December 2, 2021

Mr. Patrick Lennberg
Division of Reclamation, Mines, and Safety
1313 Sherman Street, Room 215
Denver, Colorado 80203

RE: Preliminary Adequacy Response; M-2004-044

Dear Mr. Lennberg:

This letter serves as the Preliminary Adequacy Response for the 112c Construction Materials Amendment Application (AM-2), Permit No. M-2004-044. The Preliminary Adequacy Review was summarized in your letter of November 17, 2021. The italicized items are the current comment and the bold text are the responses:

EXHIBIT B – Index Map (Rule 6.4.2):

1. *The index map incorrectly identifies WCR 23.75 as WCR 2.75, please update. Please note this edit may need to occur on maps throughout the amendment. Please affirmatively respond where this not done that where WCR 2.75 shown it is supposed to be WCR 23.75.*

   The Exhibit B map has been changed as indicated above. In addition, the same change was made to Sheets C-1 through C-7 and Sheets F-1 through F-4. Please see the attached Exhibits B, C, and F.

EXHIBIT C – Pre-Mining and Mining Plan Map(s) of Affected Lands (Rule 6.4.3):

2. *On the Pre-Mining and Mining Plan Map, C-1, please clearly show the conveyor belt corridor area that is being released through this amendment.*

   The area is shown as Tract J on Sheet C-1. Please see attached Exhibit C.

EXHIBIT D – Mining Plan (Rule 6.4.4):

3. *On page D-1, it states "The amended area, providing an area for the conveyor easement, is along the east side of Tucson Street…". Please confirm the conveyor easement is on the west side of Tucson Street and update the statement accordingly.*

   The conveyor will on the west side of Tucson Street. Exhibit D has been changed as indicated. Please see page D-1 of the attached Exhibit D.

4. *On page D-1, Weld County Road 23.75 is misidentified as 2.75, please update.*

   Exhibit D has been changed as indicated. Please see page D-1 of the attached Exhibit D.

5. *On page D-2, it is noted the South Area was removed from the permit area through approval of Technical Revision 2 (TR-02). The South Area was removed from the permit area with the*

approval of Acreage Reduction Request 2 (AR-2). TR-2 updated the Mining and Reclamation Plan maps to reflect removal of the South Area. Please update this section accordingly.

Exhibit D has been changed accordingly. Please see page D-2 of the attached Exhibit D.

6. *The Division did not find the slurry wall designs attached in this exhibit as indicated. Please provide the missing designs.*

Please see the attached slurry wall plans.

7. *What direction will each phase be mined?*

In general, both the west and east cells will be mined from the south to the north. However, the area of mining may change based on market conditions, operational needs, or site conditions.

8. *The table depicting the point in time when mining disturbance would be at its maximum, page D-4, is not complete, please provide the missing values.*

This table is actually on page D-8. The table lists the total disturbed areas that were part of TR-02 which included 3.3 acres of the former conveyor (Tract J). The new conveyor route (Tracts N, O, P, Q, R and S) occupies 7.7 acres. This adds 4.4 (7.7-3.3) acres to the total disturbed area. The new total disturbed area is now 88.2 acres. The table has been updated to indicate the 88.2 acres. Please see page D-8 of the attached Exhibit D.

9. *Wetlands, the last statement in this section needs clarification. A review of Appendix J and the report from the Department of the Army indicates there are no jurisdictional wetlands on the site. Please confirm there are no jurisdictional wetlands at the site.*

Per the Department of the Army Approved Jurisdictional Determination, there are no jurisdictional wetlands at the site. Please see page D-9 of the attached Exhibit D.

10. *Underground conveyor belt crossings. The Division understands the designs for the underground conveyor crossings are still in the design process. Please commit to submitting the final design drawings for each crossing.*

AI commits to provide the final design drawings at each underground conveyor belt crossing.

11. *What will be done with the material that is excavated for the underground crossings?*

Material excavated from the underground crossing will be placed in the mine reclamation slopes.

12. *Please provide a list of approvals and certifications the applicant must obtain before the underground crossings can begin construction. Include in this list any structure or utility agreements and access agreements obtained prior to construction.*

-Adams County Work in Right of Way Permit
-Agreement with Xcel Gas
-Agreement with Lumen (subsidiary to Century Link)
-Agreement with Qwest telephone.

-Agreement with Kerr-McGee
-Agreement with Mountain View Water
-Agreement with United Power

13. *Please show on a map(s) where the types of conveyor belt orientations are located as described on Exhibit L, e.g. under crossing, overhead crossing, and other.*

The undercrossing and overhead crossings are shown on maps C-5, C-6, and C-7. Please see the attached Exhibit C. Please note that the WCR 23 ¾ crossing type is yet to be determined. For reclamation costs (Exhibit L) we list this crossing as an undercrossing which will be more costly to reclaim.

14. *Please provide a typical cross section for the overhead conveyor crossing and include on map C-8.*

The typical cross section has been added to Sheet C-8. Please see the attached Exhibit C.

15. *Is the 50 foot wide conveyor belt corridor sufficient for installation, maintenance, and removal of equipment without affecting additional land beyond these limits? Please acknowledge affecting land beyond these limits could be considered a possible violation of the permit.*

The 50-foot wide conveyor belt corridor is sufficient for installation, maintenance, and removal of equipment without affecting additional land beyond these limits. Al acknowledges that affecting land beyond these limits could be considered a possible violation of the permit.

16. *Is there sufficient area in the proposed amendment permit boundary for all the necessary equipment to construct the underground road crossings? Please acknowledge affecting land beyond these limits could be considered a possible violation of the permit.*

There is sufficient area in the proposed amendment permit boundary for all necessary equipment to construct the underground crossings. Al acknowledges that affecting land beyond these limits could be considered a possible violation of the permit.

EXHIBIT E – Reclamation Plan (Rule 6.4.5):

17. *On page E-5 the applicant states a Technical Revision will be submitted with the final slurry wall designs. The statement is in conflict with question #6 above. Please clarify*.

As mentioned in question number 6 above, the Slurry Wall Designs are attached with this response. Slurry Wall construction commenced in October 2021. Exhibit E has been revised to reflect this. Please see page E-5 of the attached Exhibit E.

18. *On page E-9, copies of the well permit and well completion report could not be found in Exhibit G, please provide the missing information.*

A copy of the well permit and construction information is attached to this response.

19. *Please describe how the underground conveyor crossings will be reclaimed.*

A description of the manner in which the underground conveyor crossing will be reclaimed has been added to the revised Exhibit E. Please see item 13 on page E-2.

EXHIBIT F – Reclamation Plan Map (Rule 6.4.6):

20. *Please clearly show the underdrain system on the reclamation maps.*

The underdrain is shown on Sheet F-2. Please see the attached Exhibit F.

EXHIBIT G – Water Information (Rule 6.4.7):

21. *Through the SEO well permitting process was Mr. Stough (Permit # 201932) notified and an agreement entered into with AI to protect water rights?*

This well is on the De La Cruz property located at 16400 Tucson Street. The current status of this well is not known. AI has notified the De La Cruz' of the Groundwater Mitigation Plan in place at the site. The purpose of the mitigation plan is to investigate impacts to well capacities and remedy the losses in capacity if it is found to be due to AI's activities.

22. *The underdrain plans are for bid and not final. Please provide the finalized plans for the underdrain.*

The Underdrain Plans are attached to this response.

23. *Please clarify when the underdrains will be installed, prior to slurry wall construction or after?*

The underdrain is currently under construction and will be complete prior to construction of the adjacent, parallel slurry wall.

24. *What affects will the underground conveyor crossings have on groundwater flow, please reply by crossing?*

East 168th Avenue

-The undercrossing structure is designed at a high elevation in order to minimize impacts to groundwater flow.
-The transmissive layer of the alluvial aquifer extends approximately 20 feet below the bottom of the structure. The undercrossing will not cut off alluvial groundwater flow.
-Impacts that occur are anticipated to be very local, within 10 feet of the culvert.
-The impacts may include minor mounding (slight groundwater rise) on the west side and minor shadowing (slight drop in groundwater level) on the east side. We anticipate these changes will be very minor and likely unnoticeable.
-Impacts to regional flow are anticipated to be non-existent.

Tucson Street

-The undercrossing structure is designed at a high elevation in order to minimize impacts to groundwater flow.
-The transmissive layer of the alluvial aquifer extends approximately 20 feet below the bottom of the structure. The undercrossing will not cut off alluvial groundwater flow.
-Impacts that occur are anticipated to be very local, within 10 feet of the culvert.

-The impacts may include minor mounding (slight groundwater rise) on the south side and minor shadowing (slight drop in groundwater level) on the north side. We anticipate these changes will be very minor and likely unnoticeable.
-Impacts to regional flow are anticipated to be non-existent.

25. *Given where the underdrain is located on the north side of the West cell what effects will the Tucson Street conveyor undercrossing have on its ability to function as designed/intended?*

-The underdrain will terminate approximately 100 feet from the undercrossing structure. At this distance, effects on the underdrain are anticipated to be non-existent.

EXHIBIT H – Wildlife Information (Rule 6.4.8):

26. *The Colorado Parks and Wildlife provide comments on the permit application, sent to applicant on November 16, 2021. Please provide responses to their comments and concerns.*

The CPW recommends that the conveyor belt not be fenced. This is the also the same wishes of the owners of the Yoshii and Suzu Tracts (Tracts P and Q). AI will not add any additional fencing to the conveyor alignment unless requested by the Tract owner(s).

The CPW states that a small portion of the far north part of conveyor alignment is within severe winter mule deer range and requests construction be avoided in this area between December and April if possible. If a severe winter occurs, AI will consult with CPW and consider this request.

27. *Have raptor nests surveys been completed for the entire permit area as indicated in Section 3.2 of the Tetra Tech report?*

A raptor nest survey has been completed. The survey covers the entire permit area and beyond. A copy of this survey is attached to this response.

EXHIBIT L – Reclamation Costs (Rule 6.4.12):

28. *Please provide details (L x W x H) of the conveyor belts that are proposed to be installed so the Division can accurately calculate reclamation costs associated with the belts.*

The conveyor system will consist of the following three types:

Main Line Conveyor, 8,582 feet long, 6 feet wide, and 3 feet tall;

Underground Crossings, 329 feet long, 10 feet wide, 8 feet tall;

Overhead Crossings, 962 feet long, 12 feet wide, 16 feet tall.

29. *Are any of the conveyor belts going to be portable and if so what is total length?*

The main line conveyor will be placed on railroad ties. Length is 8,582 feet.

EXHIBIT S – Permanent Man-made Structures (Rule 6.4.19):

30. *Please provide the stability analysis data for the conveyor along the Challenger Reservoir to allow the Division to duplicate the analysis with Clover Technology's Galena software for verification purposes.*

Attached to this adequacy response, please see both the input and output XSTABL files for the static and seismic analyses performed along the Challenger Reservoir.

31. *Please complete a stability analysis along Tucson Street embankment for at least one cross-section under a saturated slope (high pore water pressure)/rapid reservoir drawdown conditions to verify that the proposed slopes below Tucson Street will be stable under all conditions. Please provide the stability analysis data to allow the Division to duplicate the analysis with Clover Technology's Galena software for verification purposes*

This stability analysis will be required by Adams County at a future date when the final reservoir slopes will be designed by the City of Aurora and their subcontractors. There is no County requirement for this analysis to be performed prior to mining.

Objection

32. *The Division received a timely objections, in accordance with Rule 1.7.1(2)(a), from B. Michl Lloyd, Wayne Muhler and Sherie Gould on November 15 and 16, 2021, the objections are attached to this adequacy letter (Attachment 1). Please respond to the objections.*

The comments obtained in the objections largely address items that are not relevant to the requested amendment change to change the previously approved location of the conveyor. To the extent the comments do address the revised conveyor location, such as impacts to wildlife, these items have been responded to in the above adequacy review comment responses and previous application materials.

The remaining comments are directed to items such as noise and dust control, which were addressed in the approved Adams County Conditional Use Permit, and are not within jurisdiction of the Mined Land Reclamation Board.

The applicant will attempt to contact each of the objectors and resolve the objections prior to any required pre-hearing conference as part of its continuing public outreach efforts for the Tucson South Mine.

Included in this response is:

- Revised Exhibit B.
- Revised Exhibit C.
- Revised Exhibit D.
- Revised Exhibit E.
- Revised Exhibit F.
- Slurry Wall Plans.
- Gravel Well Permit.
- Underdrain Plans.
- Raptor Nest Survey.
- XSTABL Stability Analysis Input and Output files along the Challenger Reservoir.

If there are any questions, please do not hesitate to call or email me.

CIVIL RESOURCES, LLC

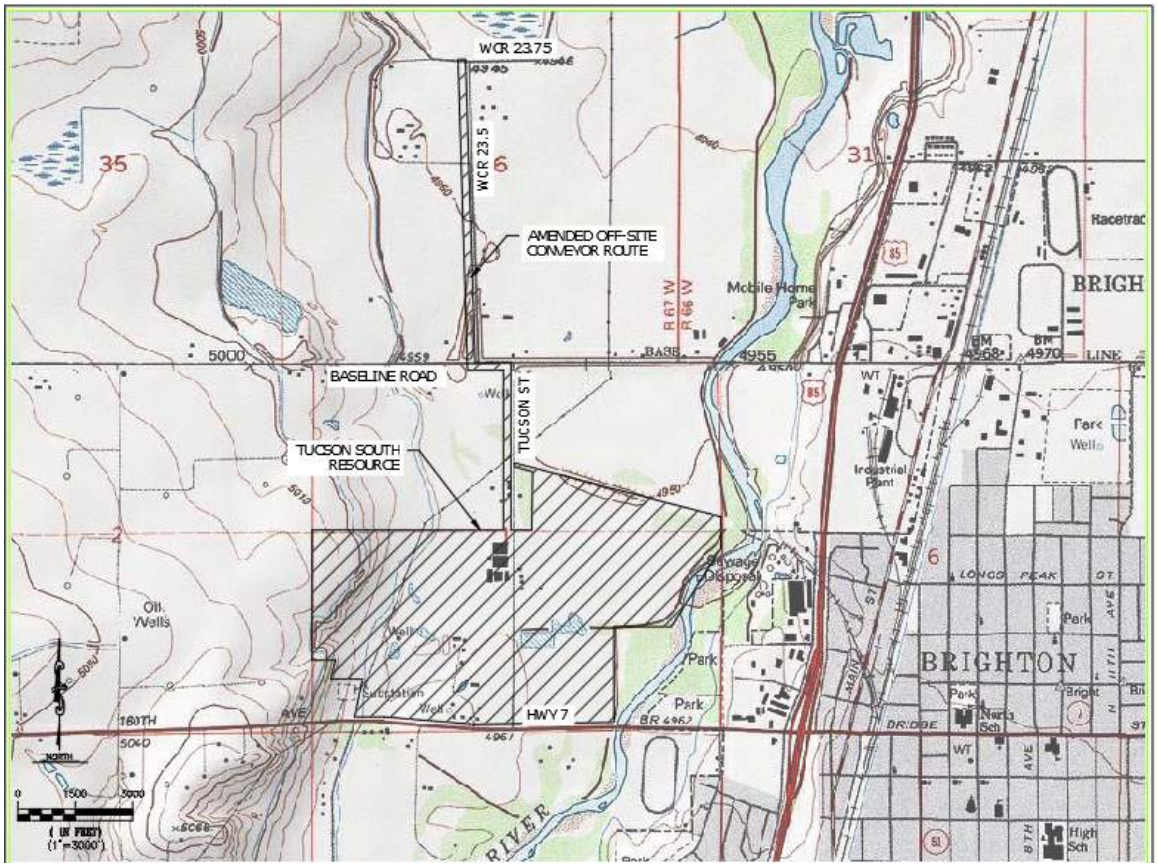
Gary Linden, P.G.

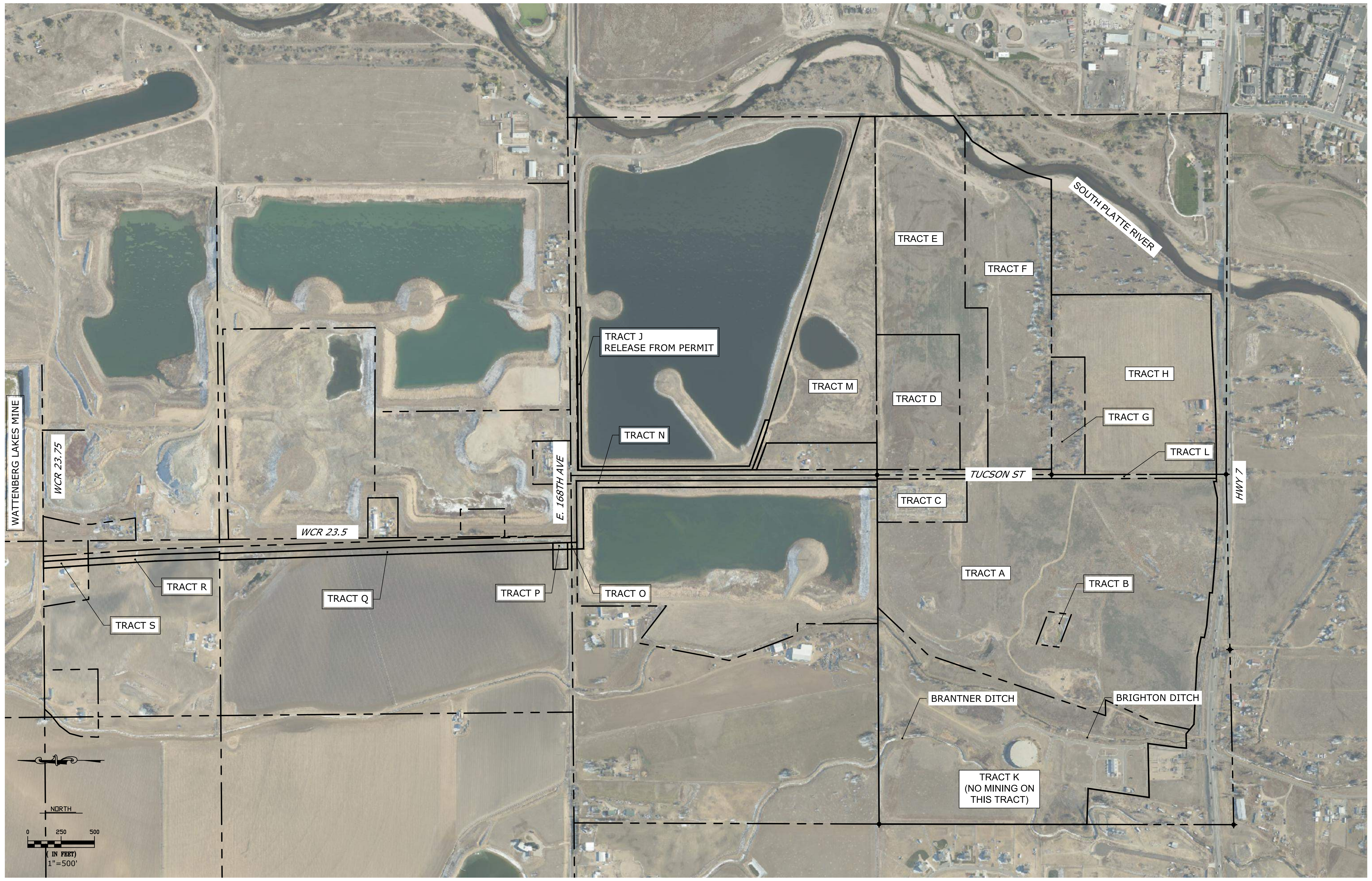
Encl:

J:\Aggregate Industries-297\Tucson South Permit Support\2021 amendment\DRMS\DRMS Responses\Adequacy review\Preliminary Adequacy response.doc

EXHIBIT B – INDEX MAP

Please refer to the attached index map.





TUCSON SOUTH RESOURCE

PRE-MINING AND MINING PLAN MAPS

MINING NOTES

1. REFER TO EXHIBITS C-2, C-3 AND C-4 FOR ADJACENT PROPERTY OWNERS, SOURCE OF SURVEY/TOPOGRAPHY, AND BENCHMARK INFORMATION.

2. AN ENGINEERING STABILITY ANALYSIS FOR SLIDING FAILURE HAS BEEN PERFORMED. MINING OCCURRING WITHIN 200' OF A MAN-MADE STRUCTURE NOT OWNED BY THE APPLICANT/OPERATOR HAS ADEQUATE SETBACK FOR SLIDING FAILURE. THE LIMIT OF MINING EXCAVATION PER THE GEOTECHNICAL SLOPE STABILITY ANALYSIS IS SHOWN ON EXHIBITS C-2, C-3 AND C-4.

3. FOR THE WEST AND EAST CELLS, THE OPERATOR WILL USE DRY MINING TECHNIQUES AND EXCAVATE MATERIAL BY BACKHOE, BULLDOZERS, AND SIMILAR EQUIPMENT. THE MINING FOR THESE PHASES WILL INVOLVE INSTALLATION OF A SLURRY WALL, DE-WATERING ACTIVE MINE AREAS AND PUMPING IN ACCORDANCE WITH THE DISCHARGE PERMIT.

4. TOPSOIL AND OVERBURDEN STOCKPILES SHALL BE TEMPORARILY STORED IN THE AREAS SHOWN. THE STOCKPILES IN THE FLOODPLAIN SHALL BE ALIGNED PARALLEL TO THE FLOOD FLOW DIRECTION OF THE S. PLATTE RIVER, HAVE MAXIMUM HEIGHT OF 30', A MAXIMUM LENGTH OF 300', MAXIMUM 3H:1V SLOPES, AND A MINIMUM OF 100' BETWEEN STOCKPILES.

5. OVERBURDEN AND TOPSOIL STOCKPILES ABOVE EXISTING GRADE, THAT ARE EXPECTED TO BE PRESENT FOR OVER 1 YEAR, WILL BE SEEDED WITH A TEMPORARY SEED MIX AS WEATHER PERMITS.

6. OVERBURDEN AND TOPSOIL STOCKPILES MAY BE STORED IN THE BOTTOM OF THE MINING CELLS IN EAST AND WEST MINING AREAS AS LONG AS THE TOP OF THE STOCKPILES ARE BELOW THE PRE-MINING SURFACE ELEVATION.

7. STOCKPILED TOPSOIL WILL BE SEGREGATED FROM OTHER SOIL.

8. THE OPERATION WILL INVOLVE CONCURRENT MINING AND RECLAMATION WITH FINAL SLOPES BEING 3H:1V, AND PLACEMENT OF 6" TO 12" OF TOPSOIL ON ALL RECONSTRUCTED AREAS ABOVE THE PROPOSED HIGH WATER LEVEL OF THE FUTURE RESERVOIR; AND OTHER DISTURBED AREAS AS NECESSARY.

9. CIVIL RESOURCES, LLC IS NOT RESPONSIBLE FOR SAFETY, IN, ON, OR ABOUT THE PROJECT SITE, NOR FOR COMPLIANCE BY THE APPROPRIATE PARTY OF ANY REGULATIONS THERETO.

10. A MINIMUM OF TEN (10) FEET OF CLEARANCE FROM ANY EXISTING POWERLINE OR FUTURE POWERLINE SHALL BE MAINTAINED AT ALL TIMES AS OUTLINES BY STATE STATUES.

11. UTILITIES SHOWN ON THIS PLAN WERE FIELD LOCATED AT THE TIME OF PLAN PREPARATION. FOR SAFETY, THE OPERATOR SHOULD LOCATE UTILITIES PRIOR TO SLURRY WALL CONSTRUCTION, OR MINING ACTIVITY.

12. PRIOR TO DISTURBANCE OF ANY WATERS OF THE U.S. AGGREGATE INDUSTRIES, INC WILL GET APPROPRIATE APPROVALS FROM THE U.S. ARMY CORPS OF ENGINEERS.

13. NO IRRIGATION DITCHES WILL BE DISTURBED. LATERALS THAT SERVE THE PROPERTY WILL BE REMOVED.

14. THE MAXIMUM SLOPE ON EASTERN HIGHWALL EXCAVATIONS THAT ARE 400 FEET OR LESS FROM THE SOUTH PLATTE RIVER SHALL NOT EXCEED 3H:1V BETWEEN APRIL 1 AND SEPTEMBER 30.

15. THE MINING LIMITS SHOWN HEREIN ASSUME SIDE SLOPE AND 3H:1V (EAST AND WEST AREAS) AS DESCRIBED IN THE SLOPE STABILITY AND SETBACK UPDATES MEMO (TETRA TECH, NOV 8, 2019). DEVIATIONS FROM THE ASSUMPTIONS MADE IN THE MEMO IMPACT THE ALLOWABLE GEOTECHNICAL SETBACK. THIS MEMO DOES NOT DOCUMENT SETBACKS THAT ARE BASED ON MUTUAL AGREEMENTS OR ADAMS COUNTY REGULATIONS.

Sheet List Table

SHEET NUMBER	SHEET TITLE
C-1	EXHIBIT C COVER SHEET & MINING NOTES
C-2	EXHIBIT C PRE-MINING PLAN WEST AREA
C-3	EXHIBIT C PRE-MINING EAST AREA
C-4	EXHIBIT C PRE-MINING PLAN WELD COUNTY CONVEYOR AREA
C-5	EXHIBIT C WEST AREA MINING PLAN
C-6	EXHIBIT C EAST AREA MINING PLAN
C-7	EXHIBIT C WELD COUNTY CONVEYOR AREA MINING PLAN
C-8	EXHIBIT C MINING PLAN DETAILS

GRAVEL MINING APPLICANT/OPERATOR:

AGGREGATE INDUSTRIES-WCR. INC.
1687 COLE BLVD, STE 300
GOLDEN, COLORADO 80401

SURFACE OWNERS:

AGGREGATE INDUSTRIES-WCR. INC.(TRACTS A, B, D, E, F, H, AND M)
1687 COLE BLVD, STE 300
GOLDEN, COLORADO 80401

CITY OF AURORA (TRACTS C, G, K AND N)
15151 EAST ALAMEDA PARKWAY, STE 3600
AURORA, COLORADO 80012

ADAMS COUNTY (TRACTS L & O)
ADAMS COUNTY GOVERNMENT CENTER
4430 SOUTH ADAMS COUNTY PARKWAY
BRIGHTON, COLORADO 80601

YOSHI & SUZU, LLP (TRACTS P & Q)
PO BOX 508
BRIGHTON, CO 80601

DOROTHY AND JAMES STRUCK (TRACT R)
507 COUNTY ROAD 23.5
BRIGHTON, COLORADO 80603

TOBY STRUCK (TRACT S)
527 COUNTY ROAD 23.5
BRIGHTON, COLORADO 80603

UTILITY INFORMATION

UTILITY INFORMATION TAKEN FROM THE TUCSON SOUTH ALTA/NSPS LAND TITLE SURVEY DATED SEPTEMBER 7, 2018 BY CIVIL ARTS AND STRUCTURES SURVEY DATED SEPTEMBER 2, 2021.

PLEASE REFER TO SHEETS C-2, C-3 AND C-4 FOR ADJACENT PROPERTY OWNERS WITHIN 200' OF PERMIT BOUNDARY. ADJACENT PROPERTY OWNER INFORMATION WAS PROVIDED BY ADAMS COUNTY AND WELD COUNTY RECORDS.

FLOOD HAZARD LEGEND:

EFFECTIVE ZONE AE: AREA OF 1% ANNUAL CHANCE FLOOD WITH BASE FLOOD ELEVATIONS DETERMINED,AS SHOWN ON FEMA FIRM (MARCH 15, 2007)

EFFECTIVE ZONE X: AREAS OF 0.2% ANNUAL CHANCE FLOOD; AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND AREAS PROTECTED BY LEVEES FROM 1% ANNUAL CHANCE FLOOD, AS SHOWN ON FEMA FIRM (MARCH 5, 2007)

EFFECTIVE FLOODWAY: THE FLOODWAY IS THE CHANNEL OF A STREAM PLUS ANY ADJACENT FLOODPLAIN AREAS THAT MUST BE LEFT FREE OF ENCROACHMENT SO THAT THE 1% ANNUAL CHANCE FLOOD CAN BE CARRIED WITHOUT SUBSTANTIAL INCREASES IN FLOOD HEIGHTS, AS SHOWN ON FEMA FIRM (MARCH 5, 2007)

PRE-PROJECT / MINING CONDITIONS: AREA IF 1% ANNUAL CHANCE FLOODPLAIN PER TETRA TECH STUDY (NOV. 2018 OR AS REVISED)

MINING AREA ACREAGE TABLE:

AREA/PHASE	TRACT	PERMIT BOUNDARY		AFFECTED AREA		MINED AREA
WEST/ PHASE1	A	82.6	137.6	82.6	88.6	72.0
	B	1.0		1.0		
	C	5.0		5.0		
	K	49.0		0.0		
EAST/ PHASE2	D	14.4	139.4	14.4	139.4	83.8
	E	30.7		30.7		
	F	29.6		29.6		
	G	4.9		4.9		
	H	32.6		32.6		
	M	27.2		27.2		
CONVEYOR	N	3.1	7.7	3.1	7.7	0.0
	O	0.1		0.1		
	P	0.1		0.1		
	Q	2.9		2.9		
	R	1.1		1.1		
	S	0.4		0.4		
TUCSON ST	L	2.9	2.9	2.9	2.9	0.0
TOTALS			287.6		238.6	155.8

CERTIFICATION:

THIS MAP WAS PREPARED BY CIVIL RESOURCES, LLC. IN COOPERATION WITH AGGREGATE INDUSTRIES-WCR, INC. AGGREGATE INDUSTRIES-WCR, INC. WILL KEEP THE DIVISION OF RECLAMATION, MINING, AND SAFETY INFORMED OF ANY CHANGES TO THE MINING OR RECLAMATION PLANS THROUGH ANNUAL REPORTS AND FILE TECHNICAL REVISIONS OR AMENDMENT APPLICATIONS AS NECESSARY THROUGHOUT THE LIFE OF THE MINE.

GARY LINDEN — 12/01/2021
DATE

811 Know what's below. Call before you dig.

CIVIL RESOURCES
8308 COLORADO BLVD
SUITE 200
FIRESTONE, CO 80504
303.833.1416
WWW.CIVILRESOURCES.COM

AGGREGATE INDUSTRIES
1687 COLE BLVD, STE 300
GOLDEN, COLORADO 80401
303-648-1175(P)

TUCSON SOUTH RESOURCE
EXHIBIT C

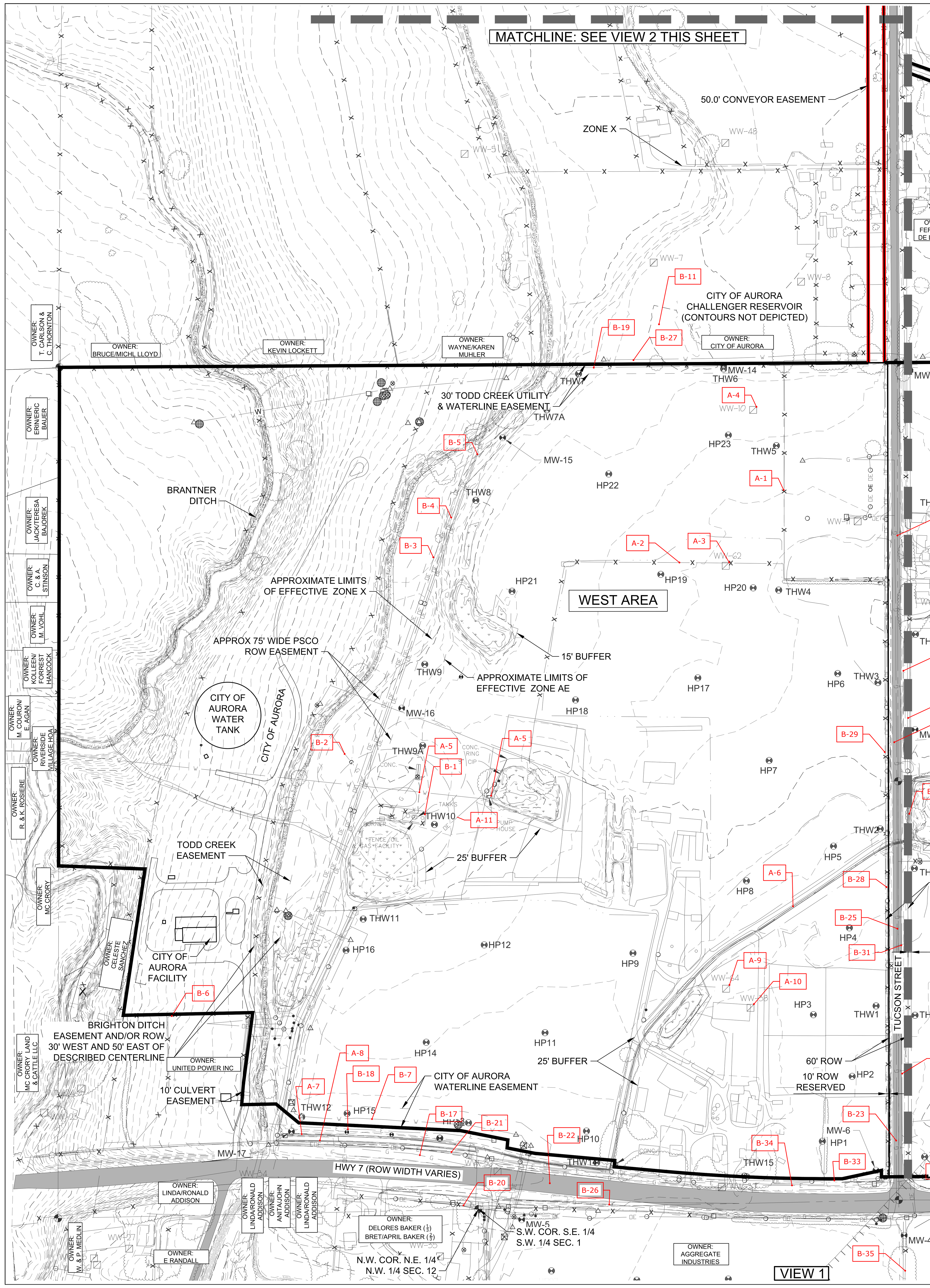
REVISIONS

NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21

DRAWN BY: CI — DATE: AUGUST 21
CHECKED BY: GL — SCALE: AS NOTED
AS NOTED
JOB NO.: 297.001.09
DWG NAME: C-1 EXHIBIT C EAST AREA RECLAMATION PLAN COVER.dwg

EXHIBIT C COVER SHEET & MINING NOTES

SHEET: C-1



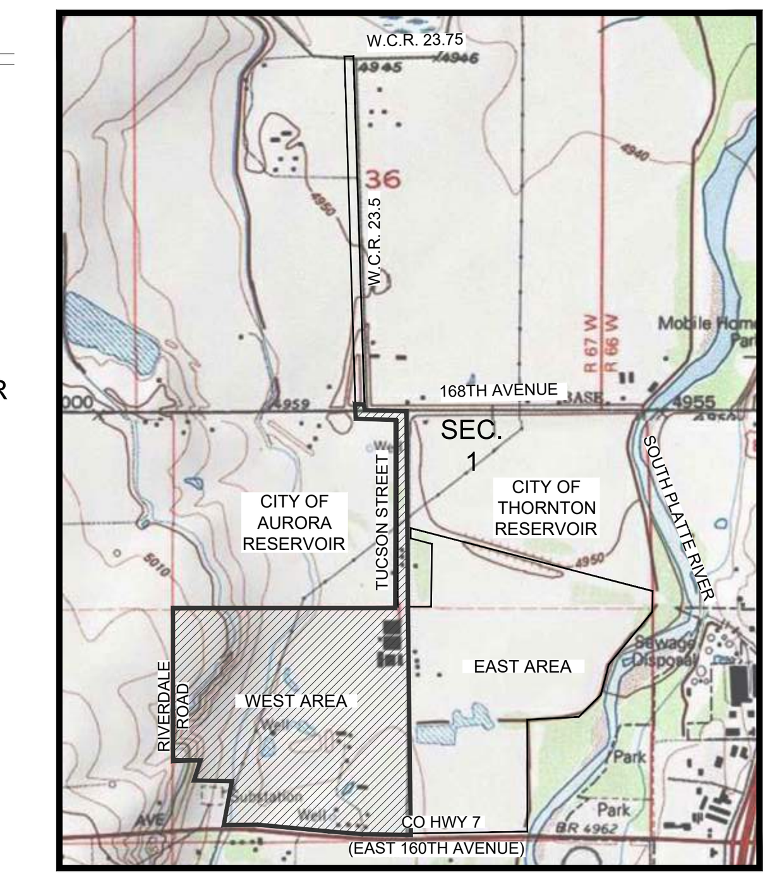
LEGEND:

MINE PERMIT BOUNDARY	EXISTING OVERHEAD ELECTRIC LINE (OE)
TRACT BOUNDARY	EXISTING GAS LINE (G)
EFFECTIVE FLOODWAY	EXISTING WATER LINE (W)
EFFECTIVE ZONE AE	EXISTING TELEPHONE LINE (OT)
EFFECTIVE ZONE X	EXISTING ASPHALT ROAD
PRE-PROJECT/MINING CONDITIONS 100-YR FLOODPLAIN	EXISTING SOUTH PLATTE RIVER
EXISTING EDGE OF WATER	MONITORING WELL LOCATION WITH WELL ID # (MW-1)
EXISTING 2' CONTOURS (4900)	WATER WELL LOCATION WITH WELL ID # (WW-10)
EXISTING FENCE (x)	EXISTING TREES
EXISTING EDGE OF ROAD	UTILITY POLE
EXISTING ELECTRIC LINE (UE)	SECTION CORNER MONUMENT

CERTIFICATION:

THIS MAP WAS PREPARED BY CIVIL RESOURCES, LLC. IN COOPERATION WITH AGGREGATE INDUSTRIES-WCR, INC. AGGREGATE INDUSTRIES-WCR, INC. WILL KEEP THE DIVISION OF RECLAMATION, MINING, AND SAFETY INFORMED OF ANY CHANGES TO THE MINING OR RECLAMATION PLANS THROUGH ANNUAL REPORTS AND FILE TECHNICAL REVISIONS OR AMENDMENT APPLICATIONS AS NECESSARY THROUGHOUT THE LIFE OF THE MINE.

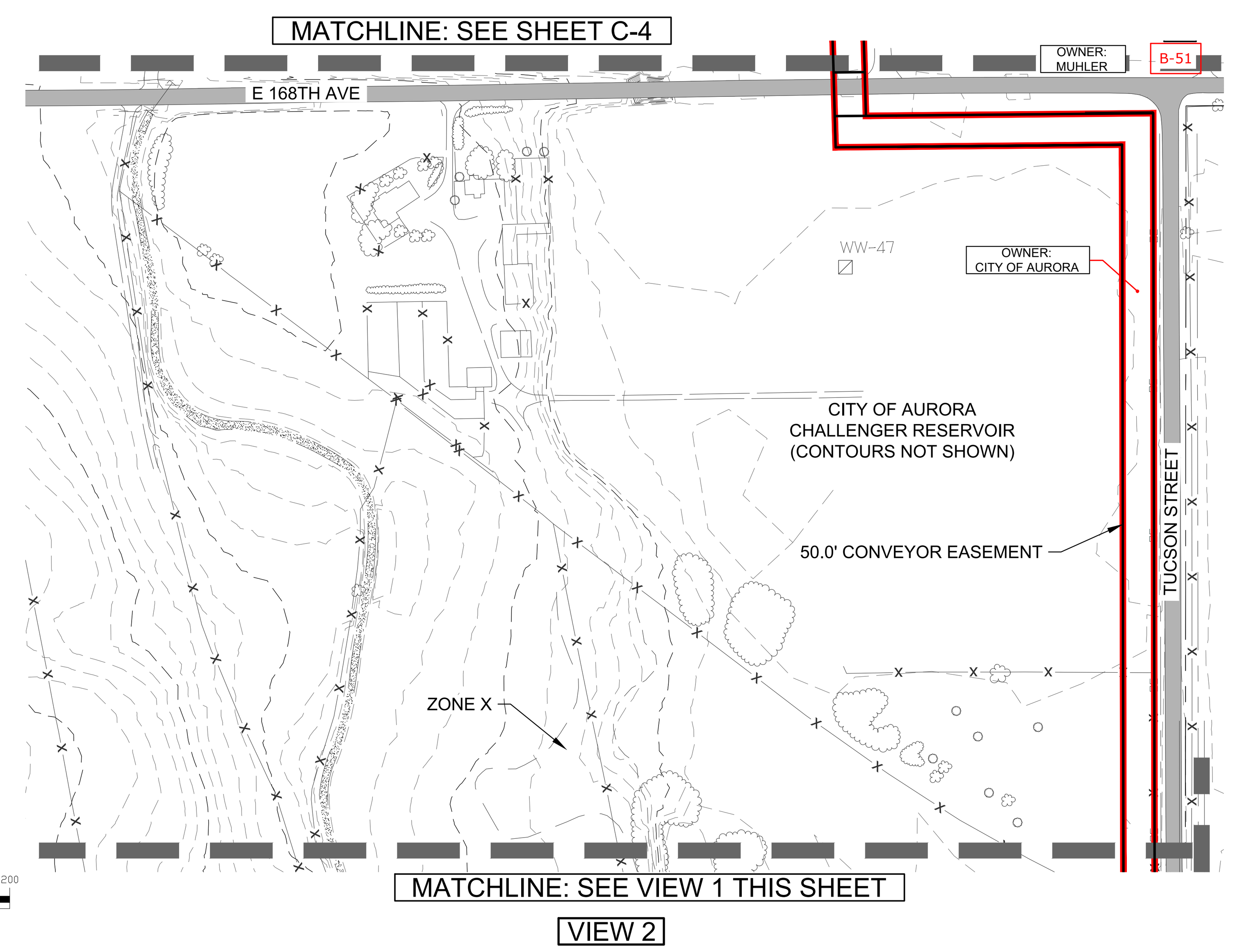
GARY LINDEN — 12/01/2021
DATE



PERMIT KEY MAP
NTS

STRUCTURE ID	STRUCTURE DESCRIPTION	OWNER	ADDRESS	RECOMENDED OFFSET PER STABILITY ANALYSES (FT)*	STRUCTURE AGREEMENT OR MHFCD OFFSET (FT)	ACTUAL OFFSET FROM MINING LIMITS (FT)**
STRUCTURES TO BE REMOVED OR ABANDONED						
A-1	FENCE	CITY OF AURORA	15151 E. ALAMEDA PKWY, AURORA, CO 80012	--	--	--
A-2	FENCES LOCATED ON PROPERTY	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	--	--	--
A-3	WW-62	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	--	--	--
A-4	WW-10	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	--	--	--
A-5	PUMP HOUSE WELL & WATERLINE	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	--	--	--
A-6	IRRIGATION DITCH	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	--	--	--
A-7	IRRIGATION LATERALS	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	--	--	--
A-8	IRRIGATION LATERALS	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	--	--	--
A-9	WW-64	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	--	--	--
A-10	WW-38	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	--	--	--
A-11	OVERHEAD POWER POLES	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	--	--	--
B-1	OIL AND GAS FACILITY, WELL, APPURTENACES, AND FENCE	GREAT WESTERN OPERATING COMPANY, LLC	1001 17TH ST., SUITE 2000, DENVER, CO 80202	--	--	--
B-2	GAS LINE	GREAT WESTERN OPERATING COMPANY, LLC	1001 17TH ST., SUITE 2000, DENVER, CO 80202	--	--	--
STRUCTURE ID	STRUCTURE DESCRIPTION	OWNER	ADDRESS			
STRUCTURES TO BE PRESERVED						
B-3	OVERHEAD ELECTRIC POWER POLES	PUBLIC SERVICE COMPANY OF COLORADO	1800 LARIMER ST. DENVER, CO 80202	68	--	75 min
B-4	OVERHEAD ELECTRIC POWER POLES	PUBLIC SERVICE COMPANY OF COLORADO	1800 LARIMER ST. DENVER, CO 80202	68	--	75 min
B-5	OVERHEAD ELECTRIC POWER POLES	PUBLIC SERVICE COMPANY OF COLORADO	1800 LARIMER ST. DENVER, CO 80202	68	--	75 min
B-6	ELECTRICAL SUBSTATION	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	45	--	511
B-7	WATERLINE	CITY OF AURORA	15151 E. ALAMEDA PKWY, AURORA, CO 80012	72	60	83 min
B-8	NUMBER INTENTIONALLY NOT USED	NA		--	--	--
B-9	BRIGHTON DITCH	BRIGHTON DITCH COMPANY	3286 WELD COUNTY RD 23, FT. LUPTON, CO 80621	45	--	90 min
B-10	NUMBER INTENTIONALLY NOT USED	NA		--	--	--
B-11	CHALLENGER RESERVOIR	CITY OF AURORA	15151 E. ALAMEDA PKWY, AURORA, CO 80012	45	--	176
B-12	NUMBER INTENTIONALLY NOT USED	NA		--	--	--
B-13	SHARED ACCESS	KATHLEEN BLOOM, DELORES, APRIL, AND BRETT BAKER, CITY OF AURORA	BLOOM: 12500 E. 160 AVE.,BRIGHTON, CO 80620; AURORA 15151 E ALAMEDA PKWY AURORA, CO 80012	106	--	200
B-14	NUMBER INTENTIONALLY NOT USED	NA		--	--	--
B-15	NUMBER INTENTIONALLY NOT USED	NA		--	--	--
B-16	NUMBER INTENTIONALLY NOT USED	NA		--	--	--
B-17	GAS LINE	XCEL	414 NICOLLET MALL MINNEAPOLIS, MN 55401	106	--	189
B-18	UNDERGROUND ELECTRIC	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	106	--	133
B-19	WATER LINE	TODD CREEK FARMS METROPOLITAN DIST. NO. 1	7550 EAST 152ND AVE.BRIGHTON, CO 80602	45	20	55
B-20	FENCE	COLORADO DEPT. OF TRANSPORTATION	2829 WEST HOWARD PLACE DENVER, CO 80204	106	--	257
B-21	FENCE	COLORADO DEPT. OF TRANSPORTATION	2829 WEST HOWARD PLACE DENVER, CO 80204	106	--	174
B-22	STATE HIGHWAY 7	COLORADO DEPT. OF TRANSPORTATION	2829 WEST HOWARD PLACE DENVER, CO 80204	106	--	185
B-23	GAS LINE	XCEL	414 NICOLLET MALL MINNEAPOLIS, MN 55401		--	
B-24	TELEPHONE LINE	CENTURY LINK	P.O. BOX 2560 OMAHA, NE 68103	106	--	257
B-25	TUCSON STREET	ADAMS COUNTY	4430 S. ADAMS PARKWAY BRIGHTON, CO 80601	44	--	71
B-26	GAS LINE	XCEL	414 NICOLLET MALL MINNEAPOLIS, MN 55401	106	--	129
B-27	WATER LINE	TODD CREEK FARMS METROPOLITAN DIST. NO. 1	7550 EAST 152ND AVE.BRIGHTON, CO 80602	45	20	55
B-28	OVERHEAD ELECTRIC POWER POLES	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	44	--	53
B-29	FENCE	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	44	--	48
B-30	FENCE	CITY OF AURORA	15151 E. ALAMEDA PKWY, AURORA, CO 80012	44	--	122
B-31	TELEPHONE LINE	CENTURY LINK	P.O. BOX 2560 OMAHA, NE 68103	44	--	80
B-32	OVERHEAD ELECTRIC POWER POLES	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	106	--	186
B-33	OVERHEAD ELECTRIC POWER POLES	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	106	--	111
B-34	UNDERGROUND ELECTRIC	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	106	--	128
B-35	FENCE	SAN MARTIN CABALLERO, LLC	13110 E. 160TH AVE. BRIGHTON, CO 80601	106	--	600
B-51	PRIVATE RESIDENCE AND OUT BUILDINGS	CRISTOFER MUHLER	11585 WELD COUNTY RD 2, BRIGHTON, CO 80603	--	--	2405

* Offset is selected from nearest feature analyzed in stability analyses



NORTH
1"=200'

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TUCSON SOUTH RESOURCE
EXHIBIT C
PRE-MINING WEST AREA

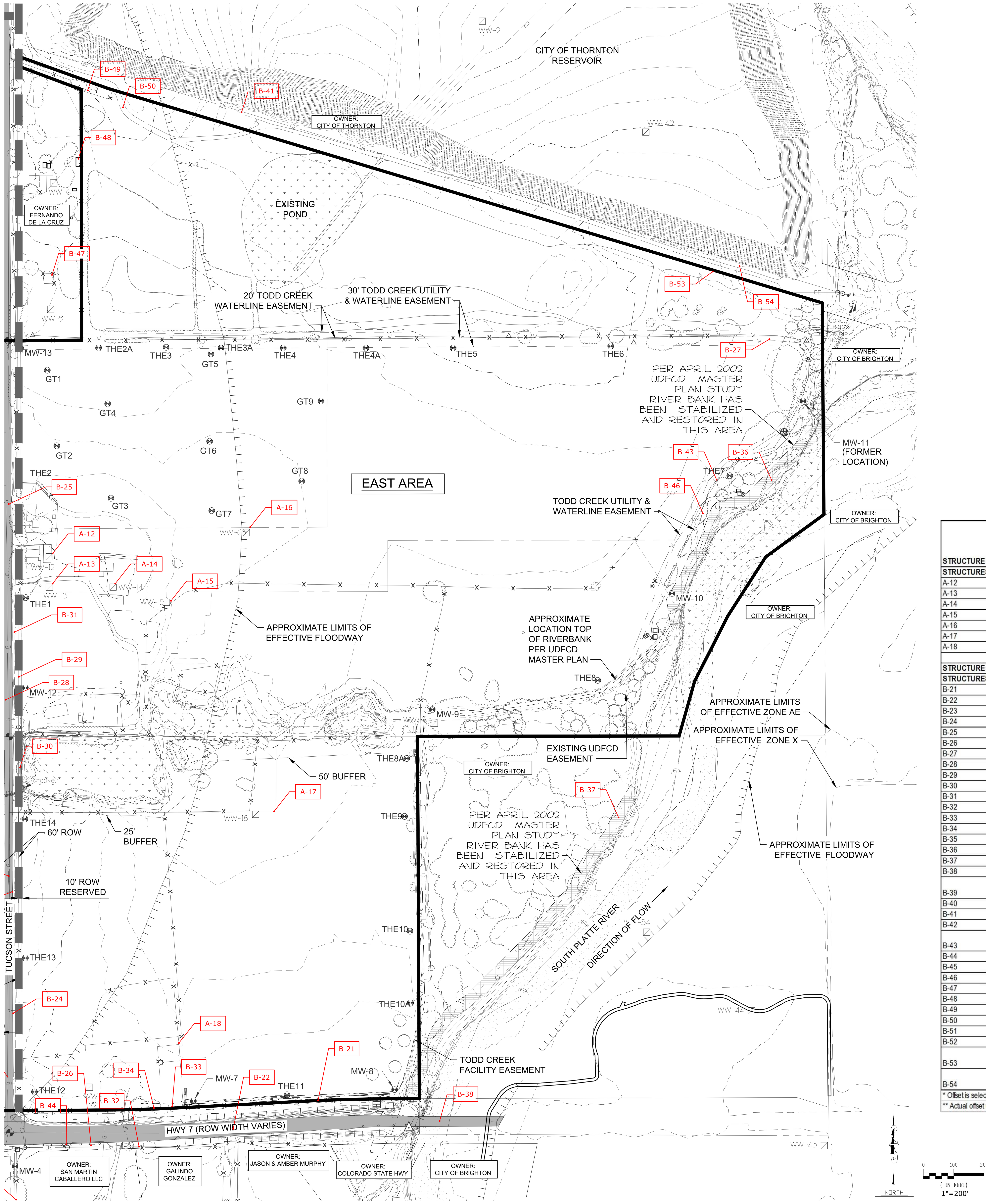
REVISIONS

NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21

DRAWN BY: CI DATE: AUGUST 21
CHECKED BY: GL SCALE: AS NOTED / AS NOTED
JOB NO.: 297.001.09
DWG NAME: C-3 EXHIBIT C MINING PLAN MAP.dwg

EXHIBIT C
PRE-MINING PLAN
WEST AREA

SHEET: C-2



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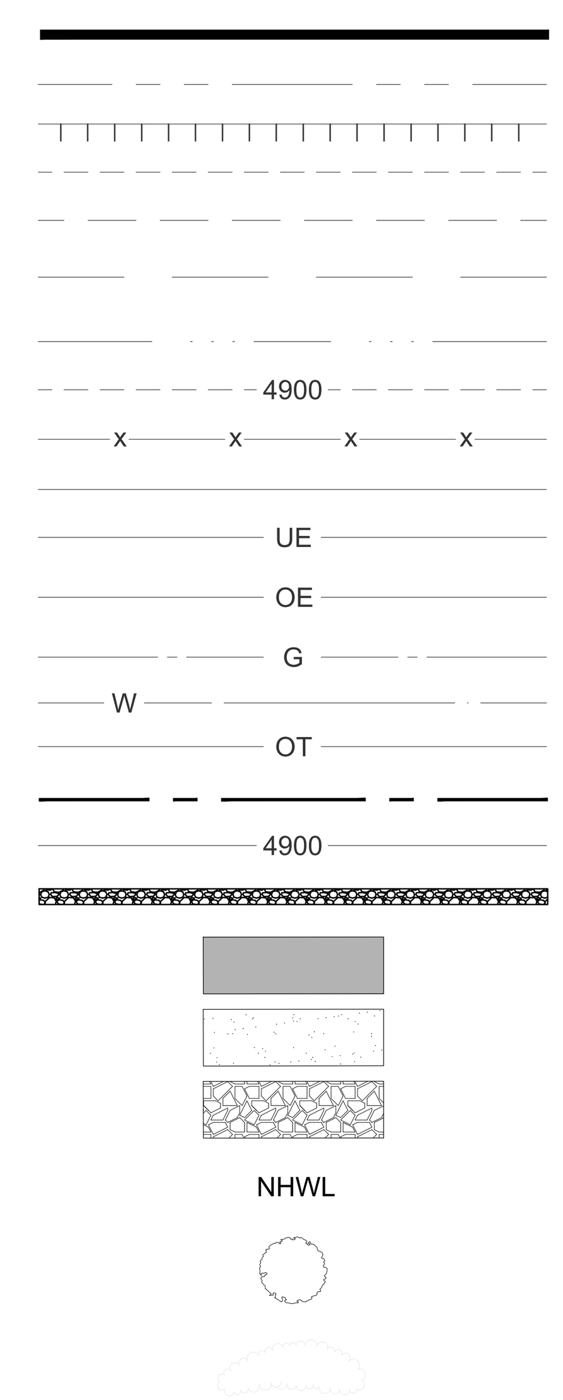
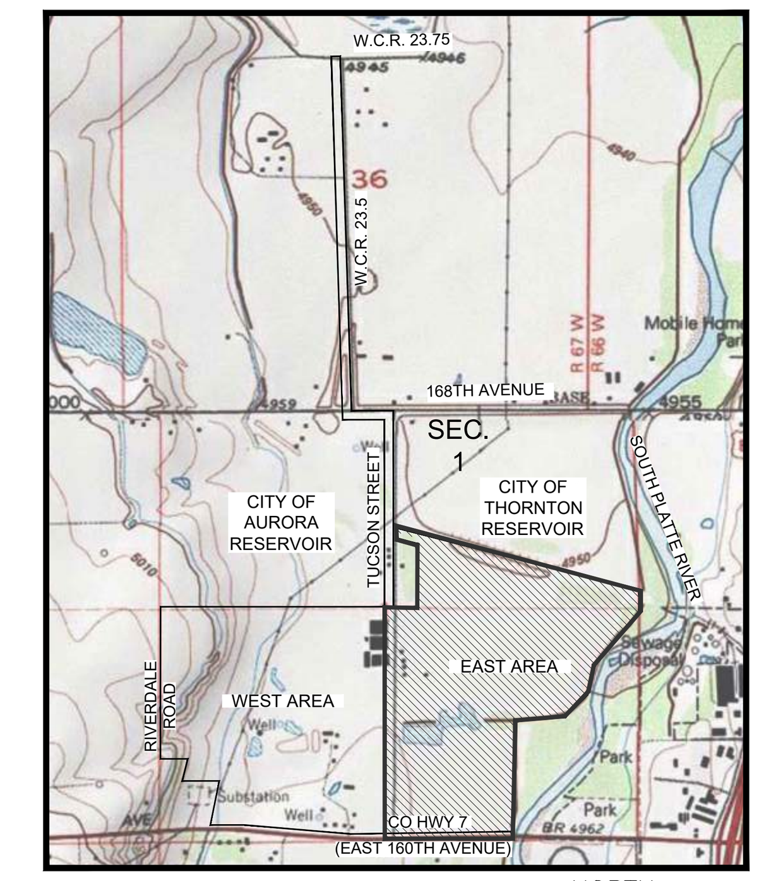


- MINE PERMIT BOUNDARY
- TRACT BOUNDARY
- EFFECTIVE FLOODWAY
- EFFECTIVE ZONE AE
- EFFECTIVE ZONE X
- PRE-PROJECT/MINING CONDITIONS 100-YR FLOODPLAIN
- EXISTING EDGE OF WATER
- EXISTING 2' CONTOURS
- EXISTING FENCE
- EXISTING EDGE OF ROAD
- EXISTING ELECTRIC LINE
- EXISTING OVERHEAD ELECTRIC LINE
- EXISTING GAS LINE
- EXISTING WATER LINE
- EXISTING TELEPHONE LINE
- PROPOSED SLURRY WALL
- PROPOSED 2' CONTOURS
- RESERVOIR ACCESS ROAD
- EXISTING ASPHALT ROAD
- EXISTING SOUTH PLATTE RIVER
- RESERVOIR ACCESS ROAD
- NORMAL HIGH WATER LINE
- PROPOSED COTTONWOOD TREE (LOCATIONS SUBJECT TO CHANGE)
- PROPOSED SHRUB BEDS (LOCATIONS SUBJECT TO CHANGE)



PERMIT KEY MAP
NTS

CERTIFICATION:

THIS MAP WAS PREPARED BY CIVIL RESOURCES, LLC. IN COOPERATION WITH AGGREGATE INDUSTRIES-WCR, INC. AGGREGATE INDUSTRIES-WCR, INC. WILL KEEP THE DIVISION OF RECLAMATION, MINING, AND SAFETY INFORMED OF ANY CHANGES TO THE MINING OR RECLAMATION PLANS THROUGH ANNUAL REPORTS AND FILE TECHNICAL REVISIONS OR AMENDMENT APPLICATIONS AS NECESSARY THROUGHOUT THE LIFE OF THE MINE.

GARY LINDEN — DATE: 12/01/2021

STRUCTURE ID	STRUCTURE DESCRIPTION	OWNER	ADDRESS	RECOMENDED OFFSET PER STABILITY ANALYSES (FT)*	STRUCTURE AGREEMENT OR MHFCD OFFSET (FT)	ACTUAL OFFSET FROM MINING LIMITS (FT)**
STRUCTURES TO BE REMOVED						
A-12	WW-12	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	--	--	--
A-13	WW-13	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	--	--	--
A-14	WW-14	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	--	--	--
A-15	WW-15	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	--	--	--
A-16	WW-63	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	--	--	--
A-17	WW-18	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	--	--	--
A-18	PRIVATE RESIDENCE	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	--	--	--
STRUCTURE ID	**STRUCTURE DESCRIPTION**	**OWNER**	**ADDRESS**			
STRUCTURES TO BE PRESERVED						
B-21	FENCE	COLORADO DEPT. OF TRANSPORTATION	2829 WEST HOWARD PLACE DENVER, CO 80204	35	--	55
B-22	STATE HIGHWAY 7	COLORADO DEPT. OF TRANSPORTATION	2829 WEST HOWARD PLACE DENVER, CO 80204	35	--	133
B-23	GAS LINE	XCEL	414 NICOLLET MALL MINNEAPOLIS, MN 55401	35	--	104
B-24	TELEPHONE LINE	CENTURY LINK	P.O. BOX 2560 OMAHA, NE 68103	35	--	81
B-25	TUCSON STREET	ADAMS COUNTY	4430 S. ADAMS PARKWAY BRIGHTON, CO 80601	35	--	84
B-26	GAS LINE	XCEL	414 NICOLLET MALL MINNEAPOLIS, MN 55401	35	--	158
B-27	WATER LINE	TODD CREEK FARMS METROPOLITAN DIST. NO. 1	7550 EAST 152ND AVE.BRIGHTON, CO 80602	35	20	200
B-28	OVERHEAD ELECTRIC POWER POLES	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	35	--	126
B-29	FENCE	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	35	--	56
B-30	FENCE	CITY OF AURORA	15151 E. ALAMEDA PKWY, AURORA, CO 80012	35	--	57
B-31	TELEPHONE LINE	CENTURY LINK	P.O. BOX 2560 OMAHA, NE 68103	35	--	81
B-32	OVERHEAD ELECTRIC POWER POLES	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	35	--	176
B-33	OVERHEAD ELECTRIC POWER POLES	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	35	--	51
B-34	UNDERGROUND ELECTRIC	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	35	--	58
B-35	FENCE	SAN MARTIN CABALLERO, LLC	13110 E. 160TH AVE. BRIGHTON, CO 80601	--	--	250
B-36	RIVERBANK STABILIZATION	MILE HIGH FLOOD CONTROL DISTRICT	2480 W. 26TH AVE., SUITE 156B, DENVER, CO 80211	44	200	200 min
B-37	RIVERBANK STABILIZATION	MILE HIGH FLOOD CONTROL DISTRICT	2480 W. 26TH AVE., SUITE 156B, DENVER, CO 80211	44	200	200 min
B-38	HIGHWAY 7 BRIDGE	COLORADO DEPT. OF TRANSPORTATION	2829 WEST HOWARD PLACE DENVER, CO 80204	--	--	338
B-39	THORNTON RESERVOIR	CITY OF THORNTON	9500 CIVIC CENTER DR., THORNTON, CO 80229-4326	--	--	335
B-40	OVERHEAD ELECTRIC POWER POLES	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	--	--	2235
B-41	OVERHEAD ELECTRIC POWER POLES	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	--	--	776
B-42	168TH STREET	ADAMS COUNTY	4430 S. ADAMS PARKWAY BRIGHTON, CO 80601	--	--	2350
B-43	WATERLINE, PUMP HOUSE AND APPURTENANCES	TODD CREEK FARMS METROPOLITAN DIST. NO. 1	7550 EAST 152ND AVE.BRIGHTON, CO 80602	--	20	143
B-44	GUARDRAIL	COLORADO DEPT. OF TRANSPORTATION	2829 WEST HOWARD PLACE DENVER, CO 80204	35	--	162
B-45	NUMBER INTENTIONALLY NOT USED	NA		--	--	--
B-46	UNDERGROUND ELECTRIC	TODD CREEK FARMS METROPOLITAN DIST. NO. 1	7550 EAST 152ND AVE.BRIGHTON, CO 80602	--	20	173
B-47	PRIVATE RESIDENCE AND OUTBUILDINGS	FERNANDO ARMANDO DE LA CRUZ BRECEDA	16400 TUCSON STREET, BRIGHTON, CO 80601	--	--	292
B-48	PRIVATE RESIDENCE AND OUTBUILDINGS	FERNANDO ARMANDO DE LA CRUZ BRECEDA	16400 TUCSON STREET, BRIGHTON, CO 80601	--	--	675
B-49	OIL AND GAS FACILITY	GREAT WESTERN OPERATING COMPANY	1001 17TH ST., SUITE 2000, DENVER, CO 80202	--	--	916
B-50	ACCESS ROAD	AGGREGATE INDUSTRIES WCR. INC.	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	--	--	839
B-51	RRIVATE RESIDENCE AND OUTBUILDINGS	CHRISTOPHER MUHLER	11585 WELD COUNTY RD 2, BRIGHTON, CO 80603	--	--	2405
B-52	NUMBER INTENTIONALLY NOT USED	NA		--	--	--
B-53	FENCE	CITY OF THORNTON	9500 CIVIC CENTER DR., THORNTON, CO 80229-4326	--	--	315
B-54	GRAVEL ROAD	CITY OF THORNTON	9500 CIVIC CENTER DR., THORNTON, CO 80229-4326	--	--	320

* Offset is selected from nearest feature analyzed in stability analyses
** Actual offset is measured from the feature to the mie limit

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TUCSON SOUTH RESOURCE
EXHIBIT C
PRE-MINING EAST AREA

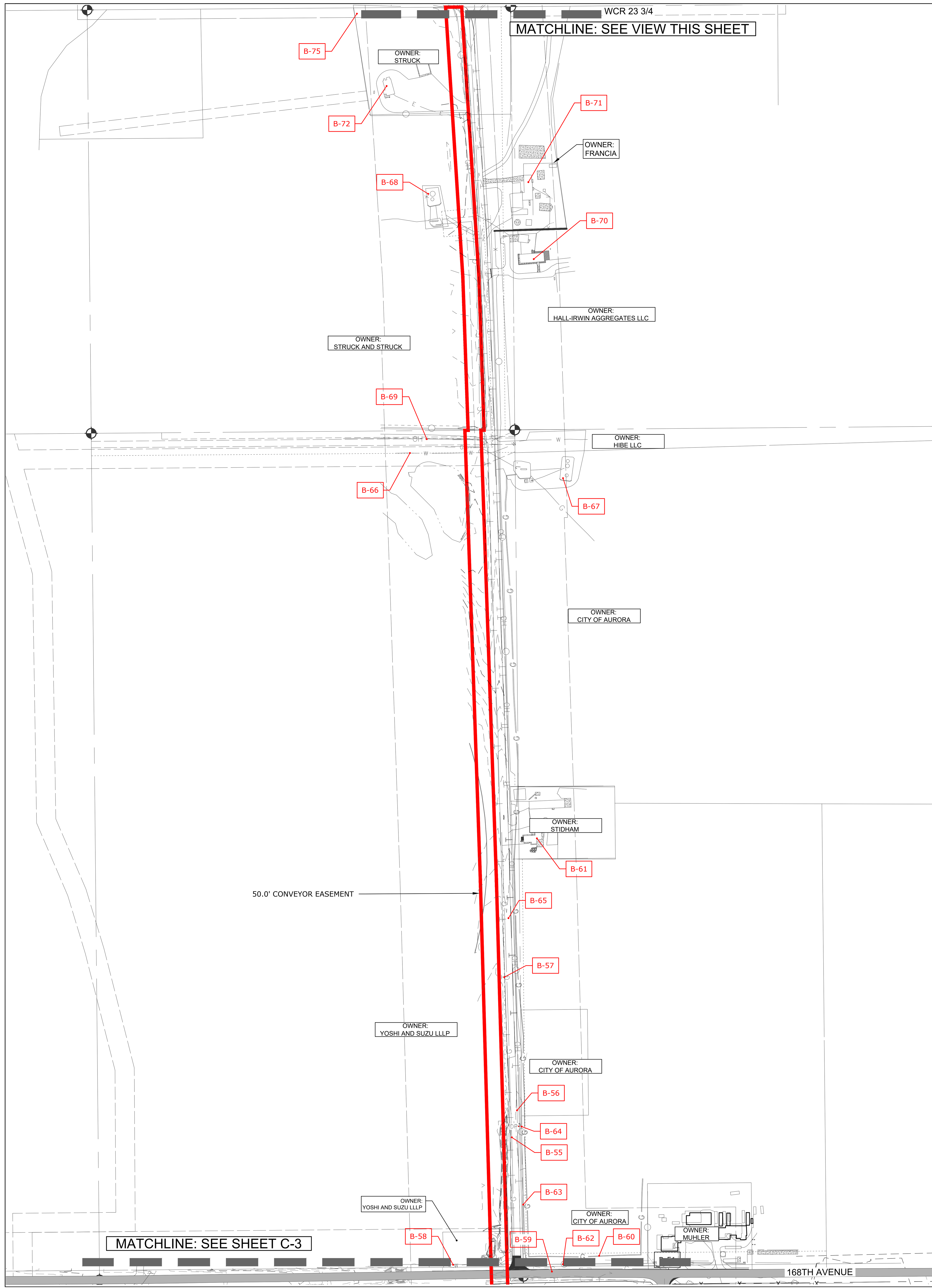
REVISIONS

NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21

DRAWN BY: CI — DATE: AUGUST 21
CHECKED BY: GL — SCALE: AS NOTED / AS NOTED
JOB NO.: 297.001.09
DWG NAME: C-3 EXHIBIT C MINING PLAN MAP.dwg

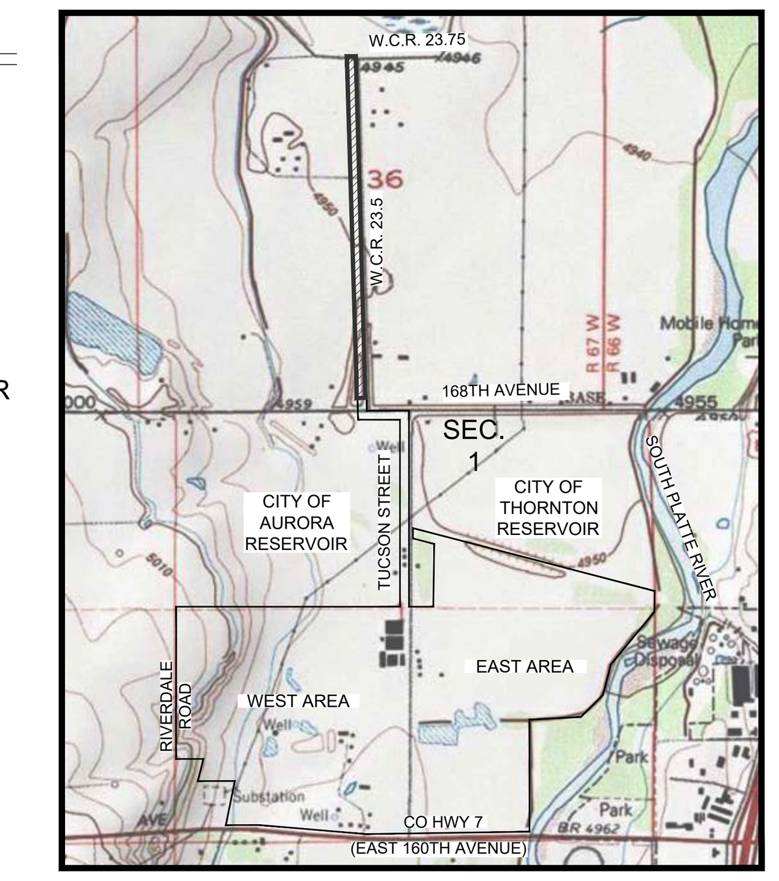
EXHIBIT C
PRE-MINING EAST AREA

SHEET: C-3



LEGEND:

MINE PERMIT BOUNDARY	EXISTING OVERHEAD ELECTRIC LINE (OE)
TRACT BOUNDARY	EXISTING GAS LINE (G)
EFFECTIVE FLOODWAY	EXISTING WATER LINE (W)
EFFECTIVE ZONE AE	EXISTING TELEPHONE LINE (OT)
EFFECTIVE ZONE X	EXISTING ASPHALT ROAD
PRE-PROJECT/MINING CONDITIONS 100-YR FLOODPLAIN	EXISTING SOUTH PLATTE RIVER
EXISTING EDGE OF WATER	MONITORING WELL LOCATION WITH WELL ID # (MW-1)
EXISTING 2' CONTOURS (4900)	WATER WELL LOCATION WITH WELL ID # (WW-10)
EXISTING FENCE	EXISTING TREES
EXISTING EDGE OF ROAD	UTILITY POLE
EXISTING ELECTRIC LINE (UE)	SECTION CORNER MONUMENT



PERMIT KEY MAP

NORTH

NTS

CERTIFICATION:

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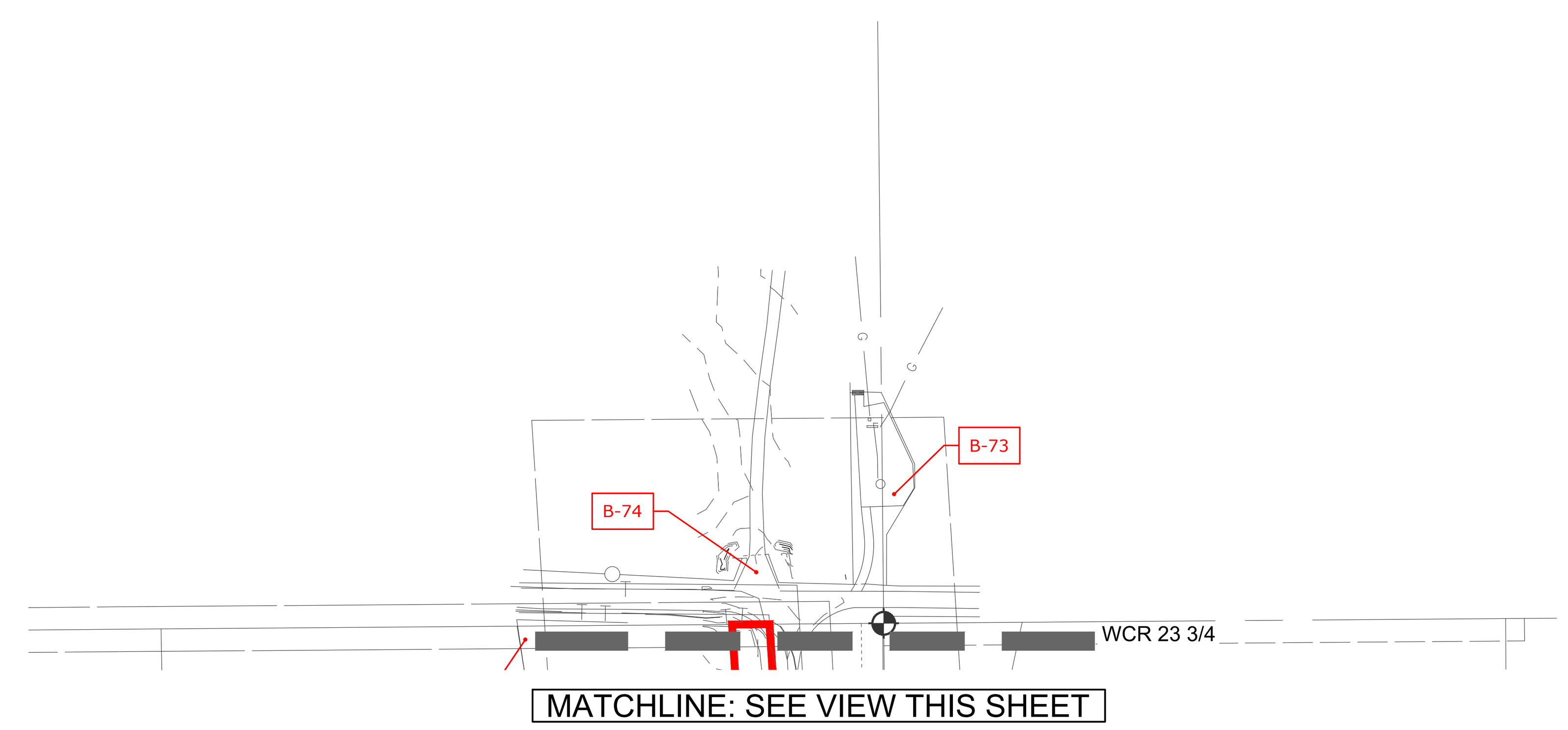
GARY LINDEN — DATE: 12/01/2021

STRUCTURE ID	STRUCTURE DESCRIPTION	OWNER	ADDRESS	RECOMENDED OFFSET PER STABILITY ANALYSES (FT)	STRUCTURE AGREEMENT OR MHFCD OFFSET (FT)	ACTUAL OFFSET FROM MINING LIMITS (FT)
STRUCTURES TO BE PRESERVED						
B-55	GAS LINE	XCEL	414 NICOLLET MALL MINNEAPOLIS, MN 55401	--	--	--
B-56	TELEPHONE LINE	CENTURY LINK	P.O. BOX 2560 OMAHA, NE 68103	--	--	--
B-57	TELEPHONE LINE	CENTURY LINK	P.O. BOX 2560 OMAHA, NE 68103	--	--	--
B-58	WATER LINE	MOUNTAIN VIEW WATER USERS	P.O. BOX 485 BRIGHTON, CO 80601	--	--	--
B-59	GAS LINE	WESTERN MIDSTREAM	9950 WOODLOCH FOREST DR STE. 2800 THE WOODLANDS TX, 77380	--	--	--
B-60	GAS LINE	WESTERN MIDSTREAM	9950 WOODLOCH FOREST DR STE. 2800 THE WOODLANDS TX, 77380	--	--	--
B-61	PRIVATE RESIDENCE AND OUTBUILDINGS	KYLE L STIDHAM	186 COUNTY ROAD 23.5, BRIGHTON, CO 80603	--	--	--
B-62	FENCE	CITY OF AURORA	15151 E. ALAMEDA PKWY, AURORA, CO 80012	--	--	--
B-63	FENCE	CITY OF AURORA	15151 E. ALAMEDA PKWY, AURORA, CO 80012	--	--	--
B-64	OVERHEAD ELECTRIC POWER POLES	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	--	--	--
B-65	WELD COUNTY ROAD 23.5	WELD COUNTY DEPT OF PUBLIC WORKS	1111 H ST., GREELEY, CO 80631	--	--	--
B-66	WATER LINE	CITY OF AURORA	15151 E. ALAMEDA PKWY, AURORA, CO 80012	--	--	--
B-67	TANK BATTERY	PDQ ENERGY	PO BOX 1899, ORANGE BEACH, AL 36561	--	--	--
B-68	TANK BATTERY	PDQ ENERGY	PO BOX 1899, ORANGE BEACH, AL 36561	--	--	--
B-69	OVERHEAD ELECTRIC POWER POLES	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	--	--	--
B-70	PRIVATE RESIDENCE AND OUTBUILDINGS	HALL IRWIN AGGREGATES LLC	301 CENTENNIAL DR, MILLIKEN, CO 80543	--	--	--
B-71	PRIVATE RESIDENCE AND OUTBUILDINGS	JAIME MEJIA FRANCIA	636 COUNTY ROAD 23.5, BRIGHTON, CO 80603	--	--	--
B-72	PRIVATE RESIDENCE AND OUTBUILDINGS	TOBY L STRUCK	527 COUNTY ROAD 23.5, BRIGHTON, CO 80603	--	--	--
B-73	TANK BATTERY	SYNERGY ENERGY	105 FORD LANE, HAZELWOOD, MO 63402	--	--	--
B-74	GRAVEL ROAD	CITY OF WESTMINSTER C/O DIR. OF PUBLIC WRKS	4800 W 92ND AVE, WESTMINSTER, CO 80031	--	--	--
B-75	WELD COUNTY ROAD 2.75	WELD COUNTY DEPT OF PUBLIC WORKS	1111 H ST., GREELEY, CO 80631	--	--	--



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TUCSON SOUTH RESOURCE
EXHIBIT C
PRE-MINING WELD COUNTY CONVEYOR

REVISIONS

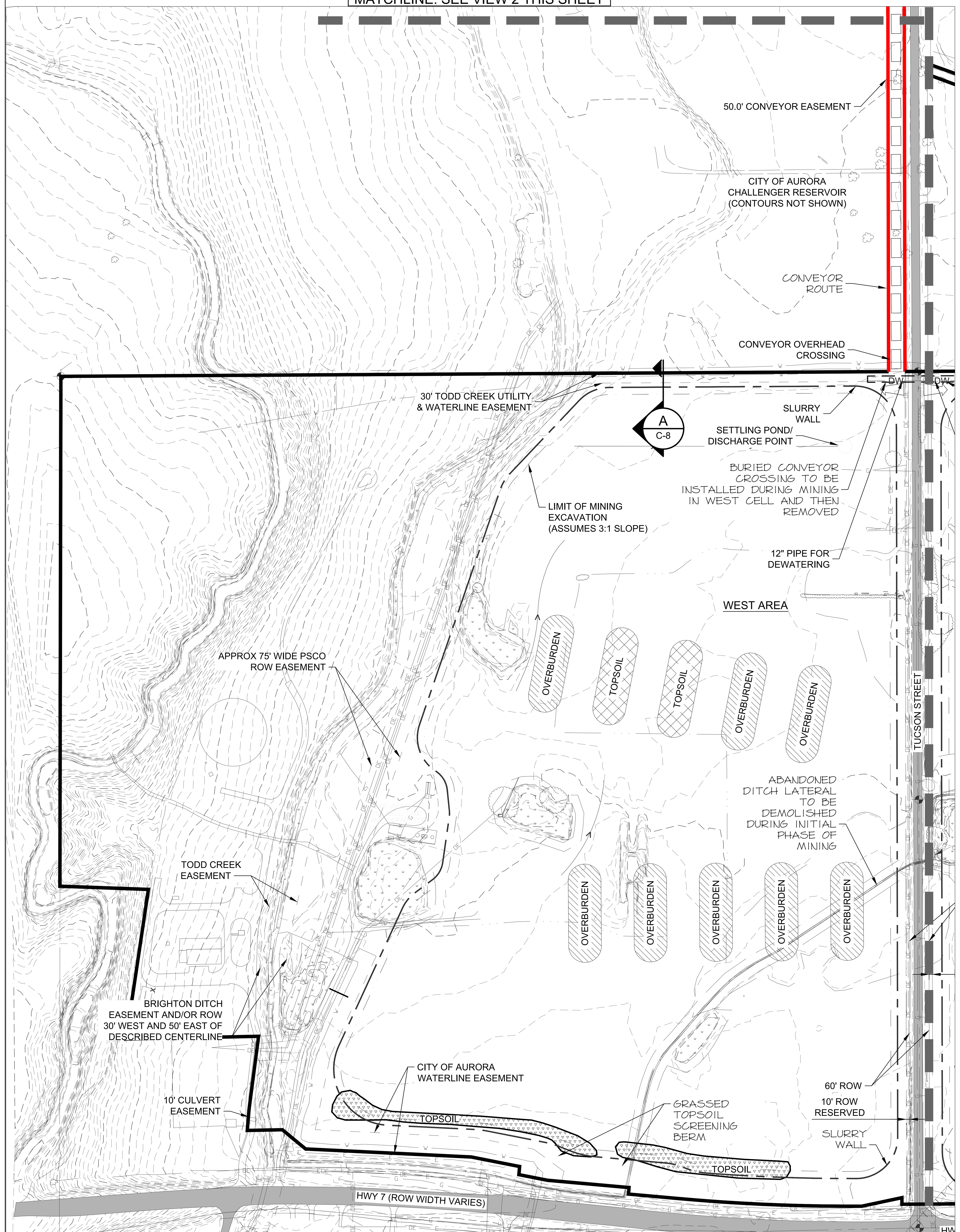
NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21

DRAWN BY: CI — DATE: AUGUST 21
CHECKED BY: GL — SCALE: AS NOTED
AS NOTED
JOB NO.: 297.001.09
DWG NAME: C-4.dwg

EXHIBIT C
PRE-MINING PLAN
WELD COUNTY
CONVEYOR AREA

SHEET: C-4

MATCHLINE: SEE VIEW 2 THIS SHEET



MATCHLINE: SEE SHEET C-6

VIEW 1

NORTH

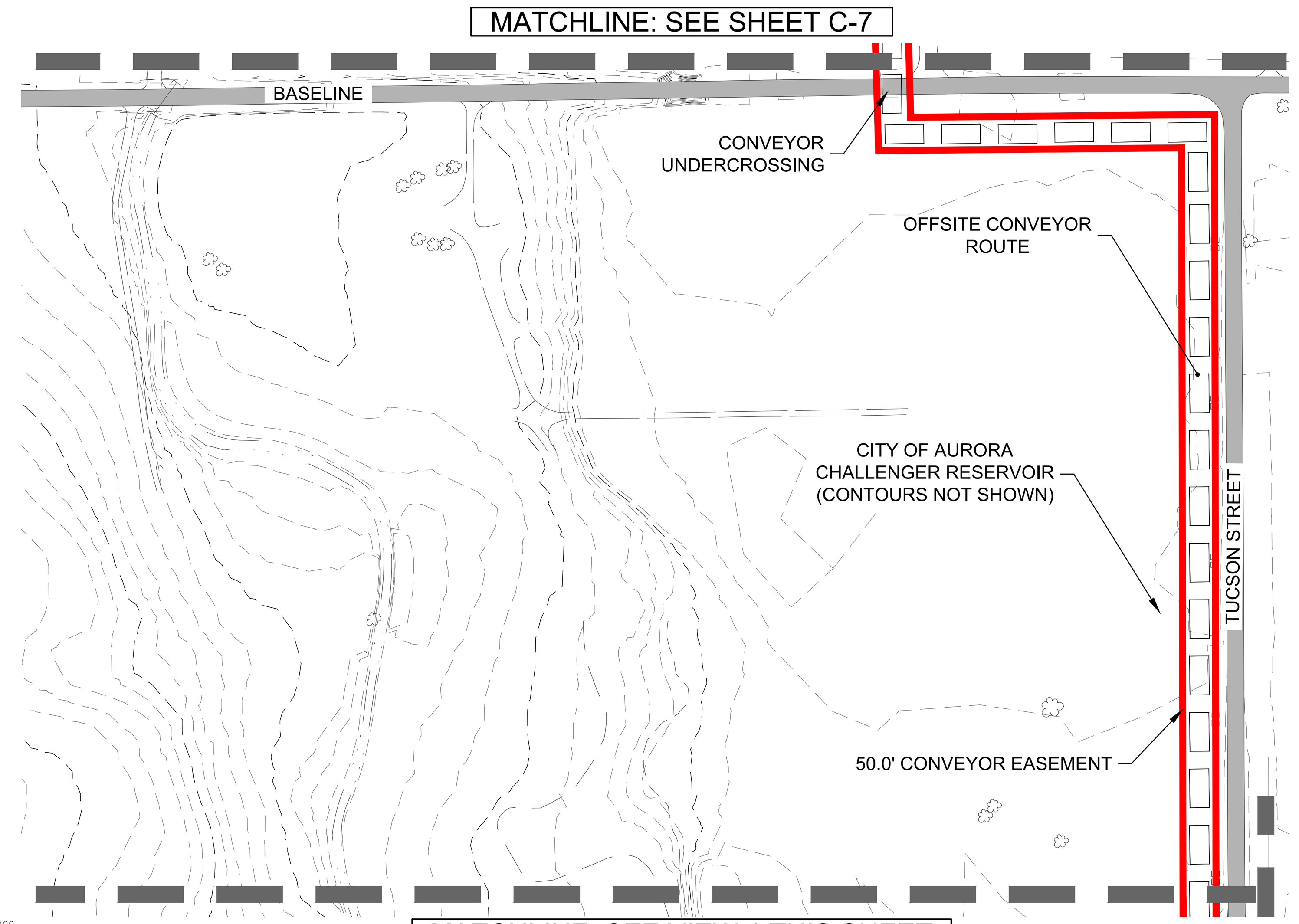
0 100 200

(IN FEET)
1"=200'

LEGEND:

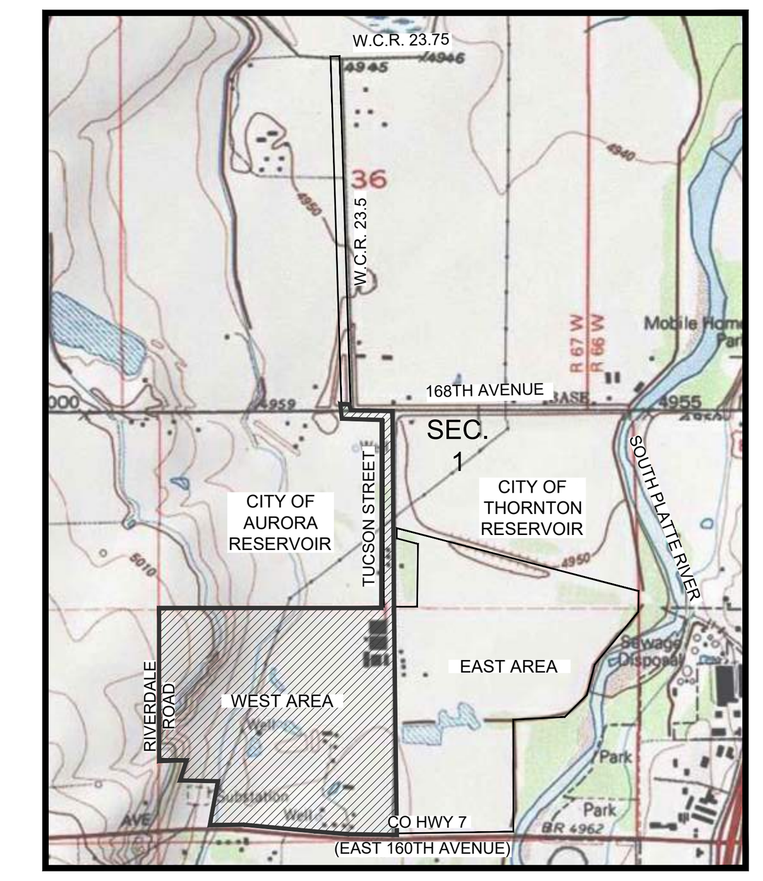
- MINE PERMIT BOUNDARY
- TRACT BOUNDARY
- EASEMENT
- EFFECTIVE FLOODWAY
- EFFECTIVE ZONE AE
- EFFECTIVE ZONE X
- PRE-PROJECT/MINING CONDITIONS 100-YR FLOODPLAIN
- EXISTING WETLAND BOUNDARY
- EXISTING WETLAND BUFFER
- EXISTING EDGE OF WATER
- 4900 EXISTING 2' CONTOURS
- x EXISTING FENCE
- EXISTING EDGE OF ROAD
- E EXISTING ELECTRIC LINE
- OE EXISTING OVERHEAD ELECTRIC LINE
- G EXISTING GAS LINE
- W EXISTING WATER LINE
- OT EXISTING TELEPHONE LINE
- PROPOSED SLURRY WALL
- LIMIT OF MINING EXCAVATION PER SLOPE STABILITY ANALYSIS
- > SURFACE DEWATERING TRENCH
- DW 12" PIPE FOR DEWATERING
- MATCHLINE
- CONVEYOR
- PROPOSED ACCESS
- OVERBURDEN STOCKPILE
- TOPSOIL STOCKPILE
- TOPSOIL SCREENING BERM W/ GRASS COVER
- SETTLING POND/DISCHARGE POINT
- EXISTING ASPHALT ROAD
- EXISTING SOUTH PLATTE RIVER
- UDFCD STABILIZATION
- EXISTING WETLANDS

MATCHLINE: SEE SHEET C-7



MATCHLINE: SEE VIEW 1 THIS SHEET

VIEW 2



PERMIT KEY MAP

NORTH

NTS

CERTIFICATION:

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Gary Linden (signature) 12/01/2021

GARY LINDEN DATE

NOTE:

1. UNDERDRAIN AND DETAILS ARE PRESENTED IN EXHIBIT G.

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TUCSON SOUTH RESOURCE
EXHIBIT C WEST AREA
MINING PLAN

REVISIONS

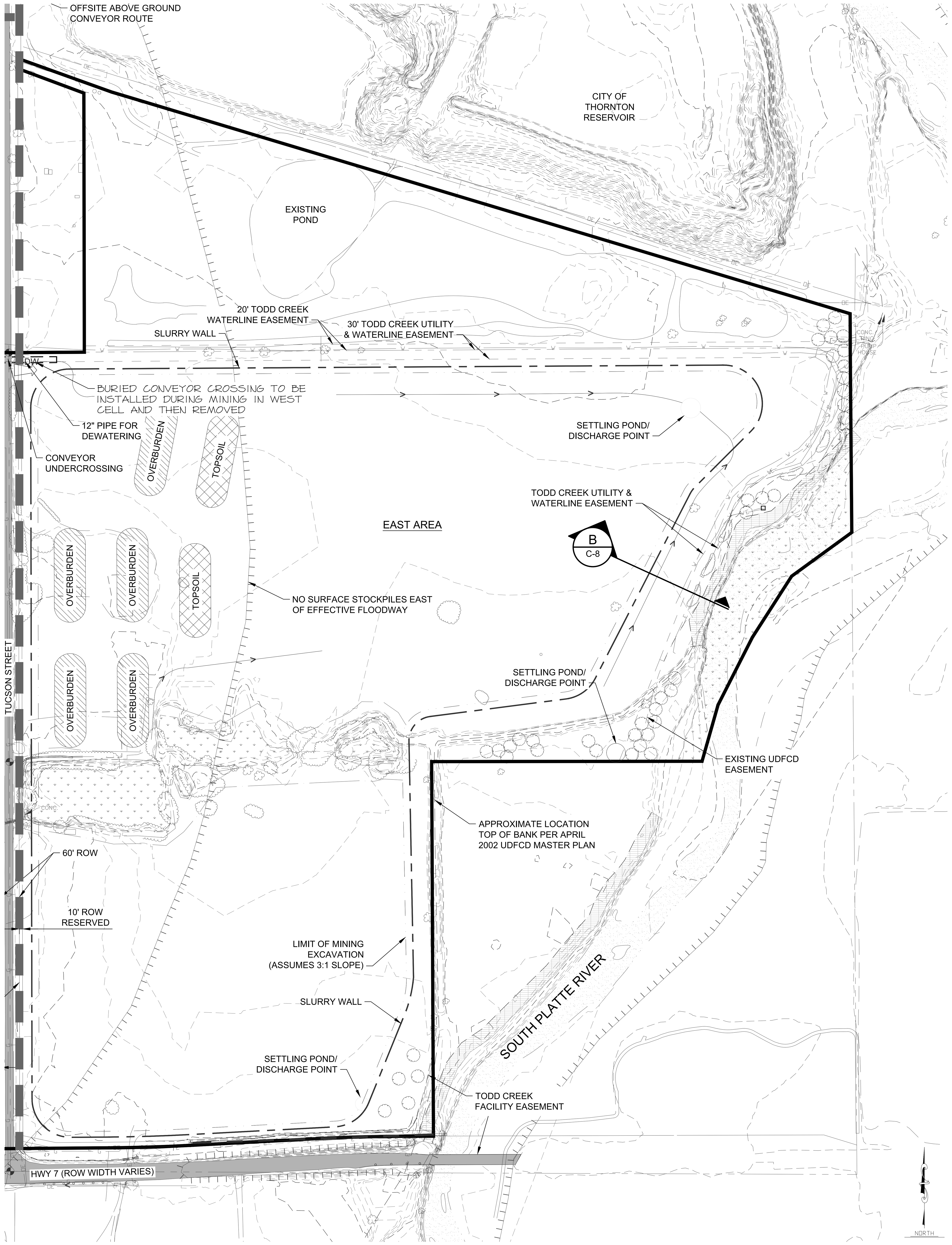
NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21

DRAWN BY: CI DATE: AUGUST 21
CHECKED BY: GL SCALE: AS NOTED
AS NOTED

JOB NO.: 297.001.09
DWG NAME: C-5 EXHIBIT C EAST AREA (PHASE 3) MINING PLAN.dwg

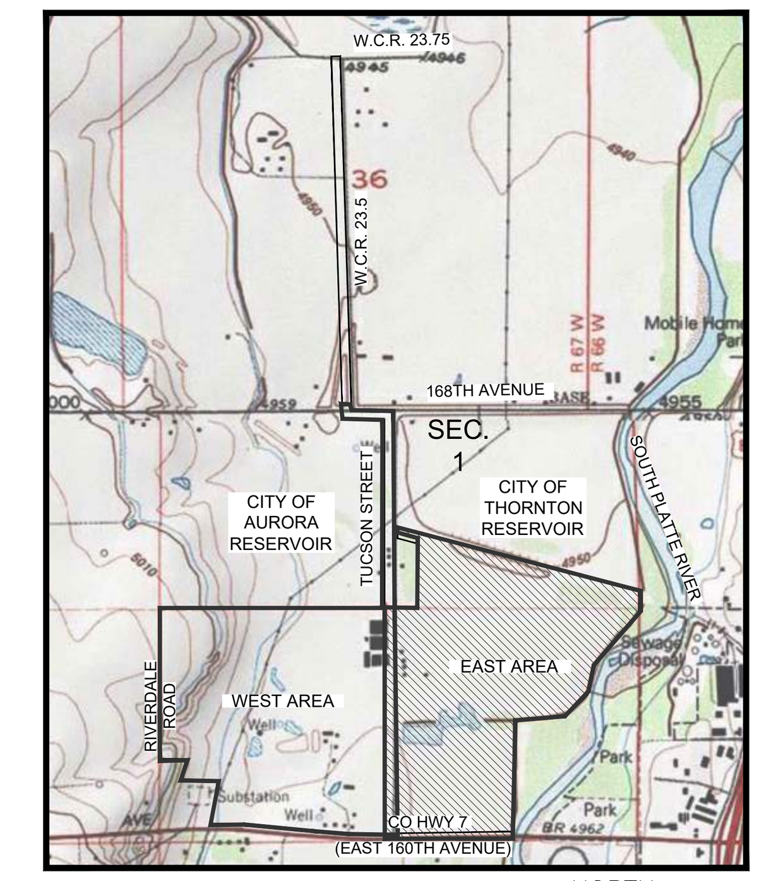
EXHIBIT C WEST AREA MINING PLAN

SHEET: C-5



LEGEND:

MINE PERMIT BOUNDARY
TRACT BOUNDARY
EASEMENT
EFFECTIVE FLOODWAY
EFFECTIVE ZONE AE
EFFECTIVE ZONE X
PRE-PROJECT/MINING CONDITIONS 100-YR FLOODPLAIN
EXISTING WETLAND BOUNDARY
EXISTING WETLAND BUFFER
EXISTING EDGE OF WATER
4900 EXISTING 2' CONTOURS
x x x x EXISTING FENCE
EXISTING EDGE OF ROAD
E E E EXISTING ELECTRIC LINE
OE EXISTING OVERHEAD ELECTRIC LINE
G EXISTING GAS LINE
W EXISTING WATER LINE
OT EXISTING TELEPHONE LINE
PROPOSED SLURRY WALL
LIMIT OF MINING EXCAVATION PER SLOPE STABILITY ANALYSIS
SURFACE DEWATERING TRENCH
DW DW DW 12" PIPE FOR DEWATERING
MATCHLINE
CONVEYOR
PROPOSED ACCESS
OVERBURDEN STOCKPILE
TOPSOIL STOCKPILE
TOPSOIL SCREENING BERM W/ GRASS COVER
SETTLING POND/DISCHARGE POINT
EXISTING ASPHALT ROAD
EXISTING SOUTH PLATTE RIVER
UDFCD STABILIZATION
EXISTING WETLANDS



NORTH
PERMIT KEY MAP
NTS

CERTIFICATION:

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Gary Linden 12/01/2021
GARY LINDEN DATE

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GOLDEN, COLORADO 80401
303-648-1175(P)

TUCSON SOUTH RESOURCE EXHIBIT C EAST AREA MINING PLAN

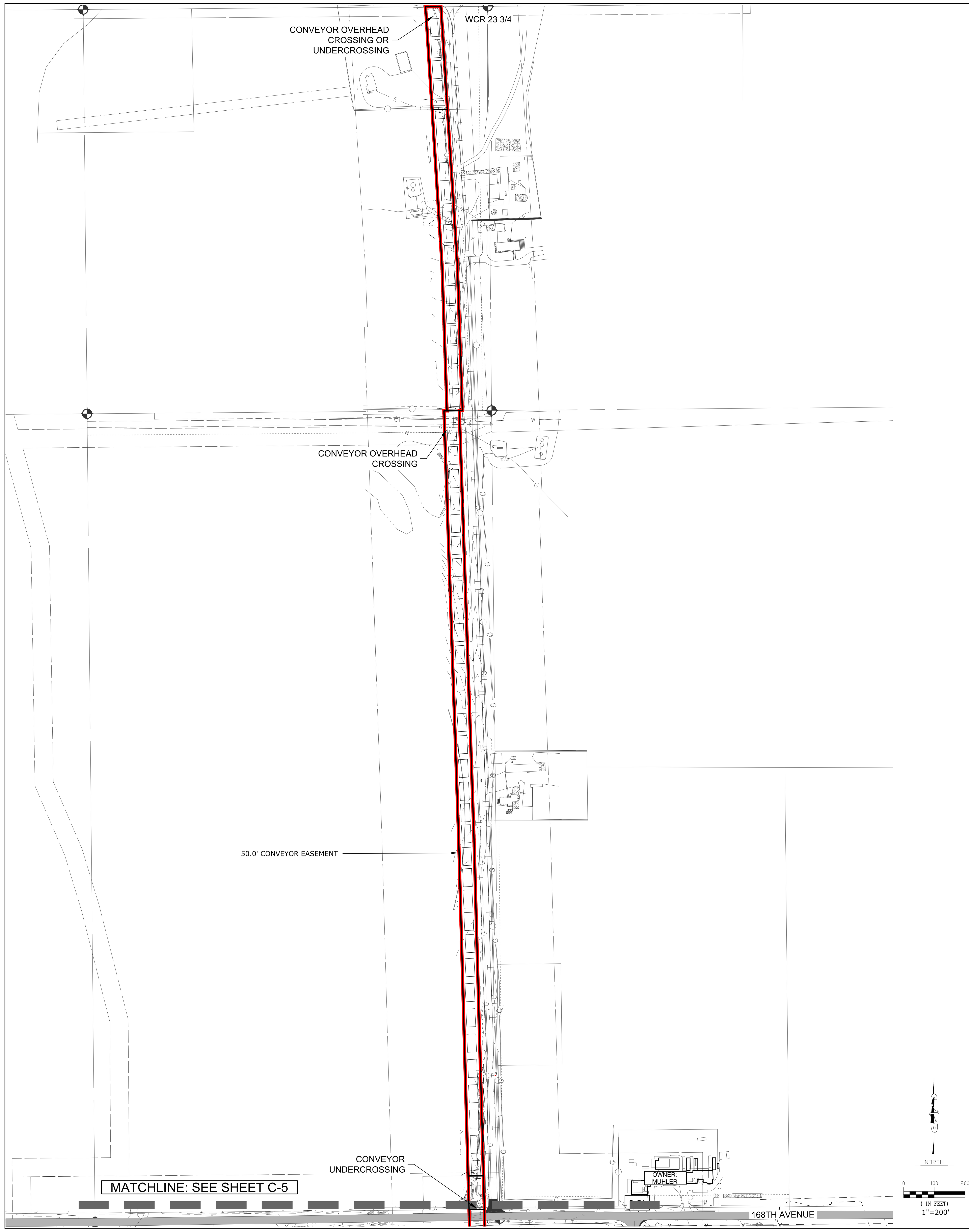
REVISIONS

NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21

DRAWN BY: CI DATE: AUGUST 21
CHECKED BY: GL SCALE: AS NOTED AS NOTED
JOB NO.: 297.001.09
DWG NAME: C-6 EXHIBIT C EAST AREA (PHASE 3) MINING PLAN.dwg

EXHIBIT C EAST AREA MINING PLAN

SHEET:
C-6



LEGEND:

- MINE PERMIT BOUNDARY
- TRACT BOUNDARY
- EASEMENT
- EFFECTIVE FLOODWAY
- EFFECTIVE ZONE AE
- EFFECTIVE ZONE X
- PRE-PROJECT/MINING CONDITIONS 100-YR FLOODPLAIN
- EXISTING WETLAND BOUNDARY
- EXISTING WETLAND BUFFER
- EXISTING EDGE OF WATER
- 4900 — EXISTING 2' CONTOURS
- x — EXISTING FENCE
- EXISTING EDGE OF ROAD
- E — EXISTING ELECTRIC LINE
- OE — EXISTING OVERHEAD ELECTRIC LINE
- G — EXISTING GAS LINE
- W — EXISTING WATER LINE
- OT — EXISTING TELEPHONE LINE
- PROPOSED SLURRY WALL
- LIMIT OF MINING EXCAVATION PER SLOPE STABILITY ANALYSIS
- > — SURFACE DEWATERING TRENCH
- DW — 12" PIPE FOR DEWATERING
- MATCHLINE
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- OVERBURDEN STOCKPILE
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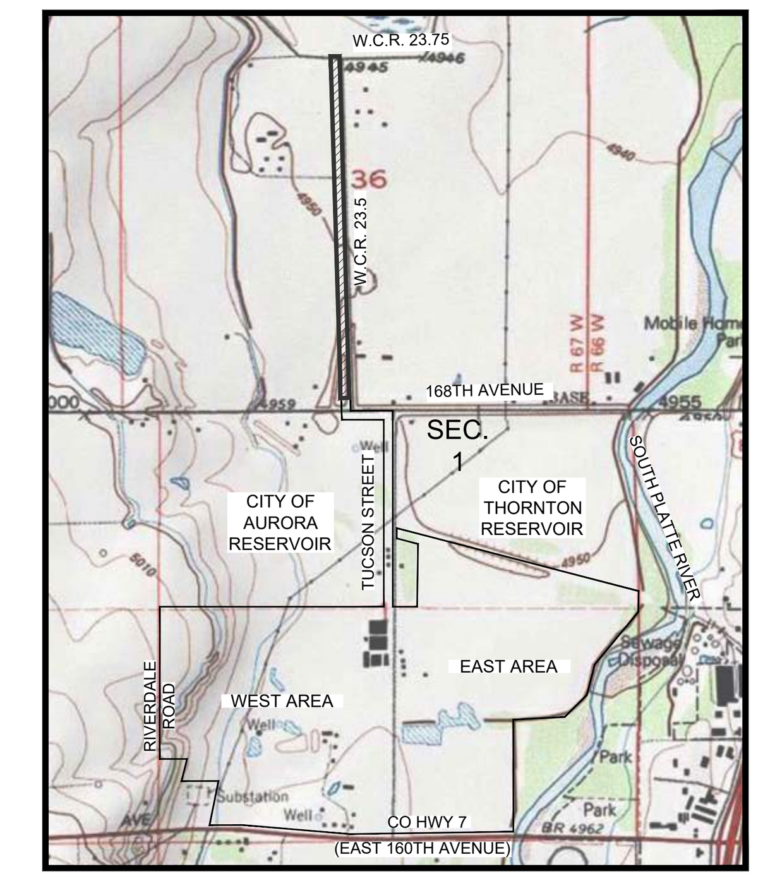
- SETTLING POND/DISCHARGE POINT
- EXISTING ASPHALT ROAD
- EXISTING SOUTH PLATTE RIVER
- UDFCD STABILIZATION
- EXISTING WETLANDS



PERMIT KEY MAP
NORTH
NTS

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GARY LINDEN	12/01/2021
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GOLDEN, COLORADO 80401
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TUCSON SOUTH RESOURCE
EXHIBIT C WELD COUNTY CONVEYOR
MINING PLAN

REVISIONS

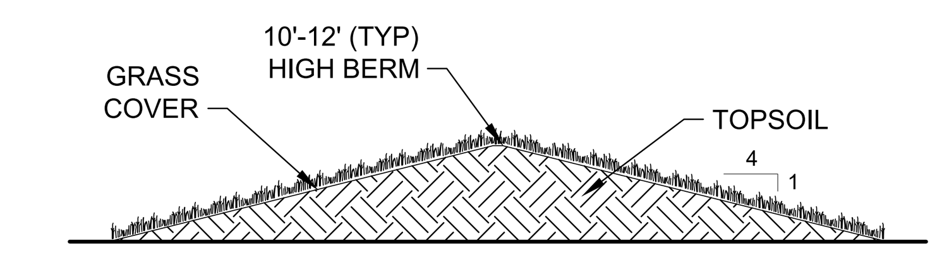
NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21

DRAWN BY: CI DATE: AUGUST 21
CHECKED BY: GL SCALE: AS NOTED
AS NOTED

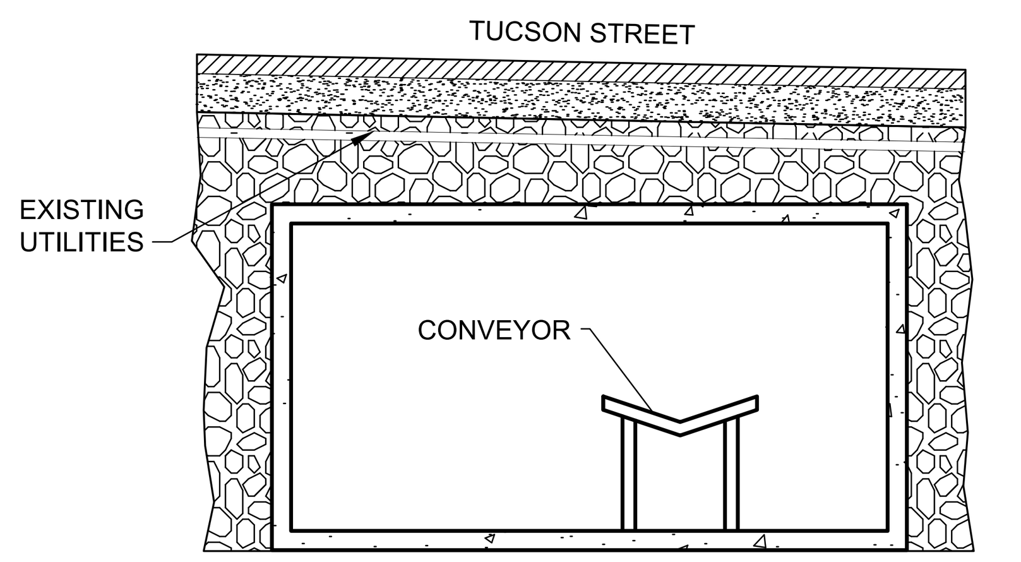
JOB NO.: 297.001.09
DWG NAME: C-7.dwg

EXHIBIT C WELD COUNTY CONVEYOR AREA MINING PLAN

SHEET:
C-7



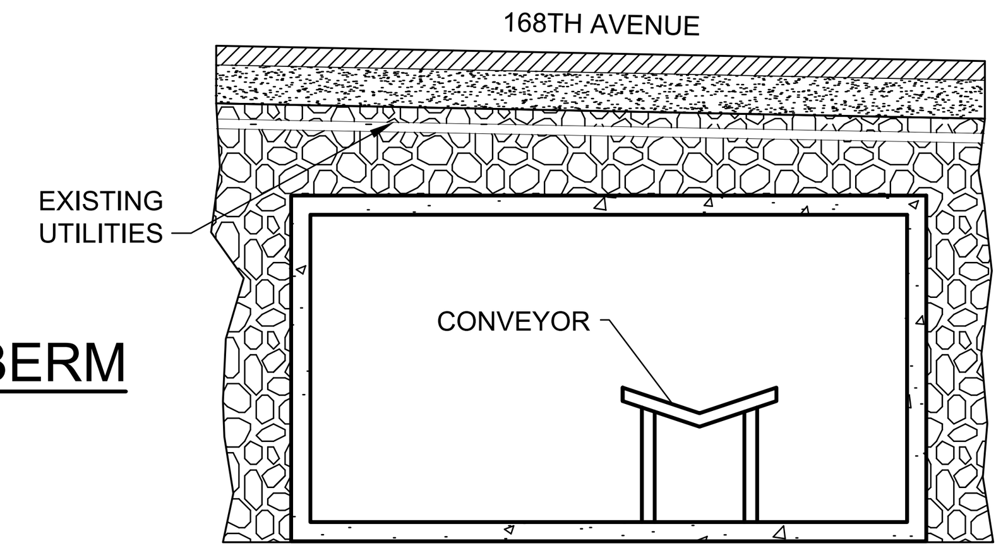
1 TEMPORARY GRASS SCREENING BERM
– NTS



NOTE:

1. THIS DETAIL IS INTENDED TO BE CONCEPTUAL DESIGN. INSTALLATION OF THE CONVEYOR CROSSING BOX UNDER TUCSON STREET IS SUBJECT TO APPROVAL OF ADAMS COUNTY PUBLIC WORKS DEPT. AND COORDINATION WITH EXISTING UTILITIES.

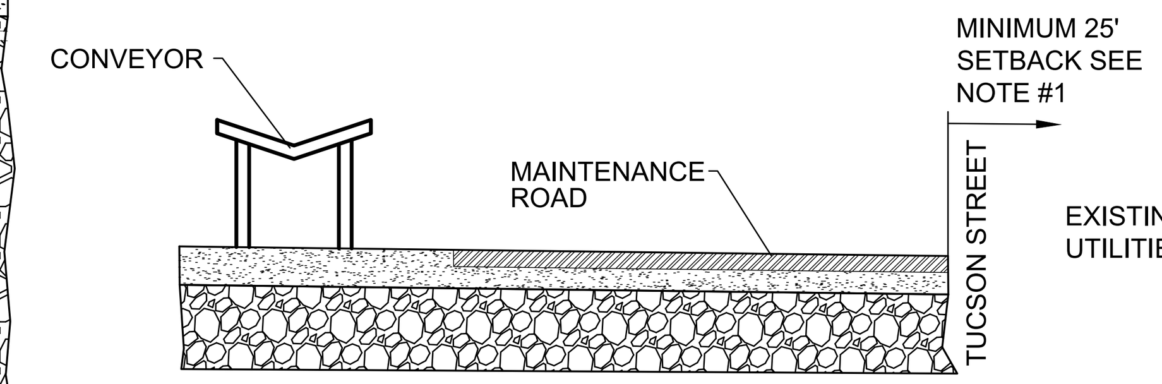
4 TUCSON STREET CONVEYOR CROSSING DETAIL
– NTS



NOTE:

1. THIS DETAIL IS INTENDED TO BE CONCEPTUAL DESIGN. INSTALLATION OF THE CONVEYOR CROSSING BOX UNDER 168TH AVENUE IS SUBJECT TO APPROVAL OF ADAMS COUNTY AND WELD COUNTY PUBLIC WORKS DEPT. AND COORDINATION WITH EXISTING UTILITIES.

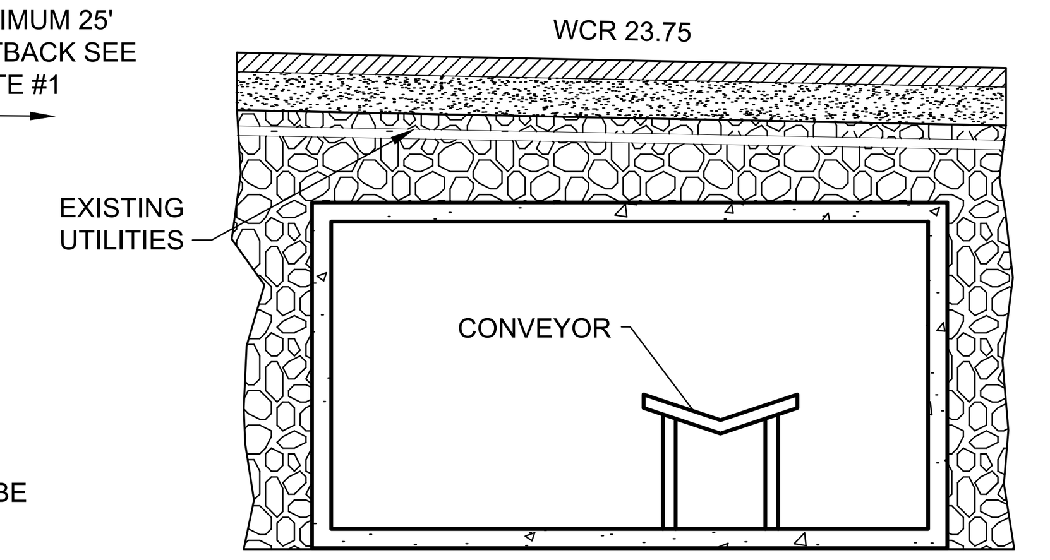
2 168TH AVENUE CONVEYOR CROSSING DETAIL
– NTS



NOTE:

1. CONVEYOR ACCESS AND MAINTENANCE ROAD SHALL BE SETBACK A MINIMUM OF 25' FROM TUCSON STREET.

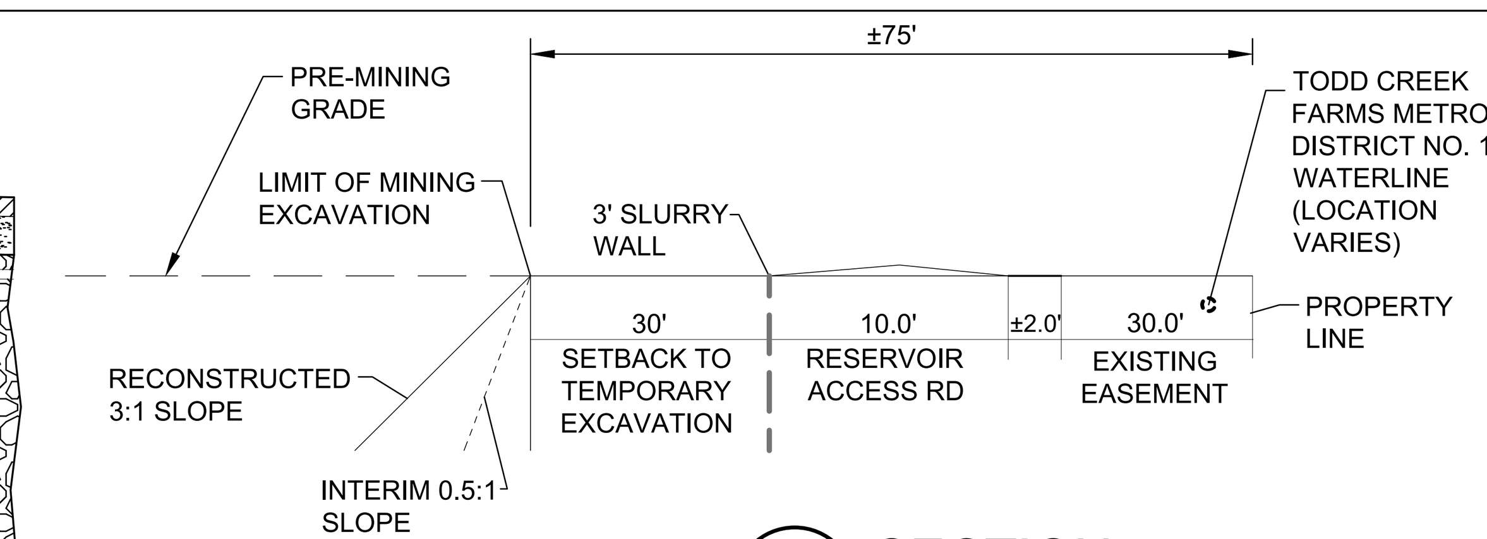
3 ON-SITE ABOVE GROUND CONVEYOR SYSTEM DETAIL
– NTS



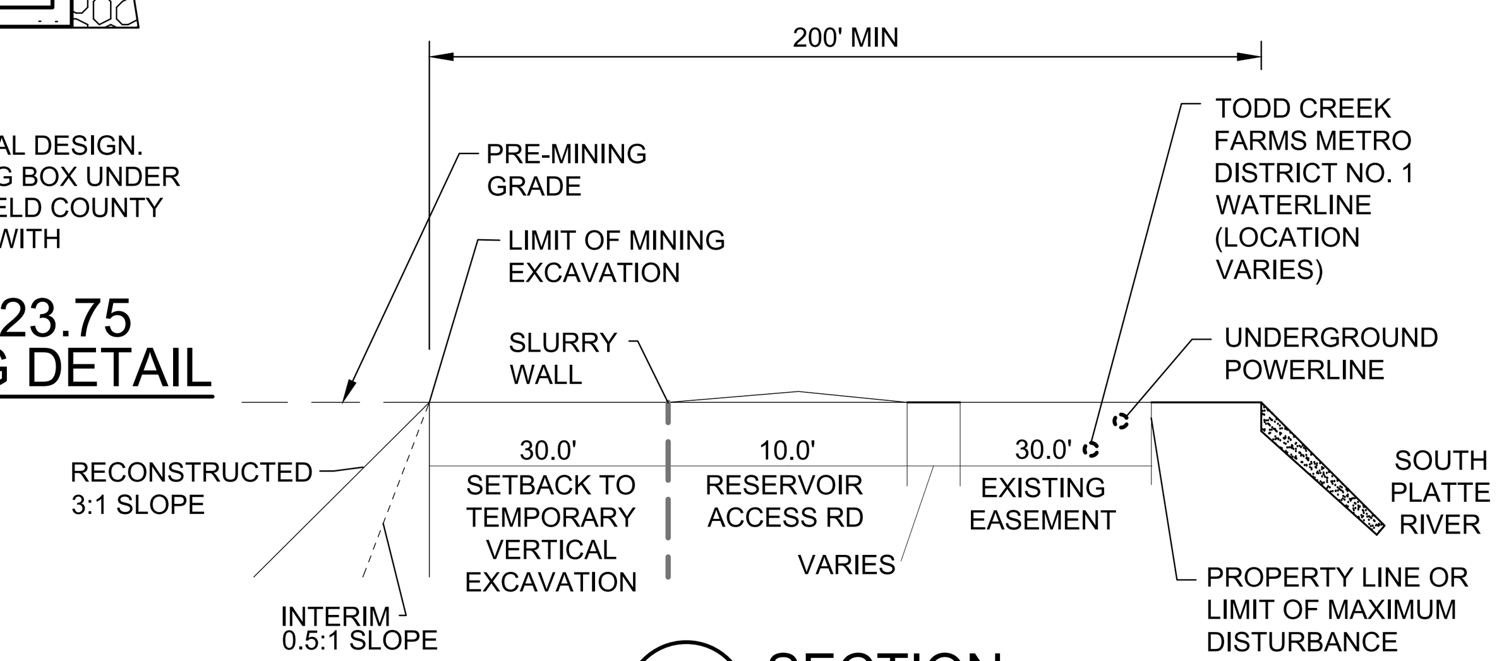
NOTE:

1. THIS DETAIL IS INTENDED TO BE CONCEPTUAL DESIGN. INSTALLATION OF THE CONVEYOR CROSSING BOX UNDER WCR 23.75 IS SUBJECT TO APPROVAL OF WELD COUNTY PUBLIC WORKS DEPT. AND COORDINATION WITH EXISTING UTILITIES.

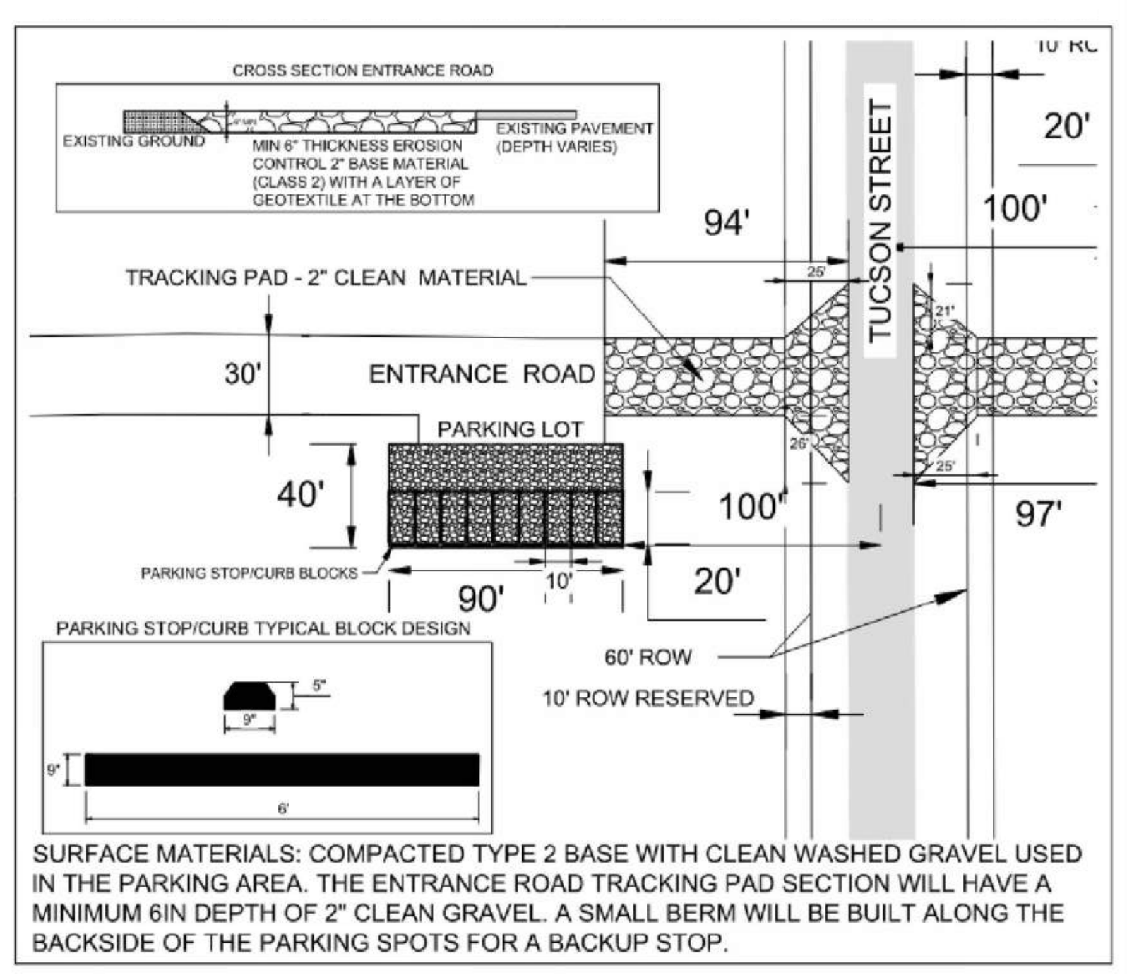
8 WELD COUNTY ROAD 23.75 CONVEYOR CROSSING DETAIL
– NTS



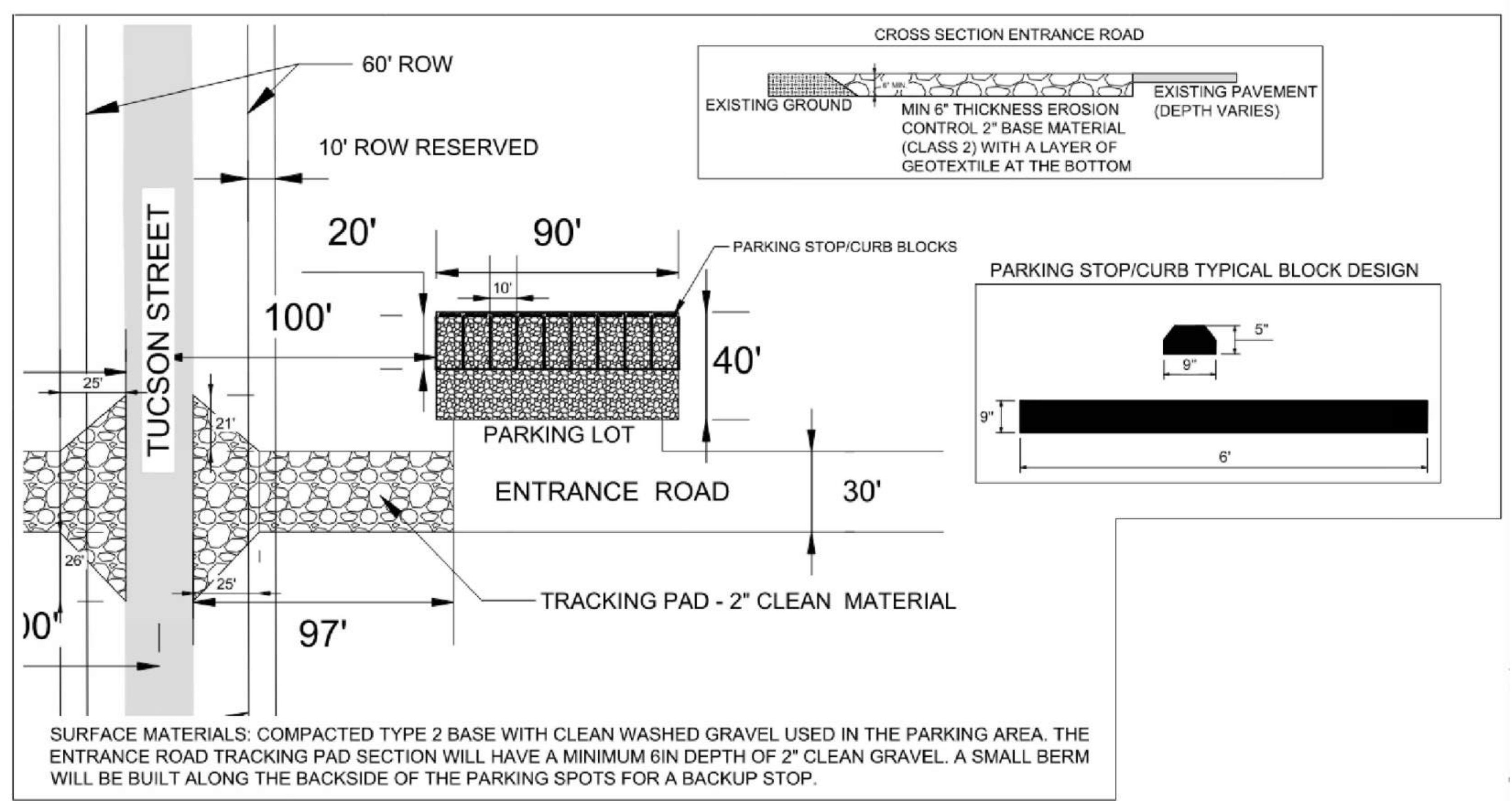
A SECTION
– NTS



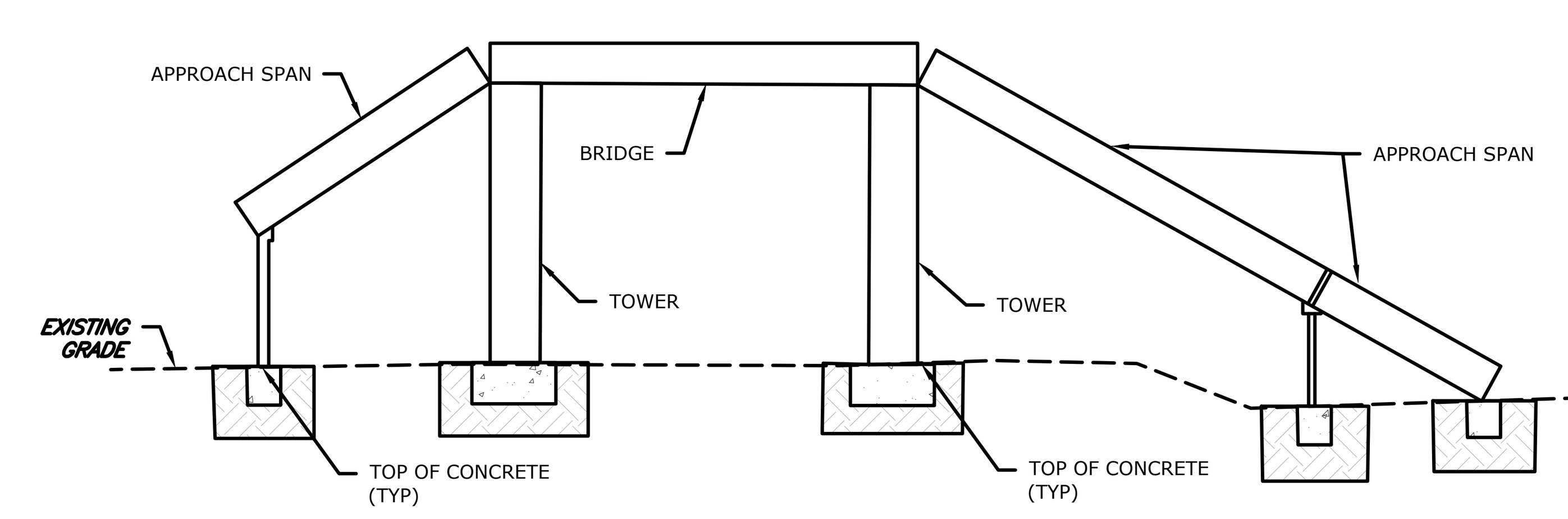
B SECTION
– NTS



9 WEST EMPLOYEE PARKING LOT TYPICAL DESIGN
– NTS



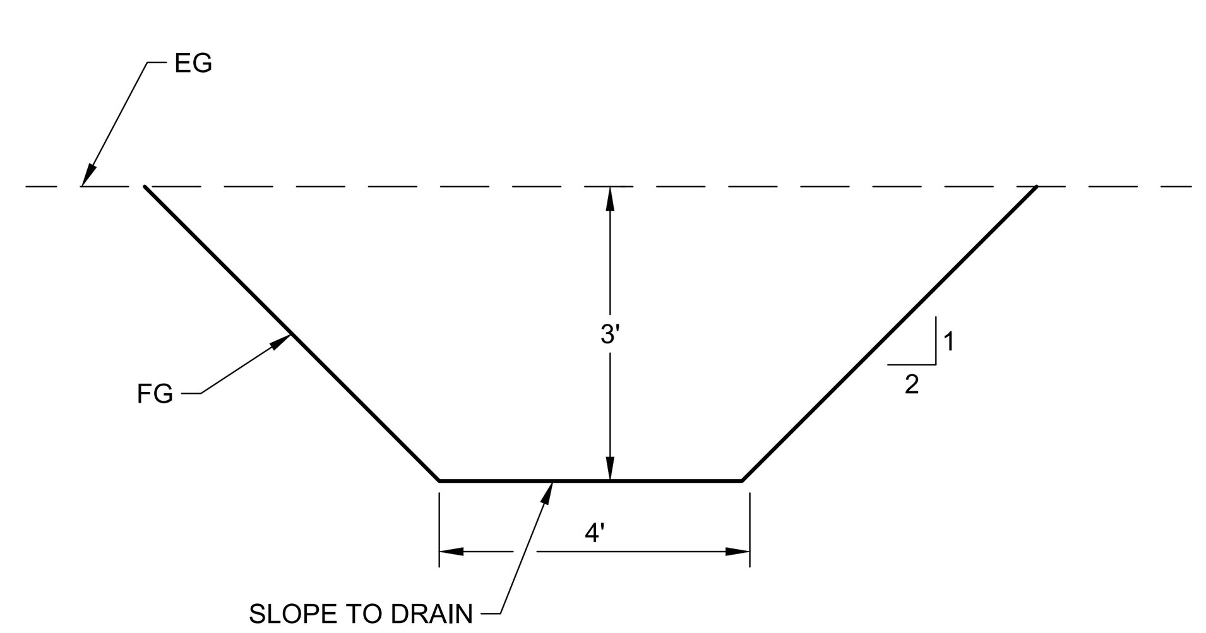
10 EAST EMPLOYEE PARKING LOT TYPICAL DESIGN
– NTS



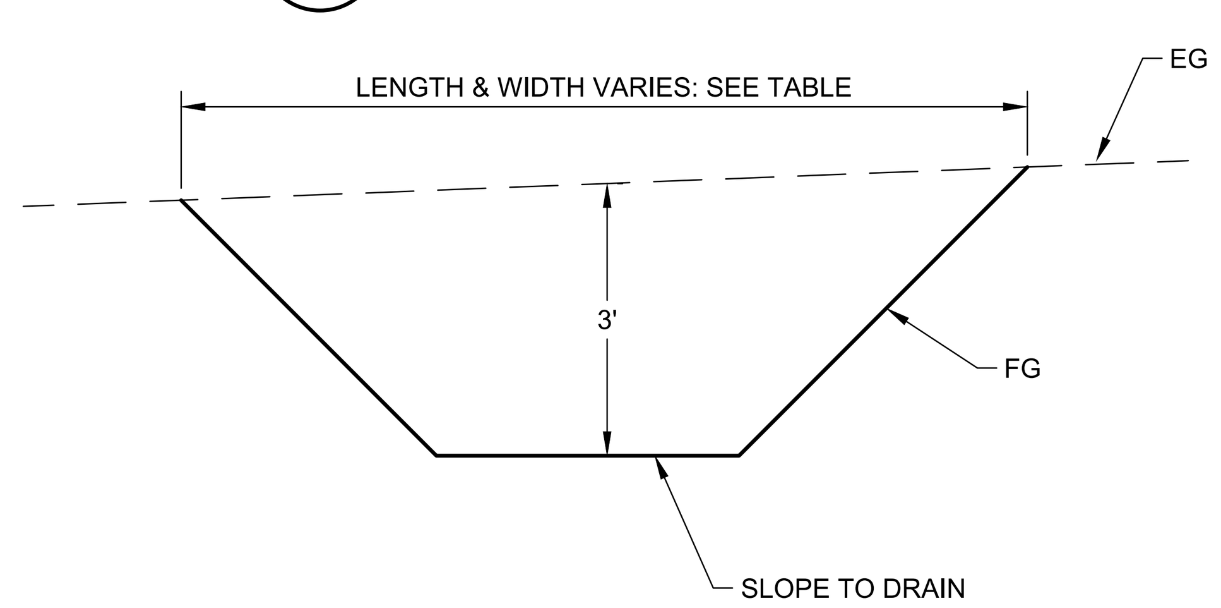
11 TYPICAL OVERHEAD CONVEYOR CROSSING
– NTS

NOTE:

1. THIS DETAIL IS INTENDED TO BE A CONCEPTUAL DESIGN. CONSTRUCTION OF OVERHEAD CONVEYOR CROSSINGS IS SUBJECT TO APPROVAL OF ADAMS AND WELD COUNTIES AND COORDINATION WITH LOCAL UTILITIES AND EASEMENT HOLDERS

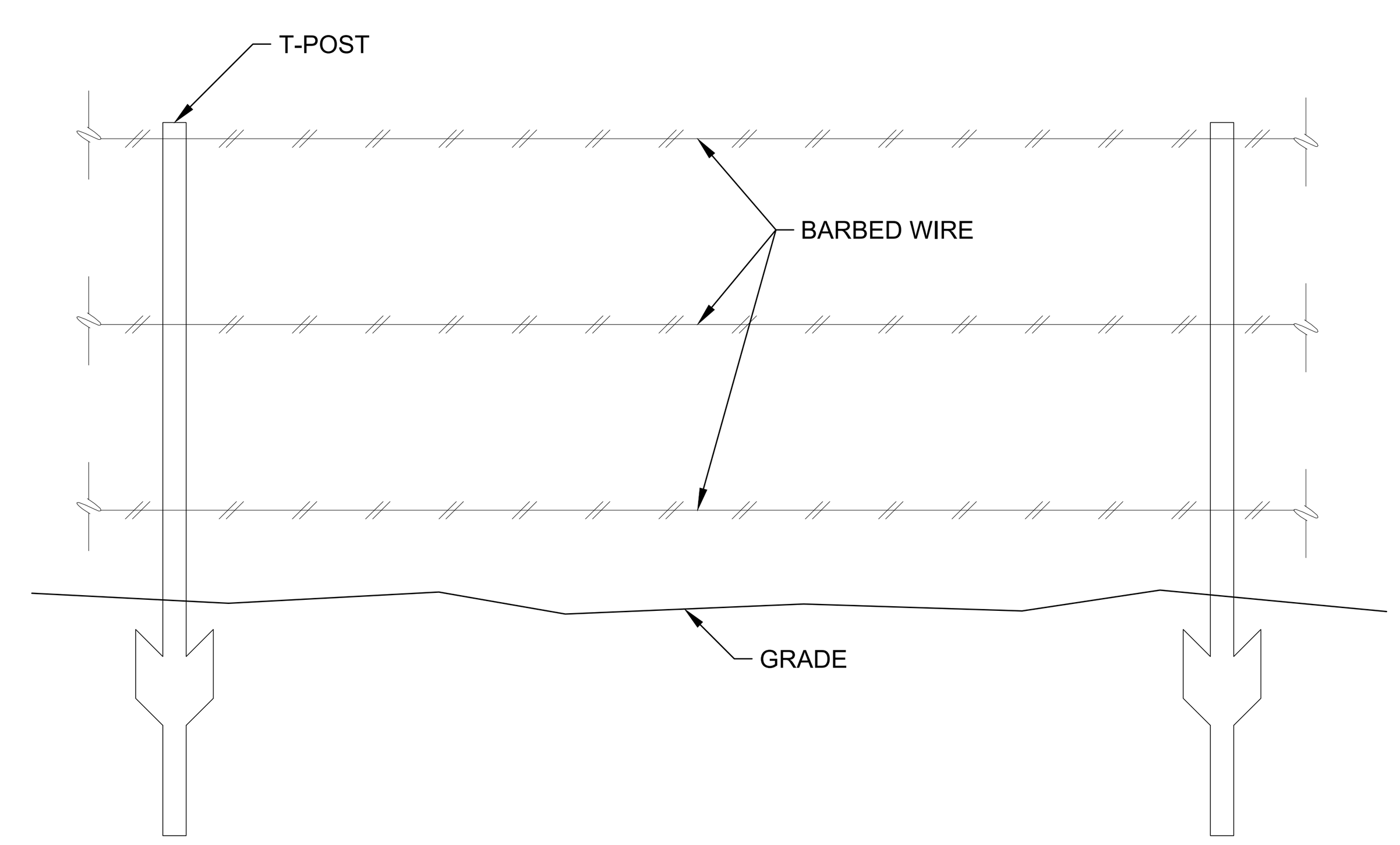


5 TYPICAL SURFACE WATER DIVERSION CHANNEL
– NTS



CELL	POND DIMENSIONS
WEST	140x140
EAST	155'x155'

6 TYPICAL DEWATERING POND CROSS SECTION
– NTS



7 3-WIRE FARM FENCE DETAIL
– NTS

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GARY LINDEN 12/01/2021
DATE

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SUITE 200
FIRESTONE, CO 80504
303.833.1416
WWW.CIVILRESOURCES.COM

AGGREGATE INDUSTRIES
1687 COLE BLVD, STE 300
GOLDEN, COLORADO 80401
303-648-1175(P)

TUCSON SOUTH RESOURCE
EXHIBIT C DETAILS

REVISIONS

NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21

DRAWN BY: CI DATE: AUGUST 21
CHECKED BY: GL SCALE: AS NOTED
AS NOTED
JOB NO.: 297.001.09
DWG NAME: C-8 EXHIBIT C EAST AREA (PHASE 3) MINING PLAN.dwg

EXHIBIT C MINING PLAN DETAILS

SHEET: C-8

EXHIBIT D – MINING PLAN

This information provided in this Exhibit is intended to satisfy the requirements outlined in Section 6.4.4 of the Colorado Mined Land Reclamation Board Construction Material Rules and Regulations:

Mining Plan

The proposed mining plan does not differ from that previously approved by the DRMS.

The proposed amended Mined Land Reclamation Board (MLRB) Tucson South Resource mine area is approximately 1.5 miles south of the Aggregate Industries Wattenberg Lakes Mine (M-2004-051), which supplies aggregate construction materials to much of southern Weld and western Adams counties. The amended area will be a conveyer easement that will allow for export of mined material from the Tucson South Resource to the Wattenberg Lakes Mine. The amended Tucson South Resource Permit Boundary contains substantiated aggregate resources to continue the supply in this region of Colorado. Supplementing resources at the Wattenberg operation, new supplies from the amended Tucson South Resource will continue to provide construction materials to meet the Front Range Colorado demand.

Introduction and Overview

The amended Tucson South Resource permit area is currently owned by Aggregate Industries-WCR Inc., the City of Aurora, Adams County, Yoshi and Suzu, LLLP, Dorothy and James Struck, and Toby Struck. The permit area consists of dryland and irrigated agriculture, a reclaimed gravel resource, a partially reclaimed gravel resource, and a former greenhouse growing operation. Above ground structures at the greenhouse have been demolished and removed from the site. Below grade features will soon be demolished and hauled from the site. The previously permitted property is located north of Colorado Highway 7, bisected by Tucson Street. The amended area, providing an area for the conveyor easement, is along the west side of Tucson Street, the south side of 168th Ave. (aka Weld County Road 2), and the west side of Weld County Road 23.5 before crossing over Weld County Road 23.75 entering the Wattenberg Lakes facility. Aggregate Industries has entered into agreements with the City of Aurora, Yoshi and Suzu LLLP, Dorothy and James Struck, and Toby Struck to allow for the conveyor easement crossing.

Mining of the Tucson South Resource is proposed to happen in two phases. The West Area (Phase 1) is located north of Colorado Highway 7 and west of Tucson Street, and the East Area (Phase 2) is located north of Colorado Highway 7 and east of Tucson Street.

In general, drainage on the site flows toward the South Platte River to the north and east of the property. The drainage pattern in the West Area either flows to local low spots on the property, is conveyed off-site to the north, or is conveyed via an irrigation return ditch to the East Area. The East cell generally drains north and east to the river via overland flow or through existing channels and ditches left by historic disturbance. Drainage at the amended area flows to local low spots before being conveyed to existing gravel mines locate north of the site.

With this project the Permit Boundary and the Affected Lands are different areas, as explained below.

Permit Boundary Area

The proposed Permit Boundary contains the following areas as shown on Exhibit C-1 and Exhibit F-1:

- Tracts of land owned by Aggregate Industries-WCR, Inc. referred to on our mapping as Tracts A, B, D, E, F, H, and M.
- Tracts of land owned by the City of Aurora referred to on our mapping as Tracts C, G, K, and N.
- Tucson Street right-of-way referred to on our maps as Tract L.
- East 168th Avenue right-of-way referred to as Tract O.
- Land owned by Yoshi and Suzu, LLLP referred to on our maps as Tracts P and Q.
- Land owned by Dorothy and James Struck is referred to as Tract R.
- Land owned by Toby Struck is referred to as Tract S.

Affected Land

The Affected Land includes all Tracts described in the Permit Boundary except Tract K, which is owned by the City of Aurora. This area is located east and west of the Brighton Ditch and will not be disturbed by the mining activities and reclamation operations. Therefore, it was excluded from the Affected Land. Aggregate Industries had previously planned to mine a South Cell which was removed from the permit with the approval of Acreage Reduction Request 2 (AR-02). Technical Revision 2 (TR-02) updated the Mining and Reclamation maps to reflect the removal of the South Cell.

Existing Land Uses

The proposed Tucson South Resource mine currently consists of dryland and irrigated agriculture, one house (with outbuilding) and the former greenhouse growing operation described above. A Todd Creek water well and associated United Power overhead electric line on the west side of the West area will also be removed. Aggregate Industries purchased the Todd Creek water well parcel and entered into an agreement to relocate the well to an area adjacent to the river. The relocated well is shown on Exhibit C-3. The applicant has contacted United Power regarding removal

of the existing electric service and will forward the documentation regarding removal of the service line upon receipt. There is one rural residential property located adjacent to the mine on Tucson Street, several more rural residential properties located south of Tracts A and H and Highway 7, and several more rural residential properties located along Baseline and Weld County Road 23.5 along the conveyor alignment. In addition, there is a developing residential subdivision located west of Tract K. The South Platte River corridor receives recreational use and the City of Brighton operates a parks and wildlife recreational area north of Highway 7 and east of Tract H along the west side of the South Platte River.

Improvements owned by the applicant or property owners that are located within the Permit Boundary Area such as un-improved roads, fences, alluvial water wells and associated pumps, houses and outbuildings, irrigation ditches and laterals, may be removed or relocated during mining and reclamation. There were two oil and gas wells and associated facilities located on the property. The wells were plugged and abandoned per Colorado Oil and Gas Conservation Commission standards and the associated facilities have been hauled from the site. Structures, easements, or rights-of-ways not owned by the applicant or property owner will not be disturbed without prior permission (see Exhibit C Pre-Mining Maps). None of the easements, rights-of-ways, or associated structures are expected to be negatively affected by mining or reclamation operations.

Nature of Deposit to be Mined

Test borings indicate a layer of topsoil and overburden ranging from 1 to 11 feet in depth with a typical overburden depth of 5 feet. The typical depth of topsoil to be removed is 6". In the western part of the site, the topsoil has been tilled until recently and likely contains a significant amount of organics. The overburden is underlain by an aggregate layer with a thickness ranging from 0 to 46 feet with a typical thickness of 25 feet. In some parts of the sites, the aggregate layer contains a 2- to 9-foot thick mud lens. The total depth to bedrock from the surface grade ranges from 5 feet in the west to approximately 50 feet in a paleochannel in the eastern part of the site. The typical depth to bedrock is approximately 27 feet over most of the mine area. The aggregate layer overlies sedimentary bedrock of the Denver Basin.

A soils report is attached in Exhibit I herein for reference.

Mine Phasing

Aggregate Industries anticipates mining and reclaiming the proposed Tucson South Resource site in approximately 5 to 8 years. The rate of mining and overall life of the mine is dependent on several factors including product demand and operational needs. Test borings have verified that commercial deposits of sand and gravel exist up to 50 feet below the surface of the ground. In addition to the commercial sand

and gravel materials, clay, silt, and other non-marketable materials excavated from the proposed permit area will be used on-site for reclamation.

The mining plan currently includes mining in two phases. Mining may occur simultaneously in more than one phase. The actual sequence may change depending on market conditions, operational needs, or site conditions:

- West Area (Phase 1), is located north of Highway 7 and west of Tucson Street and included Tracts A, B and C
- East Area (Phase 2) is north of Highway 7 and east of Tucson Street and includes Tracts D, E, F, G and H

Tracts N, O, P, Q, R, and S will contain the conveyor to export product off-site to the Wattenberg Lakes Site and will be used during all mining phases.

Mining will begin in the West Area (Phase 1). Once mining is complete in the West Area, mining will commence in the East Area (Phase 2). All necessary permits will be obtained. A summary of mining phases is presented in the table below.

Processing and sale of the material will occur on the Platte Valley site (M-1989-120). Overburden from the West and East Areas will be used to reclaim the cells. If there is excess overburden material, the material will be conveyed to the Platte Valley site and Wattenberg Lakes site for reclamation.

A slurry wall will be constructed around the East and West Areas prior to exposure of the water table. The slurry wall has been designed and is attached to this exhibit.

Mine Phasing Summary

Mine Phase	Total Acreage To be	Duration (years)
West	72.0	4
East	83.8	4
Tot	**155.8**	**8**

Mining Methods

The method of mining used within the permit boundary:

- The slurry wall liner for the West and East Areas will be installed prior to exposure of ground water at the site. Once the slurry wall is installed the West and East Areas will be dewatered. The deposit will be dry mined using dewatering trenches and pumps within the slurry lined area. Prior to excavation of each mining phase, trenches will be cut along the perimeter of the excavation to begin dewatering the sand and gravel material. The trenches will extend through the overburden and alluvium to bedrock. Pumps will be used to remove the groundwater that drains from the deposit within the lined excavation. If necessary, water from the trenches will be circulated through a settling pond prior to being discharged to adjacent drainage ditches and/or the

South Platte River (see Exhibit C Mining Maps). As excavation begins, the mining cell and dewatering trenches on the floor will continue to collect any water entering the lined Areas, keeping the deposit material relatively dry. The collected water will be directed to settling ponds within the Areas or near the final discharge point to South Platte River. It is anticipated that dewatering will be completed within the slurry wall lined mining area within 12 months and dewatering throughout the life of the mine will be limited to precipitation, stormwater runoff that drains into the mining area, and minor amounts of groundwater.

Earth Moving

Setbacks from the top of slope of each area to the proposed permit boundary or man-made structures not owned by the applicant or by agreement with the structure owner will generally be 30 feet or greater. Specific setbacks from Highway 7 and Tucson Street also account for future expansion of the roadways. The perimeter setbacks from the structures are shown on Exhibit C - Mining Maps.

These setbacks were determined in combination with Adams County regulations and the Slope Stability Analysis prepared by Tetra Tech provided herein in the Geotechnical Stability Exhibit. The setbacks reflect the Factors of Safety in the Proposed Slope Stability/Geotechnical Analysis Policy in the DRMS memorandum dated May 16, 2018.

Areas to be mined will be prepared by removal of topsoil and overburden. Each preparation area may be as much as 100 feet wide along the anticipated mining face. Usually, only enough area is stripped and prepared to provide the estimated needs for the next 10 to 14 months of mining. Surface topsoil material will be stripped separate from the underlying, deeper subsoil or overburden material. This topsoil layer contains most of the soils organic matter and will be stockpiled separately for use in reclamation. Once the topsoil has been removed, the rest of the overburden will be stripped and stockpiled separate from the topsoil.

When the alluvial material is exposed and sufficiently dewatered, the aggregate material will be recovered using equipment typical for sand and gravel mining operations. In the West and East Areas, the aggregates will be mined using conventional dry mining methods. Earth moving equipment may include, but is not limited to, dozers, loaders, scrapers, and excavators as mining progresses to a depth of 20 to 50 feet below the surface. The alluvial material is an unconsolidated deposit and, therefore, no blasting is required. The aggregate material from the Areas will be temporarily stockpiled within the various Areas, conveyed to the staging area, or immediately transported off-site for processing. During mining and reclamation activities, watering trucks for dust control will be used as needed.

The active mining face will extend no more than 2,300 feet in length. During mining and prior to reclamation in the West and East Areas, the mine walls will be a nearly vertical to ½H:1V slope (see Exhibit C, Mining Maps). Mining will progress down to the depth of quality aggregate material. Backfilling and/or grading of side slopes may follow behind the mining activities before mining in the Area is complete. Concurrent reclamation will be practiced when the highwall reaches the mine limit. During the flood season April 1 through September 30 and when the highwall is within 400 feet or less of the river the highwall will be no steeper then 3H:1V.

As mining progresses, topsoil, overburden, and non-marketable materials will be removed and stockpiled for use in reclamation activities. Overburden from the West Area and East Areas will be used in reclamation. Should there be excess overburden on these cells, the material will be conveyed to the Platte Valley site for reclamation or to be sold. During mining in the West and East Areas, topsoil will be segregated and stockpiled in the locations shown on Exhibit C Mining Maps, i.e. outside of the Floodway. As mining progresses, overburden will be taken directly to mined out slopes for use in reclamation. Topsoil and overburden stockpiles will be configured to have side-slopes no steeper than 3H:1V. If the stockpiles are inactive for more than one growing season, such as the stockpiles used for screening, they will be seeded with the fast-growing grass seed mixture below.

Stockpile Grass Seed Mixture

Grass Species	**Rate (#PLS/ac**
Luna Pubescent Wheatgrass	15.0
Amur Intermediate Wheatgrass	15.0
Rates are for broadcast seeding.	

Other than those used for screening, long-term stockpiles are not anticipated. Temporary stockpile materials will continually be used for reclamation and the stockpiles will likely be disturbed on a frequent basis and seeding the stockpiles may not be practical during the operation. If stockpile seeding is not used, surface roughening will be maintained to limit wind and water erosion.

Most of the proposed Tucson South Resource Permit Boundary Area is within the regulatory floodplain of South Platte River. Because of floodplain regulatory restrictions, stockpiling will occur within a mining Area whenever possible with the top of stockpile elevation lower than the pre-project grade. Stockpiles within the modeled floodplain above the existing ground surface will generally be created parallel to potential South Platte River flood flows. The stockpiles will be no longer than 300 feet, with minimum spacing of 100 feet between stockpiles for flood flows to pass (see Exhibit C, Mining Maps). The screening stockpiles along Highway 7 as

indicated by modeling, are located in areas where placement is not expected to impact floodplain water surface elevations. Consequently, there is no restriction on length or orientation. The impacts of stockpiles on floodplain water surface elevations is presented in the *Floodplain Use Permit* application approved by Adams County.

Additional mining and reclamation procedures will be used within the regulatory floodplain to mitigate impacts from potential flood flows. Flood season is considered to be April 1 through September 30. The southern and eastern slopes of each area will either be maintained at 3H:1V during the flood season during mining or concurrently reclaimed at 3H:1V with reclamation backfill. This restriction only applies for areas within 400 feet of the South Platte River in accordance with DRMS policy. If flood waters reach the mining Areas prior to complete reclamation, the 3H:1V slopes will allow more controlled flow into the Areas while reducing the potential for head cutting and capture of the South Platte River.

A Floodplain Use Applications have been approved by Adams and Weld Counties for this project. Adams County may request review and comment from Mile High Flood District (MHFD). Comments and revisions from the County or the MHFD will be incorporated into the final Floodplain Use Permit.

The table below illustrates a point in time when the mining disturbance could be at its maximum. At the proposed Tucson South Resource site, it is assumed that the mining disturbance will be at its greatest when the East Area mining is nearly complete. That will be a time when the slurry walls are installed and, topsoil replacement and initial seeding will be completed for the West Area.

	Mining Operation	Disturbed Area (acres)
	Active Mining Area: 1. Backfill remaining East Cell mining face and side slopes (2,300 feet in length averaging 27 feet deep requiring backfill and rough grading to 3H:1V slopes.) 2. Rough Grade remaining disturbed areas of the east cell 3. Replace topsoil on backfilled area of East cell above the HWL of the reservoir (61.5 acres) 4. Final Grade East Cell	
	Miscellaneous Disturbed Areas (Stockpiles, Haul Roads, Conveyor route) 1. Replace topsoil on internal haul roads and main site entrance (3 acres x 0.5') 2. Replace topsoil on conveyor route (7.7 acres X 0.5') 3. Replace topsoil on stockpile area (5 acres x 0.5') 4. Scarify internal haul roads and conveyor route areas 5. Final grade all miscellaneous areas (8.3 acres x 0.5') *6.* Reseed 20% of all areas in the area of disturbance above	
	Final Reclamation: 1. Seeding – entire East Area above the highwater line of the reservoir plus internal haul route and the conveyor route. 2. Weed management and re-seeding (20% of the Affected Lands located above the highwater line of the reservoirs)	
Total Disturbed Area		**88.2**

Diversions and Impoundments

Roads and irrigation ditches will effectively minimize stormwater surface run-on to the mining site, so run-on diversion structures are not anticipated. During the initial mining activities, stockpiling of topsoil and overburden on the surface is anticipated. Diversionary channels, as shown on Exhibit C, will be used divert surface runoff from leaving each of the Areas or entering the wetlands areas. Surface diversion channels will convey runoff to settling ponds, prior to discharging to the South Platte River. As mining progresses and the excavation increases in size, diversionary channels will convey less runoff because more runoff will enter the mine excavations. Runoff that collects in the excavations will be conveyed by the dewatering trenches to a common point, where it will be pumped to the river after sediment settling has occurred, if necessary.

Material Processing and Associated Facilities

Pit run material will be conveyed off-site to the Wattenberg Lakes site (M-2004-051) to be conveyed for processing at the Platte Valley site (M-1989-120).

Commodities to be Mined and Intended Use

Sand and gravel for use as construction materials will be the primary products produced from the proposed Tucson South Resource. Test pits have verified that commercial deposits of sand and gravel exist up to 50 feet below the surface of the ground. In addition to the commercial sand and gravel materials, topsoil and overburden materials will be used on-site for reclamation.

Use of Explosives

The material is unconsolidated deposits, no explosives are required.

Wetlands

The Department of the Army published an Approved Jurisdictional Determination on July 23, 2019 attached to Exhibit J. No jurisdictional wetlands are present at the site.

EXHIBIT E – RECLAMATION PLAN

This information provided in this Exhibit is intended to satisfy the requirements outlined in Section 6.4.5 of the Colorado Mined Land Reclamation Board Construction Material Rules and Regulations: The proposed mining and reclamation plan focuses on minimizing the ecological impacts of mining, minimizing the length of time of impact, and maximizing long-term benefits.

Reclamation Plan

The previously approved reclamation plan for the two mining areas (West and East) remains the same. The amended off-site conveyor route will be reclaimed as uplands meadow and agricultural. Reclamation activities have been coordinated with the property owners and are intended to meet the proposed final land use.

Aggregate Industries (AI) has set forth measures that will be taken to meet performance standards for the following requirements:

(1) Grading shall be completed to create a final topography appropriate to the final land use selected in the Reclamation Plan.

(2) Overburden and waste materials will be placed in the mined area in a manner to ensure adequate compaction for stability and to prevent leaching of toxic or acid-forming materials.

(3) All grading will be done in a manner to control erosion and siltation of the affected lands, to protect areas outside the affected land from slides and other damage.

(4) All backfilling and grading will be completed as soon as feasible after the mining process. AI has established reasonable timetables consistent with good mining and reclamation procedures.

(5) There is no anticipated refuse, acid-forming or toxic producing materials associated with this site.

(6) Any drill or auger holes that are part of the mining operation will be plugged with non-combustible material, which shall prevent harmful or polluting drainage. There are no adits or shafts associated with this site.

(7) Maximum slopes and slope combinations will be compatible with the configuration of surrounding conditions and selected land use. In all cases where a lake or pond is produced as a portion of the Reclamation Plan, all slopes, shall be no steeper than a ratio of 3:1 (horizontal to vertical ratio). There is no swimming associated with the end use of this property.

(8) Future agricultural use is anticipated along the Weld County portion of the conveyor alignment. Native topsoil will remain or be returned to this area of the conveyor in a manner that historic crop yields can be maintained.

(9) Upland meadows on the northern portion of the East Cell and along the portion of the conveyor alignment along the City of Aurora Challenger Reservoir site in Adams County will be graded to allow for access to maintain the area.

(10) AI may backfill material generated within the MLRB permitted area into an excavated pit within the permit area. AI may import inert structural fill material onto the site for backfill. Prior to import of inert structural fill generated outside of the approved permit area, AI will provide DRMS with notice of any proposed backfill activity not identified in the approved Reclamation Plan. AI will maintain a Financial Warranty at all times, adequate to cover the cost to stabilize and cover any exposed backfilled material. The Notice to DRMS shall include, but is not limited to:

(a) a narrative that describes the approximate location of the proposed activity;
(b) the approximate volume of inert material to be backfilled;
(c) a signed affidavit certifying that the material is clean and inert, as defined in Rule 1.1(20);
(d) the approximate dates the proposed activity will commence and end, however, such dates shall not be an enforceable condition;
(e) an explanation of how the backfilled site will result in a post-mining configuration that is compatible with the approved post-mining land use; and
(f) a general engineering plan stating how the material will be placed and stabilized in a manner to avoid unacceptable settling and voids.

(11) All mined material to be disposed of within the affected area will be handled in such a manner to prevent any unauthorized release of pollutants to the surface drainage system.

(12) No unauthorized release of pollutants to groundwater shall occur from any materials mined, handled or disposed of within the permit area.

(13) The conveyor undercrossings below Tucson Street and 168th Avenue will be reclaimed in the following manner:

(a) The conveyor structure and belt will be pulled from the culvert and either reclaimed at another mine or hauled away for disposal at a Municipal Solid Waste Facility (MSWF).
(b) The asphalt over the box culvert will be removed and taken to another AI facility for recycling.
(c) The box culvert will either be pulled from the ground and hauled to another site for reuse or disposal at a MSWF.
(d) Utilities that were lowered during installation of the box culverts reestablished at a grade acceptable to the Utility Owner.
(e) The area will be backfilled and compacted in a manner that satisfies Adams County.
(f) The disturbed area will be repaved in a manner that satisfies Adams County.

More specific information regarding how AI will comply with the performance standards is outlined below.

Final Proposed Land Use

The current land use for the Tucson South Resource property is a combination of partially reclaimed mining area, reclaimed mining area, and dryland and irrigated agriculture, upland meadow and a City of Aurora water facility. The City of Aurora water facility (located outside the Affected Lands, west of the Brighton Ditch) will be removed from the Permit Boundary at a future date and continue to operate. The proposed final land use for the remainder of the property is lined municipal water storage for the West cell and the majority of the East cell, upland meadow on the northern portion of the East cell and conveyor alignment along the City of Aurora Challenger Reservoir, and irrigated and dryland agriculture along the Weld County portion of the conveyor alignment. Surrounding land uses include: Water storage to the north, rural residential and agriculture to the south and along the Weld County portion of the conveyor alignment, Town of Brighton wildlife conservation area and the South Platte River to the east and water storage and suburban residential to the west. The lined storage and upland meadows are compatible with existing and future adjacent land uses. This property lies within the City of Brighton Urban Growth area and is designated as natural resource conservation and flood plain on the 2016 Future Land Use Map.

General Overview of the Reclamation Plan

Types of Reclamation acres

Reclamation of the proposed permit area will contain three land forms; uplands, agricultural, and lined, open water reservoirs. Cottonwoods and shrubs will be planted along the South Platte River on the eastern side of the east cell. Timing and installation of the plantings will be coordinated with the Urban Drainage and Flood Control District. It is anticipated that these plantings will be established as part of the concurrent reclamation of the site.

Plantings will be installed when mining commences in the East Cell (Phase 2). Plantings will be installed by a reclamation contractor in September and hand watered until the ground freezes. Plantings will be monitored in the spring to make sure they are leafing out, replaced as necessary to provide the quantities as originally installed and watered as necessary through the first three growing seasons to establish.

Common Name	Botanical Name	Planting Size	Quantity
Plains Cottonwood	Populus deltoides	10 gallon	36
American Plum	Prunus americana	1 gallon	40
Choke Cherry	Prunus virginiana	1 gallon	40
Western Sand Cherry	Prunus besseyi	1 gallon	40
Coyote willow	Salix exigua	1 gallon	40

The primary reclamation process will be backfilling the slopes of the mined-out areas to be reclaimed as reservoirs backfill of the partially reclaimed area on the northern end of the East cell to create an upland meadow. Overburden, and non-marketable materials from the site will be used as backfill. As mined out cells are backfilled, rough grading will establish the slopes and elevations necessary to facilitate the appropriate land form for that specific area of the site. In upland areas backfill materials will be placed to an elevation near or below the premining surface elevation. For areas where reservoirs are to be located, backfill will be used to create pond side slopes. Pond depth may extend all the way to bedrock and side slopes will be 3H:1V or flatter.

Except for pond slopes below normal average highwater surface elevation, all areas disturbed by mining activities will be prepared with topsoil to a minimum of 6 to 12 inches and revegetated during reclamation. Revegetation will generate a blend of upland grass species. Given suitable precipitation, seeding should produce good vegetation cover over much of the reclaimed site. Roads not necessary for future access and other disturbed areas will be reclaimed with topsoil and overburden replacement and vegetative cover to stabilize the areas and minimize erosion.

Reclamation Measures/Materials Handling

All available topsoil and overburden material will be used for backfilling and reclamation. Earth moving equipment may include, but is not limited to dozers, loaders, scrapers, and excavators. Additional farm equipment for grading and seeding may be used for revegetation activities.

Materials Handling- Backfilling

The site will be concurrently reclaimed to create the water storage reservoirs. Compaction for the reservoir side slopes at this site will be 95 percent (or better) standard proctor. When an area is completely mined out from grade to bedrock, each section approximately 800-foot-wide (or approximately 30 acres), will begin side slope construction while the next contiguous area or consecutive phase is beginning mining. Due to the floodway, there is limited space for stockpile placement at this site; by concurrently reclaiming, as an area is being prepared for mining, the overburden and topsoil can be stripped and immediately placed, or stockpiled in the previously mined area, limiting the material handling. It is estimated that within 6 months of an area being completely mined, it will be reclaimed.

Backfilling of mining cells and other reclamation activities will be concurrent with mining. Topsoil, overburden, and non-marketable material excavated during mining will be used almost immediately. The reserved topsoil and overburden will be used to create the finished grade prior to revegetation. Small temporary stockpiles may be created within or along the edge of the mining cells. When enough material is available in the stockpile, the material will be graded into the previously mined areas. Locations of topsoil and overburden stockpiles are shown on Exhibit C Mining Maps.

Material may be imported for reclamation if on-site material is insufficient to create the reclaimed pond slopes. Prior to receiving any backfill material from outside the proposed permit area, the operator will provide notice with information that includes the backfill location and volume of off-site material to be used, an affidavit certifying that the material is clean and inert, an approximate time frame for backfilling with off-site material, and an update regarding material placement procedures and the final reclamation configuration. The on-site or offsite backfill material used will not contain known toxic or hazardous materials.

All backfilling and grading will be done to stabilize the material and control erosion. Final grading and seeding will be done as soon as possible after backfilling, grading, and top soiling have been completed. The reclamation will not leave high walls on the property. In addition, there will be no auger holes, excavations, or shafts left on the property.

Materials Handling – Grading

Once backfill is placed to the approximate final grade for upland meadow, pond side slope creation, or agricultural reclamation; the area will be rough graded to establish final elevations, slopes, and transitions. Final grading will include addition of topsoil and surface preparation for revegetation. Special attention shall be given to transitions from reclaimed areas to undisturbed land. The final topography will not create new surface drainage directed onto adjacent properties.

Reservoir side slopes will include the steepest reclaimed grades on the site, potentially as steep as 3H:1V. The side slopes will be graded smooth to accommodate future maintenance of the lined reservoirs. The reclamation will not leave high walls on the property.

Materials Handling- Soil Bentonite Slurry Wall

The proposed slurry wall will provide a vertical low permeable cutoff between alluvial groundwater outside of mining cells and water stored below-grade inside of mining cells. Slurry walls (also known as slurry cutoff walls) are non-structural liners constructed to provide a primary low permeability liner and isolate a mining cell from the existing alluvial aquifer. Soil-bentonite slurry walls are a very common type of liner constructed in Colorado. Construction of a soil-bentonite slurry wall liner is underway at the Tucson South Resource East and West cells. Once the liners are constructed and meet an SEO required 90-day minimum leak test, lined water storage reservoirs located north of State Highway 7 will be available for use. Aggregate Industries contracted with Civil Resources, LLC. to provide a final design of a soil-bentonite slurry wall liner for Tucson South. The final design is submitted with this amendment. AI has awarded the contract and construction activities commenced in October 2021. The slurry wall will be constructed with a long reach excavator or other suitable trenching equipment. A trench approximately 3 feet wide and 100 to 150 feet in length will be excavated through the existing alluvium and several feet into the underlying claystone and sandstone bedrock. The total slurry wall depth varies from top to bottom based on the existing geology but will average 30 feet deep for this project. The trench will be flooded with fresh bentonite slurry to stabilize the excavation during construction of the slurry wall. A mixture of alluvium excavated from the trench, dry bentonite, and clayey supplemental fines will be mixed at the surface and placed into the trench in a semi-fluid state typically with a bulldozer and/or second excavator. The slurry in the trench is displaced by the soil-bentonite backfill as the excavation of the trench is advanced. Once the excavation of the trench followed by the backfill operation is
complete, the soil-bentonite backfill consolidates and behaves as a soft clayey soil. The top of the slurry wall is typically capped with a few feet of clayey soils to speed up the primary consolidation, identify the approximate location of the slurry wall, and provide clayey soils to fill depressions due to the consolidation of the slurry wall. Other considerations required for successful construction of a soil-bentonite slurry wall include a stable, relatively flat gently sloping (i.e. less than 1 percent parallel to the wall) construction platform along the proposed slurry wall alignment. Construction of the construction platform along the slurry wall alignment is primarily on stable, native soils found at the site and should not present a challenge for construction equipment. There are narrow areas proposed for the construction platform at this site. However, the narrow areas are relatively short and soil-bentonite slurry wall construction activities should not be greatly affected by these sections. Once soil-bentonite slurry wall construction is

complete, the construction platform will be final graded for stability and an operations and maintenance access route will be left in place. The route will be reclaimed and stabilized as a low traffic dirt road.

Gravel Pit Lining Criteria

Gravel pit liners are designed with the goal of meeting the leakage requirements outlined in the State of Colorado's document entitled *"State Engineer Guidelines for Lining Criteria of Gravel Pits,"* August 1999. As described in the guidelines, the intent of the soil-bentonite slurry wall design is to reduce the groundwater inflow (leakage rate) into the lined below-grade mining cell to at or below the Design Standard. The Design Standard is defined in the guidelines as the leakage rate that is not greater than 0.03 ft/day multiplied by the curtain area of the soil-bentonite slurry wall (i.e. the length of the perimeter wall in feet multiplied by the average vertical depth of the wall as measured from the ground surface to the mine cell floor along the toe of the cell side slope), plus 0.0015 ft/day multiplied by the area of the floor encompassed by the soil-bentonite liner. The guidelines allow for a liner to meet a performance standard which is three times the Design Standard and operate as a lined water storage cell. Monitoring and release requirements are increased from monthly reporting to weekly reporting for liners that meet the Performance Standard. At the completion of construction, the liner is subjected to a minimum 90-day leak test as described in the guidelines.

Topsoil and Revegetation

Revegetation will only include grass seeding of disturbed areas. No tree or shrub planting is planned around the perimeter of the reservoirs. In areas reclaimed for agricultural purposes, the site will be graded with the native topsoil and planted with crops at the discretion of the property owner. Where required, topsoil will be replaced to a depth of 6 to 12 inches. Topsoil will be placed after backfilling and rough grading is completed. As an area is reclaimed, runoff or excess water from adjacent areas will not be allowed to flow over slopes being graded and seeded. If needed, berms or channels will be constructed to divert excess water and dispose of it in a safe and non-erosive manner.

Seeding of disturbed areas will be done as areas are finished with preparation including grading and topsoil spreading. Seeding will be most successful if done between mid-November and the end of April. Seeding can be performed in May, if necessary, but after May it is not advisable to plant. Seeding before November is not advised as the potential for a warm growth environment and early germination would likely result in a major failure of the revegetation and require reseeding.

Fertilizer may be applied to re-soiled areas in a manner that will encourage emergence and survival of the grasses without encouraging competition from weeds. Starter fertilizer can be applied before, or at the time of, seeding. If necessary, full fertilization will be applied after emergence. Fertilizer mixtures will be based upon soil tests made on samples taken from re-soiled areas prior to seeding.

If a significant invasion of noxious weeds occurs after seeding, the weeds will be mowed before they can go to seed. The areas will be mowed periodically for additional control

as needed. Mechanical control will be used as a first priority. Chemical methods will only be used if no other alternative produces acceptable results.

Periodic inspection for noxious weeds, at least once a year early in the season, will be done. The weed inspection will search for not only the expected species but also any new List A or List B species introductions. It is likely that non-noxious and List C species will also be found. Non-noxious weeds, which are often native invaders, do not need to be controlled, but if the population of a List C species is controllable then it will be included in the control program. List C noxious species are problematic but are usually not as serious as List B species.

Specific information regarding weeds is included in the Biological Resource Inventory included with Exhibit H. Aggregate Industries utilizes an integrated weed management protocol to manage weeds on their active mining sites this protocol includes:

1. Management Objective

Manage noxious weeds and plant pests within the permit area.

2. Weed Species to be Controlled

Aggregate Industries- WCR, Inc. (AI) will control those plant species identified by current State statute or regulation as noxious. Plant pests are defined as those biological species that significantly predate the desirable vegetation of the project site.

3. Weed Management Actions

• *Monitoring*

The presence of noxious weeds and plant pests will be monitored annually, at which time weed control efforts will be reviewed and specific management measures adjusted as necessary. Management measures will be undertaken where a single or combination of noxious weed species or plant pests comprises or shows a deleterious effect to the live vegetation cover in the mitigation area as determined by observations of a revegetation or weed control specialist.

• *Control Measures*

AI will contract with a licensed herbicide applicator/weed management specialist to implement the weed management plan. Noxious weeds or plant pests may be controlled by any combination of cultural, mechanical, biological, or chemical measures. Weed control measures will be developed specifically for the noxious weed species encountered and in consultation with Adams County, local weed control district and/or the Colorado State Department of Agriculture as necessary. Topsoil slated for removal from the site will be treated with a long-term residual pre-emergent or post-emergent herbicide to reduce noxious weeds prior to removal. AI will conduct an aggressive mowing program the first year following revegetation, withholding herbicide use until the following year to avoid damaging new seedlings. Herbicides will be applied by a licensed commercial applicator. Stockpiles that remain undisturbed for more than one season will be seeded with a temporary cover crop. Where noxious weed control measures cause disturbance to the remaining vegetation, seeding or planting of desirable replacement vegetation will occur during the first normal planting or seeding season after weed control measures have been implemented and deemed successful.

• *Contact Person(s)*
During mining, the Operations Manager at the site will be the contact person for weed control. When mining is completed, the weed control contact person will be Aggregate Industries' operations staff at the corporate office in Golden, Colorado. Aggregate Industries will be responsible for weed control until the site is released by DRMS. At that time, responsibility for weed control will transfer to the land owner.

The grass seed mix, composed of a long lasting and regenerating native upland seed mixture, will be used in upland areas where no future irrigated/dryland agriculture or other development is anticipated. The native open space seed mix recommendation is presented below.

Upland Meadow Grass Seed	**Scientific Name**	**Variety**	**% of Mix**	**Application Rate (PLS/acre)**
Big Bluestem	Andropogon gerardii	Kaw	15%	1.7
Blue Grama	Bouteloua gracilis	Hachita, Lovington	10%	0.3
Green Needlegrass	Nassella viridula	Lodom	15%	1.5
Sideoats Grama	Bouteloua curtipendula	Vaughn, Butte	10%	1.0
Switch grass	Panicium virgatum	Blackwell	20%	2.0
Western Wheatgrass	Pascopyrum smithii	Arriba, Barton	30%	4.8
				Total 11.3
*Application rate is for drill seeding. If seed is to be broadcast, the application rate will be doubled.				
Temporary Stockpile Vegetation: Luna Pubescent Wheatgrass- 15 lb./ac Amur Intermediate Wheatgrass - 15 lb./ac				

Upland grass seed will be planted with a drill equipped with depth bands and press wheels. The seeded area will then be covered with certified weed-less straw mulch at a rate of 2,000 pounds per acre. The straw will be crimped into the soil to control erosion until the grass becomes established. Drill seeding is the preferred method for revegetation. If broadcast seeding is necessary on moist soils, steep slopes, or in excessively rocky areas, success can be encouraged by broadcasting onto growth medium that is very loose. If the seed is broadcast in those circumstances, then the seeded area will be dragged to help bury the seed.

Wildlife
Current wildlife conditions and potential impacts are described in Exhibit H, Wildlife Information.

Water- General Requirement
To minimize the effect on the prevailing hydrologic balance, the operator shall:
a. Comply with all applicable Colorado water laws.
b. Comply with all applicable Federal and State water quality laws and regulations.
c. Comply with all Federal and State requirements for dredge and fill.
d. Perform all work to minimize erosion and sediment transport.

Current water resource conditions and potential surface water and groundwater impacts are described in Exhibit G, Water Information.

Groundwater- Specific Requirements
Current water use on the proposed Tucson South Resource site consists of a permitted well field along the eastern portion of the site, adjacent to the South Platte River (owned and operated by the Todd Creek Metropolitan District) and limited depletions from existing, non-jurisdictional wetlands on the site. The well permit for the gravel mining operation is also in place. Copies of the well permit and well completion report are included in Exhibit G, Water Information.

This site is included in Aggregate Industries Substitute Water Supply Plan (SWSP) for the South Platte River. Specific information regarding water resources is included in Exhibit G. This plan will cover the depletions associated with water removed from the site with the material during mining. Once the site is reclaimed there will be no ongoing depletions associated with the property. The West and East cells will be reclaimed to lined water storage reservoirs. Groundwater will not be exposed along the conveyor alignment.

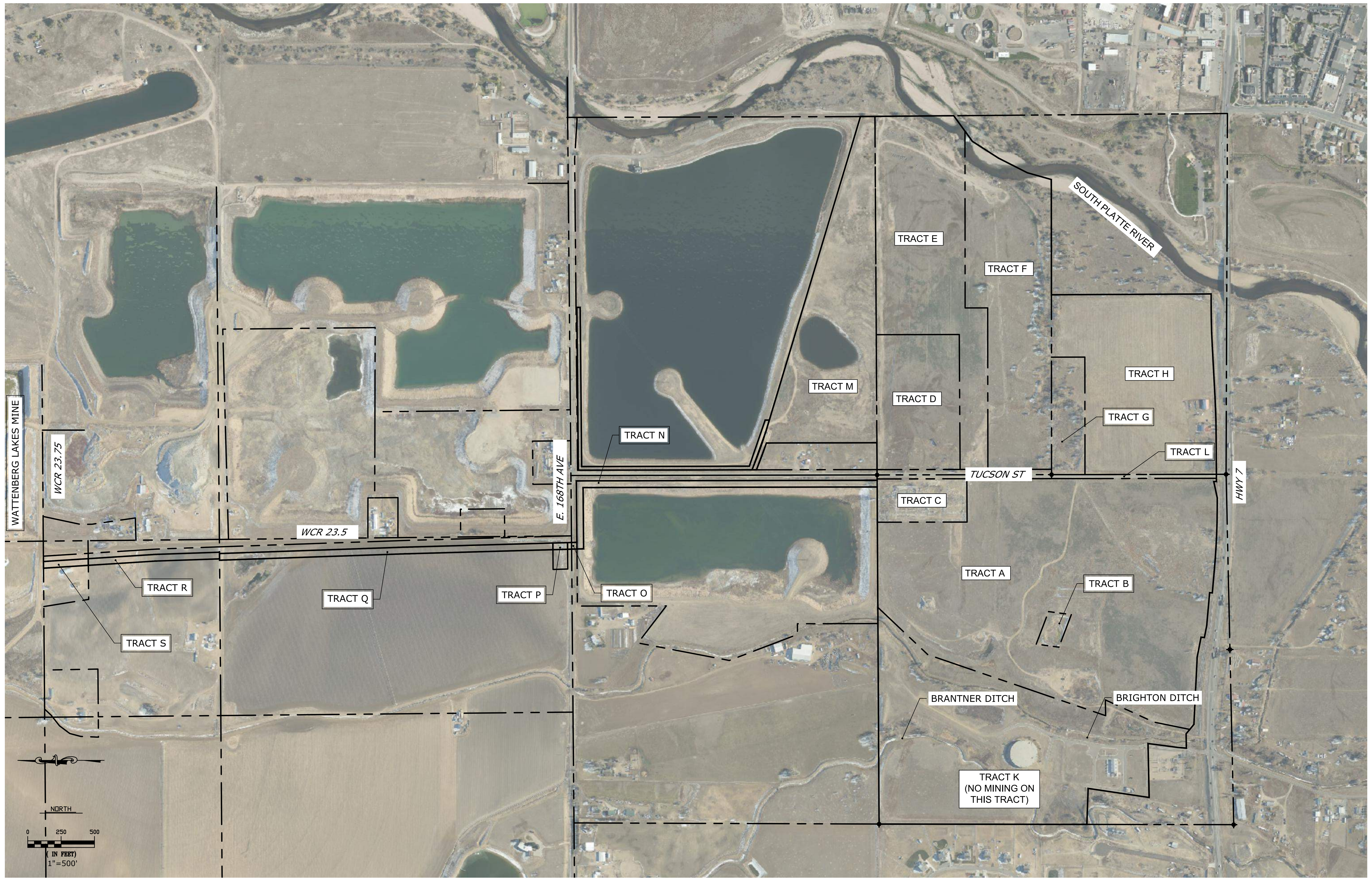
Tucson South Resource Groundwater Modeling Study on the hydrogeologic effects of Mining, prepared by Tetra Tech RMC dated August 2004 is attached herein for reference. A groundwater monitoring and mitigation plan was submitted to the Division as part of an adequacy response to Mr. Larry Oehler dated November 22, 2004 (pages 17-19). The plan was reviewed and approved by the Division as part of the original permit for the site. A copy of the approved plan is attached herein for reference in Exhibit G. Aggregate Industries obtained a well permit for the site in 2017 and filed the well completion report with the Colorado Division of Water Resources in 2018. A copy of the well permit and well completion report are also included in Exhibit G.

The mining and reclamation operation will not affect groundwater quality on or off the site. The operation will comply with State groundwater quality standards. Due to the absence of significant sources of potential pollutants, groundwater quality monitoring is not required in this operation.

Buildings and Structures
No buildings or structures associated with mining activities will be left in the proposed permit area following reclamation.

Signs and Markers

Permit notification signs will be placed and maintained at the entrance to the operation. The permit boundary will be identified where it is not already identified by fences or suitable markers. All signs and markers will be removed upon permit release.



TUCSON SOUTH RESOURCE
RECLAMATION PLAN MAPS

TUCSON SOUTH RESOURCE SHEET INDEX	
SHEET NUMBER	SHEET TITLE
F-1	EXHIBIT F COVER SHEET & RECLAMATION NOTES
F-2	EXHIBIT F WEST AREA RECLAMATION PLAN
F-3	EXHIBIT F EAST AREA RECLAMATION PLAN
F-4	WELD COUNTY CONVEYOR RECLAMATION PLAN

CERTIFICATION:

THIS MAP WAS PREPARED BY CIVIL RESOURCES, LLC. IN COOPERATION WITH AGGREGATE INDUSTRIES-WCR, INC. AGGREGATE INDUSTRIES-WCR, INC. WILL KEEP THE DIVISION OF RECLAMATION, MINING, AND SAFETY INFORMED OF ANY CHANGES TO THE MINING OR RECLAMATION PLANS THROUGH ANNUAL REPORTS AND FILE TECHNICAL REVISIONS OR AMENDMENT APPLICATIONS AS NECESSARY THROUGHOUT THE LIFE OF THE MINE.

GARY LINDEN — 12/01/2021
DATE

RECLAMATION NOTES

1. ALL FINAL RECLAIMED RESERVOIR SIDE SLOPES SHALL BE NO STEEPER THAN 3H:1V. 6"-12" OF TOPSOIL WILL BE PLACED ON ALL SLOPES ABOVE THE ASSUMED HIGH-WATER LINE. RE-VEGETATION SHALL USE SEED MIXES LISTED IN TABLE BELOW, OR SIMILAR ALTERNATE MIX BASED ON COMMERCIAL AVAILABILITY AT THE TIME OF RECLAMATION. ALL SUBSTITUTIONS WILL DETERMINED IN CONSULTATION WITH QUALIFIED EXPERTS, AND APPROPRIATE TO THE REGION AND SOIL REGIME.

2. HIGH WATER LINE IS APPROXIMATE BASED ON AN ASSUMED 1' FREEBOARD.

3. AREAS TO BE RECLAIMED AS UPLAND WILL RECEIVE A MINIMUM OF 6"-12" TOPSOIL TO BETTER ESTABLISH GRASSES AND PLANTINGS.

4. PLANTINGS WILL BE INSTALLED WHEN MINING COMMENCES IN THE EAST CELL (PHASE 2). PLANTINGS WILL BE INSTALLED BY A RECLAMATION CONTRACTOR IN SEPT AND HAND WATERED UNTIL THE GROUND FREEZES. PLANTINGS WILL BE MONITORED IN THE SPRING TO MAKE SURE THEY ARE LEAFING OUT, REPLACED AS NECESSARY TO PROVIDE THE QUANTITIES AS ORIGINALLY INSTALLED AND WATERED AS NECESSARY THROUGH THE FIRST THREE GROWING SEASONS TO ESTABLISH.

5. AT RECLAMATION, AGGREGATE INDUSTRIES-WCR., INC. WILL ATTAIN MHFD APPROVAL OF PLANTING LOCATIONS WITHIN THE MHFD EASEMENT ALONG THE SOUTH PLATTE RIVER PRIOR TO INSTALLATION.

6. SEEDING WILL BE DONE DURING THE FIRST FAVORABLE SEEDING SEASON FOLLOWING TOPSOIL PLACEMENT. BASED ON RECOMMENDATION OF THE NRCS, IT IS ANTICIPATED THAT SEEDING WILL BE DONE BETWEEN OCT 15 AND MAY 1, UNLESS WEATHER CONDITIONS REQUIRE SEEDING OUTSIDE THESE MONTHS.

7. CERTIFIED WEED-FREE STRAW CRIMPED INTO TOPSOIL WILL BE USED WHERE GRASSES ARE TO BE ESTABLISHED ABOVE THE HIGH-WATER LINE ON RESERVOIR SIDE SLOPES, OR NEW SEEDS PLANTED INTO A COVER CROP.

GRAVEL MINING APPLICANT/OPERATOR:

AGGREGATE INDUSTRIES-WCR. INC.
1687 COLE BLVD, STE 300
GOLDEN, COLORADO 80401

SURFACE OWNERS:

AGGREGATE INDUSTRIES-WCR. INC.(TRACTS A, B, D, E, F, H, AND M)
1687 COLE BLVD, STE 300
GOLDEN, COLORADO 80401

CITY OF AURORA (TRACTS C, G, K AND N)
15151 EAST ALAMEDA PARKWAY, STE 3600
AURORA, COLORADO 80012

ADAMS COUNTY (TRACTS L & O)
ADAMS COUNTY GOVERNMENT CENTER
4430 SOUTH ADAMS COUNTY PARKWAY
BRIGHTON, COLORADO 80601

YOSHI & SUZU, LLP (TRACTS P & Q)
PO BOX 508
BRIGHTON, CO 80601

DOROTHY STRUCK (TRACT R)
507 COUNTY ROAD 23.5
BRIGHTON, COLORADO 80603

TOBY STRUCK (TRACT S)
527 COUNTY ROAD 23.5
BRIGHTON, COLORADO 80603

RECLAMATION AREA ACREAGE TABLE:

RECLAMATION PLAN AREAS	ACREAGES
MINING AREAS RECLAIMED TO WATER STORAGE	155.8
DISTURBED, BUT NOT MINED LAND RECLAIMED TO UPLAND MEADOW	75.3
DISTURBED, BUT NOT MINED LAND RECLAIMED TO AGRICULTURAL	4.5
UNDISTURBED AREAS OUTSIDE AFFECTED AREA	49.0
TUCSON STREET ROW	2.9
E 168 AVE ROW	0.1
TOTAL	287.6

TREE TABLE:

Common Name	Botanical Name	Planting Size	Quantity
Plains Cottonwood	Populus deltoides	10 gallon	36
American Plum	Prunus americana	1 gallon	40
Choke Cherry	Prunus virginiana	1 gallon	40
Western Sand Cherry	Prunus besseyi	1 gallon	40
Coyote willow	Salix exigua	1 gallon	40

SEED MIX AND SEED MIX NOTES:

Upland Meadow Grass Seed	Scientific Name	Variety	% of Mix	Application Rate (PLS/acre)
Big Bluestem	Andropogon gerardii	Kaw	15%	1.7
Blue Grama	Bouteloua gracilis	Hachita, Lovington	10%	0.3
Green Needlegrass	Nassella viridula	Lodom	15%	1.5
Sideoats Grama	Bouteloua curtipendula	Vaughn, Butte	10%	1.0
Switch grass	Panicium virgatum	Blackwell	20%	2.0
Western Wheatgrass	Pascopyrum smithii	Arriba, Barton	30%	4.8
				Total 11.3

*Application rate is for drill seeding. If seed is to be broadcast, the application rate will be doubled.

Temporary Stockpile Vegetation:
Luna Pubescent Wheatgrass- 15 lb./ac
Amur Intermediate Wheatgrass - 15 lb./ac

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TUCSON SOUTH RESOURCE
EXHIBIT F
RECLAMATION PLAN

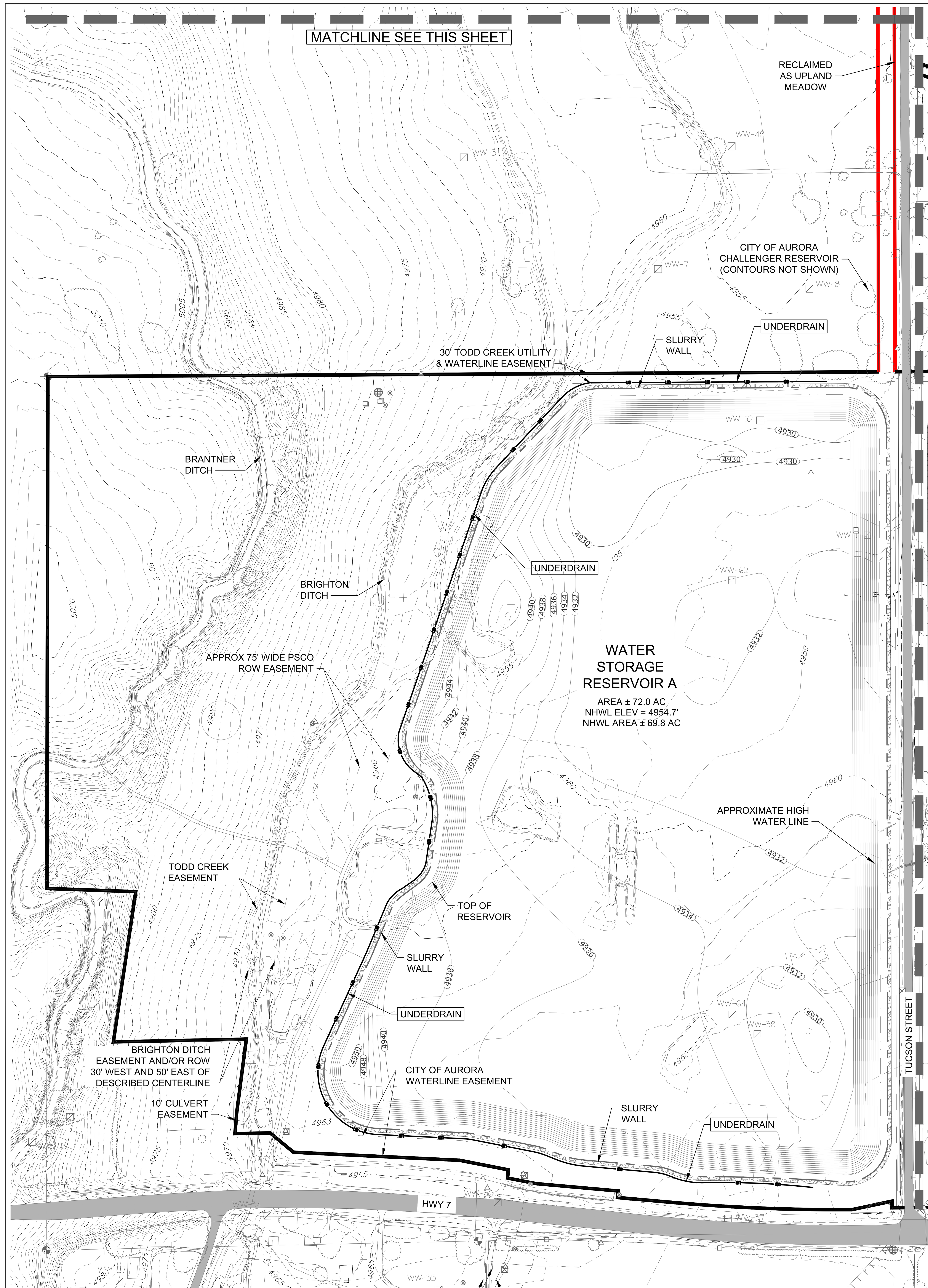
REVISIONS

NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21

DRAWN BY: CAI
CHECKED BY: GL
DATE: AUGUST 21
SCALE: AS NOTED
AS NOTED
JOB NO.: 297.001.09
DWG NAME: F-1 EXHIBIT F EAST AREA RECLAMATION PLAN.dwg

EXHIBIT F COVER SHEET & RECLAMATION NOTES

SHEET:
F-1



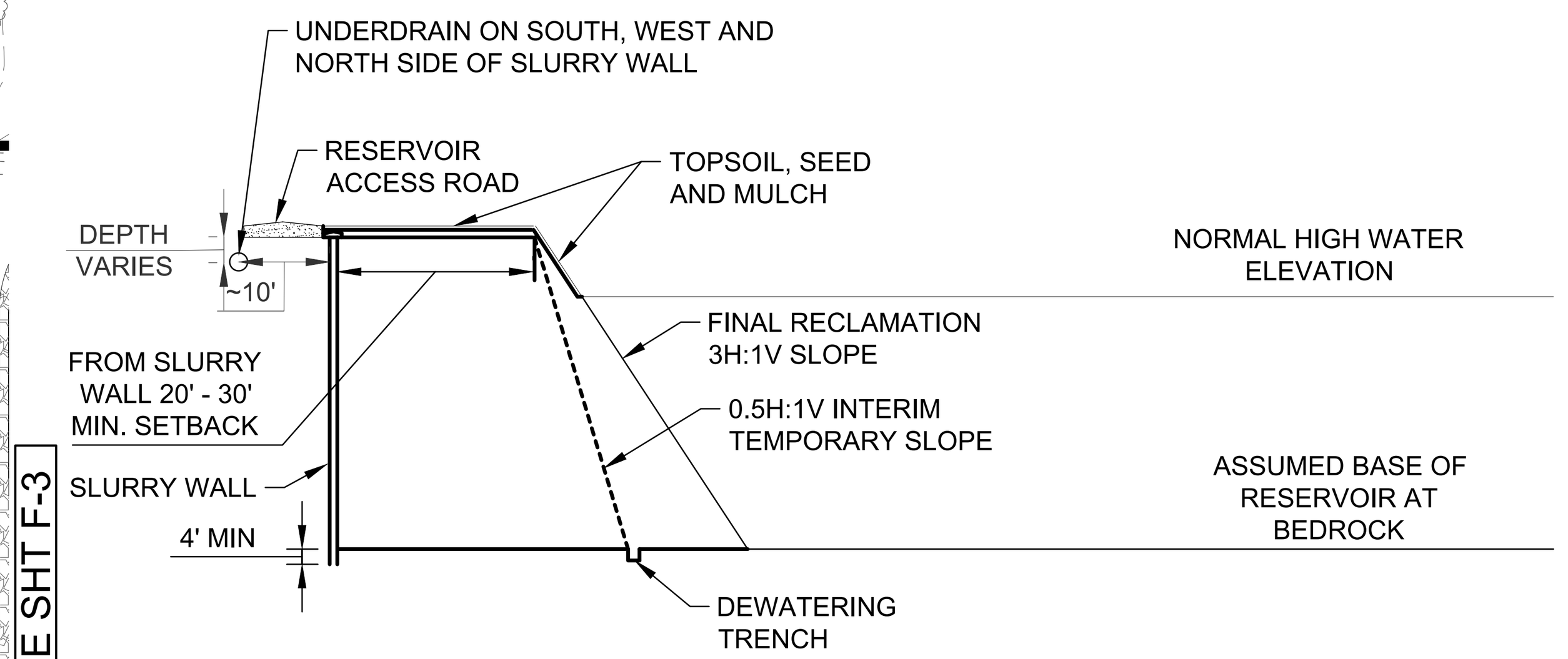
VIEW 1

NORTH
0 100 200
(IN FEET)
1"=200'

CERTIFICATION:

THIS MAP WAS PREPARED BY CIVIL RESOURCES, LLC. IN COOPERATION WITH AGGREGATE INDUSTRIES-WCR, INC. AGGREGATE INDUSTRIES-WCR, INC. WILL KEEP THE DIVISION OF RECLAMATION, MINING, AND SAFETY INFORMED OF ANY CHANGES TO THE MINING OR RECLAMATION PLANS THROUGH ANNUAL REPORTS AND FILE TECHNICAL REVISIONS OR AMENDMENT APPLICATIONS AS NECESSARY THROUGHOUT THE LIFE OF THE MINE.

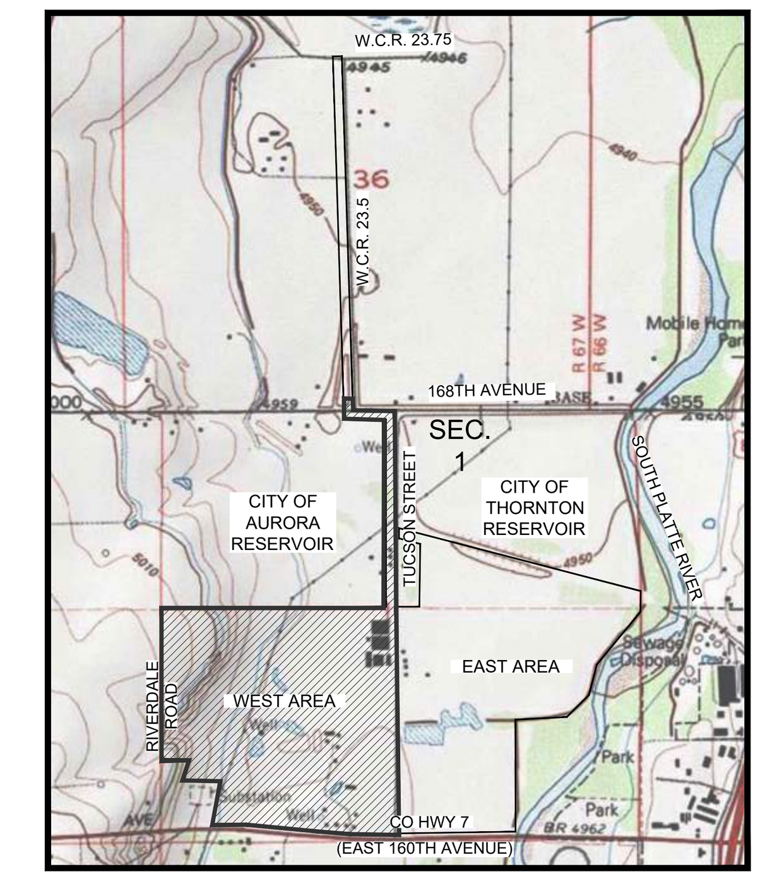
GARY LINDEN — 12/01/2021 (DATE)



1 TYPICAL RESERVOIR CROSS-SECTION

NTS

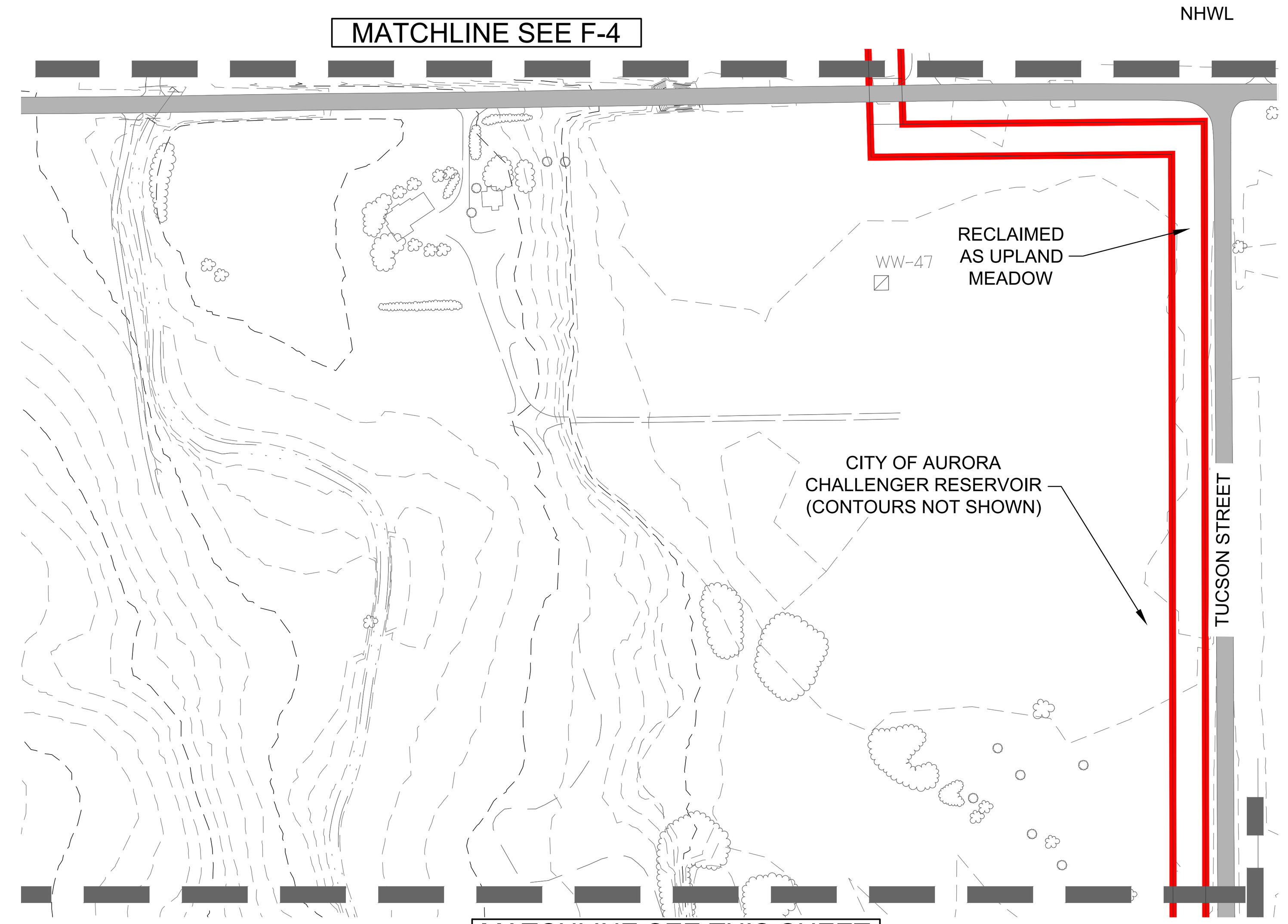
NOTE: UNDERGROUND UTILITIES NOT SHOWN.



PERMIT KEY MAP
NORTH
NTS

LEGEND:

	MINE PERMIT BOUNDARY
	TRACT BOUNDARY
	EFFECTIVE FLOODWAY
	EFFECTIVE ZONE AE
	EFFECTIVE ZONE X
	PRE-PROJECT/MINING CONDITIONS 100-YR FLOODPLAIN
	EXISTING EDGE OF WATER
4900	EXISTING 2' CONTOURS
x x x x	EXISTING FENCE
	EXISTING EDGE OF ROAD
UE	EXISTING ELECTRIC LINE
OE	EXISTING OVERHEAD ELECTRIC LINE
G	EXISTING GAS LINE
W	EXISTING WATER LINE
OT	EXISTING TELEPHONE LINE
UD UD	PROPOSED UNDERDRAIN
	PROPOSED SLURRY WALL
4900	PROPOSED 2' CONTOURS
	RESERVOIR ACCESS ROAD
	EXISTING ASPHALT ROAD
	EXISTING SOUTH PLATTE RIVER
	RESERVOIR ACCESS ROAD
NHWL	NORMAL HIGH WATER LINE



VIEW 2

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TUCSON SOUTH RESOURCE EXHIBIT F WEST AREA RECLAMATION PLAN

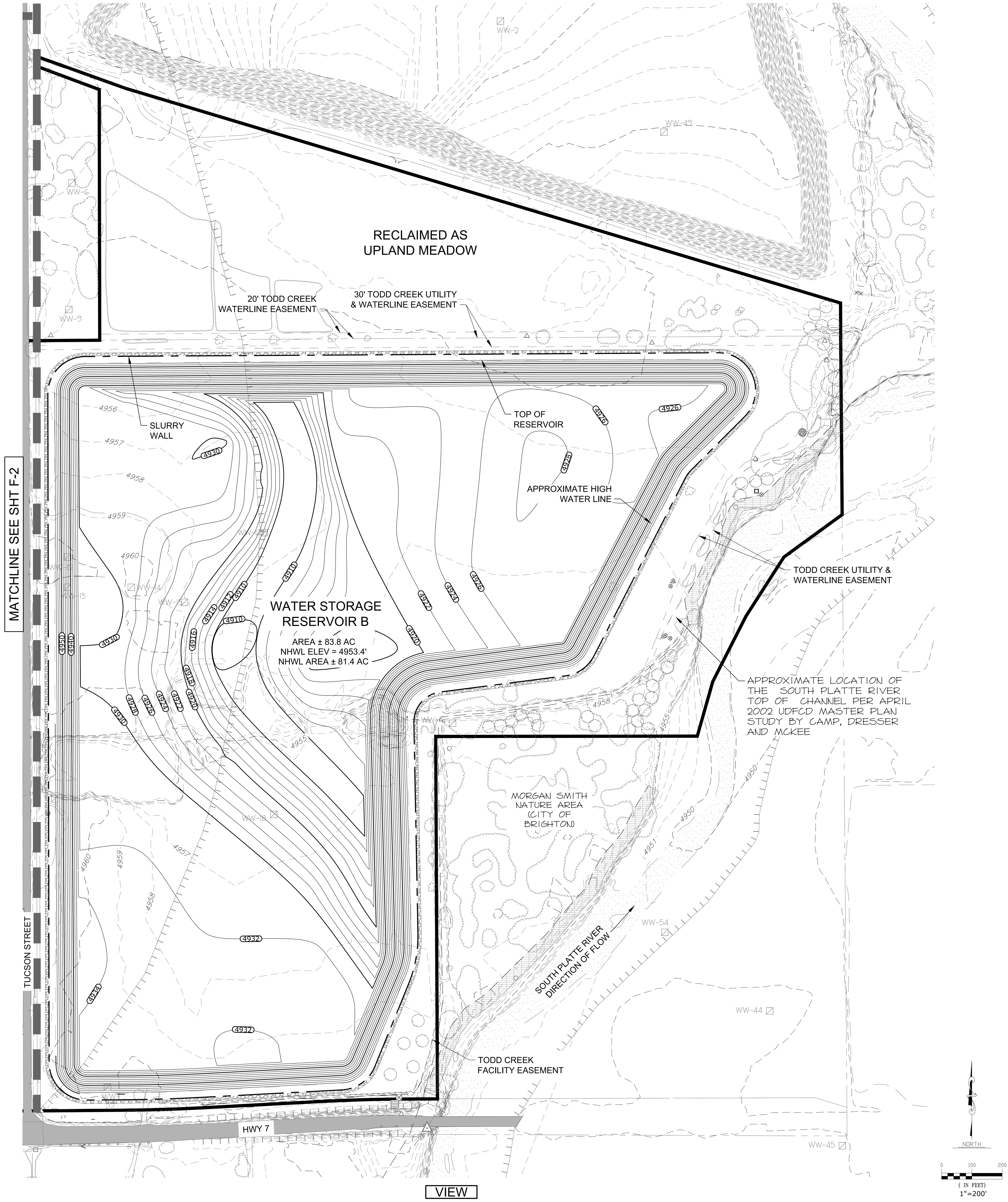
REVISIONS

NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21

DRAWN BY: CAI — DATE: AUGUST 21
CHECKED BY: GL — SCALE: AS NOTED / AS NOTED
JOB NO.: 297.001.09
DWG NAME: F-3 EXHIBIT F EAST AREA RECLAMATION PLAN.dwg

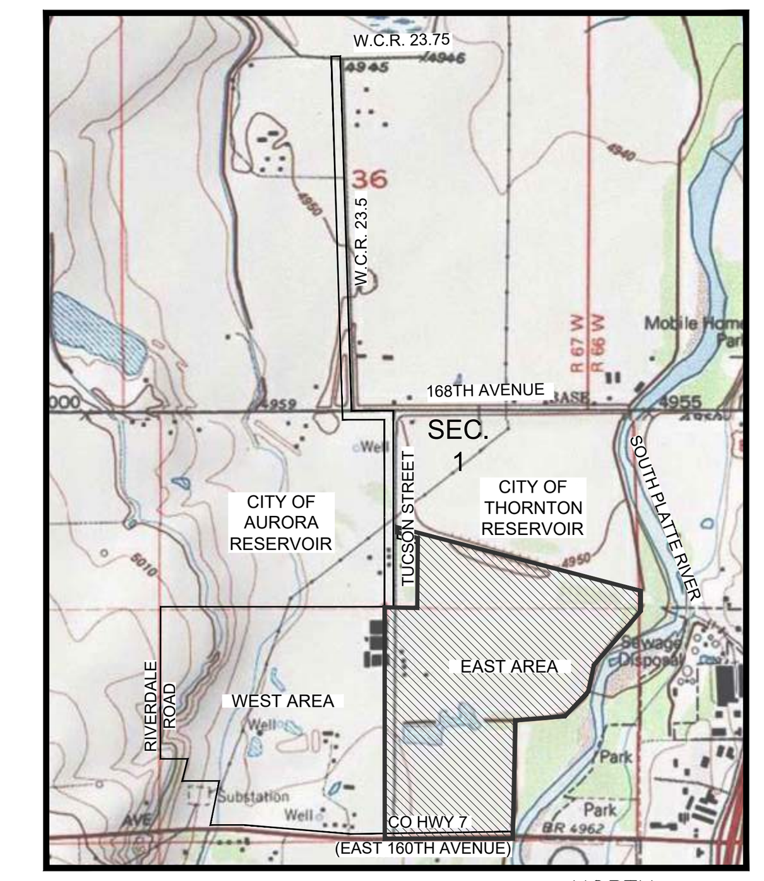
EXHIBIT F WEST AREA RECLAMATION PLAN

SHEET: F-2



LEGEND:

- MINE PERMIT BOUNDARY
- TRACT BOUNDARY
- EFFECTIVE FLOODWAY
- EFFECTIVE ZONE AE
- EFFECTIVE ZONE X
- PRE-PROJECT/MINING CONDITIONS 100-YR FLOODPLAIN
- EXISTING EDGE OF WATER
- 4900 — EXISTING 2' CONTOURS
- x — EXISTING FENCE
- EXISTING EDGE OF ROAD
- UE — EXISTING ELECTRIC LINE
- OE — EXISTING OVERHEAD ELECTRIC LINE
- G — EXISTING GAS LINE
- W — EXISTING WATER LINE
- OT — EXISTING TELEPHONE LINE
- PROPOSED SLURRY WALL
- 4900 — PROPOSED 2' CONTOURS
- RESERVOIR ACCESS ROAD
- EXISTING ASPHALT ROAD
- EXISTING SOUTH PLATTE RIVER
- RESERVOIR ACCESS ROAD
- NHWL — NORMAL HIGH WATER LINE
- PROPOSED COTTONWOOD TREE (LOCATIONS SUBJECT TO CHANGE)
- PROPOSED SHRUB BEDS (LOCATIONS SUBJECT TO CHANGE)



PERMIT KEY MAP

NORTH

NTS

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GARY LINDEN	12/01/2021
	DATE

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TUCSON SOUTH RESOURCE
EXHIBIT F EAST AREA
RECLAMATION PLAN

REVISIONS

NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21

DRAWN BY: CAI DATE: AUGUST 21
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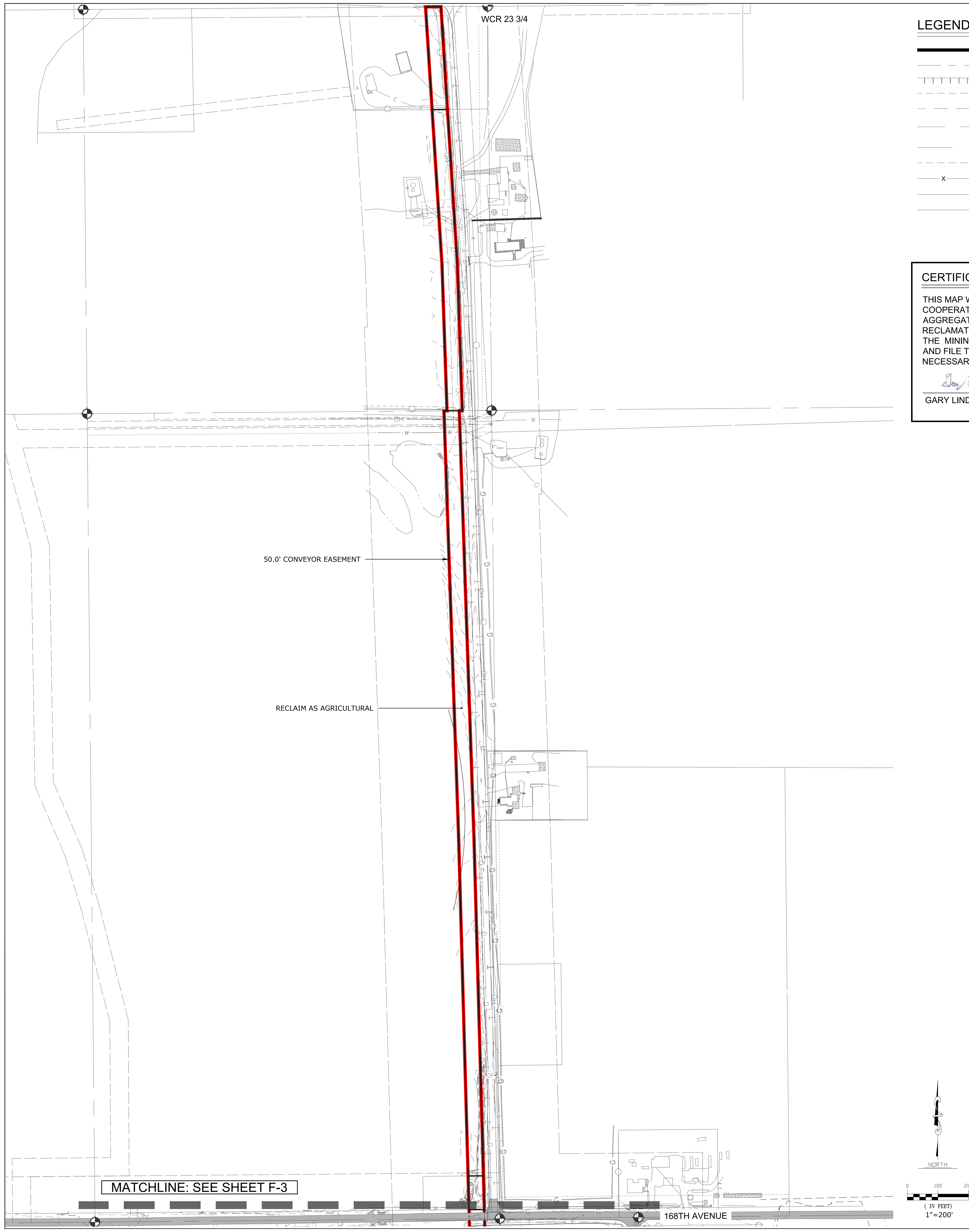
AS NOTED
JOB NO.: 297.001.09
DWG NAME: F-3 EXHIBIT F EAST AREA RECLAMATION PLAN.dwg

EXHIBIT F EAST AREA RECLAMATION PLAN

SHEET: F-3

811 Know what's below. Call before you dig.



LEGEND:

Symbol	Description
	MINE PERMIT BOUNDARY
	TRACT BOUNDARY
	EFFECTIVE FLOODWAY
	EFFECTIVE ZONE AE
	EFFECTIVE ZONE X
	PRE-PROJECT/MINING CONDITIONS 100-YR FLOODPLAIN
	EXISTING EDGE OF WATER
4900	EXISTING 2' CONTOURS
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G	EXISTING GAS LINE
W	EXISTING WATER LINE
OT	EXISTING TELEPHONE LINE
	EXISTING ASPHALT ROAD
	EXISTING SOUTH PLATTE RIVER
MW-1	MONITORING WELL LOCATION WITH WELL ID #
WW-10	WATER WELL LOCATION WITH WELL ID #
	EXISTING TREES
	UTILITY POLE
	SECTION CORNER MONUMENT

CERTIFICATION:

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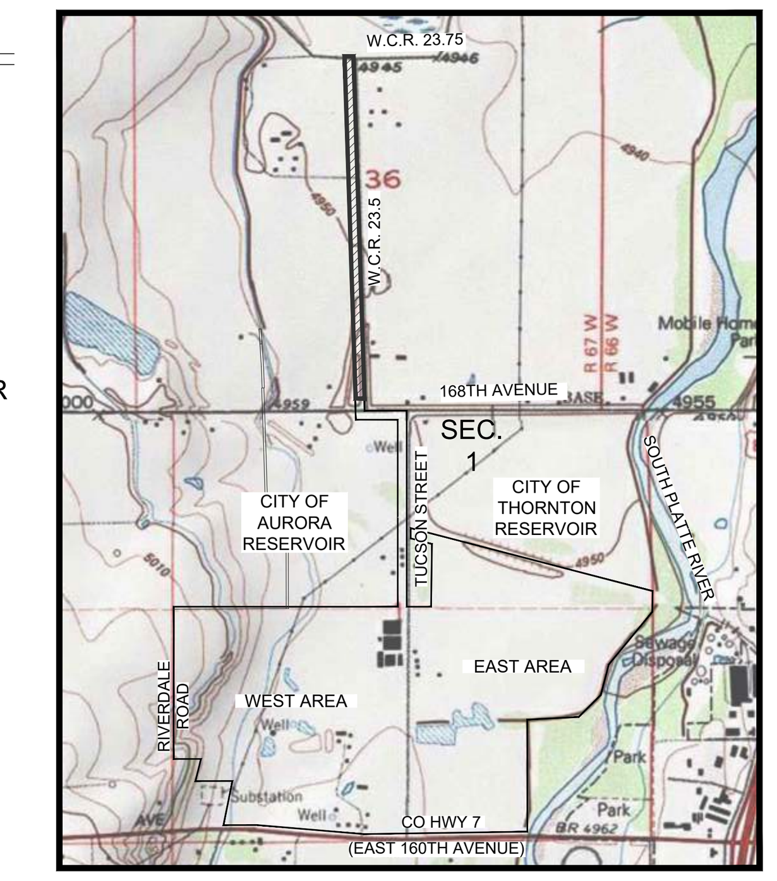
GARY LINDEN 12/01/2021
DATE



PERMIT KEY MAP
NORTH
NTS

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303-648-1175(P)

TUCSON SOUTH RESOURCE
EXHIBIT F WELD COUNTY AREA
RECLAMATION PLAN

REVISIONS

NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21

DRAWN BY: CAI
CHECKED BY: GL
DATE: AUGUST 21
SCALE: AS NOTED
AS NOTED
JOB NO.: 297.001.09
DWG NAME: F-4.dwg

WELD COUNTY CONVEYOR RECLAMATION PLAN

SHEET: F-4

CONSTRUCTION PLANS FOR

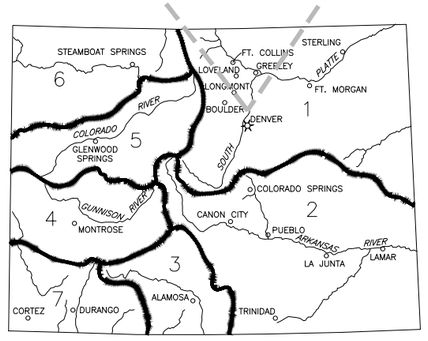
TUCSON SOUTH SLURRY WALL

EAST AND WEST CELLS

ADAMS COUNTY, COLORADO

PROJECT LOCATION MAP

SCALE: 1" = 1000'



NORTH

STATE OF COLORADO
PROJECT LOCATION MAP

N.T.S.

Sheet List Table	
SHEET NUMBER	SHEET TITLE
1	COVER
2	LEGEND NOTES
3	EXISTING CONDITIONS
4	SLURRY WALL SITE PLAN EAST CELL
5	SLURRY WALL SITE PLAN WEST CELL
6	EAST PROFILE 1
7	EAST PROFILE 2
8	WEST PROFILE 1
9	WEST PROFILE 2
10	EAST SECTIONS 1
11	EAST SECTIONS 2
12	WEST SECTIONS 1
13	WEST SECTIONS 2
14	SLURRY WALL DETAILS

CERTIFICATION:

I HEREBY CERTIFY THAT THESE PLANS FOR THE CONSTRUCTION OF THE TUCSON SOUTH SLURRY WALL WERE PREPARED UNDER MY DIRECT SUPERVISION FOR THE OWNERS THEREOF.

BY: _____ DATE: _____

BRAD L. HAGEN, P.E.
COLORADO, P.E. #32982

AGGREGATE INDUSTRIES DOES HEREBY ACCEPT AND APPROVE THESE PLANS FOR THE CONSTRUCTION OF A SLURRY WALL ON THE TRACT DESCRIBED WITHIN.

BY: _____ DATE: _____

AUTHORIZED REPRESENTATIVE
AGGREGATE INDUSTRIES

PREPARED FOR:

AGGREGATE INDUSTRIES
1687 COLE BLVD, SUITE 300
GOLDEN, CO 80401
214-213-7859

PREPARED BY:

CIVIL RESOURCES, LLC
8308 COLORADO BLVD
SUITE 200
FIRESTONE, CO 80504
303 833 1416

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GOLDEN, CO 80401
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KIMBERLY DENNIS

TUCSON SOUTH
SLURRY WALL
ADAMS COUNTY, COLORADO

REVISIONS		
NO.	DESCRIPTION	DATE
1	FOR CONSTRUCTION	11/15/21

DESIGNED BY: GL DATE: 11/15/2021
DRAWN BY: EB SCALE: AS NOTED
CHECKED BY: GL AS NOTED
JOB NO.: 297.001.09
DWG NAME: COVER AND NOTES.DWG

COVER

SHEET: 1

J:\Aggregate Industries-297\Tucson South slurry wall proposal\Drawings\Sheets\COVER AND NOTES.dwg, 11/15/2021 5:40:58 AM

NOTES:

GENERAL:

1. ALL CONSTRUCTION SHALL CONFORM TO THE DRAWINGS AND SPECIFICATIONS AND SHALL NOT BE CHANGED WITHOUT THE PRIOR WRITTEN APPROVAL OF THE OWNER'S REPRESENTATIVE.
2. THE CONTRACTOR IS RESPONSIBLE FOR CONTROL OF POLLUTION, SURFACE WATER AND EROSION THROUGHOUT THE DURATION OF THE CONTRACT.
3. THE CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING: A. ANY PERMITS OR LICENSES REQUIRED FOR CONSTRUCTION B. PROPER NOTIFICATION OF ALL NECESSARY AGENCIES PRIOR TO CONSTRUCTION AND FOR REQUIRED INSPECTIONS.
4. THE EXACT LOCATION OF ANY UTILITY LINES AND COORDINATION OF ANY DISRUPTION IN SERVICES WITH AFFECTED PARTIES IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. THE DESIGN ENGINEER IS TO BE NOTIFIED BY THE CONTRACTOR OF ANY DISCREPANCY OR CONFLICT PRIOR TO CONTINUING CONSTRUCTION.
6. ALL LOCATIONS AND ELEVATIONS SHALL BE FIELD VERIFIED PRIOR TO CONSTRUCTION. NOTIFY THE ENGINEER OF ANY FEATURES NOT SHOWN ON THESE DRAWINGS WHICH ARE THOUGHT TO POTENTIALLY IMPACT CONSTRUCTION.
7. ALL CONCRETE SHALL BE COMPLETED AND ALLOWED TO CURE SUFFICIENTLY PRIOR TO COMMENCING BACKFILL IN ACCORDANCE TO THE PROJECT SPECIFICATIONS.

EARTHWORK:

1. THE SITE SHALL BE CLEARED AND GRUBBED PRIOR TO ANY EXCAVATION. WOODY MATERIAL IS TO BE CHIPPED AND STORED WITH TOPSOIL.
2. TOPSOIL SHALL BE TEMPORARILY STOCKPILED WITHIN THE WORK AREA IN SUCH A WAY AS TO AVOID EROSION LOSSES. TEMPORARY SEEDING MAY BE REQUIRED.
3. FINE GRADING OF THE FINISHED SITE (I.E., TOP SOILED SURFACE) IS NOT REQUIRED UNTIL SEEDING, HOWEVER ALL AREAS WHERE EARTHWORK IS CONDUCTED SHALL BE RELATIVELY SMOOTH AND UNIFORM. RUTS, LARGE CLUMPS AND ROUGH AREAS SHALL BE SMOOTHED BY THE CONTRACTOR TO THE SATISFACTION OF THE OWNER BY USE OF HARROW OR DISC. TRASH, DEBRIS, AND STONES LARGER THAN 6 INCHES ARE ALL TO BE REMOVED AND DISPOSED OF PROPERLY.
4. THE UPPER 2 INCHES OF SOIL (MINIMUM) IN AREAS TO BE SEEDED SHALL BE LOOSE AND FRIABLE AND SUITABLE FOR SEEDING. MEASURES SHALL BE TAKEN BY THE CONTRACTOR TO ACHIEVE THIS CONDITION.
5. CONTROL OF GROUNDWATER AND SURFACE WATER NECESSARY TO CONDUCT THE EARTHWORK IS THE RESPONSIBILITY OF THE CONTRACTOR. ADDITIONAL GROUNDWATER CONTROLS OTHER THAN THOSE SHOWN AS PERMANENT ON THE PLANS WILL BE NECESSARY TO COMPLETE THE WORK.
6. CONTRACTOR IS RESPONSIBLE FOR ALL DUST CONTROL REQUIRED. WATER IS PERMISSIBLE TO USE AND AVAILABLE ON THE SITE. CHEMICAL AGENTS FOR DUST CONTROL MUST BE APPROVED PRIOR TO USE.
7. ANY MODIFICATIONS TO THE ELEVATIONS, GRADES AND EARTHWORK SHALL BE APPROVED AHEAD OF TIME BY THE OWNER'S ENGINEER. ALL CHANGES ARE TO BE REFLECTED ON THE CONTRACTOR'S "RED LINED" AS-BUILT DRAWINGS.
8. THERE SHALL BE NO FILL PLACED ABOVE THE ORIGINAL GROUND SURFACE IN THE FLOODWAY AS DELINEATED IN THESE PLANS.

SITE ACCESS AND PROTECTION:

1. CONTRACTOR SHALL USE ONLY DESIGNATED ACCESS ROUTES TO THE PROJECT SITE, AND SHALL REPAIR AREAS DAMAGED OUTSIDE OF THE DESIGNATED CONSTRUCTION ZONE FOR THE PROJECT AT THEIR OWN EXPENSE.
2. CONTRACTOR SHALL NOT OPERATE EQUIPMENT, STORE MATERIALS/SUPPLIES, OR OTHERWISE DISTURB WETLANDS AND SENSITIVE AREAS IN OR ADJACENT TO THE PROJECT AREA. CONTRACTOR WILL BE RESPONSIBLE FOR ANY IMPACTS FROM THEMSELVES AND THEIR SUBCONTRACTORS.
3. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND MARKING ALL UTILITIES IN THE PROJECT SITE, AND FOR PROTECTING ALL UTILITIES DURING CONSTRUCTION. DAMAGED UTILITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
4. CONTRACTOR IS RESPONSIBLE FOR HAULING AND PLACING OF ALL EXCESS MATERIALS FROM THE SITE AS DIRECTED BY THE ENGINEER.
5. THE CONTRACTOR IS TO LIMIT ACCESS TO THE SITE BY UNAUTHORIZED PERSONS WITH A SECURITY FENCE AND CLEARLY MARK THE CONSTRUCTION ZONE.

UTILITY:

1. THE UTILITY INFORMATION SHOWN IS PLOTTED FROM THE BEST AVAILABLE DATA.
2. THE CONTRACTOR IS RESPONSIBLE FOR MAKING THEIR OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO.
3. THE CONTRACTOR IS TO CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO AT 1-800-922-1987 FOR UTILITY LOCATIONS AT LEAST 2 BUSINESS DAYS, NOT INCLUDING THE DAY OF ACTUAL NOTICE, PRIOR TO EXCAVATING.
4. THE CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANY FOR ANY UTILITIES THAT NEED RELOCATING.

BORING:

1. BORE LOG LOCATIONS AND DEPTHS ARE APPROXIMATE AND BASED ON THE ORIGINAL TETRA TECH BORE LOGS SHOWN IN APPENDIX B OF THE SLURRY WALL DESIGN REPORT.
2. GROUNDWATER LEVELS WILL FLUCTUATE.

LEGEND:

- PROPERTY LINE
- EXISTING MAJOR CONTOUR (5740)
- EXISTING MINOR CONTOUR
- EXISTING BARBED WIRE FENCE (X)
- EXISTING CHAINLINK FENCE
- EXISTING EASEMENT
- EXISTING GAS LINE (G)
- EXISTING WATER LINE (W)
- EXISTING STORM SEWER
- EXISTING RAW WATER LINE (RW)
- EXISTING IRRIGATION (IR)
- EXISTING BURIED ELECTRICAL (E)
- EXISTING OVERHEAD ELECTRICAL (OH)
- EXISTING FIBER OPTIC (FO)
- EXISTING SANITARY SEWER (SS)
- MONITORING WELLS (MON. WELL)
- EXISTING WATER VALVE
- EXISTING BOLLARD
- WATER MARKER
- EXISTING UTILITY POLE
- EXISTING OVERHEAD UTILITY LINES (OH)
- EXISTING BURIED UTILITY LINES (U)
- PROPOSED MAJOR CONTOUR (5740)
- PROPOSED MINOR CONTOUR (5736)
- PROPOSED SLOPE AND DIRECTION (2.8:1)
- DETAIL IDENTIFICATION NUMBER (A / XXX | xxx)
- DRAWING NUMBER WHERE DETAIL IS SHOWN
- DRAWING NUMBER WHERE DETAIL IS TAKEN

DETAILS AND SECTIONS:

- DETAIL CALL OUTS (A / XXX | xxx)
- DETAIL TITLE (A / XX — DETAIL TITLE (X), 0 100 200, (IN FEET))
- SECTION CUT SYMBOLS - SHORT (A / XXX | xxx)
- SECTION CUT SYMBOLS - LONG (A / XXX | xxx)
- SECTION TITLE (A / XXX | xxx — SECTION - SECTION TITLE (X), 0 1000 2000, (IN FEET))

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214-213-7859 (p)
KIMBERLY DENNIS

TUCSON SOUTH
SLURRY WALL
ADAMS COUNTY, COLORADO

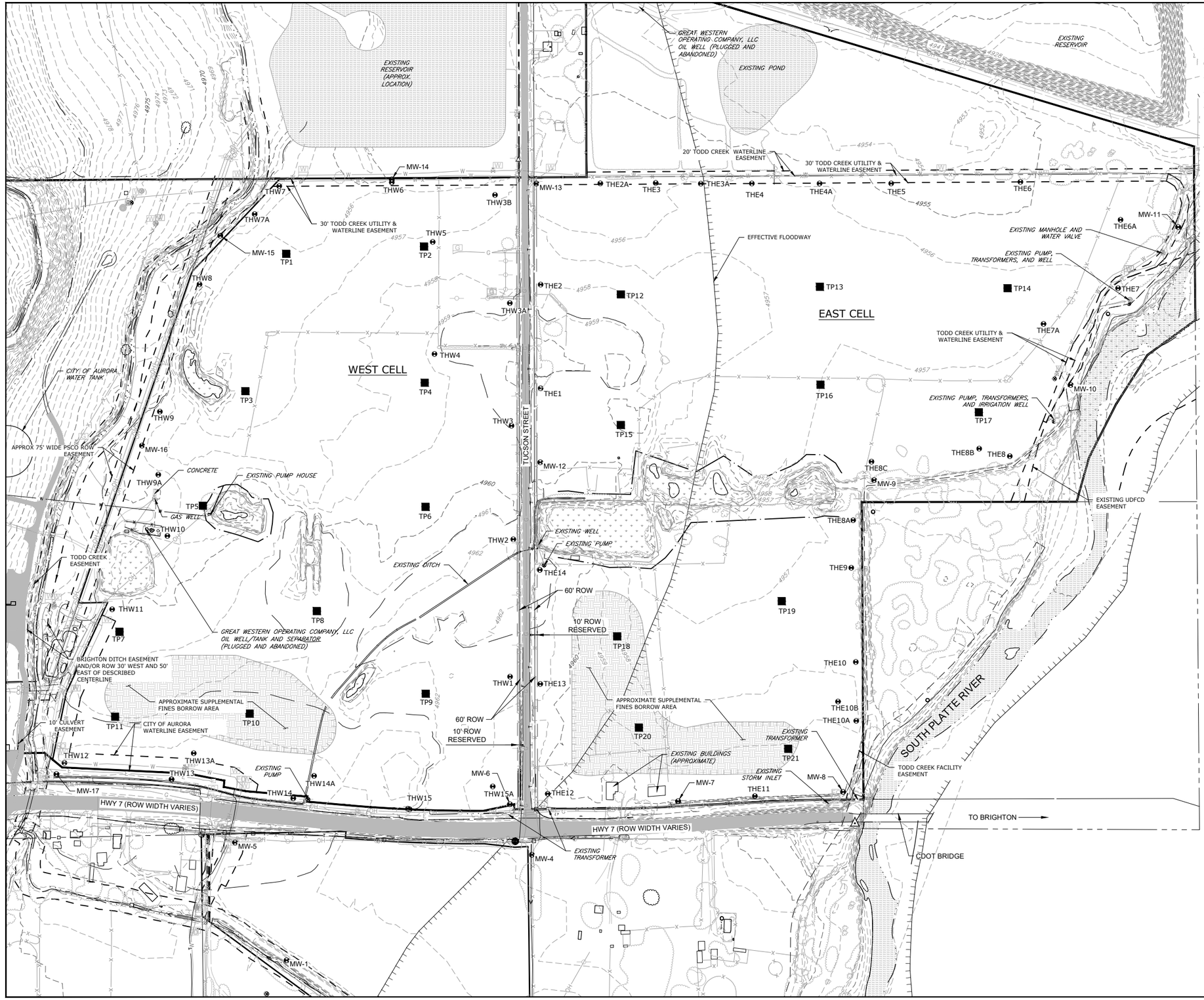
REVISIONS		
NO.	DESCRIPTION	DATE
1	FOR CONSTRUCTION	11/15/21

DESIGNED BY: GL — DATE: 11/15/2021
DRAWN BY: EB — SCALE: AS NOTED
CHECKED BY: GL — AS NOTED
JOB NO.: 297.001.09
DWG NAME: COVER AND NOTES.DWG

LEGEND NOTES

SHEET: 2

J:\Aggregate Industries-297\Tucson South slurry wall proposal\Drawings\Sheets\COVER AND NOTES.dwg, 11/15/2021 5:41:21 AM



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TUCSON SOUTH SLURRY WALL ADAMS COUNTY, COLORADO

REVISIONS		
NO	DESCRIPTION	DATE
1	FOR CONSTRUCTION	11/15/21

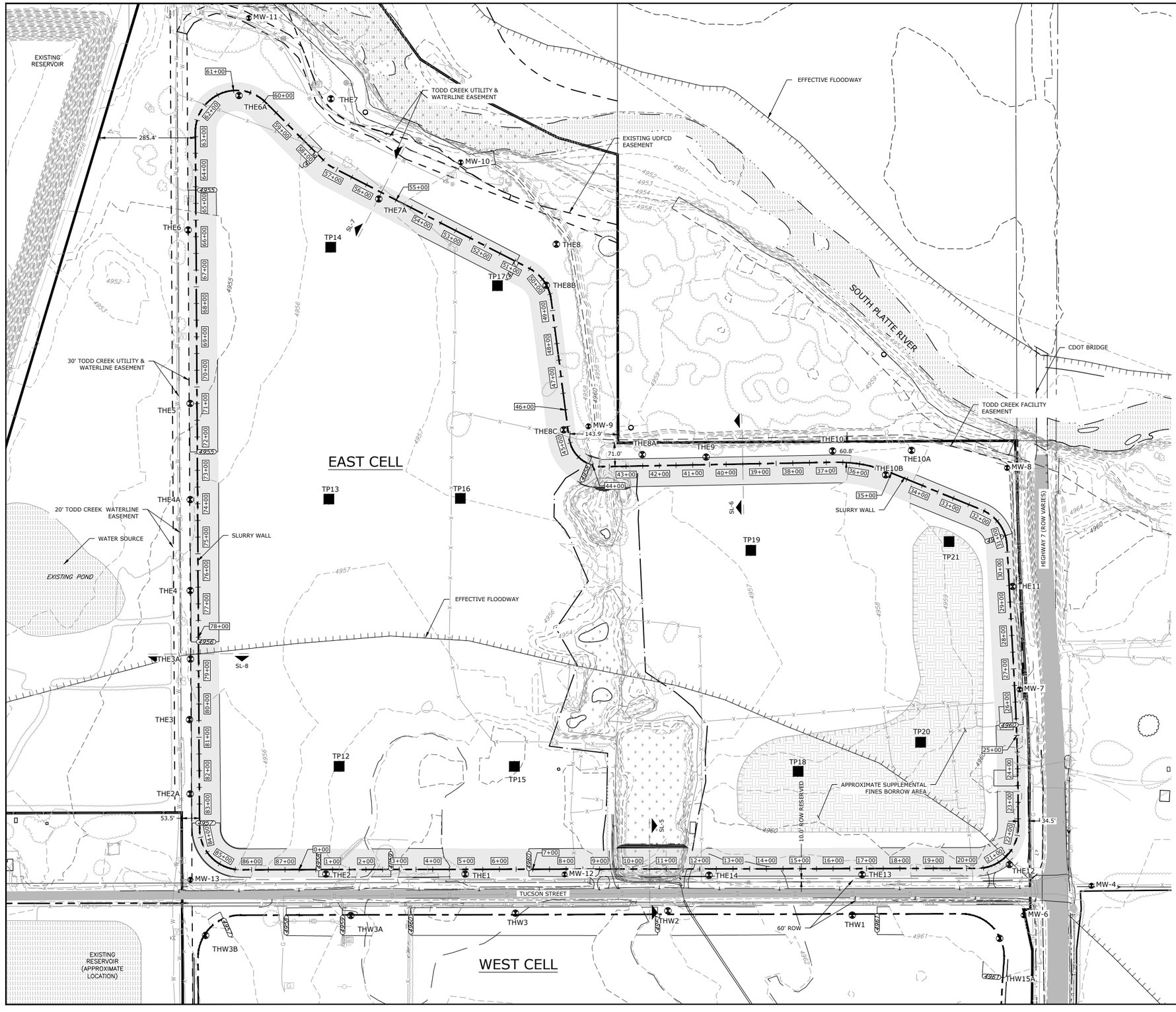
DESIGNED BY:	EJB	DATE:	11/15/2021
DRAWN BY:	EJB	SCALE:	AS NOTED
CHECKED BY:	GL		AS NOTED

JOB NO.: 297.001.09
DWG NAME: EX CONDITIONS.DWG

EXISTING CONDITIONS

SHEET: 3

J:\aggregate industries-297\tucson south slurry wall proposal\Drawings\Sheets\Ex Conditions.dwg, 11/15/2021 5:41:38 AM



LEGEND

- EXISTING CONTOUR
- PERMIT BOUNDARY
- EFFECTIVE 100-YR FLOODWAY
- EX 100 YR FLOODPLAIN
- EXISTING EDGE OF WATER
- WETLANDS
- SLURRY WALL PLATFFROM
- NON-JURISDICTIONAL WETLANDS BUFFER
- BOREHOLE
- MONITORING WELL
- TEST PIT
- BUSH/PLANT
- PUMP
- ELECTRICAL TRANSFORMER
- MISCELLANEOUS MANHOLE (ELEC, IRRIGATION, TELECOM, ETC)
- WATER MANHOLE
- SANITARY MANHOLE
- WATER WELL
- DRAINAGE STRUCTURE/MANHOLE

NOTES:

1. ALL ABOVE AND BELOW GRADE STRUCTURES WITHIN SLURRY WALL PLATFORM AREA WILL BE REMOVED PRIOR TO SLURRY WALL CONSTRUCTION.

2. EXCESS FILL REQUIRED FOR THE SLURRY WALL PLATFORM CAN BE BORROWED FROM WITHIN THE MINE LIMIT OF THE EAST CELL.

SLURRY WALL PLATFORM

CUT: 7,210 CY
FILL: 7,170 CY

NORTH

0 75 150
(IN FEET)

Know what's below. Call before you dig.

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TUCSON SOUTH
SLURRY WALL
ADAMS COUNTY, COLORADO

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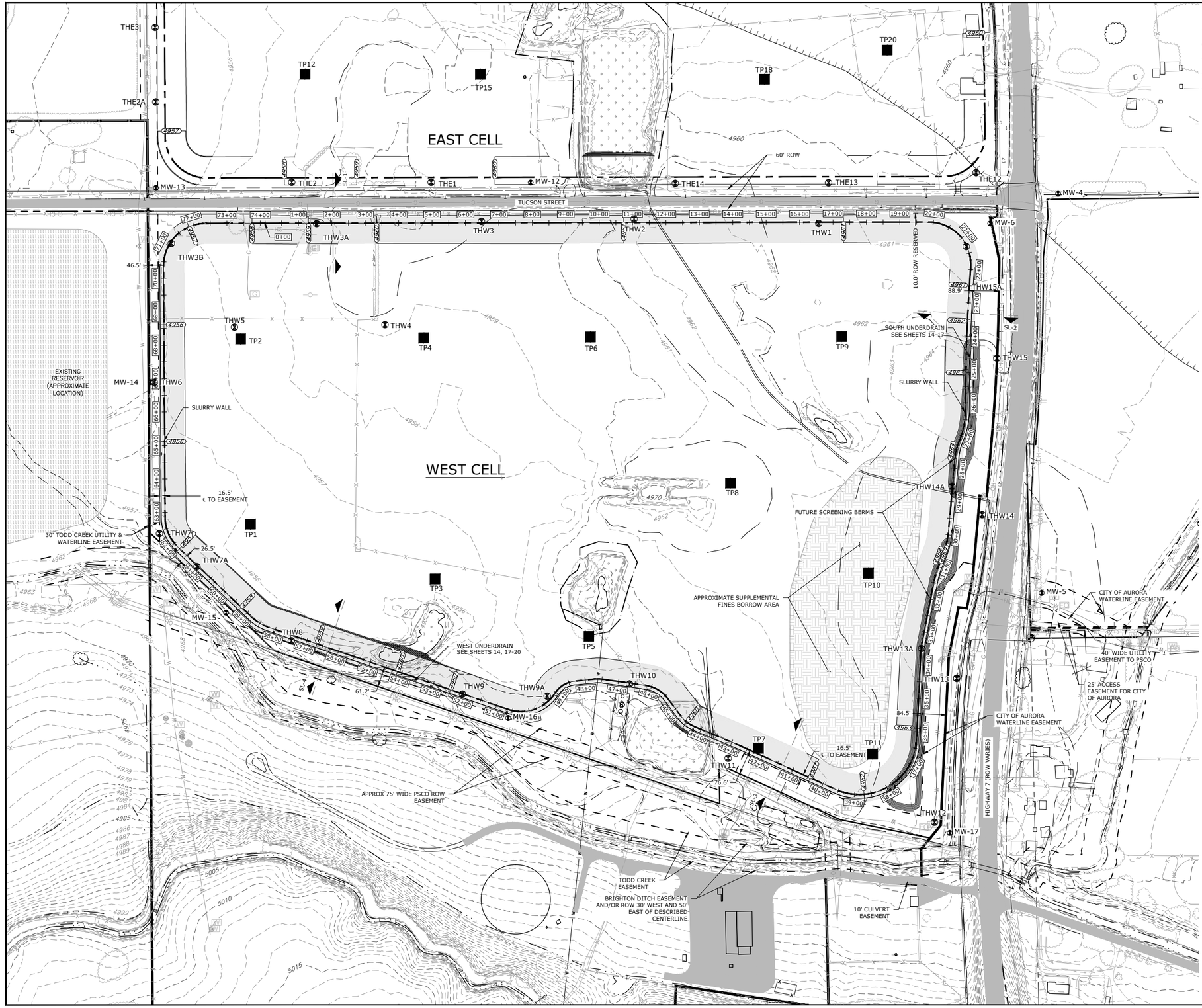
DRAWN BY: EB
CHECKED BY: GL
DATE: 11/15/2021
SCALE: AS NOTED
AS NOTED
JOB NO.: 297.001.09
DWG NAME: SITE PLAN.DWG

SLURRY WALL
SITE PLAN
EAST CELL

SHEET:
4

J:\aggregate industries-297\tucson south slurry wall proposal\Drawings\Sheets\Site Plan.dwg, 11/15/2021 5:42:29 AM



LEGEND

- EXISTING CONTOUR
- PERMIT BOUNDARY
- EFFECTIVE 100-YR FLOODWAY
- EX 100 YR FLOODPLAIN
- EXISTING EDGE OF WATER
- WETLANDS
- SLURRY WALL PLATFFROM
- NON-JURISDICTIONAL WETLANDS BUFFER
- BOREHOLE
- MONITORING WELL
- TEST PIT
- BUSH/PLANT
- PUMP
- ELECTRICAL TRANSFORMER
- MISCELLANEOUS MANHOLE (ELEC, IRRIGATION, TELECOM, ETC)
- WATER MANHOLE
- SANITARY MANHOLE
- WATER WELL
- DRAINAGE STRUCTURE/MANHOLE

NOTES:
1. ALL ABOVE AND BELOW GRADE STRUCTURES WITHIN SLURRY WALL PLATFORM AREA WILL BE REMOVED PRIOR TO SLURRY WALL CONSTRUCTION.

2.EXCESS FILL REQUIRED FOR THE SLURRY WALL PLATFORM CAN BE BORROWED FROM THE WITHIN THE MINE LIMIT OF THE WEST CELL.

SLURRY WALL PLATFORM

CUT: 2,900 CY
FILL: 13,970 CY

NORTH

0 75 150
(IN FEET)

Know what's below.
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303.833.1416
WWW.CIVILRESOURCES.COM

AGGREGATE INDUSTRIES

1687 COLE BLVD, SUITE 300
GOLDEN, CO 80401
214-213-7859 (p)
KIMBERLY DENNIS

TUCSON SOUTH
SLURRY WALL
ADAMS COUNTY, COLORADO

REVISIONS		
NO.	DESCRIPTION	DATE
1	FOR CONSTRUCTION	11/15/21

DESIGNED BY:	GL	DATE:	11/15/2021
DRAWN BY:	EB	SCALE:	AS NOTED
CHECKED BY:	GL		AS NOTED
JOB NO.:	297.001.09		
DWG NAME:	SITE PLAN.DWG		

SLURRY WALL
SITE PLAN
WEST CELL

SHEET:
5

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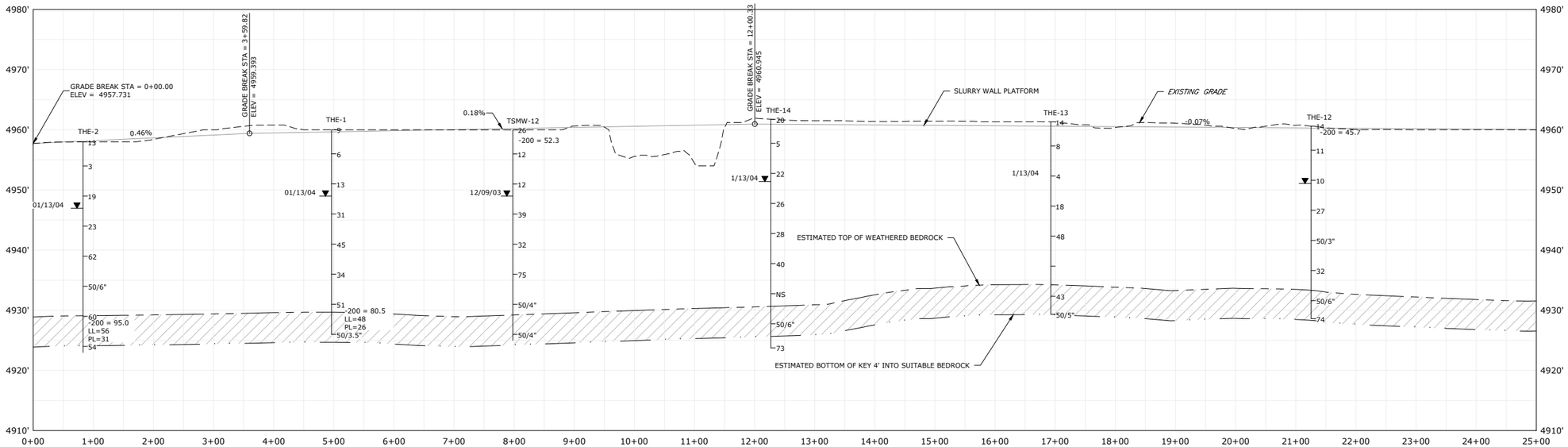

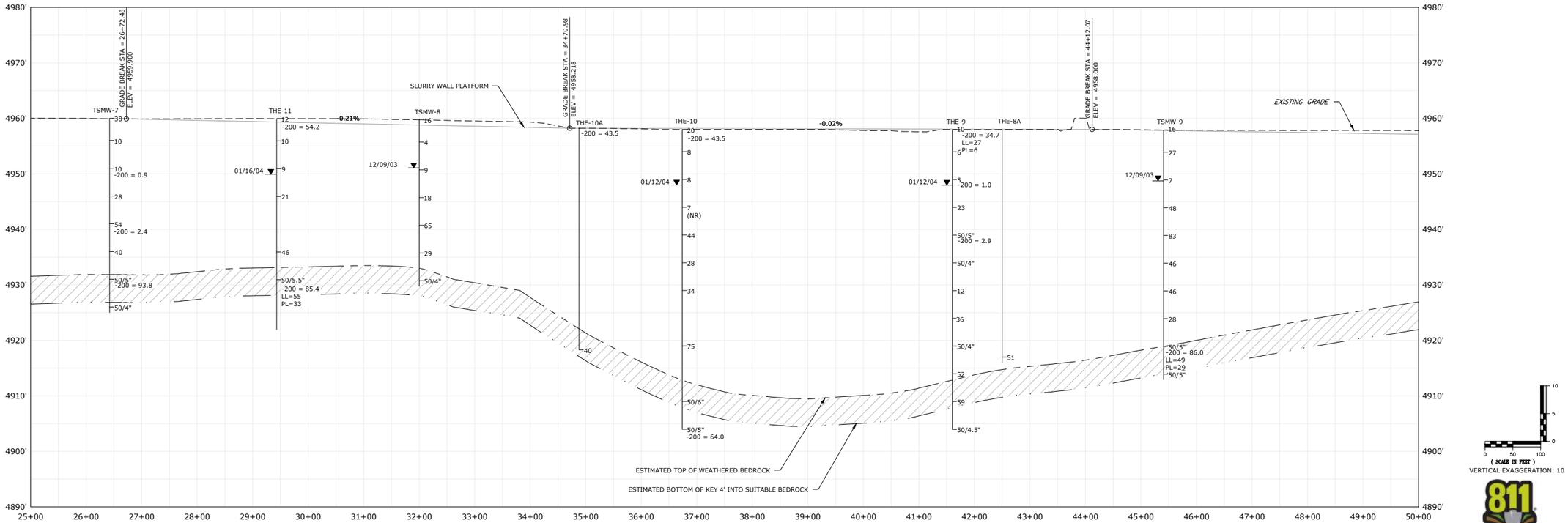

NOTE: BORE LOG LOCATIONS AND DEPTHS SHOWN ARE APPROXIMATE. MORE DETAILS OF DRILLING ARE ON THE SUMMARY LOGS SHOWN IN APPENDIX B OF THE SLURRY WALL DESIGN REPORT.

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CHECKED BY: GL	AS NOTED
JOB NO.: 297.001.09	
DWG NAME: SITE PLAN.DWG	

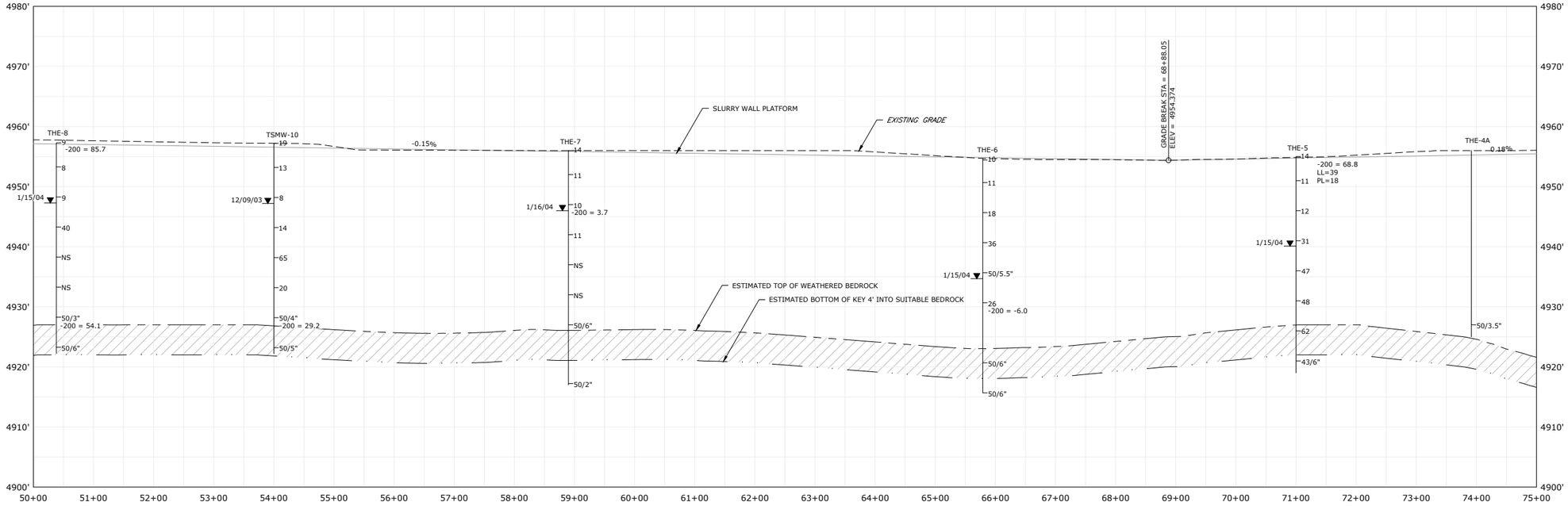
10
5
0
0 50 100
(SCALE IN FEET)
VERTICAL EXAGGERATION: 10

811 Know what's below. Call before you dig.

EAST PROFILE 1

SHEET: 6

J:\aggregate industries-297\tucson south slurry wall proposal\Drawings\Sheets\Site Plan.dwg, 11/16/2021 11:11:57 AM



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SLURRY WALL
ADAMS COUNTY, COLORADO

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DRAWN BY: EB
CHECKED BY: GL
JOB NO.: 297.001.09
DWG NAME: SITE PLAN.DWG
DATE: 11/15/2021
SCALE: AS NOTED
AS NOTED

10
5
0
0 50 100
(SCALE IN FEET)
VERTICAL EXAGGERATION: 10

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EAST PROFILE 2

SHEET: 7

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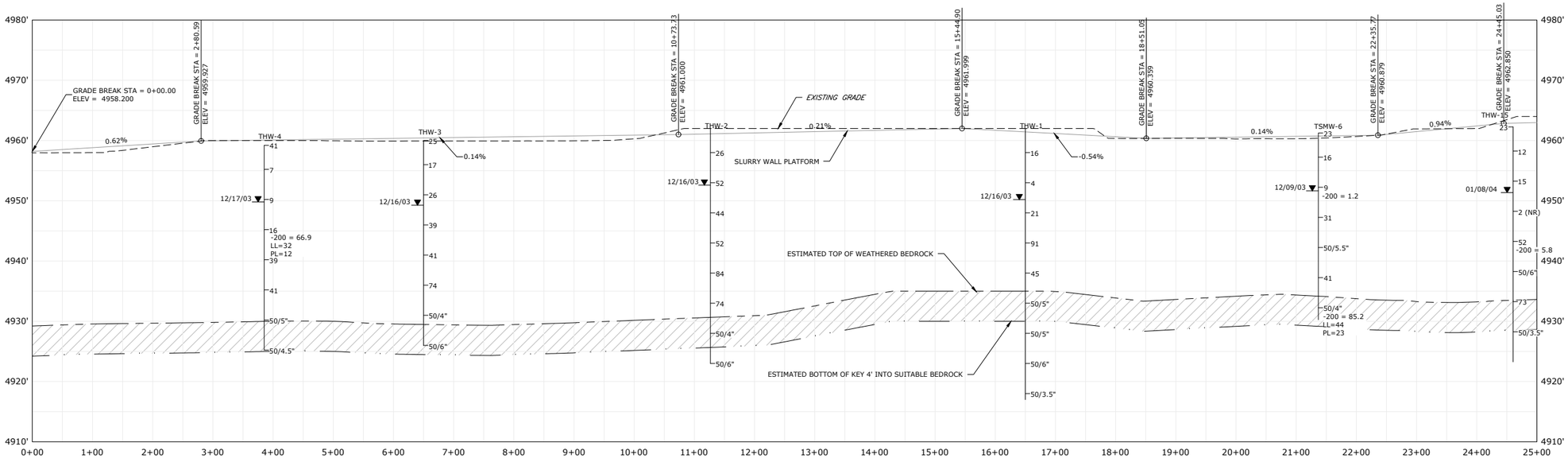

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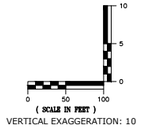

VERTICAL EXAGGERATION: 10

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JOB NO.:	297.001.09		
DWG NAME:	SITE PLAN.DWG		

WEST PROFILE 1

SHEET: 8

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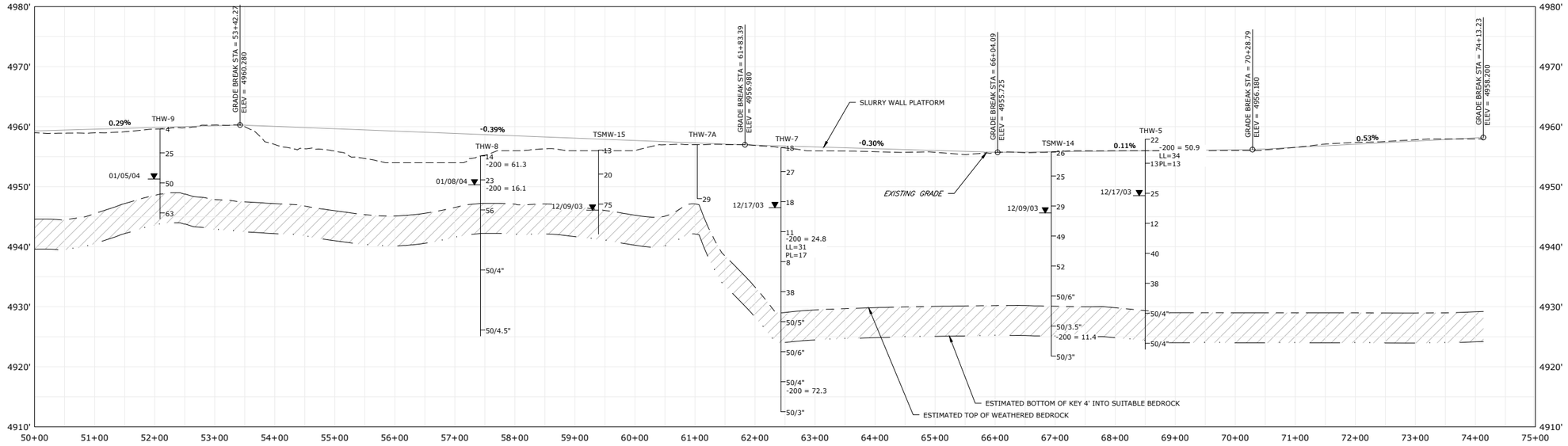
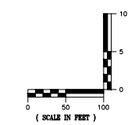


NOTE: BORE LOG LOCATIONS AND DEPTHS SHOWN ARE APPROXIMATE. MORE DETAILS OF DRILLING ARE ON THE SUMMARY LOGS SHOWN IN APPENDIX B OF THE SLURRY WALL DESIGN REPORT.



VERTICAL EXAGGERATION: 10

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ADAMS COUNTY, COLORADO

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DATE: 11/15/2021
SCALE: AS NOTED
AS NOTED
JOB NO.: 297.001.09
DWG NAME: SITE PLAN.DWG

WEST PROFILE 2

SHEET: 9

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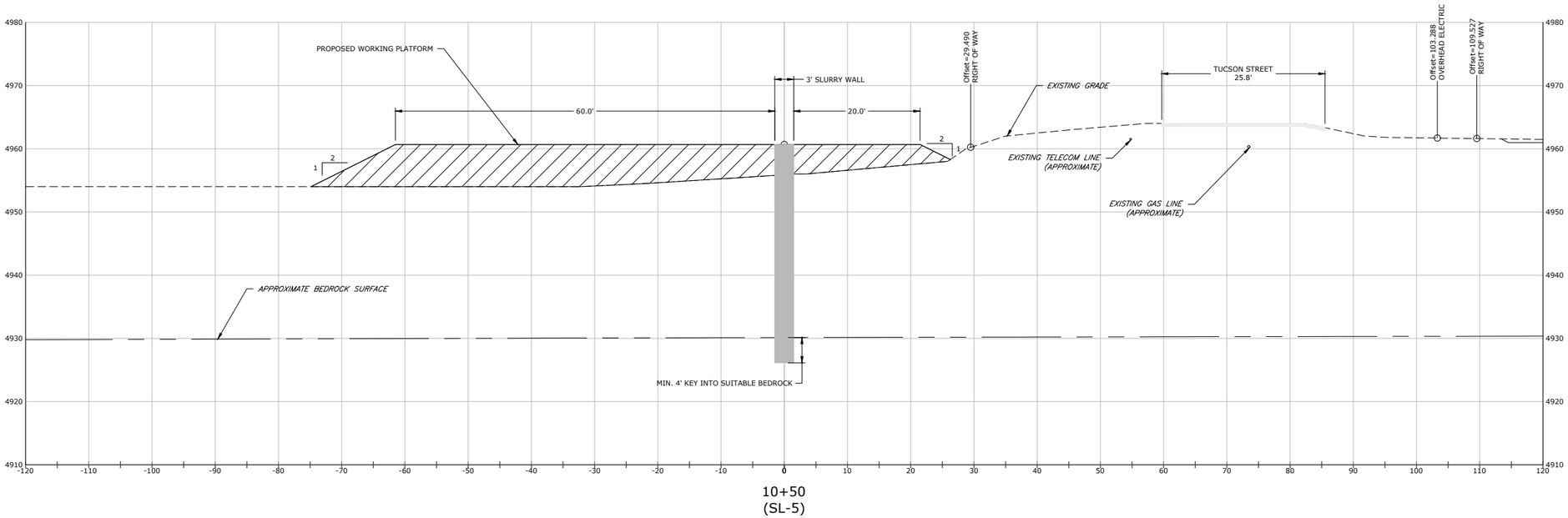

10+50
(SL-5)

39+50
(SL-6)

10
5
0
0 5 10
(SCALE IN FEET)

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ADAMS COUNTY, COLORADO

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CHECKED BY:	GL		AS NOTED
JOB NO.:	297.001.09		
DWG NAME:	SECTIONS.DWG		

EAST SECTIONS 1

SHEET:
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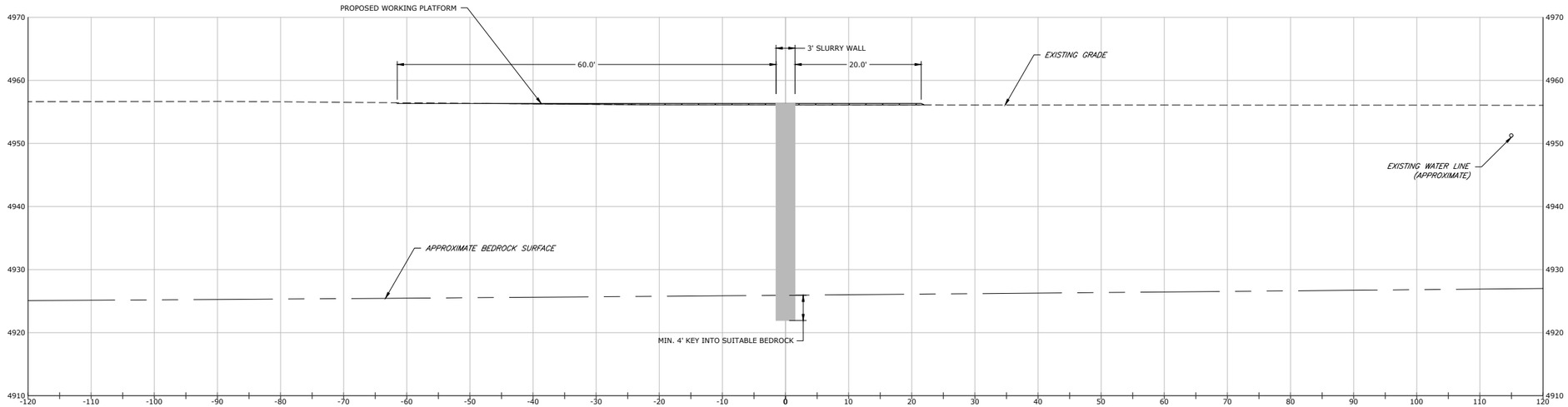

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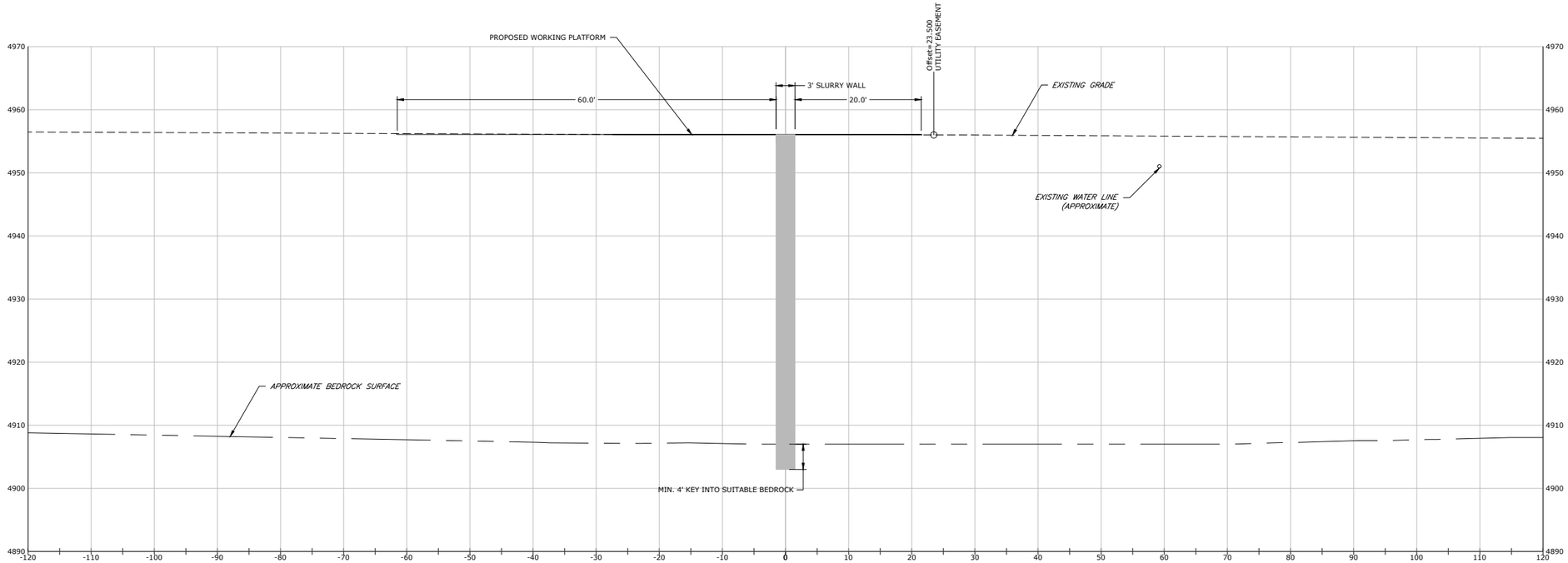
(SL-7)



78+50
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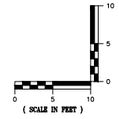

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AS NOTED
JOB NO.: 297.001.09
DWG NAME: SECTIONS.DWG

EAST SECTIONS 2

SHEET: 11

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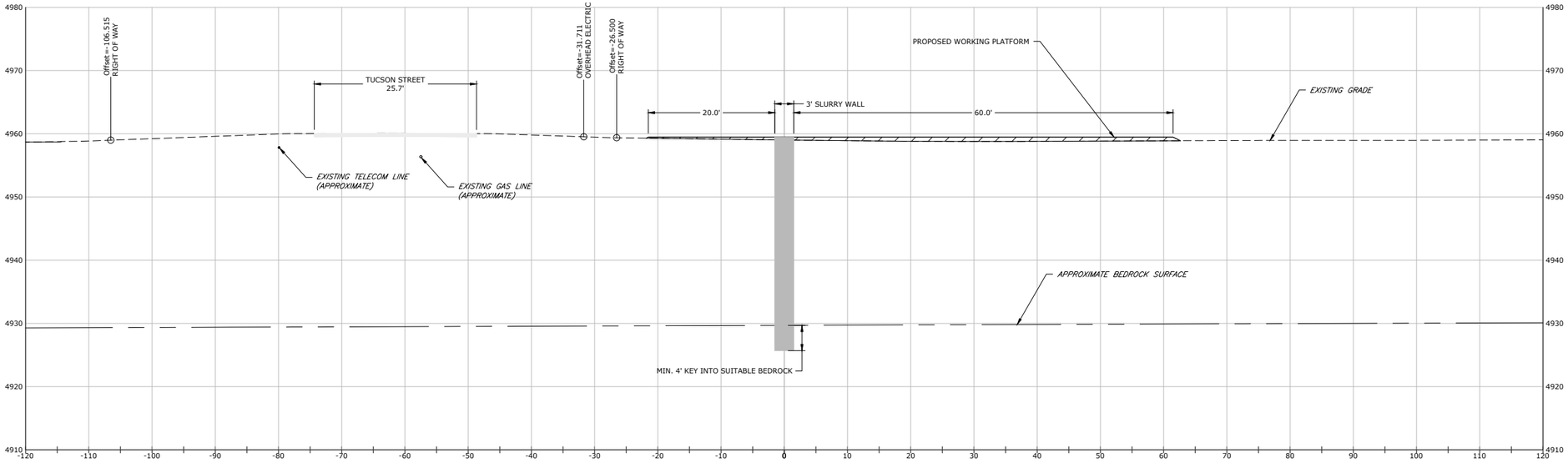
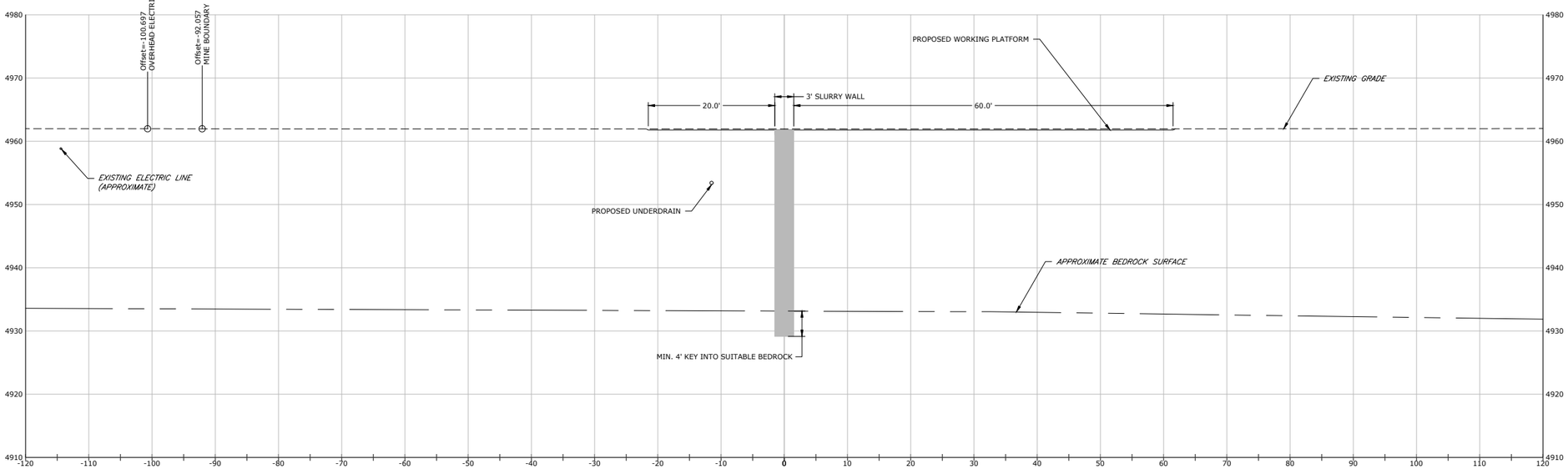
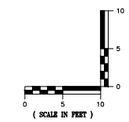


2+04
(SL-1)



23+32
(SL-2)



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ADAMS COUNTY, COLORADO

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DATE: 11/15/2021
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JOB NO.: 297.001.09
DWG NAME: SECTIONS.DWG

WEST SECTIONS 1

SHEET:
12

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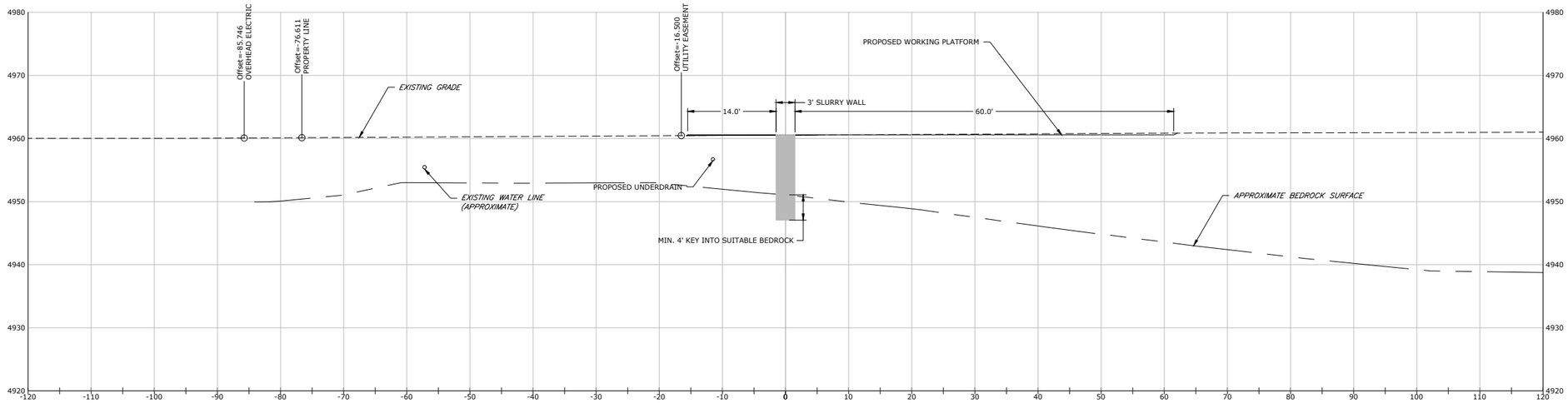

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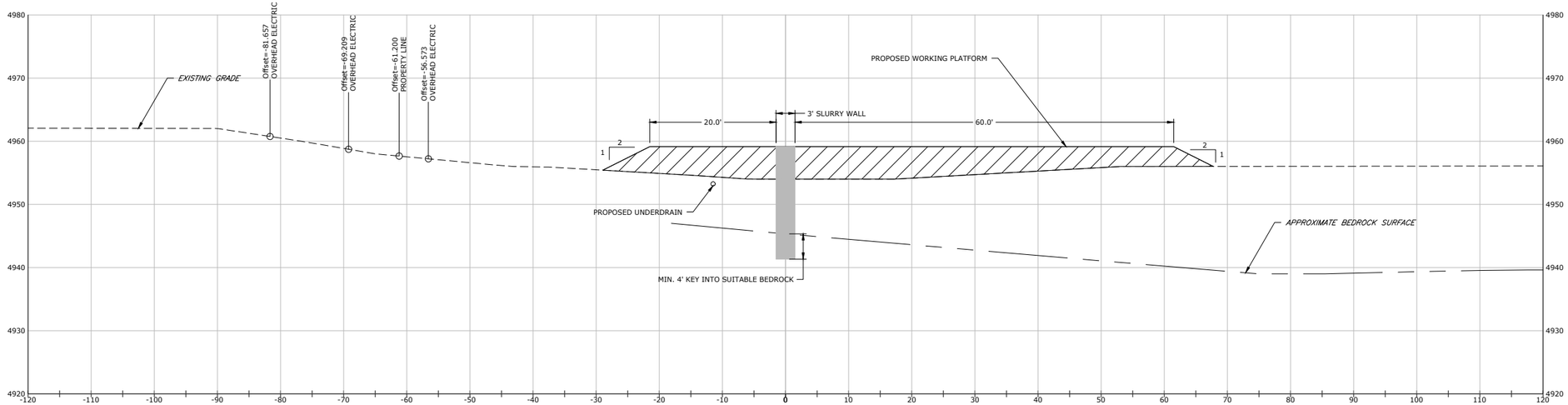
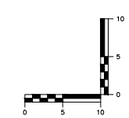
(SL-3)



56+32
(SL-4)



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DWG NAME:	SECTIONS.DWG		

WEST SECTIONS 2

SHEET:
13

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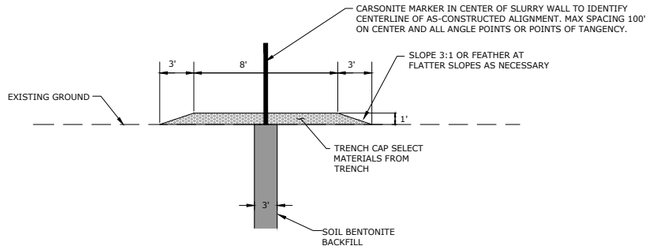
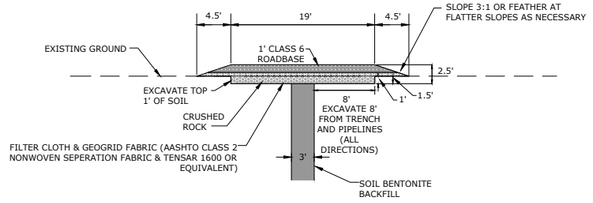


SLURRY WALL CAP DETAIL IN NON-TRAFFIC AREAS

(NOT TO SCALE)



STRUCTURAL SLURRY WALL CAP DETAIL IN AREAS OF TRAFFIC

(NOT TO SCALE)

CONSTRUCT AT APPROXIMATE STATIONS:
TO BE DETERMINED BY OWNER

East Cell, Supplemental Fines Application Rates and Bentonite Spacing

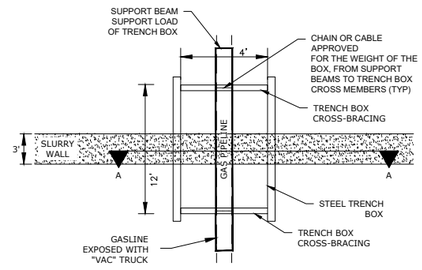
STATION INTERVAL		SUPPLEMENTAL FINES QUANTITY (CY/LIN FT)*	SPACING OF 3000 LB BAGS @1% (FT)
STATION BEGIN	STATION END		
0+00	9+00	2.6	28.0
9+00	15+00	2.9	26.0
15+00	23+00	2.4	28.0
23+00	32+00	2.2	28.0
32+00	42+00	4.2	18.0
42+00	47+00	3.6	20.0
47+00	74+00	2.7	25.0
74+00	83+00	4.1	17.0
83+00	87+42	2.6	28.0

1. SUPPLEMENTAL FINES QUANTITIES ASSUME 40% PASSING THE 200 SIEVE.
2. RATES SHOWN ARE FOR A MINIMUM OF 30% FINES PASSING THE #200 SIEVE FOR S-B BACKFILL AND MAY REQUIRE ADJUSTMENT.
3. APPROXIMATELY 25,110 CUBIC YARDS OF SUPPLEMENTAL SOILS WILL BE REQUIRED ALONG THE ALIGNMENT.

West Cell, Supplemental Fines Application Rates and Bentonite Spacing

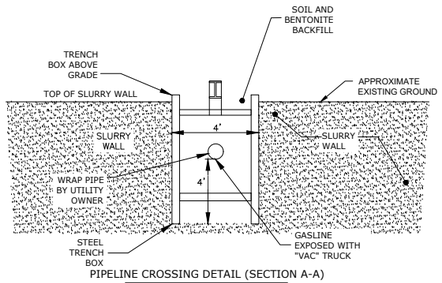
STATION INTERVAL		SUPPLEMENTAL FINES QUANTITY (CY/LIN FT)*	SPACING OF 3000 LB BAGS @1% (FT)
STATION BEGIN	STATION END		
0+00	7+00	2.6	29
7+00	14+00	2.8	25
14+00	39+00	2.2	30
39+00	43+00	1.7	38
43+00	49+00	2.1	33
49+00	58+00	1.7	38
58+00	62+00	1.9	33
62+00	67+00	2.2	30
67+00	74+15	2.6	29

1. SUPPLEMENTAL FINES QUANTITIES ASSUME 40% PASSING THE 200 SIEVE.
2. RATES SHOWN ARE FOR A MINIMUM OF 30% FINES PASSING THE #200 SIEVE FOR S-B BACKFILL AND MAY REQUIRE ADJUSTMENT.
3. APPROXIMATELY 16,470 CUBIC YARDS OF SUPPLEMENTAL SOILS WILL BE REQUIRED ALONG THE ALIGNMENT.



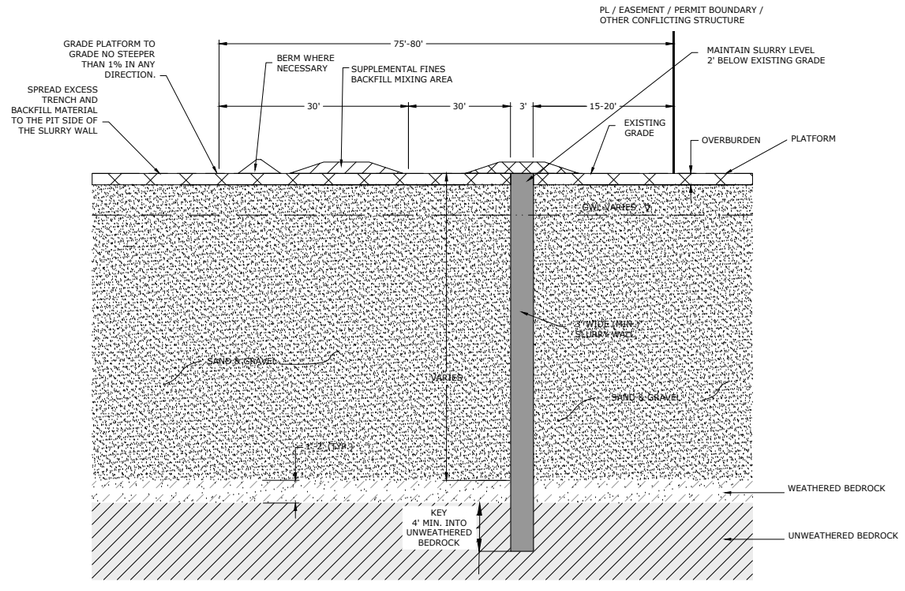
GENERALIZED PLAN VIEW

(NOT TO SCALE)
*MAY NOT BE NECESSARY



PIPELINE CROSSING DETAIL (SECTION A-A)

(NOT TO SCALE)
*MAY NOT BE NECESSARY



GENERALIZED MIXING PLATFORM SECTION VIEW

(NOT TO SCALE)

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REVISIONS

NO.	DESCRIPTION	DATE
1	FOR CONSTRUCTION	11/15/21

DESIGNED BY: ARR | DATE: 11/15/2021
DRAWN BY: ARR | SCALE: AS NOTED
CHECKED BY: BLH | AS NOTED
JOB NO.: 297.001.09
DWG NAME: COVER AND NOTES.DWG

SLURRY WALL DETAILS

SHEET: 14

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COLORADO
Division of Water Resources
Department of Natural Resources

WELL PERMIT NUMBER 81342-F
RECEIPT NUMBER 3677874

ORIGINAL PERMIT APPLICANT(S)

AGGREGATE INDUSTRIES WCR INC

AUTHORIZED AGENT

APPLEGATE GROUP, INC.

APPROVED WELL LOCATION

Water Division: 1 Water District: 2
Designated Basin: N/A
Management District: N/A
County: ADAMS
Parcel Name: N/A

Section 1 Township 1.0 S Range 67.0 W Sixth P.M.

UTM COORDINATES (Meters, Zone:13, NAD83)

Easting: 513894.1 Northing: 4427060.5

ISSUANCE OF THIS PERMIT DOES NOT CONFER A WATER RIGHT
CONDITIONS OF APPROVAL

1) This well shall be used in such a way as to cause no material injury to existing water rights. The issuance of this permit does not ensure that no injury will occur to another vested water right or preclude another owner of a vested water right from seeking relief in a civil court action.

2) The construction of this well shall be in compliance with the Water Well Construction Rules 2 CCR 402-2, unless approval of a variance has been granted by the State Board of Examiners of Water Well Construction and Pump Installation Contractors in accordance with Rule 18.

3) Approved pursuant to CRS 37-90-137 (2) and (11) for the operation of a well (gravel pit pond) in accordance with the amended temporary substitute water supply plan approved by the State Engineer on March 1, 2017, for the Aggregate Industries South Platte Combined Plan, which includes the Tucson South Pit, Division of Reclamation, Mining & Safety ("DRMS") Permit Number M-2004-044. The well (pond) shall not be operated unless it is included in a substitute water supply plan approved by the State Engineer or a plan for augmentation approved by the Water Court. The water supply plan for this pit is currently valid through December 31, 2017 and if it is not extended or if a court decree not entered for a plan for augmentation, this well permit is null and void and diversions of ground water from this well must cease immediately.

4) This well is subject to administration by the Division Engineer in accordance with applicable decrees, statutes, rules, and regulations.

5) The use of ground water, in addition to pond evaporation and dewatering at a rate of 2,000 gallons per minute is limited to water lost with the mined product and dust control.

6) The average annual amount of ground water to be appropriated shall not exceed 133.25 acre-feet, consumed by evaporative loss, water lost with the mined product, and dust control with the total surface area of the ground water pond limited to 25 acres, or the amounts covered under a water court approved plan for augmentation or substitute water supply plan approved by the State Engineer, whichever is less. No other use of water is allowed unless a permit therefor is approved.

7) The owner shall mark the well (gravel pit pond) in a conspicuous place with well permit number(s) and court case number(s) as appropriate. The owner shall take necessary means and precautions to preserve these markings.

8) A totalizing flow meter must be installed so as to measure any pumping from this gravel pit pond and maintained in good working order. Permanent records of all diversions from the gravel pit pond, tonage of mined product, and the surface area of ground water exposure shall be maintained by the well owner (recorded at least annually) and submitted to the Division Engineer upon request.

9) Pursuant to Rule 9.3.3 of the Water Well Construction Rules, ground water ponds and gravel pit wells are exempt from the minimum well construction and location standards except for contamination considerations as stated in the Rule. The owner shall take necessary means and precautions to prevent contaminants from entering the ground water pond or gravel pit well.

10) Pursuant to Rule 17.1.5 of the Water Well Construction Rules, the owner shall submit, after initiation of construction, site plan and cross section drawings showing the extent of intended excavation, the maximum depth of the pit or pond, the initial static water level, and the date of initial ground water exposure to the atmosphere.

WELL PERMIT NUMBER 81342-F **RECEIPT NUMBER 3677874**

11) This well shall be located more than 600 feet from any existing well, completed in the same aquifer, that is not owned by the applicant, excluding those wells whose owners were notified pursuant to CRS 37-90-137(2)(b)(II)(A). Notice was sent to the owners of permit nos. 202569-A, 12379-RR, 201932, 254461-A, 263132-A, 65037-F, 65038-F, 77270-F, 77271-F, 77323-F, 20989-FR, 55128, 55644, 1011310, 78167-A, 194372-A, 41223-F, 41678-F, 41677-F, 26382, 26470, 36190-A, 13698-F, 13652-F, 13653-F, and oil and gas wells API Nos. 05-001-06980 and 05-001-07140. Two responses were received from the owners of well nos. 77270-F, 77271-F, 77323-F, 20989-FR and 254461-A. These wells were subject to the hearing of the State Engineer in case no. 17SE02. On August 18, 2017 the hearing in case no. 17SE02 was vacated due to the fact that one of the objector has failed to participate in the hearing and the other objector has entered into a stipulation with this applicant.

NOTE: This well may be subject to administration in the water rights priority system in the future. It is recommended that a water court decree be obtained to affirm the priority of the well.

Issued By IOANA COMANICIU

Date Issued: 9/14/2017

Expiration Date: 9/14/2018

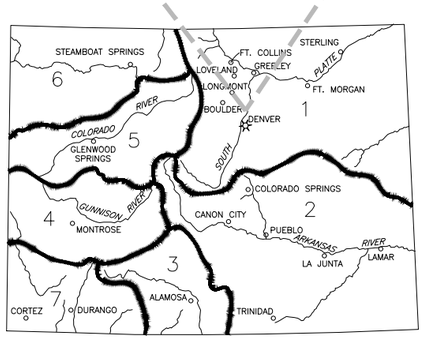
CONSTRUCTION PLANS FOR

TUCSON SOUTH UNDERDRAIN

ADAMS COUNTY, COLORADO

PROJECT LOCATION MAP

SCALE: 1" = 1000'



NORTH

STATE OF COLORADO
PROJECT LOCATION MAP

N.T.S.

Sheet List Table	
SHEET NUMBER	SHEET TITLE
1	Cover
2	LEGEND NOTES
3	EX CONDITIONS
4	SITE PLAN
5	P&P S1
6	P&P S2
7	P&P W1
8	P&P W2
9	P&P W3
10	P&P W4
11	DETAILS

CERTIFICATION:

I HEREBY CERTIFY THAT THESE PLANS FOR THE CONSTRUCTION THE TUCSON SOUTH UNDERDRAIN WERE PREPARED UNDER MY DIRECT SUPERVISION FOR THE OWNERS THEREOF.

BY: _____ DATE: _____

BRAD L. HAGEN, P.E.
COLORADO, P.E. #32982

AGGREGATE INDUSTRIES DOES HEREBY ACCEPT AND APPROVE THESE PLANS FOR THE CONSTRUCTION OF A SLURRY WALL ON THE TRACT DESCRIBED WITHIN.

BY: _____ DATE: _____

AUTHORIZED REPRESENTATIVE
AGGREGATE INDUSTRIES

PREPARED FOR:

AGGREGATE INDUSTRIES
1687 COLE BLVD, SUITE 300
GOLDEN, CO 80401
214-213-7859

PREPARED BY:

CIVIL RESOURCES, LLC
8308 COLORADO BLVD
SUITE 200
FIRESTONE, CO 80504
303 833 1416

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GOLDEN, CO 80401
214-213-7859 (p)
KIMBERLY DENNIS

TUCSON SOUTH UNDERDRAIN
ADAMS COUNTY, COLORADO

REVISIONS		
NO.	DESCRIPTION	DATE
1	FOR CONSTRUCTION	11/15/21

DESIGNED BY: GL
DRAWN BY: EB
CHECKED BY: GL
DATE: November, 2021
SCALE: AS NOTED
AS NOTED
JOB NO.: 297.001.09
DWG NAME: UNDERDRAIN_COVER AND NOTES.DWG

COVER

SHEET: 1

J:\aggregate industries-297\tucson south slurry wall proposal\Drawings\Sheets\UNDERDRAIN_COVER AND NOTES.dwg, 11/15/2021 6:10:11 AM

NOTES:

GENERAL:

1. ALL CONSTRUCTION SHALL CONFORM TO THE DRAWINGS AND SPECIFICATIONS AND SHALL NOT BE CHANGED WITHOUT THE PRIOR WRITTEN APPROVAL OF THE OWNER'S REPRESENTATIVE.
2. THE CONTRACTOR IS RESPONSIBLE FOR CONTROL OF POLLUTION, SURFACE WATER AND EROSION THROUGHOUT THE DURATION OF THE CONTRACT.
3. THE CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING: A. ANY PERMITS OR LICENSES REQUIRED FOR CONSTRUCTION B. PROPER NOTIFICATION OF ALL NECESSARY AGENCIES PRIOR TO CONSTRUCTION AND FOR REQUIRED INSPECTIONS.
4. THE EXACT LOCATION OF ANY UTILITY LINES AND COORDINATION OF ANY DISRUPTION IN SERVICES WITH AFFECTED PARTIES IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. THE DESIGN ENGINEER IS TO BE NOTIFIED BY THE CONTRACTOR OF ANY DISCREPANCY OR CONFLICT PRIOR TO CONTINUING CONSTRUCTION.
6. ALL LOCATIONS AND ELEVATIONS SHALL BE FIELD VERIFIED PRIOR TO CONSTRUCTION. NOTIFY THE ENGINEER OF ANY FEATURES NOT SHOWN ON THESE DRAWINGS WHICH ARE THOUGHT TO POTENTIALLY IMPACT CONSTRUCTION.
7. ALL CONCRETE SHALL BE COMPLETED AND ALLOWED TO CURE SUFFICIENTLY PRIOR TO COMMENCING BACKFILL IN ACCORDANCE TO THE PROJECT SPECIFICATIONS.

EARTHWORK:

1. THE SITE SHALL BE CLEARED AND GRUBBED PRIOR TO ANY EXCAVATION. WOODY MATERIAL IS TO BE CHIPPED AND STORED WITH TOPSOIL.
2. TOPSOIL SHALL BE TEMPORARILY STOCKPILED WITHIN THE WORK AREA IN SUCH A WAY AS TO AVOID EROSION LOSSES. TEMPORARY SEEDING MAY BE REQUIRED.
3. FINE GRADING OF THE FINISHED SITE (I.E., TOP SOILED SURFACE) IS NOT REQUIRED UNTIL SEEDING, HOWEVER ALL AREAS WHERE EARTHWORK IS CONDUCTED SHALL BE RELATIVELY SMOOTH AND UNIFORM. RUTS, LARGE CLUMPS AND ROUGH AREAS SHALL BE SMOOTHED BY THE CONTRACTOR TO THE SATISFACTION OF THE OWNER BY USE OF HARROW OR DISC. TRASH, DEBRIS, AND STONES LARGER THAN 6 INCHES ARE ALL TO BE REMOVED AND DISPOSED OF PROPERLY.
4. THE UPPER 2 INCHES OF SOIL (MINIMUM) IN AREAS TO BE SEEDED SHALL BE LOOSE AND FRIABLE AND SUITABLE FOR SEEDING. MEASURES SHALL BE TAKEN BY THE CONTRACTOR TO ACHIEVE THIS CONDITION.
5. CONTROL OF GROUNDWATER AND SURFACE WATER NECESSARY TO CONDUCT THE EARTHWORK IS THE RESPONSIBILITY OF THE CONTRACTOR. ADDITIONAL GROUNDWATER CONTROLS OTHER THAN THOSE SHOWN AS PERMANENT ON THE PLANS WILL BE NECESSARY TO COMPLETE THE WORK.
6. CONTRACTOR IS RESPONSIBLE FOR ALL DUST CONTROL REQUIRED. WATER IS PERMISSIBLE TO USE AND AVAILABLE ON THE SITE. CHEMICAL AGENTS FOR DUST CONTROL MUST BE APPROVED PRIOR TO USE.
7. ANY MODIFICATIONS TO THE ELEVATIONS, GRADES AND EARTHWORK SHALL BE APPROVED AHEAD OF TIME BY THE OWNER'S ENGINEER. ALL CHANGES ARE TO BE REFLECTED ON THE CONTRACTOR'S "RED LINED" AS-BUILT DRAWINGS.
8. THERE SHALL BE NO FILL PLACED ABOVE THE ORIGINAL GROUND SURFACE IN THE FLOODWAY AS DELINEATED IN THESE PLANS.

SITE ACCESS AND PROTECTION:

1. CONTRACTOR SHALL USE ONLY DESIGNATED ACCESS ROUTES TO THE PROJECT SITE, AND SHALL REPAIR AREAS DAMAGED OUTSIDE OF THE DESIGNATED CONSTRUCTION ZONE FOR THE PROJECT AT THEIR OWN EXPENSE.
2. CONTRACTOR SHALL NOT OPERATE EQUIPMENT, STORE MATERIALS/SUPPLIES, OR OTHERWISE DISTURB WETLANDS AND SENSITIVE AREAS IN OR ADJACENT TO THE PROJECT AREA. CONTRACTOR WILL BE RESPONSIBLE FOR ANY IMPACTS FROM THEMSELVES AND THEIR SUBCONTRACTORS.
3. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND MARKING ALL UTILITIES IN THE PROJECT SITE, AND FOR PROTECTING ALL UTILITIES DURING CONSTRUCTION. DAMAGED UTILITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
4. CONTRACTOR IS RESPONSIBLE FOR HAULING AND PLACING OF ALL EXCESS MATERIALS FROM THE SITE AS DIRECTED BY THE ENGINEER.
5. THE CONTRACTOR IS TO LIMIT ACCESS TO THE SITE BY UNAUTHORIZED PERSONS WITH A SECURITY FENCE AND CLEARLY MARK THE CONSTRUCTION ZONE.

UTILITY:

1. THE UTILITY INFORMATION SHOWN IS PLOTTED FROM THE BEST AVAILABLE DATA.
2. THE CONTRACTOR IS RESPONSIBLE FOR MAKING THEIR OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO.
3. THE CONTRACTOR IS TO CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO AT 1-800-922-1987 FOR UTILITY LOCATIONS AT LEAST 2 BUSINESS DAYS, NOT INCLUDING THE DAY OF ACTUAL NOTICE, PRIOR TO EXCAVATING.
4. THE CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANY FOR ANY UTILITIES THAT NEED RELOCATING.

BORING:

1. BORE LOG LOCATIONS AND DEPTHS ARE APPROXIMATE AND BASED ON THE ORIGINAL TETRA TECH BORE LOGS SHOWN IN APPENDIX B OF THE SLURRY WALL DESIGN REPORT.
2. GROUNDWATER LEVELS WILL FLUCTUATE.

LEGEND:

- PROPERTY LINE
- EXISTING MAJOR CONTOUR (5740)
- EXISTING MINOR CONTOUR
- EXISTING BARBED WIRE FENCE (X)
- EXISTING CHAINLINK FENCE
- EXISTING EASEMENT
- EXISTING GAS LINE (G)
- EXISTING WATER LINE (W)
- EXISTING STORM SEWER
- EXISTING RAW WATER LINE (RW)
- EXISTING IRRIGATION (IR)
- EXISTING BURIED ELECTRICAL (E)
- EXISTING OVERHEAD ELECTRICAL (OH)
- EXISTING FIBER OPTIC (FO)
- EXISTING SANITARY SEWER (SS)
- MONITORING WELLS (MON. WELL)
- EXISTING WATER VALVE
- EXISTING BOLLARD
- WATER MARKER
- EXISTING UTILITY POLE
- EXISTING OVERHEAD UTILITY LINES (OH)
- EXISTING BURIED UTILITY LINES (U)

- PROPOSED MAJOR CONTOUR (5740)
- PROPOSED MINOR CONTOUR (5736)
- PROPOSED SLOPE AND DIRECTION (2.8:1)
- PROPOSED UNDERDRAIN

- DETAIL IDENTIFICATION NUMBER (A / XXX)
- DRAWING NUMBER WHERE DETAIL IS SHOWN
- DRAWING NUMBER WHERE DETAIL IS TAKEN

DETAILS AND SECTIONS:

- DETAIL CALL OUTS (A / XXX / xxx)
- DETAIL TITLE (X) (A / XX; 0, 100, 200 (IN FEET)) — DETAIL TITLE
- SECTION CUT SYMBOLS - SHORT (A / XXX / xxx)
- SECTION CUT SYMBOLS - LONG (A / XXX / xxx)
- SECTION - SECTION TITLE (X) (A / XXX / xxx; 0, 1000, 2000 (IN FEET)) — SECTION TITLE

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KIMBERLY DENNIS

TUCSON SOUTH
UNDERDRAIN
ADAMS COUNTY, COLORADO

REVISIONS

NO.	DESCRIPTION	DATE
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DESIGNED BY: GL
DRAWN BY: EB
CHECKED BY: GL
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SCALE: AS NOTED
AS NOTED
JOB NO.: 297.001.09
DWG NAME: UNDERDRAIN_COVER AND NOTES.DWG

LEGEND NOTES

SHEET: 2

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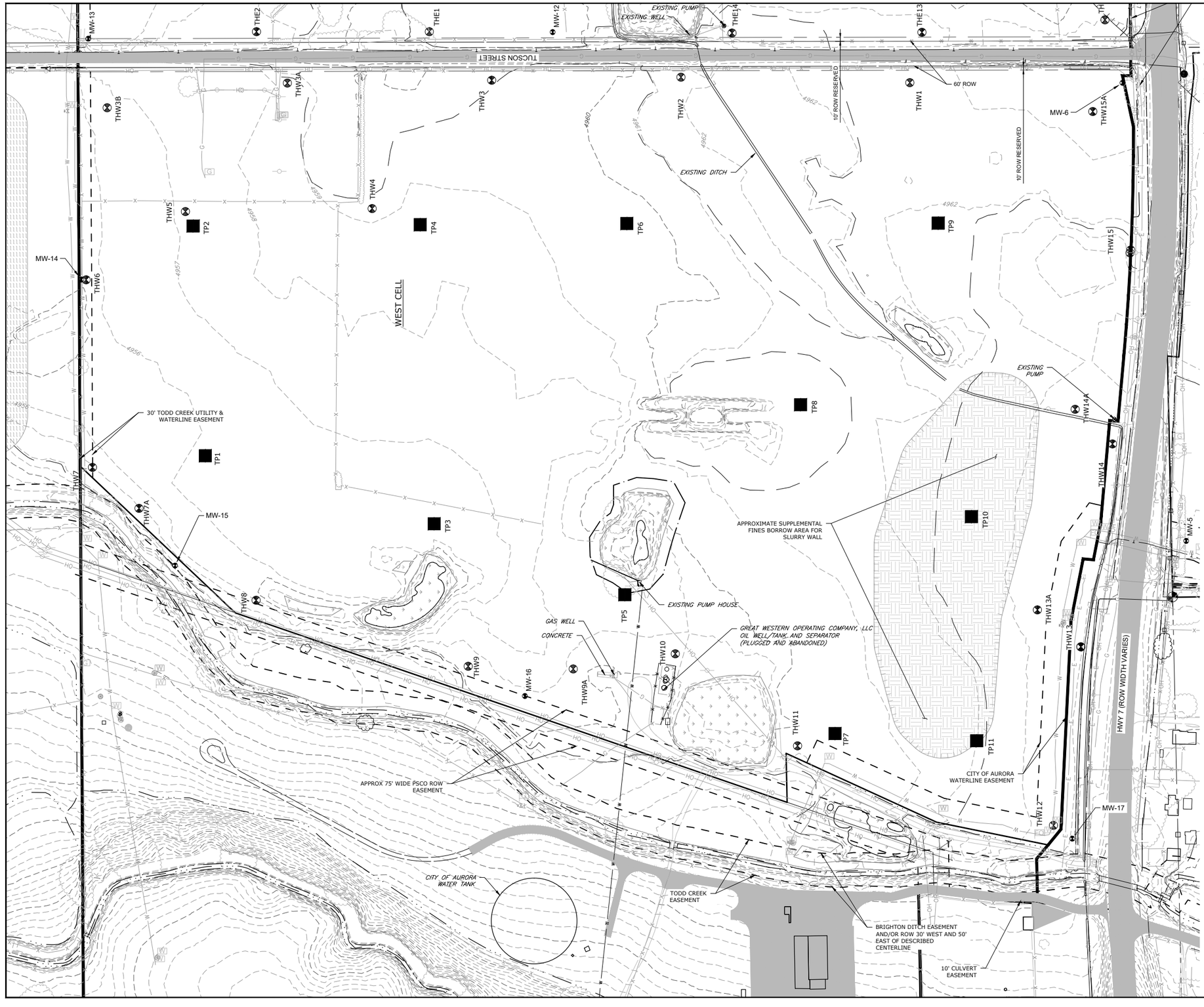

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EX CONDITIONS

SHEET: 3

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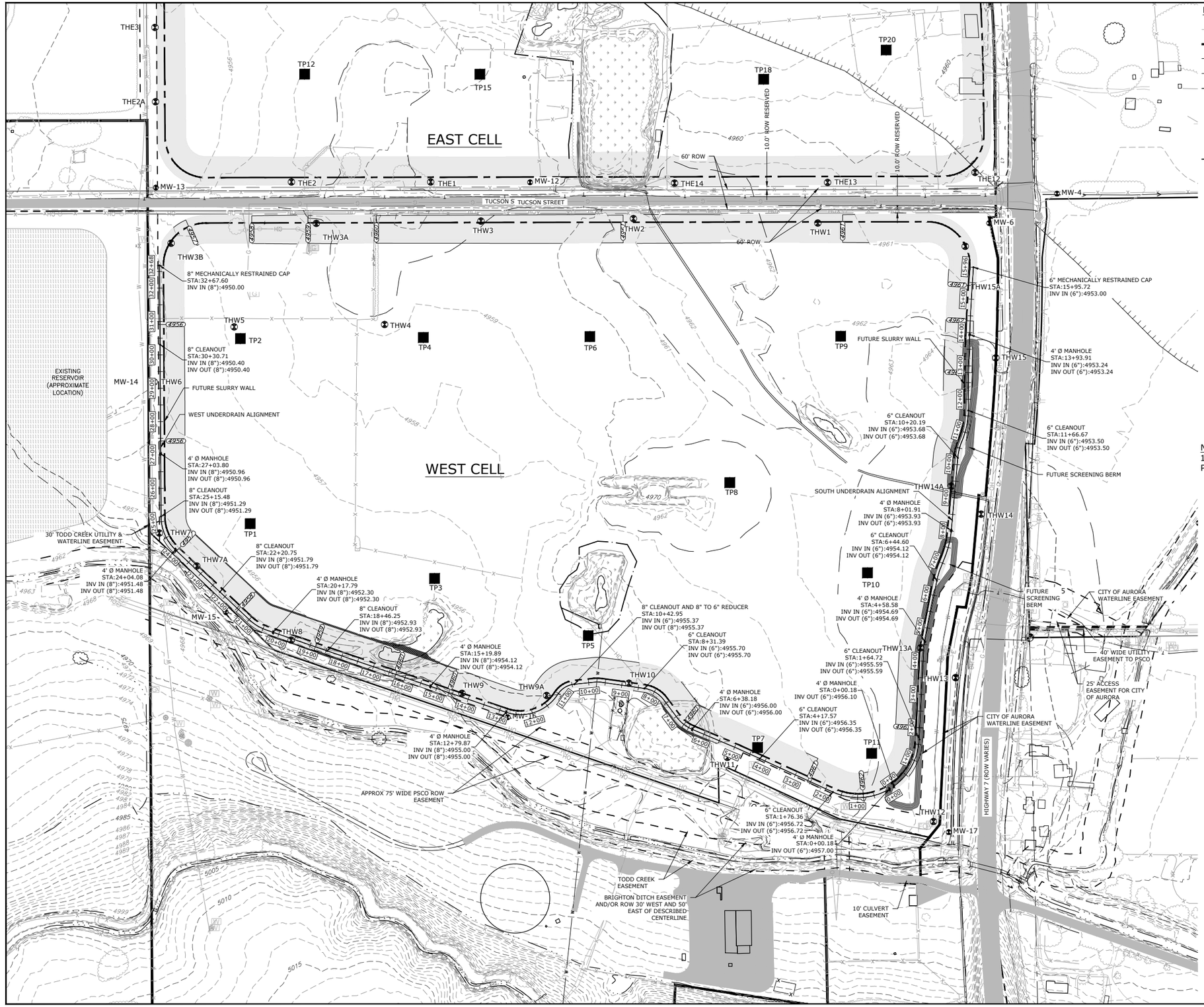

NOTES:
1. CONTRACTOR TO CONSTRUCT SLURRY WALL PLATFORM PRIOR TO CONSTRUCTING UNDERDRAIN.

NORTH
0 75 150
(IN FEET)

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UNDERDRAIN SITE PLAN

SHEET: 4

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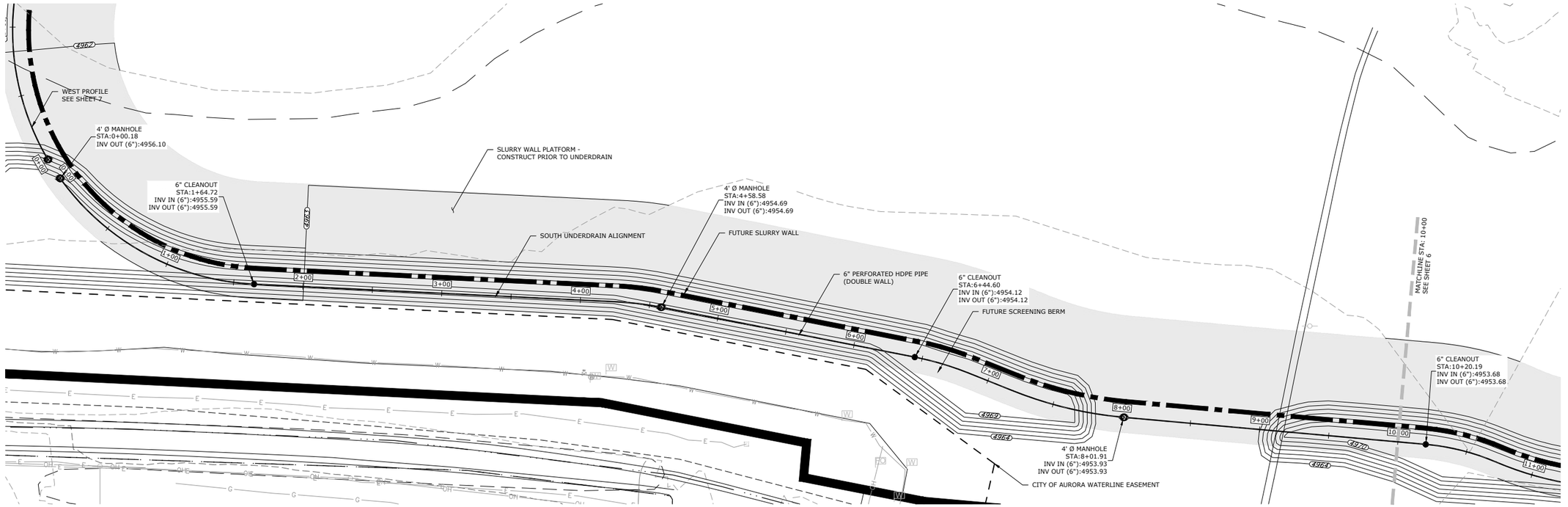
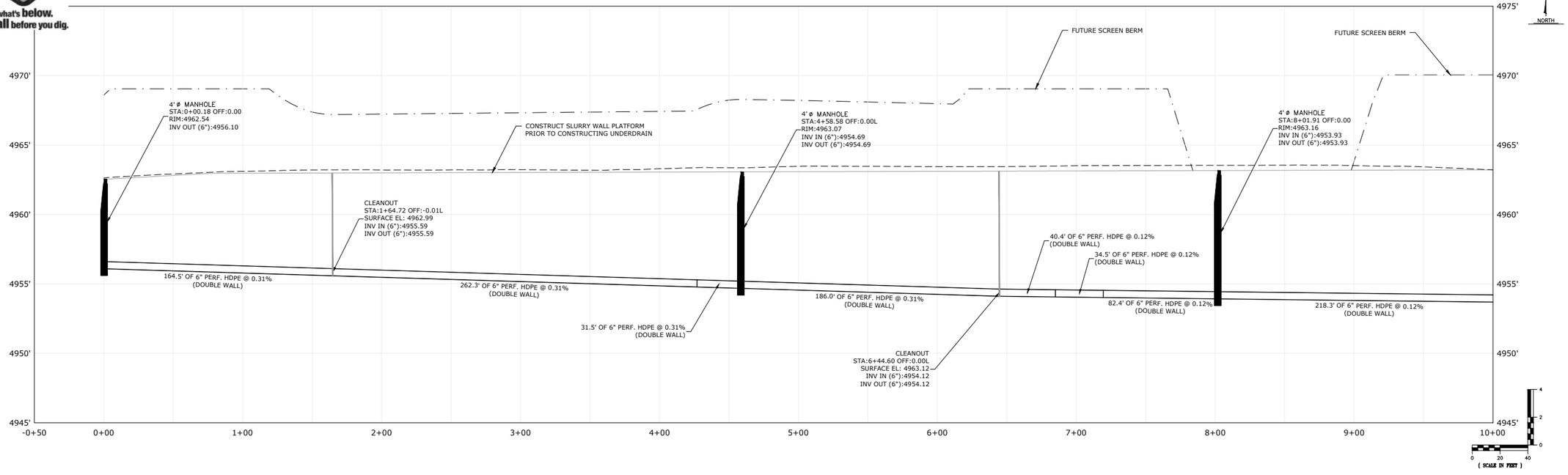


PLAN - SOUTH UNDERDRAIN



PROFILE - SOUTH UNDERDRAIN

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ADAMS COUNTY, COLORADO

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SOUTH UNDERDRAIN PNP 1

SHEET: 5

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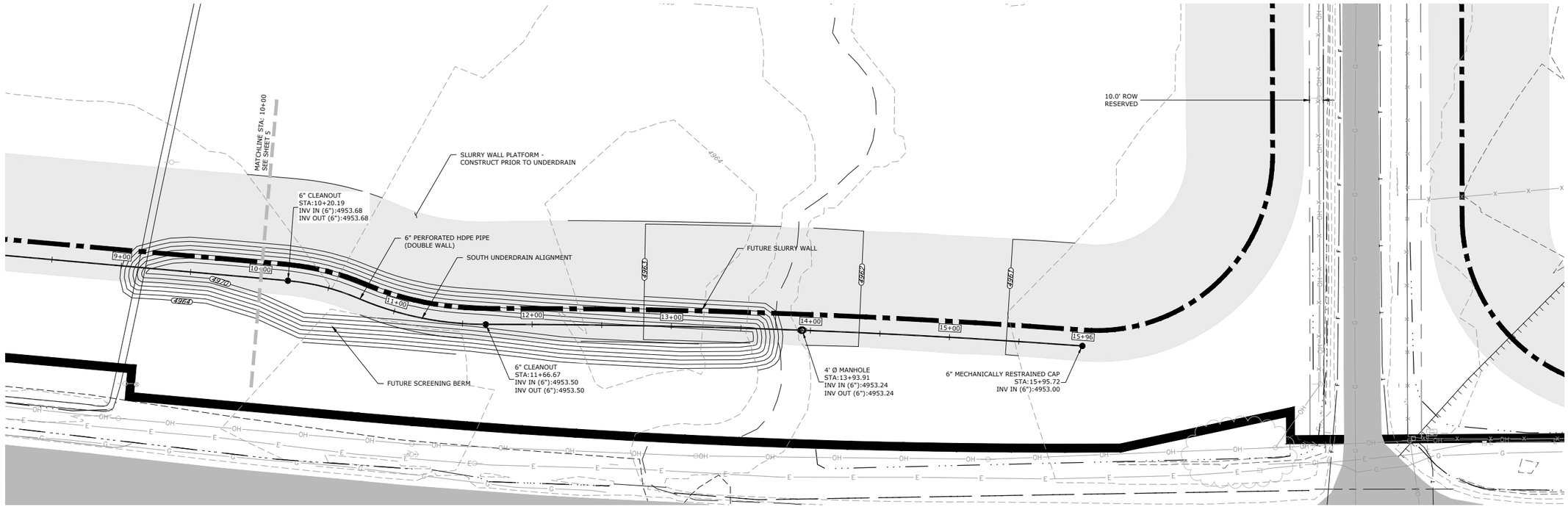

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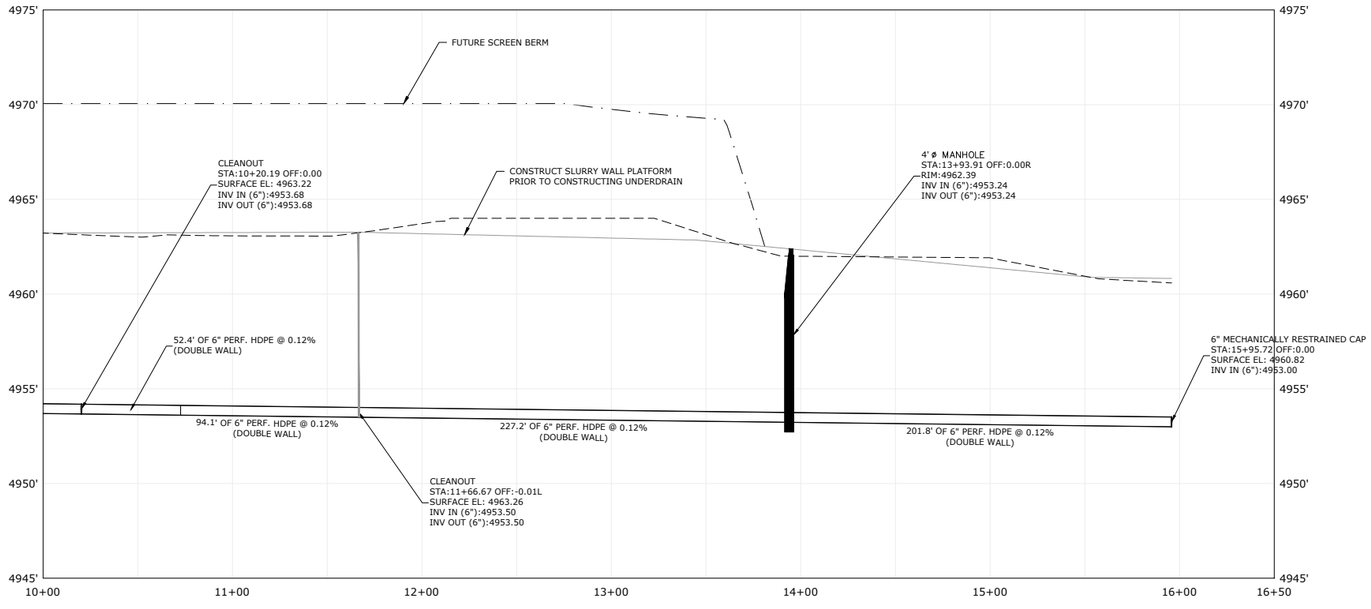

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SOUTH UNDERDRAIN PNP 2

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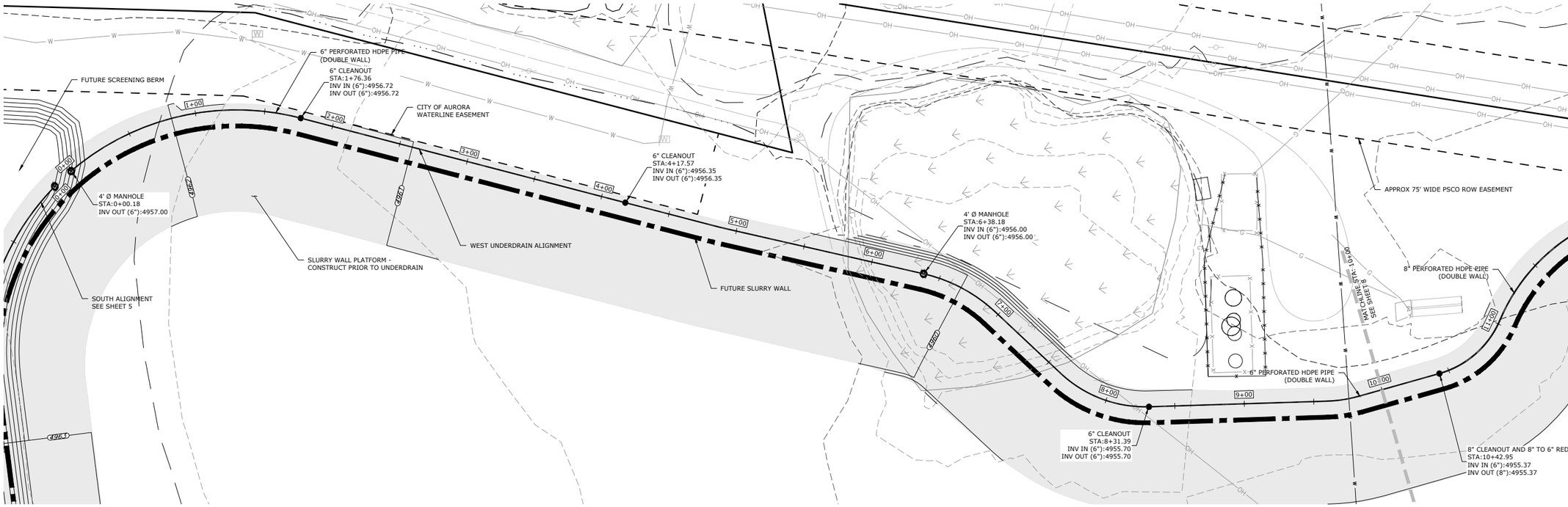

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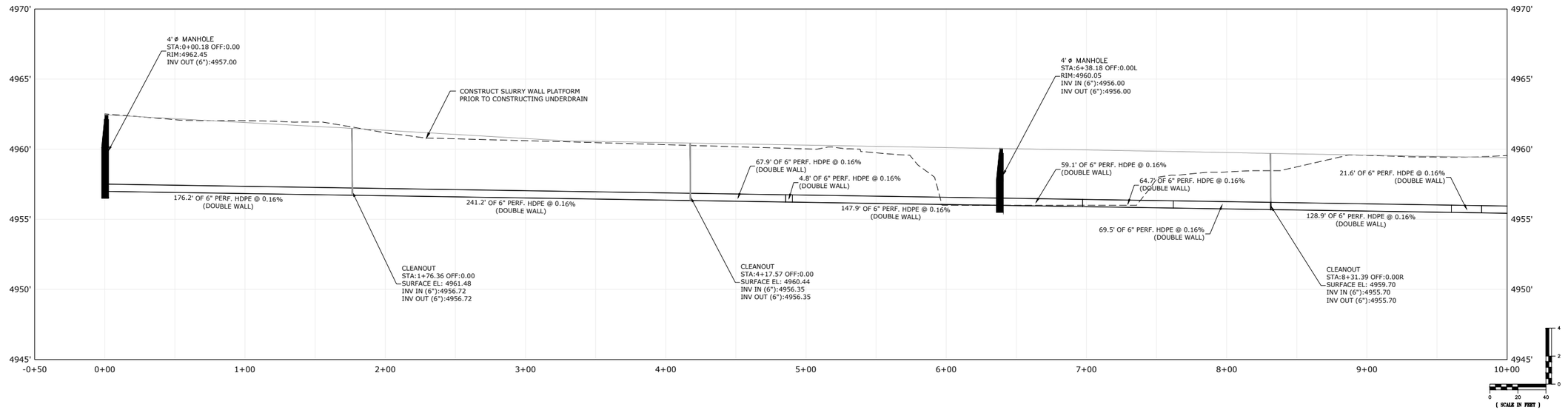

PROFILE - WEST UNDERDRAIN

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WEST UNDERDRAIN PNP1

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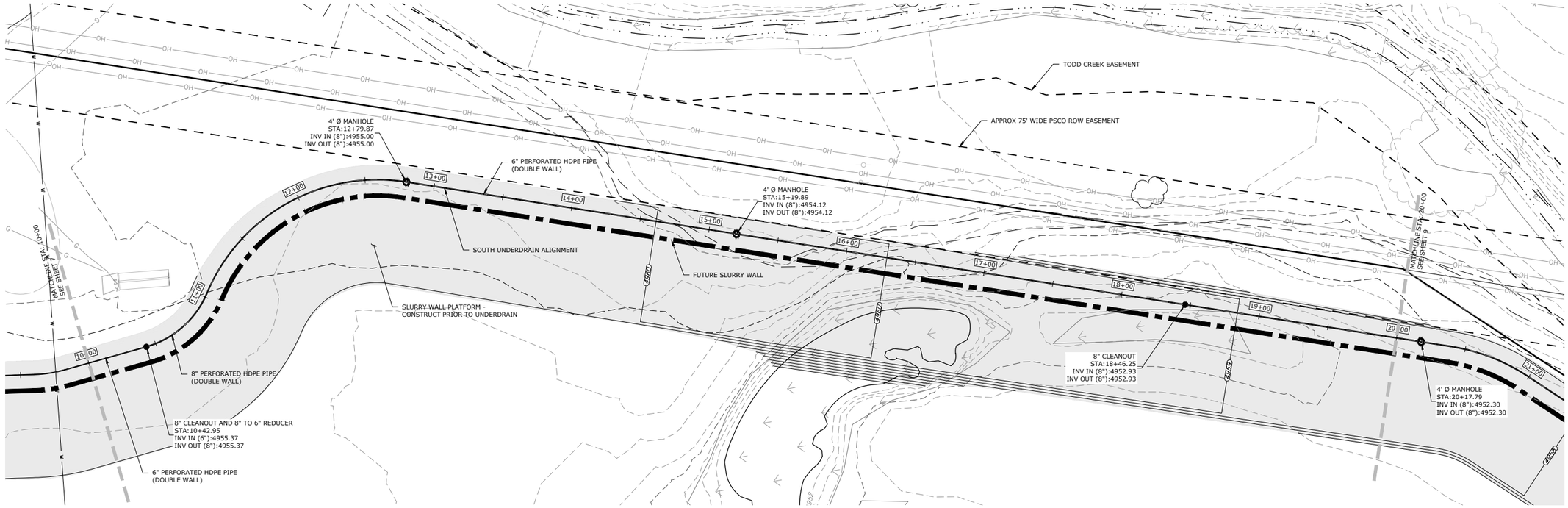
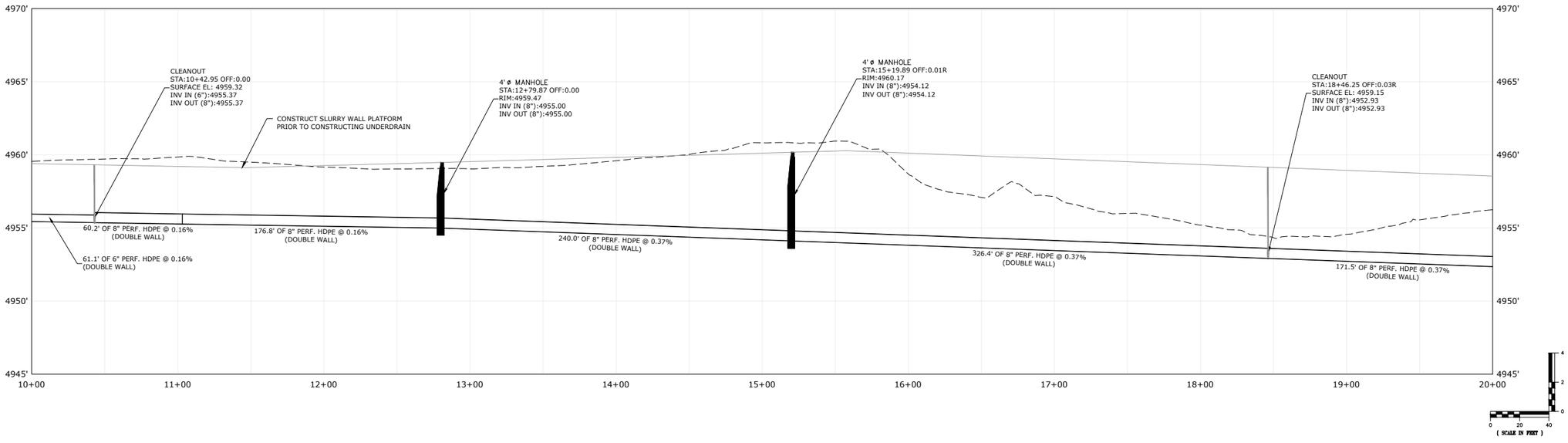


PLAN - WEST UNDERDRAIN

NORTH



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WEST UNDERDRAIN PNP 2

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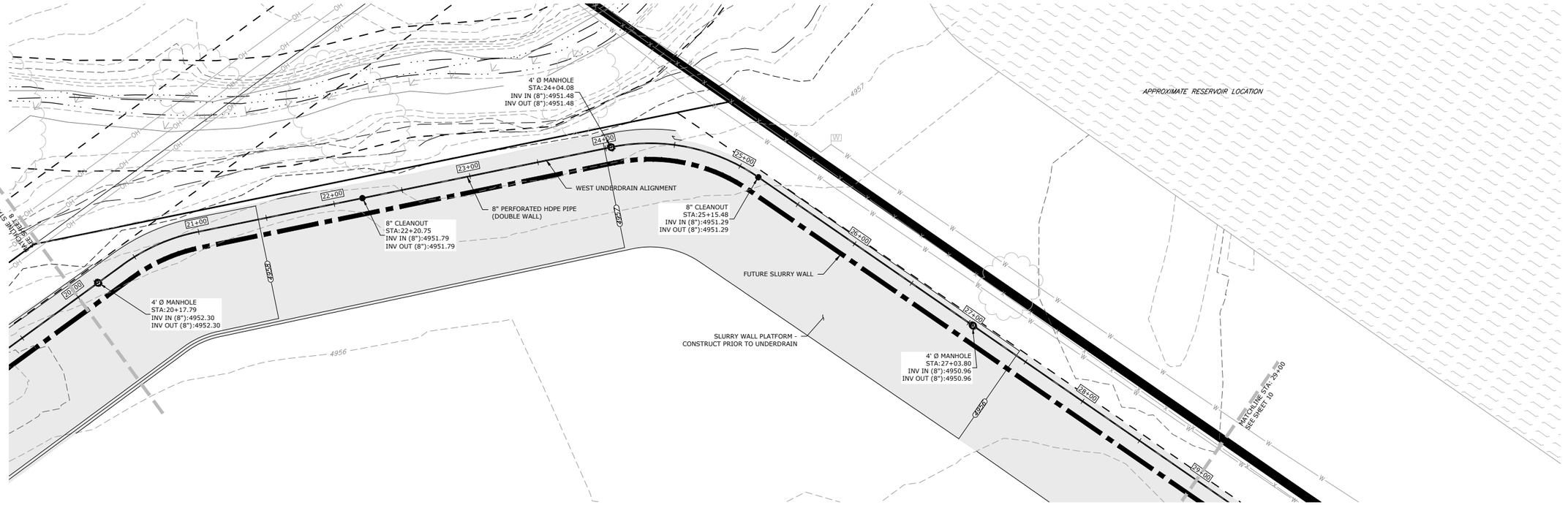
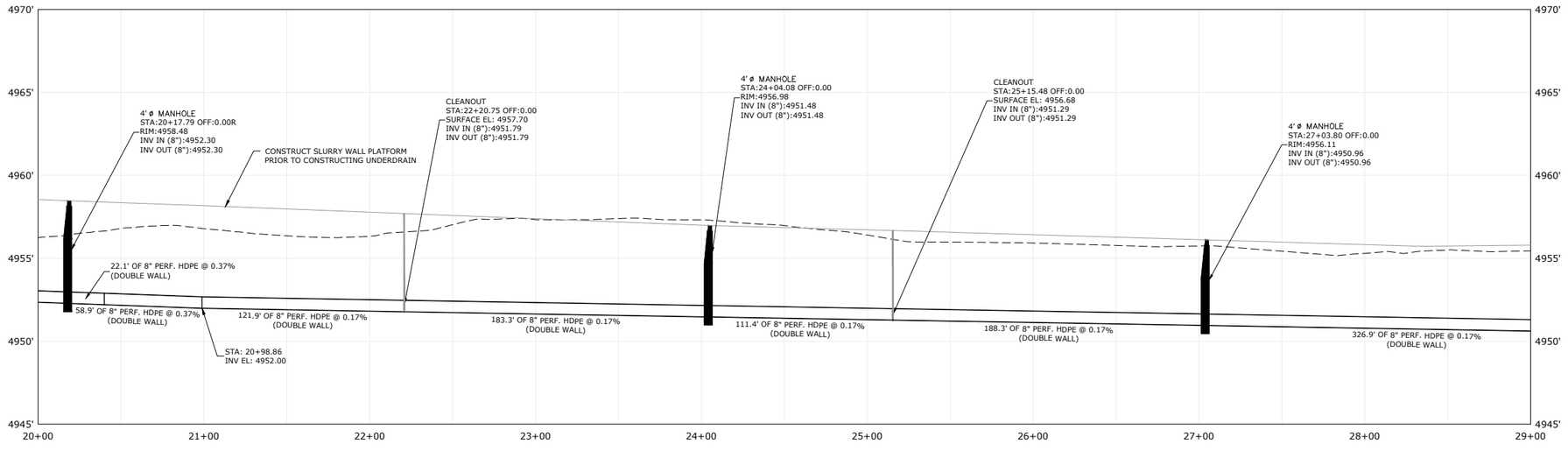


PLAN - WEST UNDERDRAIN



PROFILE - WEST UNDERDRAIN

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WEST
UNDERDRAIN
PNP 3

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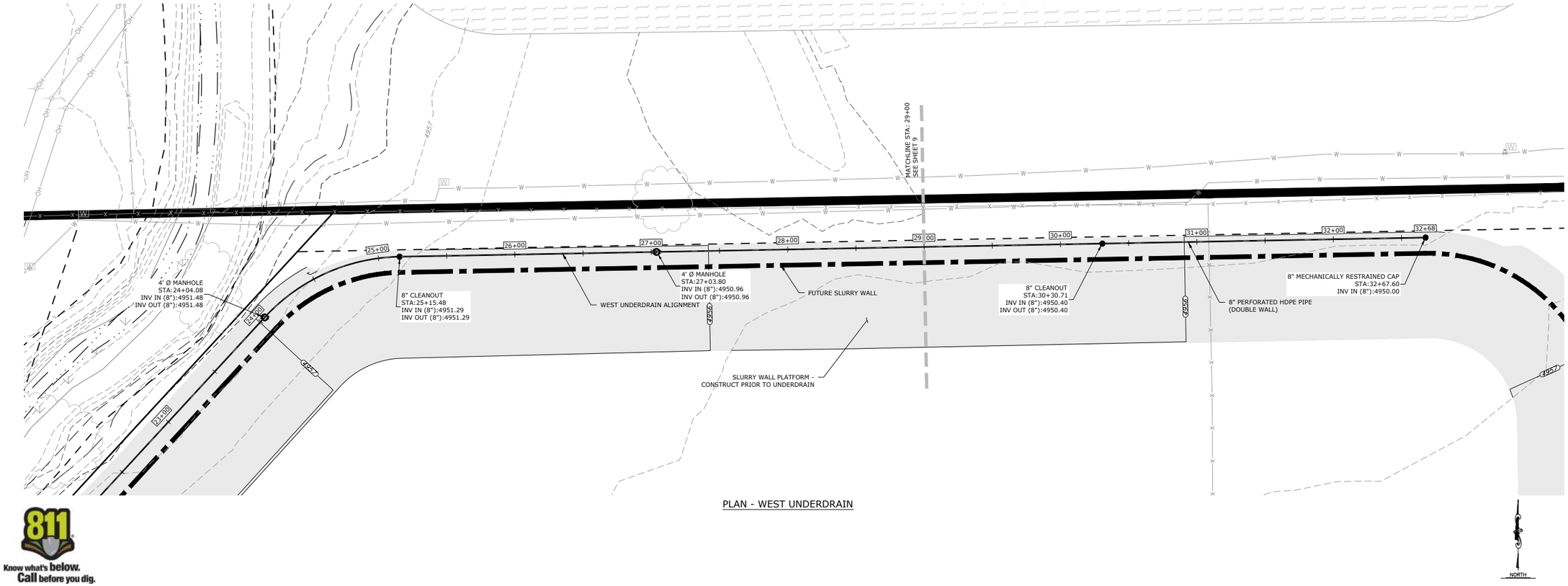
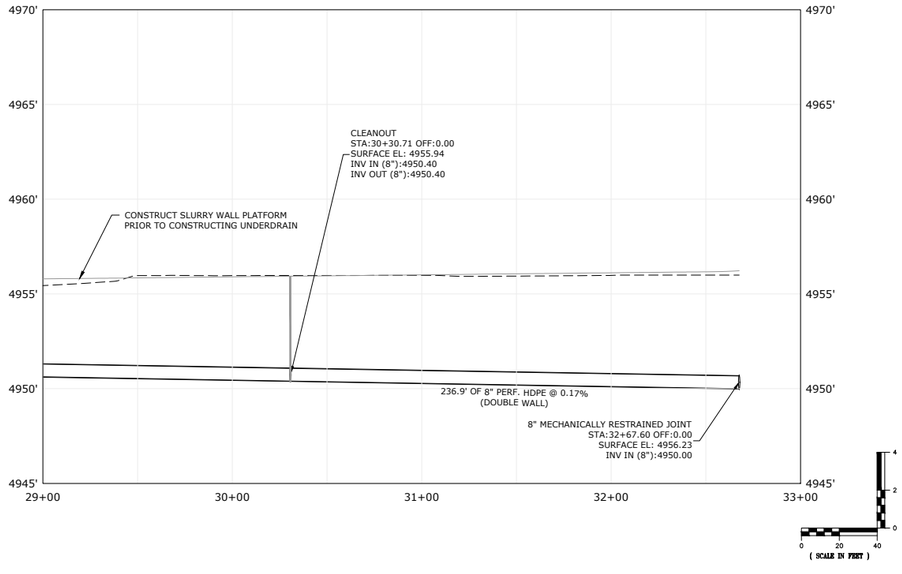


PLAN - WEST UNDERDRAIN



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214-213-7859 (p)
KIMBERLY DENNIS

TUCSON SOUTH
SLURRY WALL
ADAMS COUNTY, COLORADO

REVISIONS

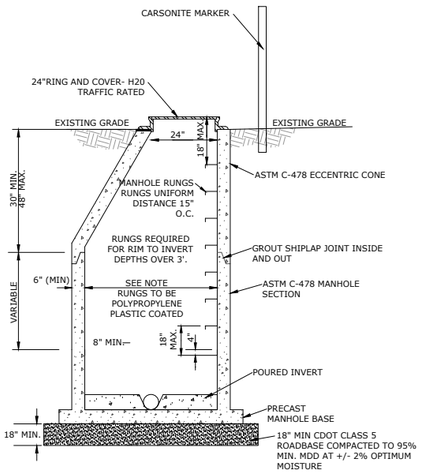
NO	DESCRIPTION	DATE
1	FOR CONSTRUCTION	11/15/21

DESIGNED BY: GL
DRAWN BY: EB
CHECKED BY: GL
DATE: November, 2021
SCALE: AS NOTED
AS NOTED
JOB NO.: 297.001.09
DWG NAME: UNDERDRAIN_SITE PLAN.DWG

WEST UNDERDRAIN PNP 4

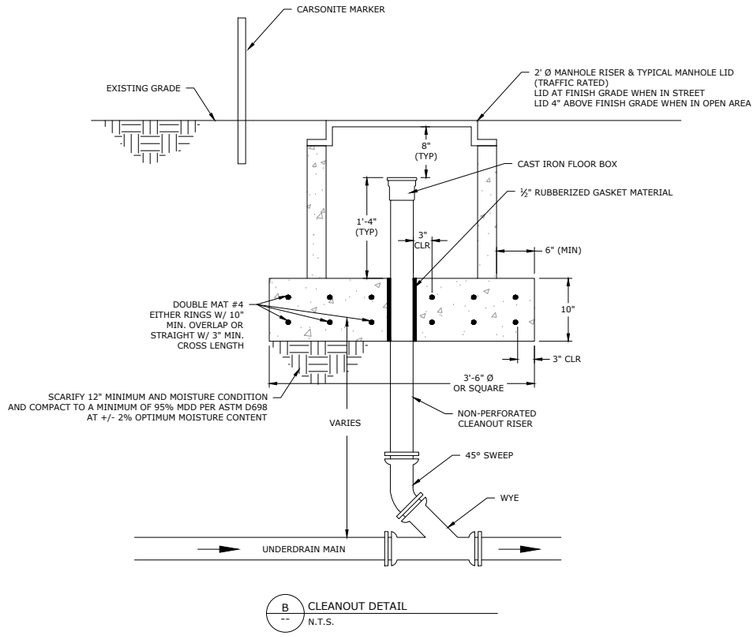
SHEET: 10

J:\aggregate industries-297\tucson south slurry wall proposal\Drawings\Sheets\UNDERDRAIN_SITE PLAN.dwg, 11/15/2021 6:15:45 AM

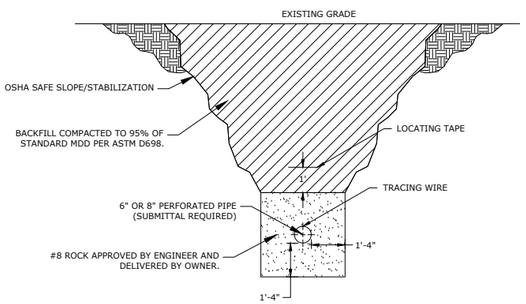


NOTES:
1. LINK-SEAL SHALL BE USED AT ALL PIPE PENETRATIONS IN MANHOLE. SUBMITTAL REQ.
2. PENETRATIONS WILL BE GROUTED INSIDE AND OUTSIDE.

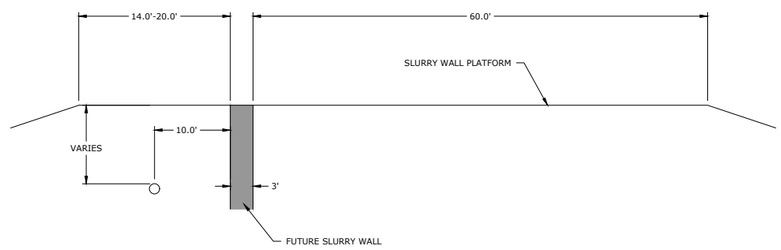
A -- 4' MANHOLE DETAIL
N.T.S.



B -- CLEANOUT DETAIL
N.T.S.



C -- UNDERDRAIN TRENCH DETAIL
N.T.S.



C -- TYPICAL HORIZONTAL PIPE LOCATION DETAIL
N.T.S.

Know what's below. Call before you dig.

CIVIL RESOURCES
8308 COLORADO BLVD
SUITE 200
FIRESTONE, CO 80504
303.833.1416
WWW.CIVILRESOURCES.COM

AGGREGATE INDUSTRIES
1687 COLE BLVD, SUITE 300
GOLDEN, CO 80401
214-213-7859 (p)
KIMBERLY DENNIS

TUCSON SOUTH
UNDERDRAIN
ADAMS COUNTY, COLORADO

REVISIONS

NO	DESCRIPTION	DATE
1	FOR CONSTRUCTION	11/15/21

DESIGNED BY: ARR | DATE: November, 2021
DRAWN BY: ARR | SCALE: AS NOTED
CHECKED BY: BLH | AS NOTED
JOB NO.: 297.001.09
DWG NAME: UNDERDRAIN_COVER AND NOTES.DWG

UNDERDRAIN DETAILS

SHEET: 11

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Technical Memorandum

DATE: Thursday, June 03, 2021

PROJECT: **Tucson South Sand and Gravel Mine Project**

TO: Kimberly Dennis (Aggregate Industries)

FROM: Andrew Phillips (Project Manager and Biologist, HDR Inc.)

SUBJECT: ***General Raptor and Western Burrowing Owl Nesting Surveys***

Project Description

Aggregate Industries is proposing to conduct gravel mining operations at two proposed sites in Adams County and build an overland conveyor system to transport mined material to an existing Wattenberg/Platte Valley facility in Weld County (Project). Situated west of Brighton, Colorado and adjacent/west of the South Platte River, the two proposed mine sites (east and west cells) are bisected by Tucson Street between 160th and 168th Avenue (see **Attachment A – Figure 1**). The proposed Project area is located in Township (T) 1 South, Range (R) 67 West, Section (S) 1 and T1 North, R67 West, S36. The proposed conveyor system would eliminate traffic concerns associated with the roads intersected by the Project. The Project would feature perimeter seeded berms during mining and buffer areas on 160th Avenue and along the South Platte River. Upon completion of mining, the two Project cells would be used for a water storage facility and Aggregate Industries would donate a parcel of land south of 160th Avenue as a conservation easement or open space to the local community. Mining operations are scheduled to start in the summer of 2021 and continue for an eight year period.

Purpose and Need

Migratory birds are protected by the 1918 Migratory Bird Treaty Act (MBTA) 16 United States Code 703-712. The MBTA affords protection to native migratory birds of North America, along with their nests and eggs. In an effort to comply with federal law, surveys were conducted for nesting raptors within the Project area. The purpose of the surveys was to identify the location and phenology of nesting raptor species in an effort to avoid effects on nesting birds that could lead to direct or indirect injury, loss of productivity, or nest abandonment. These effects to migratory birds include adults and their young or eggs.

In addition to the federal protection awarded to migratory birds under the MBTA, the western burrowing owl (*Athene cunicularia*) is listed as a state of Colorado threatened species and protected under Colorado Revised Statutes (CRS) Title 33, Parks and Wildlife 33-2-105. Occupied and remnant black-tailed prairie dog colonies occur throughout the Project area, offering suitable habitat for the burrowing owl. Because construction is scheduled to begin during the burrowing owl breeding season (March 15 to October 31), surveys for nesting burrowing owls were conducted according to Colorado Parks and Wildlife (CPW) recommended survey protocol.

Methods

Prior to the nesting surveys, a desktop review was conducted of the Project area for avian species diversity and previously recorded raptor nests. The desktop analysis involved the review of publicly available data including aerial imagery, U.S. Geological Survey topographic and vegetation data, and proprietary CPW spatial data of known raptor nest locations (CPW 2020a).

Based upon the desktop review, a survey area was identified which encompassed the proposed mine sites and conveyor system. The survey area for the general raptor survey extended up to 400 meters beyond the Project area boundaries. However, surveys were not performed in residential neighborhoods or other developed areas that lacked suitable nesting habitat for raptors.

The surveys were conducted on April 27, May 6, and May 13. Surveys for burrowing owls were conducted following the CPW recommended survey protocol. The burrowing owl surveys were conducted in the early morning hours within about 2 hours of sunrise. The survey approach for burrowing owls included a passive survey in combination with call-broadcast surveys using the burrowing owl's primary male (coo-coo) and alarm (quick-quick-quick) calls. The surveys were conducted within the proposed site cell boundary where prairie dog colonies occur. More survey points were designated in areas with a greater density of prairie dog activity and therefore with a higher probability of occupancy by burrowing owls. The limited topography of the Project site allowed for an unobstructed view up to about 300 meters surrounding each point. Passive surveys were also conducted along the proposed alignment of the conveyor system.

Surveys for other raptors were conducted in the late morning on the same survey day(s). A passive pedestrian/walking survey of the Project area was conducted in search of visual, auditory, or behavioral signs indicative of nesting raptors.

Results and Analysis

The burrowing owl survey did not result in the detection or incidental sign of nesting burrowing owls in the Project area. However, the survey did result in the incidental detection of 46 total avian species, four inactive nests, and one occupied raptor nest (see **Attachment A – Figure 2** and **Table 1**).

Table 1: Nests Recorded during the Project Survey

Map Label	Nest Type (Species)	Nest Status	General Location	Nest Substrate	Coordinates
Nest 1	Stick nest (**Red-tailed hawk**)	Occupied	Along CR 23 ½	Cottonwood tree	40.002338, -104.838885
Nest 2	Stick nest (none)	Inactive	Outside West Cell	Cottonwood tree	39.993652, -104.844352
Nest 3	Cavity nest (none)	Inactive	Adjacent to East Cell	Cottonwood tree (snag)	39.990095, -104.832375
Nest 4	Stick nest (none)	Inactive	Adjacent to East Cell	Cottonwood tree	39.990518, -104.833901
Nest 5	Stick nest (none)	Inactive	Inside East Cell	Cottonwood tree	39.990529, -104.832124

Nest 1 is occupied by a pair of red-tailed hawks (*Buteo jamaicensis*). As determined during the survey, Nest 1 was occupied but was not currently active. The definition of an active nest is one which contains viable eggs and/or chicks. A nest becomes active when the first egg is laid and remains active until fledged young are no longer dependent on the nest for survival. An occupied nest is defined as a nesting location that is occupied and defended by a mated pair but for which an active nest has not been established. Based upon these definitions, the red-tailed hawk pair at Nest 1 were witnessed actively building a stick nest and copulating near the nest location on May 6th. On May 13th, the nesting pair were present at Nest 1 and one adult was observed standing in the nest. Therefore, the nest was confirmed to be occupied and was likely or soon to be active. The average initiation of egg incubation for red-tailed hawks in Colorado is around April 1 (Preston and Beane 2020). So, the pair of red-tailed hawks at Nest 1 are either late nesters or experienced a nest failure and are initiating a second nesting attempt.

Nest 1 is located adjacent to County Road 23½ and 200 meters north of 168th Avenue. Due to the proximity of the nest to 168th Avenue and adjacent mining activities, the nesting red-tailed hawk pair are believed to be moderately tolerant of human encroachment. A higher tolerance of human presence was verified during the survey when the nesting red-tailed hawks continued to build their nest and mate while the surveyor was within less than 100 meters of the nest location. If Nest 1 becomes active, the nest would remain sensitive to Project disturbance through August 15, 2021.

The vegetation in the Project area is dominated by four vegetation communities, consisting of invasive annual grasslands, invasive annual / biannual forbland, forested riparian floodplain, and fallow agricultural land. Nesting activity for songbirds and other passerine species, particularly black-billed magpies (*Pica hudsonia*), was recorded within the Project area. During the survey, most avian diversity was recorded within the forested riparian floodplain and riparian/herbaceous wetland within the proposed east cell mine site. This area is dominated by plains cottonwood (*Populus deltoides*), peach-leaf willow (*Salix amygdaloides*), coyote willow (*Salix exigua*), and cattail species (*Typha* sp.). Wild turkeys (*Meleagris gallopavo*) were flushed while surveying this area. Although no active turkey nests were recorded, the species is likely to nest within the forest riparian floodplain or elsewhere with higher vegetation density and shrub cover. A comprehensive pre-construction survey for all migratory nesting birds would be conducted within one week of the start of mining activities.

Avian species incidentally detected during the Project survey are listed in **Table 2**.

Table 2: Avian Species Detected

Common Name (*Scientific*)	Common Name (*Scientific*)
American coot (*Fulica americana*)	Great horned owl (*Bubo virginianus*)
American crow (*Corvus brachyrhynchos*)	Horned lark (*Eremophila alpestris*)
American kestrel (*Falco sparverius*)	House finch (*Haemorhous mexicanus*)
American robin (*Turdus migratorius*)	House wren (*Troglodytes aedon*)
American white pelican (*Pelecanus erythrorhynchos*)	Killdeer (*Charadrius vociferus*)
Bald eagle (*Haliaeetus leucocephalus*)	Lark bunting (*Calamospiza melanocorys*)
Barn swallow (*Hirundo rustica*)	Mallard (*Anas platyrhynchos*)
Belted kingfisher (*Megaceryle alcyon*)	Mourning dove (*Zenaida macroura*)
Black-billed magpie (*Pica hudsonia*)	Northern flicker (*Colaptes auratus*)
Black-capped chickadee (*Poecile atricapillus*)	Osprey (*Pandion haliaetus*)
Blue jay (*Cyanocitta cristata*)	Red-tailed hawk (*Buteo jamaicensis*)
Brown-headed cowbird (*Molothrus ater*)	Red-winged blackbird (*Agelaius phoeniceus*)
Bullock's oriole (*Icterus bullockii*)	Ring-necked duck (*Aythya collaris*)
California gull (*Larus californicus*)	Say's phoebe (*Sayornis saya*)
Canada goose (*Branta canadensis*)	Song sparrow (*Melospiza melodia*)
Cattle egret (*Bubulcus ibis*)	Swainson's hawk (*Buteo swainsoni*)
Chipping sparrow (*Spizella passerina*)	Western kingbird (*Tyrannus verticalis*)
Common grackle (*Quiscalus quiscula*)	Western meadowlark (*Sturnella neglecta*)
Double-crested cormorant (*Phalacrocorax auratus*)	Western wood-pewee (*Contopus sordidulus*)
Downy woodpecker (*Dryobates pubescens*)	White-crowned sparrow (*Zonotrichia leucophrys*)
Eastern kingbird (*Tyrannus tyrannus*)	Wild turkey (*Meleagris gallopavo*)
European starling (*Sturnus vulgaris*)	Yellow-headed blackbird (*Xanthocephalus xanthocephalus*)
Great blue heron (*Ardea herodias*)	Yellow-rumped warbler (*Setophaga coronata*)

Summary and Recommendations

A total of 46 avian species were incidentally detected during the survey as well as four inactive nest sites and one occupied red-tailed hawk nest. Seasonal restrictions on human encroachment of red-tailed hawks is typically ⅓ mile radius of active nests for rural sites from February 15 through July 15 (CPW 2020b). While encroachment on rural nest sites is likely to cause nest abandonment, red-tailed hawks often become habituated to human environments in urban and suburban settings and will tolerate human encroachment to within as close as 100 meters of their nest (CPW 2020b).

The nesting pair of red-tailed hawks in the Project area at Nest 1 are believed to be moderately habituated to human activities due to the regular vehicle traffic along 168th Avenue, agricultural and mining activities, and general human presence around the nest site. During the survey, the nesting pair at Nest 1 was tolerant of vehicle and foot-traffic of the surveyor to about 100 meters. Due to the late season establishment of Nest 1, it is recommended that mining activities remain south of 168th Avenue or otherwise outside of the mapped 200-meter buffer of the nest location until after August 15. The two proposed mine sites are located over 0.5 mile from Nest 1. Therefore, mining work within the boundaries of the proposed mine sites would not disturb Nest 1 regardless of the seasonal timing and extent of mining activities.

Raptors display a high degree of fidelity to nesting sites and will routinely rehabilitate and reuse existing nests. Therefore, inactive nests identified in this report could become active in future nesting seasons. Removing inactive nests would minimize the potential for nesting activity adjacent to the mine site throughout the life of the mining activities. With the exception of eagle nests, a permit is not required to remove and destroy an inactive migratory bird nest, provided that no possession of the nest occurs after its removal (USFWS 2018). However, it is recommended that only inactive nests identified in this report be removed prior to September 1. The removal of nests not specifically identified in this report is not recommended without technical guidance from the U.S. Fish and Wildlife Service (USFWS) or other technical expert.

Most bird species would nest in the Project area between April 1 and September 1. Raptors (including burrowing owls) could nest in the Project area between February 1 and October 31. If nesting activity not discussed within this report is detected during construction, the USFWS and/or other technical experts should be consulted to identify the appropriate impact minimization measure(s) to avoid effects on the nesting species. Furthermore, an additional clearance survey for all nesting bird species would be performed no more than one week prior to the start of mining work. During this survey, the nesting status of Nest 1 would be verified, and the construction approach would be modified as needed to avoid impacting the nesting raptor pair and/or other nesting birds.

The results of this nesting survey for the western burrowing owl and other nesting raptors species are valid and applicable for the 2021 nesting season. Should mining activities and other Project-related work be delayed into 2022 or beyond, then an additional raptor nesting survey(s) would be required to identify and avoid impacting newly established nests. Assuming that mining activities begin as scheduled in 2021, ongoing mining and habitat disturbances would discourage most nesting bird species (particularly raptors) from establishing nests within and near the Project area in subsequent years.

References

CPW 2020a	CPW. 2020. Spatial data of known and historical raptor nesting sites in Colorado. Obtained directly from Colorado Parks and Wildlife in 2020.
CPW 2020b	CPW. 2020b. Recommended Buffer Zone and Seasonal Restrictions for Colorado Raptors (2020). <https://cpw.state.co.us/Documents/WildlifeSpecies/LivingWithWildlife/Raptor-Buffer-Guidelines.pdf>.
Preston and Beane 2020	Preston, C. R. and R. D. Beane (2020). Red-tailed Hawk (*Buteo jamaicensis*), version 1.0. In Birds of the World (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. Available online: <https://doi.org/10.2173/bow.rethaw.01>.
USFWS 2018	US Fishing and Wildlife Service (USFWS). 2018. Memorandum on the Destruction and Relocation of Migratory Bird Nest Contents (FWS/DMBM/AMB/068029). Available online: <https://www.fws.gov/policy/m0407.pdf>.

Note: References accessed June 1, 2021

A

Figures

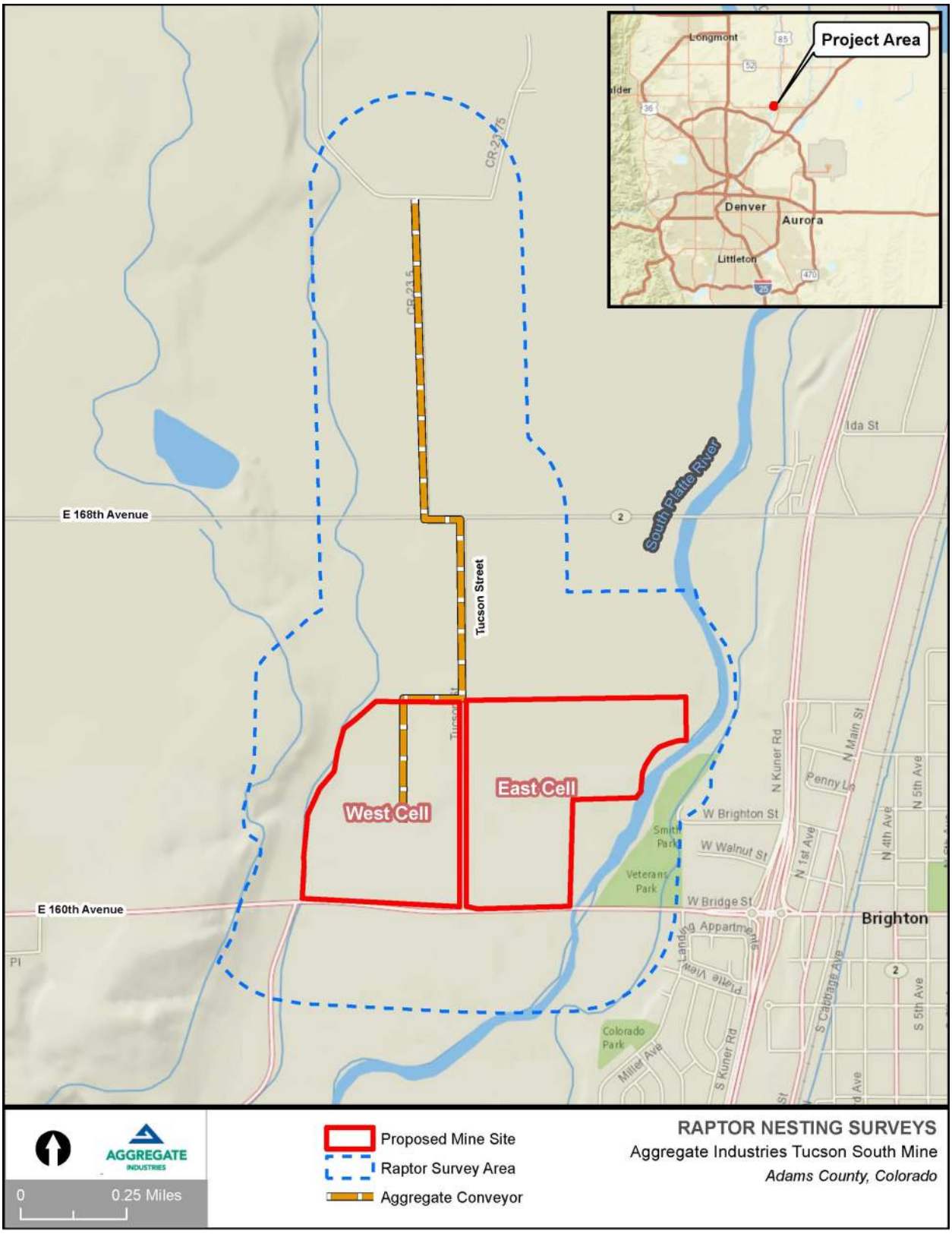

Figure 1. Project Area Location Map

Figure 2. Survey Results

```
PROFIL                                  FILE: STATIC     8-10-21   16:36    ft
Max Section Static
    18       8
       .0     4955.0       40.0     4955.0   1
     40.0     4955.0       44.0     4956.0   1
     44.0     4956.0       74.0     4956.0   1
     74.0     4956.0       78.0     4955.0   1
     78.0     4955.0      150.0     4955.0   1
    150.0     4955.0      160.0     4955.0   6
    160.0     4955.0      250.0     4925.0   6
    250.0     4925.0      400.0     4925.0   4
    150.0     4955.0      152.0     4951.0   1
       .0     4951.0      152.0     4951.0   2
    152.0     4951.0      157.0     4941.0   2
       .0     4941.0      157.0     4941.0   3
    157.0     4941.0      159.0     4937.0   3
       .0     4937.0      159.0     4937.0   2
    159.0     4937.0      165.0     4925.0   2
       .0     4925.0      165.0     4925.0   4
    165.0     4925.0      165.5     4924.0   4
       .0     4924.0      400.0     4924.0   5
SOIL
  6
  114.0    126.0      50.0    28.00     .000        .0    1
  130.0    137.0        .0    35.00     .000        .0    1
  114.0    126.0      50.0    28.00     .000        .0    1
  124.0    134.0        .0    14.00     .000        .0    1
  124.0    134.0     100.0    28.00     .000        .0    1
  119.0    126.0      25.0    26.00     .000        .0    1
WATER
  1       62.40
     5
          .0      4942.0
       154.0      4942.0
       175.0      4930.0
       250.0      4926.0
       400.0      4926.0
LOADS
  1
       130.0       147.5      3000.0          .0
CIRCL2
    20      20
    245.0      265.0      130.0      160.0
   4900.0        7.0       -5.0      -45.0
```

XSTABL File: STATIC 8-10-21 16:36

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*****************************************
*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*               using the               *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2002      *
*   Interactive Software Designs, Inc.  *
*        Moscow, ID 83843, U.S.A.       *
*                                       *
*          All Rights Reserved          *
*                                       *
*  Ver. 5.206                 96 - 1952 *
*****************************************
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Problem Description : Max Section Static

SEGMENT BOUNDARY COORDINATES

---

8 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	4955.0	40.0	4955.0	1
2	40.0	4955.0	44.0	4956.0	1
3	44.0	4956.0	74.0	4956.0	1
4	74.0	4956.0	78.0	4955.0	1
5	78.0	4955.0	150.0	4955.0	1
6	150.0	4955.0	160.0	4955.0	6
7	160.0	4955.0	250.0	4925.0	6
8	250.0	4925.0	400.0	4925.0	4

10 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	150.0	4955.0	152.0	4951.0	1
2	.0	4951.0	152.0	4951.0	2
3	152.0	4951.0	157.0	4941.0	2
4	.0	4941.0	157.0	4941.0	3
5	157.0	4941.0	159.0	4937.0	3
6	.0	4937.0	159.0	4937.0	2
7	159.0	4937.0	165.0	4925.0	2
8	.0	4925.0	165.0	4925.0	4
9	165.0	4925.0	165.5	4924.0	4
10	.0	4924.0	400.0	4924.0	5

ISOTROPIC Soil Parameters
---

6 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Surface No.
1	114.0	126.0	50.0	28.00	.000	1
2	130.0	137.0	.0	35.00	.000	1
3	114.0	126.0	50.0	28.00	.000	1
4	124.0	134.0	.0	14.00	.000	1
5	124.0	134.0	100.0			

```
28.00      .000          .0      1
            6   119.0   126.0       25.0
26.00      .000          .0      1


           1 Water surface(s) have been specified

          Unit weight of water =    62.40  (pcf)


          Water Surface No.  1 specified by  5 coordinate points

          **********************************
                   PHREATIC SURFACE,
          **********************************

            Point      x-water     y-water
             No.         (ft)        (ft)

               1            .00     4942.00
               2         154.00     4942.00
               3         175.00     4930.00
               4         250.00     4926.00
               5         400.00     4926.00


          ---------------
          BOUNDARY LOADS
          ---------------

              1 load(s) specified

          Load        x-left      x-right     Intensity
Direction
           No.         (ft)         (ft)        (psf)
(deg)

            1          130.0        147.5
3000.0           .0


          NOTE - Intensity is specified as a uniformly
distributed
                 force acting on a HORIZONTALLY projected
surface.


          A critical failure surface searching method, using a
random
```

technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 20 points equally spaced
along the ground surface between x = 245.0 ft
and x = 265.0 ft

Each surface terminates between x = 130.0 ft
and x = 160.0 ft

Unless further limitations were imposed, the minimum elevation
at which a surface extends is y = 4900.0 ft

7.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined
within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := -5.0 degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 18 coordinate points

Point	x-surf	y-surf

No.	(ft)	(ft)
1	248.16	4925.61
2	241.19	4924.98
3	234.19	4924.68
4	227.19	4924.70
5	220.20	4925.05
6	213.23	4925.73
7	206.31	4926.73
8	199.43	4928.06
9	192.63	4929.70
10	185.91	4931.66
11	179.29	4933.93
12	172.78	4936.51
13	166.40	4939.39
14	160.16	4942.57
15	154.08	4946.03
16	148.16	4949.78
17	142.43	4953.79
18	140.87	4955.00

**** Simplified BISHOP FOS = 1.570 ****

The following is a summary of the TEN most critical surfaces

Problem Description : Max Section Static

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.570	231.19	5074.54	149.89	248.16	140.87	1.093E+07
2.	1.583	226.66	5068.47	143.96	247.11	138.13	1.225E+07
3.	1.584	232.54	5071.34	147.54	251.32	141.91	1.082E+07
4.	1.590	243.05	5053.08	129.03	258.68	159.30	4.684E+06
5.	1.602	233.14	5081.17	157.62	254.47	138.77	1.343E+07
6.	1.609	229.92	5058.18	134.31	249.21	144.00	9.147E+06

```
           7.   1.611    235.28  5046.65   122.56   250.26
153.98  5.673E+06
           8.   1.625    220.00  5062.27   138.43   246.05
132.57  1.532E+07
           9.   1.630    229.43  5058.00   135.75   256.58
141.02  1.187E+07
          10.   1.634    228.80  5058.54   136.62   257.63
139.69  1.285E+07

                              * * *  END OF FILE  * * *
```

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PROFIL                                  FILE: SEISMIC    8-10-21   16:34    ft
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     40.0     4955.0       44.0     4956.0   1
     44.0     4956.0       74.0     4956.0   1
     74.0     4956.0       78.0     4955.0   1
     78.0     4955.0      150.0     4955.0   1
    150.0     4955.0      160.0     4955.0   6
    160.0     4955.0      250.0     4925.0   6
    250.0     4925.0      400.0     4925.0   4
    150.0     4955.0      152.0     4951.0   1
       .0     4951.0      152.0     4951.0   2
    152.0     4951.0      157.0     4941.0   2
       .0     4941.0      157.0     4941.0   3
    157.0     4941.0      159.0     4937.0   3
       .0     4937.0      159.0     4937.0   2
    159.0     4937.0      165.0     4925.0   2
       .0     4925.0      165.0     4925.0   4
    165.0     4925.0      165.5     4924.0   4
       .0     4924.0      400.0     4924.0   5
SOIL
  6
  114.0    126.0      50.0    28.00     .000        .0    1
  130.0    137.0        .0    35.00     .000        .0    1
  114.0    126.0      50.0    28.00     .000        .0    1
  124.0    134.0        .0    14.00     .000        .0    1
  124.0    134.0     100.0    28.00     .000        .0    1
  119.0    126.0      25.0    26.00     .000        .0    1
WATER
  1       62.40
     5
          .0      4942.0
       154.0      4942.0
       175.0      4930.0
       250.0      4926.0
       400.0      4926.0
EQUAKE
   .067     .000
LOADS
  1
       130.0       147.5      3000.0          .0
CIRCL2
    20      20
    245.0      265.0      130.0      160.0
   4900.0        7.0       -5.0      -45.0
```

XSTABL File: SEISMIC 8-10-21 16:34

```
*****************************************
*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*               using the               *
*            Method of Slices           *
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```

Problem Description : Max Section Seismic

SEGMENT BOUNDARY COORDINATES

---

8 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	4955.0	40.0	4955.0	1
2	40.0	4955.0	44.0	4956.0	1
3	44.0	4956.0	74.0	4956.0	1
4	74.0	4956.0	78.0	4955.0	1
5	78.0	4955.0	150.0	4955.0	1
6	150.0	4955.0	160.0	4955.0	6
7	160.0	4955.0	250.0	4925.0	6
8	250.0	4925.0	400.0	4925.0	4

10 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	150.0	4955.0	152.0	4951.0	1
2	.0	4951.0	152.0	4951.0	2
3	152.0	4951.0	157.0	4941.0	2
4	.0	4941.0	157.0	4941.0	3
5	157.0	4941.0	159.0	4937.0	3
6	.0	4937.0	159.0	4937.0	2
7	159.0	4937.0	165.0	4925.0	2
8	.0	4925.0	165.0	4925.0	4
9	165.0	4925.0	165.5	4924.0	4
10	.0	4924.0	400.0	4924.0	5

ISOTROPIC Soil Parameters
---

6 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Surface No.
1	114.0	126.0	50.0	28.00	.000	1
2	130.0	137.0	.0	35.00	.000	1
3	114.0	126.0	50.0	28.00	.000	1
4	124.0	134.0	.0	14.00	.000	1
5	124.0	134.0	100.0			

```
28.00      .000          .0      1
            6   119.0   126.0       25.0
26.00      .000          .0      1


           1 Water surface(s) have been specified

          Unit weight of water =    62.40  (pcf)


          Water Surface No.  1 specified by  5 coordinate points

          **********************************
                   PHREATIC SURFACE,
          **********************************

            Point      x-water     y-water
             No.         (ft)        (ft)

              1            .00     4942.00
              2         154.00     4942.00
              3         175.00     4930.00
              4         250.00     4926.00
              5         400.00     4926.00


          A horizontal earthquake loading coefficient
          of   .067 has been assigned

          A vertical earthquake loading coefficient
          of   .000 has been assigned


          ---------------
          BOUNDARY LOADS
          ---------------

              1 load(s) specified


          Load        x-left      x-right     Intensity
Direction
           No.         (ft)         (ft)        (psf)
(deg)

            1          130.0        147.5
3000.0           .0


          NOTE - Intensity is specified as a uniformly
```

distributed
force acting on a HORIZONTALLY projected
surface.

A critical failure surface searching method, using a
random
technique for generating CIRCULAR surfaces has been
specified.

400 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 20 points equally
spaced
along the ground surface between x = 245.0 ft
and x = 265.0 ft

Each surface terminates between x = 130.0 ft
and x = 160.0 ft

Unless further limitations were imposed, the minimum
elevation
at which a surface extends is y = 4900.0 ft

7.0 ft line segments define each trial failure
surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be
inclined
within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := -5.0 degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 17 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	258.68	4925.00
2	251.72	4924.34
3	244.72	4924.06
4	237.72	4924.16
5	230.74	4924.64
6	223.79	4925.50
7	216.90	4926.73
8	210.09	4928.34
9	203.37	4930.31
10	196.77	4932.64
11	190.31	4935.33
12	184.00	4938.37
13	177.87	4941.74
14	171.93	4945.44
15	166.19	4949.46
16	160.69	4953.78
17	159.30	4955.00

**** Simplified BISHOP FOS = 1.293 ****

The following is a summary of the TEN most critical surfaces

Problem Description : Max Section Seismic

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.293	243.05	5053.08	129.03	258.68	159.30	4.586E+06
2.	1.309	235.28	5046.65	122.56	250.26	153.98	5.558E+06
3.	1.316	231.19	5074.54	149.89	248.16		

```
140.87  1.071E+07
           4.   1.322    232.54  5071.34   147.54   251.32
141.91  1.061E+07
           5.   1.330    229.92  5058.18   134.31   249.21
144.00  8.968E+06
           6.   1.336    226.66  5068.47   143.96   247.11
138.13  1.200E+07
           7.   1.341    239.08  5040.58   116.89   256.58
159.43  4.691E+06
           8.   1.347    227.21  5021.92    98.00   247.11
155.72  4.769E+06
           9.   1.349    233.14  5081.17   157.62   254.47
138.77  1.316E+07
          10.   1.355    236.29  5074.25   151.25   260.79
143.33  1.073E+07


                                * * *  END OF FILE  * * *
```