

2019 Annual Inspection Report

for Compliance with the Coal
Combustion Residuals Rule
(40 CFR Part 257)

Comanche Station

*2005 Lime Road
Pueblo, Colorado 81006*

January 18, 2020



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Certification

Comanche Station CCR Unit 2019 Annual Inspection for Compliance with the Federal Coal Combustion Residuals Rule

I hereby certify that the Coal Combustion Residuals (CCR) unit (i.e. the landfill) at Comanche Station meets the inspection and operation standards specified in 40 CFR Part 257.84(b) of the Federal CCR Rule. The Comanche Station is owned by the Public Service Company of Colorado (PSCo), an Xcel Energy Company.

I am duly licensed Professional Engineer under the laws of the State of Colorado.



Matthew Rohr, PE

Colorado PE License 0053467

License renewal date October 31, 2021

1 Introduction

On April 17, 2015 the U.S. Environmental Protection Agency (EPA) published regulations under Subtitle D of the Resources Conservation and Control Act (RCRA) meant to control the safe disposal of coal combustion residuals (CCR) generated by coal fired electric utilities. The rule defines a set of requirements for the disposal and handling of CCR within CCR units (defined as either landfills or surface impoundments). As specified in 40 CFR 257.84(b), *“Existing and new CCR landfills and any lateral expansion of a CCR landfill must be inspected on a periodic basis by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards.”* Comanche Station has one (1) CCR landfill subject to the inspection requirement.

This is the fifth annual inspection report for the existing Comanche CCR landfill. This report must be completed and placed into the facility operating record no later than January 18, 2020.

The requirements for the annual inspection include:

- A review of available information regarding the status and condition of the CCR unit - §257.84 (B)(1)(i),
- A visual inspection of the CCR unit to identify signs of distress or malfunction - §257.84 (B)(1)(ii),
- An inspection report that includes the following:
 - Changes in geometry since the last inspection - §257.84 (B)(2)(i)
 - Approximate volume of CCR in unit at time of inspection - §257.84 (B)(2)(ii)
 - Appearance of actual or potential structural weakness of the CCR unit - §257.84 (B)(2)(iii)
 - Any other changes which may have affected the stability or operation of the CCR unit since the last inspection - §257.84 (B)(2)(iv)

2 Site Inspection

In accordance with §257.84(b)(ii) a site inspection of the Comanche CCR landfill was conducted by an independent Professional Engineer on November 5, 2019. This inspection was performed in advance of the CCR submittal deadline to ensure that the inspection was completed prior to snow covering the ground. The inspection was conducted by Matthew Rohr, a Colorado Professional Engineer of HDR Engineering Inc. (HDR).

The weather during the site visit was mostly sunny with temperatures ranging from 55 to 60 degrees Fahrenheit. The site was free of snow cover.

3 Review of Available Information

Numerous documents pertaining to the site operation and structural integrity were reviewed including:

1. Engineering Design and Operation Plan (EDOP) (EDOP Revised: January 19, 2018, prepared by Tetra Tech). Xcel continues to operate following this document.
2. Weekly CCR Landfill Inspection Forms (per Section 257.84(a)). Review of the Weekly Inspection Forms did not contain any indications of operational, safety, or structural concerns regarding the CCR landfill.
3. Topographic survey of Cell 1 developed by Boral Plant Services showing grades at the end of November 2019.
4. Topographic survey of Cell 2E as-built stamped on March 22, 2018, completed by Edward James Surveying, Inc.

4 Visual Inspection

Matthew Rohr of HDR completed a site inspection by walking or driving the entire landfill toe of slope, walking areas of the landfill side slopes, driving the landfill top access road, and driving and walking the top of the active landfill cells. As the CCR Rule pertains only to the CCR landfill itself, this report does not address existing topsoil stockpiles and native earth excavations outside the landfill cell.

The site inspection included an evaluation of the following landfill features:

1. Access roads;
2. Active CCR fill area; and
3. Areas that have soil cover in place, and stormwater conveyance features.

The following are the findings of the site inspection:

- The landfill side slopes range from approximately 80 feet to 100 feet in vertical height from toe to plateau and are a constant grade of approximately 4H:1V without benching.
 - The west side slopes of Cell 1 were exposed with little vegetative cover. The slopes have been tracked and dressed in preparation of filling Cell 2 East adjacent to the Cell 1 west slope.
 - The drainage rundown structure on the southeast corner of Cell 1 was inspected and generally appears to be functioning as designed. There does appear to be some areas of concentrated flow that has caused some washout of the stone material at the road crossing near the bottom of the slope. There are no

structural concerns associated with the washout. Erosion control devices could be installed at the bottom of the slope to more evenly distribute the flow at the road crossing. There was also some rilling identified (3 to 12 inches in depth) adjacent to the letdown structure near the bottom of the side slope. The rilling was more prevalent on the southern slope. The existing rills should be repaired and the area monitored for any additional maintenance needed. Due to the additional top lift completed in 2019, an extension of the down chute will be needed, and is planned for early 2020.

- The south side slopes of Cell 1, with exception of the top lift, are covered with topsoil and a dense stand of vegetation is established. As discussed above, there is some rilling that should be addressed near the southeast corner. No visual CCR was observed in the rills and there does not appear to be structural concerns associated with the rilling; however the current rilling should be addressed and the area should be a focal point of the weekly inspections. A top lift of approximately 30 vertical feet has been placed and was stepped back from the land fill side slope but was not yet soil covered. Per the EDOP, this material is a Class C ash and does not require daily or intermediate soil cover, assuming the material has adequate moisture for self-cementing. The side slope showed no signs of operational or functional concerns, and it was reported that soil cover is scheduled to be placed in 1st quarter 2020.
- The east slope of Cell 1 exhibited small erosion rills along the southern portion of the slope; no exposed CCR material was observed. The lower half of the east slope was primarily covered with dormant vegetation. The upper half of the slope was covered with soil and is awaiting seeding during months that are more favorable to seeding operations.
- The north side slope of Cell 1 had a uniform grade with topsoil and vegetation on the lower half. The upper half of the slope is no longer an active fill area and has been covered with topsoil and is awaiting seeding for vegetative cover during months that are more favorable to seeding operations.
- CCR placement in Cell 2E began in 2019. The base grade of Cell 2E is approximately 10-feet below surrounding native grade. At the time of the inspection, all fill operations remain below the surrounding berm grades by approximately five feet. There were no structural or operational concerns observed on the internal slopes of the berms, and placement and compaction operations were consistent with the EDOP.
- The top of Cell 1 is graded to a flat plateau and has exposed ash, which is EDOP compliant as long as wind erosion is not an issue. Water is reportedly routinely used for dust control, and no wind erosion of the CCR was observed during the inspection.
- In general, landfill areas recently covered with soil and areas with little vegetation established, showed signs of minor rill erosion. This is expected due to the slope grades and lack of vegetation. Rill erosion in these areas posed no apparent operational or structural concerns. These landfill areas are anticipated to stabilize as vegetation is established.

- The storm water pond, immediately north of Cell 1, appears to be functioning as designed and receives only non-contact water from the landfill area. However, at the time of the inspection, the pond had no standing water due to the area's normal scarce precipitation. The pond showed no signs of stability, functional or operational issues.
- The access road to the top of the landfill showed no signs of operational or structural concern. The sides were vegetated and had minimal rill erosion.
- The perimeter access road at the toe of slope showed no signs of operational or structural concern with the exception of the minor stone washout described above.
- The leachate collection tank constructed for Cell 2E is reportedly functioning as designed.

5 Changes in Geometry

The Federal CCR Rules require that site geometry changes be identified since the last inspection. The site geometry changed since the prior inspection due to continued CCR disposal and soil cover placement. Normal CCR disposal operations have increase the height of the Cell 1 top plateau of Cell 1 by approximately 20 feet to a top deck elevation of 4908 feet. The interim permitted height is 4910 feet. The landfill sides slopes continue to be maintained at approximately a 4H:1V slope for Cell 1. Operations in Cell 2E began in 2019 and involved uniform placement of CCR within the perimeter berm. At the time of the inspection, ash had been placed to a depth of approximately five feet.

6 Approximate CCR Volume

As reported by Xcel Energy, prior to 1987 the CCR for the Comanche Station was disposed of off-site. From 1987 to 2007, the CCR was predominately utilized off-site for beneficial use. Since 2007, the CCR has been disposed of within the on-site CCR landfill. From 2007 through November of 2018, Xcel estimates the total combined volume of CCR on-site to be 3,601,400 cubic yards (CY). In addition, fly ash and bottom ash disposed in the CCR landfill from December 2018 through November 2019 is estimated to be 305,060 CY. The total CCR volume within the landfill as of the end of November 2019 is estimated to be 3,906,460 CY.

7 Appearance of Structural Weakness

Based on the site inspection and review of available materials, the site showed no signs of operational and structural concern. Continued monitoring and minor repairs or surface vegetation should be completed to address rill and gully erosion before it becomes worse.

8 Changes Affecting Stability or Operation

There were no observed or reported operation changes that are anticipated to negatively impact the site's near-term or long-term stability. With the additional top lift added in 2019, an extension

of the southeast corner downchute on Unit 1 will be needed and is planned for construction in 2020.

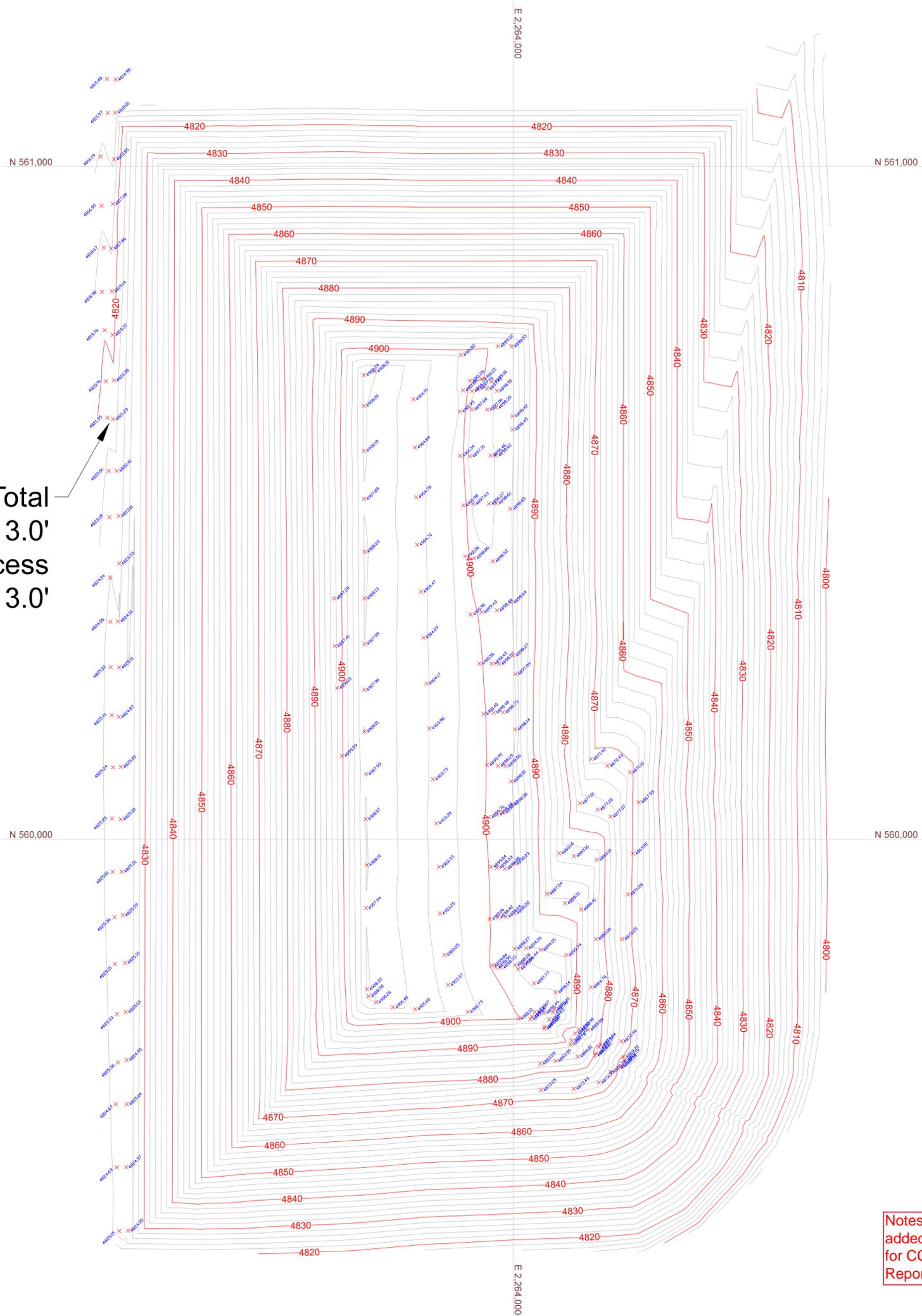
Appendix A – Cell 1 Topographic Survey



Volume Placed Dec. 2018 - Nov. 2019 - 90,735 CY
Current elevation of top of landfill - 4908'
Final elevation of landfill - 4910'

Volume shown
is for Cell 1 only.

Access Total
Length - 1713.0'
Average Access
Width - 13.0'

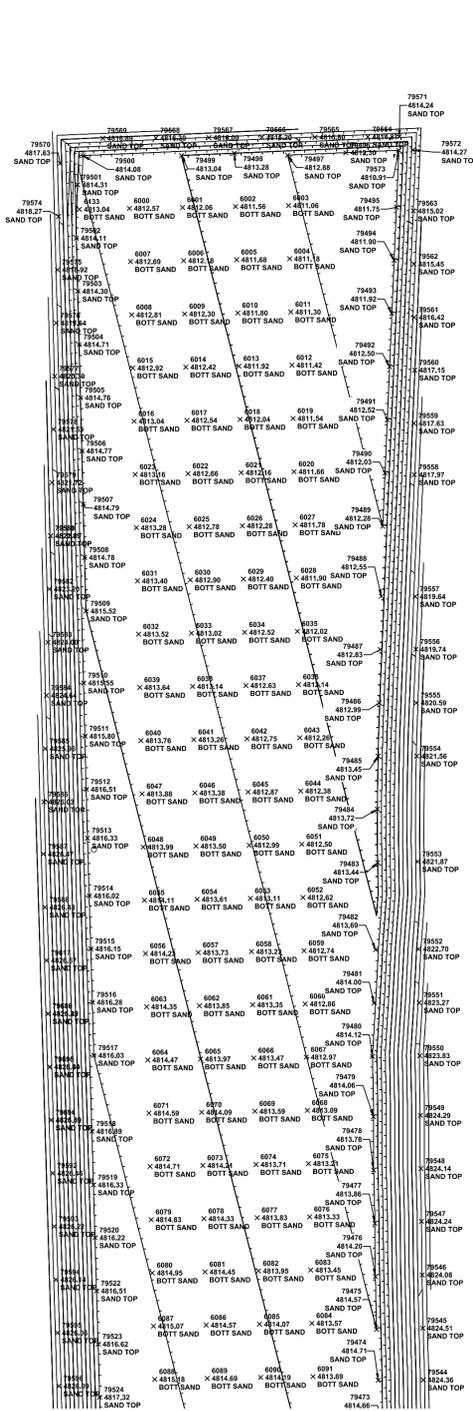


Notes in red text boxes
added by HDR Engineering
for CCR Annual Inspection
Report, January 2020.

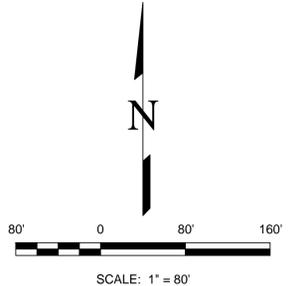
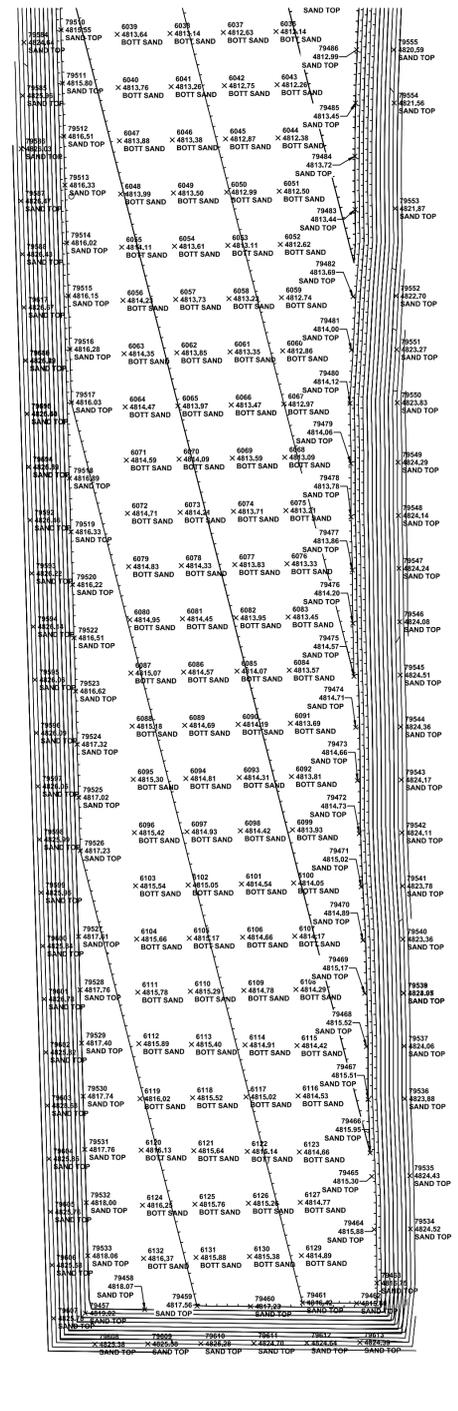
Comanche Station
Coal Ash Landfill
Remaining Volume

Appendix B – Cell 2E As-Built Survey

COMANCHE GENERATING STATION ASH LANDFILL CELL 2 EAST-AS BUILTS DRAINAGE LAYER



Approximately five feet of CCR placed above as-built grades - November 2019.



PTH	DESIGN NORTH	DESIGN EAST	DESIGN-BOTT OF SAND	TOP OF SAND-AS BUILT	DELTA	DESCRIPTION
6000	561070.80	2263117.42	4812.57	4813.58	1.01	FG
6006	560272.77	2263234.75	4813.47	4814.48	1.01	FG
6001	561071.70	2263167.47	4812.06	4813.09	1.03	FG
6002	561072.59	2263217.48	4811.56	4812.59	1.03	FG
6003	561073.49	2263267.54	4811.06	4812.07	1.01	FG
6004	561023.50	2263268.59	4811.18	4812.23	1.05	FG
6005	561022.60	2263218.56	4811.68	4812.73	1.05	FG
6006	561021.71	2263168.53	4812.18	4813.22	1.04	FG
6007	561020.81	2263118.50	4812.69	4813.70	1.01	FG
6008	560970.83	2263119.58	4812.81	4813.85	1.04	FG
6009	560971.72	2263169.60	4812.30	4813.32	1.02	FG
6010	560972.61	2263219.64	4811.80	4812.81	1.01	FG
6011	560973.51	2263269.63	4811.30	4812.32	1.02	FG
6012	560923.52	2263270.68	4811.42	4812.45	1.03	FG
6013	560922.63	2263220.72	4811.92	4812.94	1.02	FG
6014	560921.73	2263170.66	4812.42	4813.45	1.03	FG
6015	560920.84	2263120.66	4812.92	4813.95	1.03	FG
6016	560870.85	2263221.75	4813.04	4814.08	1.04	FG
6017	560871.74	2263171.72	4812.54	4813.58	1.04	FG
6018	560872.64	2263221.80	4812.04	4813.05	1.01	FG
6019	560873.53	2263271.72	4811.54	4812.55	1.01	FG
6020	560823.54	2263272.77	4811.66	4812.68	1.02	FG
6021	560822.65	2263222.88	4812.16	4813.21	1.05	FG
6022	560821.75	2263172.79	4812.66	4813.69	1.03	FG
6023	560820.86	2263122.83	4813.16	4814.19	1.03	FG
6024	560770.87	2263123.91	4813.28	4814.33	1.05	FG
6025	560771.76	2263173.85	4812.78	4813.83	1.05	FG
6026	560772.66	2263223.95	4812.28	4813.33	1.05	FG
6027	560773.55	2263273.81	4811.78	4812.82	1.04	FG
6028	560723.56	2263274.85	4811.90	4812.95	1.05	FG
6029	560722.67	2263225.03	4812.40	4813.41	1.01	FG
6030	560721.77	2263174.91	4812.90	4813.92	1.02	FG
6031	560720.88	2263124.99	4813.40	4814.42	1.02	FG
6032	560670.89	2263126.07	4813.52	4814.54	1.02	FG
6033	560671.79	2263175.98	4813.02	4814.04	1.02	FG
6034	560672.68	2263226.11	4812.52	4813.57	1.05	FG
6035	560673.57	2263275.90	4812.02	4813.05	1.03	FG
6036	560623.58	2263276.94	4812.14	4813.16	1.02	FG
6037	560622.69	2263227.19	4812.63	4813.65	1.02	FG
6038	560621.80	2263177.04	4813.14	4814.16	1.02	FG
6039	560620.90	2263127.15	4813.64	4814.69	1.05	FG
6040	560570.92	2263128.23	4813.76	4814.79	1.03	FG
6041	560571.81	2263178.10	4813.26	4814.28	1.02	FG
6042	560572.71	2263228.27	4812.76	4813.77	1.02	FG
6043	560573.59	2263278.99	4812.26	4813.27	1.01	FG
6044	560523.61	2263279.03	4812.38	4813.41	1.03	FG
6045	560522.72	2263229.35	4812.87	4813.92	1.05	FG
6046	560521.82	2263179.17	4813.38	4814.43	1.05	FG
6047	560520.93	2263129.31	4813.88	4814.89	1.01	FG
6048	560470.94	2263130.40	4813.99	4815.00	1.01	FG
6049	560471.83	2263180.23	4813.50	4814.53	1.03	FG
6050	560472.73	2263230.43	4812.99	4814.02	1.03	FG
6051	560473.62	2263280.08	4812.50	4813.52	1.02	FG
6052	560423.63	2263281.12	4812.62	4813.67	1.05	FG
6053	560422.74	2263231.51	4813.11	4814.16	1.05	FG
6054	560421.84	2263181.29	4813.61	4814.62	1.01	FG
6055	560420.95	2263131.48	4814.11	4815.15	1.04	FG
6056	560370.96	2263132.56	4814.23	4815.26	1.03	FG
6057	560371.85	2263182.36	4813.73	4814.74	1.01	FG
6058	560372.75	2263232.59	4813.23	4814.26	1.03	FG
6059	560373.64	2263282.16	4812.74	4813.77	1.03	FG
6060	560323.65	2263283.21	4812.86	4813.87	1.01	FG
6061	560322.76	2263233.67	4813.35	4814.36	1.01	FG
6062	560321.86	2263183.42	4813.85	4814.89	1.04	FG
6063	560320.97	2263133.64	4814.35	4815.40	1.05	FG
6064	560270.98	2263134.72	4814.47	4815.49	1.02	FG

SURVEYOR'S STATEMENT:

I, RANDEL R. NELSON, A PROFESSIONAL LAND SURVEYOR IN THE STATE OF COLORADO, ON THE BASIS OF MY KNOWLEDGE, INFORMATION, AND BELIEF, DO HEREBY STATE THAT THE FOLLOWING RECORD SURVEY VERIFICATIONS FOR THE ABOVE MENTIONED PROJECT WAS MADE UNDER MY RESPONSIBLE CHARGE TO THE NORMAL STANDARDS AND CARE OF A PROFESSIONAL LAND SURVEYOR PRACTICING IN THE STATE OF COLORADO AND MEETS THE HORIZONTAL AND VERTICAL SURVEY ACCURACIES DEFINED WITHIN REFERENCED SURVEY REQUIREMENTS SPECIFICATIONS.



RANDEL R. NELSON, PROFESSIONAL LAND SURVEYOR
COLORADO P.L.S. NO. 38303
FOR AND ON BEHALF OF EDWARD-JAMES SURVEYING, INC.

Notes in red text boxes added by HDR Engineering for CCR Annual Inspection Report, January 2020

PTH	DESIGN NORTH	DESIGN EAST	DESIGN-BOTT OF SAND	TOP OF SAND-AS BUILT	DELTA	DESCRIPTION
6065	560271.87	2263184.48	4813.97	4815.00	1.03	FG
6066	560272.77	2263234.75	4813.47	4814.48	1.01	FG
6067	560273.66	2263284.25	4812.98	4813.99	1.01	FG
6068	560274.55	2263333.75	4812.49	4813.50	1.01	FG
6069	560275.44	2263383.25	4812.00	4813.01	1.01	FG
6070	560276.33	2263432.75	4811.51	4812.52	1.01	FG
6071	560277.22	2263482.25	4811.02	4812.03	1.01	FG
6072	560278.11	2263531.75	4810.53	4811.54	1.01	FG
6073	560279.00	2263581.25	4810.04	4811.05	1.01	FG
6074	560279.89	2263630.75	4809.55	4810.56	1.01	FG
6075	560280.78	2263680.25	4809.06	4810.07	1.01	FG
6076	560281.67	2263729.75	4808.57	4809.58	1.01	FG
6077	560282.56	2263779.25	4808.08	4809.09	1.01	FG
6078	560283.45	2263828.75	4807.59	4808.60	1.01	FG
6079	560284.34	2263878.25	4807.10	4808.11	1.01	FG
6080	560285.23	2263927.75	4806.61	4807.62	1.01	FG
6081	560286.12	2263977.25	4806.12	4807.13	1.01	FG
6082	560287.01	2264026.75	4805.63	4806.64	1.01	FG
6083	560287.90	2264076.25	4805.14	4806.15	1.01	FG
6084	560288.79	2264125.75	4804.65	4805.66	1.01	FG
6085	560289.68	2264175.25	4804.16	4805.17	1.01	FG
6086	560290.57	2264224.75	4803.67	4804.68	1.01	FG
6087	560291.46	2264274.25	4803.18	4804.19	1.01	FG
6088	560292.35	2264323.75	4802.69	4803.70	1.01	FG
6089	560293.24	2264373.25	4802.20	4803.21	1.01	FG
6090	560294.13	2264422.75	4801.71	4802.72	1.01	FG
6091	560295.02	2264472.25	4801.22	4802.23	1.01	FG
6092	560295.91	2264521.75	4800.73	4801.74	1.01	FG
6093	560296.80	2264571.25	4800.24	4801.25	1.01	FG
6094	560297.69	2264620.75	4799.75	4800.76	1.01	FG
6095	560298.58	2264670.25	4799.26	4800.27	1.01	FG
6096	560299.47	2264719.75	4798.77	4799.78	1.01	FG
6097	560300.36	2264769.25	4798.28	4799.29	1.01	FG
6098	560301.25	2264818.75	4797.79	4798.80	1.01	FG
6099	560302.14	2264868.25	4797.30	4798.31	1.01	FG
6100	560303.03	2264917.75	4796.81	4797.82	1.01	FG
6101	560303.92	2264967.25	4796.32	4797.33	1.01	FG
6102	560304.81	2265016.75	4795.83	4796.84	1.01	FG
6103	560305.70	2265066.25	4795.34	4796.35	1.01	FG
6104	560306.59	2265115.75	4794.85	4795.86	1.01	FG
6105	560307.48	2265165.25	4794.36	4795.37	1.01	FG
6106	560308.37	2265214.75	4793.87	4794.88	1.01	FG
6107	560309.26	2265264.25	4793.38	4794.39	1.01	FG
6108	560310.15	2265313.75	4792.89	4793.90	1.01	FG
6109	560311.04	2265363.25	4792.40	4793.41	1.01	FG
6110	560311.93	2265412.75	4791.91	4792.92	1.01	FG
6111	560312.82	2265462.25	4791.42	4792.43	1.01	FG
6112	560313.71	2265511.75	4790.93	4791.94	1.01	FG
6113	560314.60	2265561.25	4790.44	4791.45	1.01	FG
6114	560315.49	2265610.75	4789.95	4790.96	1.01	FG
6115	560316.38	2265660.25	4789.46	4790.47	1.01	FG
6116	560317.27	2265709.75	4788.97	4789.98	1.01	FG
6117	560318.16	2265759.25	4788.48	4789.49	1.01	FG
6118	560319.05	2265808.75	4787.99	4789.00	1.01	FG
6119	560319.94	2265858.25	4787.50	4788.51	1.01	FG
6120	560320.83	2265907.75	4787.01	4788.02	1.01	FG
6121	560321.72	2265957.25	4786.52	4787.53	1.01	FG
6122	560322.61	2266006.75	4786.03	4787.04	1.01	FG
6123	560323.50	2266056.25	4785.54	4786.55	1.01	FG
6124	560324.39	2266105.75	4785.05	4786.06	1.01	FG
6125	560325.28	2266155.25	4784.56	4785.57	1.01	FG
6126	560326.17	2266204.75	4784.07	4785.08	1.01	FG
6127	560327.06	2266254.25	4783.58	4784.59	1.01	FG
6128	560327.95	2266303.75	4783.09	4784.10	1.01	FG
6129	560328.84	2266353.25	4782.60	4783.61	1.01	FG
6130	560329.73	2266402.75	4782.11	4783.12	1.01	FG
6131	560330.62	2266452.25	4781.62	4782.63	1.01	FG
6132	560331.51	2266501.75	4781.13	4782.14	1.01	FG
6133	561069.96	2263070.25	4813.04	4814.09	1.05	FG

DATE _____

REVISIONS

NO.	DESCRIPTION

EDWARD-JAMES SURVEYING, INC.
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Colorado Springs, CO 80907
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