

Appendix A

Road Engineering Drawings

Anarraaq and Aktigirug Exploration Program

Phase I – Exploration Access Road and Surface Pad Construction

Prepared for:

Alaska Department of Natural Resources
Alaska Department of Environmental Conservation
Northwest Arctic Borough

Teck

Prepared by:

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October 2022

This document, originally dated February 2022 and submitted to ADNR on May 9, 2022, has been modified to include updated designs for the access roads to material sites AA-MS-1 (State land) and AA-MS-4 (NANA land) and update labels for each material site to reflect the naming convention for the material sites used throughout the Plan of Operations.

The modifications to this document include:

- 1) Updating the Index of Sheets and Project Summary Tables on Sheet 3000-CE-2010
- 2) Replacing drawing 3000-CE-2012 with an updated drawing that shows the two new access roads to material sites AA-MS-1 and AA-MS-4, respectively.
- 3) Replaced drawing 3000-CE-2021 with an update that shows corrected label for material site AA-MS-1
- 4) Replaced drawing 3000-CE-2022 with an update that shows the access road to AA-MS-1
- 5) Inserting new drawings RDM015-1200-10-DWG-20056 and RDM015-1200-10-DWG-20057 after drawing 3000-CE-2022. These two new drawings illustrate details for the new access road to material site AA-MS-1.
- 6) Replaced drawing 3000-CE-2028 with an update that shows corrected label for material site AA-MS-3
- 7) Replaced drawing 3000-CE-2033 with an update that shows the access road to AA-MS-4
- 8) Inserting new drawing RDM015-1200-DWG-20058 after drawing 3000-CE-2033 to illustrate the updated design for the access road to material site AA-MS-4.
- 9) Replaced drawing 3000-CE-2041 with an update that shows corrected label for material site AA-MS-5.

A map of Alaska showing its geographical features, major cities, and surrounding bodies of water. The map includes the following labels:

- Cities and Towns:** BARROW, CHURCH SEA, RED DOG MINE, EATONVILLE, FAIRBANKS, ANCHORAGE, BETHEL, SLEIGH, KODIAK, and WASILLA.
- Bodies of Water:** ARCTIC OCEAN, BEAUFORT SEA, CHURCH SEAS, BERING SEA, GULF OF ALASKA, and PACIFIC OCEAN.
- Geographical Features:** COAST RANGE, KODIAK, and WASILLA.
- Political Boundaries:** CANADA, UNITED STATES OF AMERICA, and RUSSIA.
- Coordinates:** The map shows latitude lines at 60°N, 70°N, and 80°N, and longitude lines at 150°W, 160°W, 170°W, and 180°W.

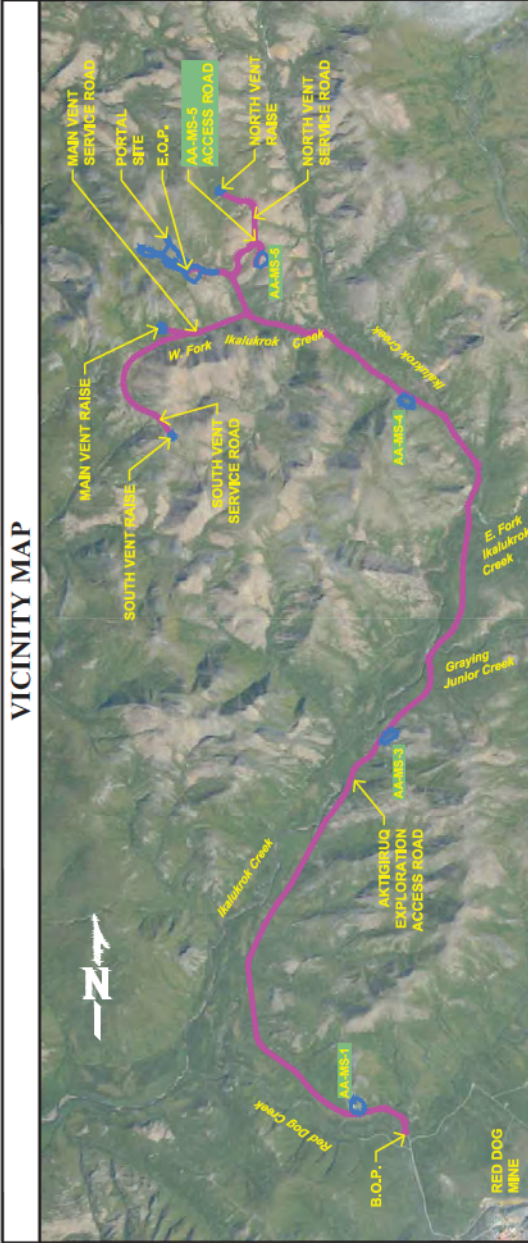
JANUARY 27, 2022

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Title: AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
COVER SHEET

www.kulerning.com	License # AEL0120081	Scale:	Dwg Size:	St:	Rev:
MMW/JOB#		AS SHOWN	D	1	D
RDM004					
			Drawing#:		
			3000-CE-2010		

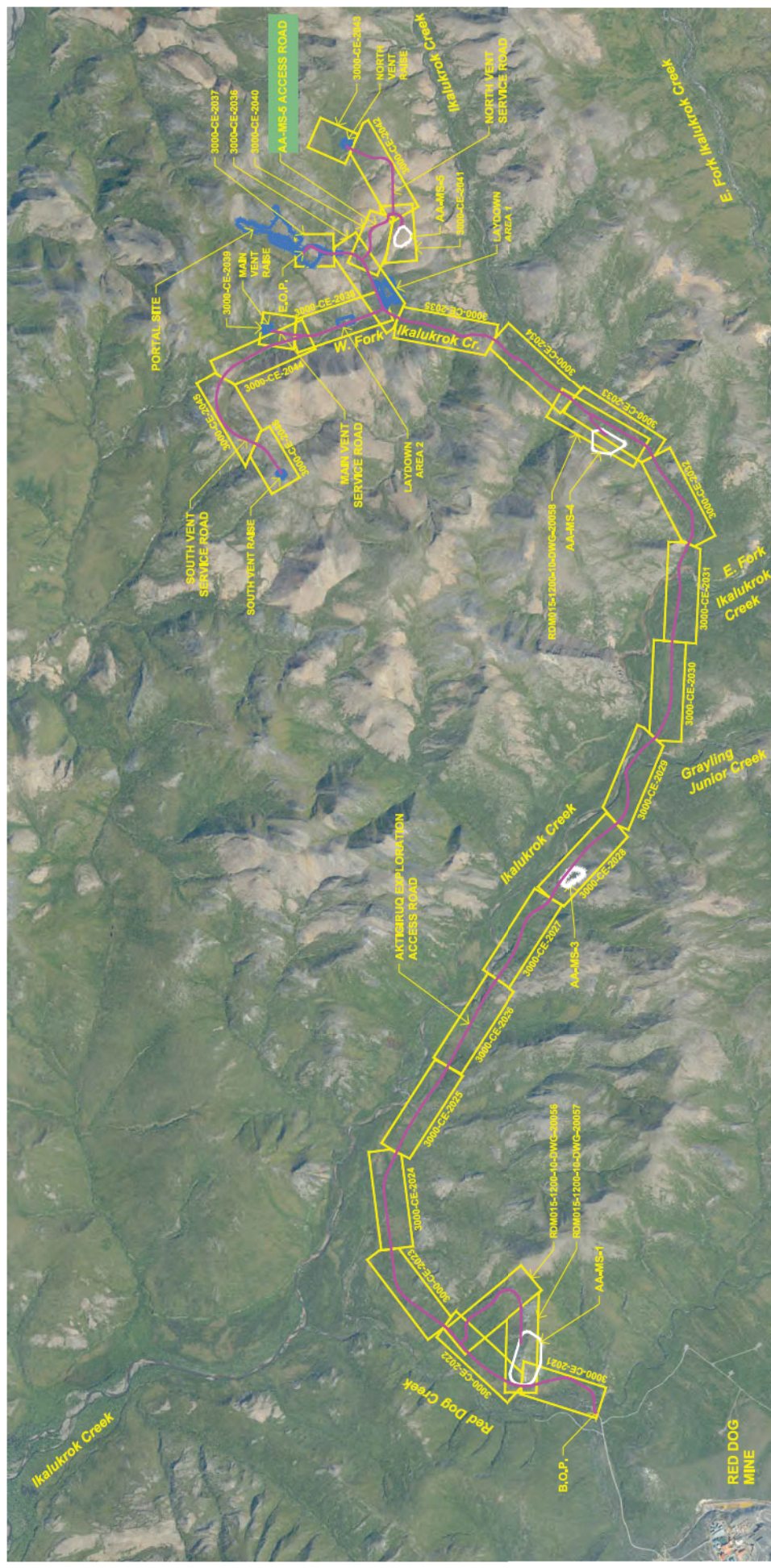
No.	Revision Description	Revised By	Checked By	Approved By	Draw. No.	Reference Drawings
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B					8	
C					7	
D					6	
E					5	
F					4	
G	ISSUED FOR PERMITTING	BLD	1/26/022	SEC	1/27/022	
H	ISSUED FOR PERMITTING	BLD	1/22/021	SEC	1/22/021	
I	ISSUED FOR PERMITTING	BLD	1/19/020	SEC	1/19/020	
J	ISSUED FOR REVIEW	BLD	1/20/19	SEC	1/20/19	
No.	Revision Description	Revised By	Checked By	Approved By	Draw. No.	Reference Drawings



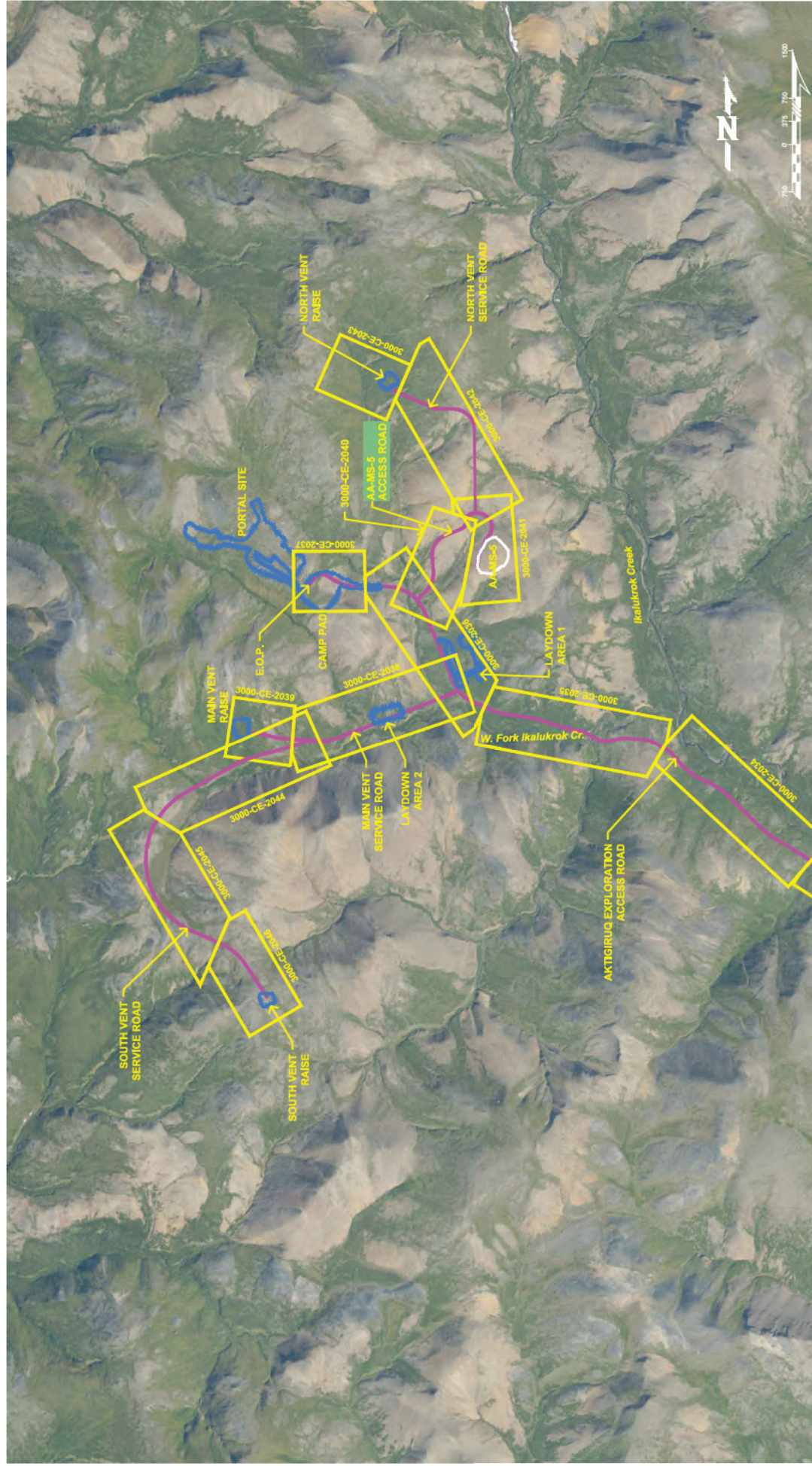
VICINITY MAP

INDEX OF SHEETS		
DRAWING NO.	DESCRIPTION	
	COVER SHEET	
3000-CE-0010	GENERAL INFORMATION	
3000-CE-0011	LEGEND, ABBREVIATIONS, & GENERAL NOTES	
3000-CE-0012	SHEET LAYOUT KEY MAP: OVERALL PROJECT AREA	
3000-CE-0013	SHEET LAYOUT KEY MAP: PORTAL AREA	
3000-CE-0014	SURVEY CONTROL SHEET	
	ESTIMATES AND SUMMARIES	
3000-CE-0015	ESTIMATE OF QUANTITIES	
3000-CE-0016	SUMMARY TABLES - 1	
3000-CE-0017	SUMMARY TABLES - 2	
	TYPICAL SECTIONS AND DETAILS	
3000-CE-0018	TYPICAL SECTIONS	
3000-CE-0019	CULVERT DETAILS	
3000-CE-0020	SIGN DETAILS	
3000-CE-0050	WEST FORK CULVERT DETAILS	
	PLAN AND PROFILE SHEETS	
3000-CE-0021	AKTUNRUG EXPLORATION ACCESS ROAD	
3000-CE-0023	AA-MS-1 SERVICE ROAD	
RD-MS-1000-10-DWG-0005	AKTUNRUG EXPLORATION ACCESS ROAD	
RD-MS-1000-10-DWG-0005	AKTUNRUG EXPLORATION ACCESS ROAD	
3000-CE-0023	AA-MS-4 SERVICE ROAD	
3000-CE-0034	AKTUNRUG EXPLORATION ACCESS ROAD	
3000-CE-0037	MAIN VENT SERVICE ROAD	
3000-CE-0038	THROUGH	
3000-CE-0039	AA-MS-5 SERVICE ROAD	
3000-CE-0040	THROUGH	
3000-CE-0041	NORTH VENT SERVICE ROAD	
3000-CE-0042	THROUGH	
3000-CE-0043	SOUTH VENT SERVICE ROAD	
3000-CE-0044	THROUGH	
3000-CE-0046	BRIDGE ABUTMENTS	
3000-CE-0046	GENERAL NOTES	
3000-CE-0441	TYPICAL WALL DETAILS - 1	
3000-CE-0442	TYPICAL WALL DETAILS - 2	
3000-CE-0443	TYPICAL BEARING DETAILS	
3000-CE-0444	FIXED END BEARING DETAILS	
3000-CE-0445	EXPANSION END BEARING DETAILS	
3000-CE-0446	BORING KEY	
3000-CE-0447	RED DOG CHECK	
3000-CE-0448	GRAYING JUNIOR CHECK	
3000-CE-0449	KAALOROK CREEK NO. 1	
3000-CE-0450	KAALOROK CREEK NO. 2	
3000-CE-0451	KAALOROK CREEK NO. 3	
PROJECT SUMMARY		
ROADWAY	WIDTH	LENGTH
AKTUNRUG EXPLORATION ACCESS ROAD	30 FT	48,942 FT (9.27 MI)
MAIN VENT SERVICE ROAD	20 FT	3,540 FT (0.67 MI)
AA-MS-1 SERVICE ROAD	50 FT	4,150 FT (0.78 MI)
AA-MS-4 SERVICE ROAD	50 FT	800 FT (0.15 MI)
AA-MS-5 SERVICE ROAD	20 FT	3,024 FT (0.57 MI)
NORTH VENT SERVICE ROAD	20 FT	2,979 FT (0.56 MI)
SOUTH VENT SERVICE ROAD	20 FT	6,401 FT (1.15 MI)

ISSUED FOR PERMITTING



Revision Description		Revised By	Checked By	Approved By	Dwg. No.	Reference Drawings	Title	
No.							Teck AMERICAN INCORPORATED  KUNA 4300 B Street, Suite 400 Anchorage, AK 99508 www.kunaeng.com License # ALR172851	AKTIGIRUQ & ANARRAQ EXPL. PROGRAM SHEET LAYOUT KEY MAP OVERALL PROJECT AREA
F	ISSUED FOR PERMITTING (UPDATED MATERIAL SITES & ACCESS)	SEC	9/2/2022	SEC	9/2/2022			
E	ISSUED FOR PERMITTING	SEC	2/7/2022	SEC	2/7/2022			
D	ISSUED FOR PERMITTING	B.D.	1/26/2022	SEC	12/7/2021			
C	ISSUED FOR PERMITTING	B.D.	1/22/2021	SEC	12/28/2021			
B	ISSUED FOR PERMITTING	B.D.	1/22/2021	SEC	12/28/2021			
A	ISSUED FOR PERMITTING	B.D.	1/22/2021	SEC	12/28/2021			
							Drawing # 3000-CE-2012 Dwg. Sub: D Scale: AS SHOWN RDM004	Sheet 1 of 1 Rev: F



Revision Description		Revised By	Checked By	Approved By	Dwg. No.	Referenced Drawings	
No.					1		
A	ISSUED FOR REVIEW	SEC 1/24/2020	SEC 1/24/2020		2		
B	ISSUED FOR APPROVAL	SEC 1/24/2020	SEC 1/24/2020		3		
C	ISSUED FOR PERMITTING	SEC 1/24/2020	SEC 1/24/2020		4		
D	ISSUED FOR PERMITTING	SEC 1/24/2020	SEC 1/24/2020		5		
E	ISSUED FOR PERMITTING	SEC 2/7/2022	SEC 2/7/2022		6		
F	ISSUED FOR PERMITTING (UPDATED MATERIAL SOURCE)	SEC 9/2/2023	SEC 9/2/2023		7		

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MAN/LOMB RDM004

Scale: AS SHOWN

Dwg. No.: D

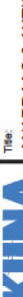
Drawing #: 3000-CE-2013

Rev: 1

Rev: F

Title: ANARRAQ & AKTIGIRUQ EXPL. PROGRAM
SHEET LAYOUT KEY MAP
PORTAL AREA

No.	Revision Description	Revised By	Checked By	Approved By	Reference Drawings
B	ISSUED FOR APPROVAL	BLL	1/23/2020	TM	1/24/2020
A	ISSUED FOR REVIEW	BLL	12/27/19	TM	12/27/2019
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8					
7					
6					
5					
4					
3					
2					
1					



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 KUNA KUNA ENGINEERING 4300 B Street, Ste 400 Calgary, Alberta T2C 1A9 Tel: 403.243.8888 Fax: 403.243.8889 www.kunaeng.com P# 607-339-4327 License # AEL-512681		Title: ANRRRAQ & AKTIGIRUQ EXPL. PROGRAM SURVEY CONTROL SHEET	
		Dwg Size: D Drawing #: 3000-CE-2014	Rev: 1 Sr: B

Scale: **MM=100' 0"**
RDM004A1

AS SHOWN

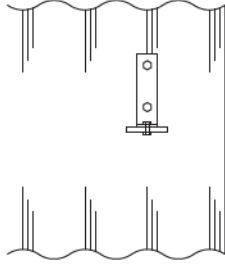
ESTIMATE OF QUANTITIES

ITEM DESCRIPTION	UNIT	AKTIGUAQ EXPL. ACCESS ROAD	MAIN VENT SERVICE ROAD	M5-5 SERVICE ROAD	NORTH VENT SERVICE ROAD	SOUTH VENT SERVICE ROAD
CLEARING						
UNCLASSIFIED EXCAVATION	ACRE	20	1.2	1.0	1.1	2.4
GENERAL EMBANKMENT FILL (PIT RUN, 12-INCH MINUS)	CUBIC YARD	94,397	4,306	19,969	16,633	57,400
PIPE BEDDING 2-INCH MINUS	CUBIC YARD	545,110	31,918	11,268	22,887	36,755
SURFACING MATERIAL, 2-INCH MINUS	CUBIC YARD	7,805	355		213	219
PRECAST CONCRETE ABUTMENT BLOCKS, 3' x 3' x 8'	CUBIC YARD	4,651	2,614	2,540	1,105	2,724
TEMPORARY BAILEY-TYPE STEEL BRIDGE, 14121 LF	EACH	210				
TEMPORARY BAILEY-TYPE STEEL BRIDGE, 14121 LF	EACH	3				
24-INCH PIPE	LINEAR FOOT	835				180
30-INCH PIPE	LINEAR FOOT	395				
36-INCH PIPE	LINEAR FOOT	531	90			
42-INCH PIPE	LINEAR FOOT	593				
48-INCH PIPE	LINEAR FOOT	99	113			
84-INCH PIPE	LINEAR FOOT	298				
96-INCH PIPE	LINEAR FOOT	297				
24-INCH PIPE FOR CROSS CULVERTS	LINEAR FOOT	1,860	4		175	
CULVERT MARKER POSTS	EACH	92			2	4
STANDARD SIGNS	SQUARE FOOT	7.50				
DELINEATOR, SNOW	EACH	990	72	62	60	132
GEOTEXTILE, SEPARATION, CLASS 1	SQUARE YARD	261,500				

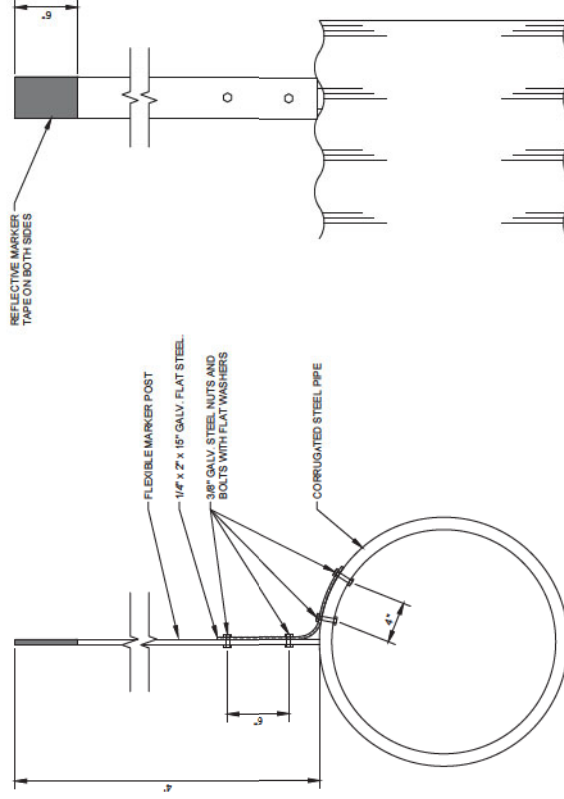
QUANTITY ESTIMATION NOTES:

- CLEARING QUANTITIES WERE ESTIMATED AS 25% OF THE ROAD EMBANKMENT FOOTPRINT.
- UNCLASSIFIED EXCAVATION VOLUMES SHOWN ARE IN-PLACE BANK VOLUMES.
- UNCLASSIFIED EXCAVATION INCLUDES EXCAVATION OF ALL KINDS.
- UNCLASSIFIED EXCAVATION SHOULD BE REUSED IF IT MEETS MATERIAL SPECIFICATIONS.
- ALL BORROW AND AGGREGATE SURFACE COURSE MATERIAL QUANTITIES SHOWN ARE IN-PLACE COMPACTED FINAL VOLUMES.
- NO ALLOWANCE HAS BEEN MADE FOR THAW SETTLEMENT OF THE SUBGRADE OR POORLY COMPACTED FROZEN MATERIAL.
- PIPE BEDDING QUANTITY WAS ESTIMATED AS THE CROSS-SECTION OF A SQUARE (2 FEET LARGER THAN THE CULVERT, BUT NOT INCLUDING THE PIPE) TIMES THE CULVERT LENGTH.
- BORROW (PIT RUN AND PIPE BEDDING) QUANTITIES SHOWN DO NOT INCLUDE ANY REUSE OF USABLE EXCAVATION.
- TEMPORARY BRIDGES INCLUDE ALL ITEMS REQUIRED, EXCEPT THE CONCRETE BLOCK ABUTMENTS.
- 24-INCH PIPE CROSS CULVERTS WILL NEED TO BE FIELD FIT TO MEET THE DRAINAGE NEEDS OF THE PROJECT. THE STATIONS IN THE DESIGN ARE APPROXIMATE BASED ON SURFACE DATA.
- CULVERT MARKER POSTS WERE ASSUMED TO BE LOCATED AT EACH END OF THE CULVERTS.
- SNOW DELINEATORS WERE ASSUMED TO BE SPACED AT 100 FEET AND LOCATED ON BOTH SIDES OF THE ROADS.
- GEOTEXTILE QUANTITIES WERE ESTIMATED AS 120% OF THE ROAD FOOTPRINT AREA TO BE COVERED.
- FILL QUANTITIES SHOWN ON THE PLAN AND PROFILE SHEETS IS GENERAL EMBANKMENT AND SURFACING MATERIAL COMBINED.
- SURFACING MATERIAL, 2-INCH MINUS INCLUDES BERM MATERIAL VOLUME.

				Title: AKTIGUAQ & ANARRAQ EXPL. PROGRAM ESTIMATE OF QUANTITIES	
Revision Description		Scale: AS SHOWN		Drawing #: 3000-CE-2015	
No.		Date:		Rev:	
1. ISSUED FOR PERMITTING		1/20/2022		1	
2. ISSUED FOR PERMITTING		1/22/2021		2	
3. ISSUED FOR PERMITTING		1/22/2020		3	
4. ISSUED FOR PERMITTING		1/22/2020		4	
5. ISSUED FOR PERMITTING		1/22/2020		5	
6. ISSUED FOR PERMITTING		1/22/2020		6	
7. ISSUED FOR PERMITTING		1/22/2020		7	
8. ISSUED FOR PERMITTING		1/22/2020		8	
9. ISSUED FOR PERMITTING		1/22/2020		9	
10. ISSUED FOR PERMITTING		1/22/2020		10	
11. ISSUED FOR PERMITTING		1/22/2020		11	
12. ISSUED FOR PERMITTING		1/22/2020		12	
13. ISSUED FOR PERMITTING		1/22/2020		13	
14. ISSUED FOR PERMITTING		1/22/2020		14	
15. ISSUED FOR PERMITTING		1/22/2020		15	



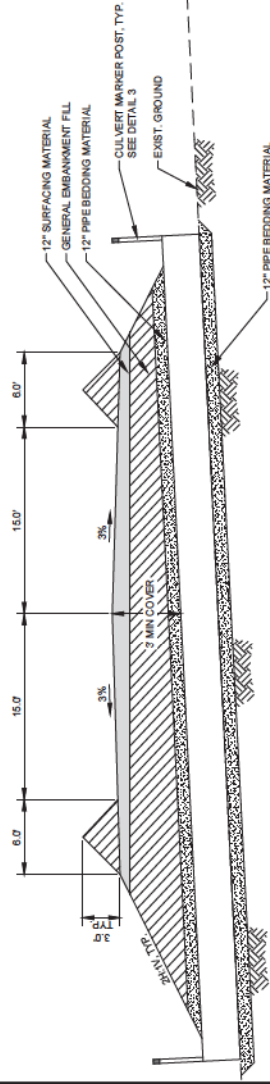
TOP VIEW



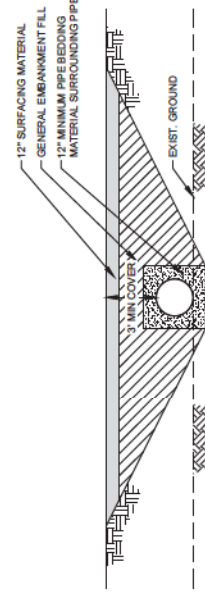
END VIEW

SIDE VIEW

CULVERT MARKER POST INSTALLATION $\frac{3}{3000\text{-CE-2019}}$
SCALE: 1" = 3'



CULVERT SECTION 1
SCALE: 1" = 3'



CULVERT SECTION 2
SCALE: 1" = 3'

Revision Description		Revised By	Checked By	Approved By	Dwg. No.	Reference Drawings	
No.							
A	ISSUED FOR PERMITTING						
B	ISSUED FOR PERMITTING						
C	ISSUED FOR PERMITTING						
D	ISSUED FOR PERMITTING						
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No.							
A	ISSUED FOR PERMITTING						
B	ISSUED FOR PERMITTING						
C	ISSUED FOR PERMITTING						
D	ISSUED FOR PERMITTING						

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AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
CULVERT DETAILS

MANULOGRA

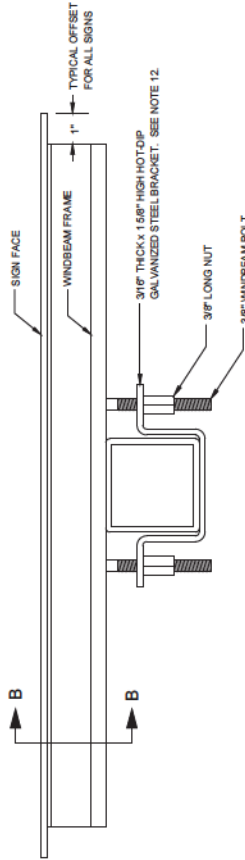
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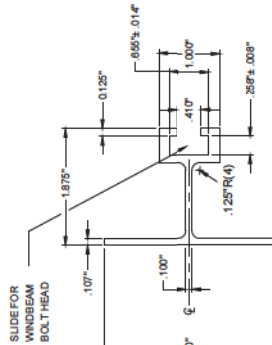
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Rev: D

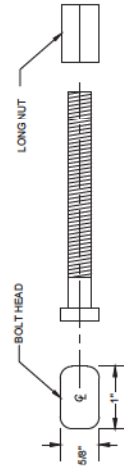


WINDBEAM LOCATIONS

SECTION A - A TYPICAL SIGN ATTACHMENT DETAILS AT EACH WINDBEAM



SECTION B - B WINDBEAM CROSS SECTION



3/8" WINDBEAM BOLT AND LONG NUT

SIGN FRAMING DETAILS

SCALE: NTS

3000-CE-2020

3000-CE-2020

POST OFFSET AND HEIGHT

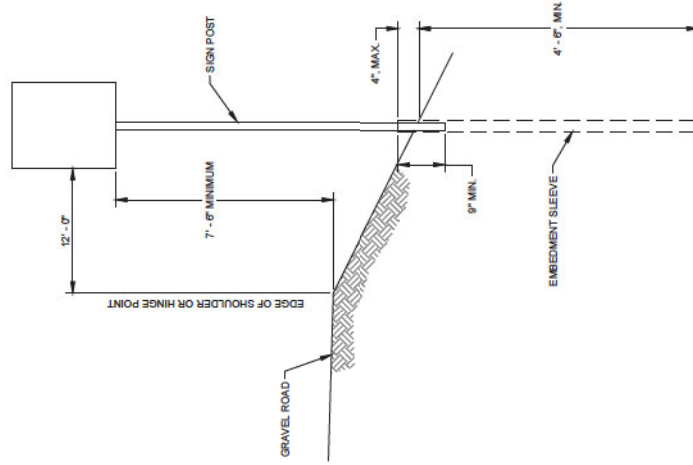
SCALE: NTS

2

7

NOTES:

1. SIGN POSTS SHALL BE 2.5" PERFORMED STEEL TUBE.
2. EMBEDMENT SLEEVES SHALL BE 3"x3"x1/4" STEEL TUBE, EMBEDDED A MINIMUM OF 4'-0" INTO THE GROUND.
3. SIGN POSTS SHALL BE MOUNTED IN THE STEEL TUBE EMBEDMENT SLEEVES USING 3/8" DIA. BOLTS, NUTS AND FLAT WASHERS. SIGN POST SHALL HAVE AT LEAST A 9" OVERLAP INTO THE EMBEDMENT SLEEVE.



POST OFFSET AND HEIGHT

SCALE: NTS

2

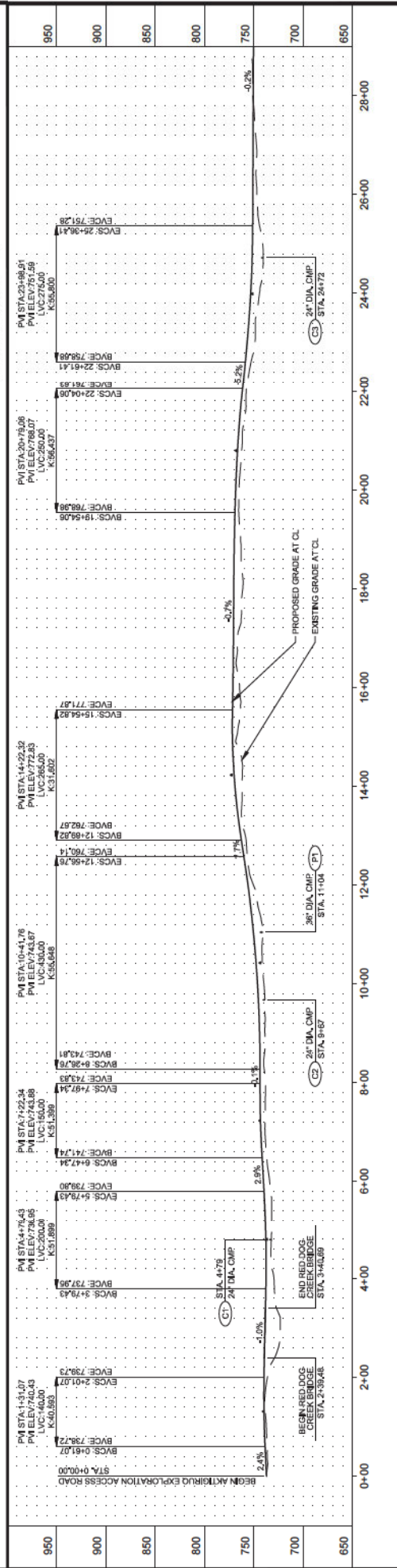
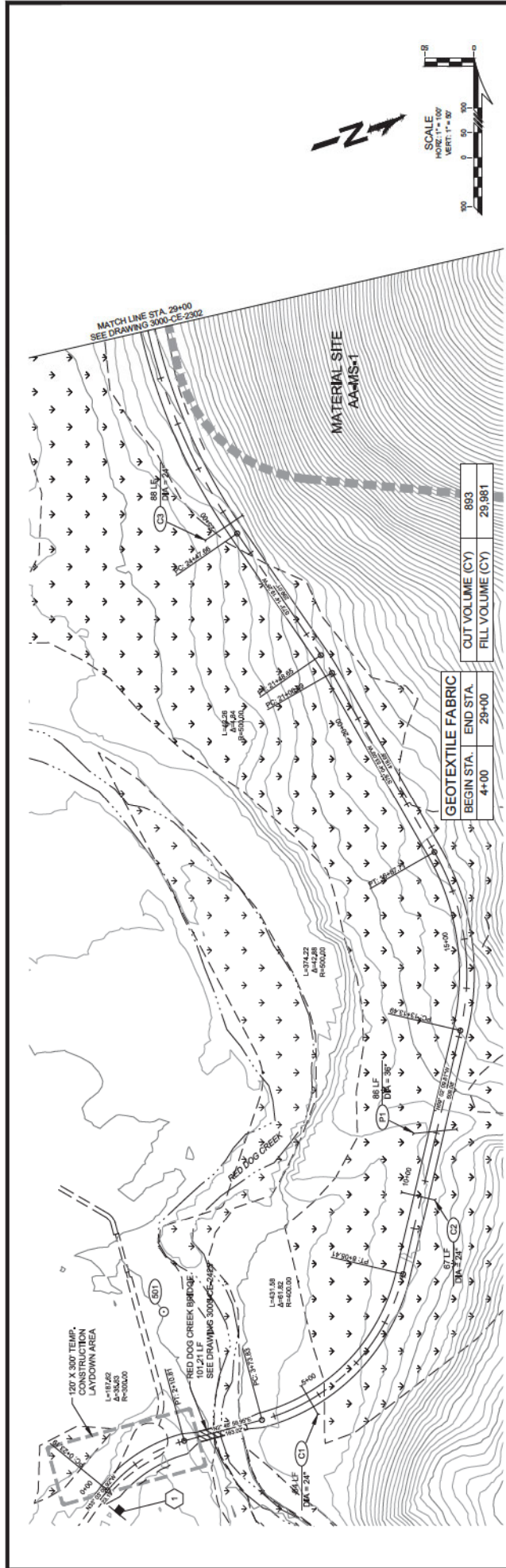
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C	ISSUED FOR PERMITTING	SJC	1/27/2021	3	
B	ISSUED FOR PERMITTING	SJC	1/27/2021	2	
A	ISSUED FOR REVIEW	SJC	1/22/19	1	
No.					

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	Title:		AKTIGIRUQ & ANARRAQ EXPL. PROGRAM SIGN DETAILS	
	MW/C/O/B#	Social	Dwg Size:	Rev:
RDM004	AS SHOWN	D	3000-CE-2020	1
				D

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Revision Description		Checked by	Approved by	Dwg. No.	Reference Drawings	
A	ISSUED FOR REVIEW			1		
B	ISSUED FOR APPROVAL			2		
C	ISSUED FOR PERMITTING			3		
D	ISSUED FOR PERMITTING (UPDATED MATERIAL SITE)			4		
E	ISSUED FOR PERMITTING (UPDATED MATERIAL SITE)			5		

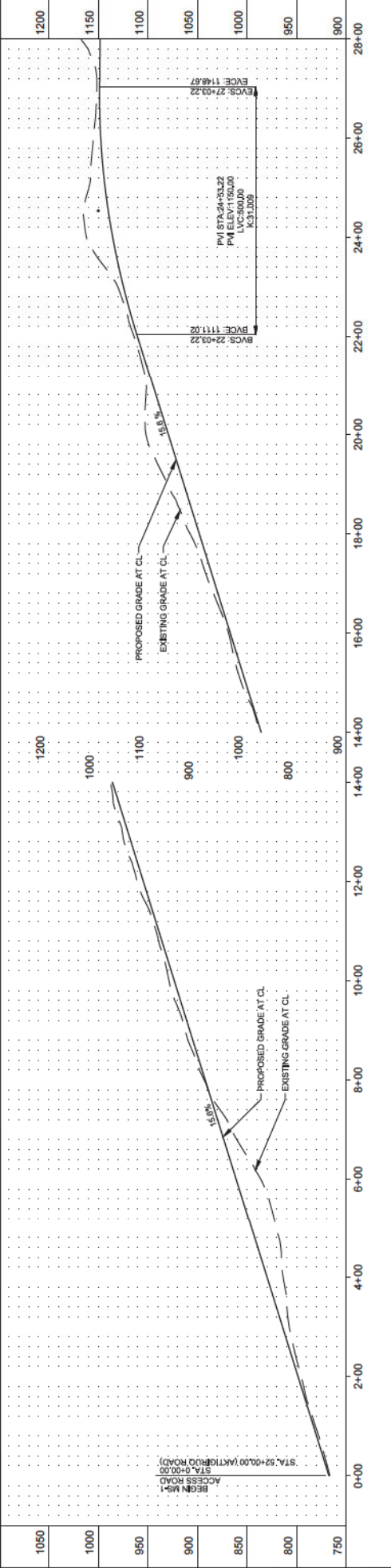
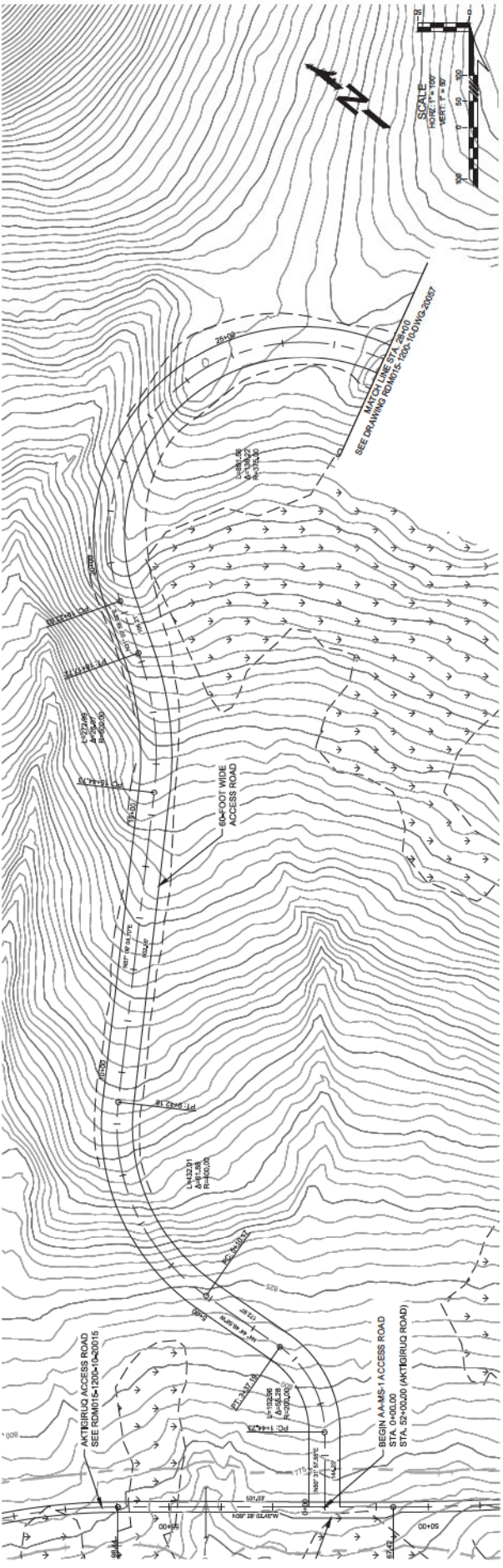
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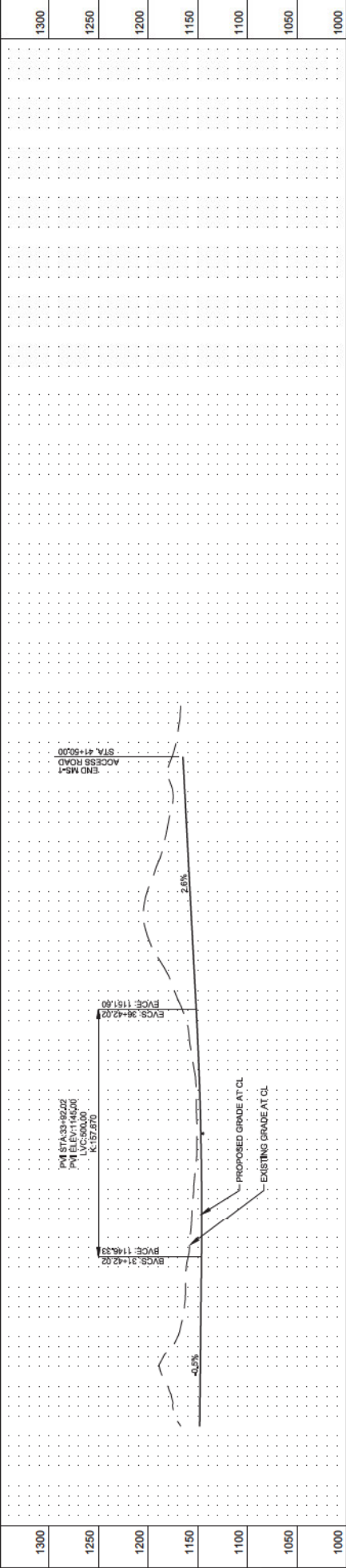
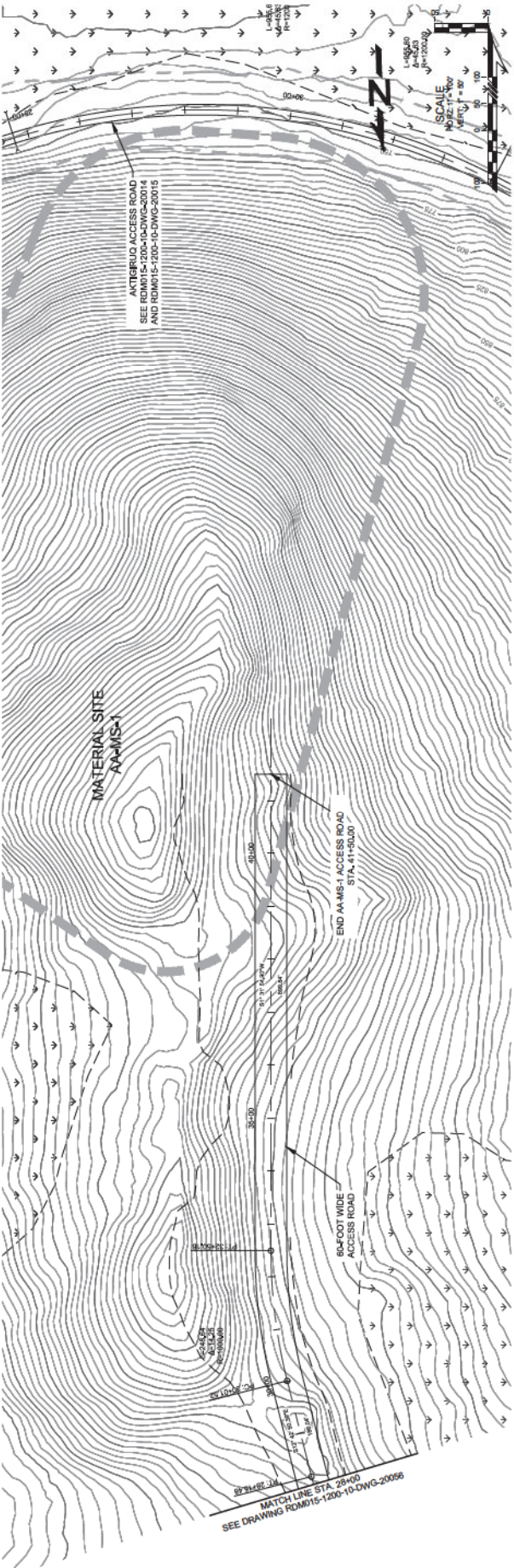
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A	ISSUED FOR REVIEW			1		
B	ISSUED FOR APPROVAL			2		
C	ISSUED FOR PERMITTING			3		
D	ISSUED FOR PERMITTING (UPDATED MATERIAL SITE)			4		
E	ISSUED FOR PERMITTING (UPDATED MATERIAL SITE)			5		

AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
PLAN AND PROFILE
AKTIGIRUQ EXPLORATION ACCESS ROAD

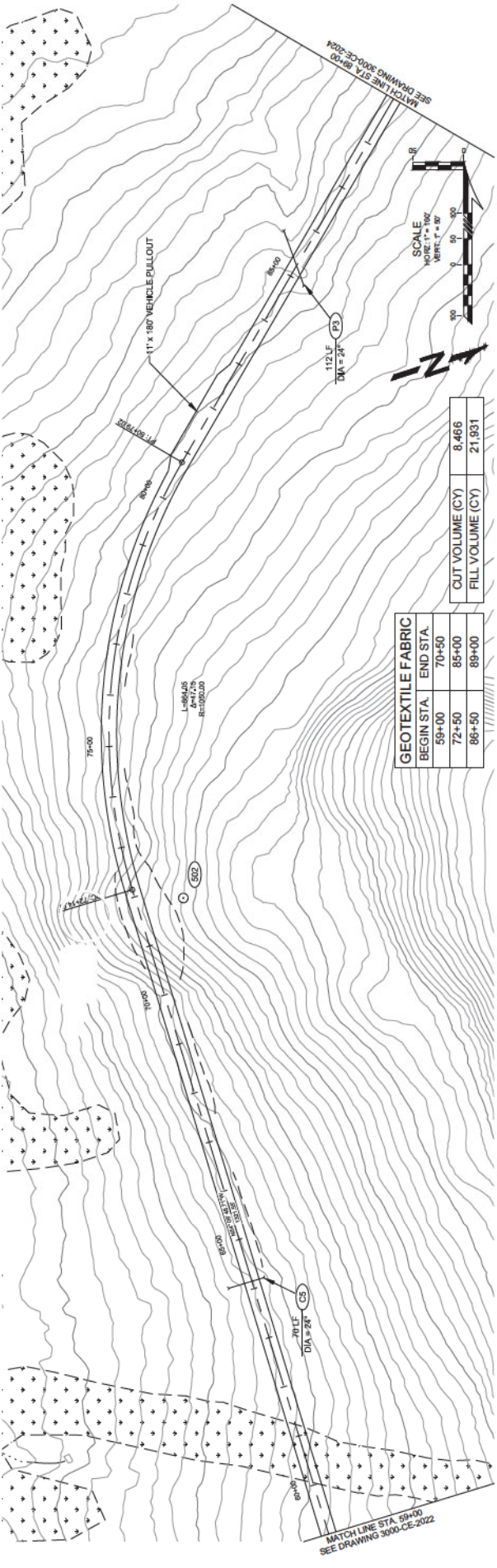
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Dwg. No.: 3000-CE-2021
Rev: 1
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				Title AKTIGIRUQ & ANARRAQ ACCESS ROAD PLAN AND PROFILE AA-MS-1 ACCESS ROAD		Rev: A	
No.		Revision Description		Scale AS SHOWN		Drawing # RDM015-1200-10-DWG-20056	
A. ISSUED FOR PERMIT (JEP)		BLD. 9/30/22 SEC. 9/30/22		Dwg. Size D		Drawing # RDM015-1200-10-DWG-20056	
No.		Revision Description		Scale AS SHOWN		Drawing # RDM015-1200-10-DWG-20056	

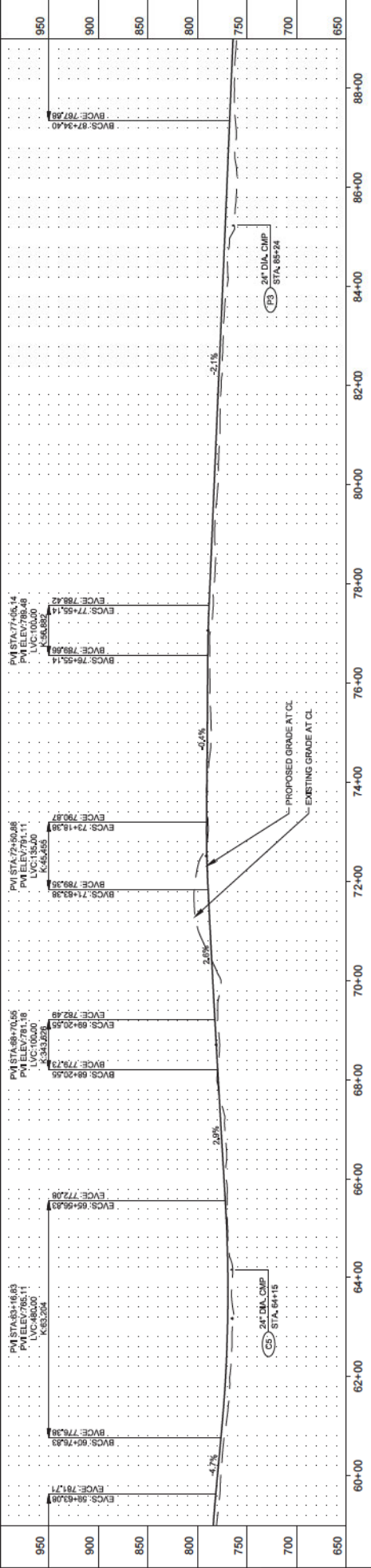


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No. 1 Description: ISSUED FOR PERMIT (FP) (UPDATED MATERIAL SITE) Date: 02/22/2022 Checked by: SEC Approved by: SEC		No. 2 Description: ISSUED FOR PERMIT (FP) Date: 02/22/2022 Checked by: SEC Approved by: SEC		No. 3 Description: REVISION Date: 02/22/2022 Checked by: SEC Approved by: SEC		Reference Drawing



GEOTEXTILE FABRIC		
BEGIN STA.	END STA.	
59+00	70+50	8,466
72+50	85+00	21,931
86+50	89+00	

BEGIN STA.	END STA.	CUT VOLUME (CY)	FILL VOLUME (CY)
59+00	70+50	8,466	21,931
72+50	85+00		
86+50	89+00		



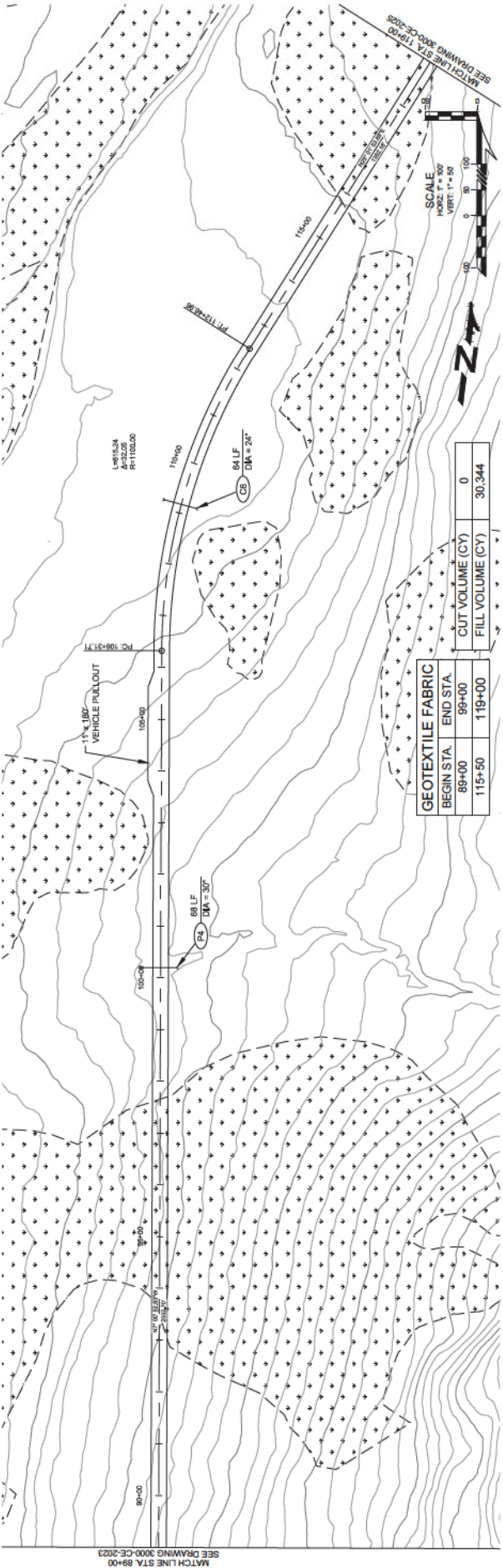
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C	ISSUED FOR PERMITTING			3		
D	ISSUED FOR PERMITTING			4		
E	ISSUED FOR PERMITTING			5		
F	ISSUED FOR PERMITTING			6		
G	ISSUED FOR PERMITTING			7		
H	ISSUED FOR PERMITTING			8		
I	ISSUED FOR PERMITTING			9		

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 ANCHORAGE, AK 99503
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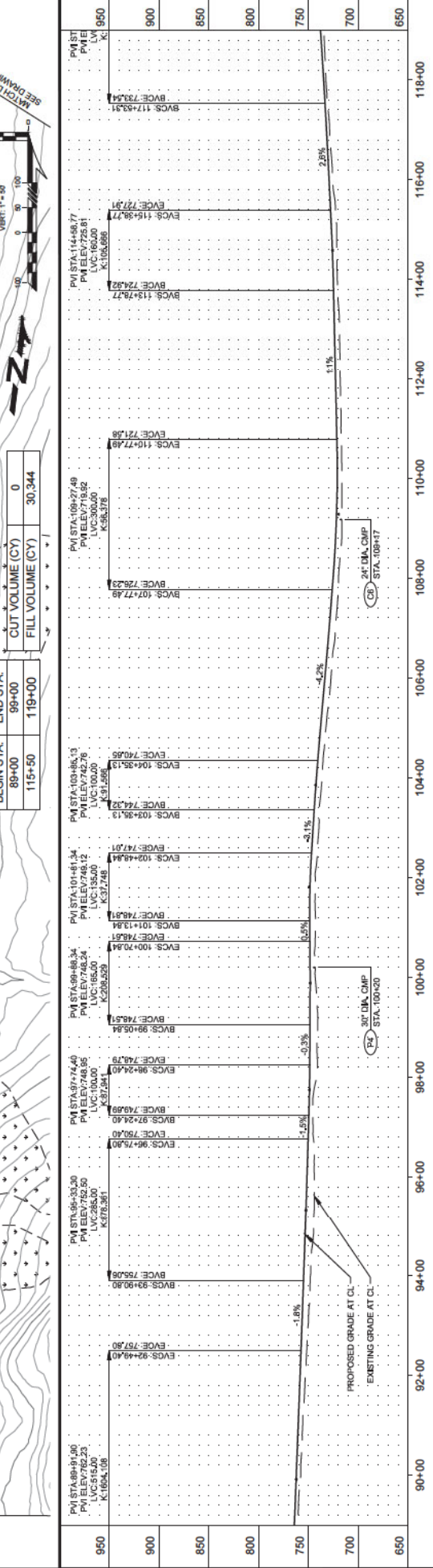
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Title: AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
 PLAN AND PROFILE
 AKTIGIRUQ EXPLORATION ACCESS ROAD

Scale: AS SHOWN
 Drawing #: 3000-CE-2023
 Dwg. Sta.: D
 Rev.: 1



GEOTEXTILE FABRIC		
BEGIN STA.	END STA.	
115+50	119+00	0
		30,344



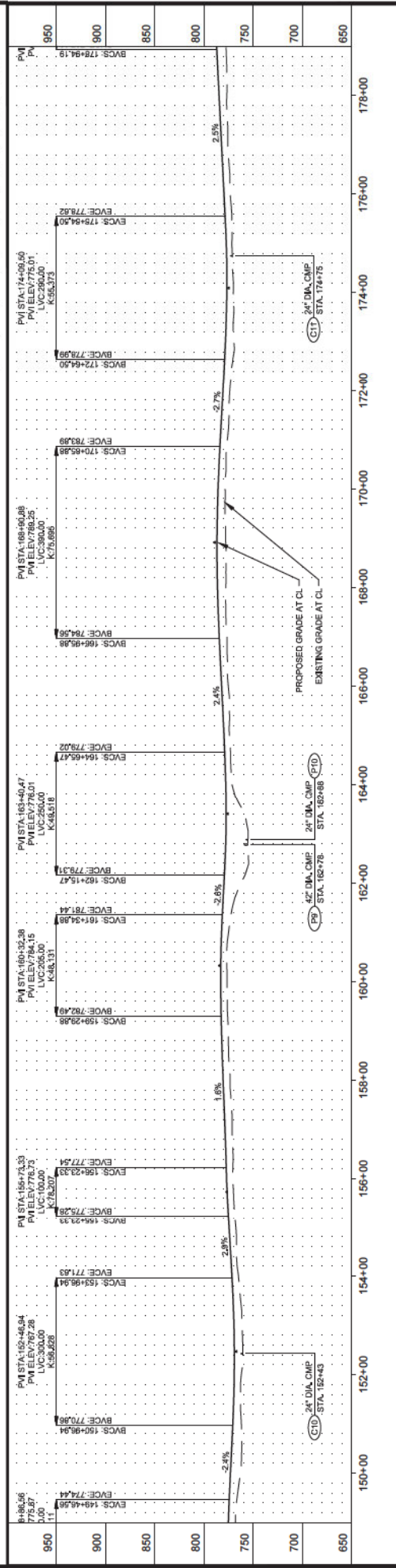
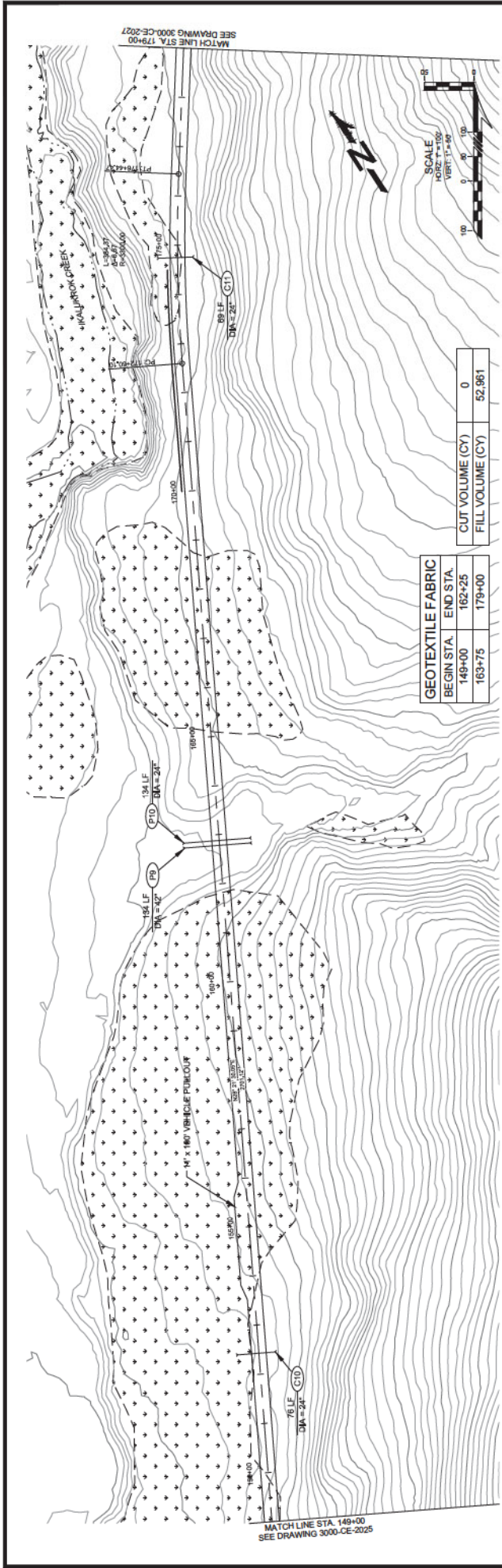
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Anchorage, AK 99501
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Project: AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
Plan and Profile
AKTIGIRUQ EXPLORATION ACCESS ROAD

Scale: AS SHOWN
Drawing #: 3000-CE-2024
Sheet: 1 of 1
Rev: D

No.	Revision Description	Reviewed by	Checked by	Approved by	Dwg. No.	Reference Drawings
4	ISSUED FOR PERMITTING					
3	ISSUED FOR PERMITTING					
2	ISSUED FOR PERMITTING					
1	ISSUED FOR PERMITTING					



Revision Description				Approved By		Checked By		Designed By		Reference Drawings	
D	ISSUED FOR PERMITTING	BAD	1/27/2022	SEC	1/27/2022						
C	ISSUED FOR PERMITTING	BAD	1/27/2021	SEC	1/27/2021						
B	ISSUED FOR PERMITTING	BAD	1/27/2020	SEC	1/27/2020						
A	ISSUED FOR PERMITTING	BAD	1/27/2019	SEC	1/27/2019						
No.											

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 License # 461572851

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AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
PLAN AND PROFILE
AKTIGIRUQ EXPLORATION ACCESS ROAD

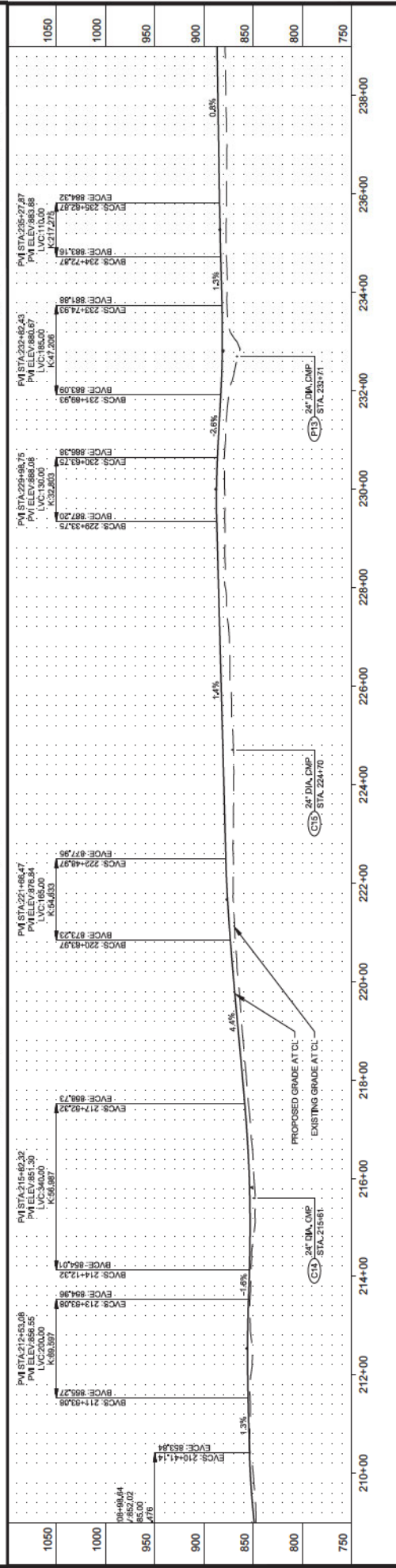
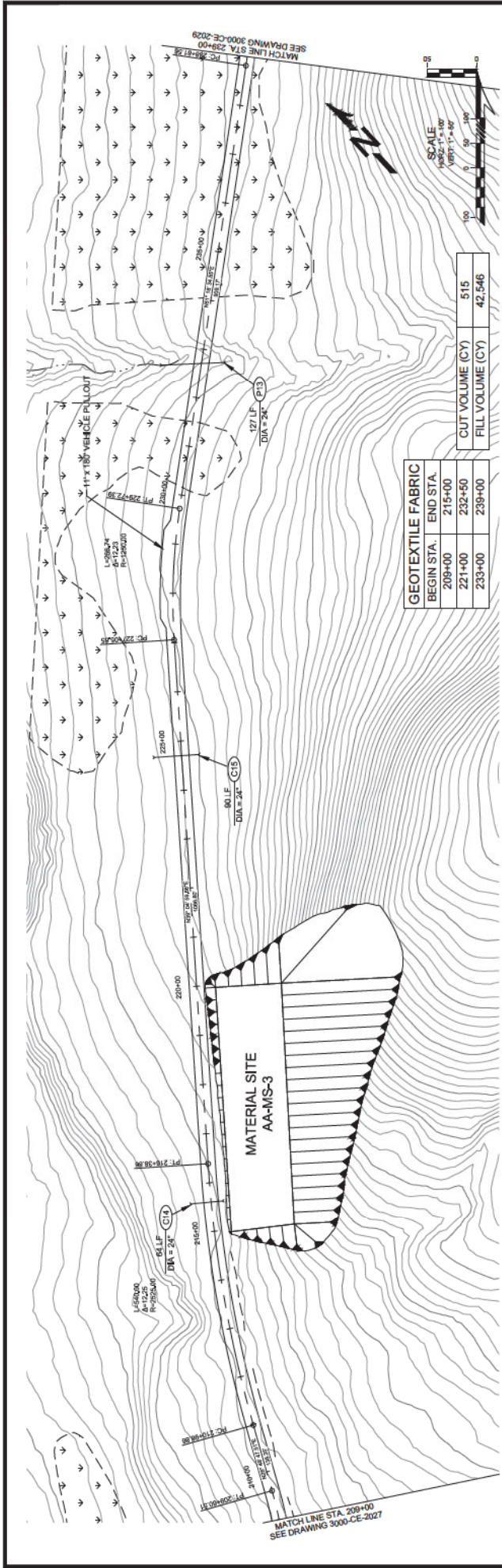
Rev.	1	D
Sh.	1	D
Dwg. No.	3000-CE-2028	
Scale	AS SHOWN	
Dwg. Size	D	
Drawing #	3000-CE-2028	

SCALE
 1" = 100'
 VERT. 1" = 50'

NORTH

BEGIN STA.	END STA.
149+00	162+25
163+75	179+00
CUT VOLUME (CY) 0	
FILL VOLUME (CY) 52,961	

BEGIN STA.	END STA.
149+00	162+25
163+75	179+00
CUT VOLUME (CY) 0	
FILL VOLUME (CY) 52,961	



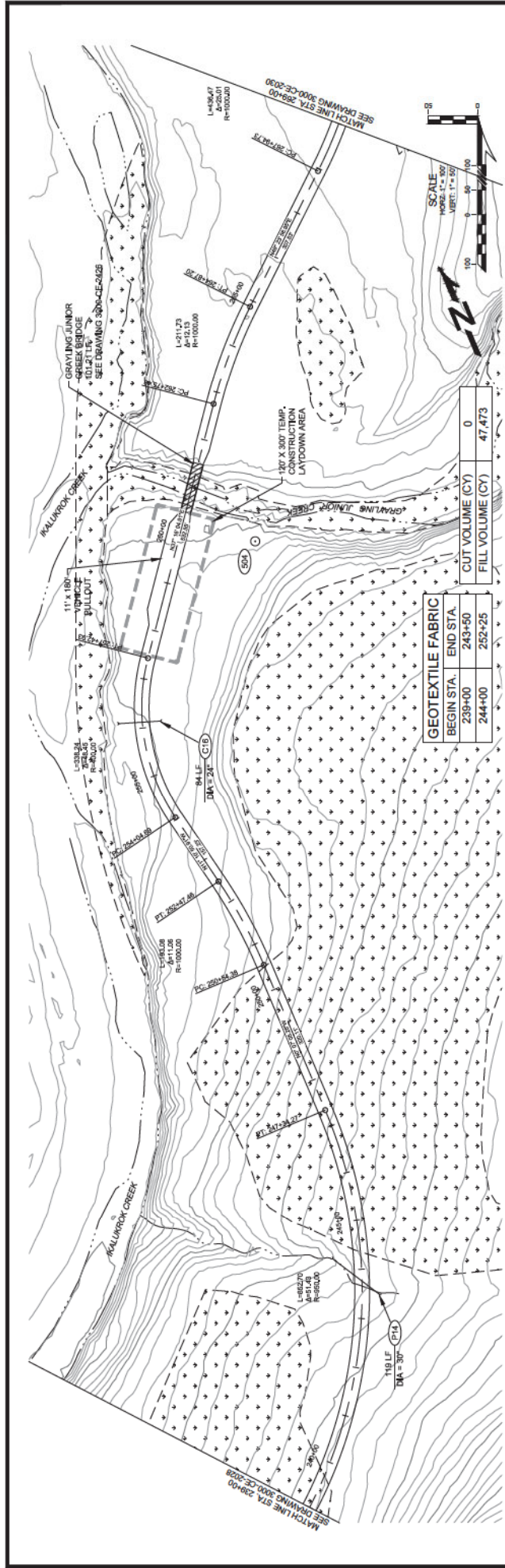
Revision Description				Approved By				Checked By				Reviewed By				No.			
E ISSUED FOR PERMITTING (UPDATED MATERIAL SITE)				SEC 9/22/2022				SEC 9/22/2022				SEC 9/22/2022				SEC 9/22/2022			
D ISSUED FOR PERMITTING				SEC 10/20/2022				SEC 10/20/2022				SEC 10/20/2022				SEC 10/20/2022			
C ISSUED FOR PERMITTING				SEC 12/22/2021				SEC 12/22/2021				SEC 12/22/2021				SEC 12/22/2021			
B ISSUED FOR PERMITTING				SEC 12/22/2021				SEC 12/22/2021				SEC 12/22/2021				SEC 12/22/2021			
A ISSUED FOR PERMITTING				SEC 12/22/2021				SEC 12/22/2021				SEC 12/22/2021				SEC 12/22/2021			

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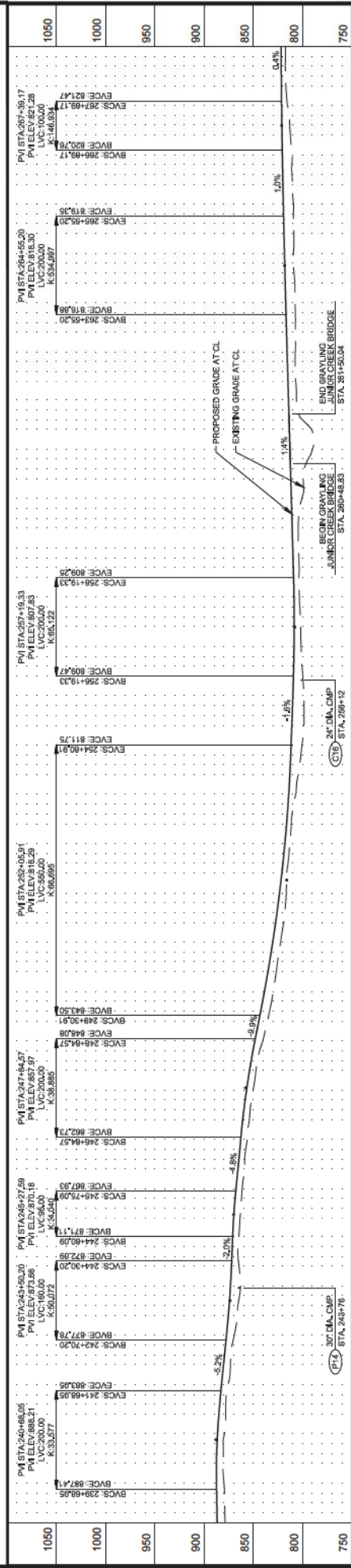
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AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
PLAN AND PROFILE
AKTIGIRUQ EXPLORATION ACCESS ROAD

Rev.	Dwg. No.	Dwg. Title	Scale	AS SHOWN	3000-CE-2028	1	E
	D						



GEOTEXTILE FABRIC		
BEGIN STA.	END STA.	
239+00	243+50	
244+00	252+25	
		CUT VOLUME (CY) 0
		FILL VOLUME (CY) 47,473



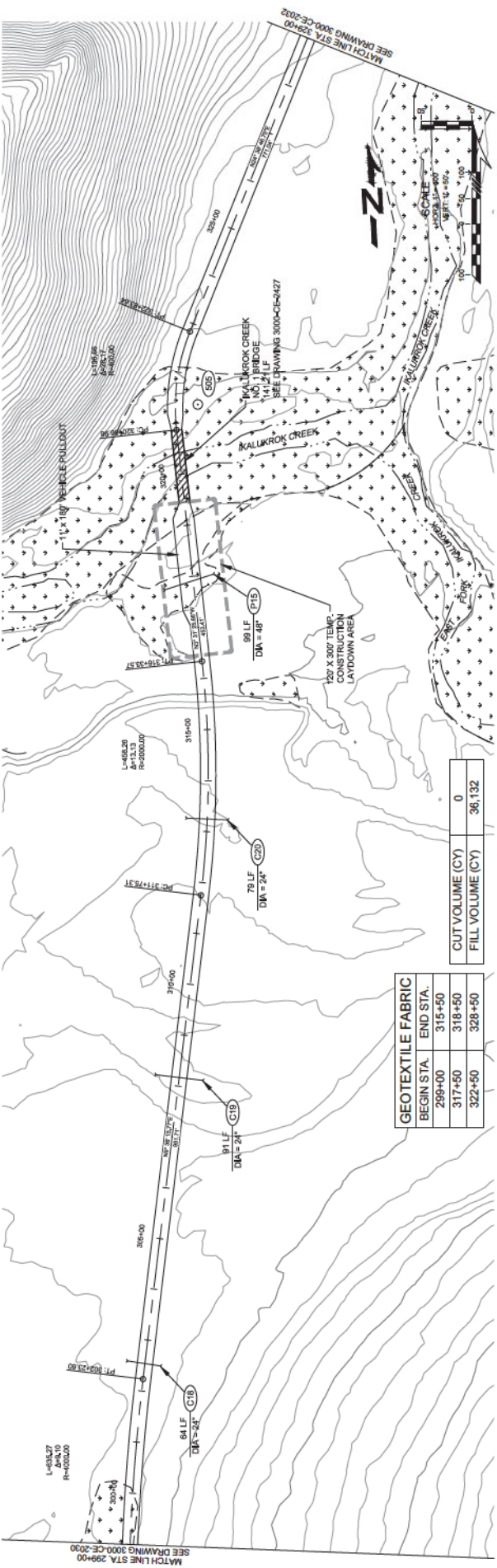
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C	ISSUED FOR PERMITTING						
B	ISSUED FOR PERMITTING						
A	ISSUED FOR PERMITTING						
Revision Description		Revised By	Checked By	Approved By	Dwg. No.	Reference Drawings	
1	ISSUED FOR PERMITTING						
2	ISSUED FOR PERMITTING						
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7	ISSUED FOR PERMITTING						
8	ISSUED FOR PERMITTING						
9	ISSUED FOR PERMITTING						

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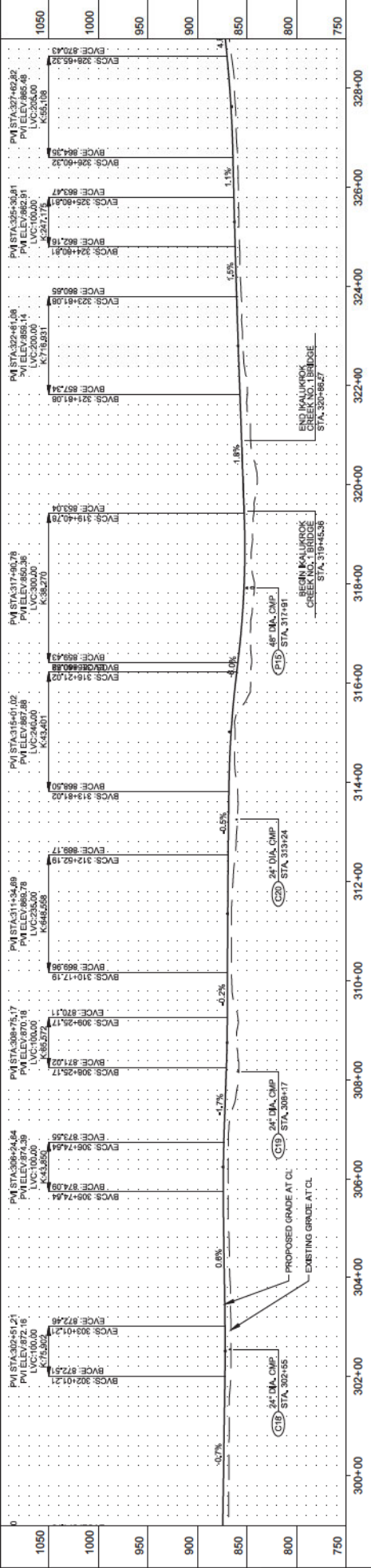
AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
PLAN AND PROFILE
AKTIGIRUQ EXPLORATION ACCESS ROAD

Title: **AKTIGIRUQ & ANARRAQ EXPL. PROGRAM**
 Plan and Profile: **AKTIGIRUQ EXPLORATION ACCESS ROAD**
 Drawing #: **3000-CE-2029**
 Dwg. Size: **D**
 Scale: **AS SHOWN**
 Author: **RM004**
 Date: **3000-CE-2029**
 Rev: **1**
 D: **D**



GEOTEXTILE FABRIC

BEGIN STA.	END STA.	CUT VOLUME (CY)	FILL VOLUME (CY)
299+00	315+50	0	36,132
317+50	318+50		
322+50	328+50		



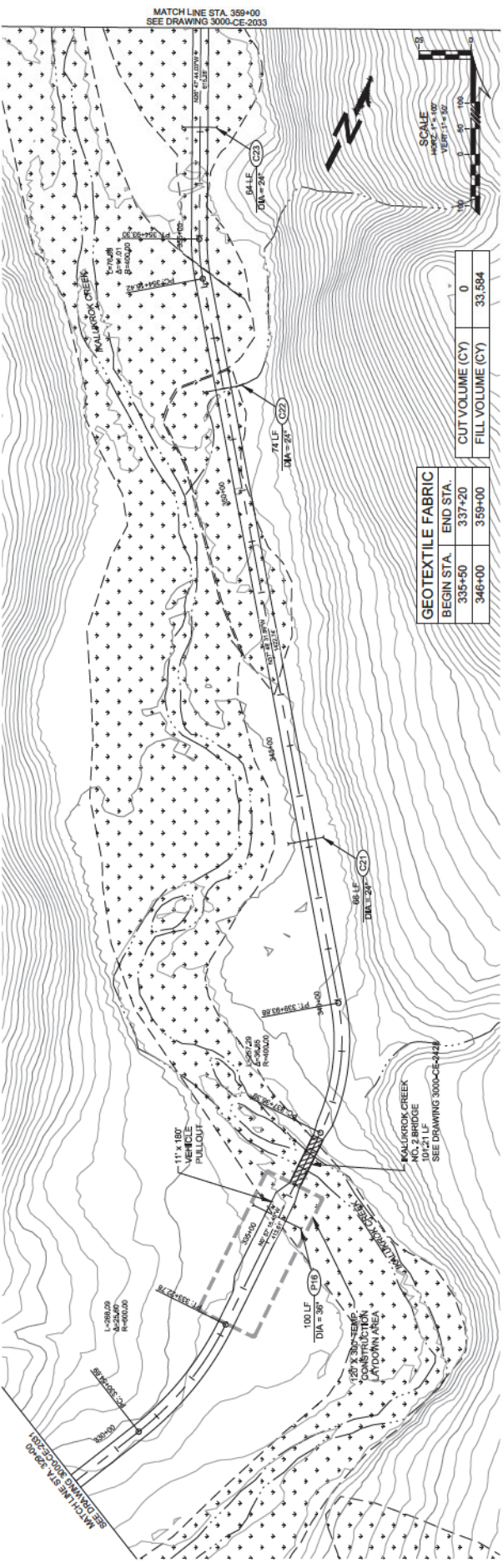
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AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
PLAN AND PROFILE
AKTIGIRUQ EXPLORATION ACCESS ROAD

Scale: AS SHOWN
Drawing #: 3000-CE-2031
Sheet: 1 of 1
Rev: D

Revised By: []
Checked By: []
Approved By: []
Dwg. No.: []
Reference Drawings: []

Revised Description: []



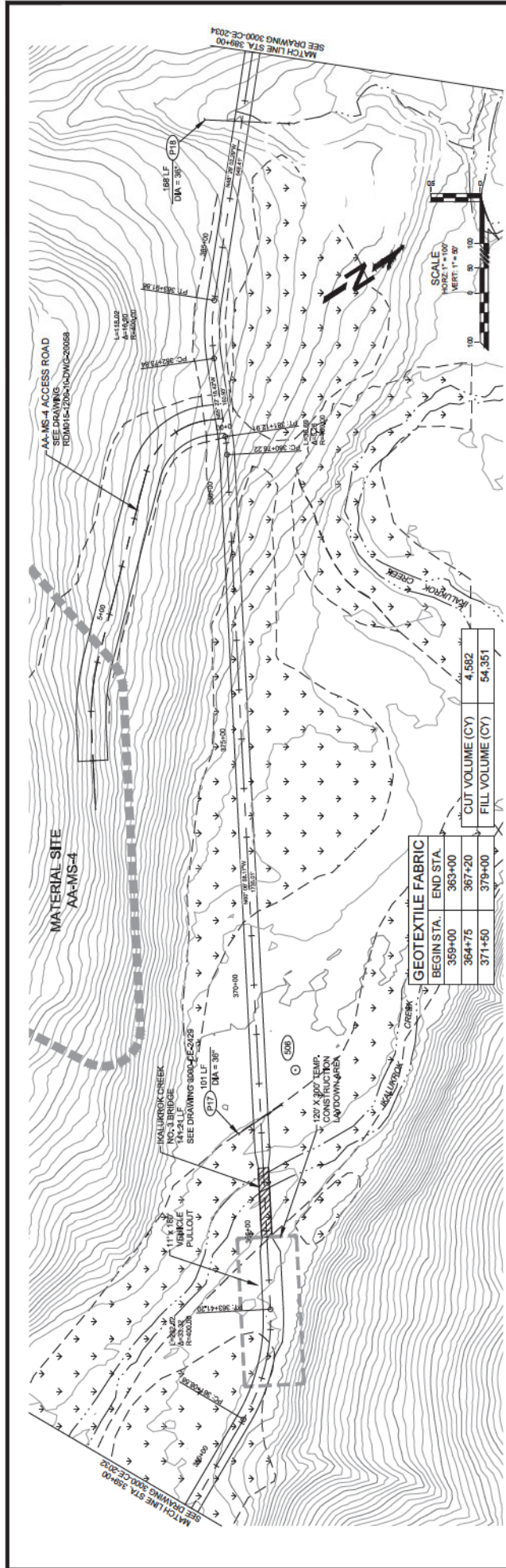
GEOTEXTILE FABRIC	
BEGIN STA.	END STA.
335+50	337+20
346+00	359+00

CUT VOLUME (CY)	FILL VOLUME (CY)
0	33,584

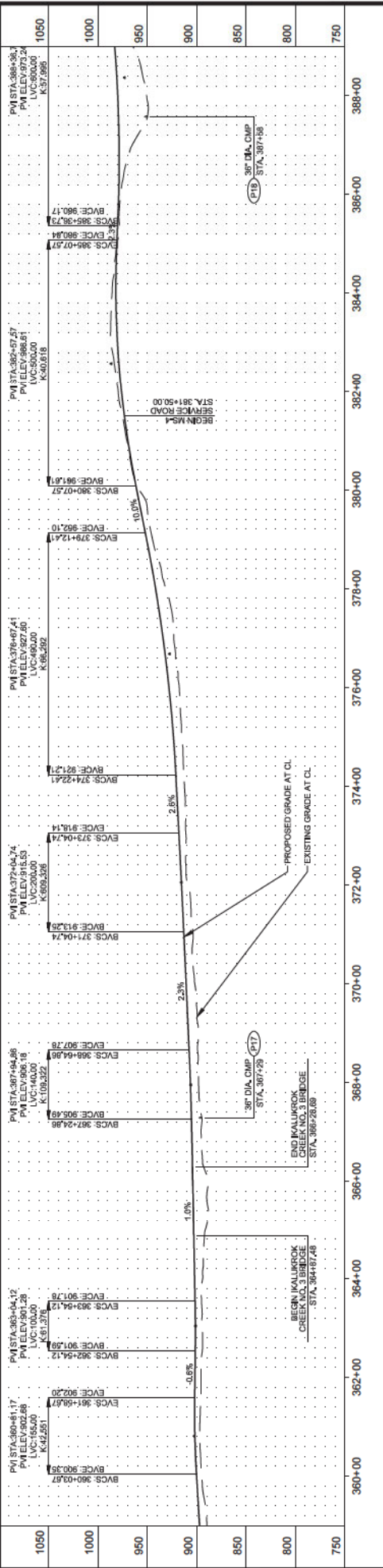
Station	330+00	332+00	334+00	336+00	338+00	340+00	342+00	344+00	346+00	348+00	350+00	352+00	354+00	356+00	358+00
1050	PM STA 330+00.26 PVI ELEV 979.65 LVC 240.00 K=34.10		PM STA 334+11.07 PVI ELEV 971.81 LVC 300.00 K=52.49		PM STA 336+10.98 PVI ELEV 983.74 LVC 265.00 K=45.27		PM STA 340+35.53 PVI ELEV 979.50 LVC 310.00 K=67.24		PM STA 344+26.56 PVI ELEV 986.11 LVC 100.00 K=43.48		PM STA 348+29.56 PVI ELEV 988.11 LVC 100.00 K=43.48		PM STA 352+30.54 PVI ELEV 988.19 LVC 100.00 K=43.48		PM STA 356+33.87 PVI ELEV 989.18 LVC 240.00 K=54.90
1000	BVC: 328+36.26 EVC: 331+76.26	BVC: 335+61.07 EVC: 338+61.07	BVC: 337+12.12 EVC: 340+72.55	BVC: 338+07.58 EVC: 340+72.55	BVC: 341+70.53 EVC: 344+80.53	BVC: 344+80.53 EVC: 347+29.56	BVC: 347+29.56 EVC: 350+54.54	BVC: 350+54.54 EVC: 353+54.54	BVC: 353+54.54 EVC: 356+12.87	BVC: 356+12.87 EVC: 359+12.87	BVC: 359+12.87 EVC: 362+12.87	BVC: 362+12.87 EVC: 365+12.87	BVC: 365+12.87 EVC: 368+12.87	BVC: 368+12.87 EVC: 371+12.87	BVC: 371+12.87 EVC: 374+12.87
950															
900															
850															
800															
750															

AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
PLAN AND PROFILE
AKTIGIRUQ EXPLORATION ACCESS ROAD

Revised by	Checked by	Approved by	Dwg. No.	Scale	Dwg. Size	Drawing #	Rev.
				AS SHOWN	D	3000-CE-2032	1



GEOTEXTILE FABRIC			
BEGIN STA.	END STA.	CUT VOLUME (CY)	FILL VOLUME (CY)
359+00	363+00	4,582	54,351
364+75	367+20		
371+50	379+00		



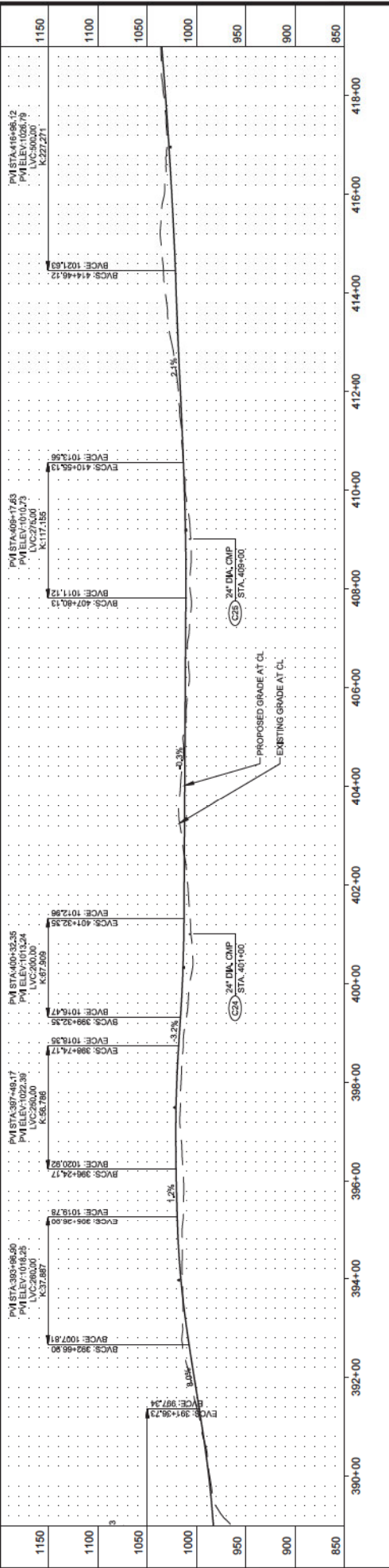
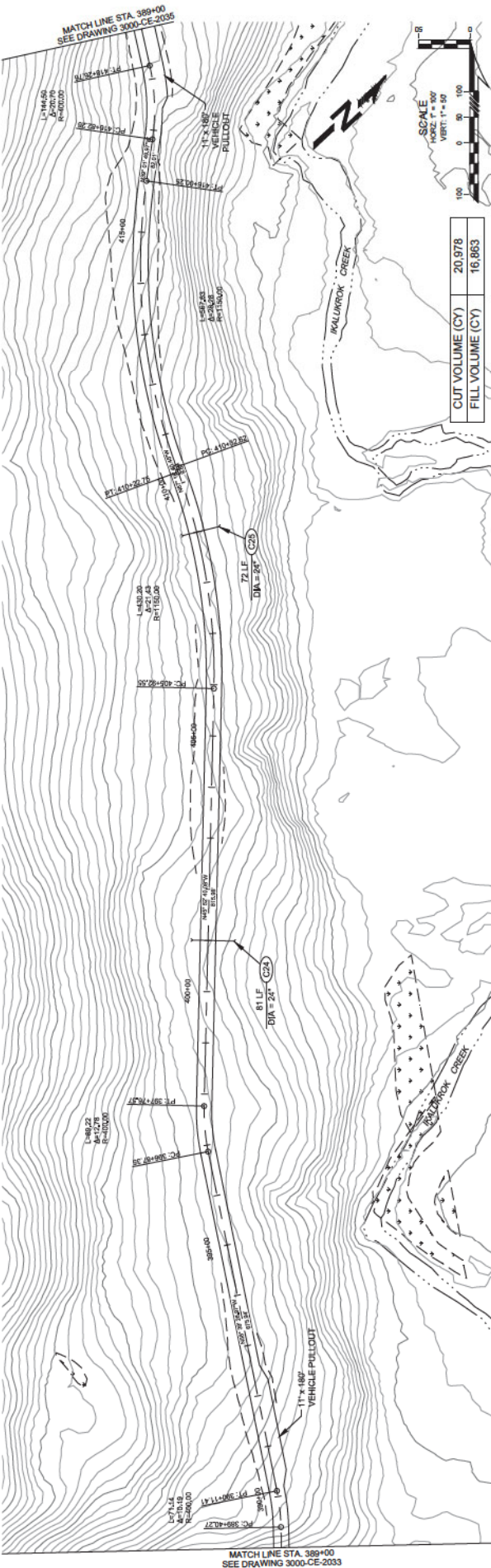
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3	ISSUED FOR PERMITTING						3		
4	ISSUED FOR PERMITTING						4		
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6	ISSUED FOR PERMITTING						6		
7	ISSUED FOR PERMITTING						7		
8	ISSUED FOR PERMITTING						8		
9	ISSUED FOR PERMITTING						9		

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AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
PLAN AND PROFILE
AKTIGIRUQ EXPLORATION ACCESS ROAD

Title: AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
 Drawing #: 3000-CE-2033
 Scale: AS SHOWN
 Dwg. No.: D
 Rev.: E



AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
PLAN AND PROFILE
AKTIGIRUQ EXPLORATION ACCESS ROAD

No.	Revision Description	Checked By	Approved By	Dwg. No.	Scale	Drawing #	Dwg. Sta.	D	Sh.	Rev.
1	ISSUED FOR PERMITTING									
2	ISSUED FOR PERMITTING									
3	ISSUED FOR PERMITTING									
4	ISSUED FOR PERMITTING									
5	ISSUED FOR PERMITTING									
6	ISSUED FOR PERMITTING									
7	ISSUED FOR PERMITTING									
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3000-CE-2034

3000-CE-2034

AKTIGIRUQ & ANARRAQ EXPL. PROGRAM

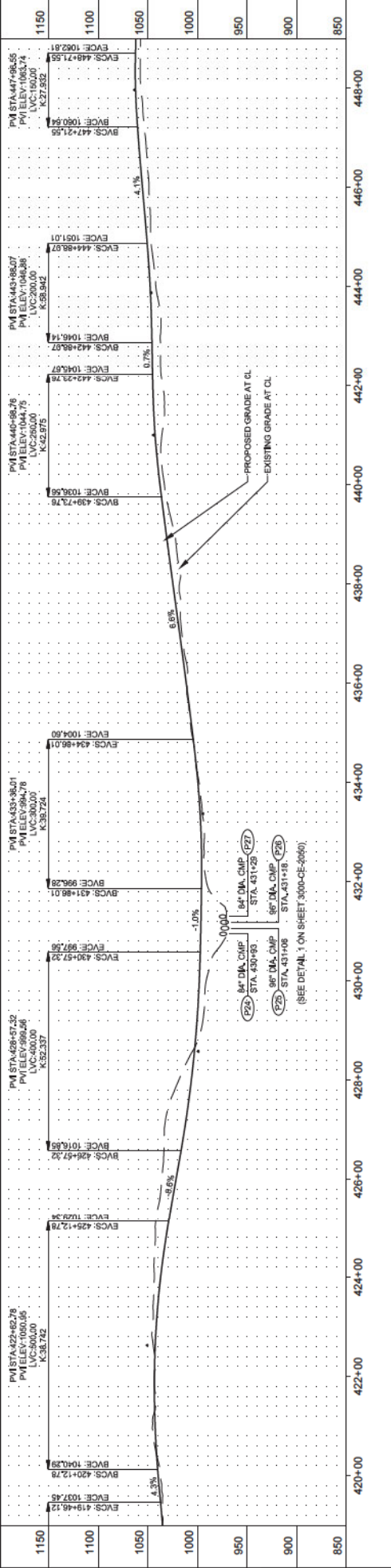
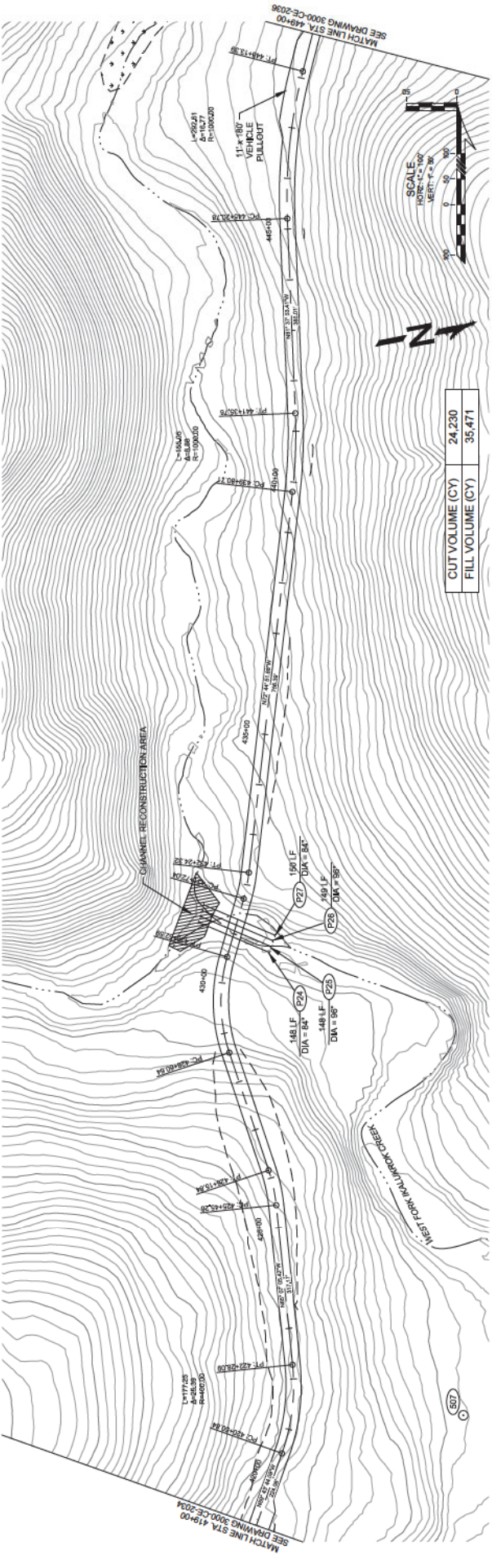
PLAN AND PROFILE

AKTIGIRUQ EXPLORATION ACCESS ROAD

AKTIGIRUQ & ANARRAQ EXPL. PROGRAM

PLAN AND PROFILE

AKTIGIRUQ EXPLORATION ACCESS ROAD



Revision Description				Checked by		Approved by		Dwg. No.		Reference Drawings	
D	ISSUED FOR PERMITTING	BAD	1/2/2022	SEC	1/27/2022						
C	ISSUED FOR PERMITTING	BAD	1/22/2021	SEC	1/22/2021						
B	ISSUED FOR PERMITTING	BAD	1/22/2020	SEC	1/22/2020						
A	ISSUED FOR PERMITTING	BAD	1/22/2019	SEC	1/22/2019						
No.											

AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
PLAN AND PROFILE
AKTIGIRUQ EXPLORATION ACCESS ROAD

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PLAN AND PROFILE
AKTIGIRUQ EXPLORATION ACCESS ROAD

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PLAN AND PROFILE
AKTIGIRUQ EXPLORATION ACCESS ROAD

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PLAN AND PROFILE
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PLAN AND PROFILE
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PLAN AND PROFILE
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PLAN AND PROFILE
AKTIGIRUQ EXPLORATION ACCESS ROAD

AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
PLAN AND PROFILE
AKTIGIRUQ EXPLORATION ACCESS ROAD

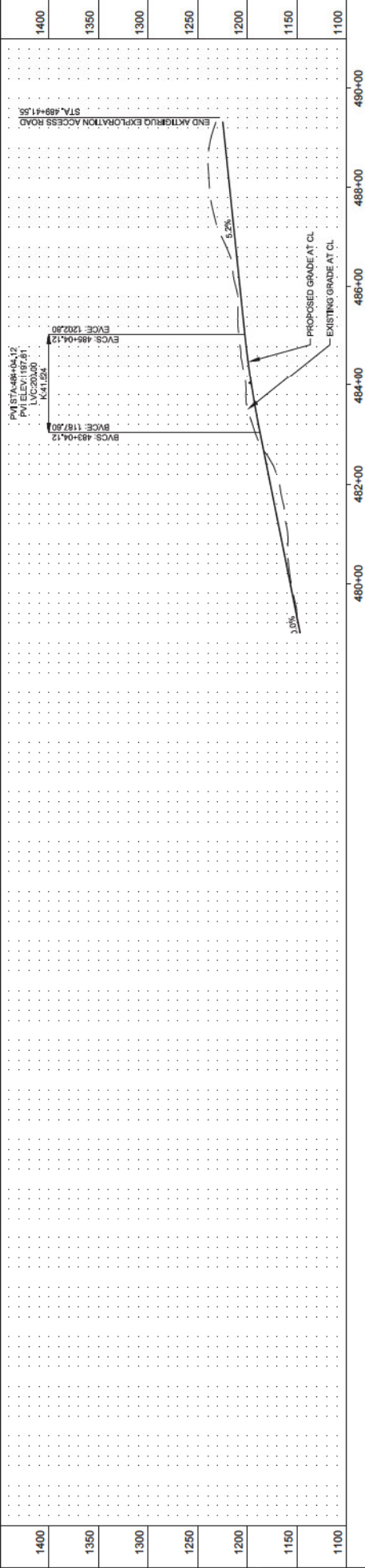
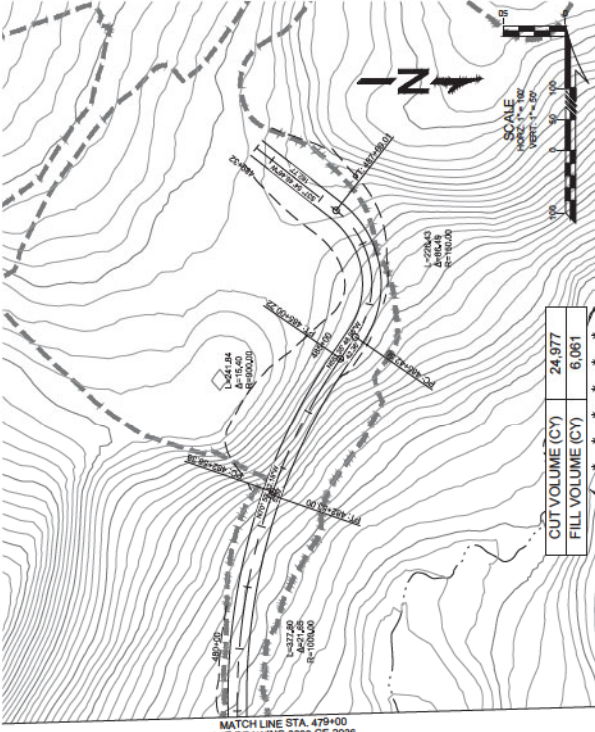
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PLAN AND PROFILE
AKTIGIRUQ EXPLORATION ACCESS ROAD

AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
PLAN AND PROFILE
AKTIGIRUQ EXPLORATION ACCESS ROAD

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PLAN AND PROFILE
AKTIGIRUQ EXPLORATION ACCESS ROAD

AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
PLAN AND PROFILE
AKTIGIRUQ EXPLORATION ACCESS ROAD

AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
PLAN AND PROFILE
AKTIGIRUQ EXPLORATION ACCESS ROAD



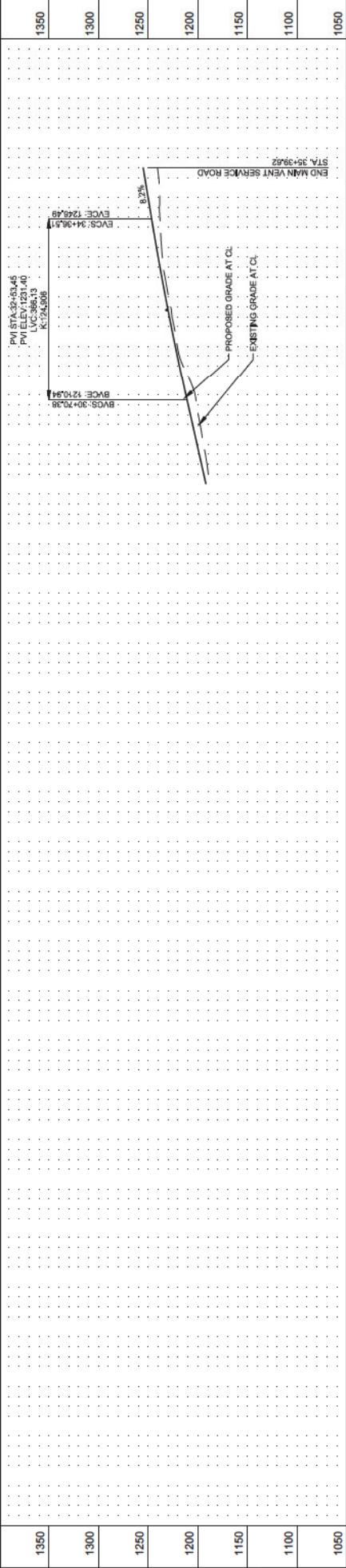
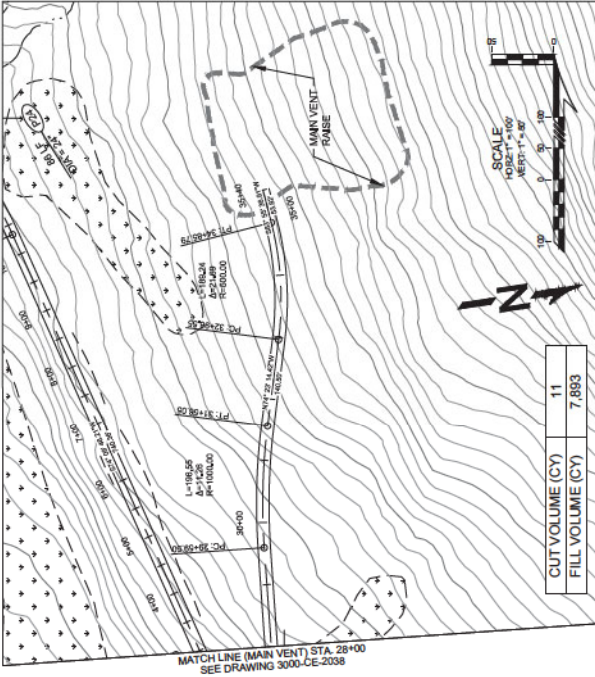
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C	ISSUED FOR PERMITTING	BAD	1/26/2022	SEC	1/26/2022								
B	ISSUED FOR PERMITTING	BAD	1/26/2022	SEC	1/26/2022								
A	ISSUED FOR PERMITTING	BAD	1/26/2022	SEC	1/26/2022								
No.													

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Title: AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
 PLAN AND PROFILE
 AKTIGIRUQ EXPLORATION ACCESS ROAD

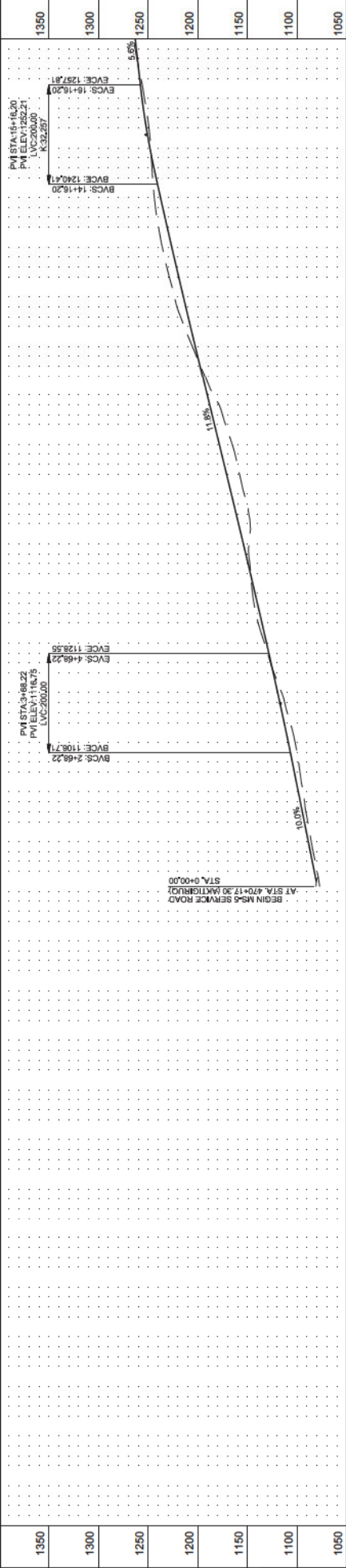
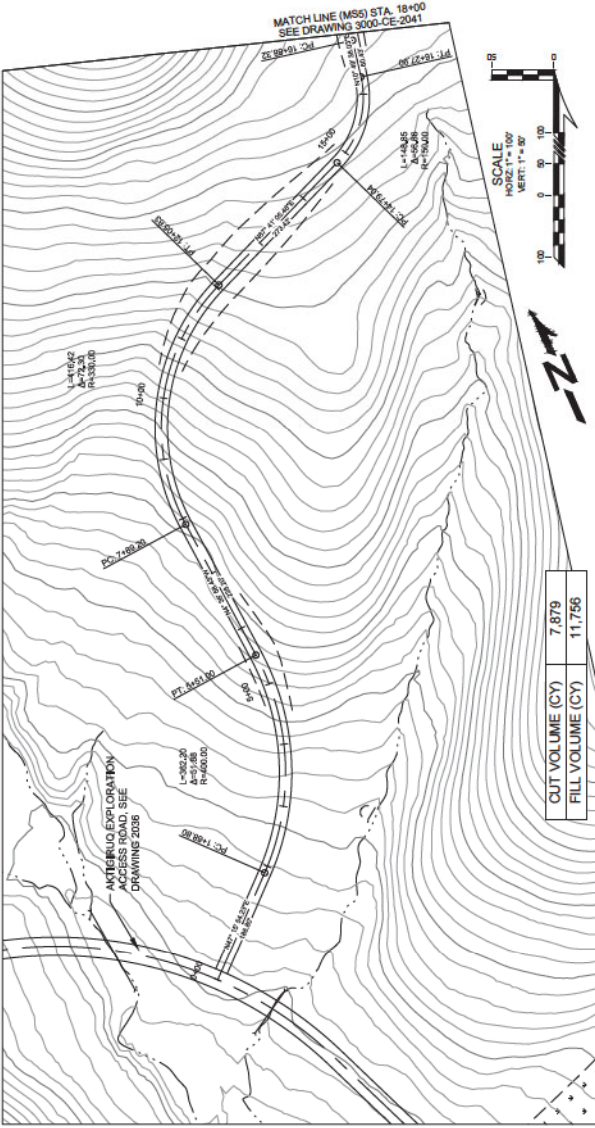
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 Dwg. Size: D
 Rev: 1



AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
PLAN AND PROFILE
MAIN VENT SERVICE ROAD

Scale: AS SHOWN
Drawing #: 3000-CE-2039
Rev: D

No.	Revision Description	Checked By	Checked Date	Approved By	Dwg. No.	Reference Drawings
D	ISSUED FOR PERMITTING	SEC	1/27/2022			
C	ISSUED FOR PERMITTING	SEC	1/27/2022			
B	ISSUED FOR APPROVAL	SEC	1/27/2020			
A	ISSUED FOR REVIEW	SEC	1/27/2019			



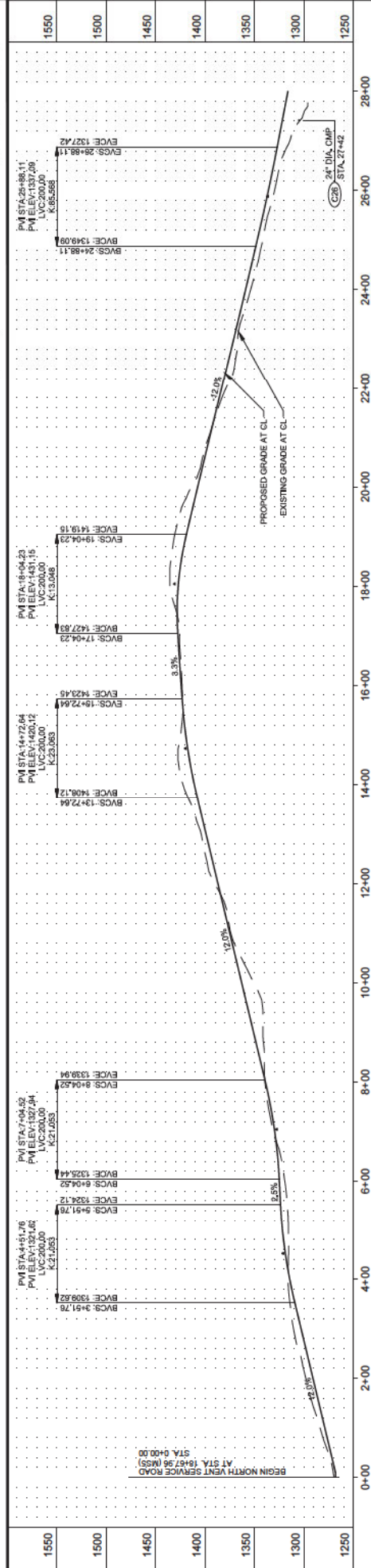
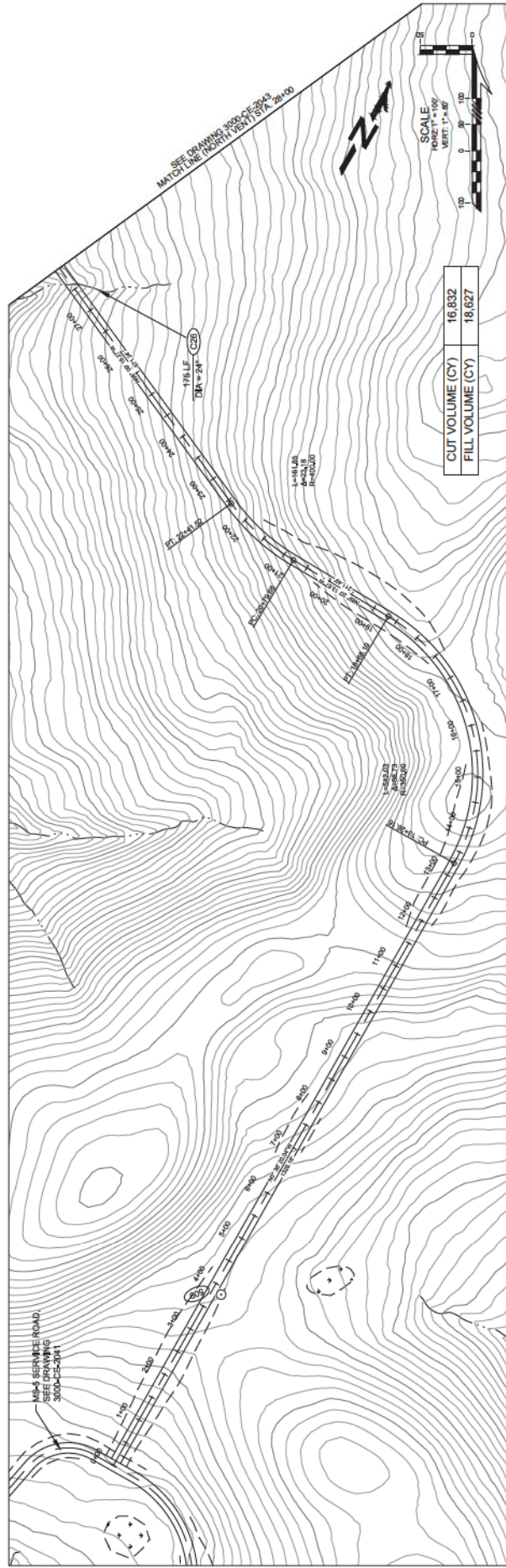
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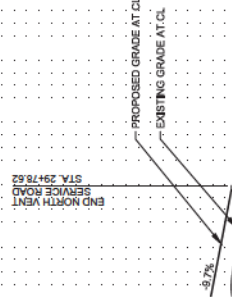
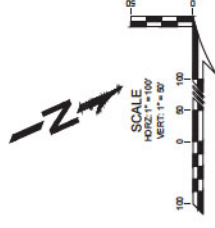
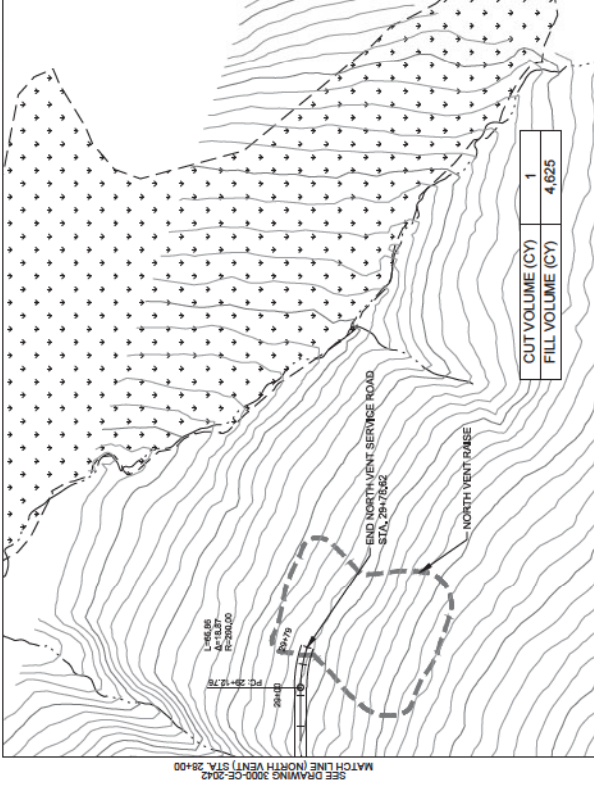
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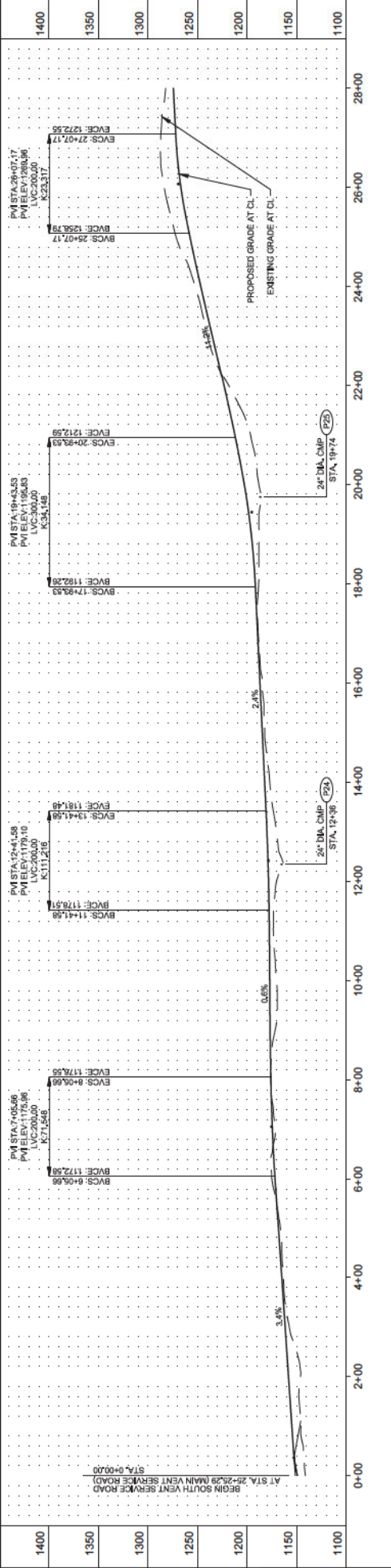
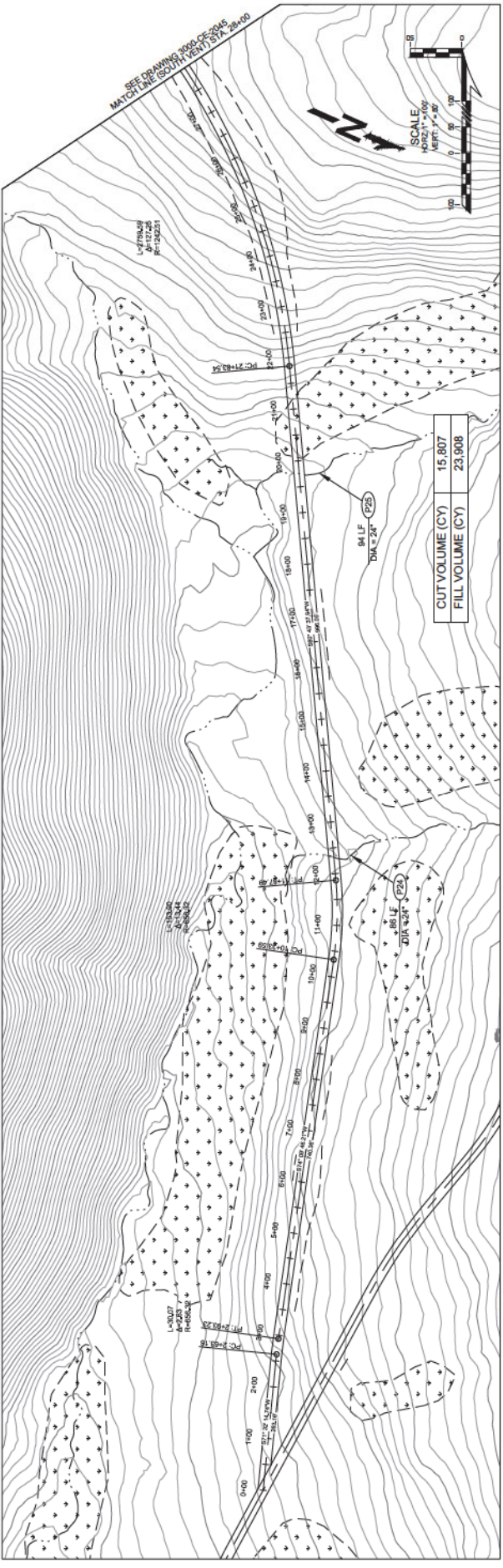
AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
PLAN AND PROFILE
AA-MS-5 ACCESS ROAD

Scale: AS SHOWN
Drawing #: 3000-CE-2040
Rev: D

No.	Revision Description	Reviewed By	Checked By	Approved By	Dwg. No.	Reference Drawings
1	ISSUED FOR PERMITTING	SEC. 1/27/2022				
2	ISSUED FOR PERMITTING	SEC. 1/27/2022				
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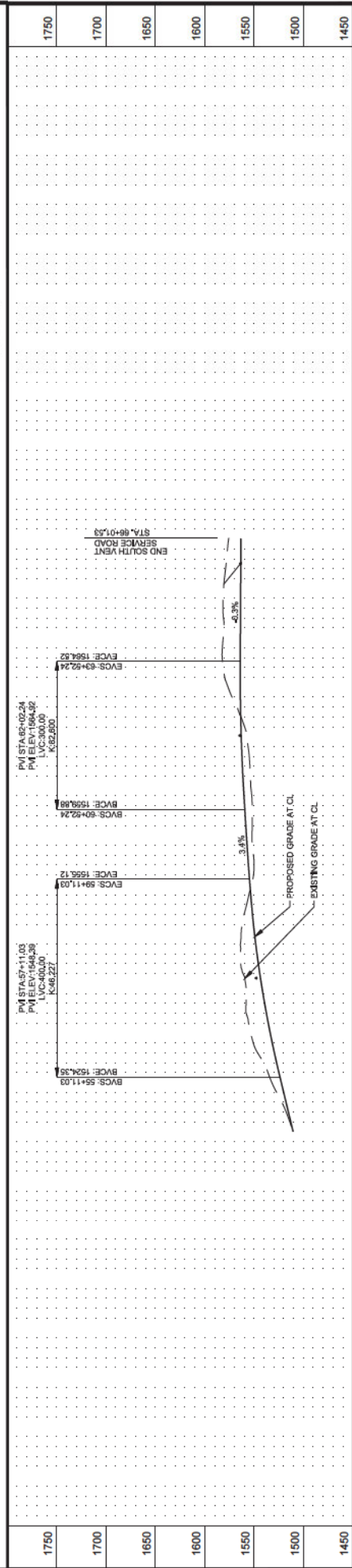
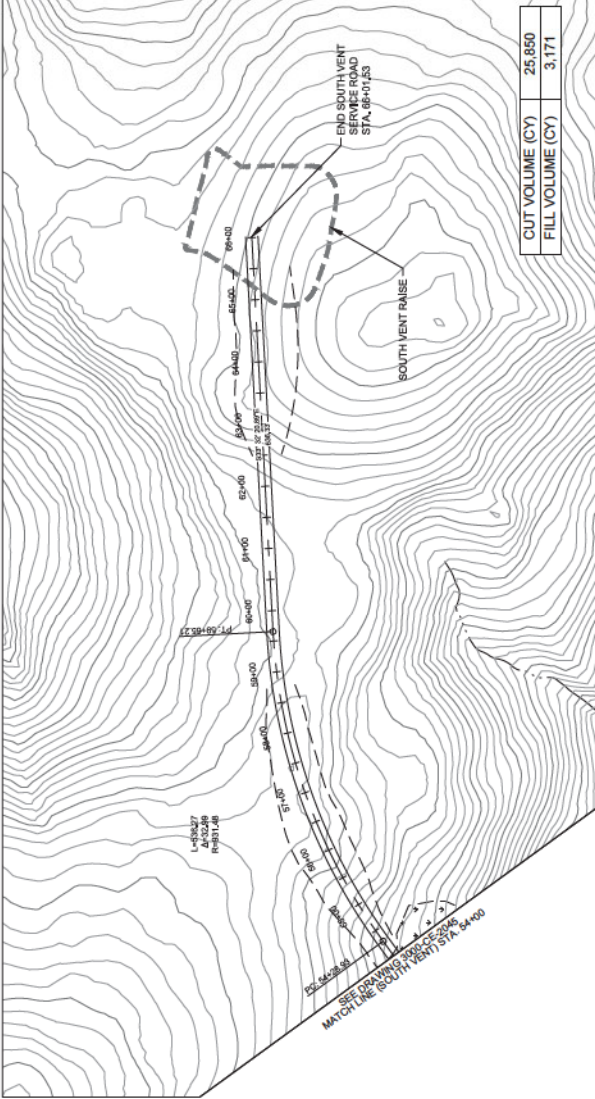
 上海坤纳建筑设计有限公司 KUNA ARCHITECTURE CO., LTD. No. 3300 Zhongyuan Road, Phase 1 Amenity, Pudong New Area, Shanghai 200000 867-339-9500 F# 867-339-5527 www.kuna.com.cn E-mail: kuna@kuna.com.cn AKTIRIQU & ANARRAAQ EXPL. PROGRAM PLAN AND PROFILE SOUTH VENT SERVICE ROAD AS SHOWN 3000-CE-2044 D 3000-CE-2044 1 3000-CE-2044 B										 TECK AMERICAN INCORPORATED Revision Description Approved By Checked By Revised By BLD SEC 1/27/2022									
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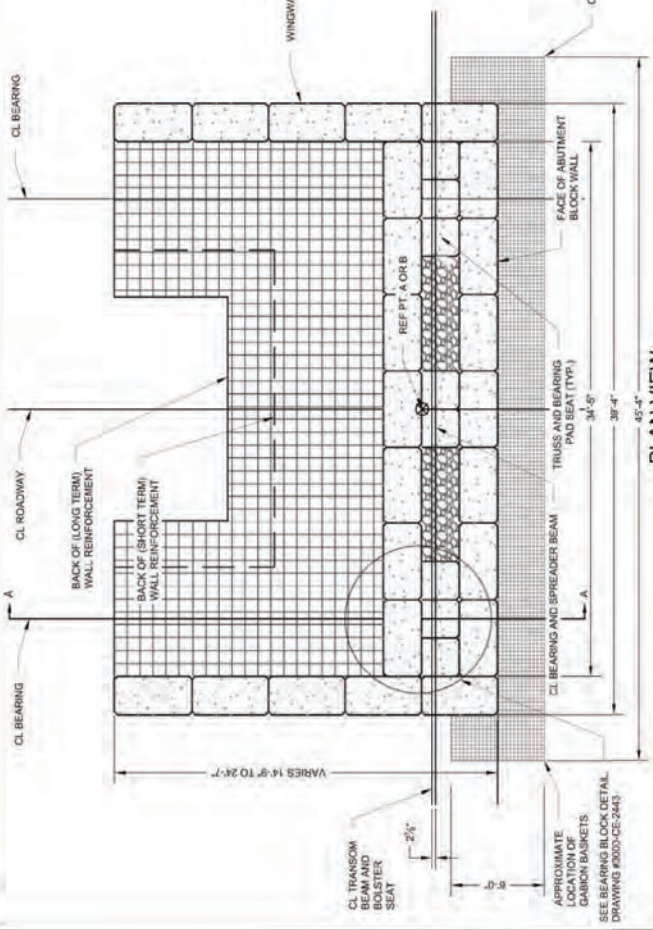
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AMERICAN
INCORPORATED

Title: AKTIGIRUQ & ANARRAQ EXPL. PROGRAM
 PLAN AND PROFILE
 SOUTH VENT SERVICE ROAD

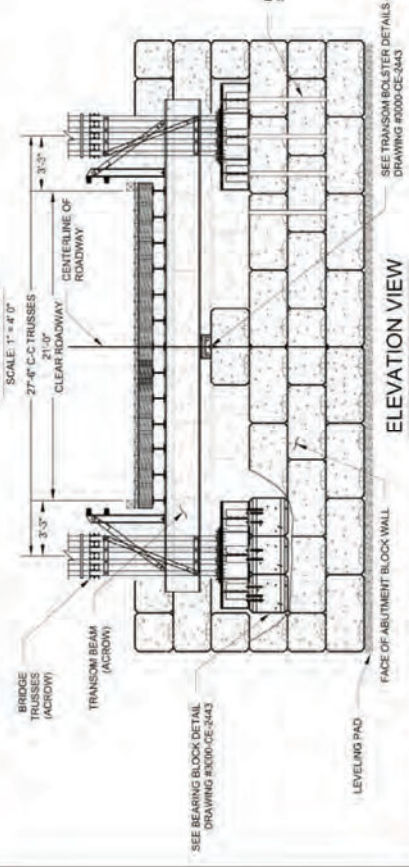
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 Rev: B



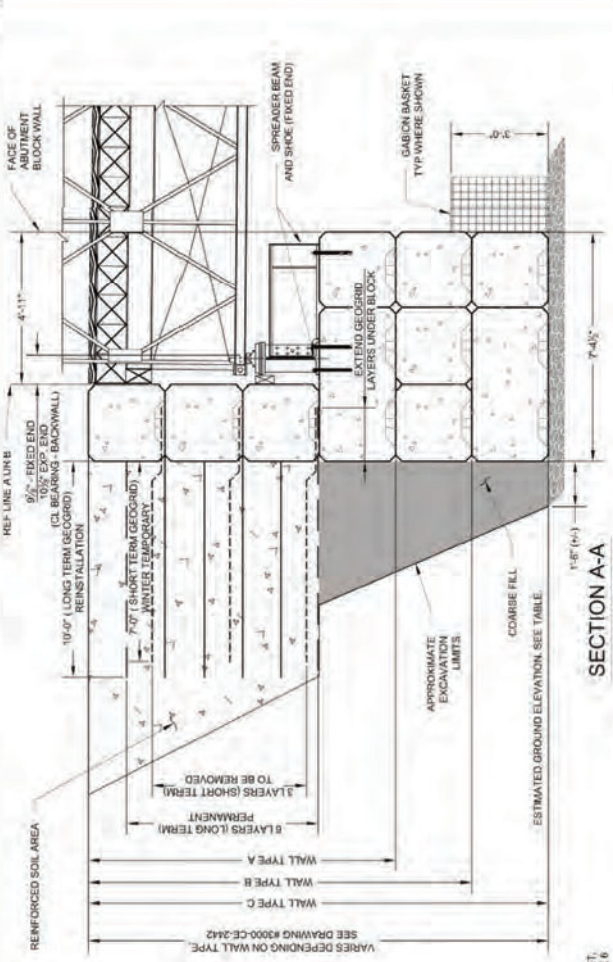
54+00										56+00	58+00	60+00	62+00	64+00	66+00	68+00	Title: AKTIGIRUQ & ANARRAQ EXPL. PROGRAM PLAN AND PROFILE SOUTH VENT SERVICE ROAD						
																							
																				KUNA ENGINEERING 4300 B Street, Ste 600 807-339-6500 Fax 807-339-6327 www.kunaeng.com License # AEL572851			
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PLAN VIEW
SCALE: 1" = 4' 0"



ELEVATION VIEW
SCALE: 1" = 4' 0"



SECTION A-A
SCALE: 1" = 2' 0"

(FIXED END BEARING SHOWN)

LEGEND:

REINFORCED BACKFILL MATERIAL

CONCRETE BLOCK (ULTRABLOCK)

GABION LEGEND

MIRAFI 3XT (LONG TERM)

MIRAFI 3XT (LONG TERM)

MIRAFI 3XT (SHORT TERM)

ESTIMATED GROUND ELEVATION TABLE (FT)

ABUTMENT	ABUTMENT A	ABUTMENT B
RED DOG CREEK	729.52	726.04
GRAYLING JUNKIE CREEK	797.77	804.12
IKALUKROK CREEK NO. 1	843.29	845.62
IKALUKROK CREEK NO. 2	863.90	872.06
IKALUKROK CREEK NO. 3	892.28	892.23
WEST FORK IKALUKROK CREEK		

NOTES:

1. VERTICAL ULTRABLOCK WALL FACE = 0 DEGREES
2. SHORT TERM GROUND REINFORCEMENT WILL UTILIZE MIRAFI 3XT OR EQUIVALENT PLACED IN THREE LAYERS AT THE ULTRABLOCK INTERFACE BEGINNING AT THE ELEVATION OF THE BASE OF THE ABUTMENT BACKWALL (BASE OF SPREADER BEAM). GEORGRID WILL BE SECURED BETWEEN THE ULTRABLOCK LAYERS AND EXTEND 10 FEET OUT FROM BACKWALL AND FROM SIDES (WINDWALLS). VERTICAL SPACING BETWEEN LAYERS WILL BE ONE ULTRABLOCK HEIGHT OR NOMINAL 30 INCHES.
3. LONG TERM GROUND REINFORCEMENT WILL UTILIZE MIRAFI 3XT AND MIRAFI 8XT OR EQUIVALENT. MIRAFI 8XT GEORGRID WILL BE PLACED AT THE ULTRABLOCK INTERFACE AT THE ELEVATION OF THE BACKWALL. MIRAFI 3XT GEORGRID WILL BE PLACED IN TWO LAYERS AT THE ULTRABLOCK INTERFACE. BETWEEN THE ULTRABLOCK LAYERS AND EXTEND 10 FEET OUT FROM THE BACKWALL AND FROM SIDES (WINDWALLS). MIRAFI 3XT GEORGRID WILL BE PLACED IN LAYERS WITH A VERTICAL SPACING OF NOMINALLY 15 INCHES OR ONE HALF ULTRABLOCK HEIGHT. GEORGRID WILL BE SECURED BETWEEN THE ULTRABLOCK LAYERS OR BUTTED AGAINST THE WALL FOR MID-BLOCK LAYERS AND EXTEND 10 FEET OUT FROM BACKWALL AND FROM SIDES (WINDWALLS). MIRAFI 8XT AND WILL BE PLACED 15 INCHES BELOW THE TOP OF ROAD ELEVATION.
4. SHORT TERM BACK SLOPE RATIO PER OSHA SAFETY REGULATIONS (29CFR, SHORT PART 1926, SUBPART P, EXCAVATION). SLOPING MAY BE REQUIRED IF THE SHORT TERM BACK SLOPE WILL OPEN UP TO A STEEP SLOPE. THE SLOPE RATIO TO BE OBTAINED NOTE THAT SLOPE VARIES BASED ON SOIL TYPES.
5. USE THE SAME FILL IN ALL AREAS
6. GABION SCOUR PROTECTION SHOULD WRAP AROUND UPSTREAM AND DOWNSTREAM ENDS OF ABUTMENT FOR A DISTANCE EQUAL TO TWICE THE CHANNEL FLOW DEPTH IN THE BRIDGE OPENING, OR 25 FEET WHICHEVER IS LESS.
7. ALL DIMENSIONS SHOWN ARE NOMINAL AND DO NOT ACCOUNT FOR BLOCK TOLERANCES. SEE ULTRA BLOCK SPECIFICATIONS FOR KEY AND CONCRETE TOLERANCES.
8. ADDITIONAL ULTRABLOCKS ADDED AS REQUIRED ACCORDING TO GROUND / BEDROCK CONDITIONS.

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ANARRAQ & AKTIGIRUQ EXPL. PROGRAM
BRIDGE ABUTMENTS
TYPICAL WALL DETAILS -1

No.	Revision Description	Checked By	Approved By	Date	Drawn No.
1	ISSUED FOR APPROVAL (PREVIOUS EDITIONS #3000-CE-2443, REV. A)	NW		01/22/2020	01/22/2020
2					
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Drawn: D

Scale: AS SHOWN

Revision: 1

Drawn: 3000-CE-2441

Rev: A

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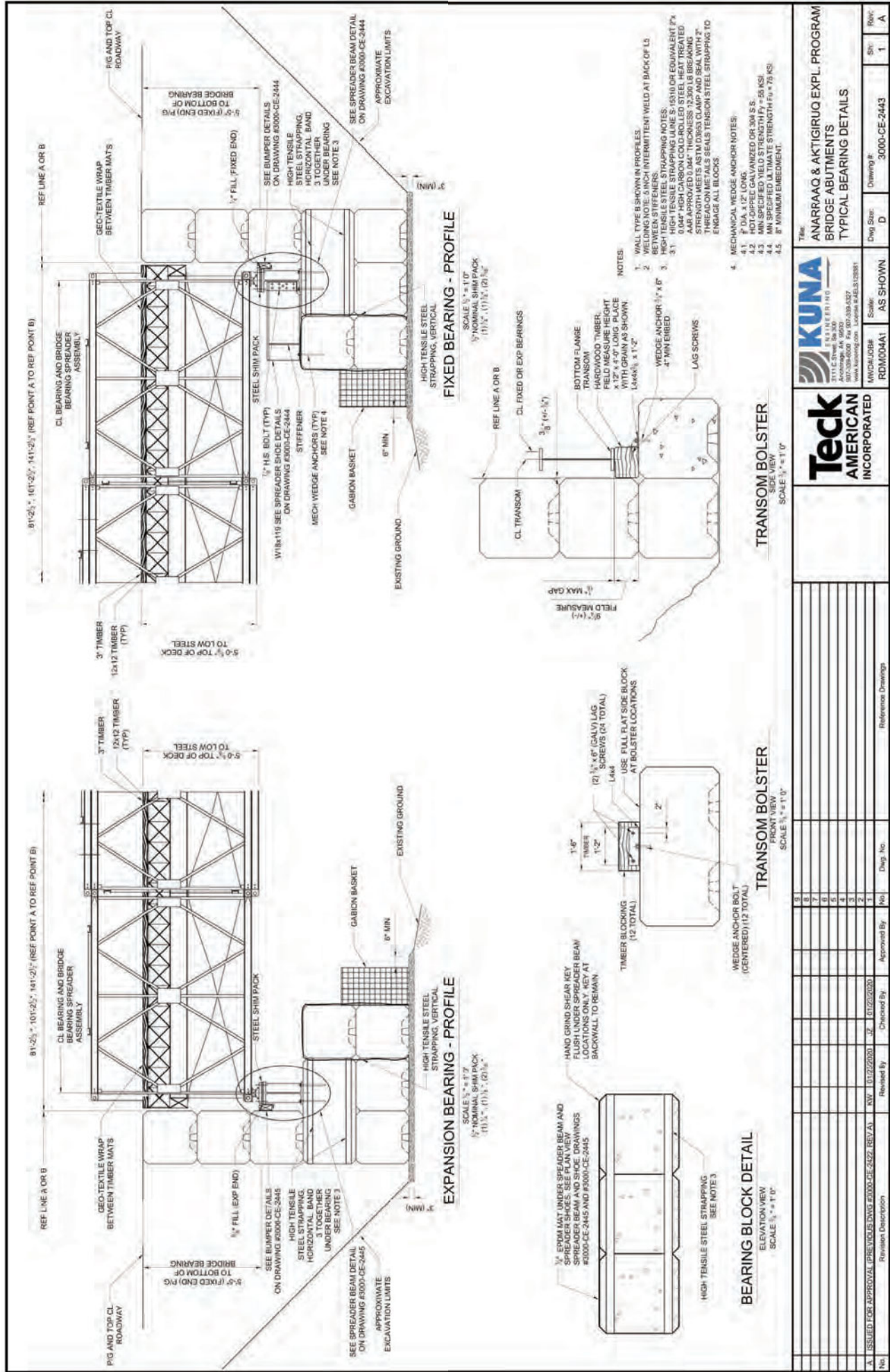
3115 C Street, Suite 300

Anchorage, AK 99503

Phone: 907.562.1234

Fax: 907.562.1235

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Revision History				Reference Drawings			
No.	Revision Description	Revised By	Checked By	Approved By	Not	Draw. No.	
1	ISSUED FOR APPROVAL (PRELIMINARY) #3000-CE-2442, REV. A	NW	01/22/2020	02	01/22/2020		
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ANARRAQ & AKTIGIRUQ EXPL. PROGRAM
BRIDGE ABUTMENTS
TYPICAL BEARING DETAILS

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UNCL-0084 ROM0041

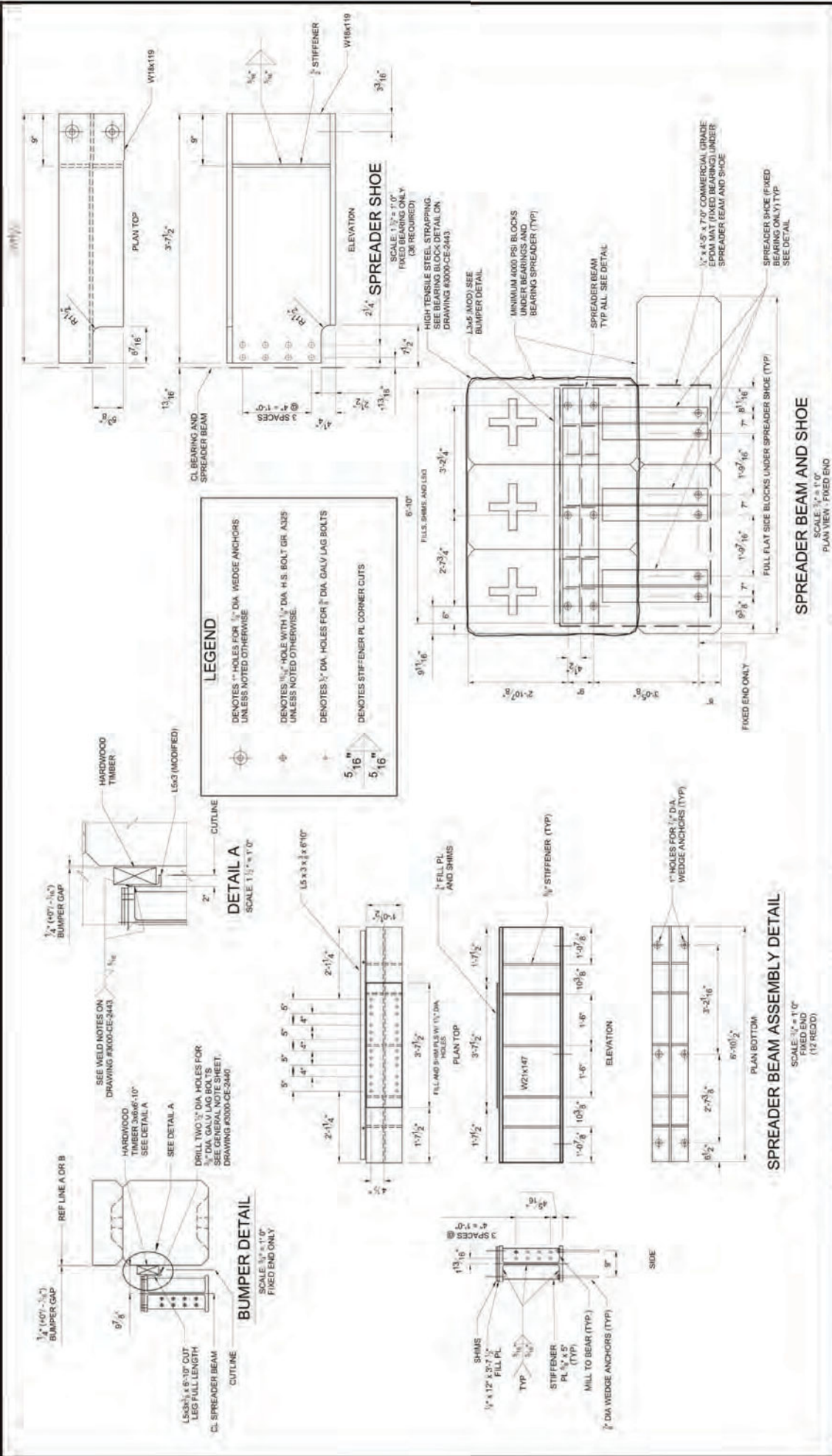
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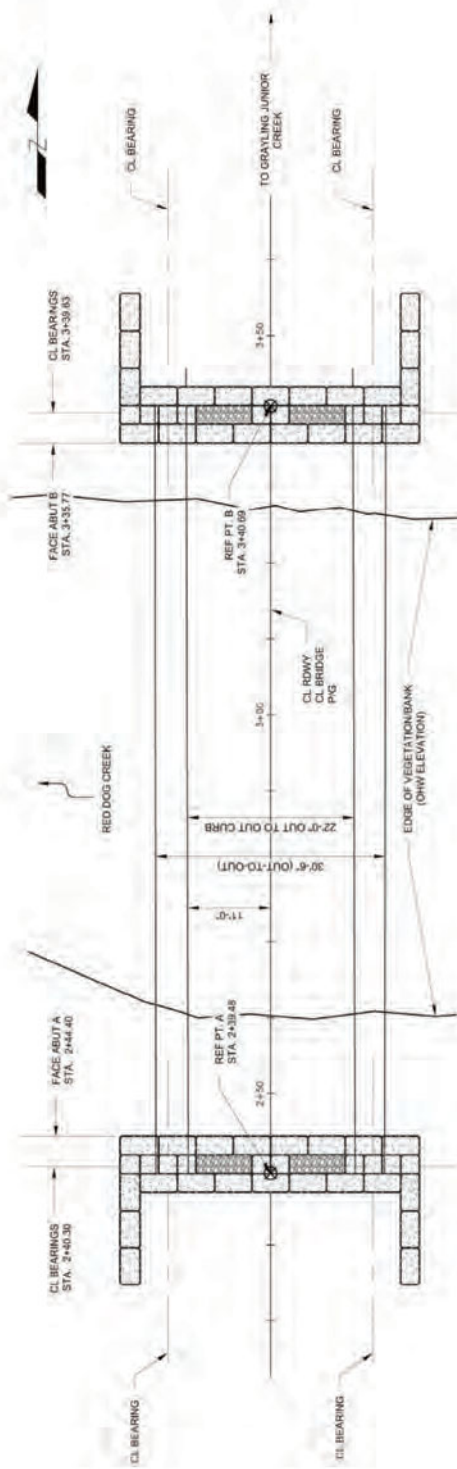
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Rev: 1

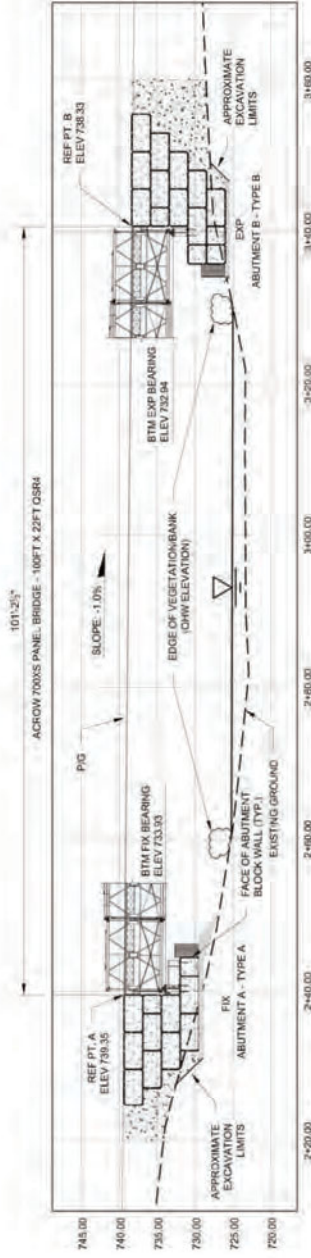
Rev: A

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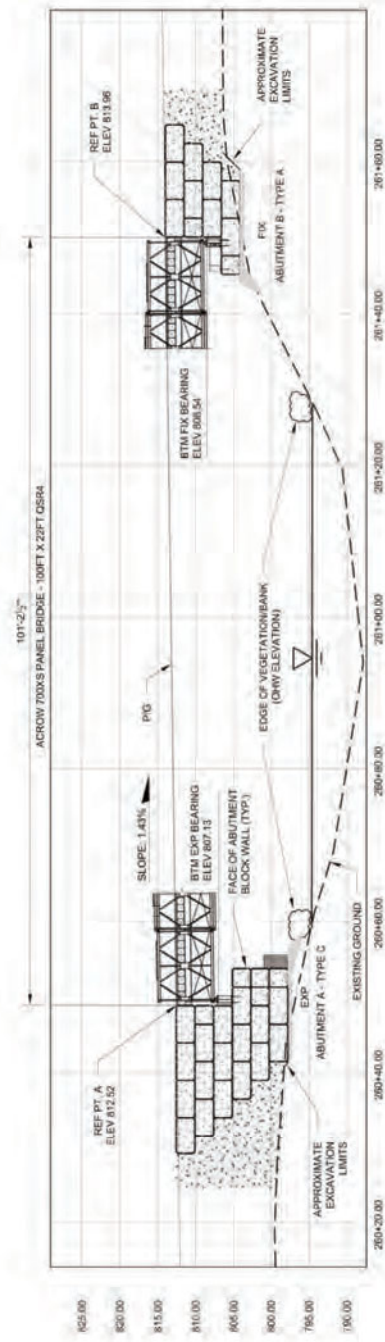
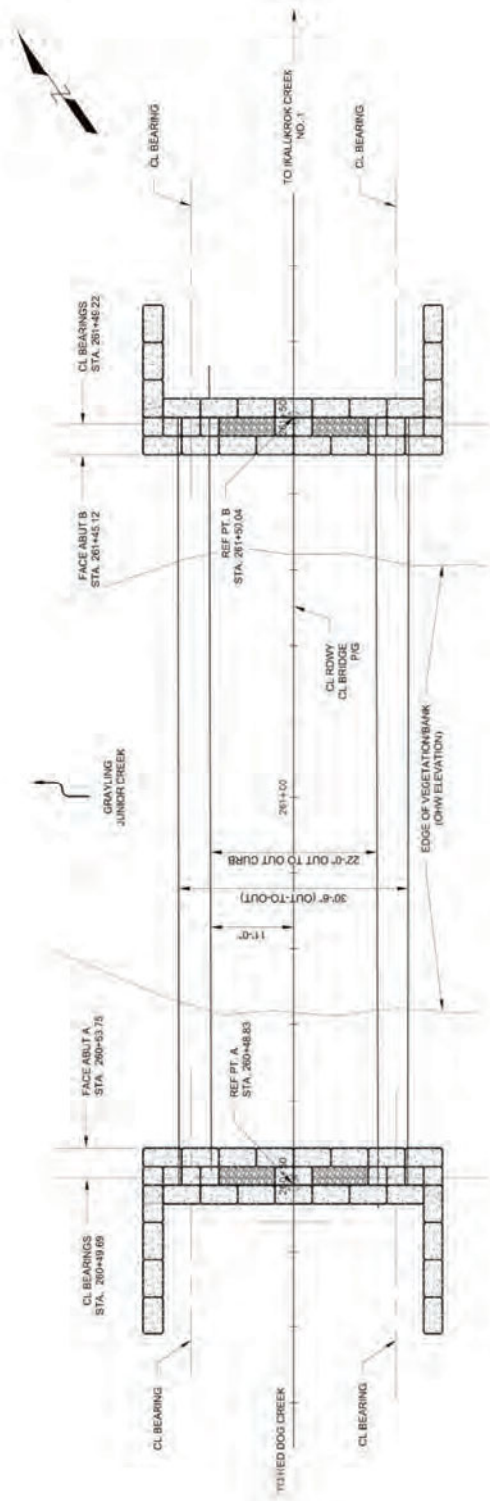


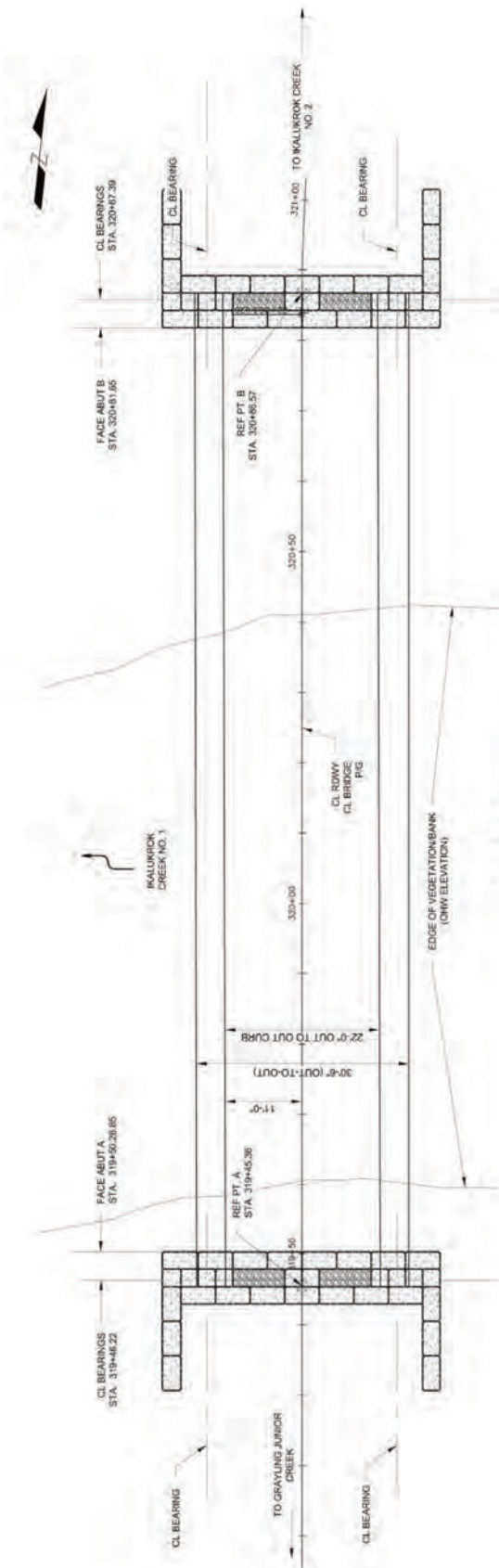
PLAN VIEW



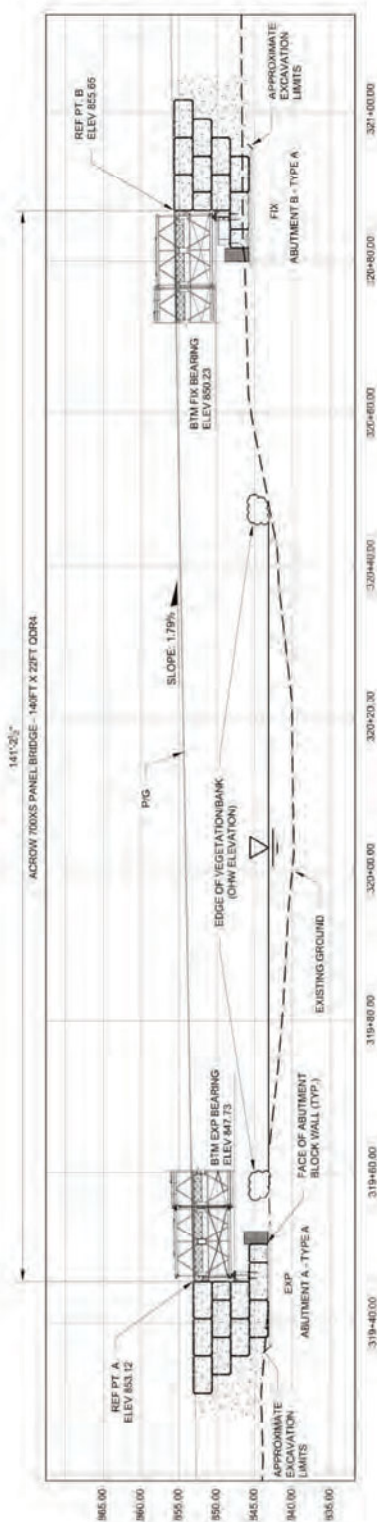
ELEVATION VIEW

TECK AMERICAN INCORPORATED										ANARRAQ & AKTIGIRUQ EXPL. PROGRAM BRIDGE ABUTMENTS RED DOG CREEK										Scale AS SHOWN Dwg. Sht. D Sheet # 3000-CE-2447 Rev. 1 Rev. A									
										Reference Drawings																			

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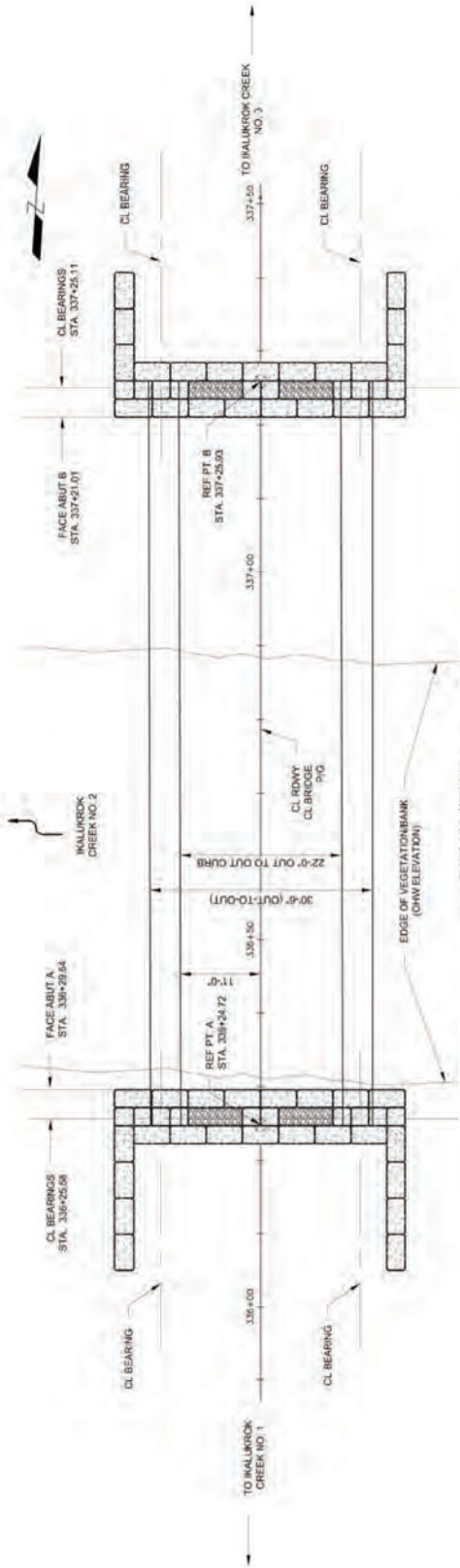


PLAN VIEW

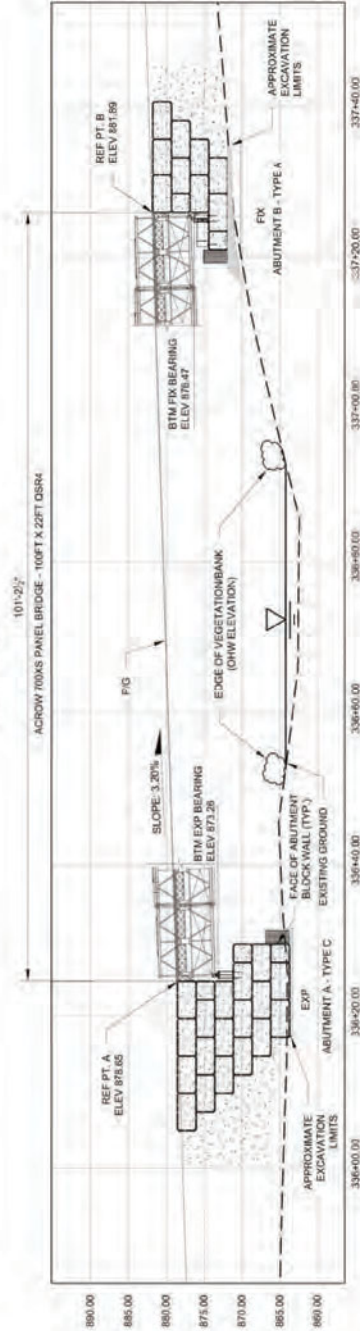


ELEVATION VIEW

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Revision Description		Approved By		Checked By		Drawn By		Reference Drawings	
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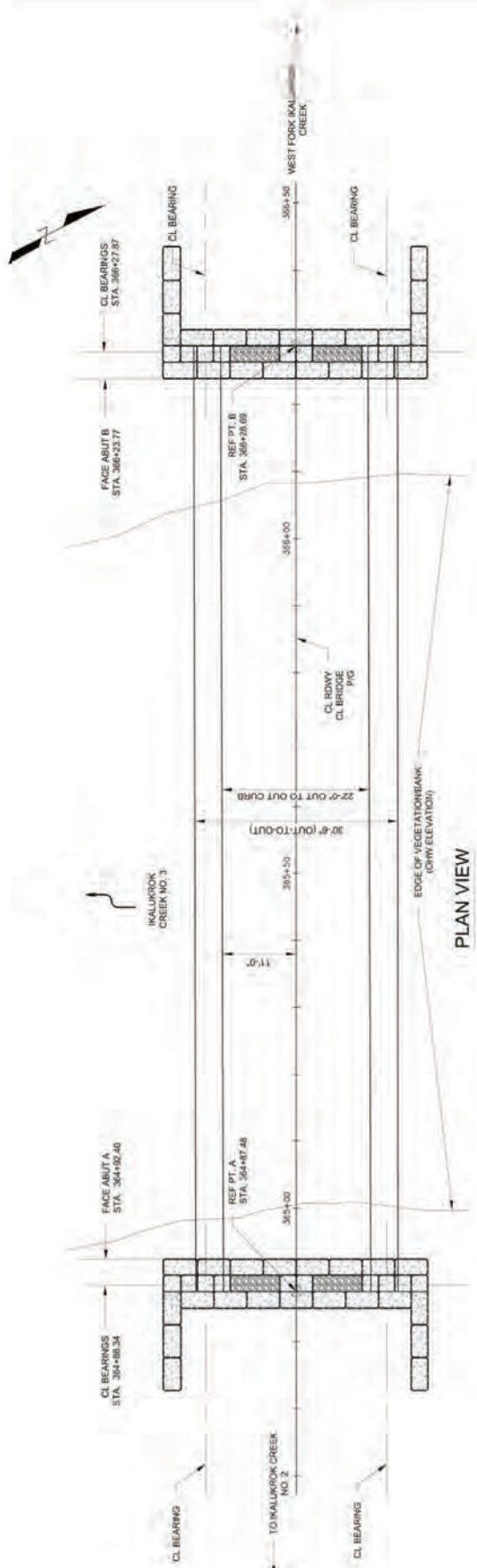


PLAN VIEW



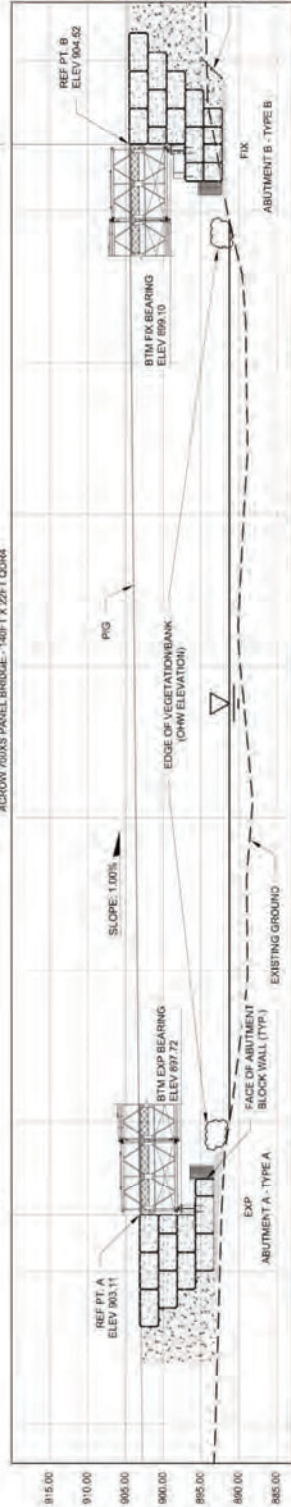
ELEVATION VIEW

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Reference Drawings				Draw. No.				Draw. Size: D				Rev:	
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A				ISSUED FOR APPROVAL (PREVIOUS Dwg #1000-CE-2428, REV A)				01/22/2020				01/22/2020	
No.				Revision Description				01/22/2020				01/22/2020	



PLAN VIEW

141'-20" ACROSS 700X5 PANEL BRIDGE - 140FT X 22FT OOR4



ELEVATION VIEW

								ANARRAAQ & AKTIGIRUQ EXPL. PROGRAM BRIDGE ABUTMENTS IKALUKROK CREEK NO. 3				Title:	
								Scale: AS SHOWN				Drawing #: 3000-CE-2451	Rev: A
								UNCL-0086 ROM0041				Drawing #: 3000-CE-2451	Rev: A
								Reference Drawings				Drawing No.	No.
												Approved By	Checked By
												Revised By	Date
												Revision Description	No.
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												01/22/2020	1
												01/22/2020	1