



Proposed Prairie Creek Mine Access Road

Response to Technical Review Undertakings

Response to the undertakings outlined from

June 13 to 16, 2016 Technical Review

August 17, 2016

Prepared For:

Canadian Zinc Corporation

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DOCUMENT INFORMATION

Project Number:	16GP0041 (originally 14GP-0128, 15GP0091)
File Number:	
Filename:	16GP0041 Undertaking Response June Technical Session.docx
Document Revision:	4

REVISION HISTORY

Rev.#	Date of Issue	Reviewed By	Approved By	Description
1	June 30, 2016	DH		Draft
2	Aug 11, 2016	EK	DH	Final Undertaking 20,22,25,26,27,29
3	Aug 17,2016	EK	DH	Final Undertaking 19,23,24
4	Aug 18, 2016	EK	DH	Final Undertaking 19,23,24 revised



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1 BACKGROUND

Canadian Zinc Corporation (CZN) has applied to build an “all season” access road connecting the Prairie Creek Mine to Highway 7. As part of the environmental assessment (EA) process, Allnorth completed an evaluation and submitted a report titled “Proposed Prairie Creek Mine Access Road” on February 27, 2015. Following comments from the Mackenzie Valley Environmental Impact Review Board (MVEIRB) on April 23, 2015, Allnorth submitted a supplementary report in September, 2015.

A Technical Session was completed in Yellowknife, Northwest Territories from June 13 to 16, 2016 involving various government agencies supported by their designated consultants and Canadian Zinc supported by their consultants. The session produced a number of “undertakings” to be followed up by Canadian Zinc.

This document provides Allnorth’s responses to some of those undertakings on behalf of Canadian Zinc.

2 UNDERTAKING RESPONSE

2.1 Undertaking # 19

CanZinc will calculate missing curvature data for section KP34-39 and provide this information.

2.1.1 Response:

A preliminary design was completed for section km 34+800 to 39+000. As per the request, curvature data is now identified on the plan view and is located in Appendix A.

2.2 Undertaking #23 and #24

Undertaking 23 and 24 are considered interrelated and therefore a single response is provided.

Undertaking #23

CanZinc will clarify: i) the exact footprint (in square meters) of the channel that is being lost and potentially degraded by the road in the area of the Sundog Creek realignment. Suggested addition from Parks Canada: ii) and the detailed methodology that was used to calculate these data. Description of the methodology should include aerial photography showing areas that were deemed to identify: i) areas lost and potentially degraded, ii) floodplain habitat, and iii) vegetated and non-vegetated areas within the floodplain of Sundog alignment.

Undertaking #24

CanZinc will provide a more detailed version of Table 2 in Allnorth memo (PR# 178) that shows the individual road segments and their contributions to the total estimated area occupying the active floodplain, or within the channel, to better understand and assess habitat lost due to encroachments.



2.2.1 Response

The lower Sundog Creek KP 33 TO 38.1 Memorandum dated March 18, 2016, Page 2, last paragraph, provided the definitions of terms which provided the basis for calculating the road footprint within the floodplain. Below are the definitions re-stated with additional description, including a field picture (Figure 1) for added visual clarity. It is important to note that this exercise is to identify those portions of the road occupying different components of the floodplain and is not directly related to fish habitat values. The latter are being evaluated concurrently by Hatfield Consultants (John Wilcockson).

"Active floodplain" is considered to be portions of the floodplain which experience surface water flows during some part of the year over successive years. The active floodplain is typically distinguishable in pictures as exposed, whitish/grey gravels with no or sparse vegetation growth. The limit of the active floodplain is likely determined by creek flows with a return period of approximately 1 in 20 years. Within this active floodplain at a lower elevation is the normal HWM. For the creek realignment, Tetra Tech completed hydraulic modelling of 1 in 2 year return period flows. These results have been used to approximate the normal HWM. Tetra Tech also determined that the threshold at which water would currently first spill into the proposed creek realignment channel is about a 10-year flood. The active floodplain above the normal HWM may be characterized by exposed gravels more grey in colour, and some vegetation.

"Channel thalweg" is the portion of main channel that contains the deepest water flows occurring over longer periods of the year.

"Active braided or secondary channel" is a portion of the floodplain which experiences surface water flows occasionally during peak flow periods, such as unusual summer storms. Like the active floodplain, there may be portions of active braided channels above and below the normal HWM, although the majority is expected to be above. Active braided channels are typically distinguishable in pictures as fragmented, narrow channels with noticeable vegetated portions intermixed with noticeable narrow, scoured channels.

"Old or historic floodplain" would include portions of the floodplain which have not experienced surface water flow for some time, 20 years or more, and are considered quasi-stable. The historic floodplain is typically distinguishable in pictures as being darker in colour, noticeably vegetated with grasses, shrubs, and small trees.

"Outside floodplain" is floodplain that was active many years ago, and is now elevated above the 100 year high water level and can be significantly treed with spruce, jack pine, willows, and birch.



Figure 1: Visual example of the various components of the floodplain and how it was classified (downstream view of Sundog Creek near KP 33).

2.2.2 Methodology of the Analysis

Two sections of road were previously identified to potentially occupy the active or historic floodplain of Sundog Creek. These sections are from KP 33.2 to 34.2 and KP 34.8 to 39.0. A two-step approach was taken to determine the footprint of the road within these sections:

- (1) Potential road prism occupying the floodplain. Calculation of the potential footprint area occupying the floodplain. Preliminary road designs including cross sections have been completed for sections KP 33.2 to 34.2 and 34.8 to 39.0 and are found in Appendix A. A number of refined alignment adjustments have been completed to reduce or eliminate footprint of road prism within the floodplain. The preliminary design indicates that the road from 33.2 to 34.2 can be constructed outside the Q100 HWM.



Tetra Tech EBA provided Q100 HWM and Q2 HWM flow projections to assist in calculating road footprint occupying the floodplain. Visual depiction of these flows, in the area of the proposed creek realignment, was shown in Tetra Tech's letter dated March 17, 2016 (Figures 6 and 7). From KP 33.6 to 38.0, Q100 HWM was provided at 200 m intervals which were then calculated at 30 m intervals and applied to road design cross sections. For short section above 33.6 to 33.2, HWM was calculated based on the 33.6 value with an average stream gradient increase of 1.5% across the section. Each cross section of the road design identifies the road prism and the defined Q100 HWM. If the footprint of the road prism occupied HWM, a width is measured and an area is calculated based on the 30 m interval. A detail breakdown of this calculation is located in Appendix B. The assessed footprint was also transferred onto plan view drawings to visually demonstrate which portions of the road footprint occupy the Q100 floodplain. The Q2 HWM flow projections were provided to Allnorth as a shape file and were overlaid on the plan view drawings to provide a visual depiction of road footprint occupying Q2 areas. The plan view drawings are located in Appendix C. In some locations, the Q2 projections overlap outer floodplain areas upslope, as clearly indicated by the LiDAR imagery. This was attributed to projection error, and the Q2 area was adjusted using the imagery.

- (2) **Classification of the floodplain.** Assessing the type of floodplain the footprint occupies. Floodplain types were defined using Q2 flows (HWM) and visual assessment of field, aerial, and ortho photos in relation to the floodplain definitions outlined in Section 2.1.1 above. The visual assessment was also corroborated by field observations completed July 13 to 14, 2016 by John Wilcockson, (Hatfield Consultants). A detail breakdown, section by section, is located in Appendix B.
- Floodplain types (as defined in (1) above) within the Q100 area were calculated. The Q2 area was calculated based on polygon shapes as defined in the plan views found in Appendix C. Table 3 below is a summary of those results.

Table 1. Summary road footprint occupying Q2 and Q100 floodplain.

Floodplain Classification	Q2 Area (m²)	Q100 Area (m²)
Active	8,048	12,030
Active Braided / Secondary	3,106	6,360
Channel Thalweg	2,575	2,880
Old Historic	0	3,390
Totals	13,729	24,660
Note: Q2 Area is included in Q100 area		



3 PIKA ALIGNMENT ADJUSTMENTS

Surveys by Tetra Tech EBA noted the presence of pikas in Sundog Creek talus. In response, portions of the alignment have been adjusted to shift the road footprint away from pika habitat, as directed by Tetra Tech EBA. Consequently, this shift off the edge of the talus slopes places a greater portion of the road prism within the floodplain. The majority of the additional footprint within the floodplain occurs in portions classified as seasonal "secondary" and "old historic". A balance was made between avoiding pika habitat and minimizing the footprint of the road prism on active portions of the floodplain. Portions of the alignment were shifted up to 15 m away from the toe of defined talus slopes. These adjustments can be viewed in the Plan view of the road designs located in Appendix A.

We trust this report satisfies your requirements at this time and thank you for the opportunity to work with you on the project. If you have questions or concerns do not hesitate to contact our office.

Yours truly,

ALLNORTH CONSULTANTS LIMITED

Prepared By:

Ernest Kragt

Project Coordinator

Reviewed By:

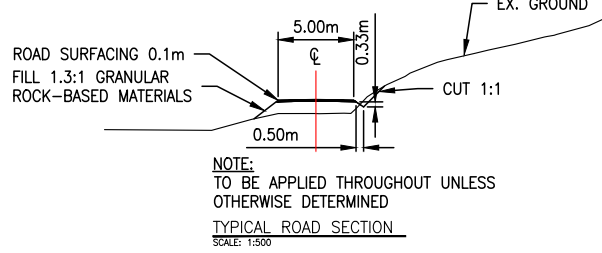
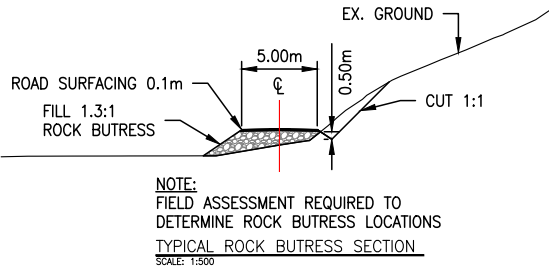
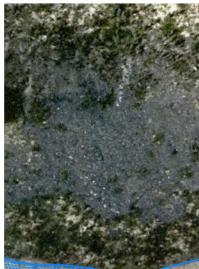
Bradley Major, P.Eng.

Division Manager



Appendix A Updated Road Designs

- **33+200 to 34+200**
- **34+800 to 39+000**



VOLUME SUMMARY m3

TOTAL		
33+200	Road Surfacing	515.5
TO	Cut	110
34+200	Fill (factored 1.15)	12,500
	Waste	150.0

KEY PLAN



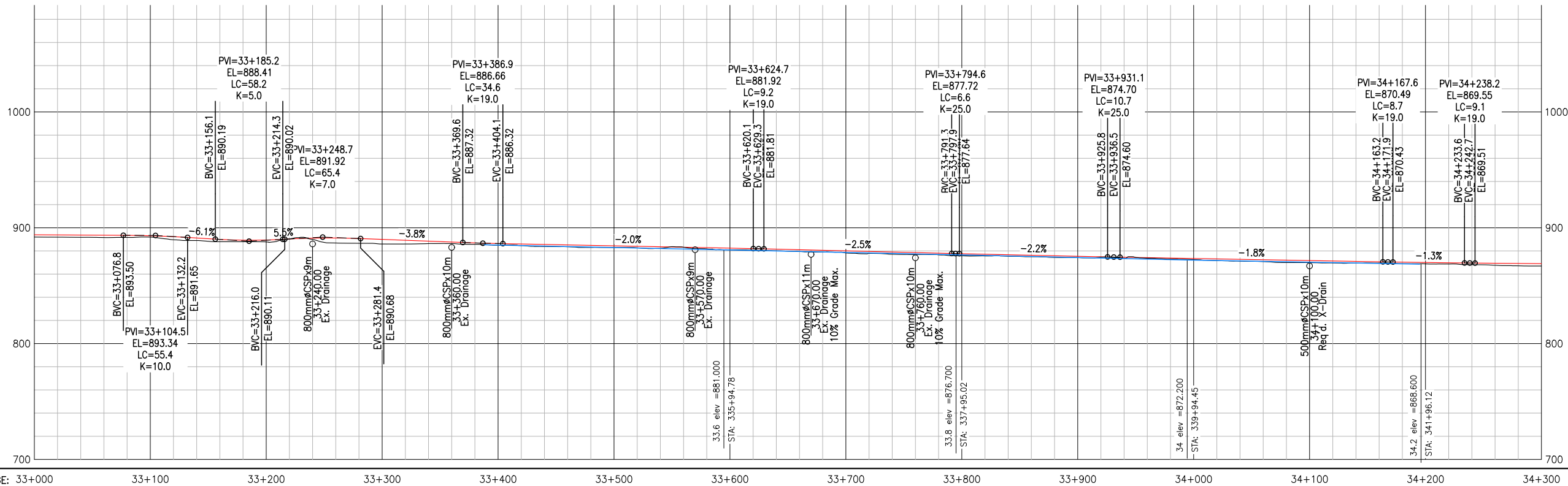
LEGEND

- PROPOSED DESIGN CL
- PROPOSED ROAD EDGES
- PROPOSED CUT/FILL LINES
- EX. ROAD EDGES
- WATERCOURSES

NOTES:
SURFACE USED IN DESIGN WAS
GENERATED USING CONTOURS PROVIDED
BY OTHERS. POINT DATA OR LIDAR DATA
WAS NOT PROVIDED.

SOILS:

FIELD STATIONS:



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1	2016/07/19	REVISED ALIGNMENT	TMM	EK



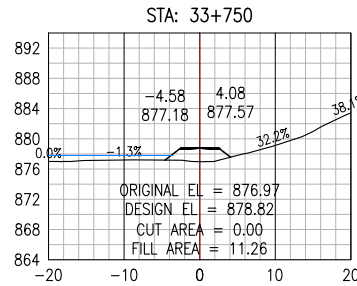
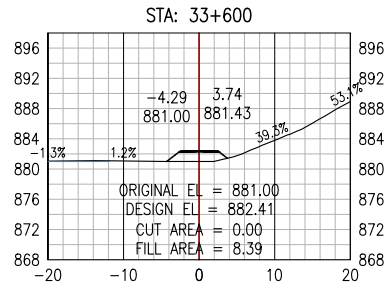
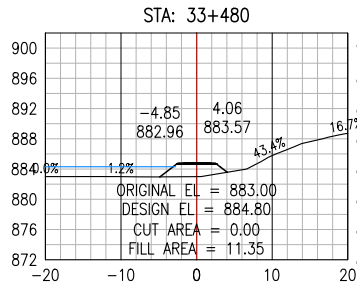
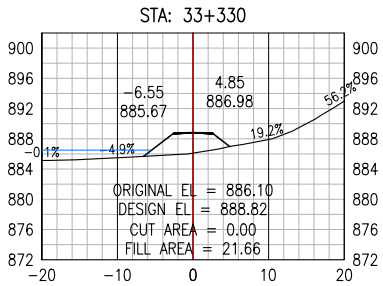
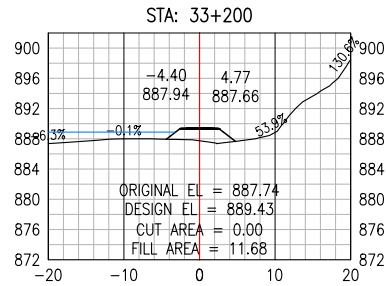
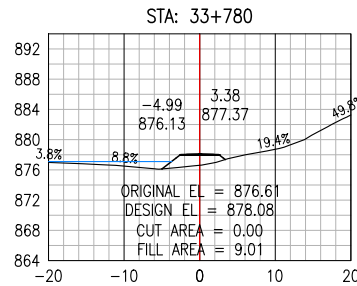
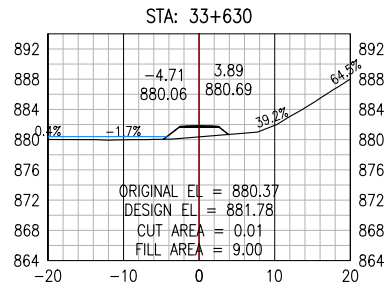
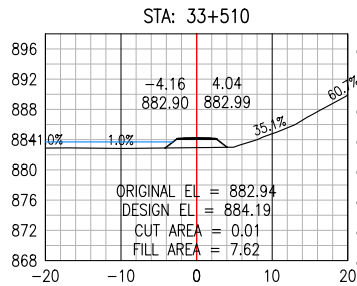
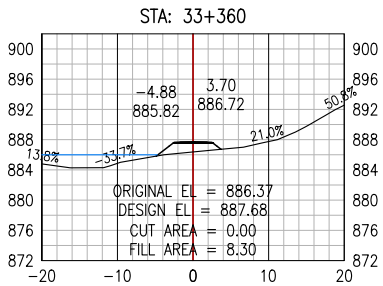
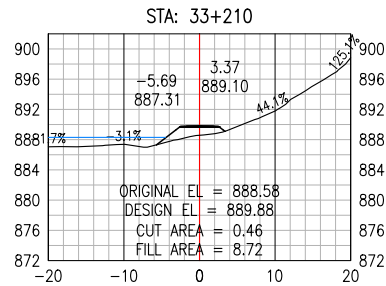
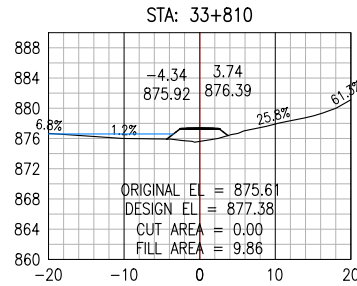
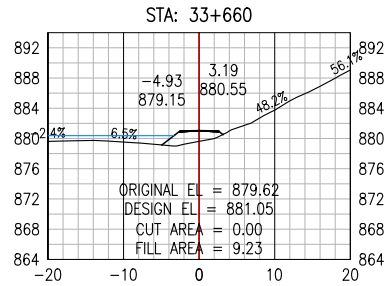
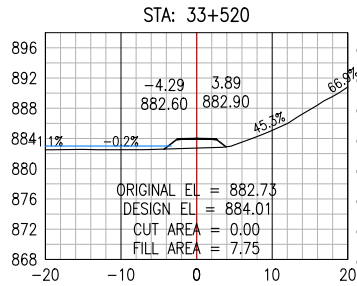
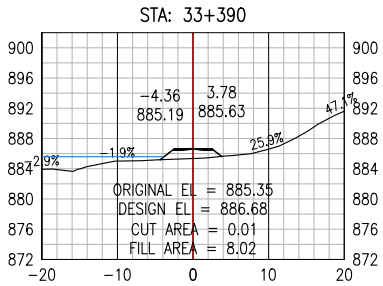
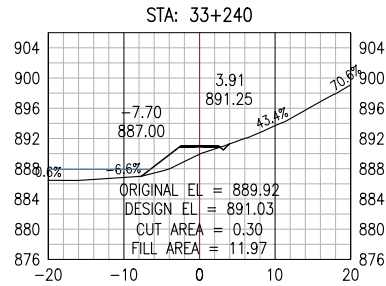
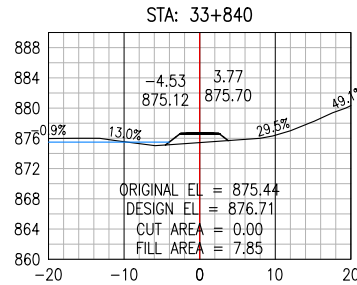
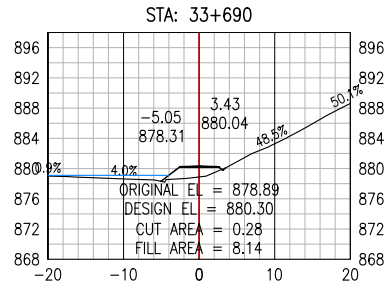
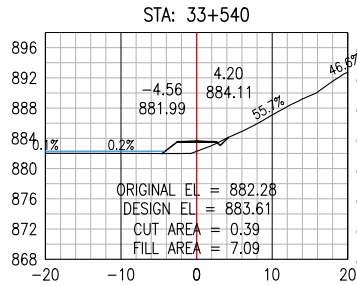
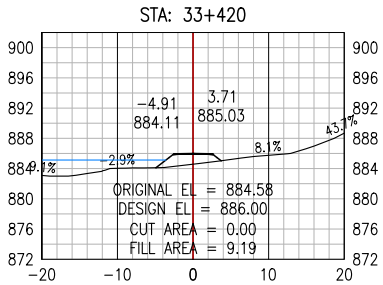
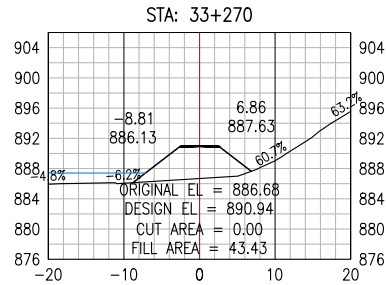
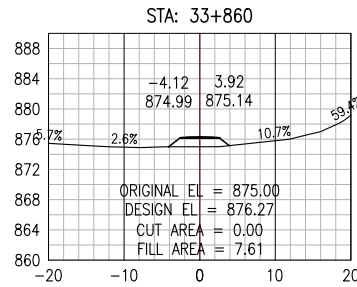
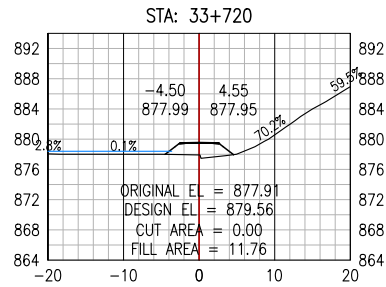
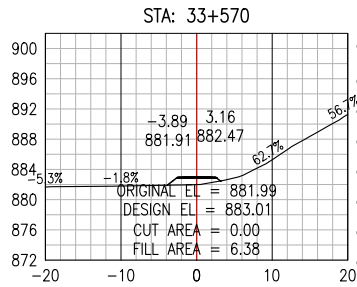
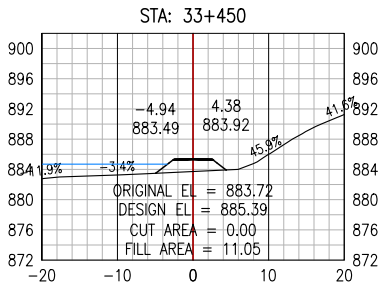
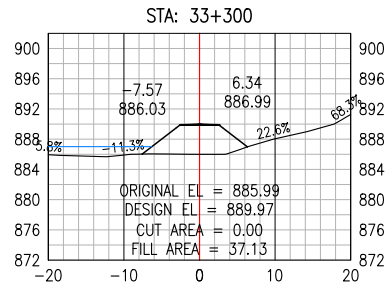
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**PRAIRIE CREEK MINE
GEOMETRIC DESIGN
km 33+200 to km 34+200**

TITLE:
**PLAN AND PROFILE
DRAWINGS
km 33+200 to km 34+200**

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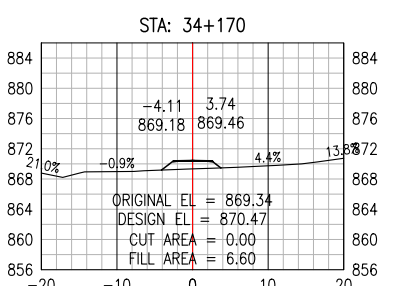
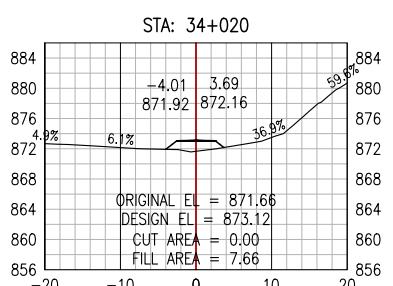
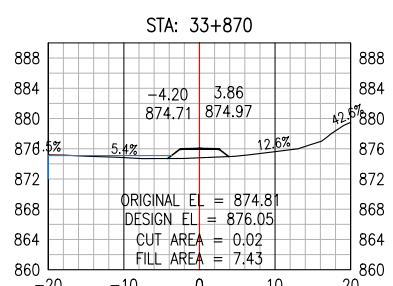
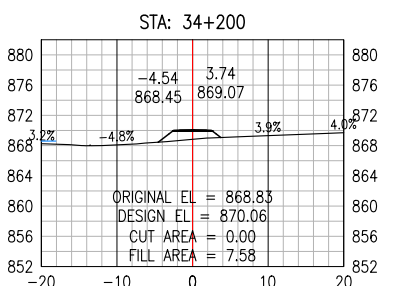
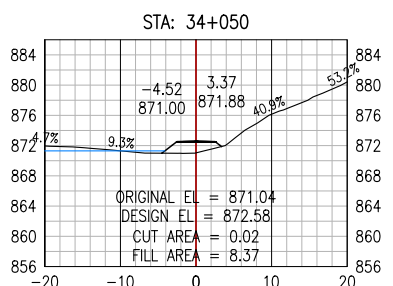
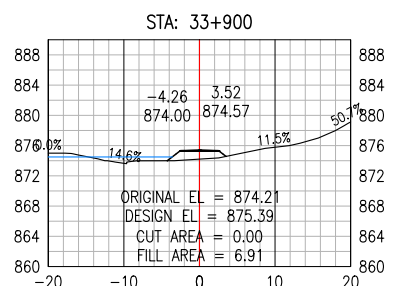
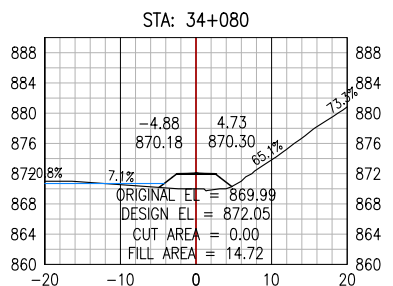
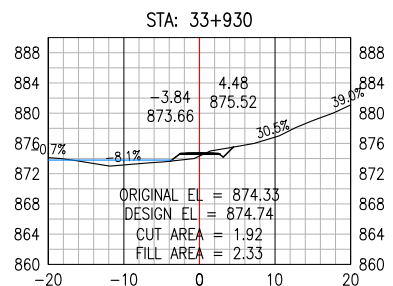
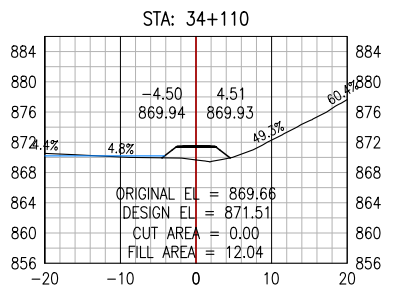
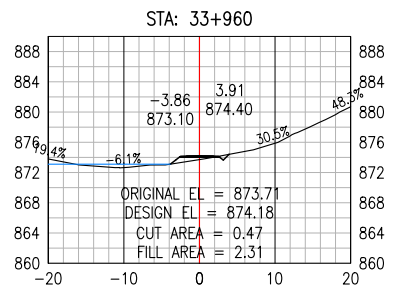
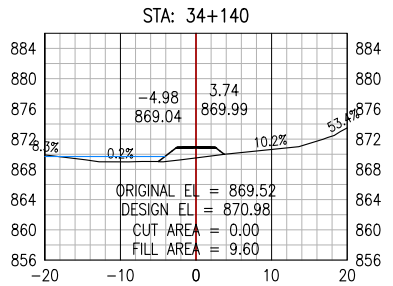
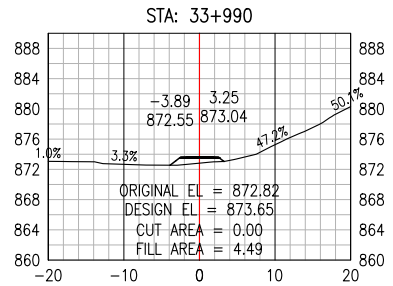
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**PRAIRIE CREEK MINE
GEOMETRIC DESIGN
km 33+200 to km 34+200**

TITLE:

**CROSS SECTION
DRAWINGS
PAGE 1 of 2**

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**PRAIRIE CREEK MINE
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km 33+200 to km 34+200**

TITLE:
**CROSS SECTION
DRAWINGS
PAGE 2 of 2**

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PRAIRIE CREEK MINE GEOMETRIC DESIGN km 34+800 to km 39+000

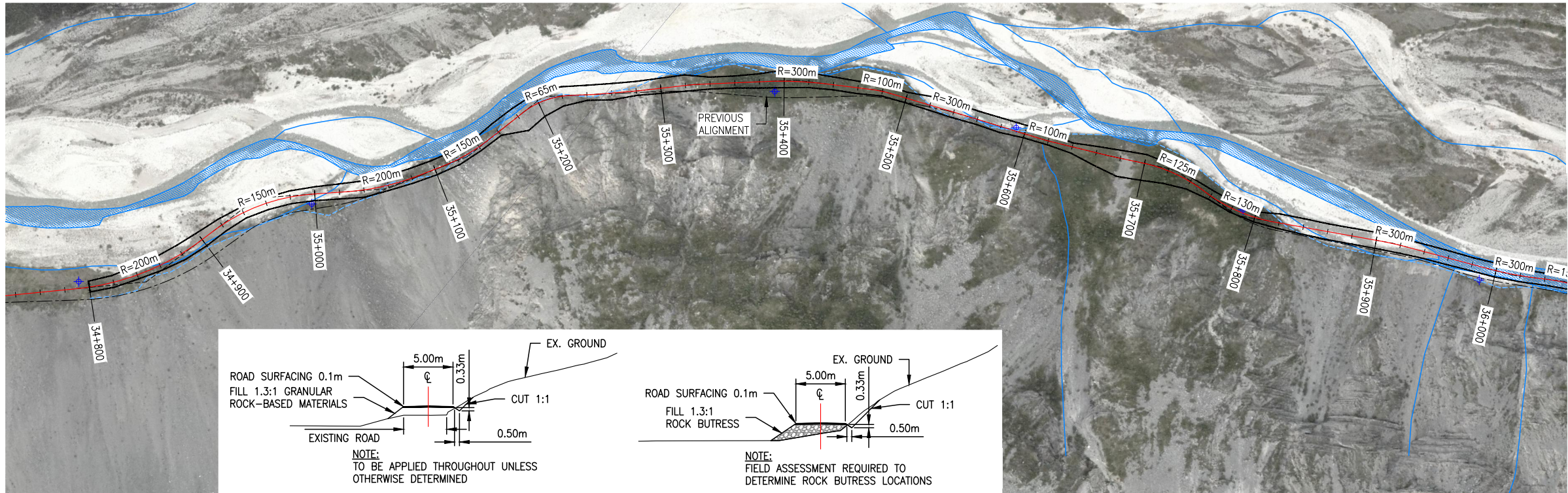
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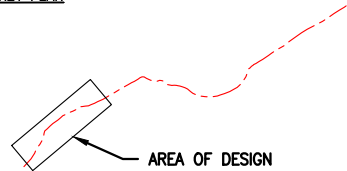


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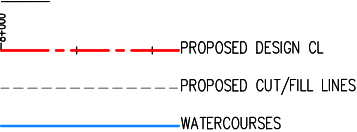
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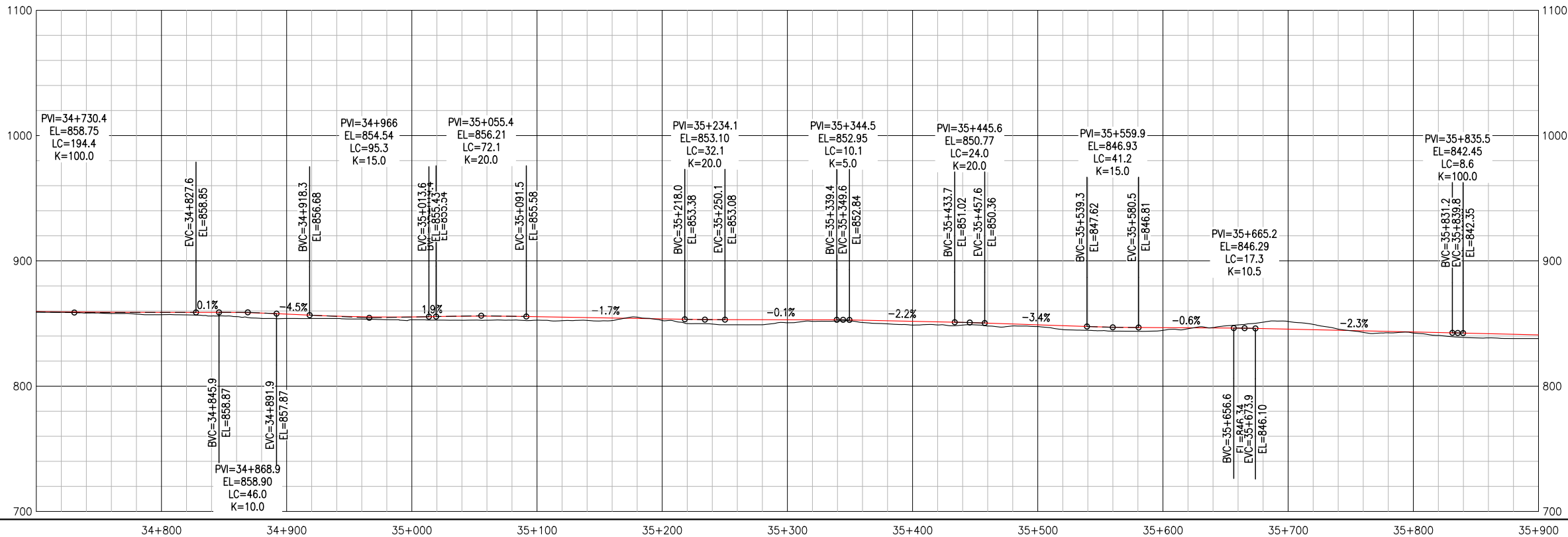
KEY PLAN



LEGEND



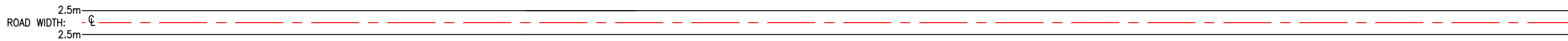
SOILS:
FIELD STATIONS:



CHAINAGE: 34+800 34+900 35+000 35+100 35+200 35+300 35+400 35+500 35+600 35+700 35+800 35+900

MASS MOVEMENT: 1 2 3 4 5 6

EARTHWORKS:	1	2	3	4	5	6
Road Surfacing	103.1	103.1	103.1	103.1	103.1	103.1
Cut	2.29	375.4	449.77	5.83	5386.28	
Fill	4997.51	4473.24	5003.32	4899.53	508.83	
Borrow Pit	0.0	10000.00	7372.0	5000.00	0.0	
Dump Site	0.0	0.0	0.0	0.0	0.0	



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REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
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3	2016/07/09	REVISED ALIGNMENT	TMM	WBM
2	2016/06/15	DRAFTING EDITS	TMM	WBM
1	2016/02/25	HORIZONTAL REALIGNMENT	TMM	WBM
0	2014/12/03	ISSUED FOR REVIEW	TMM	WBM

CLIENT:



CLIENT NO:		DRWN: TMM	DATE: 16/02/25
PROJECT NO:	14-GP-0128	DSGN: TMM	DATE: 16/02/25
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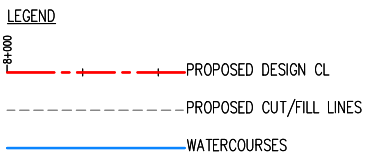
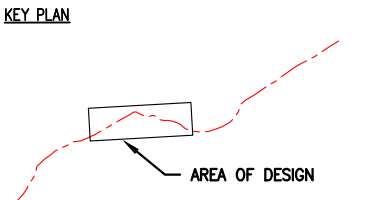
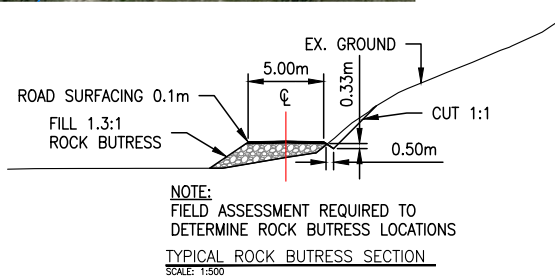
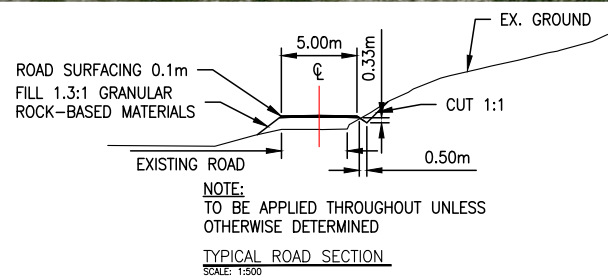
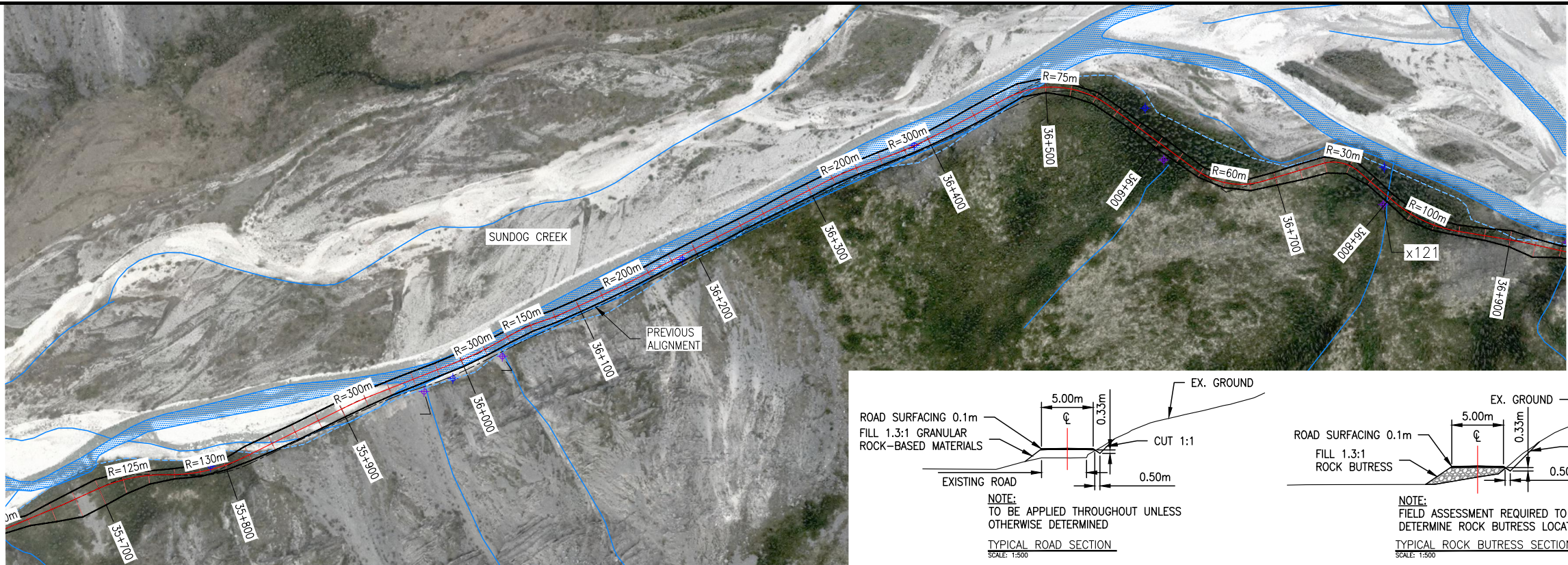
PROJECT:

**PRAIRIE CREEK MINE
GEOMETRIC DESIGN
km 34+800 to km 39+000**

TITLE:
**PLAN AND PROFILE
DRAWINGS
km 34+800 to km 35+800**

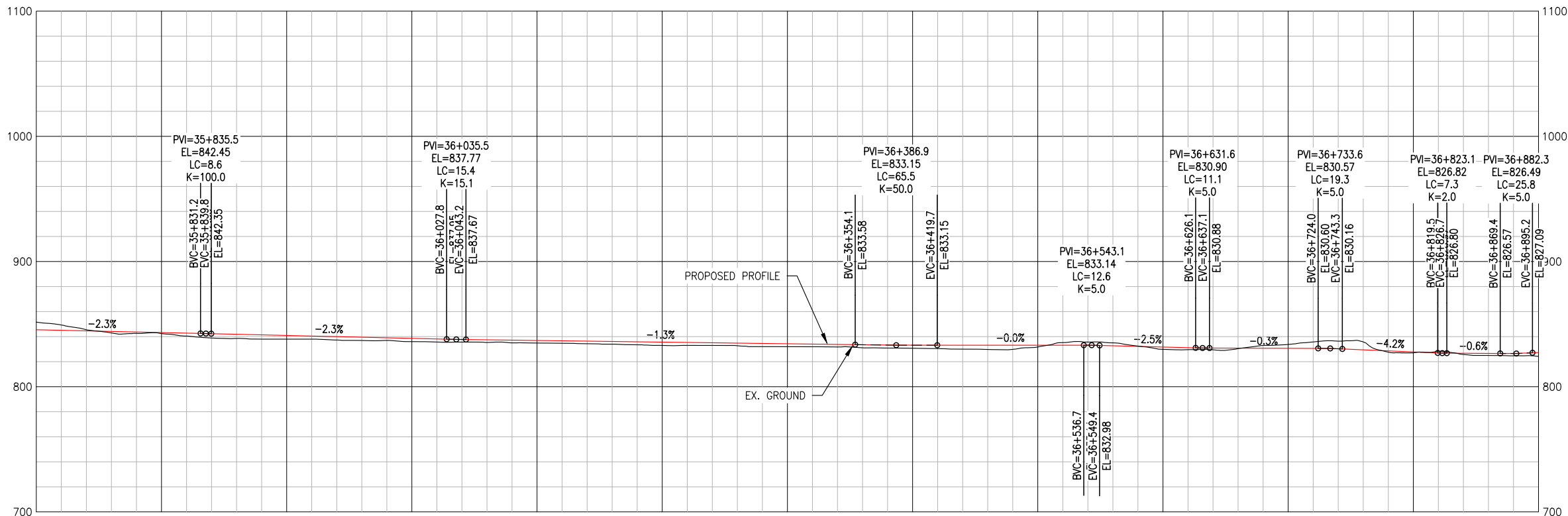
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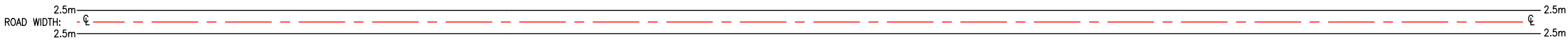
FIELD STATIONS:



CHAINAGE: 35+800 35+900 36+000 36+100 36+200 36+300 36+400 36+500 36+600 36+700 36+800 36+900

MASS MOVEMENT: 7 8 9 10 11 12 13 14

EARTHWORKS:	7	8	9	10	11	12	13	14
Road Surfacing								
Cut		103.1		103.1		103.1	103.1	
Fill		5355.26		3786.45		1365.28	4427.16	
Borrow Pit		7266.4		3577.52		3159.75	845.19	
Dump Site		0.0		6000.00		0.0	0.0	



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REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
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3	2016/07/19	REVISED ALIGNMENT	TMM	WBM
2	2016/06/15	DRAFTING EDITS	TMM	WBM
1	2016/02/25	HORIZONTAL REALIGNMENT	TMM	WBM
0	2014/12/03	ISSUED FOR REVIEW	TMM	WBM



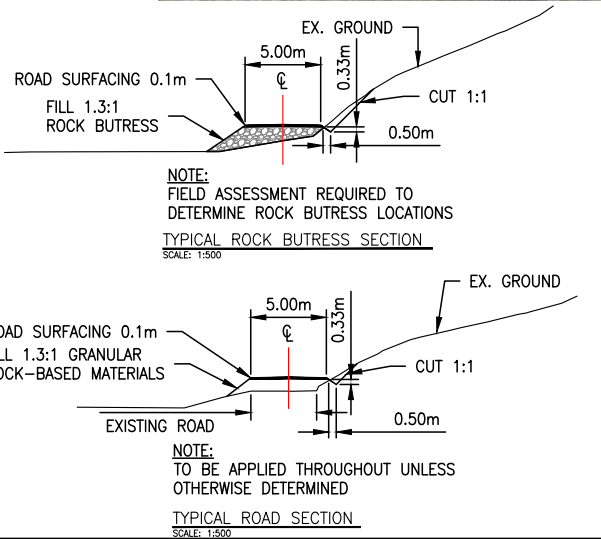
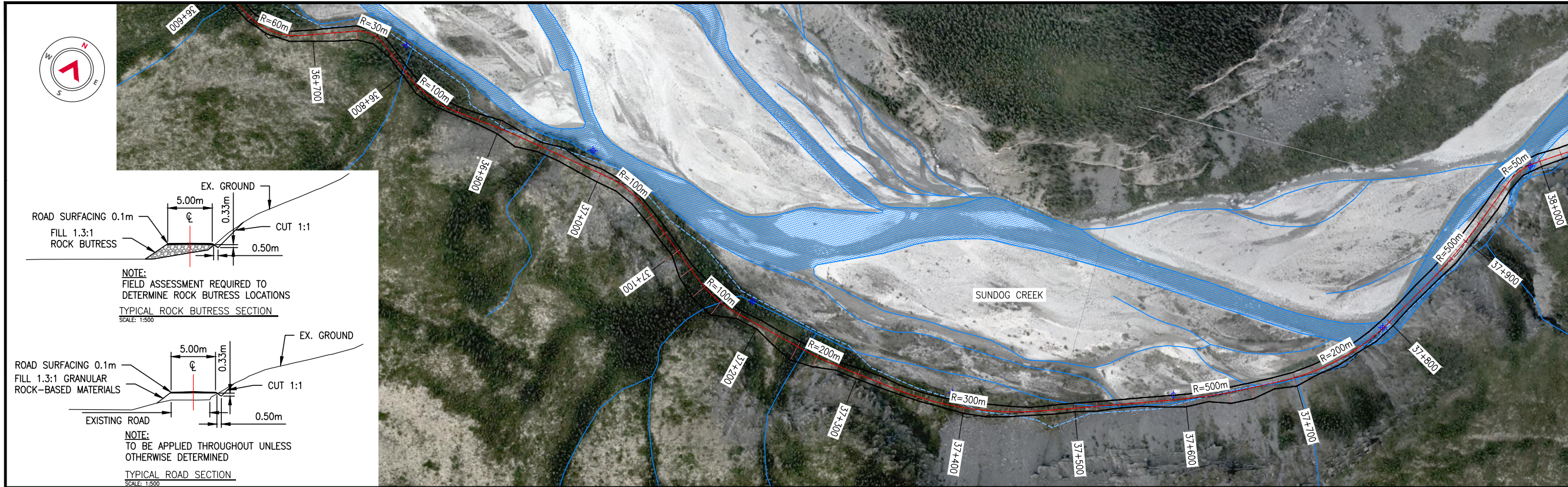
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PROJECT:

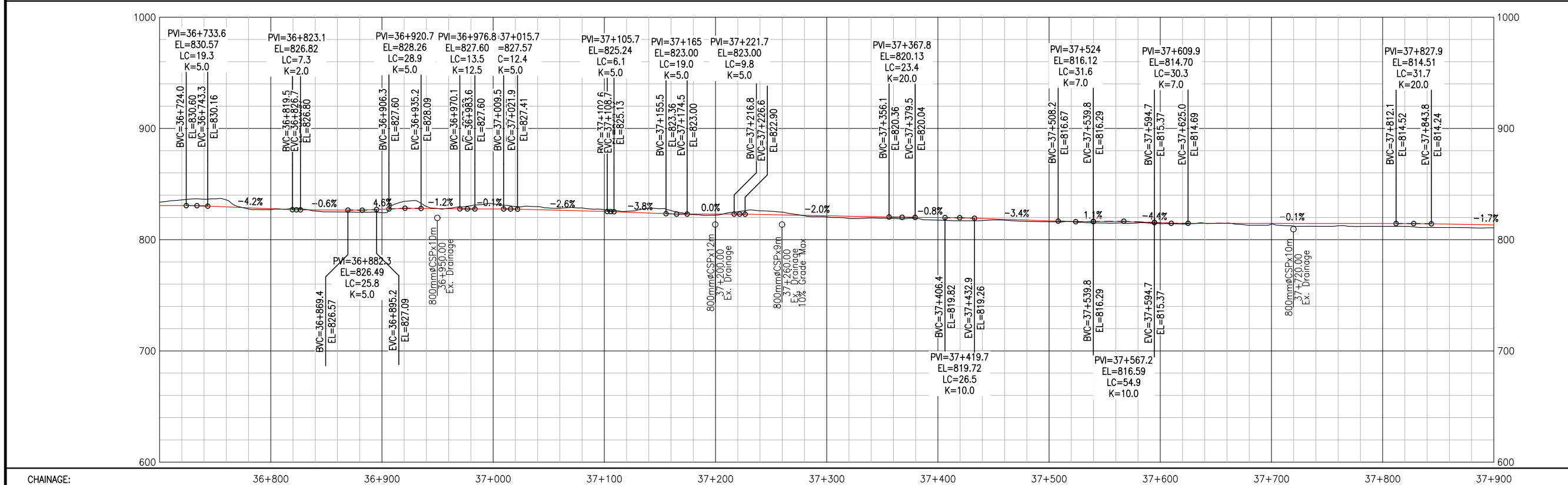
**PRAIRIE CREEK MINE
GEOMETRIC DESIGN
km 34+800 to km 39+000**

TITLE:
**PLAN AND PROFILE
DRAWING
km35+800 to km 36+800**

DWG NO:	14GP0128-040-1920-006	REV:	4
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SOILS:
FIELD STATIONS:



CHAINAGE:	36+800	36+900	37+000	37+100	37+200	37+300	37+400	37+500	37+600	37+700	37+800	37+900
MASS MOVEMENT:	14	15	16	17								
EARTHWORKS:												
Road Surfacing												
Cut		103.1			103.1			103.1		103.1		
Fill		3110.04			5935.04			55.49		476.08		
Borrow Pit		1434.4			108.44			2116.61		2601.1		
Dump Site		0.0			0.0			2655.7		0.0		
		0.0			3000.00			0.0		0.0		
ROAD WIDTH:	2.5m	2.5m	2.5m	2.5m	2.5m	2.5m	2.5m	2.5m	2.5m	2.5m	2.5m	2.5m

KEY PLAN

AREA OF DESIGN

LEGEND

PROPOSED DESIGN CL

PROPOSED CUT/FILL LINES

WATERCOURSES

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4	2016/08/16	REVISED ALIGNMENT	CC	WBM
3	2016/07/20	REVISED ALIGNMENT	TMM	WBM
2	2016/06/15	DRAFTING EDITS	TMM	WBM
1	2016/02/25	HORIZONTAL REALIGNMENT	TMM	WBM
0	2014/12/03	ISSUED FOR REVIEW	TMM	WBM
REV	YY/MM/DD	DESCRIPTION	DRWN	APVD

CLIENT:

CANADIAN ZINC CORPORATION

Allnorth

CLIENT NO:	DRWN:	TMM	DATE:	14/12/03	
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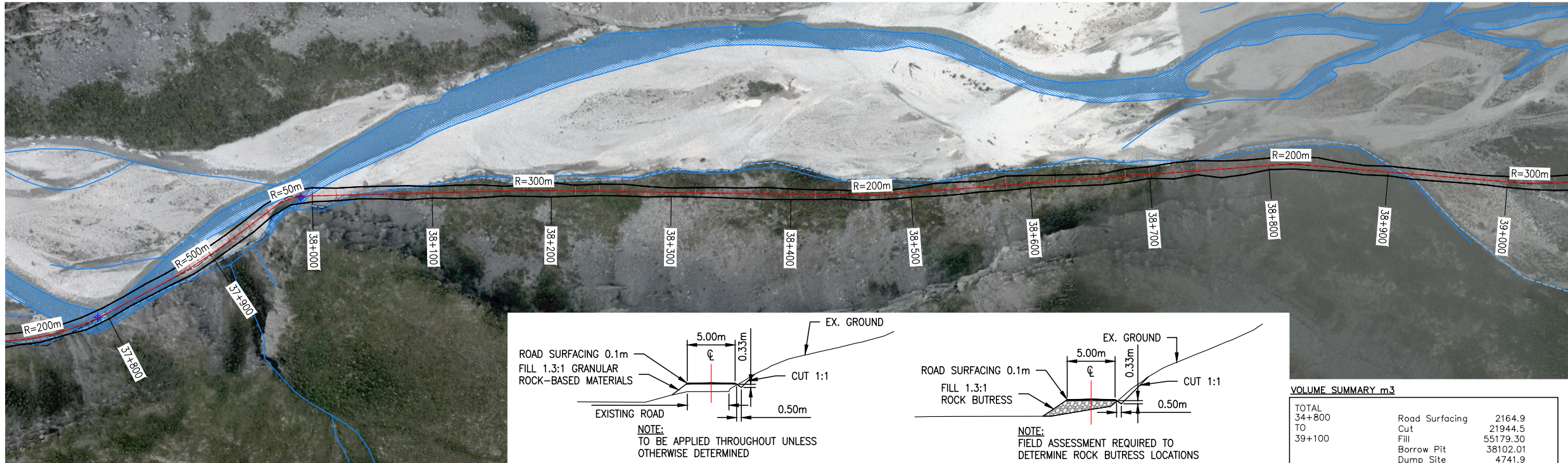
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**PRAIRIE CREEK MINE
GEOMETRIC DESIGN
km 34+800 to km 39+000**

TITLE:

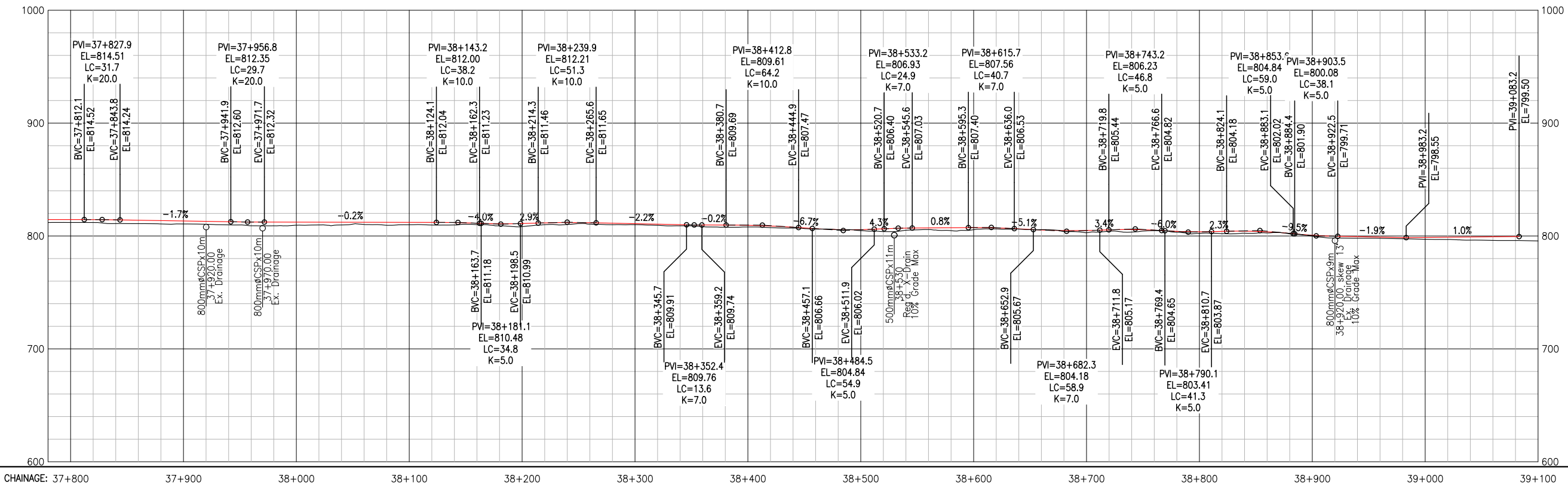
**PLAN AND PROFILE
DRAWING
km 36+800 to km 37+800**

DWG NO:	16GP0041-040-1920-007	REV:	4
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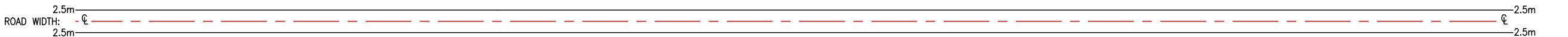


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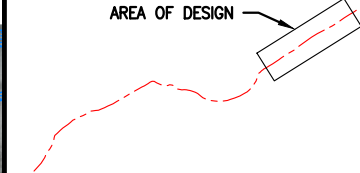
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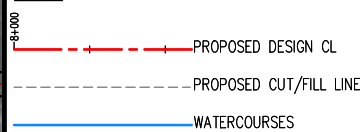
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EARTHWORKS:					
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Cut			69.05	69.05	416.53
Fill			3277.27	2250.88	1726.46
Borrow Pit			7500.00	0.0	0.0
Dump Site			0.0	0.0	0.0



KEY PLAN



LEGEND



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2	2016/06/15	DRAFTING EDITS	TMM	WBM
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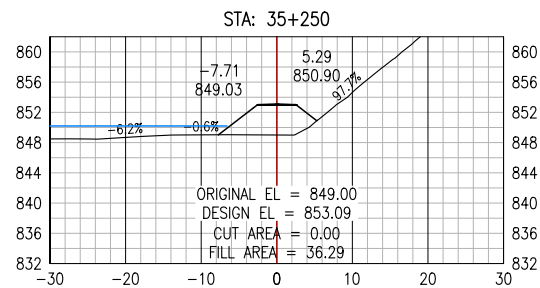
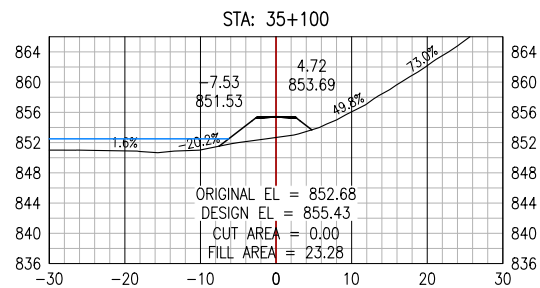
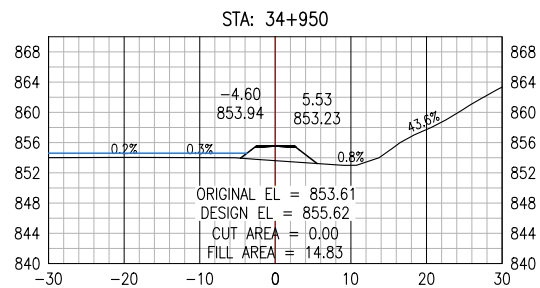
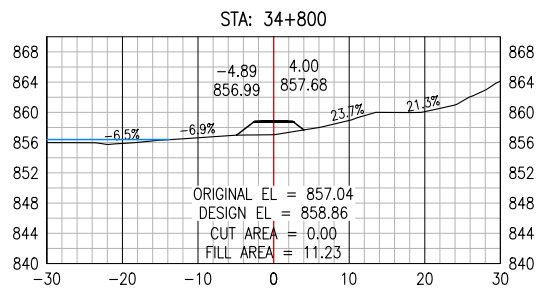
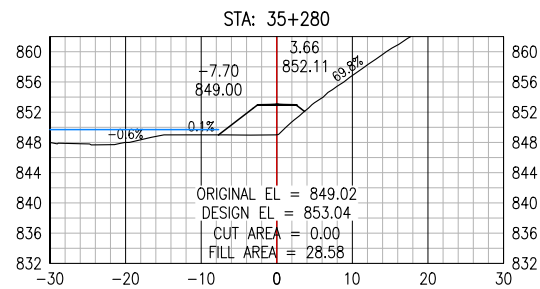
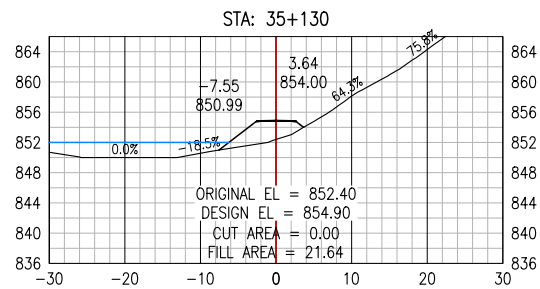
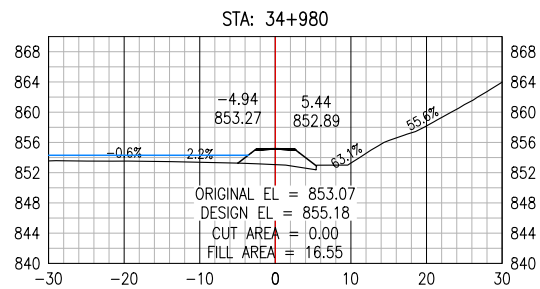
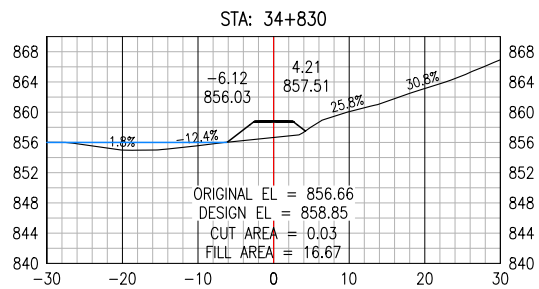
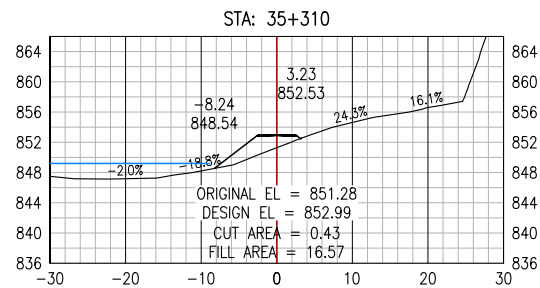
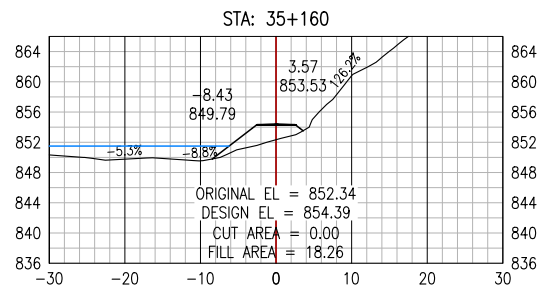
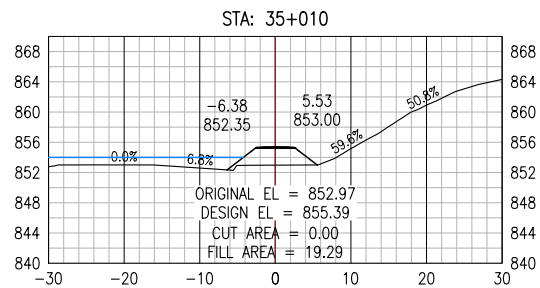
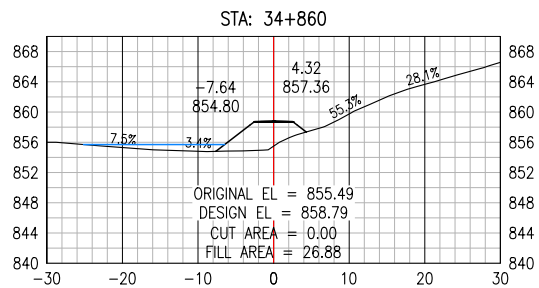
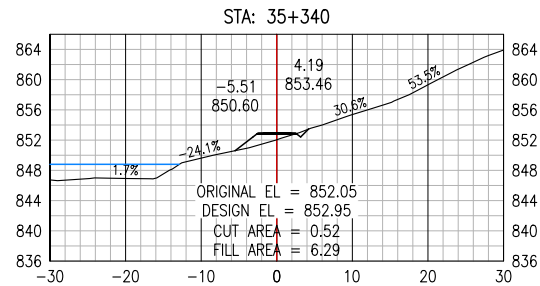
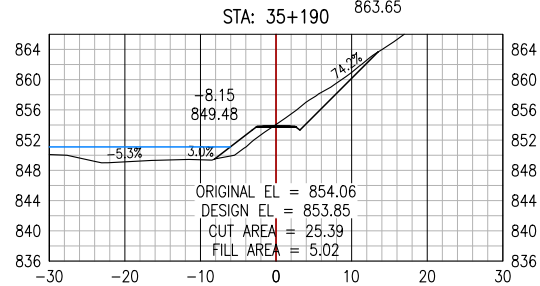
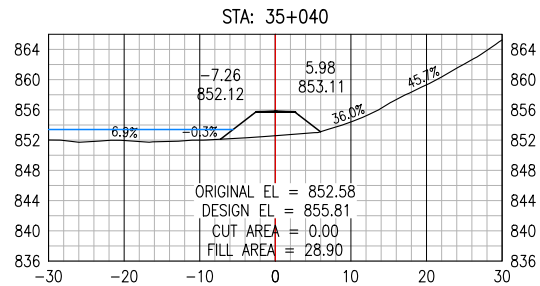
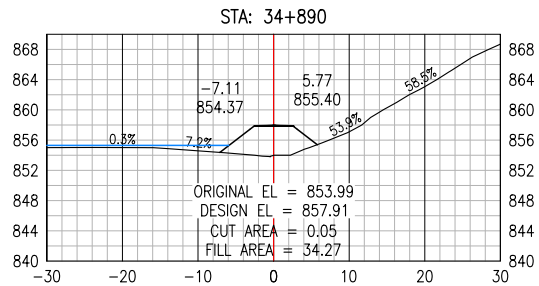
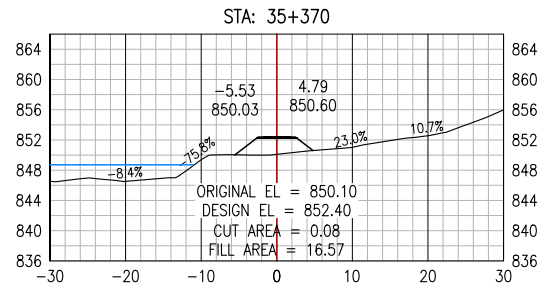
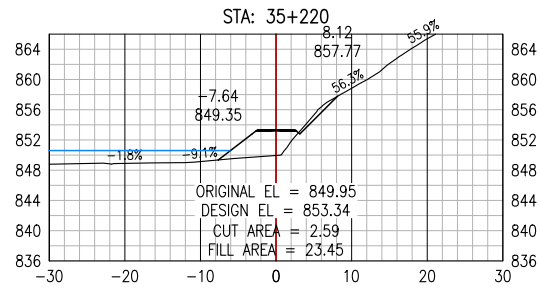
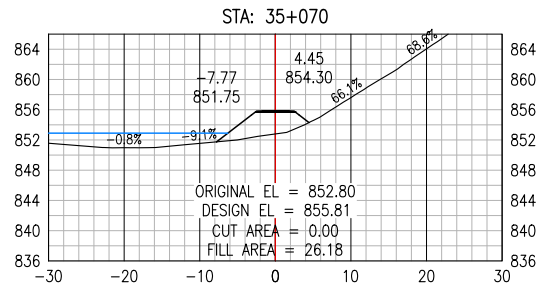
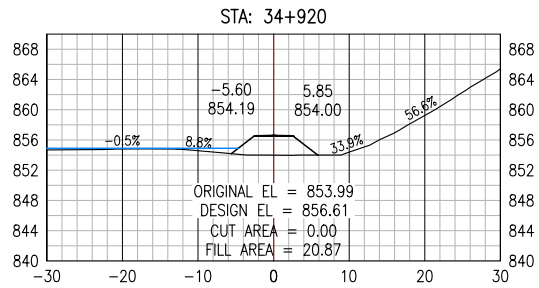
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PROJECT:					

PROJECT:

**PRAIRIE CREEK MINE
GEOMETRIC DESIGN
km 34+800 to km 39+000**

TITLE:
**PLAN AND PROFILE
DRAWING
km 37+800 to km 39+000**

DWG NO:	REV:
16GP0041-040-1920-008	4



LEGEND

— EXISTING GROUND

— Q100 HWM (EST.)

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CLIENT:



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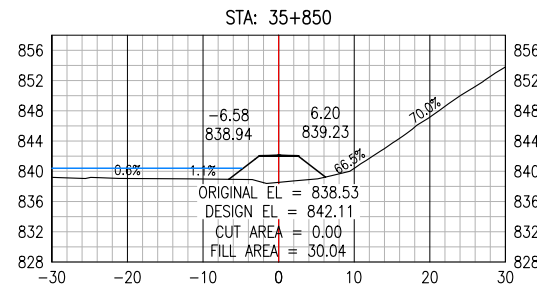
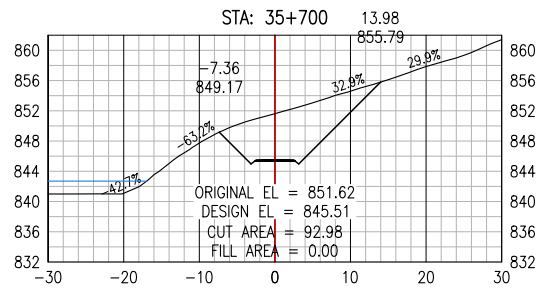
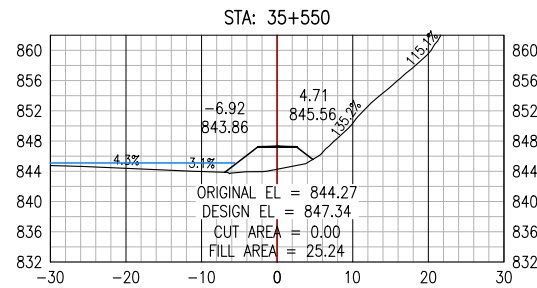
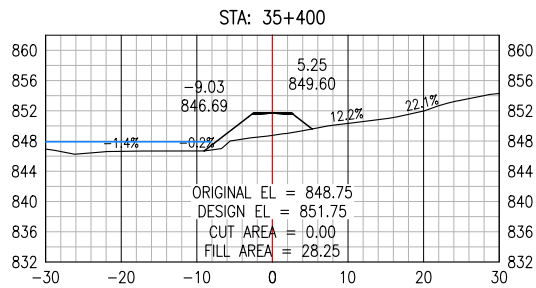
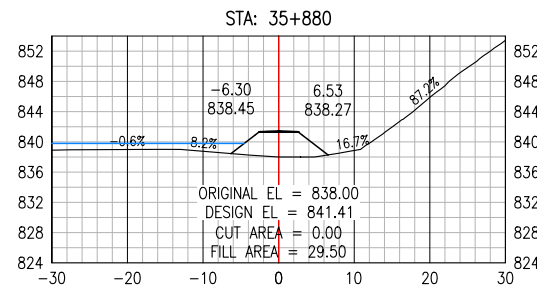
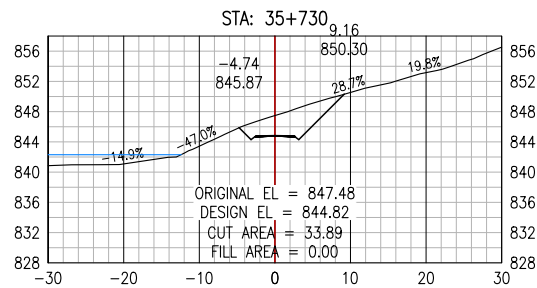
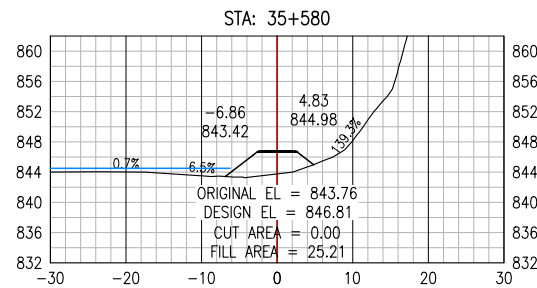
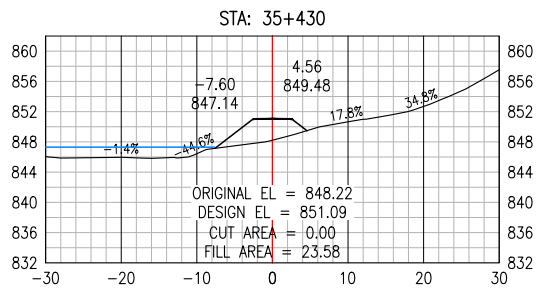
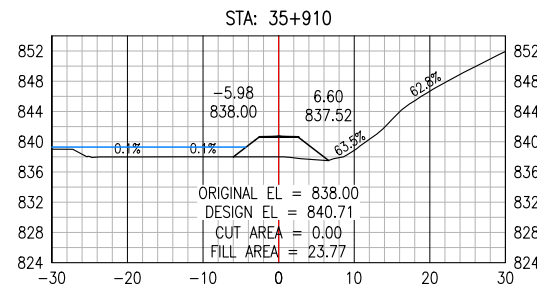
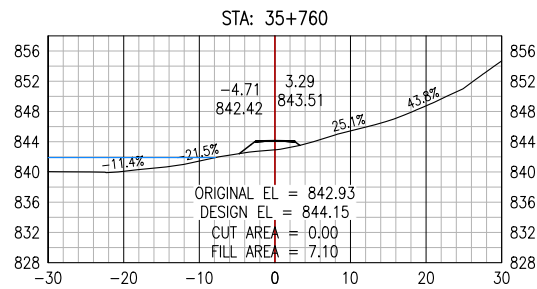
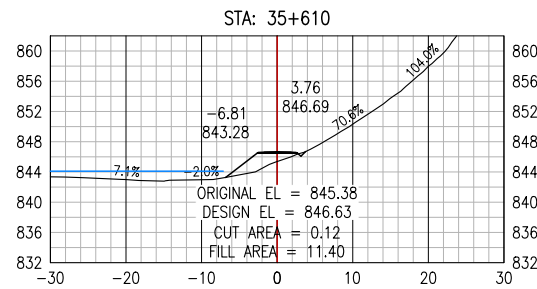
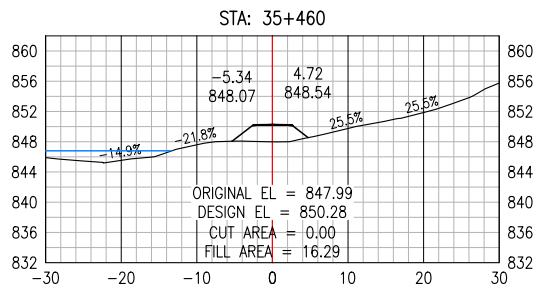
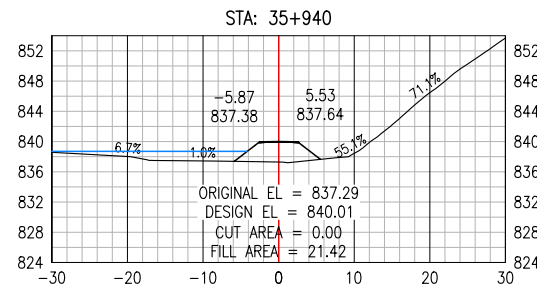
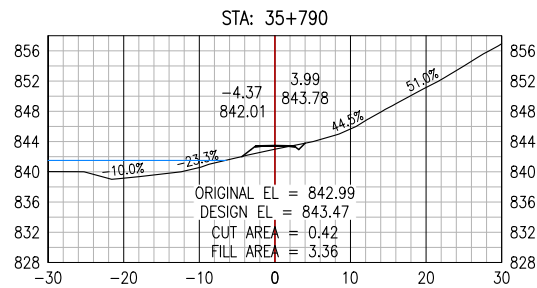
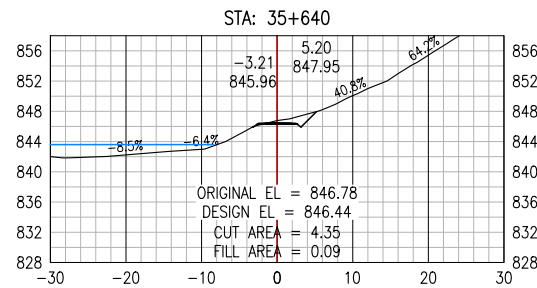
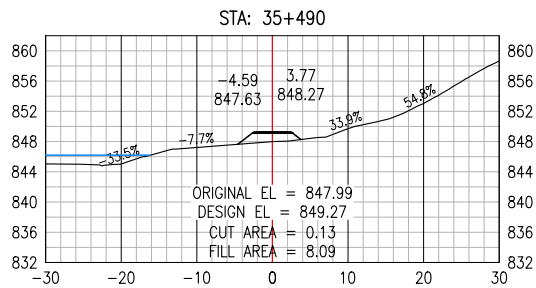
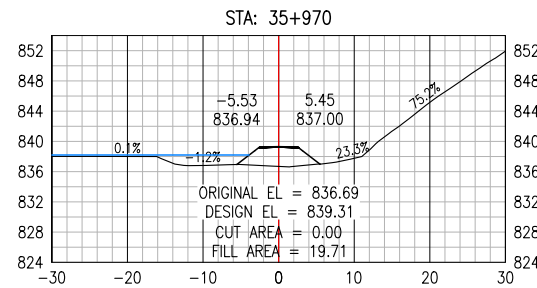
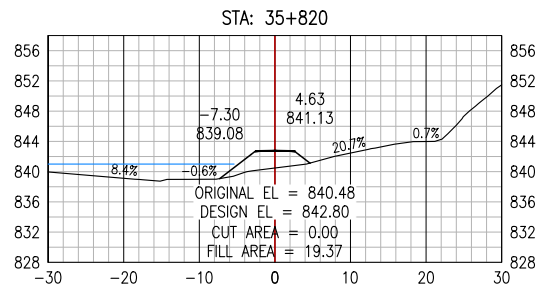
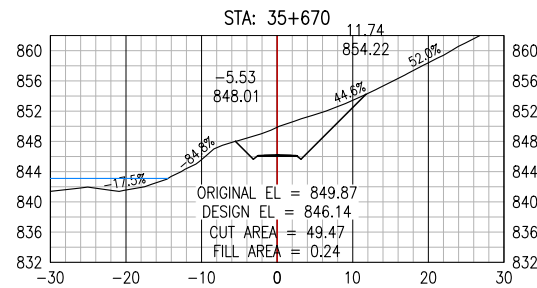
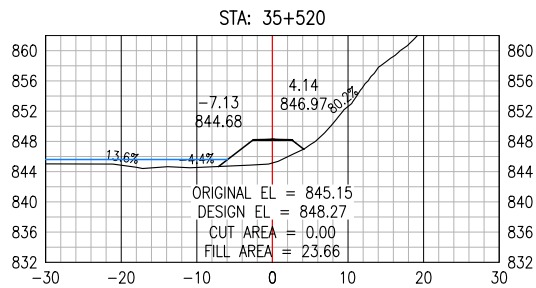
PROJECT:

**PRIARIE CREEK MINE
GEOMETRIC DESIGN
km 34+800 to km 39+000**

TITLE:

**CROSS SECTION
DRAWINGS
PAGE 1 of 8**

DWG NO:	16GP0041-040-1920-009	REV:	3
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LEGEND

— EXISTING GROUND
— Q100 HWM (EST.)

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CLIENT:



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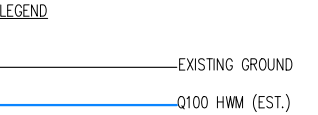
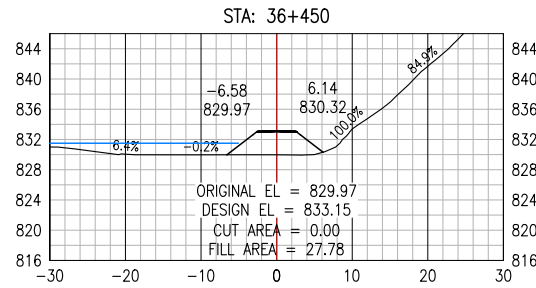
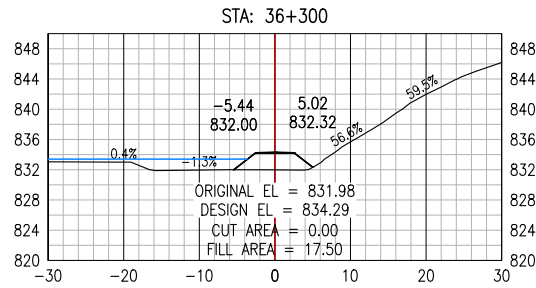
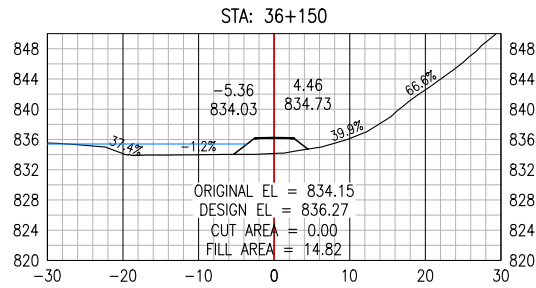
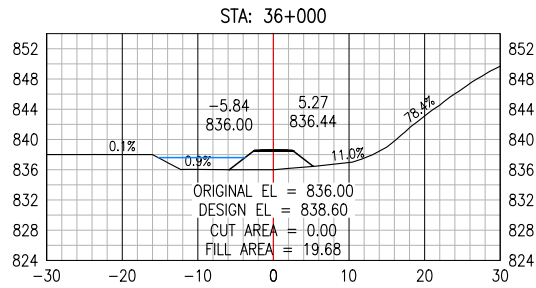
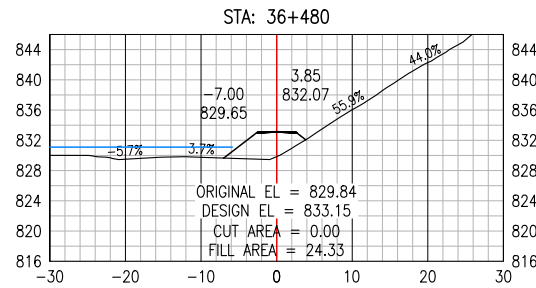
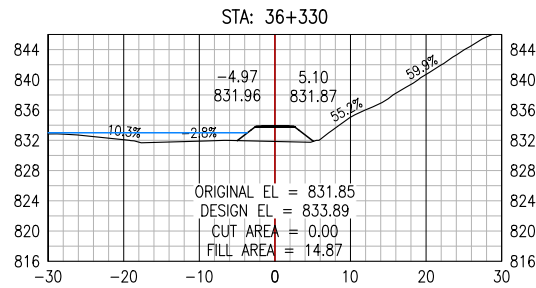
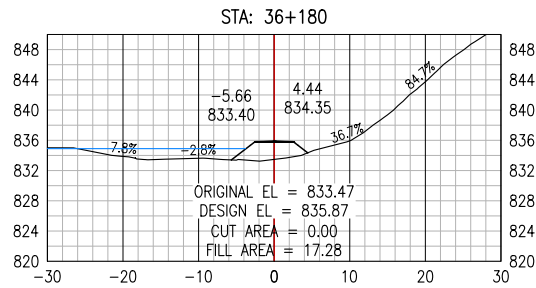
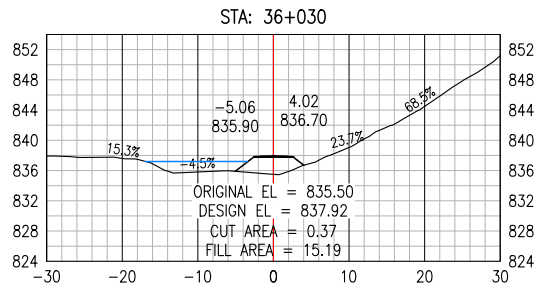
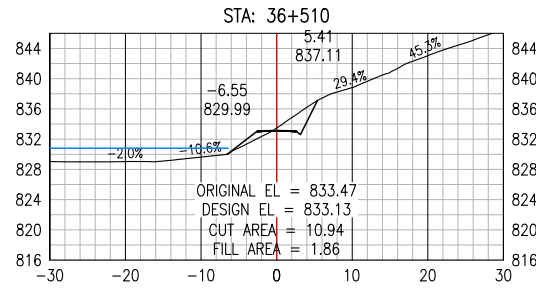
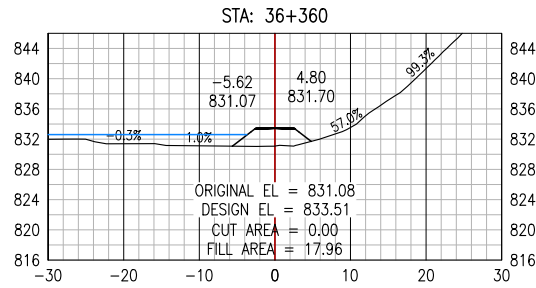
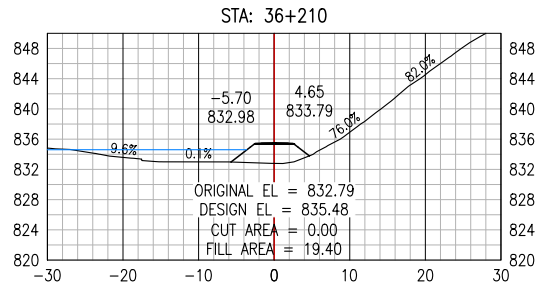
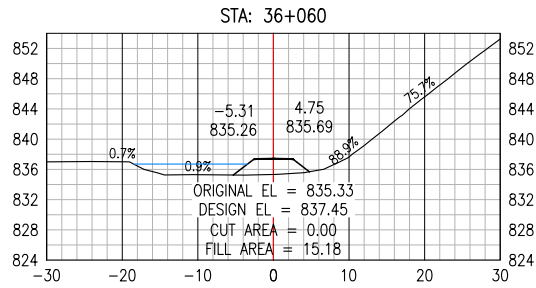
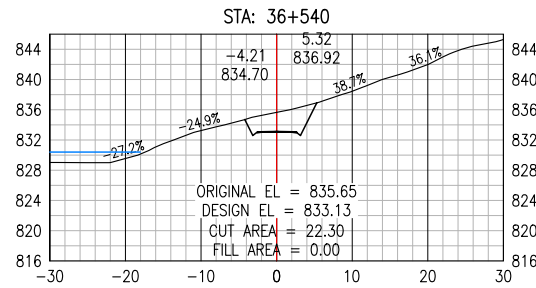
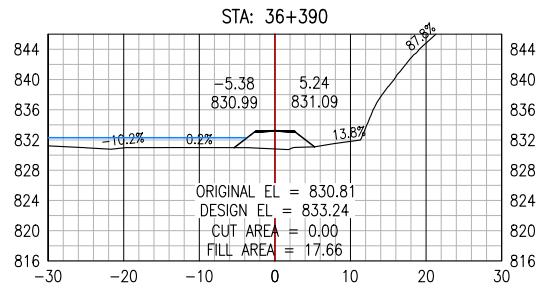
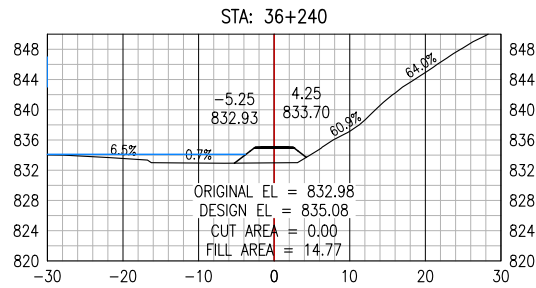
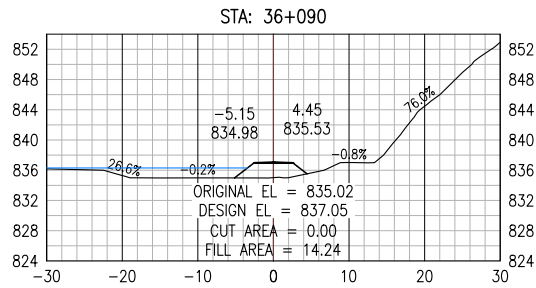
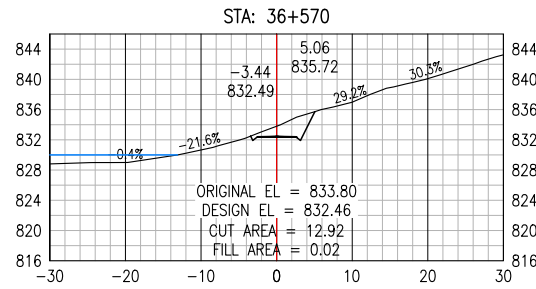
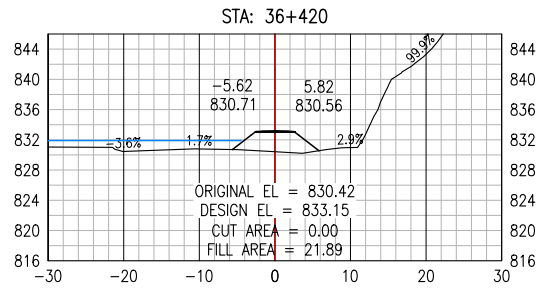
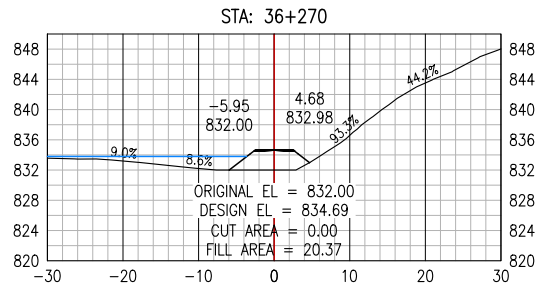
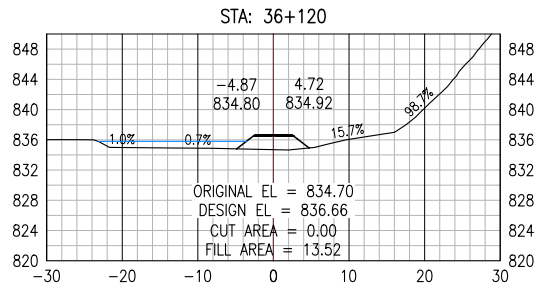
PROJECT:

**PRIARIE CREEK MINE
GEOMETRIC DESIGN
km 34+800 to km 39+000**

TITLE:

**CROSS SECTION
DRAWINGS
PAGE 2 of 8**

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2	2016/07/20	REVISED ALIGNMENT	TMM	WBM
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CLIENT:



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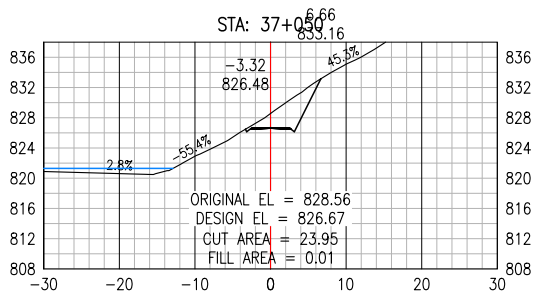
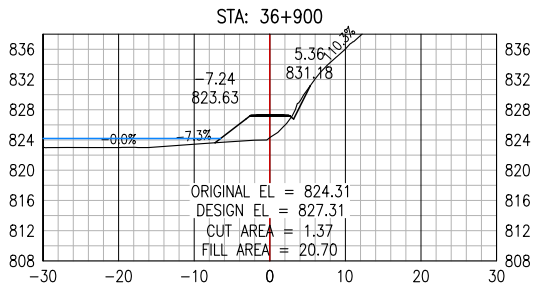
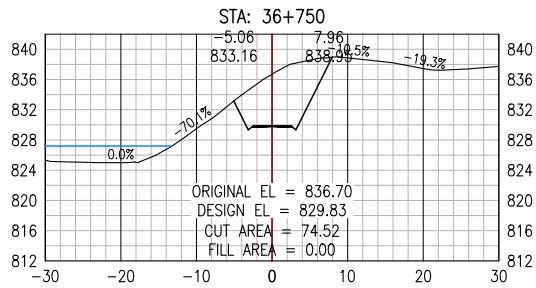
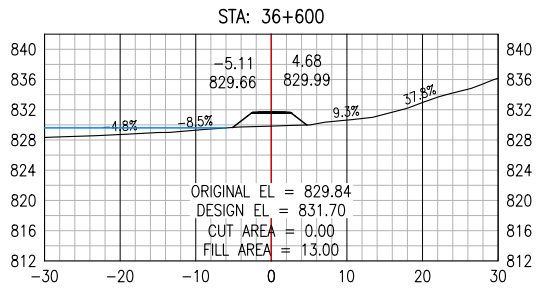
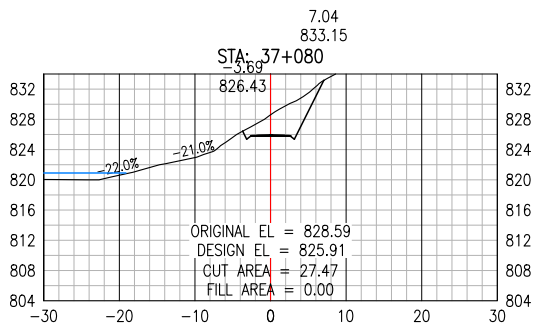
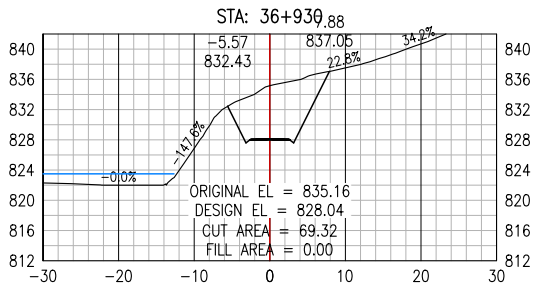
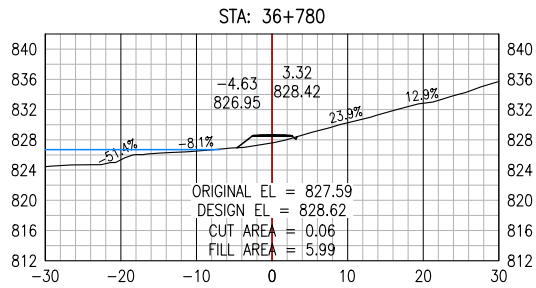
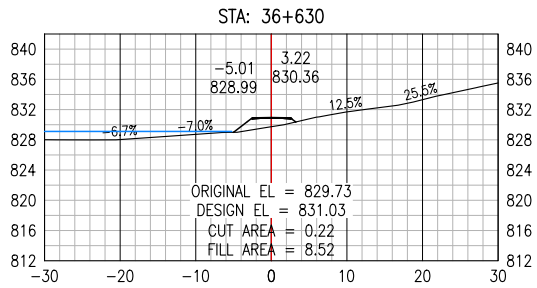
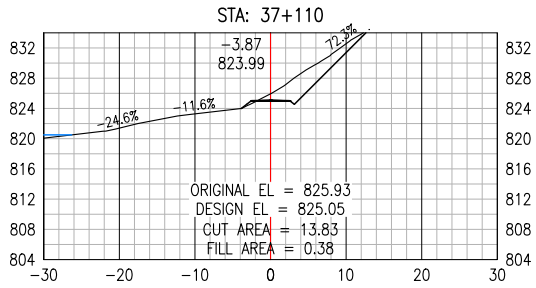
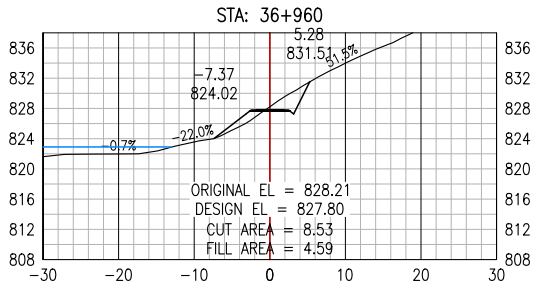
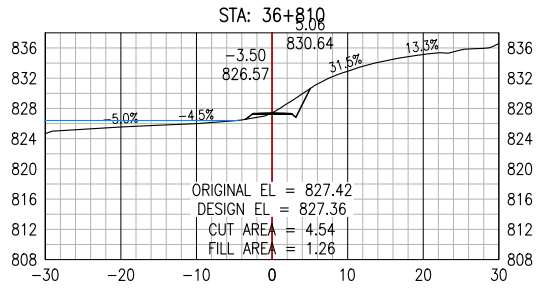
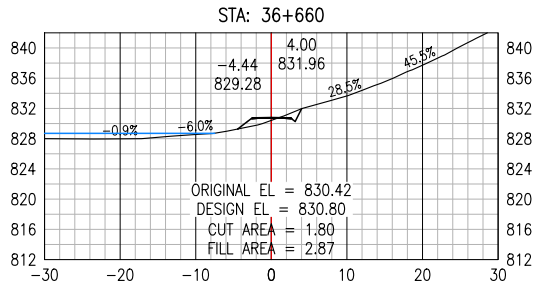
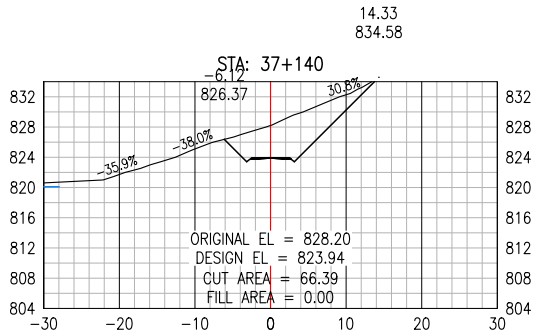
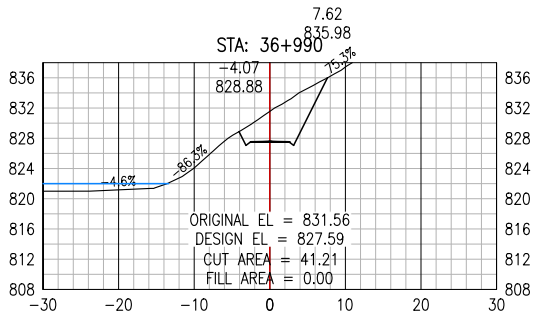
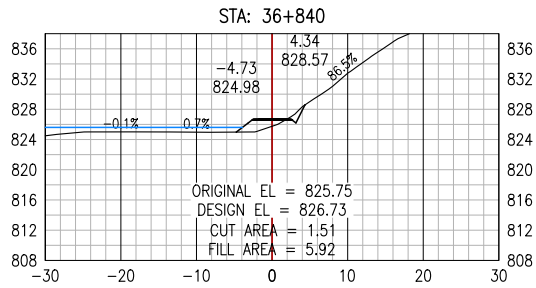
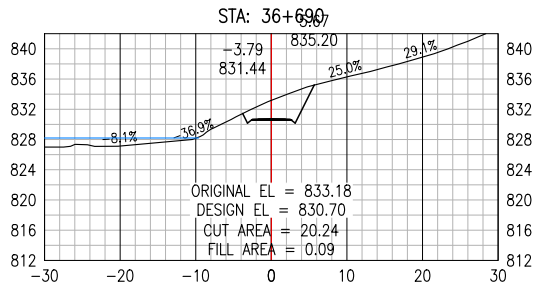
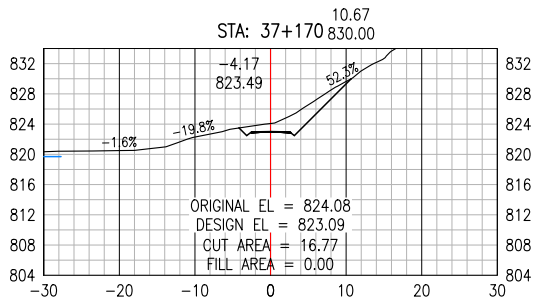
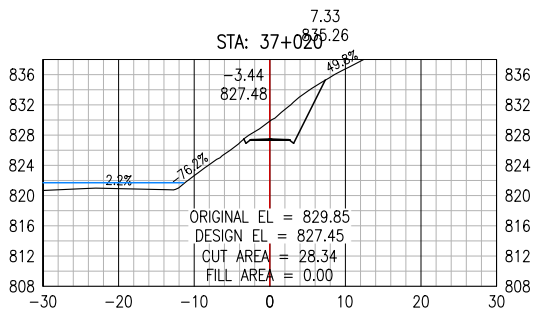
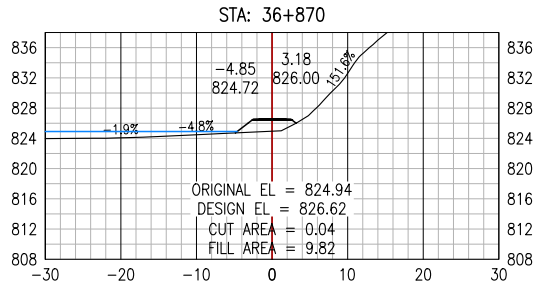
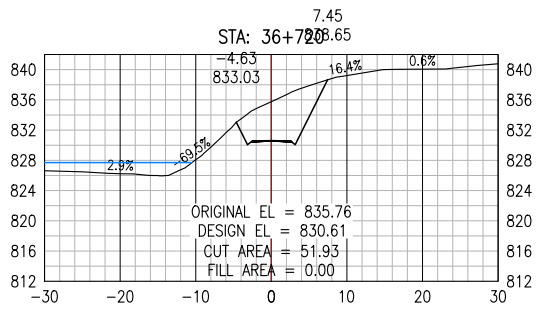
PROJECT:

**PRIARIE CREEK MINE
GEOMETRIC DESIGN
km 34+800 to km 39+000**

TITLE:

**CROSS SECTION
DRAWINGS
PAGE 3 of 8**

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— EXISTING GROUND
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REV	YY/MM/DD	DESCRIPTION	DRWN	APVD

CLIENT:



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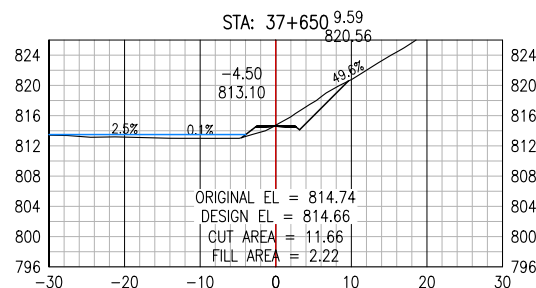
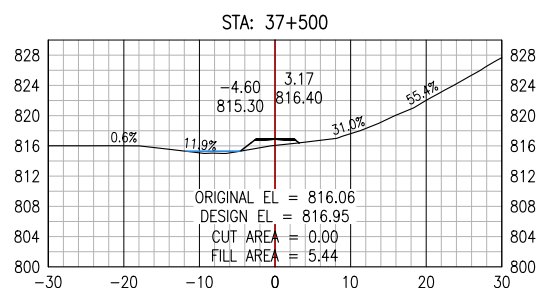
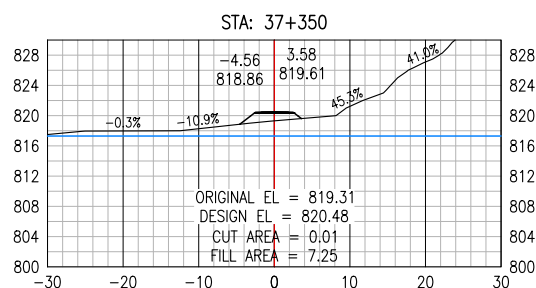
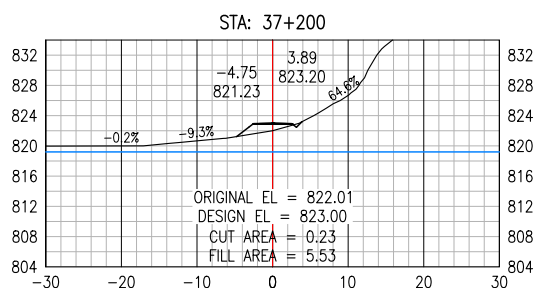
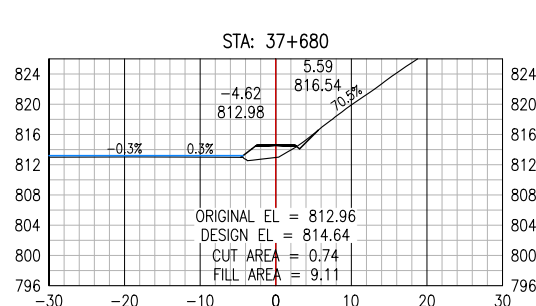
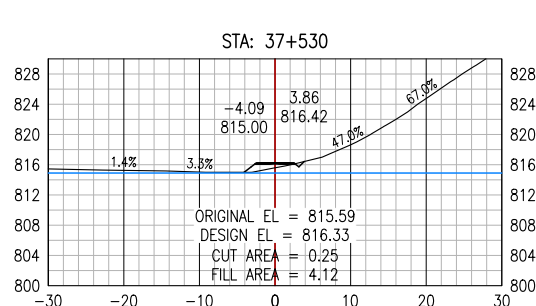
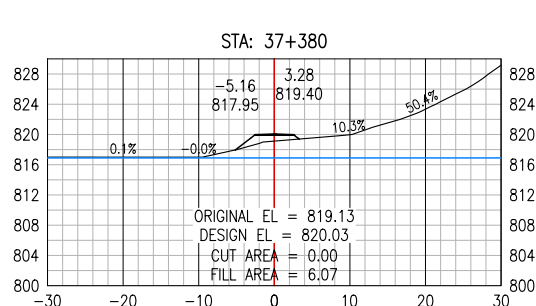
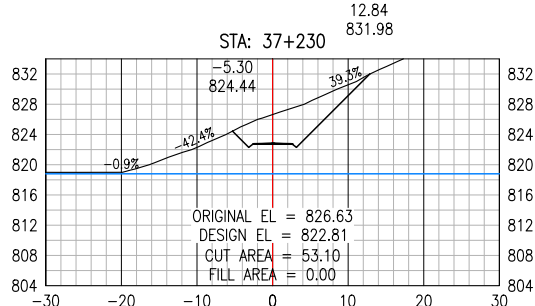
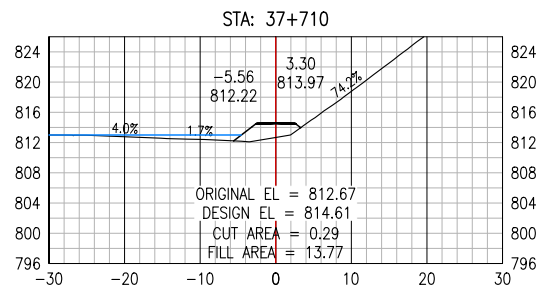
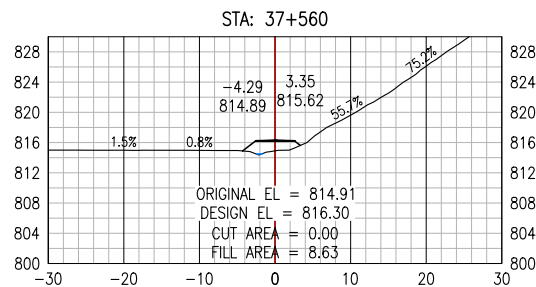
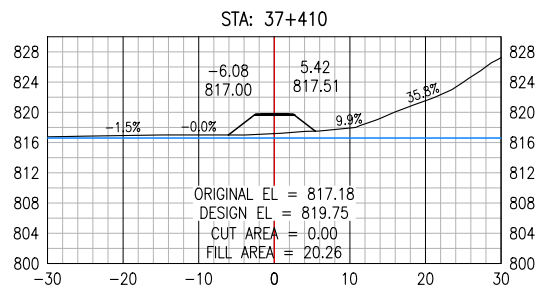
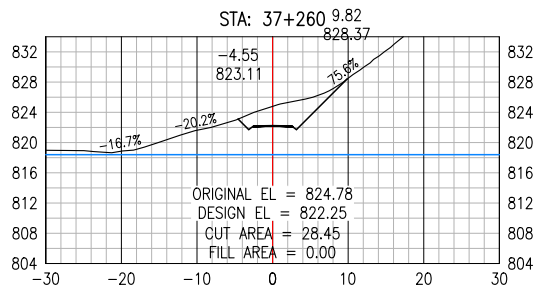
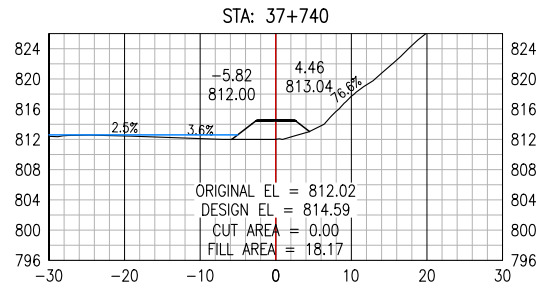
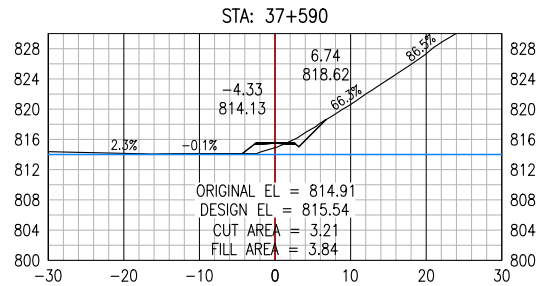
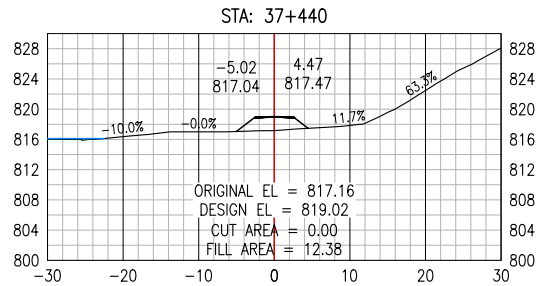
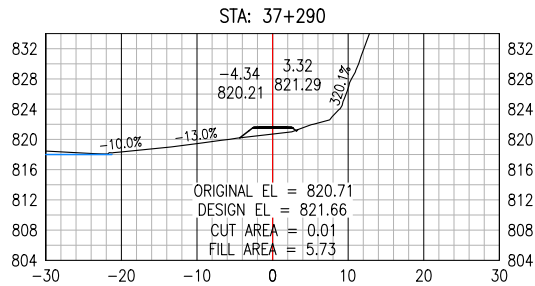
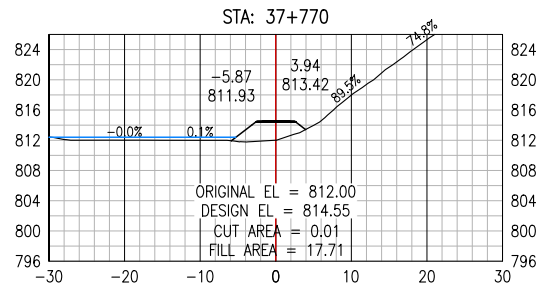
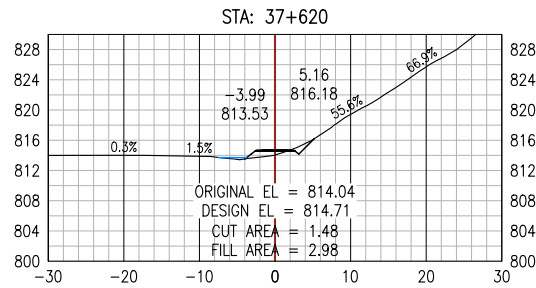
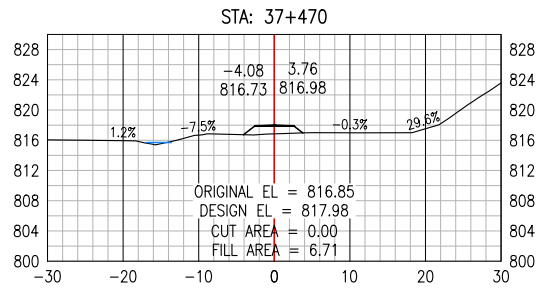
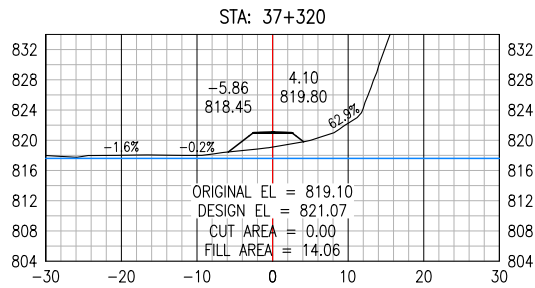
PROJECT:

**PRIARIE CREEK MINE
GEOMETRIC DESIGN
km 34+800 to km 39+000**

TITLE:

**CROSS SECTION
DRAWINGS
PAGE 4 of 8**

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EXISTING GROUND
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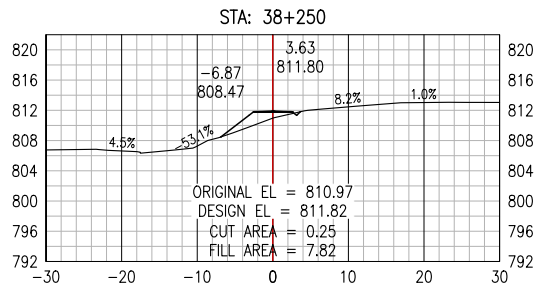
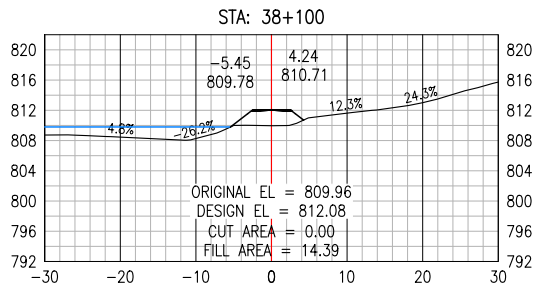
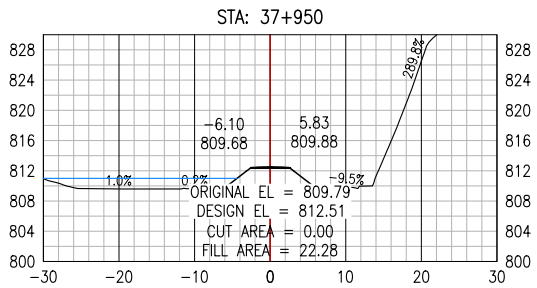
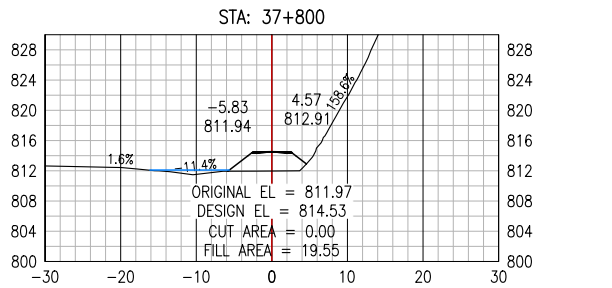
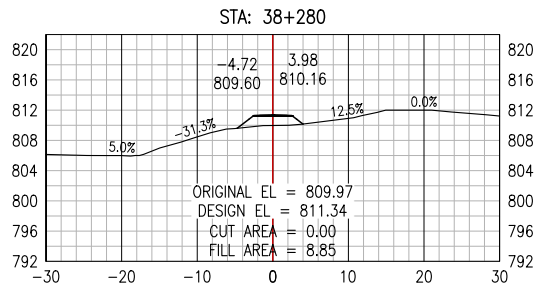
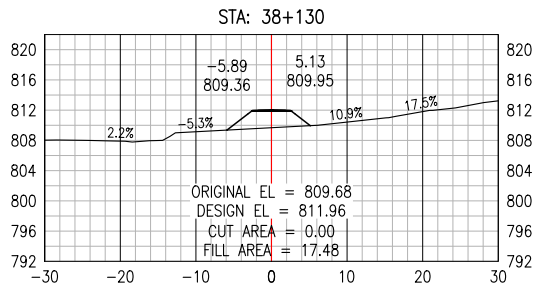
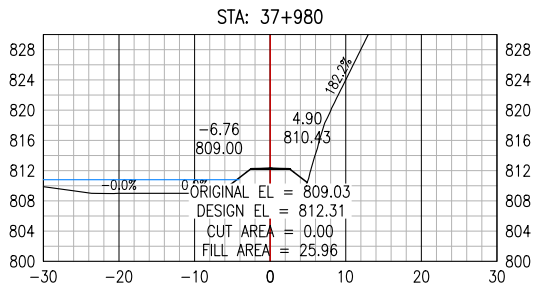
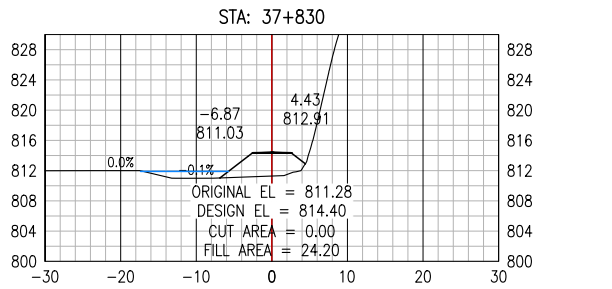
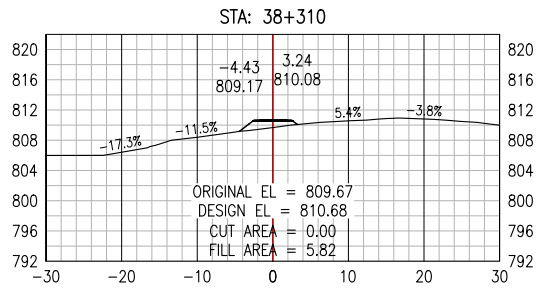
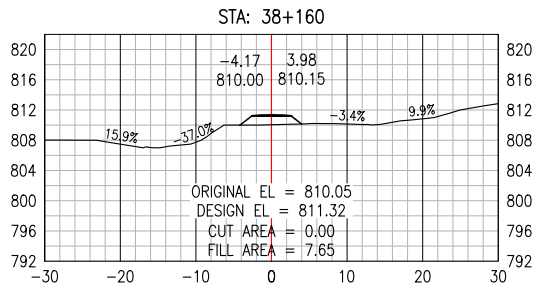
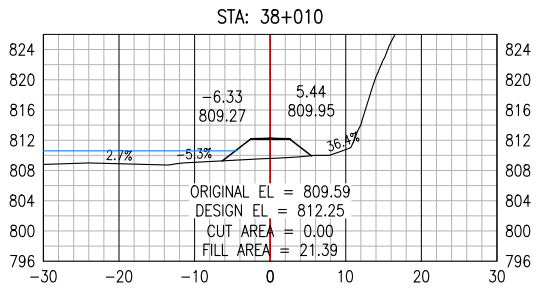
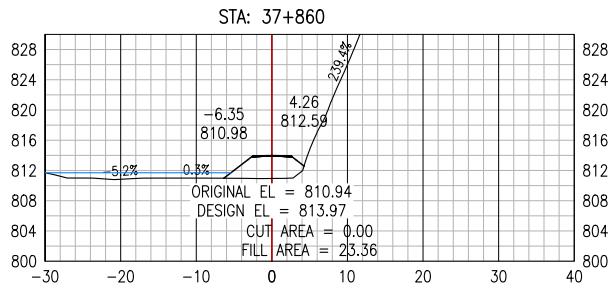
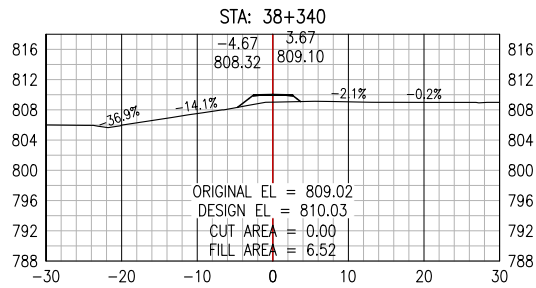
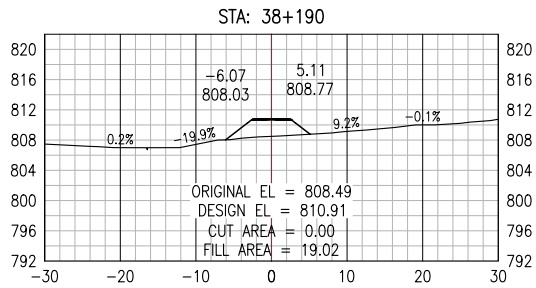
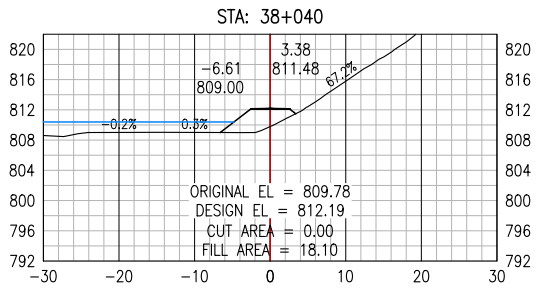
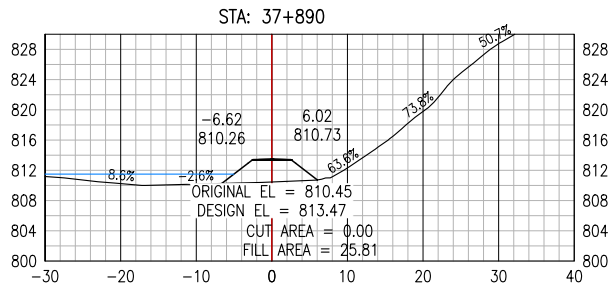
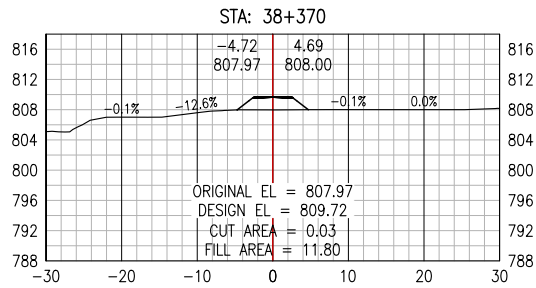
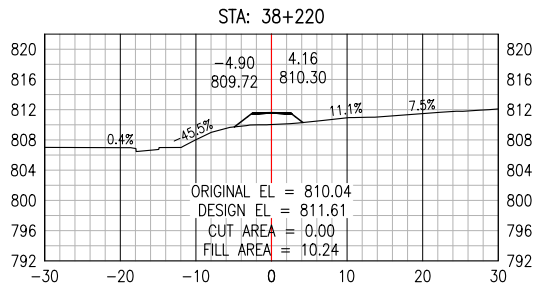
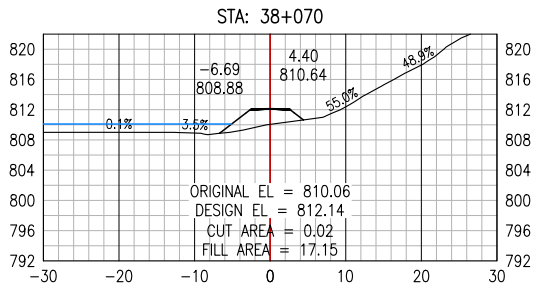
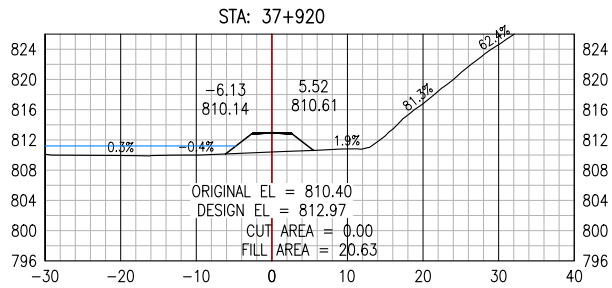
PROJECT:

**PRIARIE CREEK MINE
GEOMETRIC DESIGN
km 34+800 to km 39+000**

TITLE:

**CROSS SECTION
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CLIENT:



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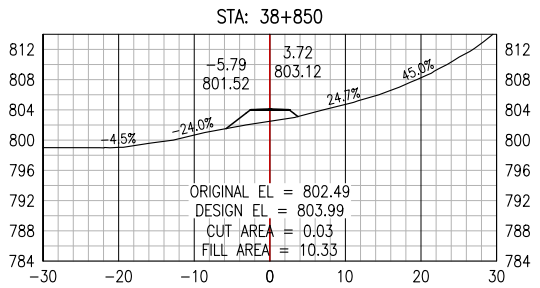
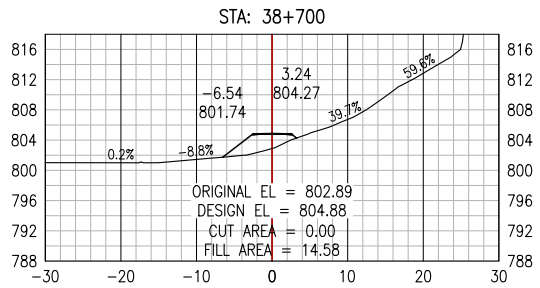
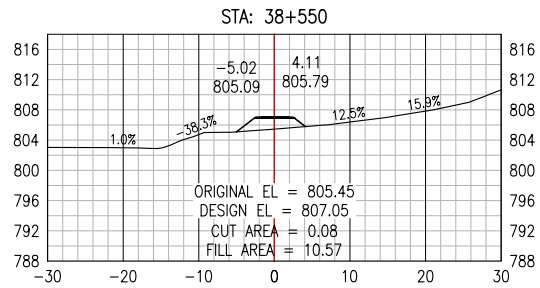
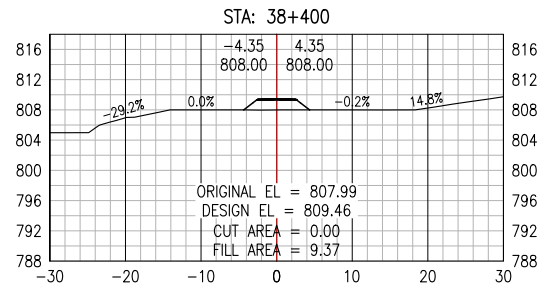
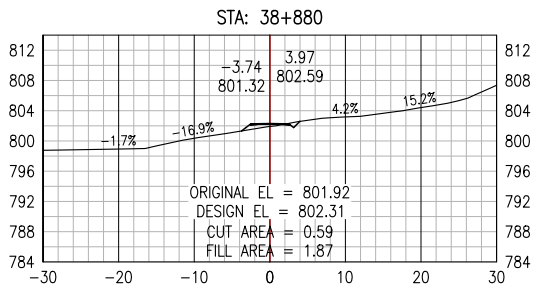
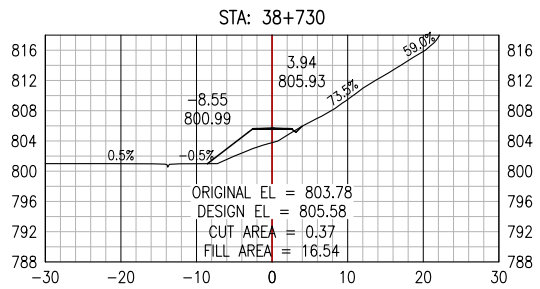
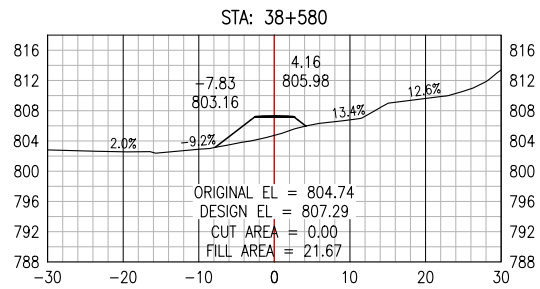
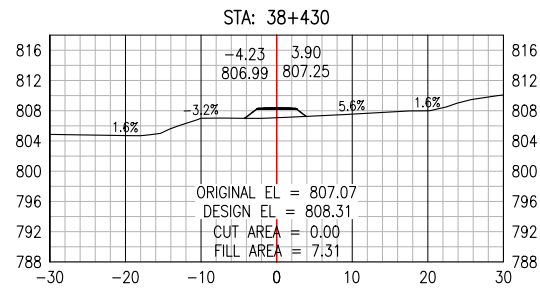
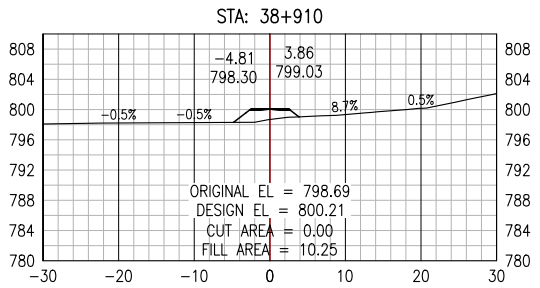
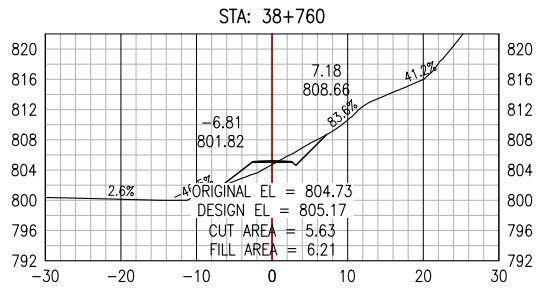
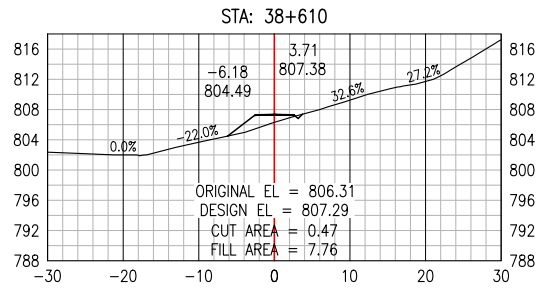
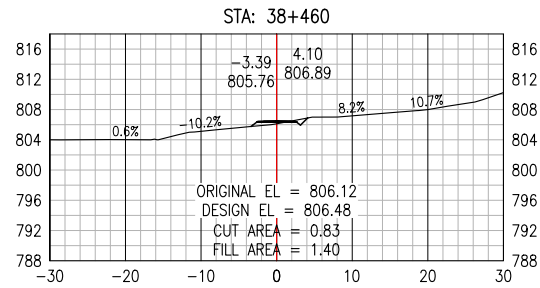
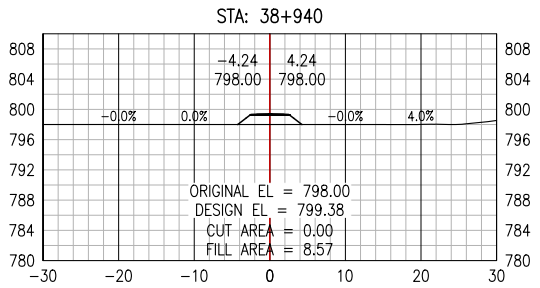
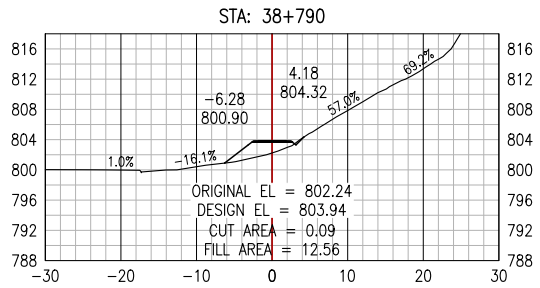
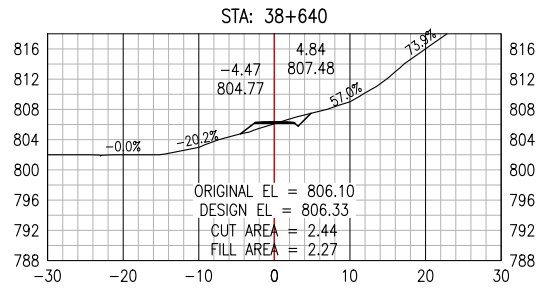
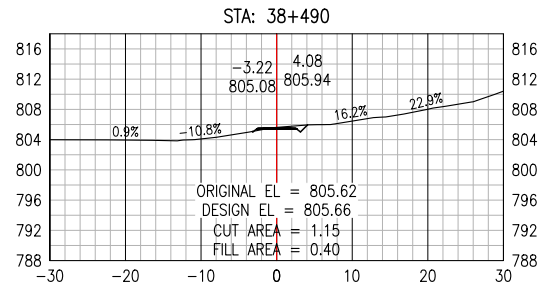
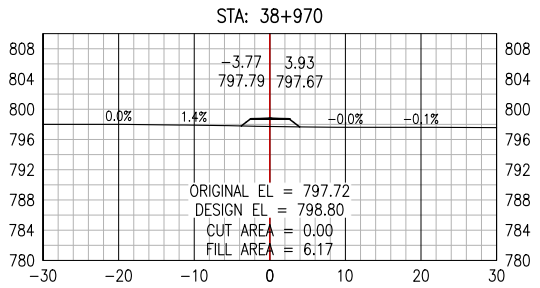
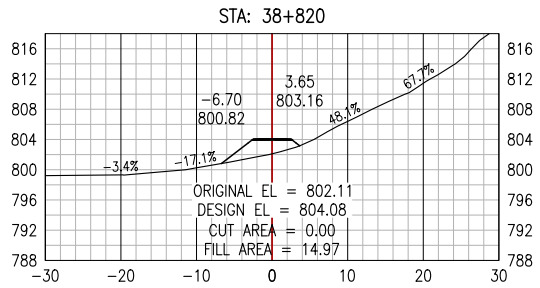
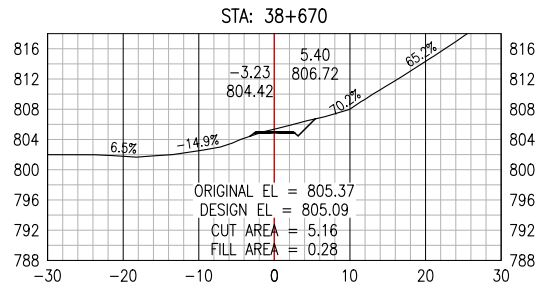
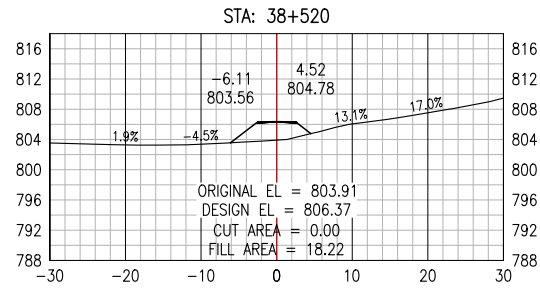
PROJECT:

**PRIARIE CREEK MINE
GEOMETRIC DESIGN
km 34+800 to km 39+000**

TITLE:

**CROSS SECTION
DRAWINGS
PAGE 6 of 8**

DWG NO:	16GP0041-040-1920-014	REV:	3
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LEGEND

EXISTING GROUND
Q100 HWM (EST.)

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REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
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2	2016/07/20	REVISED ALIGNMENT	TMM	WBM
1	2016/02/26	HORIZONTAL REALIGNMENT	TMM	WBM
0	2014/12/04	ISSUED FOR REVIEW	TMM	WBM

CLIENT:



CLIENT NO:	-	DRWN:	TMM	DATE:	16/02/26
PROJECT NO:	14-GP-0128	DSGN:	TMM	DATE:	16/02/26
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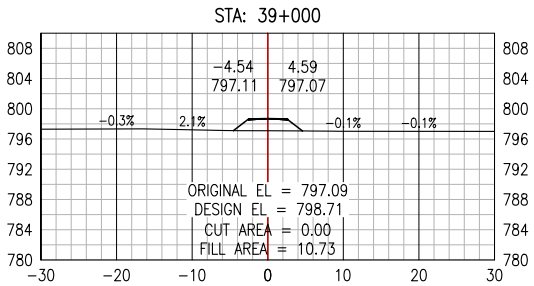
PROJECT:

**PRIARIE CREEK MINE
GEOMETRIC DESIGN
km 34+800 to km 39+000**

TITLE:

**CROSS SECTION
DRAWINGS
PAGE 7 of 8**

DWG NO:	16GP0041-040-1920-015	REV:	3
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LEGEND

- EXISTING GROUND
- Q100 HWM (EST.)

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3	2016/07/20	REVISED ALIGNMENT	CC	WBM
2	2016/07/20	REVISED ALIGNMENT	TMM	WBM
1	2016/02/26	HORIZONTAL REALIGNEMNT	TMM	WBM
0	2014/12/04	ISSUED FOR REVIEW	TMM	WBM
REV	YY/MM/DD	DESCRIPTION	DRWN	APVD

CLIENT:



CLIENT NO:	-	DRWN:	TMM	DATE:	16/02/26
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PROJECT:

**PRIARIE CREEK MINE
GEOMETRIC DESIGN
km 34+800 to km 39+000**

TITLE:

**CROSS SECTION
DRAWINGS
PAGE 8 of 8**

DWG NO:	16GP0041-040-1920-016	REV:	3
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Appendix B Calculated Road Footprint

Prairie Creek Mine Access Road KP 33 to 39 Footprint Analysis Access Road Impacting Sundog Creek											
Section		Floodplain Type	Road Prism Width (m)	Width (m) within Floodplain (Q100)	Area occuying Floodplain (m2, Q100)	Q 2 Flow	Active	Secondary	Ch. Thalweg	Old Historic	Comments
Start KP	End KP										
33.200	33.210	old historic	9	13	390	DATA NOT AVAIL- ABLE	0	0	0	390	
33.210	33.240	old historic	9	5	150		0	0	0	150	
33.240	33.270	old historic	12	2	60		0	0	0	60	
33.270	33.300	old historic	15	12	360		0	0	0	360	
33.300	33.330	old historic	13.5	12	360		0	0	0	360	
33.330	33.360	old historic	11	6	180		0	0	0	180	
33.360	33.390	old historic	8	1	30		0	0	0	30	
33.390	33.420	old historic	8	0	0		0	0	0	0	
33.420	33.450	old historic	8	5	150		0	0	0	150	
33.450	33.480	old historic	9	12	360		0	0	0	360	
33.480	33.510	old historic	9	10	300		0	0	0	300	
33.510	33.520	old historic	10	12	120		0	0	0	120	
33.520	33.540	old historic	9	9	180		0	0	0	180	
33.540	33.570	old historic	9	5	150		0	0	0	150	
33.570	33.600	old historic	8	0	0		0	0	0	0	
33.600	33.630	old historic	8	0	0		0	0	0	0	
33.630	33.660	secondary	9	9	270		0	270	0	0	
33.660	33.690	secondary	9	9	270		0	270	0	0	
33.690	33.720	secondary	8	7	210		0	210	0	0	
33.720	33.750	secondary	8	8	240		0	240	0	0	
33.750	33.780	secondary	9	8	240		0	240	0	0	
33.780	33.810	secondary	9	9	270		0	270	0	0	
33.810	33.840	secondary	8	8	240		0	240	0	0	
33.840	33.860	secondary	8	6	120		0	120	0	0	
33.860	33.870	old historic	8	0	0						
33.870	33.900	secondary	9	8	240		0	240	0	0	
33.900	33.930	secondary	8	6	180		0	180	0	0	
33.930	33.960	secondary	9	1	30		0	30	0	0	
33.960	33.990	secondary	8	1	30		0	30	0	0	
33.990	34.020	old historic	8	0	0		0	0	0	0	
34.020	34.050	secondary	8	1	30		0	30	0	0	
34.050	34.080	secondary	8	5	150		0	150	0	0	
34.080	34.110	secondary	10	10	300		0	300	0	0	
34.110	34.140	secondary	8	8	240		0	240	0	0	
34.140	34.170	old historic	8	5	150		0	0	0	150	
34.170	34.200	old historic	8	0	0		0	0	0	0	
34.800	34.830	old historic	9	0	0	0	0	0	0		
34.830	34.860	old historic	10	0	0		0	0	0	0	
34.860	34.890	secondary	12	8	240		0	240	0	0	
34.890	34.920	secondary	12	11	330		0	330	0	0	

Prairie Creek Mine Access Road KP 33 to 39 Footprint Analysis Access Road Impacting Sundog Creek											
Section		Floodplain Type	Road Prism Width (m)	Width (m) within Floodplain (Q100)	Area occuying Floodplain (m2, Q100)	Q 2 Flow	Active	Secondary	Ch. Thalweg	Old Historic	Comments
Start KP	End KP										
34.920	34.950	secondary	12	16	480	1995	0	480	0	0	
34.950	34.980	secondary	10	18	540		0	540	0	0	
34.980	35.010	secondary	10	17	510		0	510	0	0	
35.010	35.040	secondary	12	13	390		0	390	0	0	
35.040	35.070	active	13	13	390	550	390	0	0	0	
35.070	35.100	active	12	5	150		150	0	0	0	
35.100	35.130	active	12	5	150		150	0	0	0	
35.130	35.160	active	11	4	120		120	0	0	0	
35.160	35.190	active	11	5	150		150	0	0	0	
35.190	35.220	active	20	4	120		120	0	0	0	
35.220	35.250	active	12	9	270		270	0	0	0	
35.250	35.280	active	13	12	360		360	0	0	0	
35.280	35.310	active	12	8	240		240	0	0	0	
35.310	35.340	outside	10	0	0	0	0	0	0	0	
35.340	35.370	outside	10	0	0		0	0	0	0	
35.370	35.400	outside	10	0	0		0	0	0	0	
35.400	35.430	outside	10	0	0		0	0	0	0	
35.430	35.460	outside	10	0	0		0	0	0	0	
35.460	35.490	outside	10	0	0		0	0	0	0	
35.490	35.520	outside	8	0	0		0	0	0	0	
35.520	35.550	active	11	8	240		240	0	0	0	
35.550	35.580	active	11	9	270	518	270	0	0	0	
35.580	35.610	active	12	8	240		240	0	0	0	
35.610	35.640	active	13	1	30		30	0	0	0	
35.640	35.670	outside	10	0	0		0	0	0	0	
35.670	35.700	outside	13	0	0	0	0	0	0	0	
35.700	35.730	outside	13	0	0		0	0	0	0	
35.730	35.760	outside	14	0	0		0	0	0	0	
35.760	35.790	outside	14	0	0		0	0	0	0	
35.790	35.820	outside	8	0	0		0	0	0	0	
35.820	35.850	active	13	13	390		390	0	0	0	
35.850	35.880	active	13	15	450		450	0	0	0	
35.880	35.910	active	12	18	540		540	0	0	0	
35.910	35.940	active	12	16	480		480	0	0	0	
35.940	35.970	active	12	16	480		480	0	0	0	
35.970	36.000	active	11	14	420		420	0	0	0	
36.000	36.030	active	11	16	480		480	0	0	0	
36.030	36.060	active	9	10	300		300	0	0	0	
36.060	36.090	active	9	12	360		360	0	0	0	
36.090	36.120	active	9	11	330		330	0	0	0	

Prairie Creek Mine Access Road KP 33 to 39 Footprint Analysis Access Road Impacting Sundog Creek											
Section		Floodplain Type	Road Prism Width (m)	Width (m) within Floodplain (Q100)	Area occuying Floodplain (m2, Q100)	Q 2 Flow	Active	Secondary	Ch. Thalweg	Old Historic	Comments
Start KP	End KP										
36.120	36.150	active	9	11	330	6924	330	0	0	0	
36.150	36.180	active	9	11	330		330	0	0	0	
36.180	36.210	active	10	12	360		360	0	0	0	
36.210	36.240	active	10	11	330		330	0	0	0	
36.240	36.270	active	9	9	270		270	0	0	0	
36.270	36.300	active	10	12	360		360	0	0	0	
36.300	36.330	active	10	12	360		360	0	0	0	
36.330	36.360	active	9	11	330		330	0	0	0	
36.360	36.390	active	10	12	360		360	0	0	0	
36.390	36.420	active	11	16	480		480	0	0	0	
36.420	36.450	active	12	16	480		480	0	0	0	
36.450	36.480	active	13	15	450		450	0	0	0	
36.480	36.510	active	12	10	300		300	0	0	0	
36.510	36.540	outside	12	0	0	0	0	0	0	0	
36.540	36.570	outside	12	0	0		0	0	0	0	
36.570	36.600	outside	12	0	0		0	0	0	0	
36.600	36.630	outside	10	0	0		0	0	0	0	
36.630	36.660	outside	9	0	0		0	0	0	0	
36.660	36.690	outside	9	0	0		0	0	0	0	
36.690	36.720	outside	12	0	0		0	0	0	0	
36.720	36.750	outside	13	0	0		0	0	0	0	
36.750	36.780	outside	12	0	0		0	0	0	0	
36.780	36.810	outside	10	0	0		0	0	0	0	
36.810	36.840	old historic	9	0	0	0	0	0	0	0	imagery clearly indicates outside floodplain, HWM suggests otherwise
36.840	36.870	old historic	9	4	120		0	0	0	120	
36.870	36.900	old historic	9	2	60		0	0	0	60	
36.900	36.930	old historic	10	2	60		0	0	0	60	
36.930	36.960	outside	16	0	0	0	0	0	0	0	
36.960	36.990	outside	10	0	0		0	0	0	0	
36.990	37.020	outside	12	0	0		0	0	0	0	
37.020	37.050	outside	14	0	0		0	0	0	0	
37.050	37.080	outside	13	0	0		0	0	0	0	
37.080	37.110	outside	13	0	0		0	0	0	0	
37.110	37.140	outside	14	0	0		0	0	0	0	
37.140	37.170	outside	18	0	0		0	0	0	0	
37.170	37.200	outside	14	0	0		0	0	0	0	
37.200	37.230	outside	8	0	0		0	0	0	0	
37.230	37.260	outside	14	0	0		0	0	0	0	
37.260	37.290	outside	12	0	0		0	0	0	0	
37.290	37.320	outside	9	0	0		0	0	0	0	

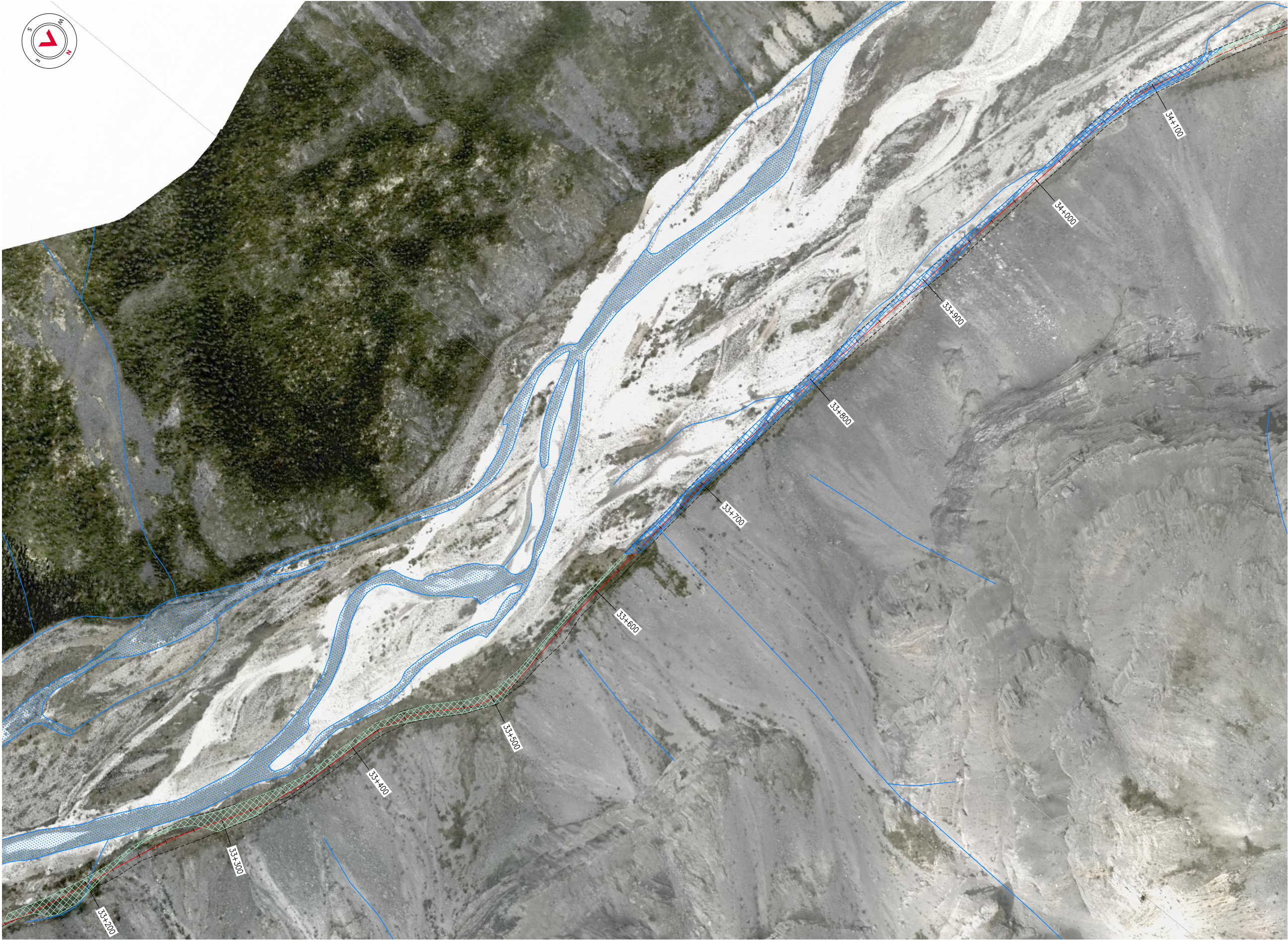
Prairie Creek Mine Access Road KP 33 to 39 Footprint Analysis Access Road Impacting Sundog Creek											
Section		Floodplain Type	Road Prism Width (m)	Width (m) within Floodplain (Q100)	Area occuying Floodplain (m2, Q100)	Q 2 Flow	Active	Secondary	Ch. Thalweg	Old Historic	Comments
Start KP	End KP										
37.320	37.350	outside	10	0	0		0	0	0	0	
37.350	37.380	outside	9	0	0		0	0	0	0	
37.380	37.410	outside	9	0	0		0	0	0	0	
37.410	37.440	outside	11	0	0		0	0	0	0	
37.440	37.470	outside	9	0	0		0	0	0	0	
37.470	37.500	outside	8	0	0		0	0	0	0	
37.500	37.530	old historic	9	1	30	0	0	0	0	30	
37.530	37.560	old historic	9	6	180		0	0	0	180	
37.560	37.590	secondary	9	2	60	1111	0	60	0	0	
37.590	37.620	secondary	10	2	60		0	60	0	0	
37.620	37.650	secondary	9	2	60		0	60	0	0	
37.650	37.680	secondary	12	3	90		0	90	0	0	
37.680	37.710	secondary	10	4	120		0	120	0	0	
37.710	37.740	secondary	9	6	180		0	180	0	0	
37.740	37.770	secondary	9	8	240		0	240	0	0	
37.770	37.800	Ch. Thalweg	10	6	180	2575	0	0	180	0	
37.800	37.830	Ch. Thalweg	11	10	300		0	0	300	0	
37.830	37.860	Ch. Thalweg	11	11	330		0	0	330	0	
37.860	37.890	Ch. Thalweg	10	10	300		0	0	300	0	
37.890	37.920	Ch. Thalweg	12	14	420		0	0	420	0	
37.920	37.950	Ch. Thalweg	12	17	510		0	0	510	0	
37.950	37.980	Ch. Thalweg	12	18	540		0	0	540	0	
37.980	38.010	Ch. Thalweg	10	10	300		0	0	300	0	
38.010	38.040	active	10	6	180	56	180	0	0	0	
38.040	38.070	active	11	5	150		150	0	0	0	
38.070	38.100	outside	9	0	0	0	0	0	0	0	
										0	
							12030	6360	2880	3390	

TOTALS	Active	8048	12030			
	Secondary	3106		6360		
	Ch. Thalweg	2575			2880	
	Old Historic	0				3390



Appendix C Plan View Road Prism Occupying Sundog Creek

Date: 2016/08/16 | User: Cory Carlson | File: F:\16GP004 Canadian Zinc\1000-Drawings\1011-Civil\01-Production\14GP0128-040-1920-033.2km-034.2km PLANVIEW | Layout: 14GP0128-040-1920-004 | Paper Size: 598.8mm x 431.8mm



KEY PLAN



LEGEND

- 8+000
- PROPOSED DESIGN CL
- PROPOSED CUT/FILL LINES
- WATERCOURSES
- SUNDOG Q2 HEC-RAS
- Q2 FOOTPRINT
ROAD PRISM OVERLAP
- OLD HISTORIC FLOODPLAIN
Q100 (HWM)
- ACTIVE FLOODPLAIN
Q100 (HWM)
- CHANNEL THAGWEG
Q100 (HWM)
- SECONDARY FLOODPLAIN
Q100 (HWM)

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0	16/08/16	ISSUED FOR REVIEW	CC
REV	YY/MM/DD	DESCRIPTION	DRWN APVD

CLIENT:



CLIENT NO:		DRWN:	TMM	DATE:	14/12/03
PROJECT NO:	14-GP-0128	DSGN:	TMM	DATE:	14/12/03
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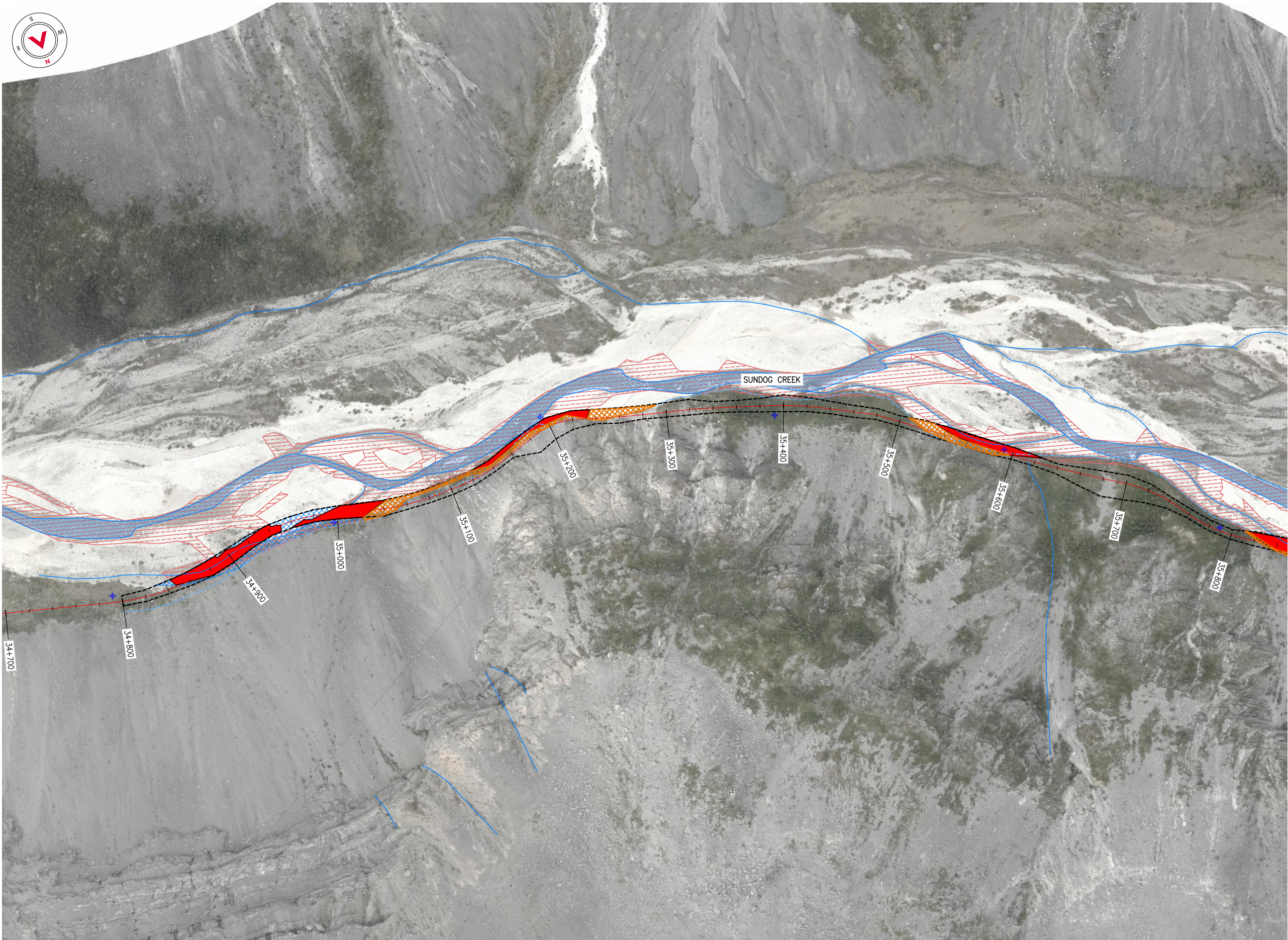
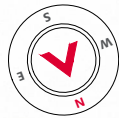
PROJECT:

**SUNDOG CREEK
FLOODPLAIN / ROAD PRISM
ANALYSIS**

TITLE:

**PLAN VIEW
km 33+200 to km 34+200**

DWG NO:	REV:
14GP0128-040-1920-004	0



KEY PLAN

AREA OF DESIGN

LEGEND

PROPOSED DESIGN CL

PROPOSED CUT/FILL LINES

ISSUED FOR REVIEW
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3	2016/07/09	REVISED ALIGNMENT	TMM	WBM
2	2016/06/15	DRAFTING EDITS	TMM	WBM
1	2016/02/25	HORIZONTAL REALIGNMENT	TMM	WBM
0	2014/12/03	ISSUED FOR REVIEW	TMM	WBM

CLIENT:

CLIENT NO:	DRWN:	TMM	DATE:	16/02/25
PROJECT NO:	14-GP-0128	DSGN:	TMM	DATE: 16/02/25
DRAWING SIZE:	ANSI "B"	CHKD:	EK	DATE: -
SCALE:	H = 1:2000	APVD:	WBM	DATE: -

PROJECT:

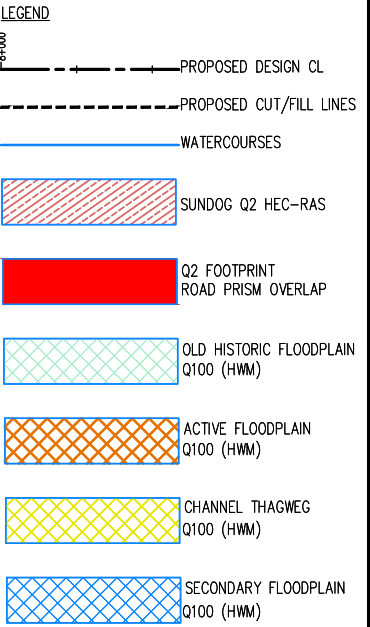
**SUNDOG CREEK
FLOODPLAIN / ROAD PRISM
ANALYSIS**

TITLE:

**PLAN VIEW
km 34+800 to km 35+800**

DWG NO:	REV:
16GP0041-325-1920-005	4

Date: 2016/08/16 | User: Cory Carlson | File: F:\16GP0048_Canadian Zinc\1000-Drawings\1011-Civil\01-Production\16GP0041-325-1920-34.8m-PLAN\VIEW_RL_CC_160816 | Layout: 14GP0128-325-1920-006 | Paper Size: 558.8mm x 431.8mm



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REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
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3	2016/07/19	REVISED ALIGNMENT	TMM	WBM
2	2016/06/15	DRAFTING EDITS	TMM	WBM
1	2016/02/25	HORIZONTAL REALIGNMENT	TMM	WBM
0	2014/12/03	ISSUED FOR REVIEW	TMM	WBM

CLIENT:

CLIENT NO:		DRWN:	TMM	DATE:	16/02/25
PROJECT NO:	14-GP-0128	DSGN:	TMM	DATE:	16/02/25
DRAWING SIZE:	ANSI "B"	CHKD:	EK	DATE:	-
SCALE:	H = 1:2000	APVD:	WBM	DATE:	-

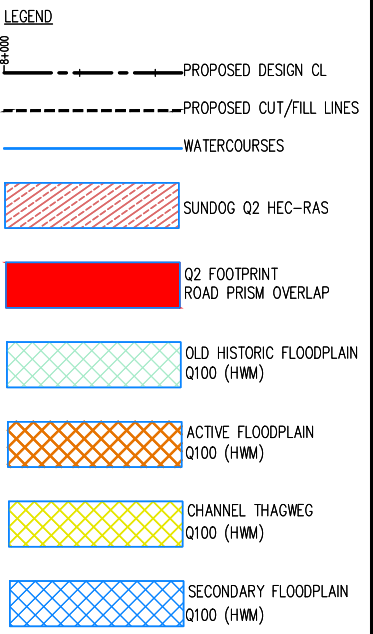
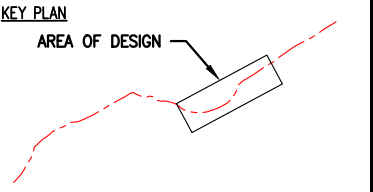
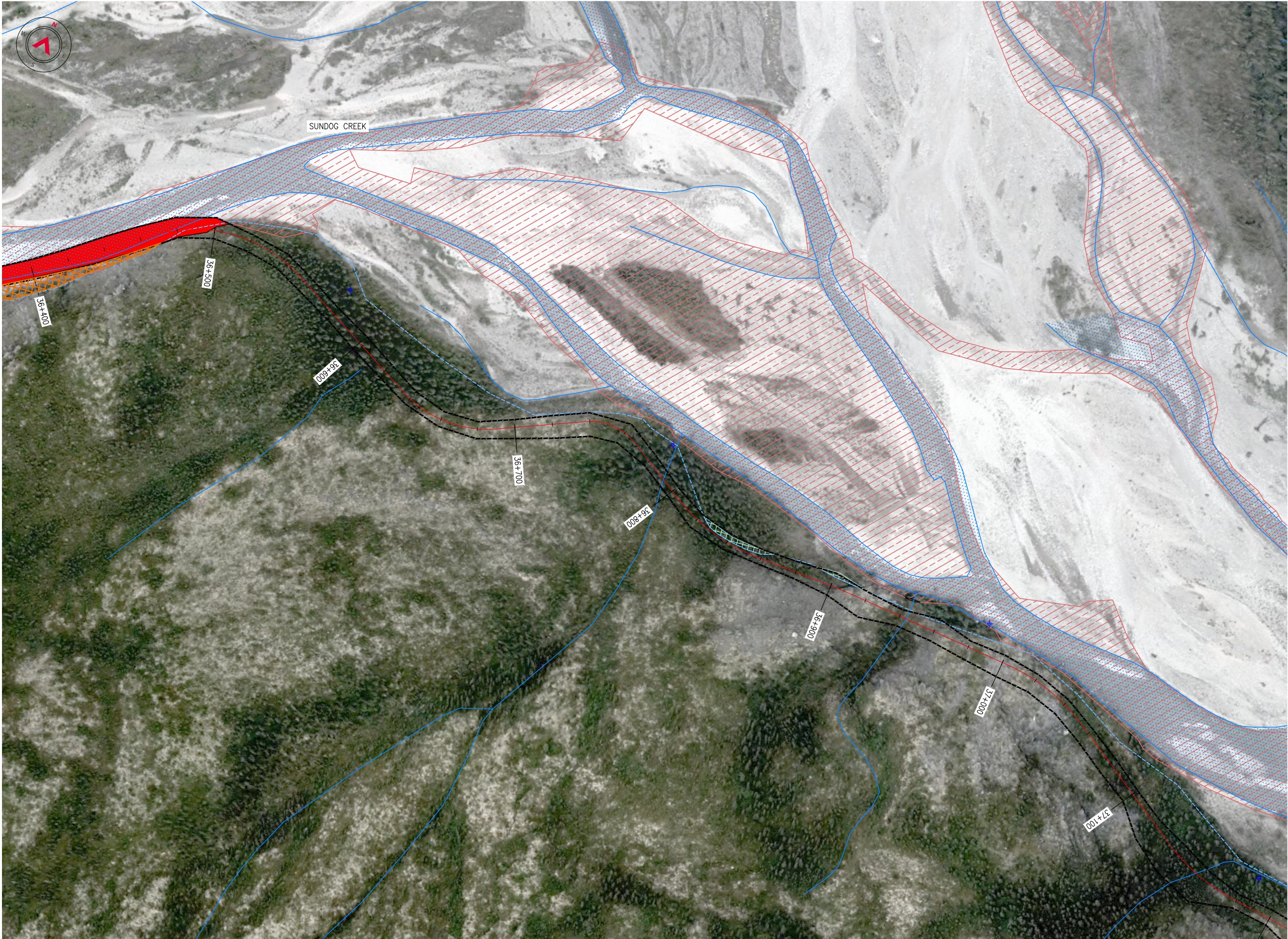
PROJECT:

**SUNDOG CREEK
FLOODPLAIN / ROAD PRISM
ANALYSIS**

TITLE:

**PLAN VIEW
km 35+800 to km 36+400**

DWG NO:	REV:
14GP0128-325-1920-006	4



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3	2016/07/20	REVISED ALIGNMENT	TMM	WBM
2	2016/06/15	DRAFTING EDITS	TMM	WBM
1	2016/02/25	HORIZONTAL REALIGNMENT	TMM	WBM
0	2014/12/03	ISSUED FOR REVIEW	TMM	WBM

CLIENT:

CLIENT NO:		DRWN:	TMM	DATE:	14/12/03
PROJECT NO:	14-GP-0128	DSGN:	TMM	DATE:	14/12/03
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PROJECT:					

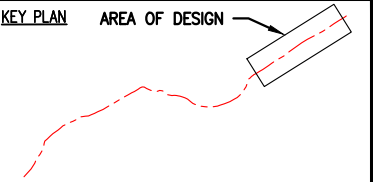
PROJECT:

**SUNDOG CREEK
FLOODPLAIN / ROAD PRISM
ANALYSIS**

TITLE:

**PLAN VIEW
km 36+400 to km 37+100**

DWG NO:	REV:
16GP0041-325-1920-007	4



LEGEND

	PROPOSED DESIGN CL
	PROPOSED CUT/FILL LINES
	WATERCOURSES
	SUNDOG Q2 HEC-RAS
	Q2 FOOTPRINT ROAD PRISM OVERLAP
	OLD HISTORIC FLOODPLAIN Q100 (HWM)
	ACTIVE FLOODPLAIN Q100 (HWM)
	CHANNEL THAGWEG Q100 (HWM)
	SECONDARY FLOODPLAIN Q100 (HWM)

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0	2014/12/03	ISSUED FOR REVIEW	TMM	WBM

CLIENT:

CLIENT NO:		DRWN:	TMM	DATE:	16/02/25
PROJECT NO:	14-GP-0128	DSGN:	TMM	DATE:	16/02/25
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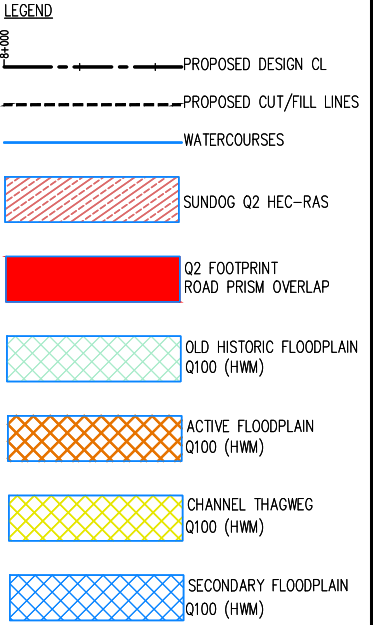
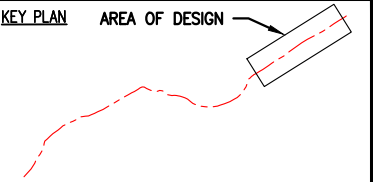
PROJECT:

**SUNDOG CREEK
FLOODPLAIN / ROAD PRISM
ANALYSIS**

TITLE:

**PLAN VIEW
km 37+100 to km 37+800**

DWG NO:	REV:
16GP0041-325-1920-008	4



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2	2016/06/15	DRAFTING EDITS	TMM	WBM
1	2016/02/25	HORIZONTAL REALIGNMENT	TMM	WBM
0	2014/12/03	ISSUED FOR REVIEW	TMM	WBM

CLIENT:

 **CANADIAN ZINC CORPORATION**

 **Allnorth**

CLIENT NO:	DRWN: TMM	DATE: 16/02/25
PROJECT NO: 14-GP-0128	DSGN: TMM	DATE: 16/02/25
DRAWING SIZE: ANSI "B"	CHKD: EK	DATE: -
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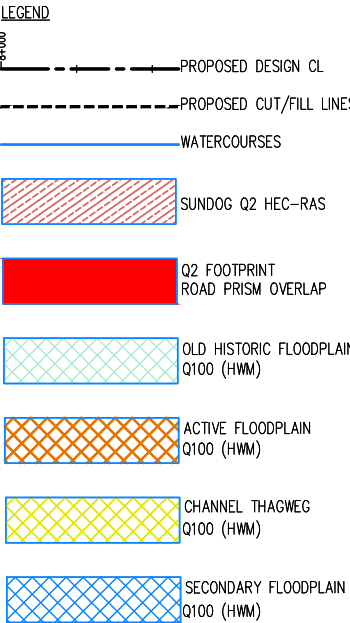
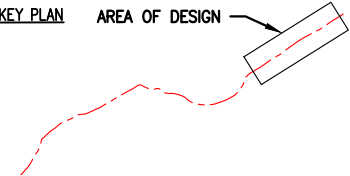
PROJECT:

**SUNDOG CREEK
FLOODPLAIN / ROAD PRISM
ANALYSIS**

TITLE:

**PLAN VIEW
km 37+100 to km 37+800**

DWG NO:	REV:
16GP0041-325-1920-008	4



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1	2016/02/25	HORIZONTAL REALIGNMENT	TMM	WBM
0	2014/12/03	ISSUED FOR REVIEW	TMM	WBM

CLIENT:

CANADIAN ZINC CORPORATION



CLIENT NO:		DRWN: TMM	DATE: 16/02/2025
PROJECT NO:	14-GP-0128	DSGN: TMM	DATE: 16/02/2025
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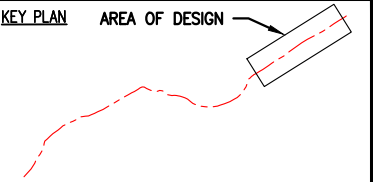
PROJECT:

**SUNDOG CREEK
FLOODPLAIN / ROAD PRISM
ANALYSIS**

TITLE:

**PLAN VIEW
km 37+800 to km 38+500**

DWG NO:	REV:
16GP0041-325-1920-009	4



LEGEND

	PROPOSED DESIGN CL
	PROPOSED CUT/FILL LINES
	WATERCOURSES
	SUNDOG Q2 HEC-RAS
	Q2 FOOTPRINT ROAD PRISM OVERLAP
	OLD HISTORIC FLOODPLAIN Q100 (HWM)
	ACTIVE FLOODPLAIN Q100 (HWM)
	CHANNEL THAGWEG Q100 (HWM)
	SECONDARY FLOODPLAIN Q100 (HWM)

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0	2014/12/03	ISSUED FOR REVIEW	TMM	WBM

CLIENT:

CLIENT NO:	DRWN: TMM	DATE: 16/02/25
PROJECT NO: 14-GP-0128	DSGN: TMM	DATE: 16/02/25
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PROJECT:

**SUNDOG CREEK
FLOODPLAIN / ROAD PRISM
ANALYSIS**

TITLE:

**PLAN VIEW
km 38+500 to km 39+000**

DWG NO: 16GP0041-325-1920-010	REV: 4
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