

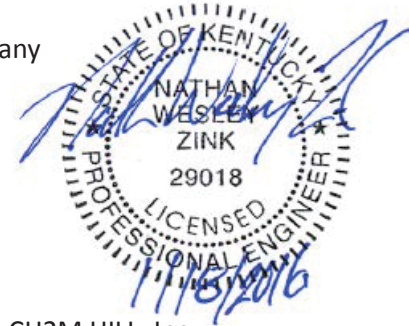
PRELIMINARY ENGINEERING
NOT FOR CONSTRUCTION

TECHNICAL MEMORANDUM



Coal Combustion Residual Pond Closure Evaluation: Green River Generating Station

PREPARED FOR: Louisville Gas & Electric Company and Kentucky Utilities Company
 PREPARED BY: CH2M HILL, Inc.
 DATE: September 18, 2015



1 Executive Summary

Louisville Gas & Electric Company and Kentucky Utilities Company (LG&E-KU) tasked CH2M HILL, Inc. (CH2M) with performing coal combustion residuals (CCR) evaluations for seven generating 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 technical memorandum applies solely to Green River 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 compliance alternative that considers regulatory, 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 Green River are the Main Ash Pond, Ash Treatment Basin (ATB) #2, and the SO2 Pond.
- The estimated cost for closing the three ponds is summarized in Exhibit 1-1. Cost information is included in Attachment 2.

Proposed Conceptual Closure Approach ¹	Total Capital Cost		
	Low (-30%)	Cost	High (+30%)
Main Ash Pond Closure	\$12.9 M	\$18.4 M	\$23.9 M
ATB#2 Closure	\$13.7 M	\$19.5 M	\$25.4 M
SO2 Closure	\$9.6 M	\$13.8 M	\$17.9 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.

This cost estimate, along with any resulting conclusions on project financial or economic feasibility or funding requirements, is prepared for guidance in project evaluation and implementation from

CH2MHILL

GREEN RIVER
CONCEPTUAL CLOSURE PLAN
MAIN ASH POND

LOUISVILLE KENTUCKY
AND KENTUCKY UTILITIES
LOUISVILLE GAS AND ELECTRIC COMPANY

COAL COMBUSTION RESIDUAL EVALUATION

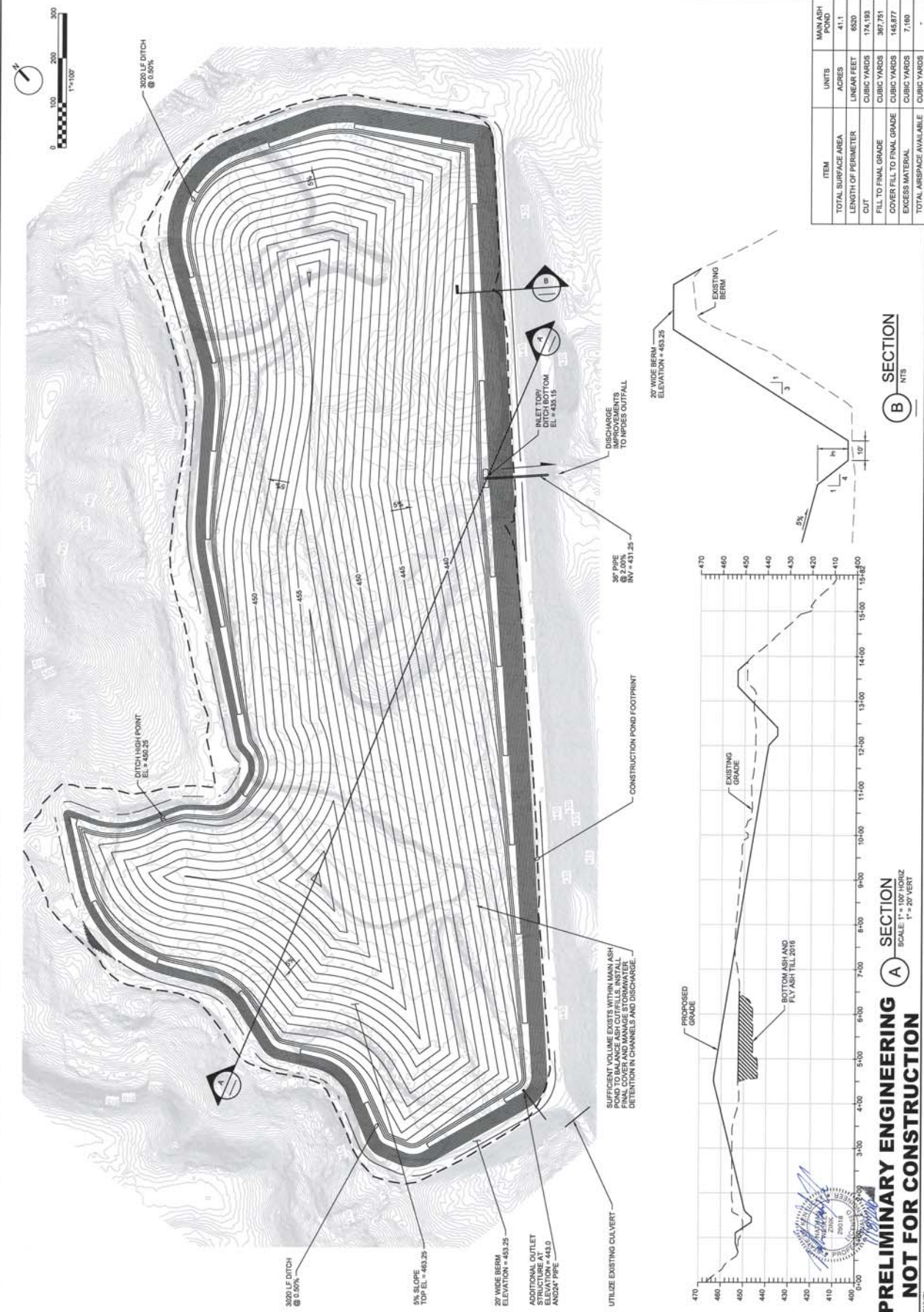
NO.	DATE	REVISION	CHK	APP'D

ITEM	UNITS	MAIN ASH POND
TOTAL SURFACE AREA	ACRES	41.1
LENGTH OF PERIMETER	LINEAR FEET	6000
CUT	CUBIC YARDS	174,193
FILL TO FINAL GRADE	CUBIC YARDS	387,751
COVER FILL TO FINAL GRADE	CUBIC YARDS	145,877
EXCESS MATERIAL	CUBIC YARDS	7,160
TOTAL AIRSPACE AVAILABLE	CUBIC YARDS	-

VERIFY SCALE: 1" = 100' HORIZ. 1" = 20' VERT.

DATE: OCTOBER 2014
PROJ: 488248
DWG: 7.160
SHEET: 10 of 24

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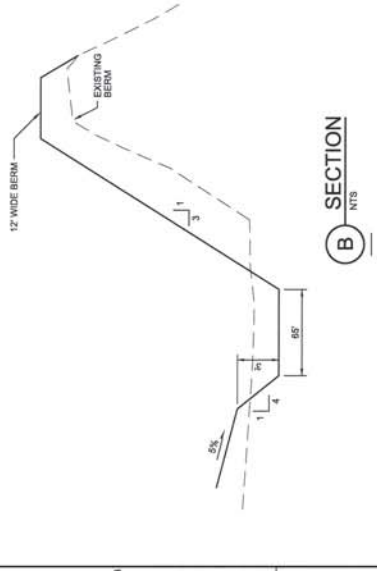
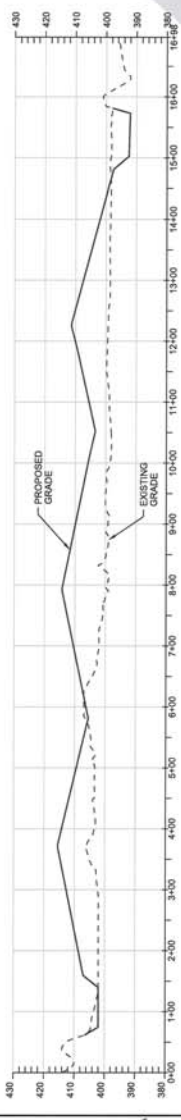
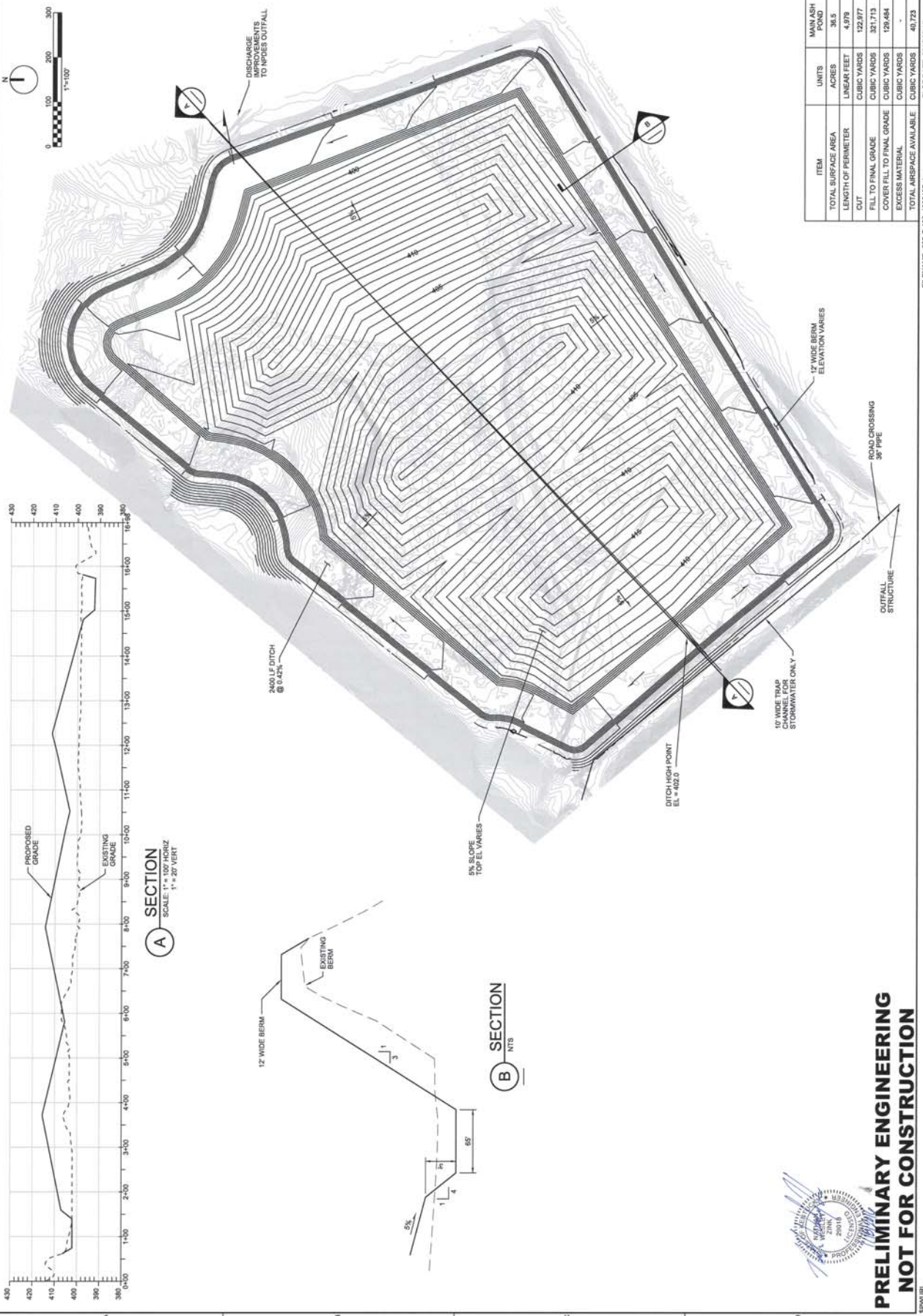


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A SECTION
SCALE: 1" = 100' HORIZ
1" = 20' VERT

B SECTION
NTS





**PRELIMINARY ENGINEERING
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SPWJRL

ITEM	UNITS	MAN ASH POND
TOTAL SURFACE AREA	ACRES	36.5
LENGTH OF PERIMETER	LINEAR FEET	4,979
CUT	CUBIC YARDS	122,977
FILL TO FINAL GRADE	CUBIC YARDS	371,713
COVER FILL TO FINAL GRADE	CUBIC YARDS	129,464
EXCESS MATERIAL	CUBIC YARDS	-
TOTAL AIRSPACE AVAILABLE	CUBIC YARDS	49,173

NO.	DATE	BY	AP/VD	CHK	DR	DESIGN

CH2MHILL
GREEN RIVER
CONCEPTUAL CLOSURE PLAN #2
ASH TREATMENT POND #2

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

VERIFY SCALE
DATE: OCTOBER 2014
PROJ: 48624B
DWG: 48624B
SHEET: 11 of 24

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NO.	DATE	REVISION	CHK	APVD

NO.	DATE	REVISION	CHK	APVD

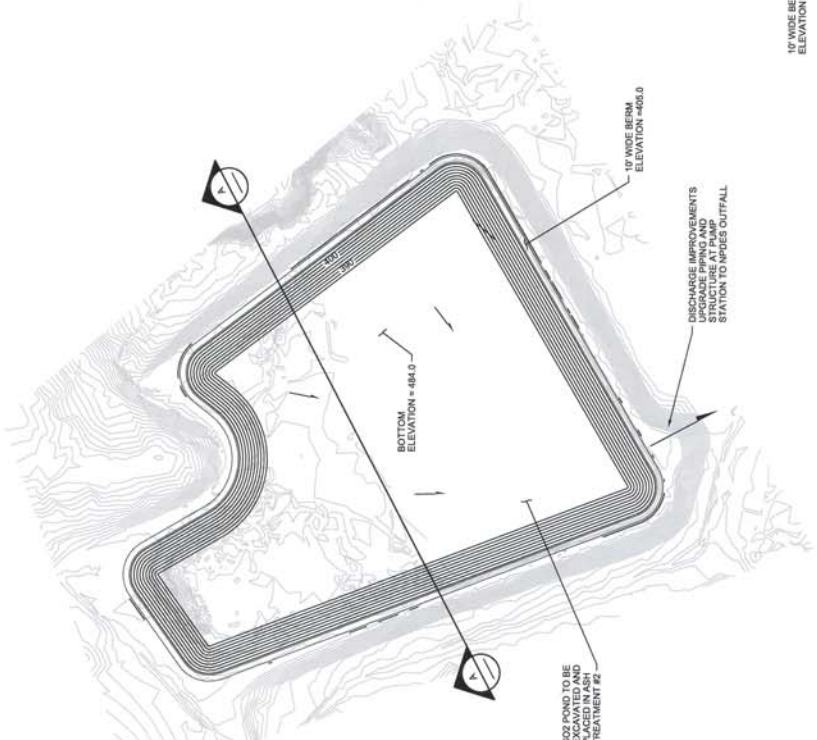
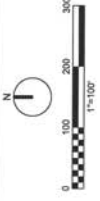
CH2MHILL
 GREEN RIVER
 CONCEPTUAL CLOSURE PLAN
 SO2 POND

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

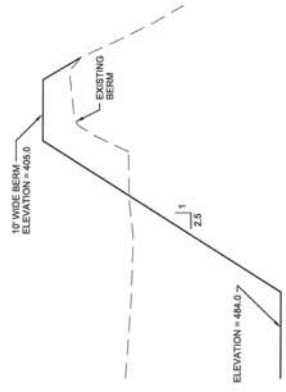
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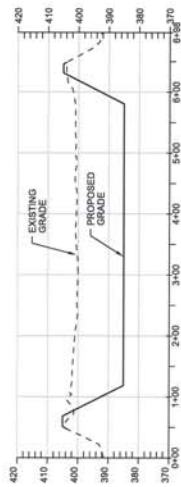


**PRELIMINARY ENGINEERING
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ITEM	UNITS	SO2 POND
TOTAL SURFACE AREA	ACRES	10.1
LENGTH OF PERIMETER	LINEAR FEET	2760
CUT	CUBIC YARDS	198,736
FILL TO FINAL GRADE	CUBIC YARDS	-
COVER FILL TO FINAL GRADE	CUBIC YARDS	17,892
EXCESS MATERIAL (TO ATRZ)	CUBIC YARDS	198,736
TOTAL AIRSPACE AVAILABLE	CUBIC YARDS	-



(B) SECTION
 NTS



(A) SECTION
 SCALE: 1" = 100' HORIZ
 1" = 20' VERT

PRELIMINARY ENGINEERING
NOT FOR CONSTRUCTION

TECHNICAL MEMORANDUM



Coal Combustion Residual Pond Closure Evaluation: Pineville Generating Station

PREPARED FOR: Louisville Gas & Electric Company and Kentucky Utilities Company
 PREPARED BY: CH2M HILL, Inc.
 DATE: September 18, 2015



1 Executive Summary

Louisville Gas & Electric Company and Kentucky Utilities Company (LG&E-KU) tasked CH2M HILL, Inc. (CH2M) with performing coal combustion residuals (CCR) evaluations for eight sites to develop conceptual CCR ash pond closure approach 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 report applies to Pineville Generating Station (Exhibit 1). The following scope activities were completed:

- Review of LG&E-KU provided historical CCR information and kickoff meeting workshop (June 2015)
- Development of a CCR compliance alternative that consider regulatory, geotechnical, and stormwater aspects as it relates to CCR and ash ponds and associated cost estimates for the site.
- The Ash Treatment Basin (ATB) was identified as the applicable CCR unit for Pineville.
- The estimated cost for closing the ATB is summarized in Table 1-1. Detailed cost information is included in Attachment 2.

Proposed Conceptual CCR Pond Closure Approach	Low (-30%)	Total Capital Cost	High (+30%)
Remove surface water. Construct final cover (maximum grades). Install new surface water control pond and outlet structure.	\$4.9 M	\$7.0 M	\$9.1 M

This cost estimate should be considered a Feasibility or Study (Class 4) cost estimate. A summary breakdown for CAPEX and OPEX 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.

This cost estimate, along with any resulting conclusions on project financial or economic feasibility or funding requirements, is prepared for guidance in project evaluation and implementation from information available at the time the estimate was prepared. The final costs of the project and resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, firm selected for final engineering design, and

NO.	DATE	DESCRIPTION	DR	CHK	APVD

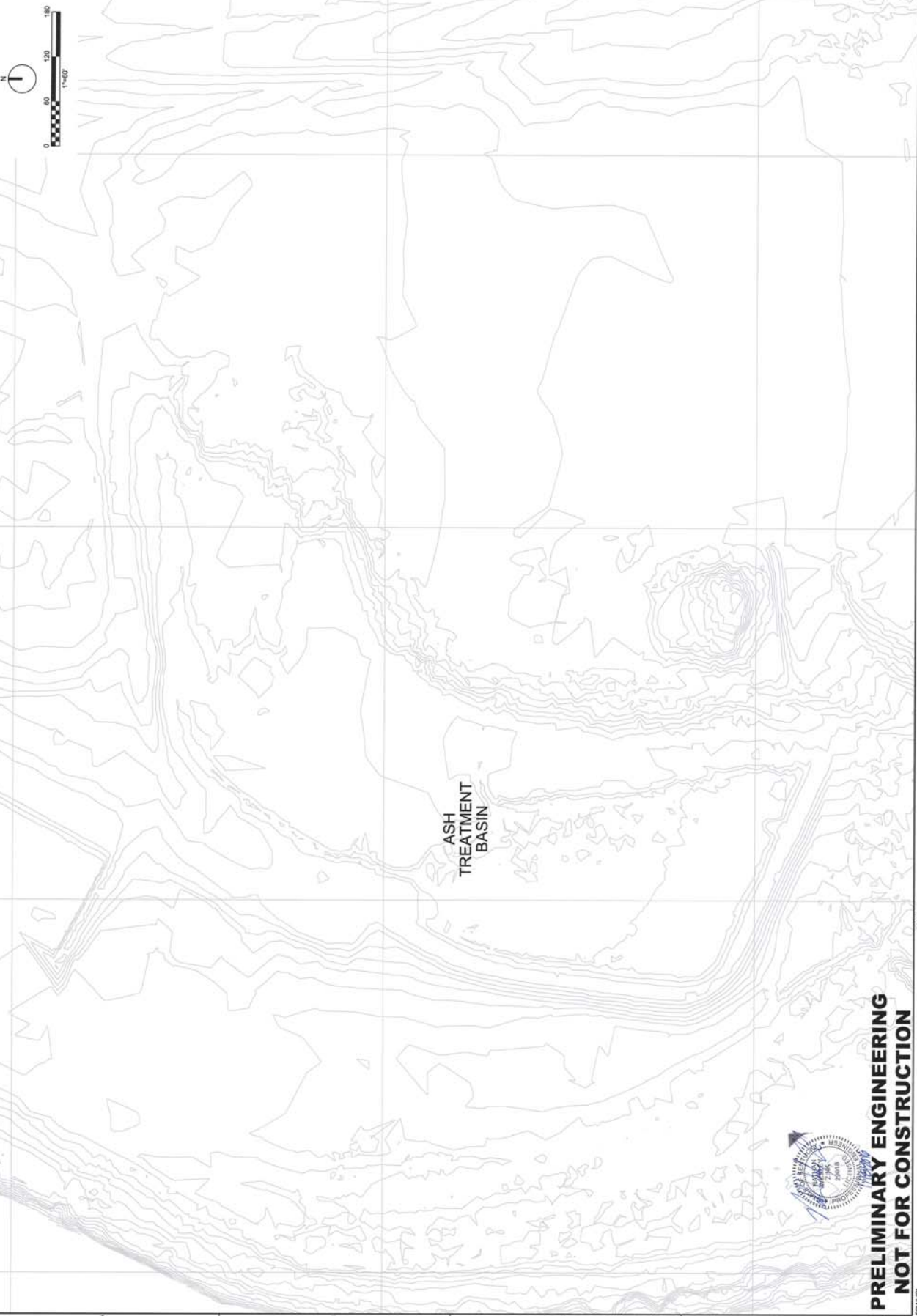
LOUISVILLE GAS AND ELECTRIC COMPANY
LOUISVILLE, KENTUCKY
AND KENTUCKY UTILITIES

EXISTING CONDITIONS
PINEVILLE
CH2MHILL.

VERIFY SCALE
DATE OF FIELD WORK
DATE
PROJ
DWG
SHEET

DATE JULY 2015
PROJ 488248
DWG EXHIBIT 1
SHEET of

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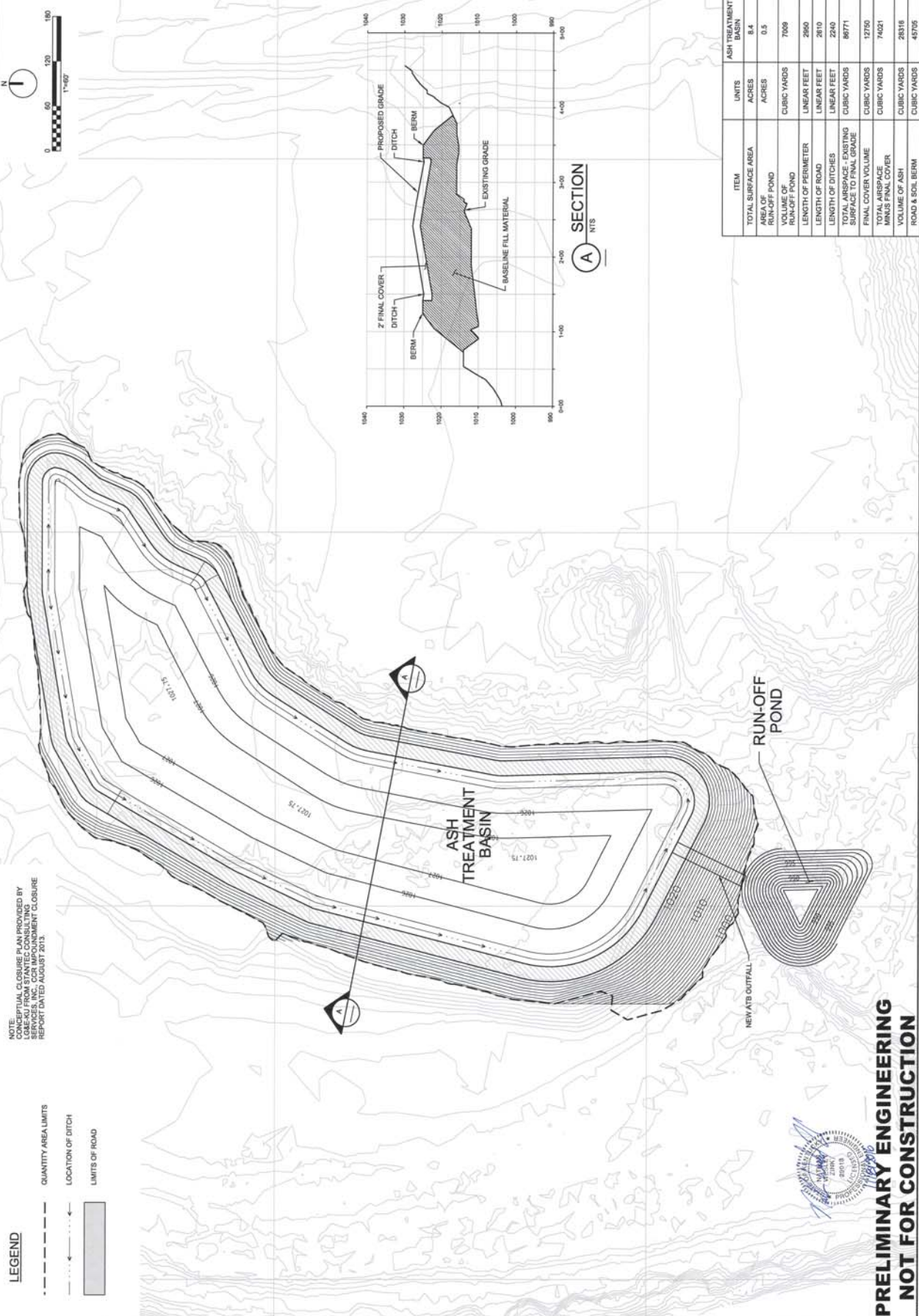
NO.	DATE	DESCRIPTION	BY	CHK	APVD

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

CH2MHILL
PINEVILLE
PROPOSED CONCEPTUAL
CLOSURE PLAN
ASH TREATMENT BASIN

DATE	PROJ	DWG	SHEET
JULY 2013	488249	EXHIBIT 2	of

VERIFY SCALE
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NOTE: FINAL CLOSURE PLAN PROVIDED BY
CONCEPTUAL CLOSURE AND REPAIR
SERVICES, INC. COR IMPROVEMENT CLOSURE
REPORT DATED AUGUST 2013.

LEGEND

--- (dashed line)	QUANTITY AREA LIMITS
- - - (long dashed line)	LOCATION OF DITCH
▭ (shaded rectangle)	LIMITS OF ROAD

ITEM	UNITS	ASH TREATMENT BASIN
TOTAL SURFACE AREA	ACRES	8.4
AREA OF RUN-OFF POND	ACRES	0.5
VOLUME OF RUN-OFF POND	CUBIC YARDS	7069
LENGTH OF PERIMETER	LINEAR FEET	2600
LENGTH OF ROAD	LINEAR FEET	2610
LENGTH OF DITCHES	LINEAR FEET	2240
TOTAL AIRSPACE - EXISTING SURFACE TO FINAL GRADE	CUBIC YARDS	86771
FINAL COVER VOLUME	CUBIC YARDS	12750
TOTAL AIRSPACE MINUS FINAL COVER	CUBIC YARDS	74021
VOLUME OF ASH	CUBIC YARDS	28316
ROAD & SOIL BERM	CUBIC YARDS	45705

A SECTION
N/S

**PRELIMINARY ENGINEERING
NOT FOR CONSTRUCTION**



PRELIMINARY ENGINEERING
NOT FOR CONSTRUCTION

TECHNICAL MEMORANDUM



Coal Combustion Residual Pond Closure Evaluation: Tyrone Generating Station

PREPARED FOR: Louisville Gas & Electric Company and Kentucky Utilities Company
PREPARED BY: CH2M HILL, Inc.
DATE: November 20, 2015



1 Executive Summary

Louisville Gas & Electric Company and Kentucky Utilities Company (LG&E-KU) tasked CH2M HILL, Inc. (CH2M) with performing coal combustion residuals (CCR) evaluations for eight sites to develop conceptual CCR ash pond closure approach 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 report applies to Tyrone Generating Station (Exhibit 1). The following scope activities were completed:

- Review of LG&E-KU provided historical CCR information and kickoff meeting workshop (June 2015)
- Development of a CCR compliance alternative that consider regulatory, geotechnical, and stormwater aspects as it relates to CCR and ash ponds and associated cost estimates for the site.
- The Ash Treatment Basin (ATB) was identified as the applicable CCR unit for Tyrone. Other CCR units that could be affected by the CCR regulations at the site, but that were not evaluated further, include the Beneficial Reuse Stockpile and the possible CCR Fill Area.
- The estimated cost for closing the ATB is summarized in Table 1-1. Detailed cost information is included in Attachment 2.

Table 1-1. Tyrone Proposed Conceptual Cost Estimate

Proposed Conceptual CCR Pond Closure Approach	Low (-30%)	Total Capital Cost	High (+30%)
Fill ATB with material from the Beneficial Reuse Stockpile onsite. Remove surface water. Construct final cover (maximum grades). Install new surface water control pond and outlet structure.	\$8.1 M	\$11.6 M	\$15.1 M

This cost estimate should be considered a Feasibility or Study (Class 4) cost estimate. A summary breakdown for CAPEX and OPEX 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.

NO.	DATE	DESCRIPTION	BY	CHK	APP'D

REVISION	CHK	APP'D

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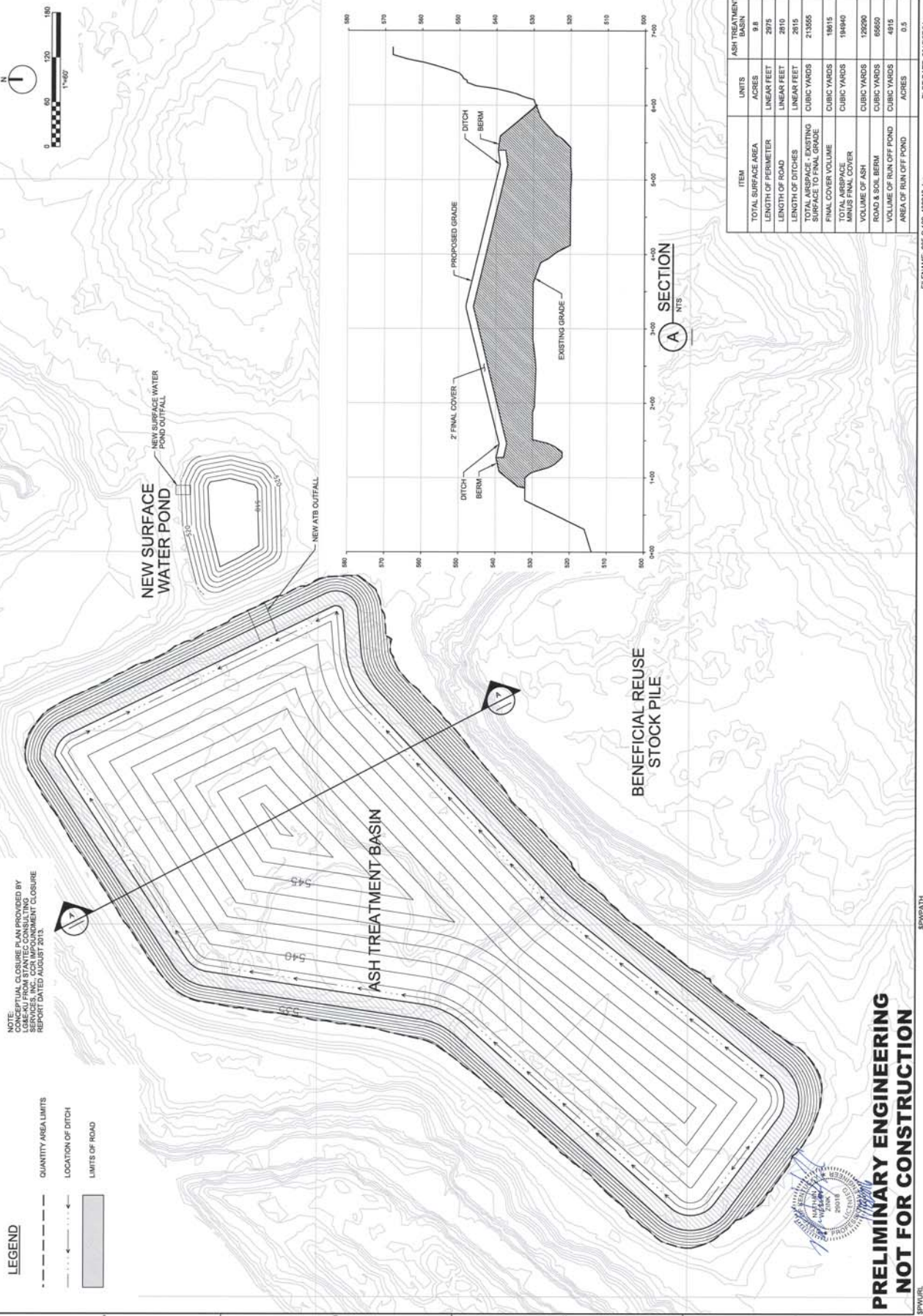
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TYRONE
PROPOSED CONCEPTUAL
CLOSURE PLAN
ASH TREATMENT BASIN

DATE	JULY 2015
PROJ	488248
DWG	EXHIBIT 2
SHEET	of

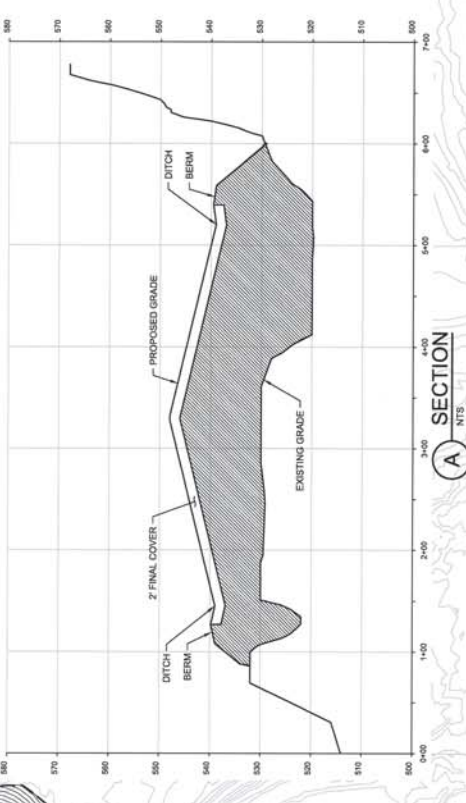
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LEGEND

--- (dashed line)	QUANTITY AREA LIMITS
- - - (dash-dot line)	LOCATION OF DITCH
▭ (shaded rectangle)	LIMITS OF ROAD



ITEM	UNITS	ASH TREATMENT BASIN
TOTAL SURFACE AREA	ACRES	9.8
LENGTH OF PERIMETER	LINEAR FEET	2975
LENGTH OF ROAD	LINEAR FEET	2910
LENGTH OF DITCHES	LINEAR FEET	2915
TOTAL AIRSPACE - EXISTING SURFACE TO FINAL GRADE	CUBIC YARDS	213555
FINAL COVER VOLUME	CUBIC YARDS	19915
TOTAL AIRSPACE MINUS FINAL COVER	CUBIC YARDS	194640
ROAD & SOIL BERM	CUBIC YARDS	129000
VOLUME OF ASH	CUBIC YARDS	66550
AREA OF RUN OFF POND	CUBIC YARDS	4915
AREA OF RUN OFF POND	ACRES	0.5

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TECHNICAL MEMORANDUM



Coal Combustion Residual Pond Closure Evaluation: Ghent Generating Station

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



1 Executive Summary

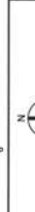
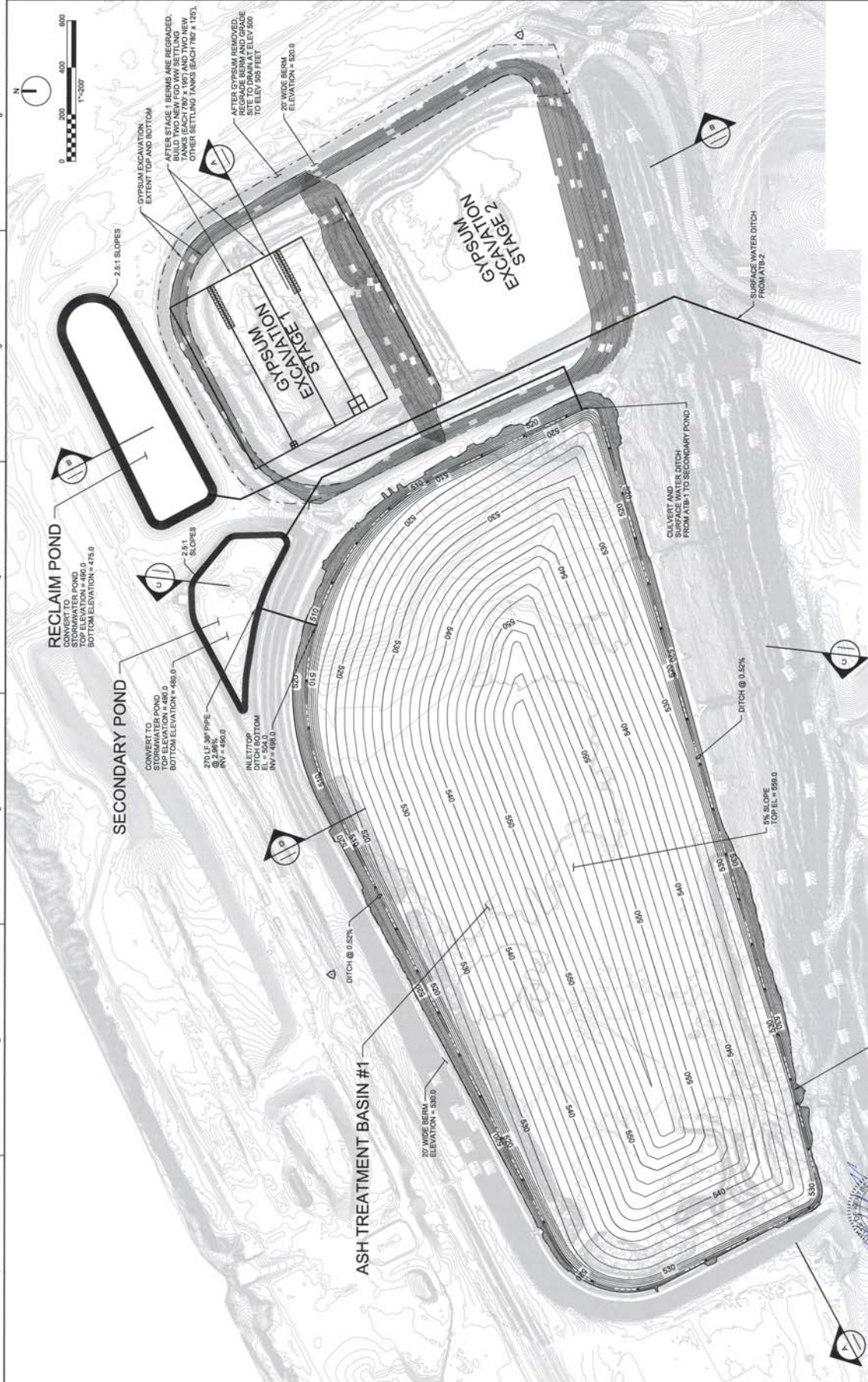
Louisville Gas & Electric Company and Kentucky Utilities Company (LG&E-KU) tasked CH2M HILL Engineers (CH2M) with performing coal combustion residuals (CCR) evaluations for eight sites to develop conceptual CCR ash pond closure approaches and cost estimates. The generating stations under evaluation are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

This technical memorandum applies to Ghent 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 (Exhibits 2-1 through 2-4) are contained in Attachment 1.
- The applicable ponds at the Ghent Station are the Ash Treatment Basin #1 (ATB1), Gypsum Stack, Secondary Pond, Reclaim Pond, and the Ash Treatment Basin #2 (ATB2)
- Construct new concrete process tanks 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 Exhibit 1-1. Detailed cost information is included in Attachment 2.

Exhibit 1-1. Ghent Proposed Conceptual Pond Closure Approach Cost Estimate

Proposed Conceptual CCR Pond Closure Approach	Low (-30%)	Total Capital Cost	High (+30%)
ATB1	\$39.9 M	\$57.0 M	\$74.0 M
Gypsum Stack	\$49.7 M	\$71.0 M	\$92.3 M
Concrete Process Tanks and Dewatering Facility	\$73.3 M	\$104.7 M	\$136.1 M
ATB2	\$55.6 M	\$79.4 M	\$103.3 M
Secondary Pond	\$2.1 M	\$3.0 M	\$3.9 M
Reclaim Pond	\$3.3 M	\$4.7 M	\$6.1 M



NO.	DATE	BY	APPROVED	REVISION

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

CH2MHILL.
GHEHT - CONCEPTUAL CLOSURE PLAN
ASH RECLAIM BASIN #1,
RECLAIM POND, SECONDARY POND
AND GYPSUM STACK

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Item	Units	Quantity	Secondary Pond	ATP-1
Final Surface Area	AC	60.28	2.36	4.14
Length of Perimeter	LF	6,008	2,008	5,055
Volume of Material	CY	12,574	2,217	10,357
Total Fill - Existing to Final	CT	9,257	1,824	7,433
Total Fill - Existing to Final	CT	-4,442.57	-3,128	-1,314.56
Total Fill Capacity	CT	---	---	---
Total Capacity	CT	---	---	---

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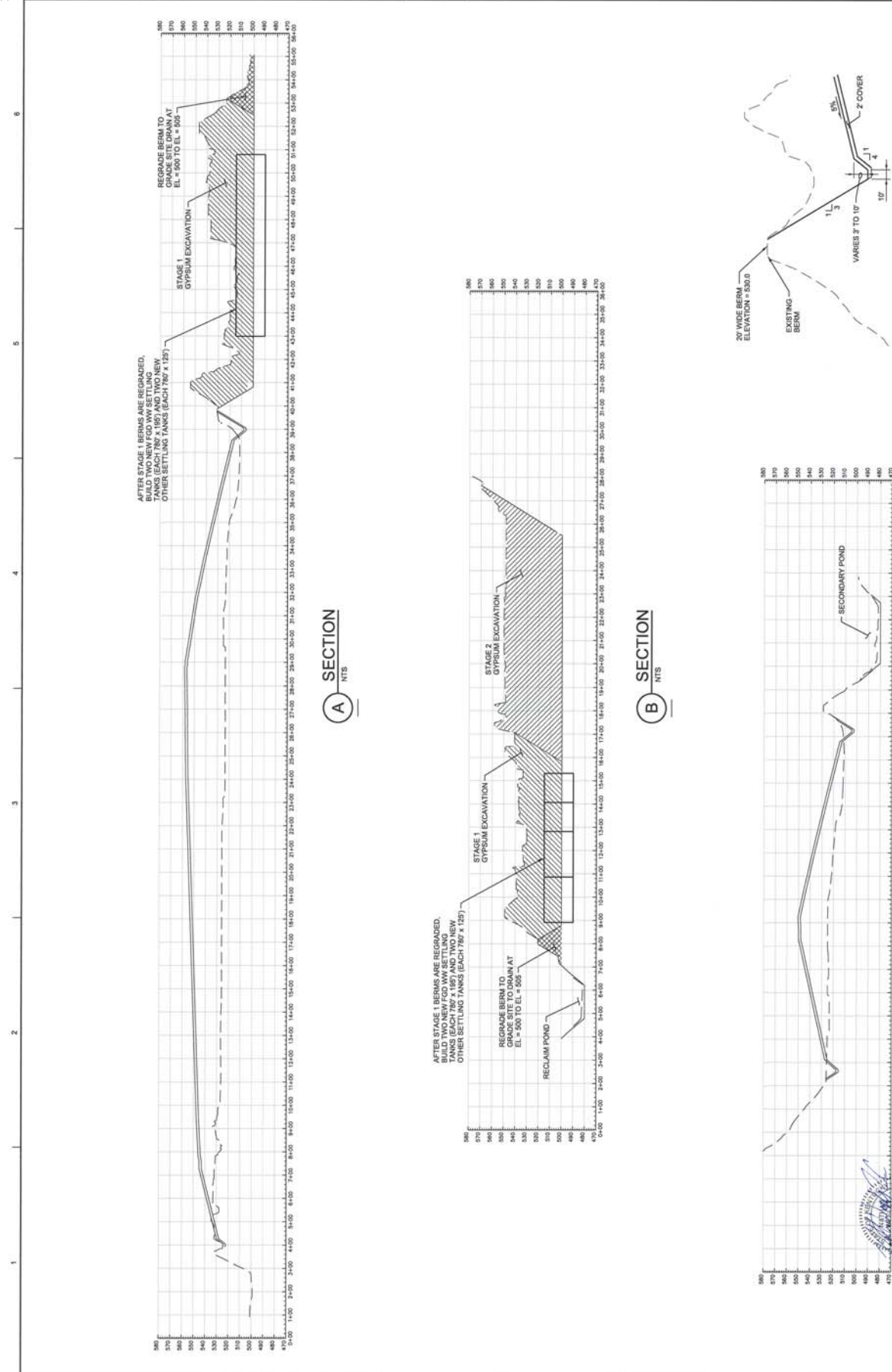
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NO.	DATE	REVISION	BY	APP'D

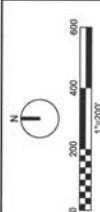
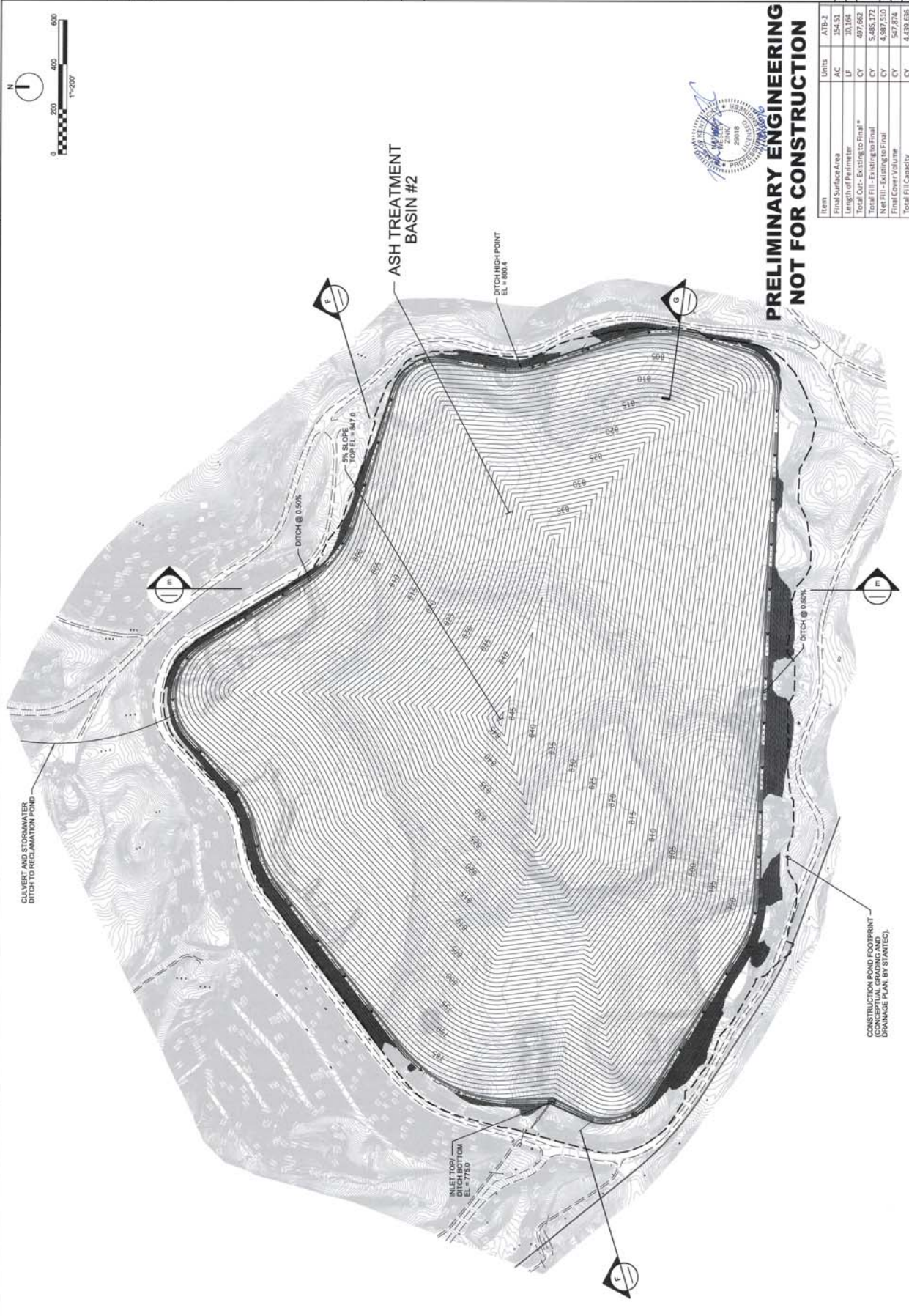
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LOUISVILLE GAS AND ELECTRIC COMPANY
LOUISVILLE, KENTUCKY
COAL COMBUSTION RESIDUAL EVALUATION
ASH TREATMENT BASIN #1
RECLAIM POND, SECONDARY POND
AND GYPSUM STACK CROSS SECTIONS

CH2MHILL
GHEAT - CONCEPTUAL CLOSURE PLAN
ASH TREATMENT BASIN #1
RECLAIM POND, SECONDARY POND
AND GYPSUM STACK CROSS SECTIONS

DATE	SEPTEMBER 2015
PROJ	488248
DWG	EXHIBIT 2-2
SHEET	of



**PRELIMINARY ENGINEERING
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NO.	DATE	DESIGN	CHK	APVD

CH2MHILL
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 LOUISVILLE GAS AND ELECTRIC COMPANY
 LOUISVILLE, KENTUCKY
 COAL COMBUSTION RESIDUAL EVALUATION
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Item	Units	ATB-2
Final Surface Area	AC	154.51
Length of Perimeter	LF	30,164
Total Cut - Existing to Final*	CY	497,662
Total Fill - Existing to Final	CY	5,485,172
Net Fill - Existing to Final	CY	4,987,510
Final Cover Volume	CY	547,874
Total Fill Capacity	CY	4,439,636

* includes cut for 'Z' cover subgrade at A/B-2

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STATTEC ENGINEERING
 1101 W. 10th Street
 Louisville, KY 40203
 502.581.1100
 www.stattec.com

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

ASH TREATMENT BASIN #2 SECTIONS

CH2MHILL

VERIFY SCALE
DATE: JULY 2015
PROJ: 488248
DWG: EXHIBIT 2-4
SHEET: of

FILENAME: 005-C-202A_488248.dgn

PLOT DATE: 2015/07/17

3.1 SLOPE

4.1 SLOPE

PROPOSED GRADE

EXISTING GRADE

Z COVER

SECTION F NTS

SECTION E NTS

SECTION G NTS

PRELIMINARY ENGINEERING
NOT FOR CONSTRUCTION

SPW/CEL

SPW/PATH

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PRELIMINARY ENGINEERING
NOT FOR CONSTRUCTION

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

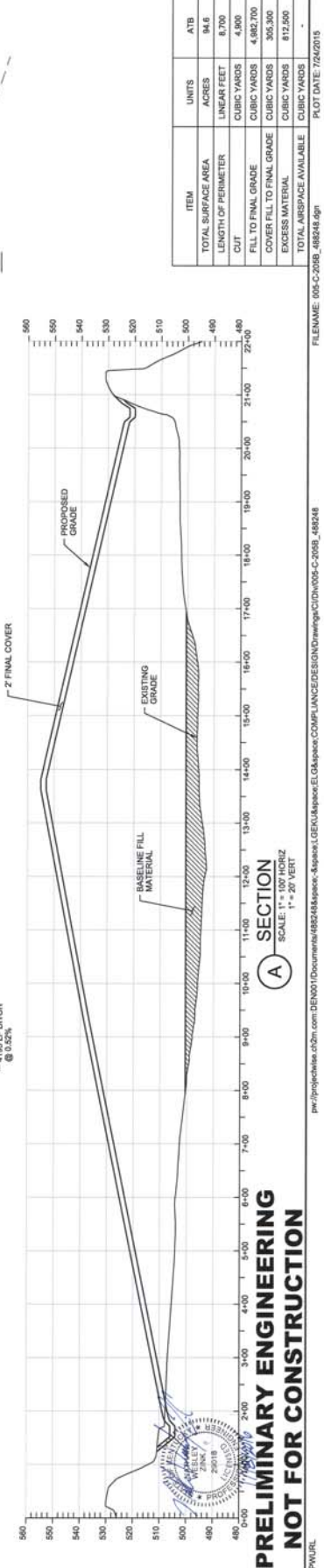
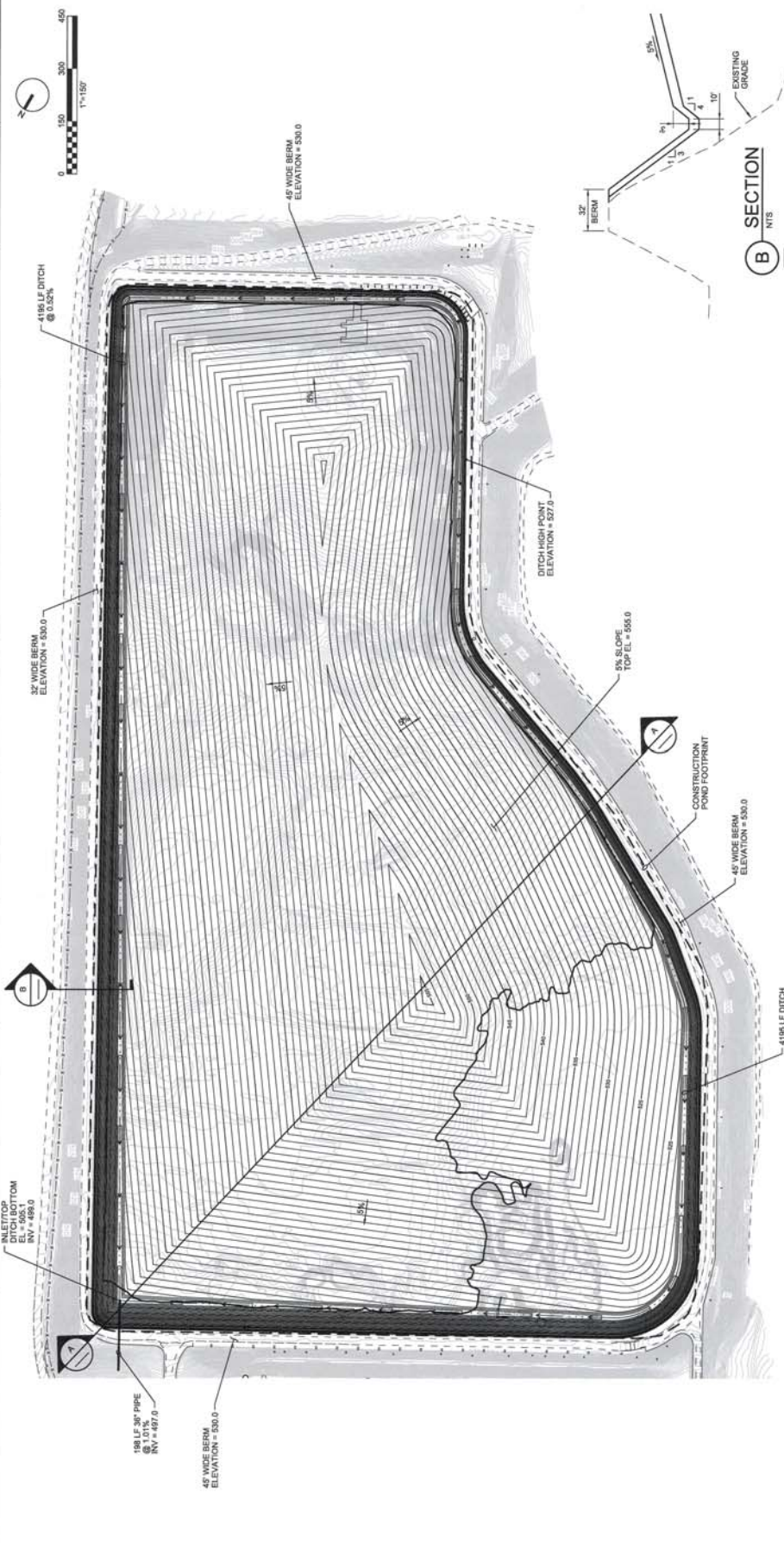
This cost estimate should be considered a Feasibility or Study (Class 4) cost estimate. A summary breakdown for CAPEX costs for each station for the selected design basis are provide Attachments section. Class 4 estimates are generally prepared based on limited information, and subsequently have wide 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.

NO.	DATE	REVISION	BY	APP'D

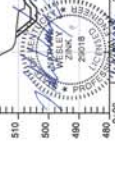
CH2MHILL®
 TRIMBLE
 CONCEPTUAL CLOSURE PLAN
 ASH TREATMENT BASIN
 COAL COMBUSTION RESIDUAL EVALUATION
 LOUISVILLE GAS AND ELECTRIC COMPANY
 LOUISVILLE, KENTUCKY
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ITEM	UNITS	ATB
TOTAL SURFACE AREA	ACRES	94.6
LENGTH OF PERIMETER	LINEAR FEET	8,700
CUT	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
 ORIGINAL DRAWING
 DATE
 EXHIBIT 7.1
 SHEET
 PLOT TIME: 8:39:37 AM
 FILENAME: 006-C-2068_488248.dgn
 PLOT DATE: 7/24/2013



**PRELIMINARY ENGINEERING
 NOT FOR CONSTRUCTION**



SPWURL

NO.	DATE	REVISION	BY	APP'D

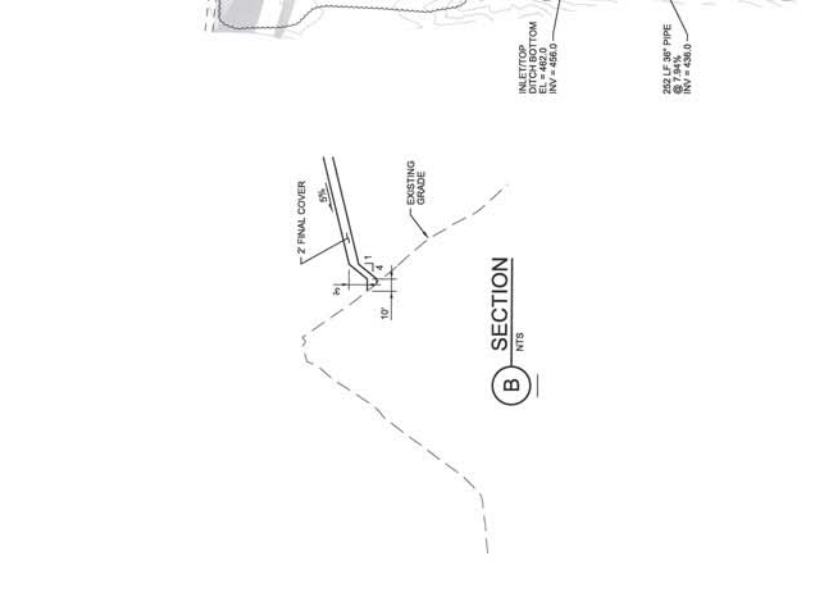
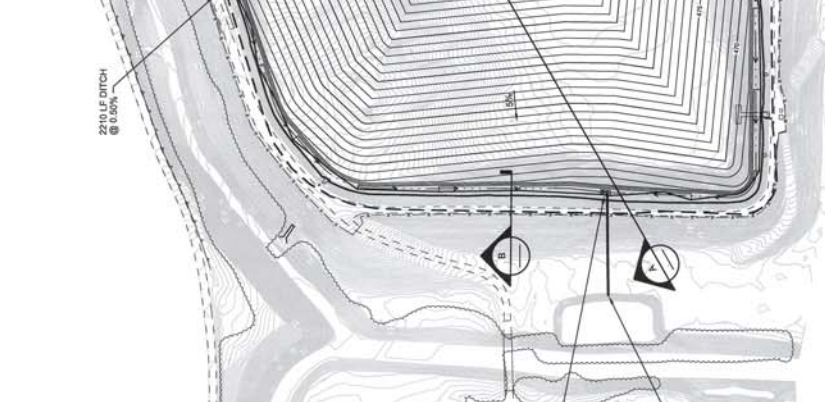
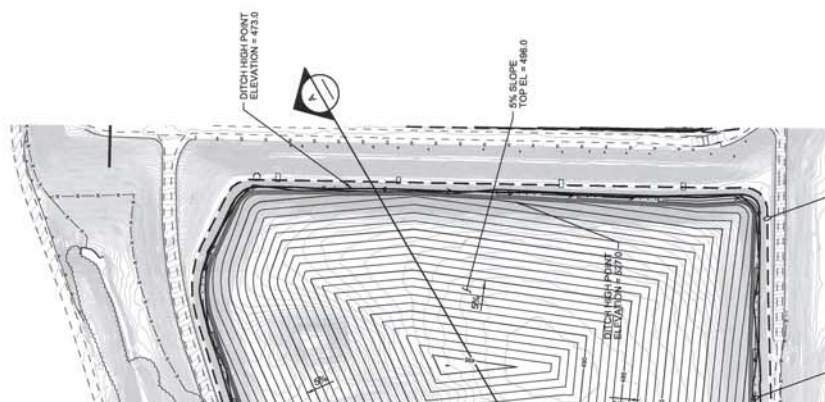
NO.	DATE	REVISION	BY	APP'D

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

VERIFY SCALE
DATE: JULY 2015
PROJ: 488248
DWG: EXHIBIT 7.2
SHEET: 12 OF 12
PLOT TIME: 9:39:38 AM
FILENAME: 005-C-205C_488248.dgn
PLOT DATE: 7/24/2015



PRELIMINARY ENGINEERING SECTION A
SCALE: 1" = 10' HORIZ
1" = 20' VERT

NOT FOR CONSTRUCTION

SPWURL

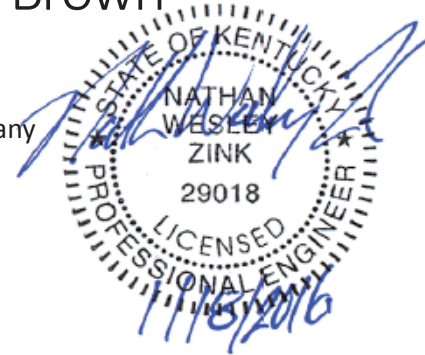
PRELIMINARY ENGINEERING
NOT FOR CONSTRUCTION

TECHNICAL MEMORANDUM



Coal Combustion Residual Evaluation: E. W. Brown 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 Brown Generating Station. The following scope activities were completed:

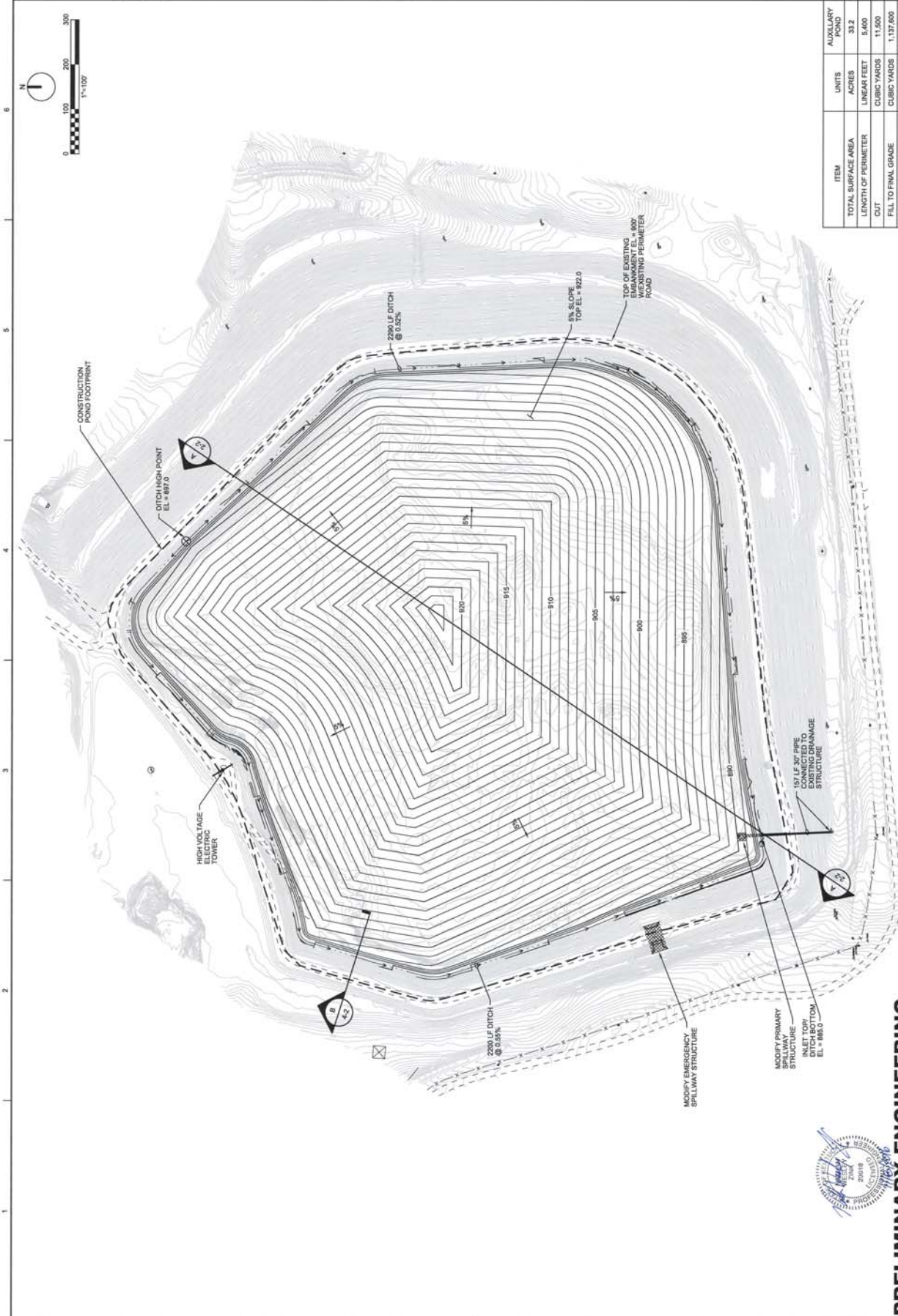
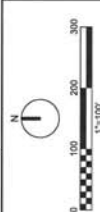
- Review of LG&E-KU provided historical CCR information and kickoff meeting workshop (June 2015)
- Developed a CCR pond closure compliance alternative that considers regulatory, civil, geotechnical, and stormwater aspects as it relates to CCR ash ponds and associated cost estimates for the generating station. Discussion of the conceptual approach is included in Section 2, and drawings are contained in Attachment 1.
- 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 three 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%)
Auxiliary Pond Closure	\$18.1 M	\$25.9 M	\$33.6 M
Concrete Process Tanks and Dewatering Facility	\$44.0 M	\$62.9 M	\$81.8 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, process flow diagrams (PFD) 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.

This cost estimate, along with any resulting conclusions on project financial or economic feasibility or funding requirements, is prepared for guidance in project evaluation and implementation from



NO.	DATE	DESCRIPTION	BY	APP'D

CH2MHILL
E.W. BROWN
CONCEPTUAL CLOSURE PLAN
AUXILIARY POND

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

DATE: JULY 2015
PROJECT: 488248
DRAWING: EXHIBIT 2-1
SHEET: 8 of

FILENAME: 005-C-200A_488248.dgn
PLOT DATE: 7/24/2015
PLOT TIME: 10:11:48 AM

ITEM	UNITS	AUXILIARY POND
TOTAL SURFACE AREA	ACRES	33.2
LENGTH OF PERIMETER	LINEAR FEET	5,460
CUT	CUBIC YARDS	11,500
FILL TO FINAL GRADE	CUBIC YARDS	1,137,600
COVER FILL TO FINAL GRADE	CUBIC YARDS	107,600
EXCESS MATERIAL	CUBIC YARDS	24,700
TOTAL AIRSPACE AVAILABLE	CUBIC YARDS	-



**PRELIMINARY ENGINEERING
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CH2MHILL
E.W. BROWN
CONCEPTUAL CLOSURE SECTIONS
AUXILIARY POND

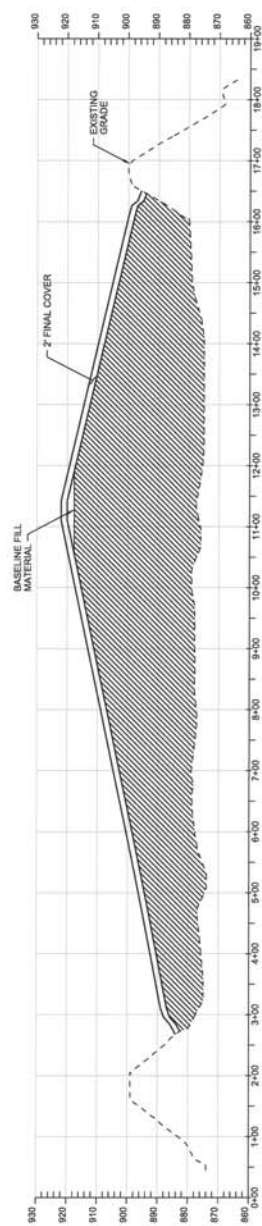
COAL COMBUSTION RESIDUAL EVALUATION
LOUISVILLE GAS AND ELECTRIC COMPANY
LOUISVILLE, KENTUCKY

REVISION

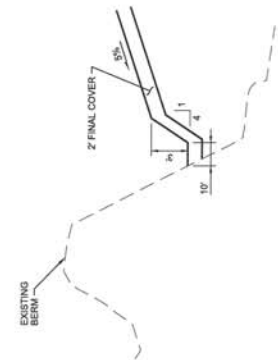
NO.	DATE	DSGN	CHK	APP'D

VERIFY SCALE
DATE: JULY 2015
PROJ: 488248
DWG: EXHIBIT 2-2
SHEET: 9 of 10

FILENAME: 005-C-2006_488248.dgn
PLOT DATE: 7/24/2015
PLOT TIME: 10:08:51 AM



A SECTION
SCALE: 1" = 100' HORIZ
1" = 20' VERT
2:1



B SECTION
NTS



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