Initial Hazard Potential Classification Assessment – Bottom Ash Pond

Comanche Station - Active CCR Surface Impoundment

Public Service Company of Colorado
Denver, Colorado

September 9, 2019

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LIST OF ABBREVIATIONS AND ACRONYMS

ADF	Ash Disposal Facility
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
PSCo	Public Service Company of Colorado
RCRA	Resource Conservation and Recovery Act

Qualified Professional Engineer Certification

I hereby certify, as a Professional Engineer in the State of Colorado, that the information in this document was assembled under my direct supervisory control. This report is not intended or represented to be suitable for reuse by PSCo or others without specific verification or adaptation by the Engineer.

I hereby certify, as a Professional Engineer in the State of Colorado, that the information contained in this report has been prepared in accordance with the requirements of 40 CFR §257. I further certify that a satisfactory demonstration of the requirements of 40 CFR Section §257.73 paragraph (a)(2)has been made.

SIGNATURE:

9/9/19

Michael Batten, PE
Colorado Licensed Professional Engineer No. 0054961

September 9, 2019

1.0 Introduction

This Initial Hazard Potential Classification Assessment report has been prepared for the existing CCR impoundment (referred to herein as the Bottom Ash Pond) located at the Public Service Company of Colorado (PSCo) Comanche Station (the Site).

On April 17, 2016 the Environmental Protection Agency (EPA) issued the final version of the federal Coal Combustion Residual (CCR) Rule to regulate the disposal of CCR materials generated at coal-fired units. The rule is administered as part of the Resources Conversation and Recovery Act (RCRA, 42 United States Code (U.S.C.) Section 6901 et seq.), using the Subtitle D approach.

Comanche Station is subject to the CCR Rule and as such must develop a Hazard Potential Classification Assessment for existing CCR impoundments per 40 Code of Federal Regulations (CFR) Section 257.73(a)(2). This report provides and verifies the Hazard Assessment Certification for the Bottom Ash Pond at the Comanche Station. Section 257.73(a)(2) requires that this document accomplish the following:

- Document the hazard potential classification of each CCR unit as either a high hazard potential CCR surface impoundment, a significant hazard potential CCR surface impoundment, or a low hazard potential CCR surface impoundment.
- Document the basis for each hazard potential classification.

1.1 General Information

The Comanche Station is located west of Lime Road approximately three miles south of Colorado Highway 50 in Pueblo County, Colorado **(Figure 1**). The Site is located in the west half of Section 20, Township 21 South, Range 64 West of the 6th Principal Meridian, Pueblo, Colorado. The facility is in an area zoned I-3 (Industrial) by the City of Pueblo Zoning Department. The Bottom Ash Pond is located approximately 1,400 feet southeast of the main power plant building. **Figure 2** shows the various facilities and infrastructure located at Comanche Station.

Comanche Station is a coal-fired plant that consists of three units (Units 1, 2 and 3) that burn Powder River Basin coal. Unit 1 was built in 1973 and is rated at 350 megawatts (MW), Unit 2 was built in 1975 and is rated at 350 MW, and Unit 3 was built in 2010 and is rated at 750 MW.

1.2 Type of Facility

The CCR impoundment is located in the southeastern area of the Site (Figure 2). The impoundment was constructed in 1972 and has a surface area of approximately 1.6 acres. Historic documents at the Site indicate that this impoundment was built with a 3-foot thick soil base liner; however, the soil base liner does not meet the requirements of 40 CFR §257.71. The impoundment is approximately 505 feet long by 140 feet wide and 20 feet deep. The primary influent to this impoundment is bottom ash sluiced from Units 1 and 2.

The primary purpose of this impoundment is to settle out bottom ash from the influent water. The bottom ash is sluiced to a concrete bunker located at the south end of the impoundment. The bunker collects the larger bottom ash solids, and water and fines are passed through to the impoundment. Dewatered bottom ash is removed from the bunker on a regular basis for off-site encapsulated beneficial use, or disposal in the on-site CCR landfill approximately 1,700 feet west of the impoundment. Additional smaller volume non-CCR influent sources include the continuous deionization softeners waste, brine and rinse, and activated carbon filter backwash and rinse. Effluent from the CCR impoundment discharges to the immediately adjacent Polishing Pond prior to being discharged to the St. Charles River under the Site's Clean Water Act discharge permit.

2.0 Hazard Potential Classification Assessment – 257.73 (a)(2)

The Bottom Ash Pond at Comanche Station is a partially incised impoundment, with an earthen berm on the west side that retains CCR. The earthen berm is composed of compacted clay fill and claystone fill, according to the Stearns-Roger Corporation drawings issued for construction on May 14, 1976 (Figures 3 and 4). The top of the berm is surfaced as a roadway, and is being used for vehicular access around the impoundments. The berm height is approximately 17 feet, with a top width of approximately 47 feet and side slopes of 2.5:1 (exterior) and 3:1 (interior) according to the aforementioned drawings. The berm divides the Bottom Ash Pond from the coal stockpile area, which is an unlined, incised area of the site where coal is temporarily stockpiled. A review of the surrounding topography shows the coal stockpile area is located within a depression with sufficient volume to contain a release from the Bottom Ash Pond.

Per the *Comanche Station No Aquifer Determination Memorandum* (HDR, January 2018), the perched water in the colluvium under the site does not meet the definition of an aquifer. The uppermost aquifer beneath the site is the Dakota Sandstone at a depth of over 1,450 feet. The estimated travel time for water from the impoundments to migrate through the underlying Pierre Shale deposits to reach the Dakota Sandstone Aquifer is approximately 13,000 years. With regard to horizontal flow of perched water, the distance from the surface impoundment to the St. Charles River, the nearest receptor for the colluvium, is approximately 4,000 feet and the potential for lateral migration of perched water in the colluvium is less than 10 feet per year.

Since the only area downstream of the Bottom Ash Pond is the coal stockpile area, there is no probable loss of human life and low economic and environmental losses in the event of failure or mis-operation of the impoundment. Any release from the Bottom Ash Pond would be contained on the Comanche Station property and clean-up would be implemented per facility spill response procedures.

Given that there is no probable loss of human life and low economic and environmental losses in the event of failure or mis-operation of the impoundment, the Bottom Ash Pond is classified as a **low hazard potential CCR surface impoundment**. This determination is based on the criteria

provided in the FEMA Federal Guidelines for Dam Safety – Hazard Potential Classification System for Dams, April 2004.

3.0 References

1) Comanche Unit 3 Generating Station, Comanche Station, Pueblo, Colorado, URS 2005.
2) Comanche Station Ash Disposal Facility Engineering Design and Operations Plan, Pueblo, Colorado, HDR September 2017, Revised January 2018.
3) Federal Guidelines for Dam Safety – Hazard Potential Classification System for Dams, (FEMA) April 2004.
4) Excerpts from Stearns-Roger Corporation Comanche S.E. Generating Station-Unit No. 1-1973-350,000 KW Construction Drawings, issued May 14, 1976.
5) Xcel Energy, 2005. Comanche Station Coal Ash Disposal Facility Design and Operations Plan. August 24, 2005.
6) Comanche Station No Aquifer Determination Memorandum, HDR January 2018.

Figures

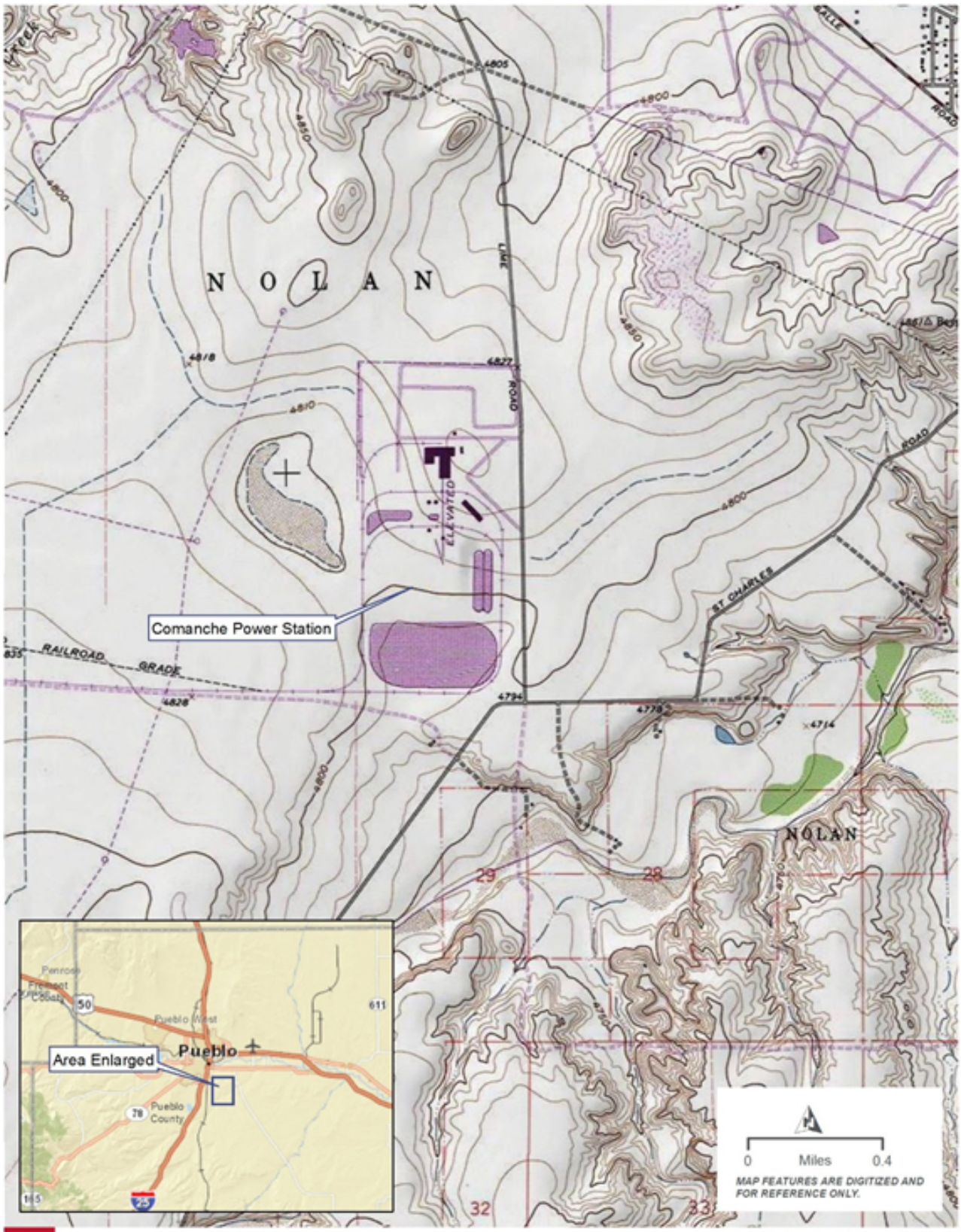


FIGURE 1: COMANCHE STATION LOCATION MAP

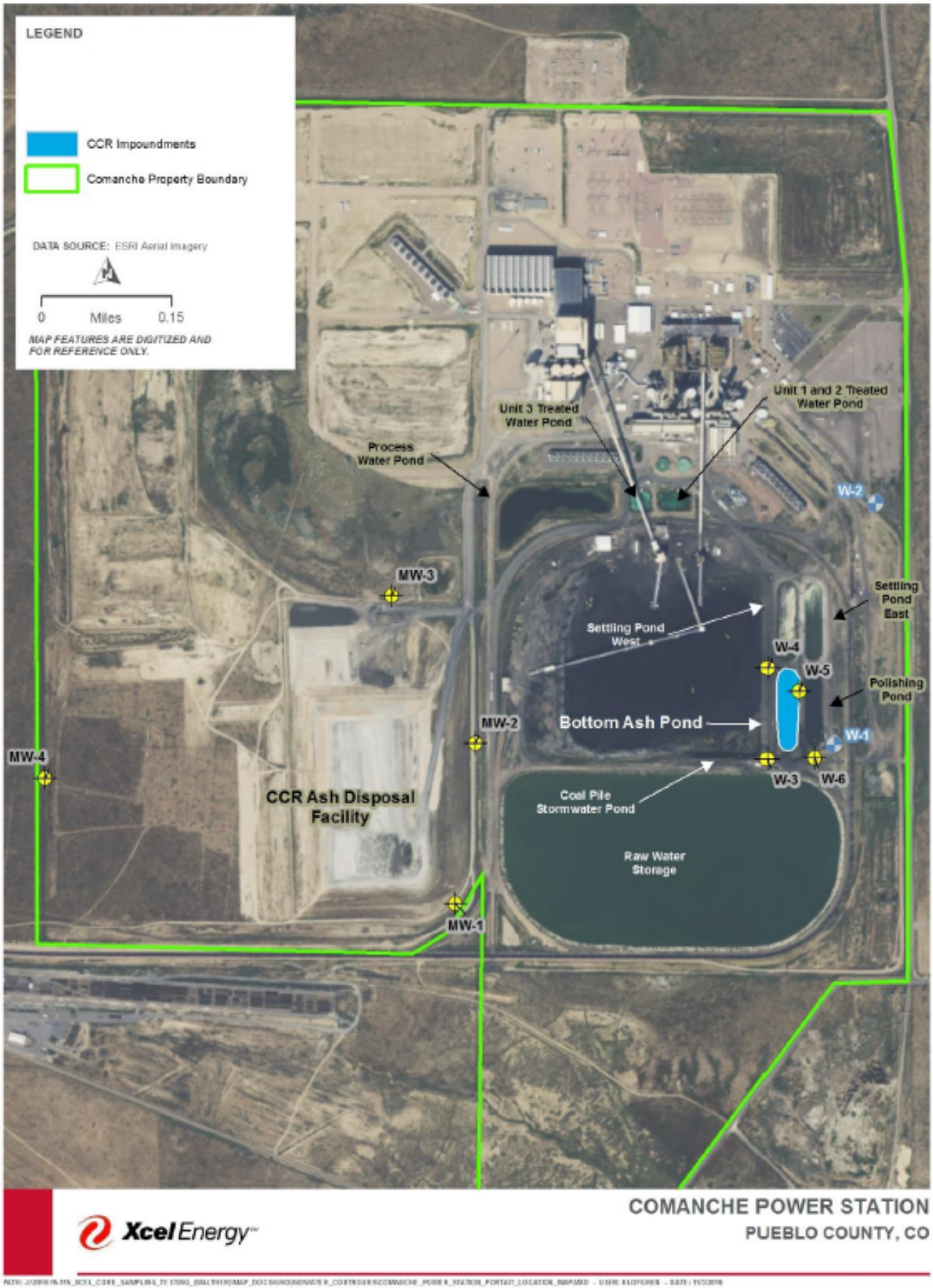
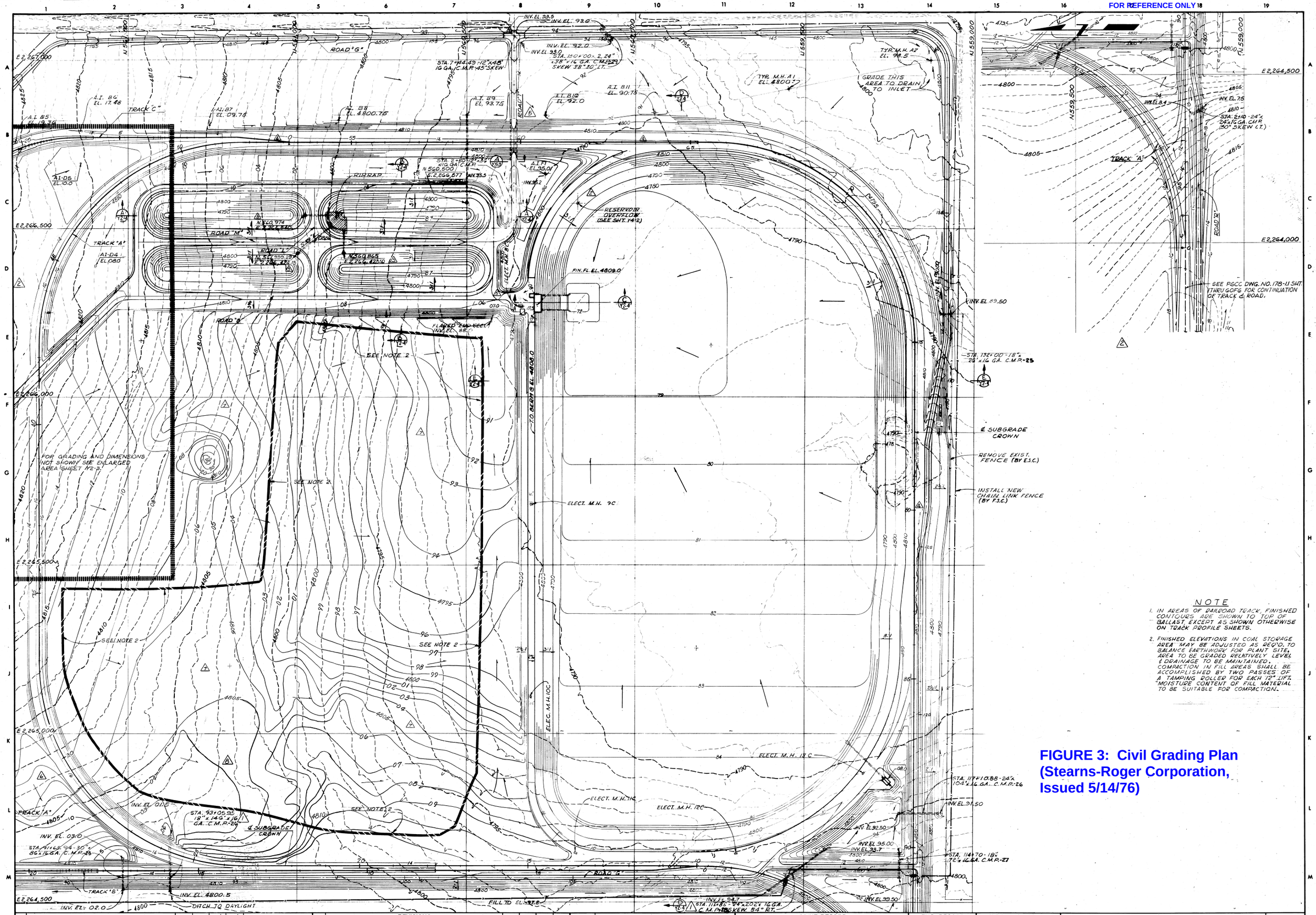


FIGURE 2: COMANCHE STATION LAYOUT MAP



NOTE

1. IN AREAS OF RAILROAD TRACK, FINISHED CONTOURS ARE SHOWN TO TOP OF BALLAST EXCEPT AS SHOWN OTHERWISE ON TRACK PROFILE SHEETS.
2. FINISHED ELEVATIONS IN COAL STORAGE AREA MAY BE ADJUSTED AS REQ'D. TO BALANCE EARTHWORK FOR PLANT SITE. AREA TO BE GRADED RELATIVELY LEVEL & DRAINAGE TO BE MAINTAINED. COMPACTION IN FILL AREAS SHALL BE ACCOMPLISHED BY TWO PASSES OF A TAMPING ROLLER FOR EACH 12" LIFT. MOISTURE CONTENT OF FILL MATERIAL TO BE SUITABLE FOR COMPACTION.

FIGURE 3: Civil Grading Plan (Stearns-Roger Corporation, Issued 5/14/76)

NO	REVISION	DATE	BY	CHK'D	APP'D
6	REV. GRADING FOR BORROW AREA @ L-8	10-15-74	JWG		

RECEIVED COLO. ISSUED MAY 14 1976 TO FIELD

NO.	REVISIONS	DATE	BY	CH'D	APP'D
0	GENERAL REVISION - FOR BIDS	2-22-71	J.L.H.		JGL
1	APPROVED FOR CONSTRUCTION	3-3-71	J.L.H.		
2	REV. ROAD "R", LOCATION RES. OVERFLOW & REMOVED HOLD.	3-9-71	J.L.H.		JGL
3	REV. COORDINATES & ASH PONDS & C.M.P. MARKS	4-16-71	J.L.H.		JGL
4	REV. FIN. GR. CONTOURS IN THE AREA OF R.R. TRACK 'A' FROM 51+00 TO 83+00	5-25-71	N.A.T.		RYO
5	ADDED ROAD "T", REV. PUMPING STA. AREA.	9-16-71	J.L.H.		JRL
6	REV. GRADING	10/5/72	MS		
7	"AS BUILT" GRADING IN COAL YARD	3/27/74	daB		

REFERENCE DRAWINGS

PRINT RECORD														
DATE ISSUED	5/14/71	5/24/71	6/3/71	9/10/71	10/4/71	10/8/71	12/1/71		12/28/71	12/28/71				
REVISION NO.	P-1	01	1	2	3	4	5	6	7	8				
FOR	APP'L	FINAL APPL.	AFC	RAFC	RAFC	RAFC	RAFC		RAFC	RAFC				
CUSTOMER	15	1-5	15	1-5	1-5	2-5	2-5		2-5	2-5				
FIELD	—	—	✓	✓	✓	✓	✓		✓	✓				
INTRA CO.	6	7	7	7	7	7	8		8	4				
CM1-506 (PENC)				12										
CM1-700 SITE AREA		18		18	18/11	V								
CM1-528 6105														

ENG. RECORD		
DRAWN	D.H.	6-25-70
CHECKED	SJC	7-23-70
MECH. CK.	JRB	7-24-70
STRUCT. CK.	JGL	7-28-70
ELECT. CK.	RLK	7-29-70
PIPING CK.	RSM	8-5-70
APPROVED		8-6-70
APPROVED		8-26-70

DRAWING STATUS	
ISSUED	DATE
PRELIMINARY	10/26/70
FOR COMMENTS AND APPROVAL	12-4-70
APPROVED FOR CONSTRUCTION	3/5/71
REVISED & APPROVED FOR CONSTRUCTION 2 REV.	12/28/71

NOT APPROVED FOR CONSTRUCTION UNLESS SIGNED & DATED BELOW AS PRINTS BEARING EARLIER DATE A/OR NUMBER ARE

CIVIL
GRADING PLAN
SHEET 2
COMANCHE S.E. GENERATING STATION-UNIT NO. 1-1973-350.000KW
PUBLIC SERVICE COMPANY OF COLORADO

SCALE 1"=100'
Stearns-Roger CORPORATION
ORDER NO. 8-37888

DWG. NO. L-22000
SHEET NO. Y2-2
REV. 2

FOR REFERENCE ONLY

PUBLIC SERVICE CO. of COLO. ISSUED MAY 14 1976 FOR FIRM

SECTION (A) Y2-4 REF. DWG. Y2-2 & Y2-8
HORIZ. 1"=50'
VERT. 1"=5'

SECTION (B) Y2-4 REF. DWG. Y2-2 & Y2-8
HORIZ. 1"=50'
VERT. 1"=5'

SECTION (C) Y2-4 REF. DWG. Y2-2 & Y2-8
HORIZ. 1"=50'
VERT. 1"=5'

SECTION (D) Y2-4 REF. DWG. Y2-2 & Y2-8
HORIZ. 1"=50'
VERT. 1"=5'

SECTION (E) Y2-4 REF. DWG. Y2-2 & Y2-8
HORIZ. 1"=50'
VERT. 1"=5'

SECTION (F) Y2-4 REF. DWG. Y2-1, Y2-3, Y2-7 & Y2-9
HORIZ. 1"=50'
VERT. 1"=5'

NOTE
1. ALL RAILROAD TRACK, TIES & BALLAST INCLUDED IN P.T.C.

FIGURE 4: Civil Miscellaneous Sections (Stearns-Roger Corporation, Issued 5/14/76)

NO.	REVISIONS	DATE	BY	CH'K	APP'D
(8)	REVISED LIMITS OF WORK BY ESC & P.S.	12/21/12	SJL	SJL	JDL
(9)	REVISED LIMITS OF WORK BY P.S., ADD. DIMENSION	3/4/13	T.M.A.T.	SJL	JDL
(10)	ADDED TRACK "G" TO SECTS. E & D	12/4/13	SJL	SJL	JDL

JAMES R. SWEENEY REGISTERED 4118 PROFESSIONAL ENGINEER STATE OF COLORADO

NO.	REVISIONS	DATE	BY	CH'D	APP'D
6	REVISED SECTIONS D, E & F-REV. NOTES, SECT'S. A, B & C, FOR BIDS	2/16/71	DH	SJL	SJL
1	APPROVED FOR CONSTRUCTION	3-3-71	J.L.H.	SJL	JDL
2	REMOVED HOLDS, REV. RIPRAP & WATER ELEVATIONS OF RAW WATER RES., REV. ROADS "L" & "M" RD. SECT "C" TO SECT. "B"	3/8/71	R.T.H.	SJL	JDL
3	REV. SEC. "D" & "E".	3/19/71	J.L.H.	SJL	JDL
4	REV. SECS. "D" & "E" AS PER REV. OF PROFILE TRACK "A"	3/29/71	N A T	SJL	RVO
5	ADDED RD. "T" TO SECT. "A".	9/1/71	J.L.H.	SJL	JDL
6	GENERAL REVISIONS. CONTRACT NO. CM1-550	2/1/72	J.L.H.	SJL	JDL
7	REV. SEC. "A", "C" & "F".	6/6/12	J.L.H.	SJL	JDL

NO.	REFERENCE DRAWINGS	3/27/73	12/7/73
	CM1-550	—	—
	CM1-500	2	—

PRINT RECORD	3/10/73	3/14/71	3/31/71	4/13/71	6/8/71	8/27/71	10/6/72	11/4/72	12/1/72
DATE ISSUED	10	9							
REVISION NO.	P-1	01	1	2	3	4	5	6	7	8
FOR	APPVL	FINAL APPVL	AFC	RAFC	RAFC	RAFC	RAFC	APPVL	RAFC	RAFC
CUSTOMER	1S	1-S	1S	1-S	1-S	2-S	2-S	1-S	2-S	2-S
FIELD	—	—	✓	✓	—	✓	✓	—	✓	✓
INTRA CO.	6	7	7	7	6	7	8	8	8	8
APPROVED	CM1-506(FENCE)				12			—	—	—
APPROVED	CM1-500 SITE PREP.		18		18	6/11	✓	—	2	2

ENG. RECORD	
DRAWN	R.T.H. 9/19/10
CHECKED	SJL 9/23/10
MECH. CK.	JEB 11/8/10
STRUCT. CK.	SJL 11/24/10
ELECT. CK.	JDL 11/9/10
PIPING CK.	HSM 3/3/71
APPROVED	JDL 11/15/10
APPROVED	JDL 2/26/71

DRAWING STATUS		
ISSUED		DATE
PRELIMINARY	JDL	10/8/70
FOR COMMENTS AND APPROVAL	JDL	2/26/71
APPROVED FOR CONSTRUCTION	JDL	3/3/71
REVISED & APPROVED FOR CONSTRUCTION REV. 10	JDL	7/27/73
NOT APPROVED FOR CONSTRUCTION UNLESS SIGNED & DATED. DESTROY ALL PRINTS BEARING EARLIER DATE &/OR REVISION NO.		

CIVIL
MISCELLANEOUS SECTIONS
COMANCHE S.E. GENERATING STATION-UNIT NO. 1-1973-350,000 KW
PUBLIC SERVICE COMPANY OF COLORADO

DWG. NO. L-22000
SHEET NO. Y2-4
SCALE AS NOTED
Stearns-Roger CORPORATION
ORDER NO. 8-37888
REV. 10

0008844