on limited information, and subsequently have wide accuracy ranges. Typically, engineering is from 1 to 5 percent complete, and would comprise at a minimum the following: plant capacity, block schematics, layout, PFDs for main process systems and engineered process and utility equipment lists. The expected accuracy range for the estimates prepared for this study is +30 percent/-30 percent. A contingency of 30 percent has been included in the cost estimates as a provision for unforeseeable, additional costs within the general bounds of the project scope; particularly where experience has shown that unforeseeable costs are likely to occur.

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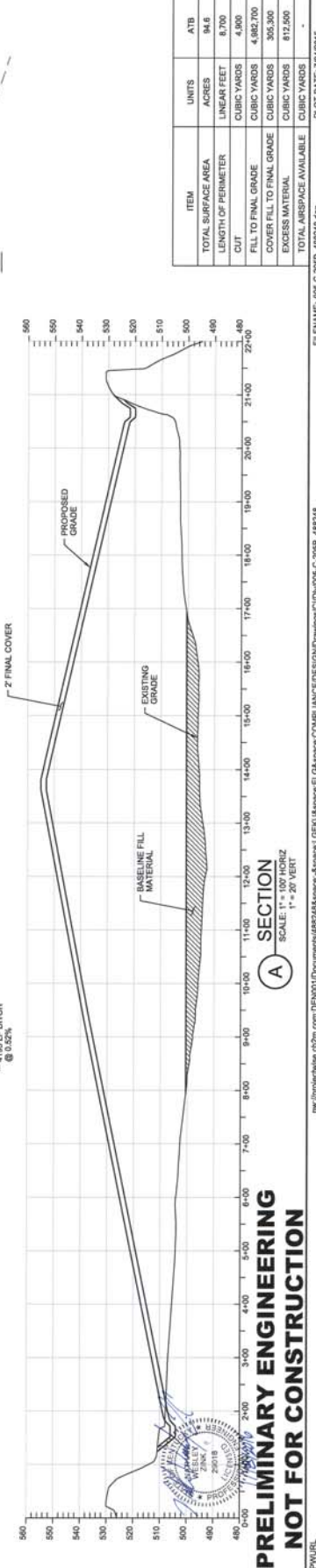
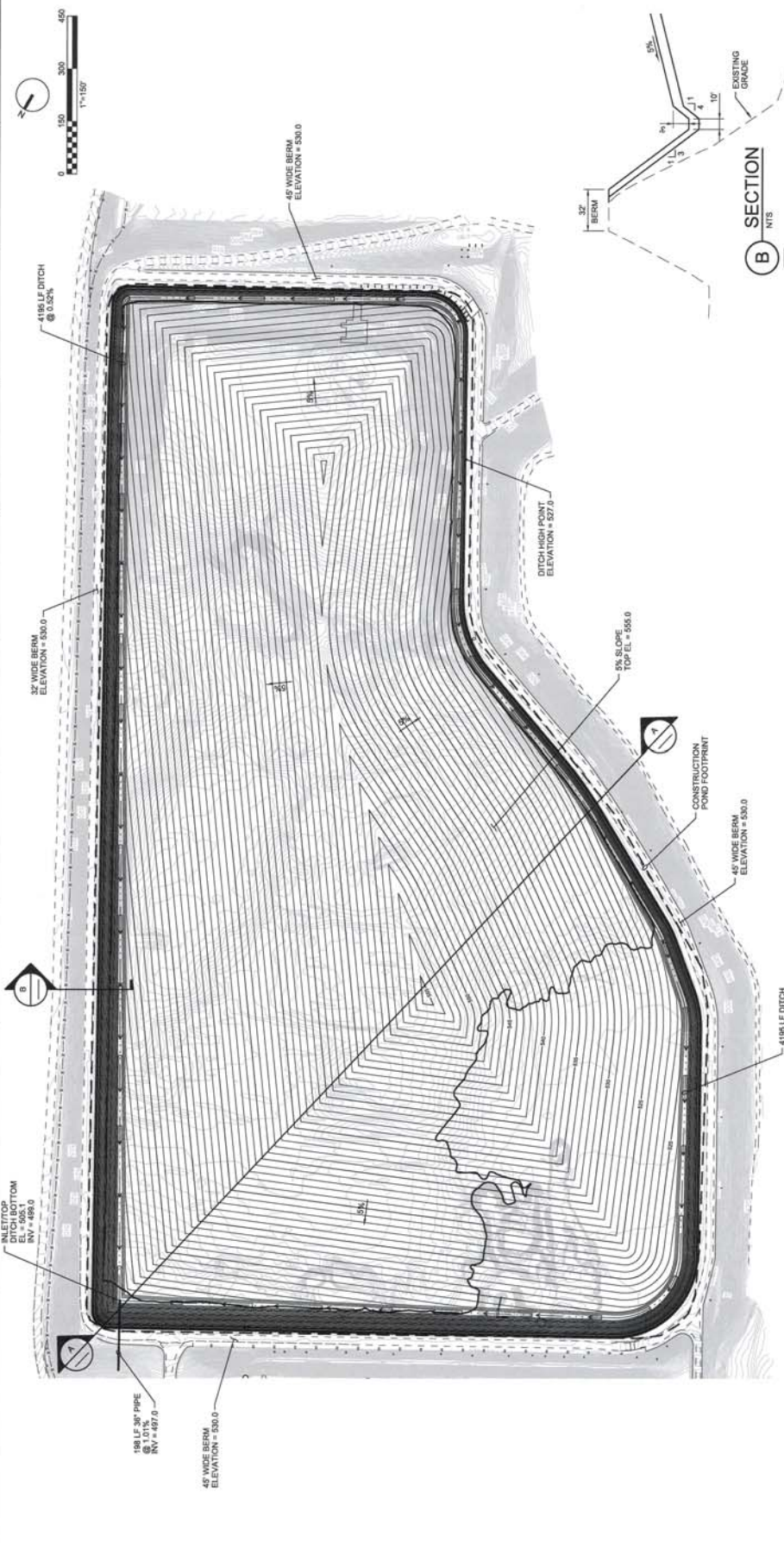
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COAL COMBUSTION RESIDUAL EVALUATION
LOUISVILLE GAS AND ELECTRIC COMPANY
LOUISVILLE, KENTUCKY

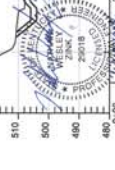
CH2MHILL
TRIMBLE
CONCEPTUAL CLOSURE PLAN
ASH TREATMENT BASIN

ITEM	UNITS	ATB
TOTAL SURFACE AREA	ACRES	94.6
LENGTH OF PERIMETER	LINEAR FEET	8,700
CUT	CUBIC YARDS	4,900
FILL TO FINAL GRADE	CUBIC YARDS	4,982,700
COVER FILL TO FINAL GRADE	CUBIC YARDS	305,300
EXCESS MATERIAL	CUBIC YARDS	812,500
TOTAL AIRSPACE AVAILABLE	CUBIC YARDS	-

VERIFY SCALE
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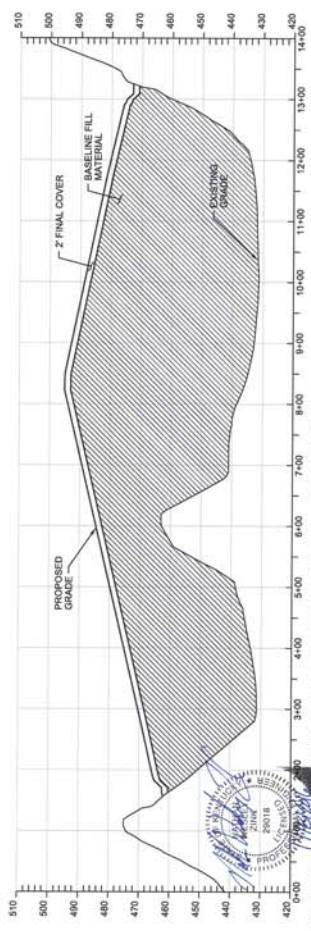
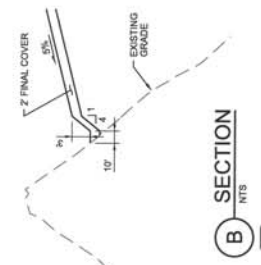
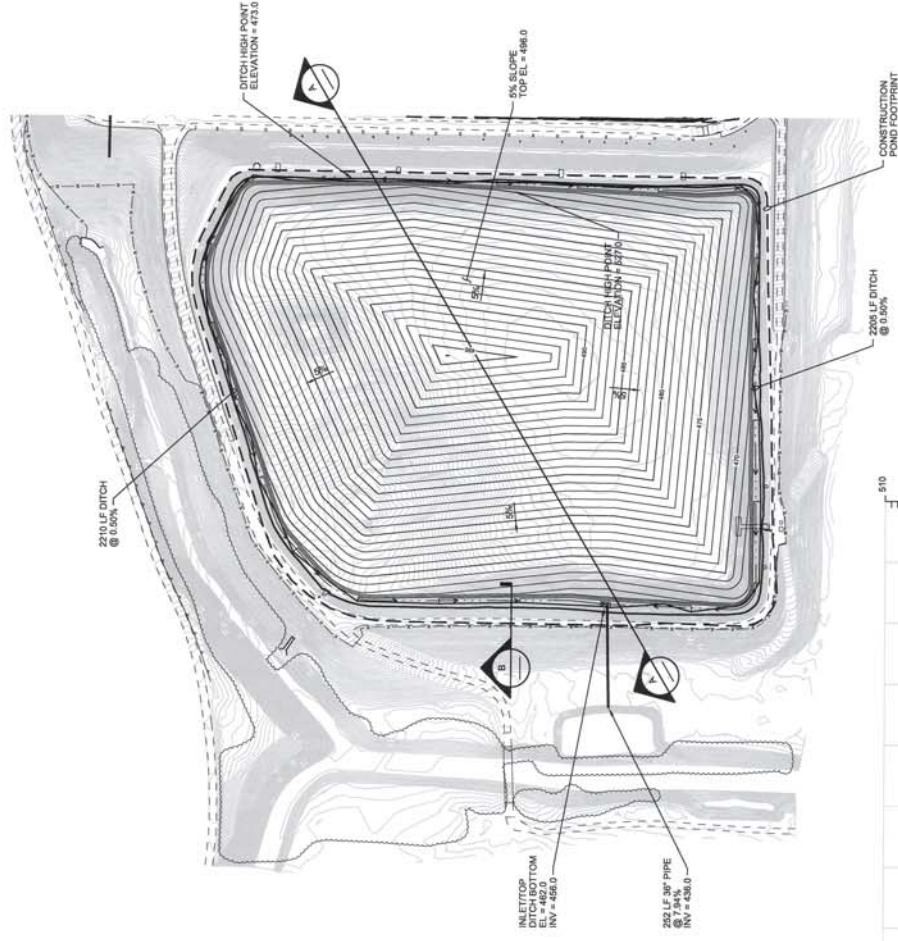
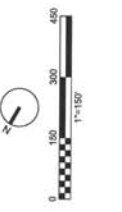
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COAL COMBUSTION RESIDUAL EVALUATION
LOUISVILLE GAS AND ELECTRIC COMPANY
LOUISVILLE, KENTUCKY

CH2MHILL
TRIMBLE
CONCEPTUAL CLOSURE PLAN
GYPSUM STACK

ITEM	UNITS	AMOUNT
TOTAL SURFACE AREA	ACRES	33.4
LENGTH OF PERIMETER	LINEAR FEET	4,700
CUT	CUBIC YARDS	4,900
FILL TO FINAL GRADE	CUBIC YARDS	1,660,200
COVER FILL TO FINAL GRADE	CUBIC YARDS	107,800
EXCESS MATERIAL	CUBIC YARDS	460,700
TOTAL AIRSPACE AVAILABLE	CUBIC YARDS	460,700

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PRELIMINARY ENGINEERING SECTION A
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