



October 2016

Kincaid Generation, L.L.C.  
199 Illinois 104  
Kincaid, IL 62540

**RE: History of Construction  
USEPA Final CCR Rule, 40 CFR § 257.73(c)  
Kincaid Power Station  
Kincaid, Illinois**

On behalf of Kincaid Generation, L.L.C., AECOM has prepared the following history of construction for the Ash Pond at the Kincaid Power Station in accordance with 40 CFR § 257.73(c).

#### **BACKGROUND**

40 CFR § 257.73(c)(1) requires the owner or operator of an existing coal combustion residual (CCR) surface impoundment that either (1) has a height of five feet or more and a storage volume of 20 acre-feet or more, or (2) has a height of 20 feet or more to compile a history of construction by October 17, 2016 that contains, to the extent feasible, the information specified in 40 CFR § 257.73(c)(1)(i)–(xii).

The history of construction presented herein was compiled based on existing documentation, to the extent that it is reasonably and readily available (see 80 Fed. Reg. 21302, 21380 [April 17, 2015]) and AECOM's site experience. AECOM's document review included construction drawings, geotechnical investigations, operation and maintenance information, etc. for the Ash Pond at the Kincaid Power Station.

## HISTORY OF CONSTRUCTION

**§ 257.73(c)(1)(i): The name and address of the person(s) owning or operating the CCR unit; the name associated with the CCR unit; and the identification number of the CCR unit if one has been assigned by the state.**

Owner: Kincaid Generation, L.L.C.

Address: 1500 Eastport Plaza Drive  
Collinsville, IL 62234

CCR Unit: Ash Pond

The Ash Pond does not have a state assigned identification number.

**§ 257.73(c)(1)(ii): The location of the CCR unit identified on the most recent USGS 7<sup>1</sup>/<sub>2</sub> or 15 minute topographic quadrangle map or a topographic map of equivalent scale if a USGS map is not available.**

The location of the Ash Pond has been identified on an USGS 7-1/2 minute topographic quadrangle map in **Appendix A**.

**§ 257.73(c)(1)(iii): A statement of the purpose for which the CCR unit is being used.**

The Ash Pond is being used to store and dispose of sluiced bottom ash and to clarify other non-CCR waste streams to be used as recycled water for plant operations. Newly placed ash is recovered by a third party and recycled for beneficial use.

**§ 257.73(c)(1)(iv): The name and size in acres of the watershed where the CCR unit is located.**

Most of the Kincaid Power Plant property including the entire Kincaid Ash Pond is located in the northeastern portion of the Sangchris Lake Watershed with a 12-digit Hydrologic Unit Code (HUC) of 071300070402 and a drainage area of 23,382 acres (USGS, 2016). The remaining portion of the Kincaid Power Station property is located in the northwestern portion of the Town of Tovey Watershed and a 12-digit Hydrologic Unit Code (HUC) of 071300070401 with a drainage area of 23,341 acres (USGS, 2016).

**§ 257.73(c)(1)(v): A description of the physical and engineering properties of the foundation and abutment materials on which the CCR unit is constructed.**

The foundation materials consist of foundation clay overlying glacial till. The physical properties of the foundation clay for the Ash Pond are described as native fine grained soils of alluvial origin with occasional layers of coarse-grained soil. The fine-grained soils (clays) are generally classified as low to medium plasticity silty clay, sandy clay, clay with sand, or clay (CL) with trace amounts of sand or gravel; or high plasticity clay (CH). The CL and CH soils are soft to very stiff, very moist to very wet, and brown to gray with some occurrence of reddish brown silt seams. The coarse-grained soil is classified as clayey sand (SC), with a

trace amount of gravel, very loose, very wet, and brown to gray. The fines portion of the clayey sand is low plastic. The foundation clay is underlain by glacial till that is predominantly classified as sandy clay (CL) with some occurrences of clayey sand (SC) or silty sand (SM), usually with a trace amount of fine gravel, generally hard, low to medium plasticity, slightly moist to very wet, and brown to gray. An available summary of the engineering properties of the foundation materials is presented in **Table 1** below.

**Table 1. Summary of Foundation Material Engineering Properties**

Material	Unit Weight (pcf)	Peak Drained Shear Strength		Peak Undrained Shear Strength	Post-Earthquake Shear Strength
		Cohesion, $c'$ (psf)	Friction Angle, $f'$ (deg)	$S_u/p'$	$S_{ur}/p'$
Foundation Clay (Under Embankment)	125	0	32 <i>with curved envelope for <math>s'_{ff} &lt; 2160</math> psf</i>	$S_u/p' = 0.48$ , Minimum $S_u = 800$ psf	$S_{ur}/p' = 0.30$ , Minimum $S_u = 400$ psf
Foundation Clay (Free Field)	125	0	30	$S_u/p' = 0.30$ , Minimum $S_u = 400$ psf	$S_{ur}/p' = 0.30$ , Minimum $S_u = 400$ psf
Till	135	0	40	$S_u/p' = 0.64$ , Minimum $S_u = 800$ psf	$S_{ur}/p' = 0.64$ , Minimum $S_u = 800$ psf

The Ash Pond is an enclosed impoundment with embankments and does not have abutments.

**§ 257.73(c)(1)(vi): A statement of the type, size, range, and physical and engineering properties of the materials used in constructing each zone or stage of the CCR unit; the method of site preparation and construction of each zone of the CCR unit; and the approximate dates of construction of each successive stage of construction of the CCR unit.**

The physical properties of the materials used for embankment construction of the Ash Pond are described as low to medium plasticity sandy clay or clay with sand (CL), or high plasticity clay (CH). The CL and CH soils have occasional occurrences of trace levels of fine gravel, are medium stiff to very stiff with occasional soft zones, moist to very moist, and brown to gray. The embankment fill generally appears to be well-compacted. An available summary of the engineering properties of the embankment materials is presented in **Table 2** below.

**Table 2. Summary of Construction Material Engineering Properties**

Material	Unit Weight (pcf)	Peak Drained Shear Strength		Peak Undrained Shear Strength	Post-Earthquake Shear Strength
		Cohesion, $c'$ (psf)	Friction Angle, $f'$ (deg)	$S_u/p'$	$S_{ur}/p'$
Embankment Fill	135	0	40 <i>with curved envelope for <math>s'_{ff} &lt; 1440</math> psf</i>	$S_u/p' = 0.68$ , Minimum $S_u = 575$ psf	$S_{ur}/p' = 0.68$ , Minimum $S_u = 575$ psf

The method of site preparation and construction for the Ash Pond is not reasonably and readily available.

The approximate dates of construction of each successive stage of construction of the Ash Pond are provided in **Table 3** below.

**Table 3. Approximate dates of construction of each successive stage of construction.**

Date	Event
1964-1965	Construction of Ash Pond
1967	Ash Pond was put into service
1978-1980	Installation of Ash Pond recycle water intake structures and associated piping
Mid-1980's	Erosion repair along north embankment adjacent to Sangchris Lake
2006	Replacement of emergency outlet piping
2009-2010	Tree removal, grading, and vegetation re-established along the north and east embankment
2010	Riprap placement along the northwest Ash Pond embankment adjacent to Sangchris Lake

**§ 257.73(c)(1)(vii): At a scale that details engineering structures and appurtenances relevant to the design, construction, operation, and maintenance of the CCR unit, detailed dimensional drawings of the CCR unit, including a plan view and cross sections of the length and width of the CCR unit, showing all zones, foundation improvements, drainage provisions, spillways, diversion ditches, outlets, instrument locations, and slope protection, in addition to the normal operating pool surface elevation and the maximum pool surface elevation following peak discharge from the inflow design flood, the expected maximum depth of CCR within the CCR surface impoundment, and any identifiable natural or manmade features that could adversely affect operation of the CCR unit due to malfunction or mis-operation.**

Drawings that contain items pertaining to the requested information for the Ash Pond are listed in **Table 4** below. Items marked as "Not Available" are items not found during a review of the reasonably and readily available record documentation.

**Table 4. List of drawings containing items pertaining to the information requested in § 257.73(c)(1)(vii).**

	Ash Pond
Dimensional plan view (all zones)	B-32
Dimensional cross sections	B-32
Foundation Improvements	Not Applicable
Drainage Provisions	Not Applicable
Spillways and Outlets	869D4-C12A, 869D4-C36 to C37, 869D-M69
Diversion Ditches	Not Applicable
Instrument Locations	Figure 2A
Slope Protection	B-32
Normal Operating Pool Elevation	Not Available
Maximum Pool Elevation	Not Available
Approximate Maximum Depth of CCR in 2016	30 feet

All drawings referenced in **Table 4** above can be found in **Appendix B** and **Appendix C**.

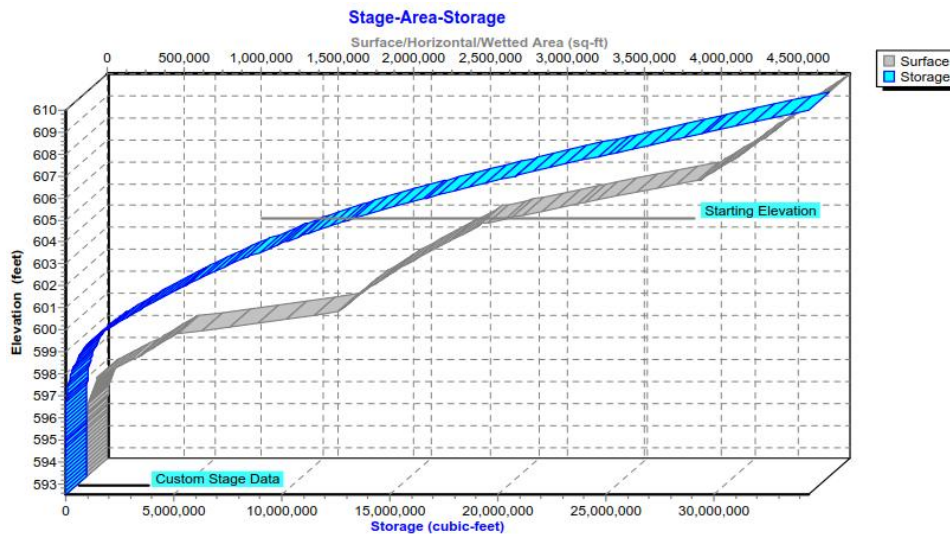
Based on the review of the drawings listed above, no natural or manmade features that could adversely affect operation of the CCR unit due to malfunction or mis-operation were identified.

**§ 257.73(c)(1)(viii): A description of the type, purpose, and location of existing instrumentation.**

Existing instrumentation within the Ash Pond consists of vibrating-wire and open standpipe piezometers and a water level gauge. The purpose of the piezometers is to measure the pore water pressures within the embankment. The purpose of the water level gauge is to measure the water surface level within the Ash Pond. Twelve (12) vibrating-wire and open-standpipe piezometers were installed in 2015 and the locations are presented on Figure 2A in **Appendix C**. Three (3) piezometers were installed in 2016 and the locations are presented on Figure 2A in **Appendix C**. The water level gauge is located adjacent to the emergency outlet structure in the southeast corner of the Ash Pond. A location map of the water level gauge is not reasonably and readily available.

**§ 257.73(c)(1)(ix): Area-capacity curves for the CCR unit.**

The area-capacity curve for the Ash Pond is presented in **Figure 1** below. “Area-capacity curves”, as defined by 40 CFR § 257.53, “means graphic curves which readily show the reservoir water surface area, in acres, at different elevations from the bottom of the reservoir to the maximum water surface, and the capacity or volume, in acre-feet, of the water contained in the reservoir at various elevations.”



**Figure 1. Area-capacity curve for Ash Pond**

The area-capacity curve shown was taken from the pond modeling analysis. Actual pond capacity is limited to the approximate berm elevation listed in **Table 5** below. Any information above berm elevation should be disregarded.

**§ 257.73(c)(1)(x): A description of each spillway and diversion design features and capacities and calculations used in their determination.**

A recycle water intake structure (screen house) is located in the southeast corner of the Ash Pond. Impounded water from the Ash Pond is screened through the intake structure and fed into a gated 60-inch diameter (dia.) pipe (Invert El. 592.3 feet.) where it flows to the recycle pump house. Design drawings indicate that the 60-inch dia. pipe is reinforced concrete pipe (RCP). The Ash Pond also contains an emergency outlet structure in the southeast corner of the pond. The emergency outlet structure consists of a sluice gate (Invert El. 597.5 feet.) and concrete overflow weir (Invert El. 604.3 feet.), with an ungated 48-inch dia. corrugated metal pipe (CMP) outlet. Unless otherwise noted, all elevations in this report are based on the NAVD88 datum.

In 2016, the discharge capacity of the Ash Pond was evaluated using HydroCAD 10 software modeling a 1,000-year, 24-hour rainfall event. The model results indicate that the Ash Pond has enough storage capacity above the existing placed CCR, and will not overtop the embankment during the 1,000-year, 24-hour storm event. The results of the HydroCAD 10 analysis are presented below in **Table 5**.

**Table 5. Results of HydroCAD 10 analysis**

	Ash Pond
Approximate Minimum Berm Elevation <sup>1</sup> (ft)	605.2
Approximate Emergency Spillway Elevation <sup>1</sup> (ft)	Not Applicable
Starting Pool Elevation <sup>1</sup> (ft)	603.3
Peak Elevation <sup>1</sup> (ft)	605.1
Time to Peak (hr)	21.9
Surface Area (ac)	75.5
Storage <sup>2</sup> (ac-ft)	110.7

**§ 257.73(c)(1)(xi): The construction specifications and provisions for surveillance, maintenance, and repair of the CCR unit.**

Drawings for the Ash Pond refer to construction specification *Job Specification G-1943*, but that specification is not reasonably and readily available.

The operations and maintenance plans for the Ash Pond are currently being prepared by Kincaid Generation, L.L.C.

**§ 257.73(c)(1)(xii): Any record or knowledge of structural instability of the CCR unit.**

In 2013, minor subsidence of the embankment crest was observed along portions of the southwestern Ash Pond embankment. The subsidence was believed to have been caused by historical underground mining operations below the Ash Pond from the 1950s to the 1990s. Gravel and soil fill was placed in the settlement areas to restore the embankment crest elevation. The embankment is observed during the weekly inspections and no further evidence of subsidence has occurred since 2013. Information regarding the subsidence is presented in **Appendix D**.

There is no record or knowledge of any other structural instability of the Ash Pond at Kincaid Power Station.

## LIMITATIONS

The signature of AECOM's authorized representative on this document represents that to the best of AECOM's knowledge, information and belief in the exercise of its professional judgment, it is AECOM's professional opinion that the aforementioned information is accurate as of the date of such signature. Any recommendation, opinion or decisions by AECOM are made on the basis of AECOM's experience, qualifications and professional judgment and are not to be construed as warranties or guaranties. In addition, opinions relating to environmental, geologic, and geotechnical conditions or other estimates are based on available data and that actual conditions may vary from those encountered at the times and locations where data are obtained, despite the use of due care.

Sincerely,



Claudia Prado  
Project Manager



Victor Modeer, P.E., D.GE  
Senior Project Manager



## REFERENCES

United States Environmental Protection Agency (USEPA). (2015). *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule*. 40 CFR Parts 257 and 261, 80 Fed. Reg. 21302, 21380 April 17, 2015.

United States Geological Survey (USGS). (2016). The National Map Viewer. <http://viewer.nationalmap.gov/viewer/>. USGS data first accessed in March of 2016.

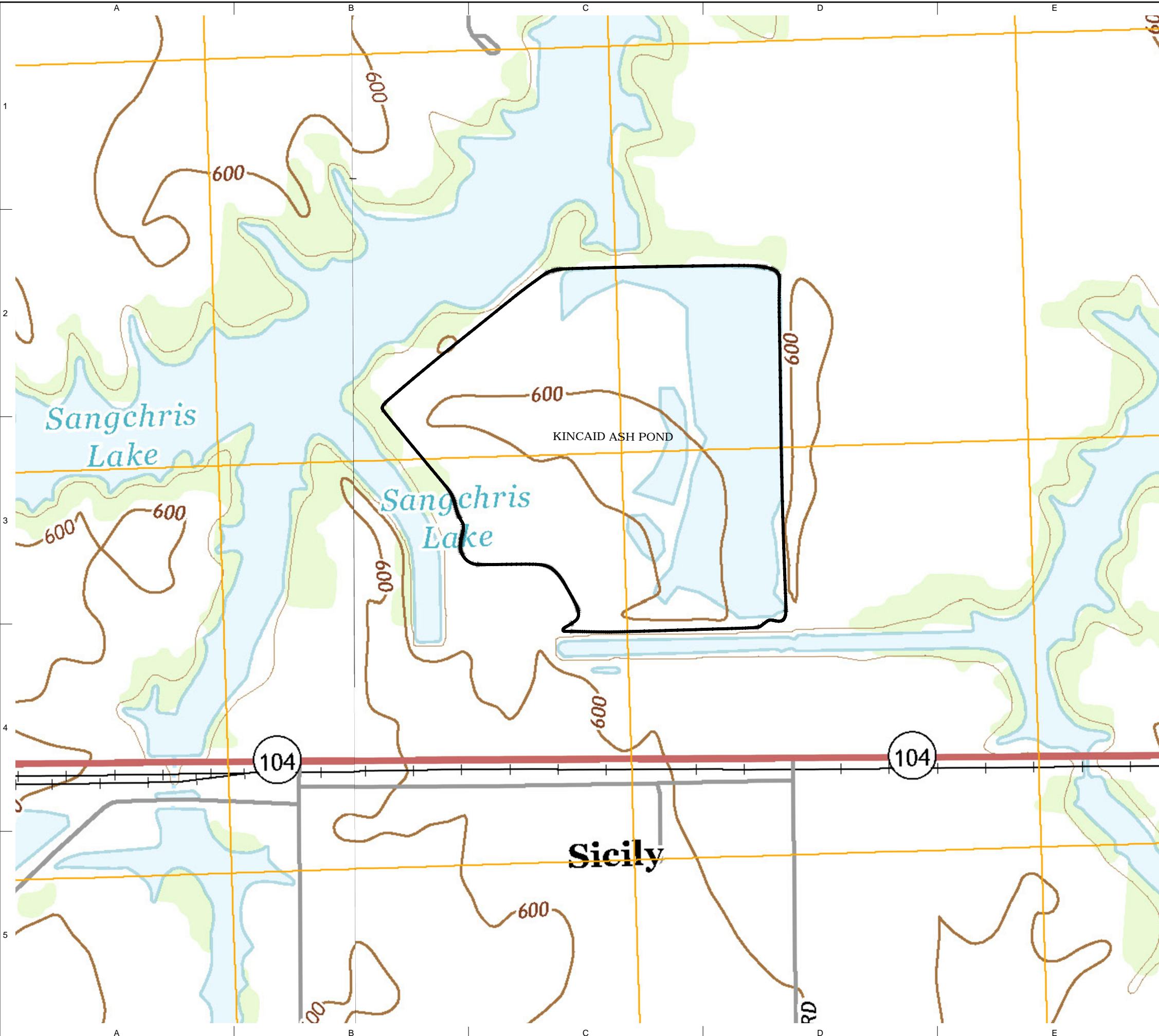
## APPENDICES

- Appendix A: History of Construction Vicinity Map
- Appendix B: Kincaid Power Station Drawings
- Appendix C: Kincaid Ash Pond Piezometer Locations
- Appendix D: Ash Pond Embankment Settlement (2013)



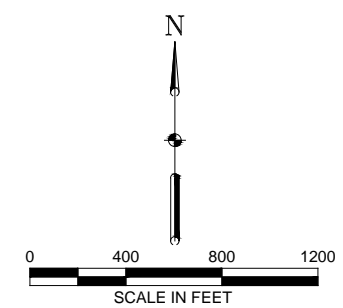
## Appendix A: History of Construction Vicinity Map

AECOM DRAWING PATH: P:\Projects\Geotech\60428794\_Dyney\CCR\13\_Construction\_History\04\_Technical\_Production\5\_Kincaid\Reference\_Documents\Vicinity\_Location\_Map\_References\Figures\C-01\_History\_of\_Construction\_Vicinity\_Map\_(Kincaid)\_MUN.dwg



**LEGEND**  
 CCR UNITS

SOURCE:  
 MAP PROVIDED FROM ELECTRONIC  
 USGS DIGITAL RASTER GRAPHIC 7.5  
 MINUTE TOPOGRAPHIC MAP OF KINCAID  
 ILLINOIS AND PAWNEE ILLINOIS,  
 REVISED 2015.



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 314-429-0462 (fax)

**KINCAID  
 GENERATION, L.L.C.**  
 199 Illinois 104  
 Kincaid, IL 62540

**HISTORY OF  
 CONSTRUCTION**  
 KINCAID  
 POWER STATION  
 KINCAID, ILLINOIS

ISSUED FOR BIDDING \_\_\_\_\_ DATE BY \_\_\_\_\_

ISSUED FOR CONSTRUCTION \_\_\_\_\_ DATE BY \_\_\_\_\_

REVISIONS		
NO.	DESCRIPTION	DATE
△		
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AECOM PROJECT NO: 60489731  
 DRAWN BY: DJD  
 DESIGNED BY: DJD  
 CHECKED BY: MN  
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 PLOT DATE:  
 SCALE: 1" = 400'  
 ACAD VER: 2014

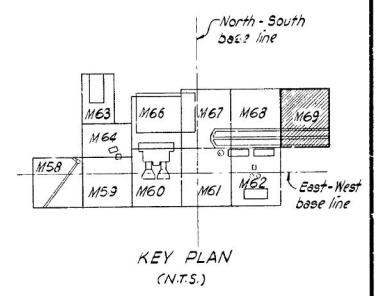
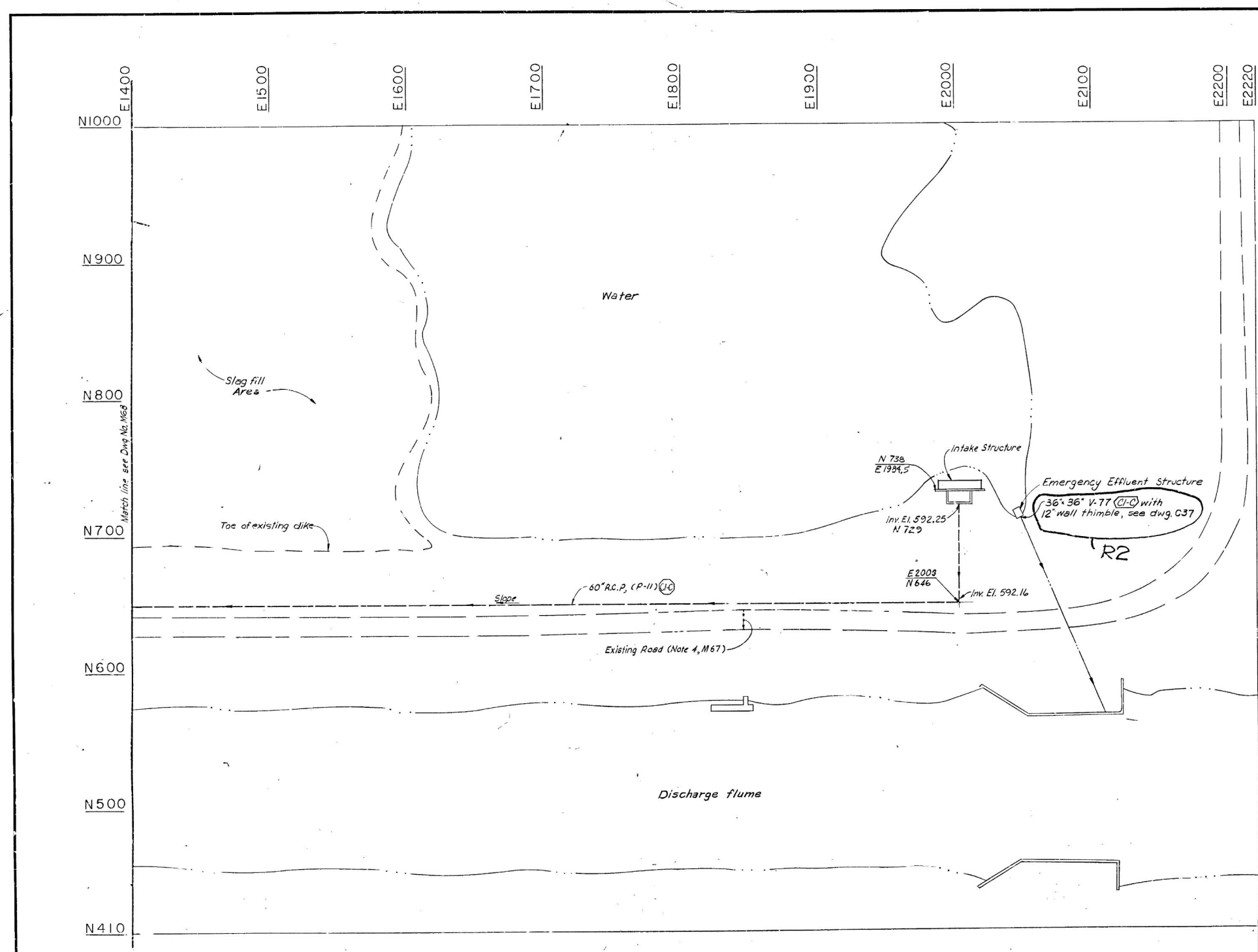
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**HISTORY OF  
 CONSTRUCTION  
 VICINITY MAP**

**01**



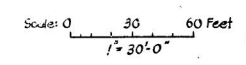
#### **Appendix B: Kincaid Power Station Drawings**

1. "Outside Piping Sheet II", Drawing No. 869D4-M69, Revision R2, 10 August, 1978, Harza Engineering Company.
2. "Ash Pond Dike Piping Prevention", Drawing No. 869D4-C12A, Revision R1, 29 June, 1978, Harza Engineering Company.
3. "Ash Sluice Water Intake Structures", Drawing No. 869D4-C36, Revision R2, 25 September, 1980, Harza Engineering Company.
4. "Ash Sluice Water Stilling Well and Emergency Effluent Sump Structures", Drawing No. 869D4-C37, Revision R4, 8 May, 1979, Harza Engineering Company.
5. "Intake & Discharge Flumes, Plans & Sections", Drawing No. B-32, Revision P, 2 December, 1965, Harza Engineering Company.



REFERENCE DRAWINGS  
Civil: C36, C37, R2

NOTES:  
1. Work this dwg. with dwg. M68 & A.67.  
2. For general notes & symbols see M3.



DSGN.	BL/CHK	REVIEWED
CHKD.	SS	CIVIL
DWN.	OGR	MECH.
CHKD.	SS	ELECT.
SUBM.	JP	

REV. NO.	DATE	NATURE OF REVISION	BY	CHKD.	APPD.
R2	8-10-78	Miscellaneous revisions	VM	MD	JP
R2	1-12-78	Contract 869D4-C1	JH	MD	JP
R1	1-12-78	Issued for construction contract 869D4-CE	JH	MD	JP
R1		Issued for construction contract 869D4-C1	JH	MD	JP
R0	12-2-77	Issued for Bid 869D4-C2	JH	MD	JP
R0	11-4-77	Issued for Bid 869D4-C1	JH	MD	JP

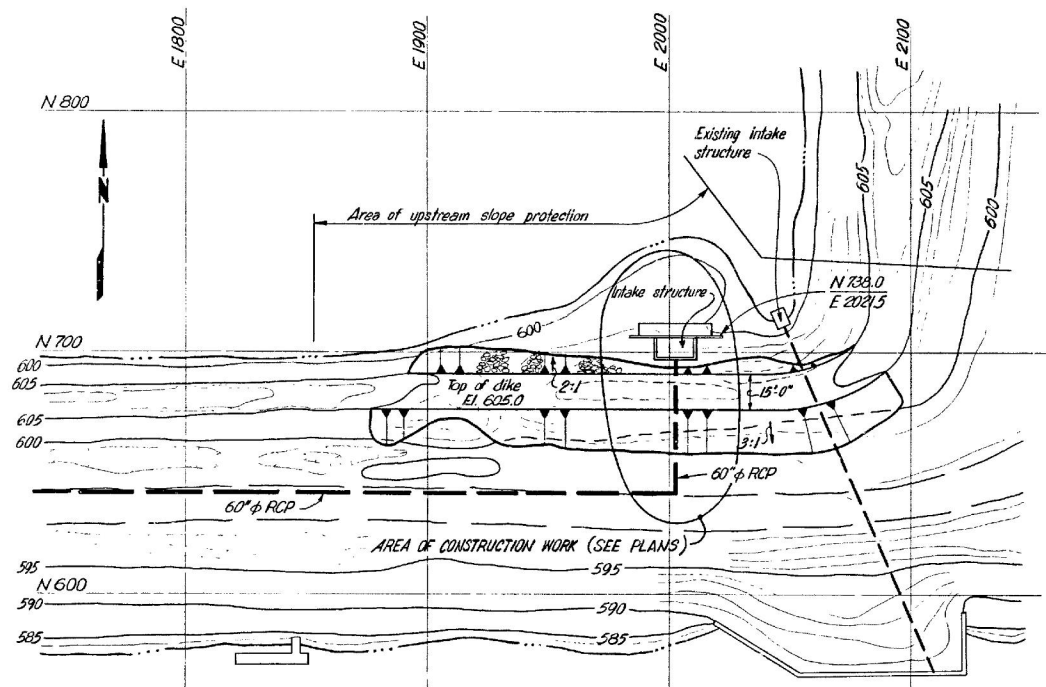
COMMONWEALTH EDISON COMPANY  
CHICAGO, ILLINOIS

KINCAID STATION      WASTEWATER TREATMENT

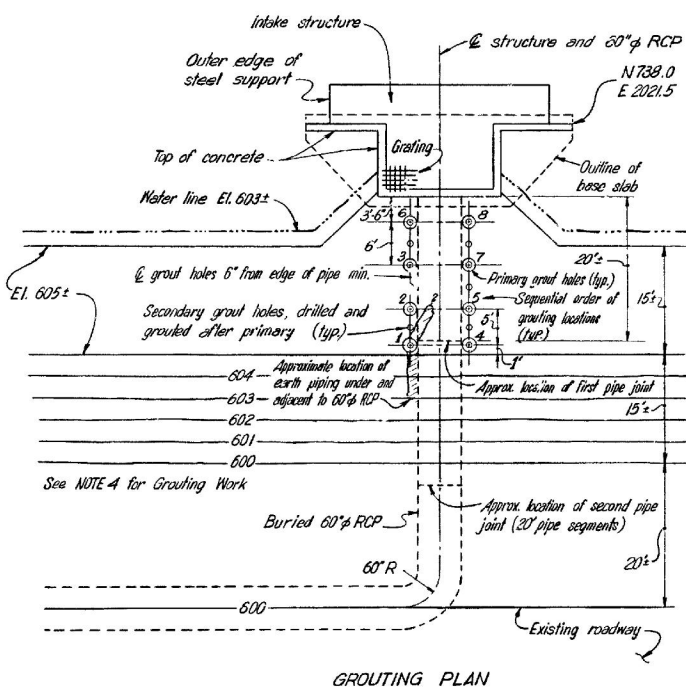
**OUTSIDE PIPING  
SHEET II**

CONSULTING ENGINEERS  
**HARZA ENGINEERING COMPANY**  
APPROVED: [Signature]

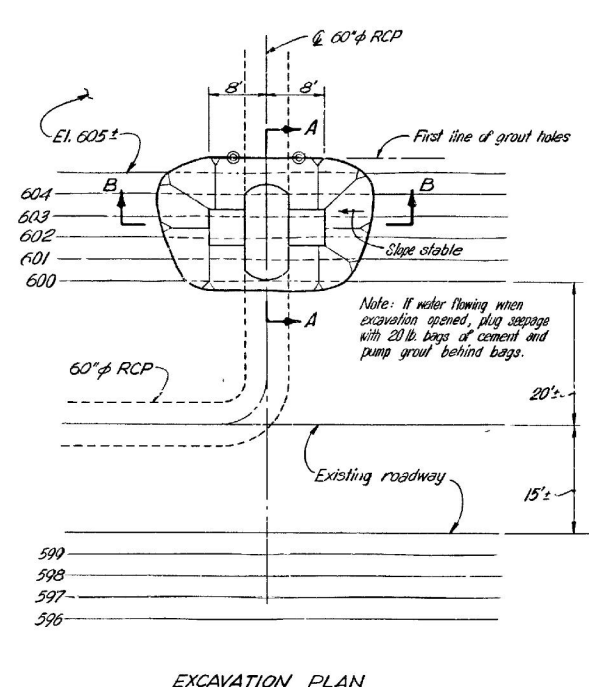
CHICAGO, ILLINOIS      DATE: NOV. 1977      DWG. NO. 869D4-M69



PLAN  
ASH POND DIKE  
Scale 0 30 Feet



GROUTING PLAN



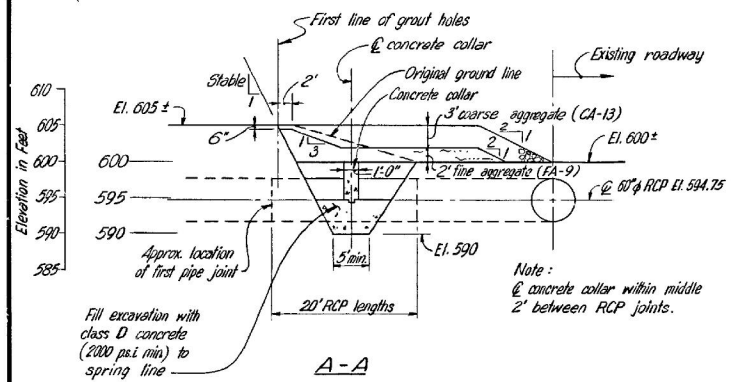
EXCAVATION PLAN

REFERENCE DRAWINGS:  
 No. Title  
 869 D4-C36 Ash Sluice Water Intake Structures  
 869 D4-C12 Settling Ponds and Ash Pond Dike

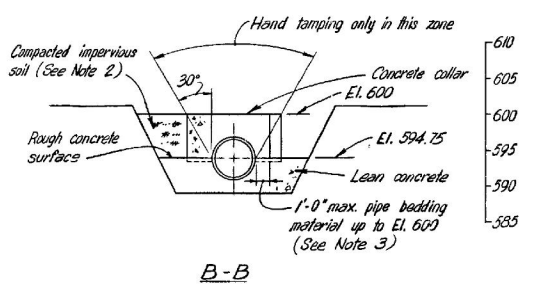
NOTE:  
 1. Contract 869 D4-C1 specifications shall be followed unless noted otherwise on this drawing.  
 2. Impervious soil shall pass the No. 4 sieve, and shall have at least 25 percent passing the No. 200 sieve.  
 3. Pipe bedding material shall consist of fine aggregate (FA-9 State of Illinois).  
 4. Grout shall consist of a sand-cement mixture with possibly pea gravel. The mixture and pressures shall be as determined by the Owner's Representative in the field.



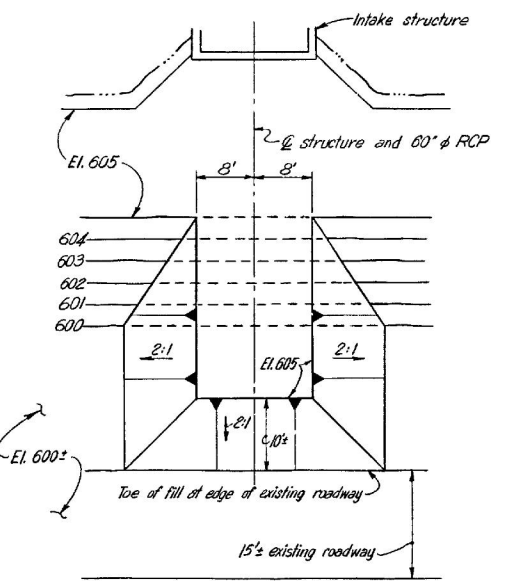
Scale 0 20 Feet  
Except as noted



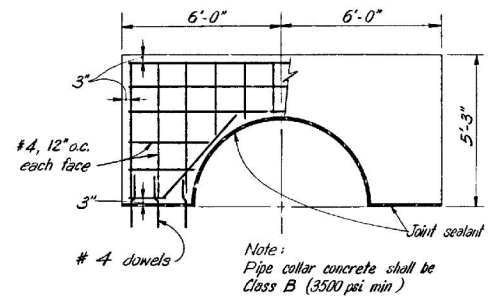
A-A



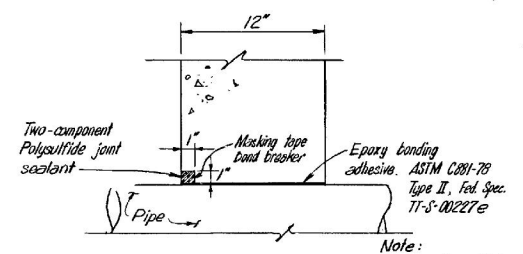
B-B



COMPLETED EARTHWORK PLAN



PIPE COLLAR STEEL REINFORCEMENT  
Scale 0 2 Feet



PIPE COLLAR SEALING DETAIL  
Scale 0 6 inches

DSGN.	AJF	REVIEWED
CHKD.	YCC	CIVIL
DWN.	YCC	MECH.
CHKD.	AJF	ELECT.
SUBM.	YCC	

REV.	NO.	DATE	NATURE OF REVISION	BY	CHKD.	APPD.
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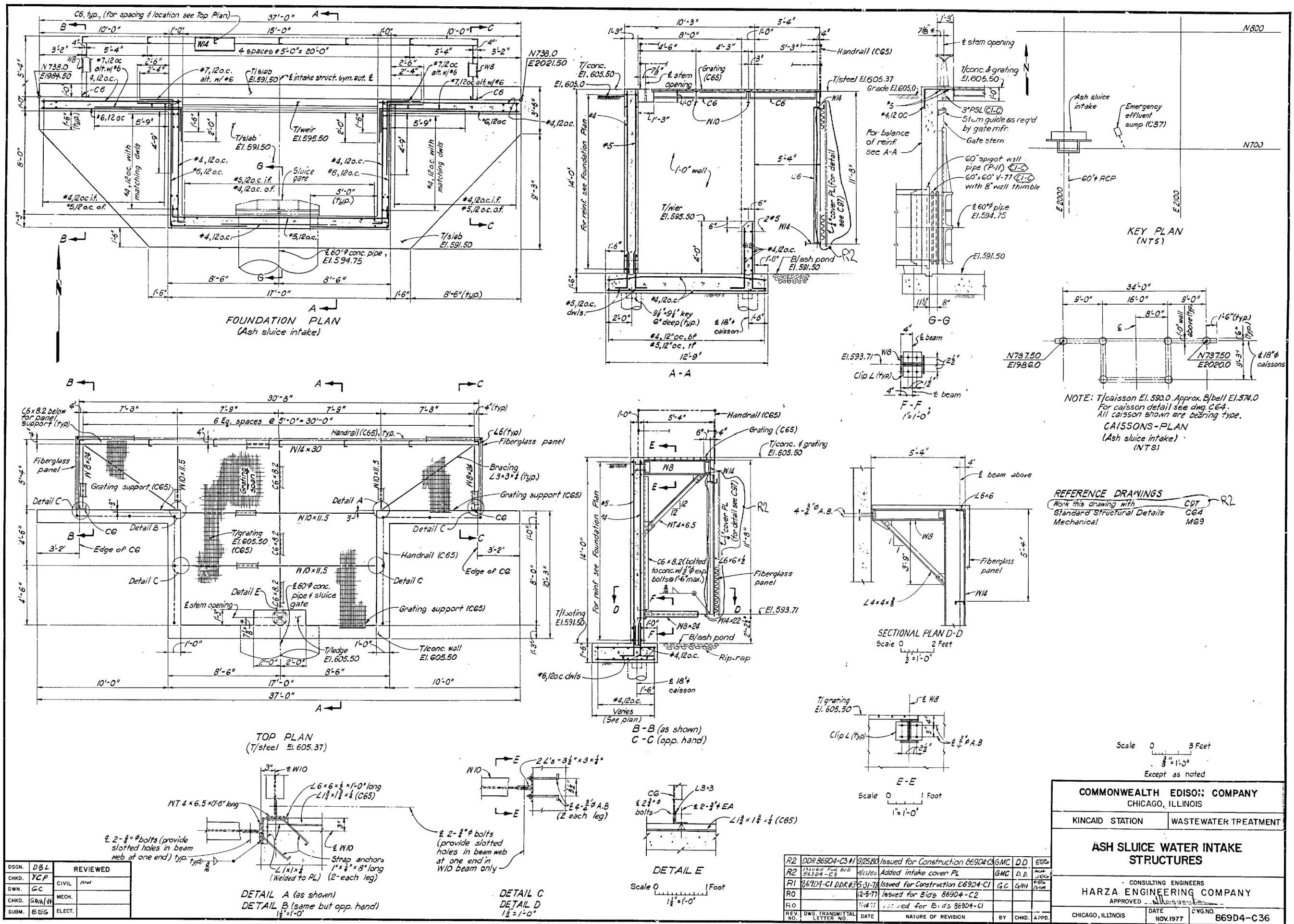
COMMONWEALTH EDISON COMPANY  
CHICAGO, ILLINOIS

KINCAID STATION | WASTEWATER TREATMENT

**ASH POND DIKE  
PIPING PREVENTION**

CONSULTING ENGINEERS  
**HARZA ENGINEERING COMPANY**  
APPROVED: *Frank M. Scott*

CHICAGO, ILLINOIS | DATE: J'ULY, 1979 | PWG. NO. 869 D4-CI2A



DSGN.	DBL	REVIEWED
CHKD.	YCP	CIVIL
DWN.	GC	MECH.
CHKD.	GAA/H	ELECT.
SUBM.	EEG	

REV.	NO.	DATE	NATURE OF REVISION	BY	CHKD.	APPD.
R2	DDR 869D4-C3 #1	9/25/80	Issued for Construction 869D4-C3	GMC	DD	EEG
R2	ISSUED FOR BID 869D4-C3	4/15/80	Added intake cover PL	GMC	D.D.	EEG
R1	869D4-C1 DDR #3	5-31-78	Issued for Construction 869D4-C1	G.C.	G.H.	EEG
RO		12-5-77	Issued for Bids 869D4-C2			
RO		1/4/77	Issued for Bids 869D4-C1			

**COMMONWEALTH EDISON COMPANY**  
CHICAGO, ILLINOIS

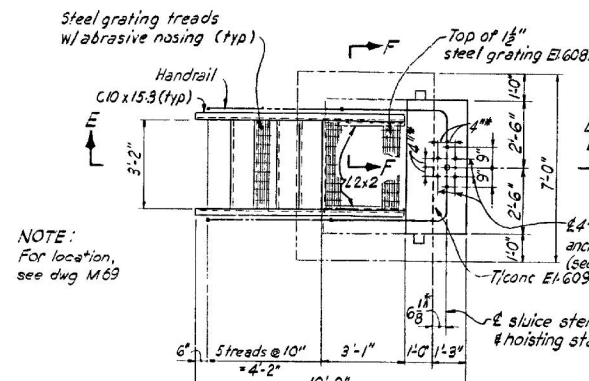
KINCAID STATION WASTEWATER TREATMENT

**ASH SLUICE WATER INTAKE STRUCTURES**

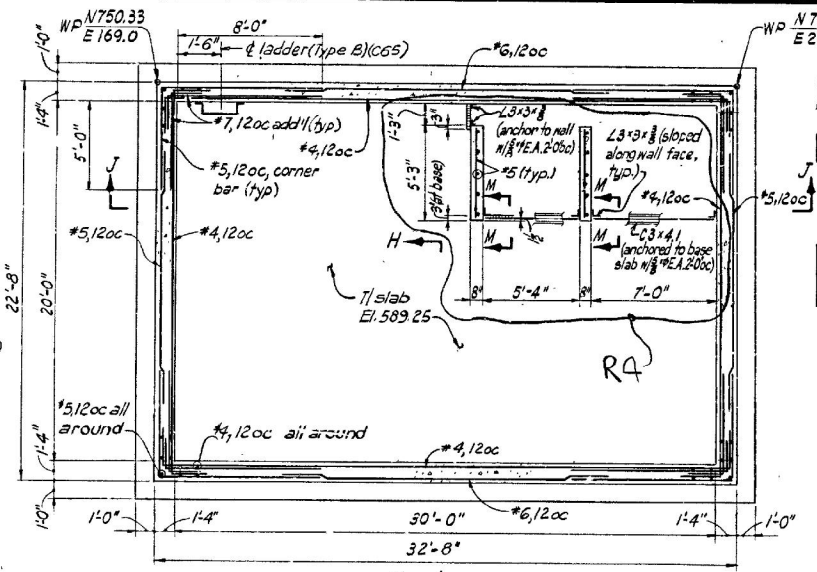
CONSULTING ENGINEERS  
**HARZA ENGINEERING COMPANY**

APPROVED: \_\_\_\_\_

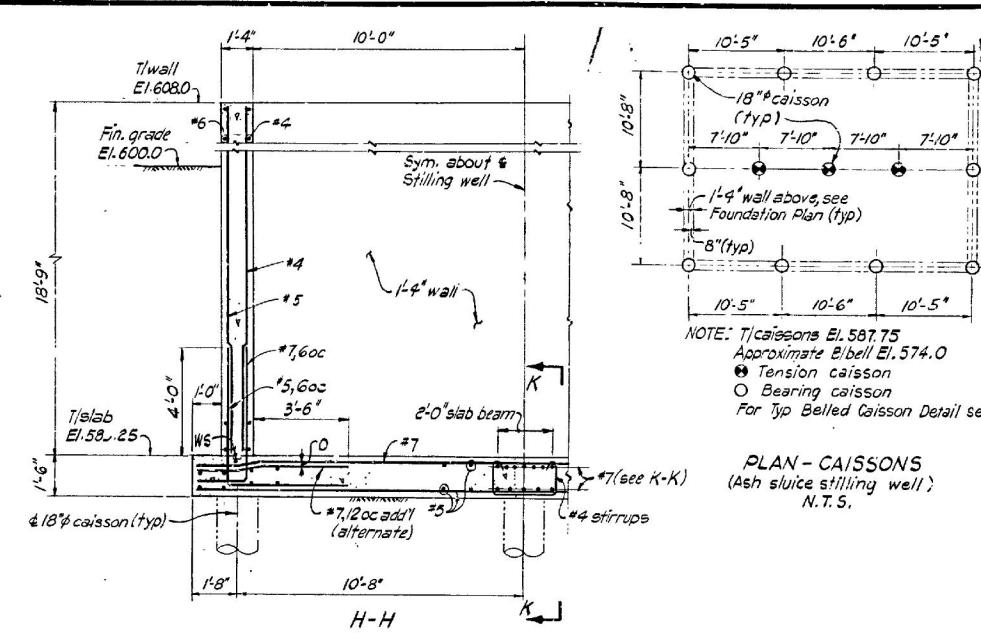
CHICAGO, ILLINOIS DATE NOV. 1977 C'VG. NO. 869D4-C36



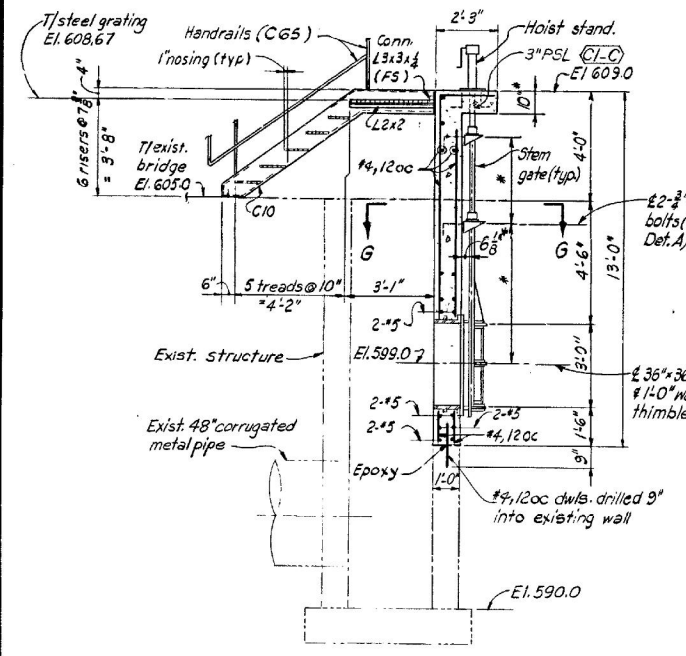
PLAN  
(Emergency effluent sump)



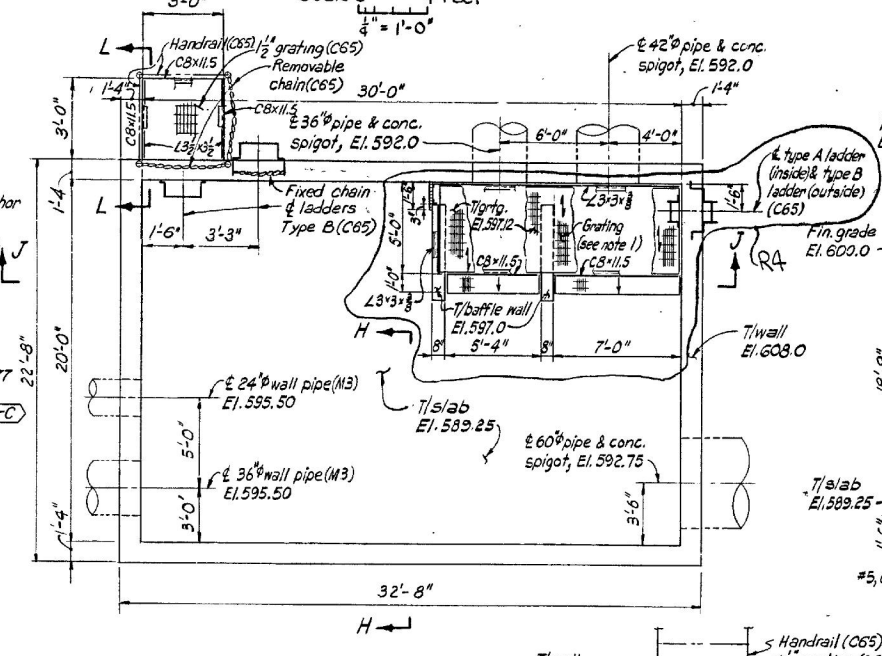
FOUNDATION PLAN  
(Ash sluice stilling well)



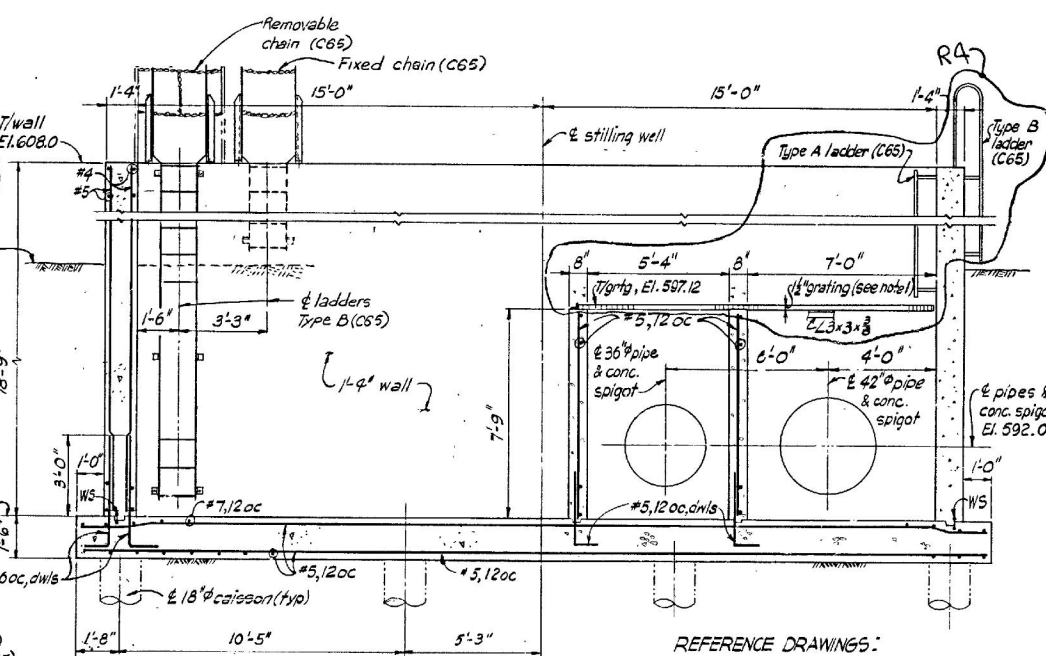
PLAN - CAISSONS  
(Ash sluice stilling well)



E-E



TOP PLAN

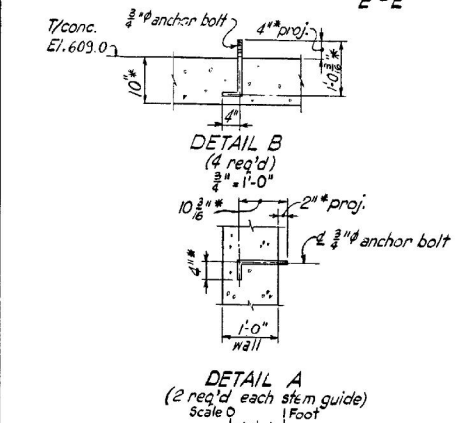


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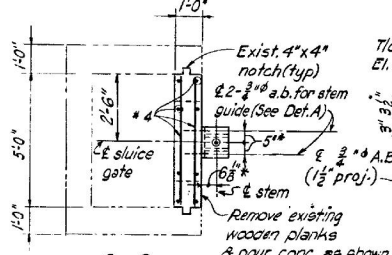
Standard Structural Details C64  
Mechanical M67, M69

Notes:  
1. Grating for baffle wall to be Ryerson open steel, sfd. mesh 19"-4, 1/2" x 3/8" bearing bars 1/2" o.c. & 3/8" cross bars, 4" o.c. or equal. All steel for grating & supports should be galvanized.

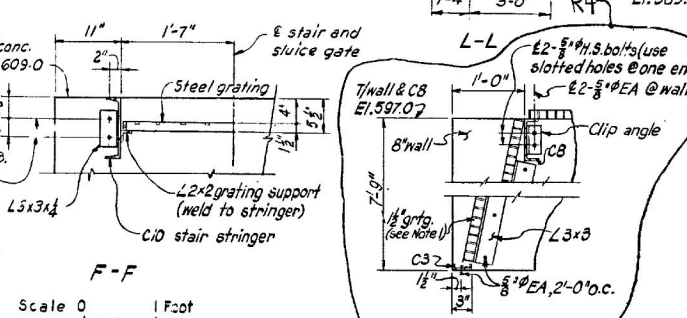
Scale 0 3 6 Feet  
1/8" = 1'-0"  
Except as noted



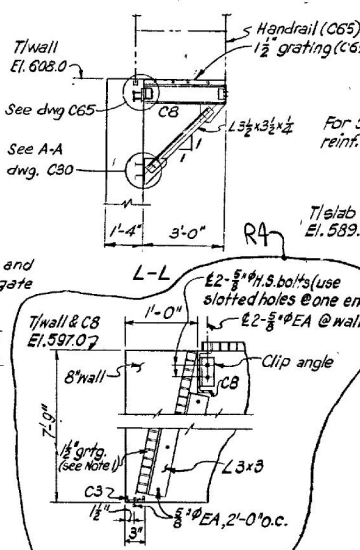
DETAIL A  
(2 req'd each stem guide)



G-G



F-F



M-M

DSGN.	DBL	REVIEWED
CHKD.	YCP	
DWN.	EE	CIVIL
CHKD.	YCP	MECH.
SUBM.	EEG	ELECT.

REV. NO.	DWG. TRANSMITTAL LETTER NO.	DATE	NATURE OF REVISION	BY	CHKD.	APP'D.
RA	DDR 869D4-C1	5-8-70	Add intake screen in stilling well 869D4-C1	GC	GAH	EEG
RB	DDR 869D4-C1	8-2-70	Sluice gate details added 869D4-C1	GC	GAH	EEG
R2	DDR 869D4-C1	11-11-70	Platform & ladder added Emergency effluent sump released 869D4-C1	DL	GAH	EEG
RI	DDR 869D4-C1	1-12-70	Issued for construction 869D4-C2	FG	GAH	EEG
RI		3-23-70	Issued for construction 869D4-C1	FG	GAH	EEG
RI		10-12-71	Issued as Addendum 869D4-C1	EE	YCP	EEG
RO		12-5-71	Issued for Bids 869D4-C2			
RO		11-4-71	Issued for Bids 869D4-C1			

COMMONWEALTH EDISON COMPANY  
CHICAGO, ILLINOIS

KINCAID STATION WASTEWATER TREATMENT

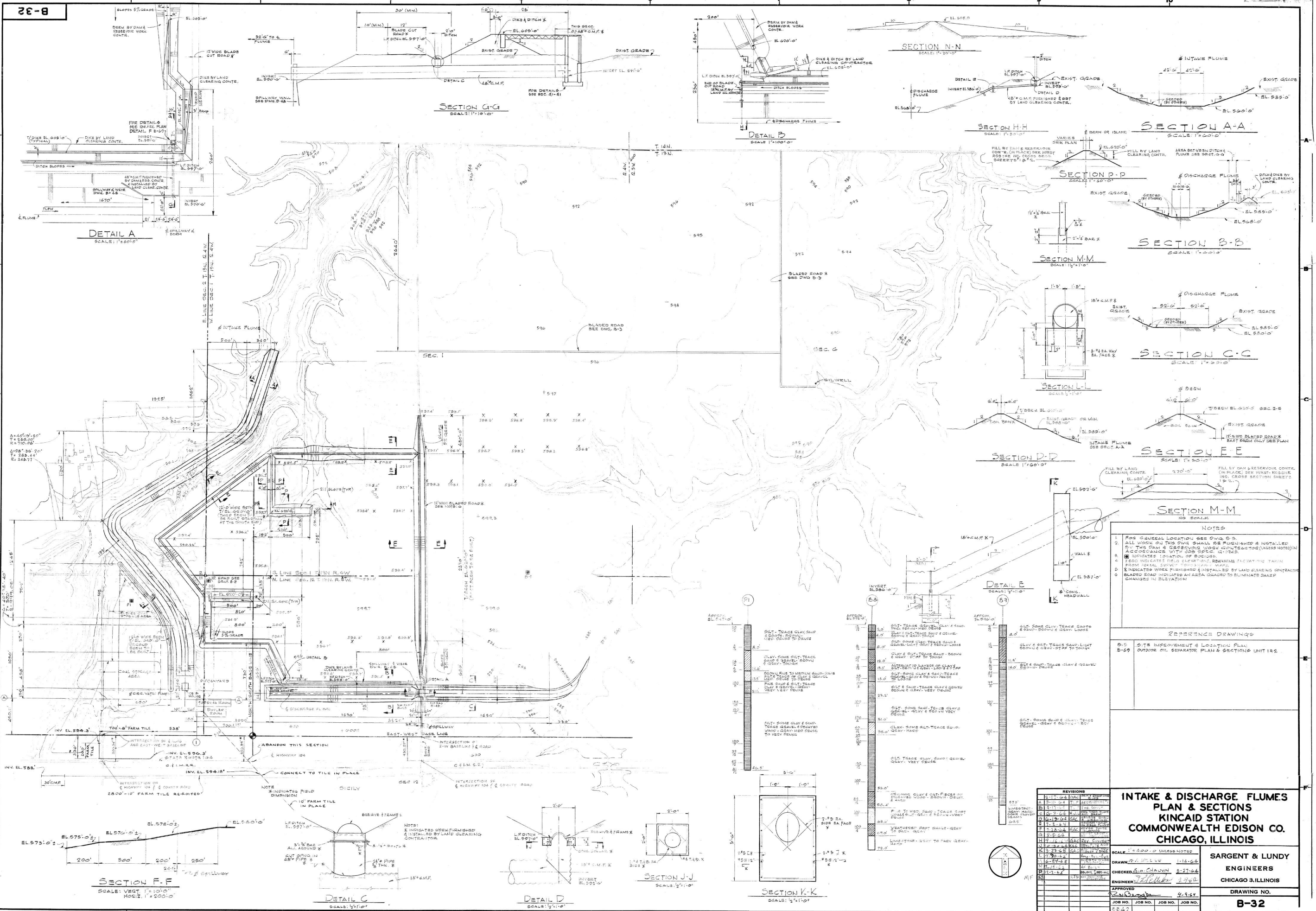
**ASH SLUICE WATER STILLING WELL AND EMERGENCY EFFLUENT SUMP STRUCTURES**

CONSULTING ENGINEERS  
**HARZA ENGINEERING COMPANY**

APPROVED

CHICAGO, ILLINOIS DATE NOV. 1977 L'WG. NO. 869D4-C37





- NOTES**
1. FOR GENERAL LOCATION SEE DWG. B-3.
  2. ALL WORK ON THIS DWG. SHALL BE FURNISHED & INSTALLED BY THE DAM & RESERVOIR WORK CONTRACTOR (UNLESS NOTED) IN ACCORDANCE WITH JOB SPEC. Q-118.
  3. 1"200 INDICATES FIELD ELEVATION. REMAINING ELEVATION TAKEN FROM RECAL SURVEY POINTS SHOWN ON MAP.
  4. X INDICATES WORK FURNISHED & INSTALLED BY LAND CLEARING CONTRACTOR.
  5. BLADED ROAD INDICATES AN AREA GRADED TO ELIMINATE SHARP CHANGES IN ELEVATION.

- REFERENCE DRAWINGS**
- B-3 SITE IMPROVEMENT & LOCATION PLAN
  - B-69 OUTDOOR OIL SEPARATOR PLAN & SECTIONS UNIT 1&2

**INTAKE & DISCHARGE FLUMES PLAN & SECTIONS  
KINCAID STATION  
COMMONWEALTH EDISON CO.  
CHICAGO, ILLINOIS**

REVISIONS	
1	REVISED TO SHOW CHANGES TO SECTION A-A
2	REVISED TO SHOW CHANGES TO SECTION B-B
3	REVISED TO SHOW CHANGES TO SECTION C-C
4	REVISED TO SHOW CHANGES TO SECTION D-D
5	REVISED TO SHOW CHANGES TO SECTION E-E
6	REVISED TO SHOW CHANGES TO SECTION F-F
7	REVISED TO SHOW CHANGES TO SECTION G-G
8	REVISED TO SHOW CHANGES TO SECTION H-H
9	REVISED TO SHOW CHANGES TO SECTION I-I
10	REVISED TO SHOW CHANGES TO SECTION J-J
11	REVISED TO SHOW CHANGES TO SECTION K-K
12	REVISED TO SHOW CHANGES TO SECTION L-L
13	REVISED TO SHOW CHANGES TO SECTION M-M
14	REVISED TO SHOW CHANGES TO SECTION P-P
15	REVISED TO SHOW CHANGES TO SECTION Q-Q
16	REVISED TO SHOW CHANGES TO SECTION R-R
17	REVISED TO SHOW CHANGES TO SECTION S-S
18	REVISED TO SHOW CHANGES TO SECTION T-T
19	REVISED TO SHOW CHANGES TO SECTION U-U
20	REVISED TO SHOW CHANGES TO SECTION V-V
21	REVISED TO SHOW CHANGES TO SECTION W-W
22	REVISED TO SHOW CHANGES TO SECTION X-X
23	REVISED TO SHOW CHANGES TO SECTION Y-Y
24	REVISED TO SHOW CHANGES TO SECTION Z-Z

SCALE: 1"=200'-0" UNLESS NOTED  
 DRAWN BY: J. CHAVIN 3-27-64  
 CHECKED BY: J. CHAVIN 3-27-64  
 ENGINEER: J. CHAVIN 3-27-64  
 APPROVED: J. CHAVIN 4-9-64  
 JOB NO. 2342 JOB NO. 2342 JOB NO. 2342

**SARGENT & LUNDY  
ENGINEERS  
CHICAGO, ILLINOIS**

DRAWING NO. **B-32**





## Appendix C: Kincaid Ash Pond Piezometer Locations

FILE: P:\PROJECTS\GEOTECH\60428794\_DYNEGYCCR\04\TASKS\00\_PROGRAM\_TASKS\1.0\_TASK\_1\_INITIAL\_UNIT\_ASSESSMENT\CCR\_FACT\_SHEETS\SITE\_MAPS\FIGURE\_2A\_PIEZOMETER\_LOCATION\_PLAN (KINCAID ASH POND).DWG Last edited: NOV. 03. 15 @ 11:33 a.m. by: david\_dequire



LEGEND

-  AECOM PIEZOMETER LOCATION
-  APPROXIMATE NRT PIEZOMETER LOCATION

 CCR UNIT BERM ALIGNMENT

0 400

APPROXIMATE SCALE FEET

KINCAID GENERATION, L.L.C. PROJECT NO. 60440697



DRN. BY:djd October 2015  
DSGN. BY:eg  
CHKD. BY:eg

Kincaid Ash Pond  
Piezometer Locations

FIG. NO. 2A

SOURCE:  
MAP PROVIDED BY GOOGLE EARTH PRO 2015



**Appendix D: Ash Pond Embankment Settlement (2013)**

August 2, 2013

Mr. Don Torricelli  
Performance Specialist  
Kincaid Power Station

RE: Ash Pond Embankment Settlement

Dear Mr. Torricelli:

After a call by Kincaid personnel on July 31, 2013 regarding transverse cracking of the crest of a portion of the southwest embankment section of the Kincaid Station Ash Pond, James P. Knutelski, P.E. of Hanson visited the site to observe the cracks. He was accompanied by Don Torricelli of the Kincaid Power Station. The following observations were made:

- The affected area was approximately 250 ft by 250 ft. The area is situated on the southwest side of the ash pond adjacent to the water intake channel for the power station. The location of the affected area is shown on the attached aerial photo and coal mine map.
- Surface features within the affected area include tension cracks, compression heaving, and apparent settlement. There is no survey data showing that settlement has occurred, however the crest of the dam is approximately 2 ft lower in the affected area than the adjacent crest.
- Tension cracks cross the embankment perpendicular to the embankment crest. On the upstream side of the embankment where ash has been filled to the elevation of the crest, the tension cracks change direction slightly.
- Compression heaving of the ground surface was observed along two lines near the center of the affected area and the lines of heaving were separated by about 12 ft. Compression heaving only occurred in the low area of the depression.
- The tension cracks were not visible more than 5 ft down the downstream slope of the embankment due to dense vegetative cover. A noticeable depression in the downstream slope was observed in the affected area.
- Cracks, settlement, or other surface features were not observed between the toe of the embankment and the inlet channel. They either did not exist, or were not visible due to dense vegetative cover.
- There were no wet areas, seepage, or evidence of seepage observed on the downstream slope of the embankment, the toe of the embankment, or the area between the embankment toe and the inlet channel.

The surficial features at the southwest embankment of the ash pond appear to be related to mine subsidence of the Peabody No. 10 coal mine that was active between 1951 and 1994. The following points indicate data or observations to support this conclusion:

- The affected area is undermined according to the available map.
- There are no utilities or other underground structures within the affected area that could be a source of leakage and underground erosion.
- The tension cracking and surface heaving that was observed transverse to the embankment crest are consistent with a sag subsidence above room and pillar mining.

The Peabody No. 10 mine is listed as blind room and pillar mine. Between 40% and 70% of the coal is removed in this type of mining. The Herrin coal seam was mined at depths between 300 ft and 380 ft. The average thickness of the coal seam was between 6.5 ft and 7.5 ft in this mine and the maximum thickness was 13.0 ft. The coal was mined beneath the Anna Shale or a limestone roof. Generally 6 ft to 7 ft of the coal was removed.

In Illinois, the maximum settlement for a sag type subsidence is generally situated near the center of the subsided area and the maximum settlement magnitude is generally between 2 ft and 4 ft. A review of the map of the coal mine for the affected area would allow a more precise estimate of maximum settlement magnitude.

Subsidence events can manifest rapidly in a manner of days, or slowly over several months or years. Prediction of future or continued subsidence is generally not economical or reliable with the technology available today.

In order to protect critical components of the Kincaid Power Station from additional or future subsidence, methods to prevent or minimize subsidence are probably the most feasible and economical.

Since injection of coal combustion byproduct (CCB) materials into the abandoned mine around the power station is currently part of the plant operation, it is recommended that CCB injection into areas beneath critical components of the power plant be given priority. Filling these areas would most likely result in greatly reduced, or eliminate future surface subsidence. Filling undermined areas that have already experienced subsidence may reduce or prevent additional subsidence.

Repair of the embankment does not appear to be necessary at this time because: there is no observed seepage or evidence of seepage in the embankment in this area, the depression in the embankment crest does detrimentally affect the freeboard of the impoundment, and the water detention within the impoundment is hundreds of feet from the affected embankment

This area should be observed daily for a week following the date of subsidence event and weekly thereafter for a period of 2 months. Noticeable additional cracking or settlement, seepage through the embankment, or wet areas near the toe of then embankment should be reported to Hanson immediately.

The portion of the coal mine that extends under Sangchris Lake was likely mined around the same time period as the two recently subsided areas near the power station. A similar event occurring under the lake has the potential to flood the mine. A significant loss of lake water into

the mine is unlikely; however, considering the consequences, it is prudent to be observant of unusual conditions on the lake. Non-typical surface disturbances such as bubbling, swirls, or whirlpools could be evidence of drainage into the abandoned mine. Hanson should be contacted if any of these occurrences are observed.

Please contact me at (217) 747-9380 if you have any questions concerning this letter or if you require additional information.

Sincerely,

HANSON PROFESSIONAL SERVICES INC.



James P. Knutelski, PE, GE  
Geotechnical Engineer

#### References

Coal Mines in Illinois, Kincaid Quadrangle retrieved July 31, 2013 from  
<http://www.isgs.illinois.edu/maps-data-pub/coal-maps/topo-mines/kincaid.pdf>

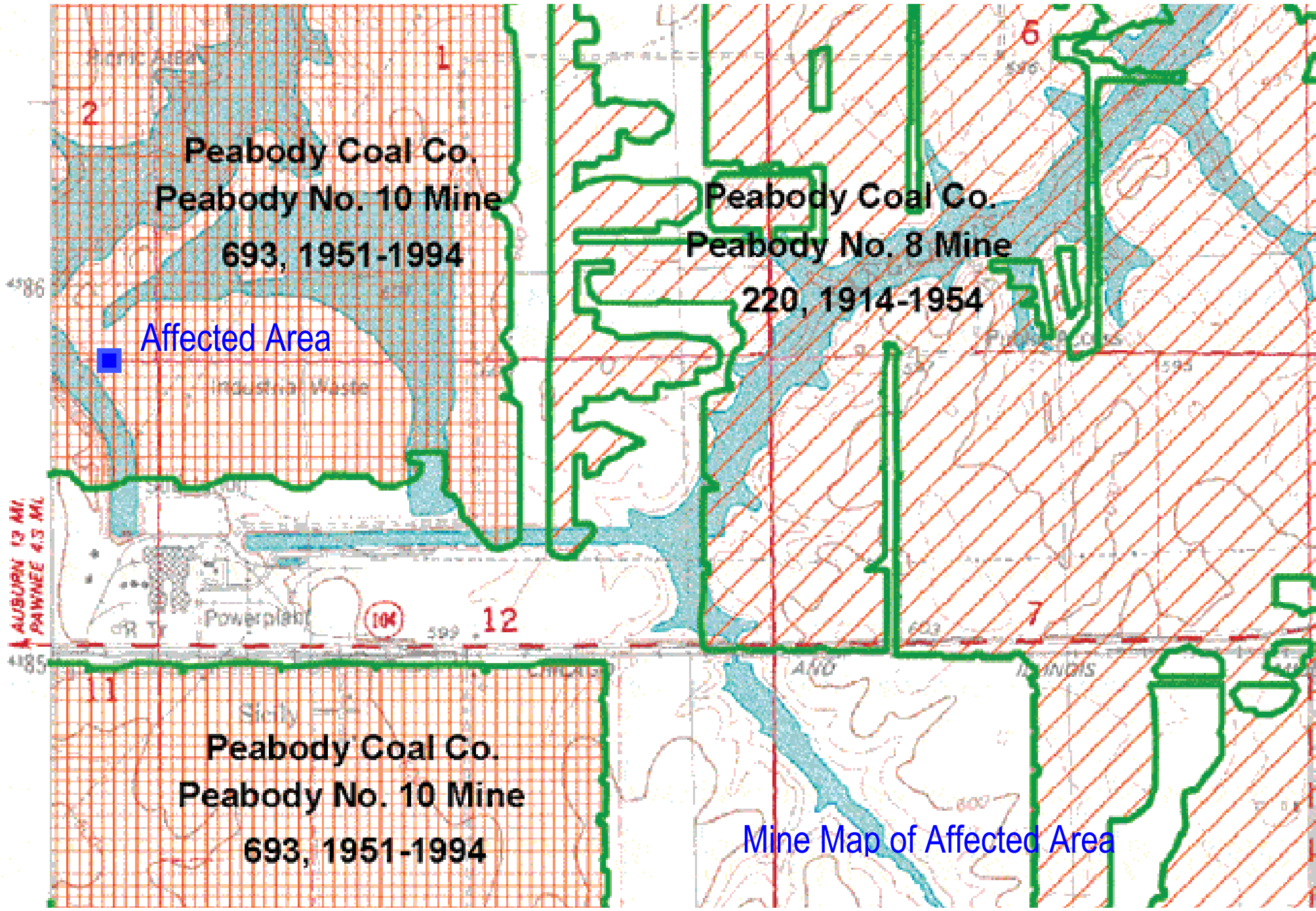
Mine Subsidence in Illinois: Facts for Homeowners, Bauer, Robert A., IDNR, ISGS Circular 569, 2006

#### Attachments



Aerial photo of affected area





**Peabody Coal Co.  
Peabody No. 10 Mine  
693, 1951-1994**

**Peabody Coal Co.  
Peabody No. 8 Mine  
220, 1914-1954**

**Affected Area**

**Peabody Coal Co.  
Peabody No. 10 Mine  
693, 1951-1994**

**Mine Map of Affected Area**



Tension cracking in embankment crest



Compression heaving in crest of embankment



Depression in embankment crest and downstream slope, tension cracks visible