

# DUSEL - LBNE

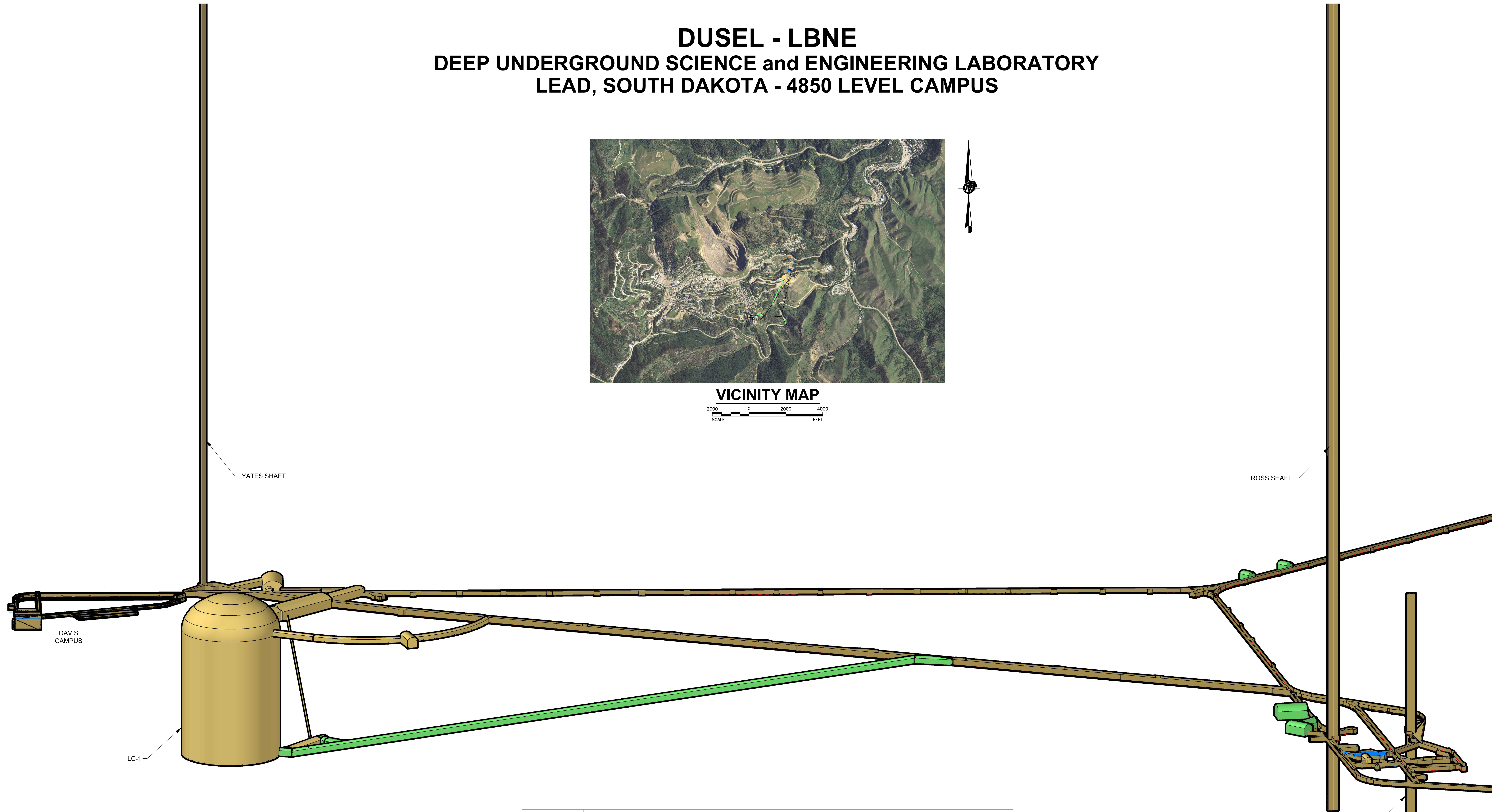
## DEEP UNDERGROUND SCIENCE and ENGINEERING LABORATORY

### LEAD, SOUTH DAKOTA - 4850 LEVEL CAMPUS



**VICINITY MAP**

2000 0 2000 4000  
SCALE FEET



REVISION/DATE	DRAWING NUMBER	DRAWING TITLE
22JULY11	GEC-G1-01	CONCEPTUAL WCD 200KT EXCAVATION 4850 LEVEL CAMPUS
22JULY11	GEC-G1-02	LITHOLOGY AND STRUCTURAL GEOLOGY 4850 LEVEL
22JULY11	GEC-G1-03	EXISTING CONDITIONS ON 4850 LEVEL
22JULY11	GEC-G3-01	WCD 200KT AND ACCESS DRIFT LOCATIONS
22JULY11	GEC-DRFT-01	WCD 200KT ACCESS DRIFT EXCAVATIONS DETAILS
22JULY11	GEC-DRFT-02	WCD 200KT UTILITY DRIFT EAST-WEST ACCESS DRIFT INTERSECTION
22JULY11	GEC-DRFT-03	ROSS SHAFT - CAP AND POWDER MAGAZINES EXCAVATIONS
22JULY11	GEC-LC1-01	WCD 200KT EXCAVATION
22JULY11	GECS-LC1-01	WCD 200KT EXCAVATION SEQUENCE
22JULY11	GSP-GEN-01	ROCK SUPPORT, DRAINAGE, AND INVERT DETAILS AND NOTES
22JULY11	GSP-GEN-02	ROCK SUPPORT DETAILS
22JULY11	GSP-DRFT-01	GSP-DRFT-01 - WCD 200KT ACCESS DRIFT ROCK SUPPORT
22JULY11	GSP-DRFT-02	WCD 200KT UTILITY DRIFT EAST-WEST ACCESS DRIFT INTERSECTION ROCK SUPPORT

**LEGEND**

- EXCAVATIONS REQUIRED FOR EXPERIMENT
- EXCAVATIONS REQUIRED FOR CONSTRUCTION
- EXISTING EXCAVATIONS

Drawing File: N:\11\11-21775A\_A\_4850\_Level\_01-GEC-G1-01.dwg | User: GEC-G1-01 | Date: 07/22/11 17:37 | Plot: 07/22/11 17:37

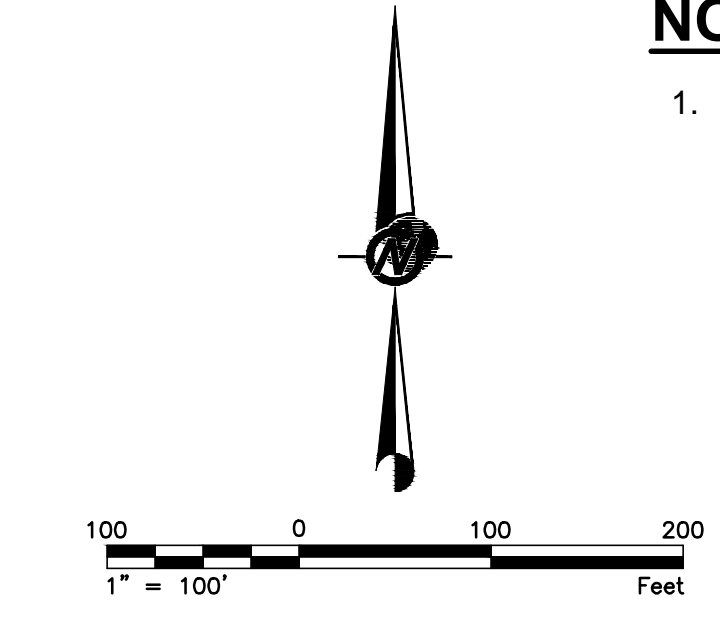
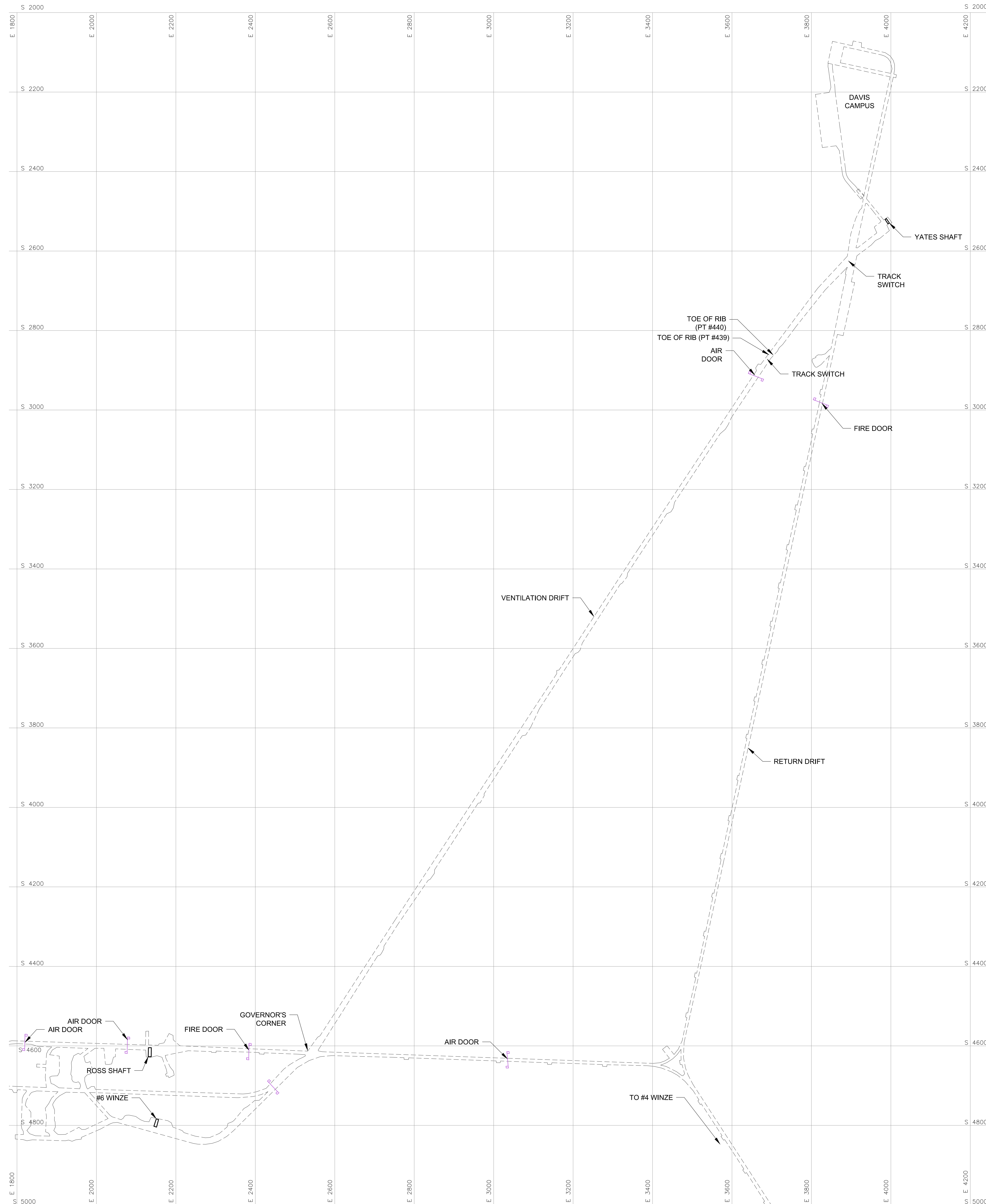
**NOT FOR CONSTRUCTION**

22JULY2011	WTW	50% CONCEPTUAL DESIGN REVIEW			
REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK
PROJECT					
DUSEL-LBNE CONCEPTUAL EXCAVATION DESIGN LEAD, LAWRENCE COUNTY, SOUTH DAKOTA					
TITLE					
<b>CONCEPTUAL WCD 200KT EXCAVATION 4850 LEVEL CAMPUS</b>					
PROJECT No. 113-81779		FILE No. 01-GEC-G4-01			
DESIGN	WTW	12/09	SCALE AS SHOWN	REV.	A
CADD	AKW	01/10			
CHECK	WTW	01/10			
REVIEW	WTW	01/10			
<b>Golder Associates</b> DENVER, COLORADO			<b>GEC-G1-01</b>		









**NOTE:**

1. EXISTING CONDITIONS BASED ON DRAWINGS SUPPLIED BY DUSEL.

Drawing File: N:\11\11-21775A\_A\_4850 Level\_03-02-11-03.dwg | User: GEC-01-03 | Date: 07/22/11 17:38 | Plot: 07/22/11 17:38

**NOT FOR CONSTRUCTION**

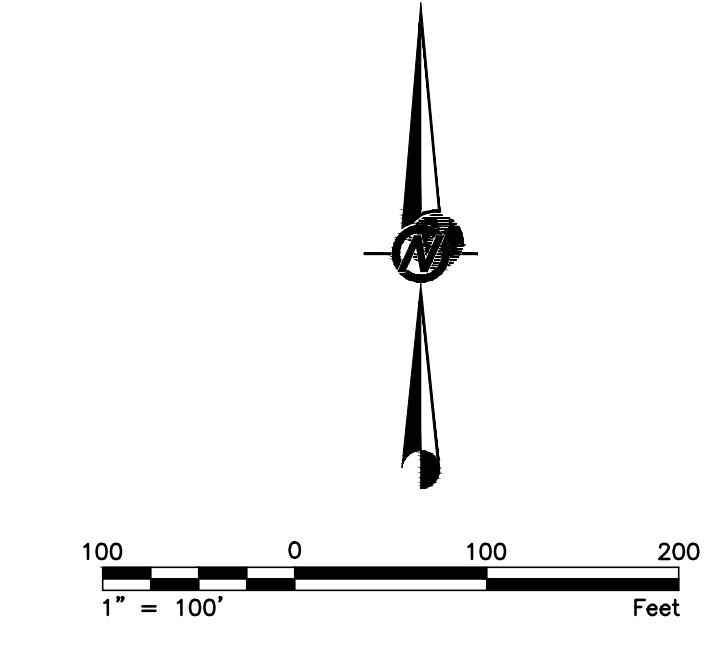
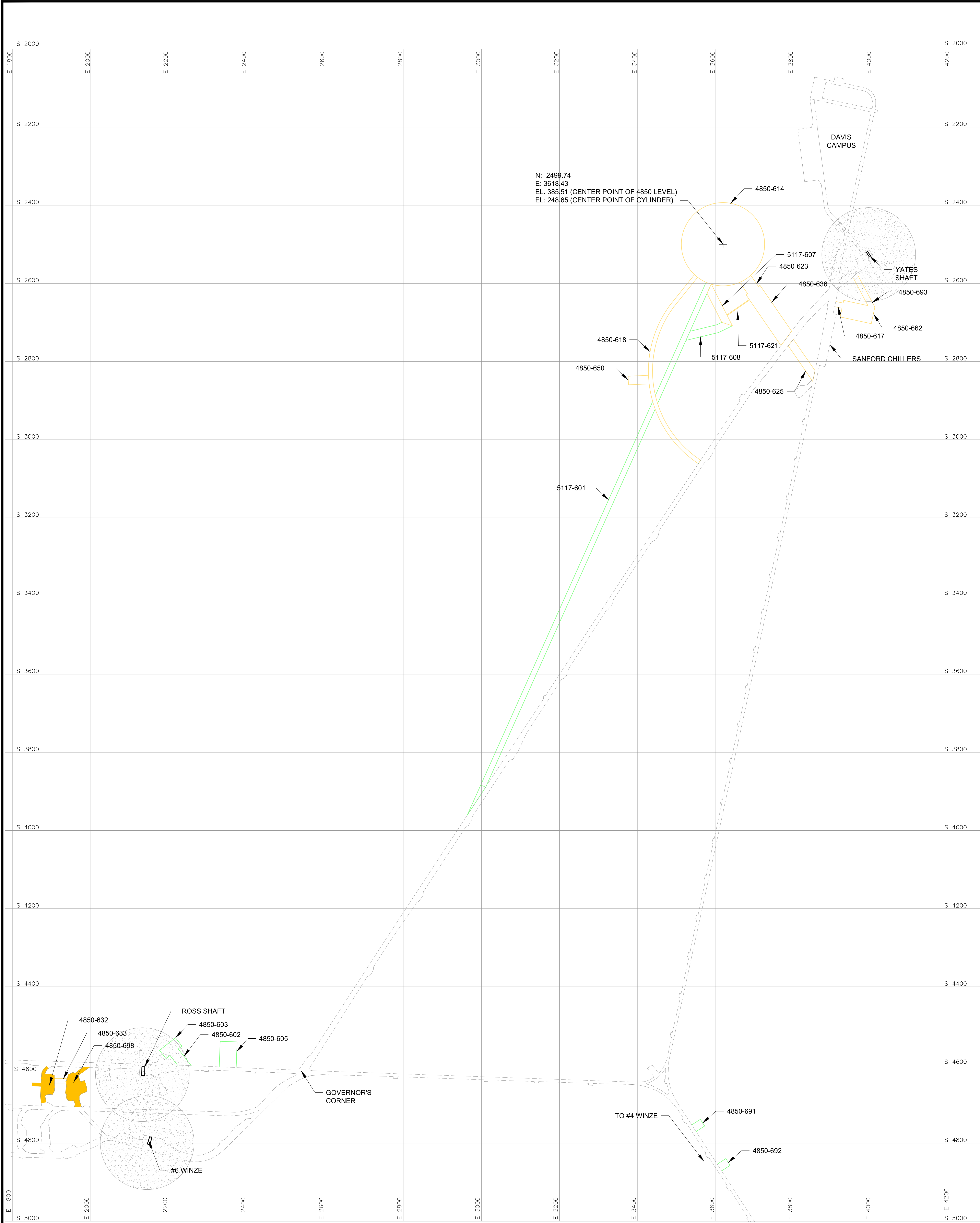
REV	DATE	DES	DESCRIPTION	CADD	CHK	R/W
22	JULY 2011	WTW	50% CONCEPTUAL DESIGN REVIEW			

PROJECT: DUSEL-LBNE CONCEPTUAL EXCAVATION DESIGN LEAD, LAWRENCE COUNTY, SOUTH DAKOTA

TITLE: **EXISTING CONDITIONS ON 4850 LEVEL**

PROJECT No.	113-81779	FILE No.	03-GEC-01-03
DESIGN	WTW	07/11	SCALE AS SHOWN
CADD	AKW	07/11	REV. A
CHECK	WTW	07/11	<b>GEC-G1-03</b>
REVIEW	WTW	07/11	





- LEGEND**
- 4850-601 EXCAVATION NUMBER
  - EXISTING 4850 LEVEL
  - EXCLUSION ZONES
  - EXCAVATIONS REQUIRED FOR EXPERIMENT
  - EXCAVATIONS REQUIRED FOR CONSTRUCTION

- NOTE:**
1. EXISTING CONDITIONS BASED ON DRAWINGS SUPPLIED BY DUSEL.
  2. FORMER HOMESTEAKE MINE COORDINATES (FEET) SHOWN FOR REFERENCE.

**TABLE 7.1 DRAFT  
WCD EXCAVATION VOLUMES AND WASTE ROCK TONNAGE AS OF JULY 20, 2011**

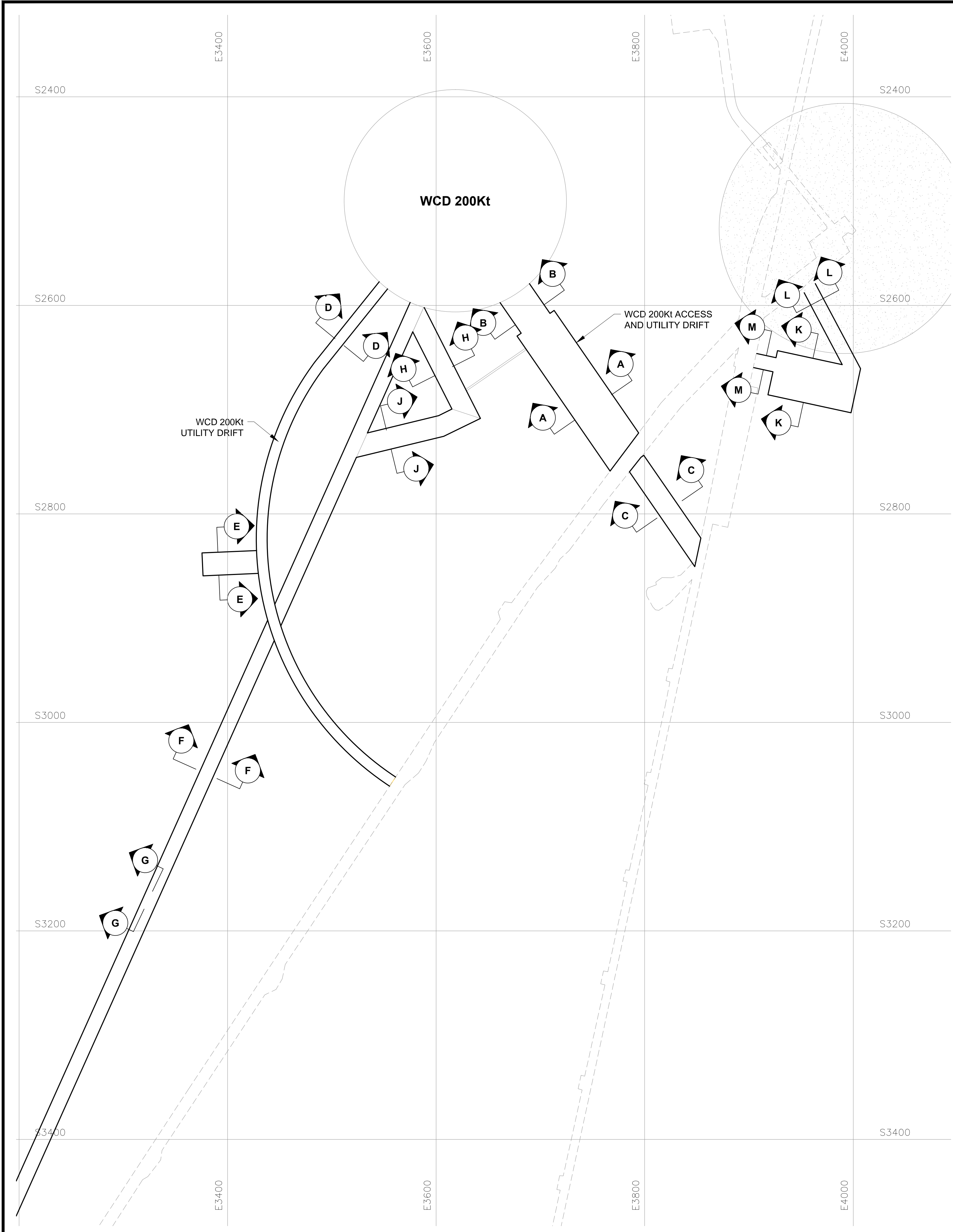
Excavation Number (1)	Description	WBS		Function	Volumes and Tonnage, English				Volumes and Tonnage, Metric			
		1.06.03.05.04			Nominal Excavation Volume (yd <sup>3</sup> )	Excavation Volume with Over Break (yd <sup>3</sup> )	Waste Rock Volume with 150% Swell Factor (yd <sup>3</sup> )	Waste Rock Weight (tons)	Nominal Excavation Volume (m <sup>3</sup> )	Excavation Volume with 10% Swell Factor (m <sup>3</sup> )	Waste Rock Volume with 150% Swell Factor (m <sup>3</sup> )	Waste Rock Weight (tonnes)
<b>01 Drifts, Raises and Ramps</b>												
4850-618	WCD Egress Drift	.01	.01	Experiment	3,913	4,521	6,782	11,167	2,994	3,459	5,189	10,138
4850-623	WCD Access and Utility Drift	.01	.01	Experiment	1,557	1,717	2,575	4,240	1,191	1,313	1,970	3,848
4850-625	Ventilation Cross-Drift	.01	.01	Experiment	1,345	1,512	2,268	3,735	1,029	1,157	1,736	3,390
4850-636	WCD Access and Utility Drift - Enlarged section	.01	.01	Experiment	6,552	6,973	10,460	17,224	5,013	5,336	8,003	15,833
5117-619	Combination Water Collection Sump	.01	.01	Experiment	0	0	0	0	0	0	0	0
5117-621	LC 1 Utility Borehole from 4850-023	.01	.01	Experiment	22	32	53	16	16	25	48	48
4850-605	Construction Maintenance/Assembly Shop	.01	.02	Construction	2,711	2,931	4,396	7,239	2,075	2,242	3,364	6,570
4850-691	Powder Magazine	.01	.02	Construction	330	389	583	960	252	297	446	872
4850-692	Cap Magazine	.01	.02	Construction	330	389	583	960	252	297	446	872
5117-607	Clean Water Sump	.01	.02	Construction	1,084	1,223	1,835	3,022	829	936	1,404	2,743
5117-608	Dirty Water Sump	.01	.02	Construction	1,190	1,342	2,013	3,315	911	1,027	1,540	3,008
<b>02 Areas of Refuge</b>												
4850-617	Area of Refuge 4 Primary Access Drift	.02		Experiment	137	172	258	425	105	132	197	386
4850-632	Area of Refuge 9 - West half	.02		Experiment	0	0	0	0	0	0	0	0
4850-633	Area of Refuge 9 - Connecting drift	.02		Experiment	227	275	413	880	173	211	316	617
4850-650	WCD Egress Access	.02		Experiment	0	0	0	0	0	0	0	0
4850-662	Area of Refuge 4 (Near Yates Shaft)	.02		Experiment	3,068	3,303	4,954	8,158	2,347	2,527	3,791	7,404
4850-693	Area of Refuge 4 Secondary Access Drift	.02		Experiment	608	715	1,072	1,765	465	547	820	1,602
4850-698	Area of Refuge 9 - East half	.02		Experiment	0	0	0	0	0	0	0	0
<b>03 Cavern</b>												
4850-614	WCD Cavern (200 kT)	.03		Experiment	356,895	455,578	683,367	1,125,278	273,076	348,582	522,873	1,021,345
<b>04 Waste Rock Handling and Disposal</b>												
4850-602	Ross Shaft Waste Dump Drift	.04		Construction	829	937	1,406	2,315	634	717	1,076	2,101
4850-603	Rock Breaker Cross Cuts	.04		Construction	1,176	1,312	1,968	3,241	900	1,004	1,508	2,942
5117-601	5117 Ramp	.04		Construction	18,581	20,575	30,862	50,820	14,217	15,743	23,614	46,128
<b>Totals</b>					<b>400,553</b>	<b>503,886</b>	<b>755,828</b>	<b>1,244,598</b>	<b>306,480</b>	<b>385,544</b>	<b>578,316</b>	<b>1,129,845</b>

NOT FOR CONSTRUCTION

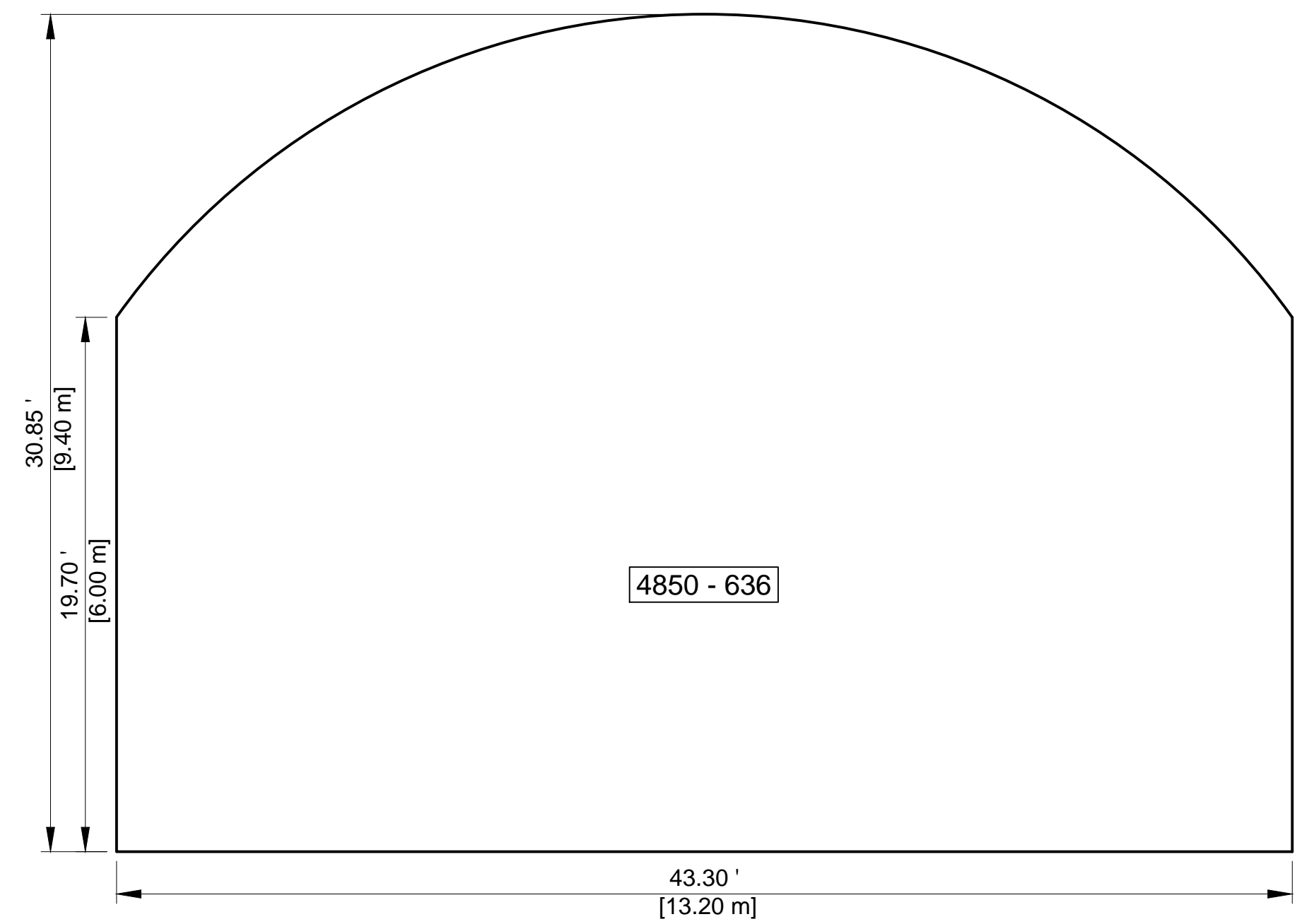
22JULY2011	WTW	50% CONCEPTUAL DESIGN REVIEW			
REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK
PROJECT: DUSEL-LBNE CONCEPTUAL EXCAVATION DESIGN LEAD, LAWRENCE COUNTY, SOUTH DAKOTA					
TITLE: WCD 200KT AND ACCESS DRIFT LOCATIONS					
PROJECT No. 113-81779		FILE No. 04-GEC-G3-01			
DESIGN	WTW	06/11	SCALE	AS SHOWN	REV. A
CADD	AKW	06/11			
CHECK	WTW	07/11			
REVIEW	WTW	07/11	<b>GEC-G3-01</b>		

Plot Time: 07/22/11 17:38

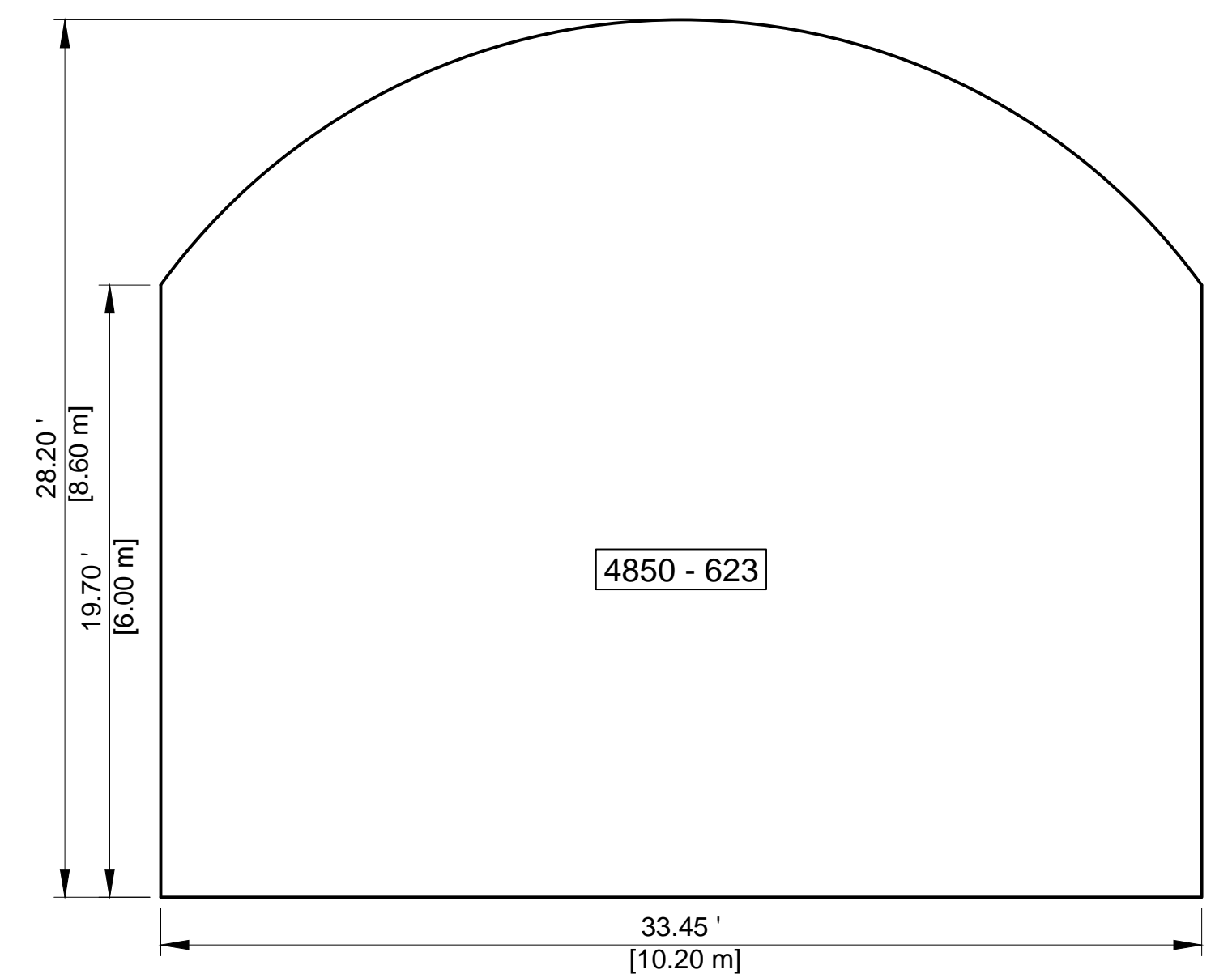




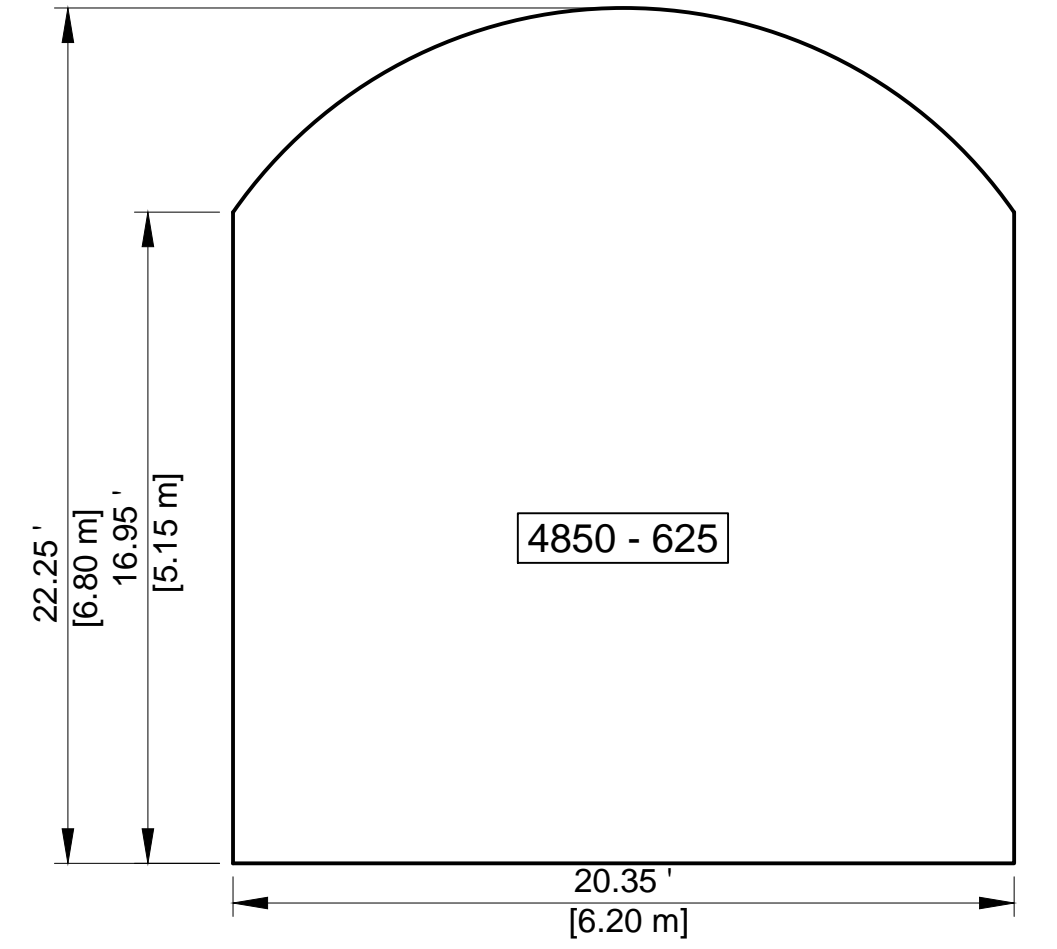
**PLAN**  
SCALE 1" = 50'



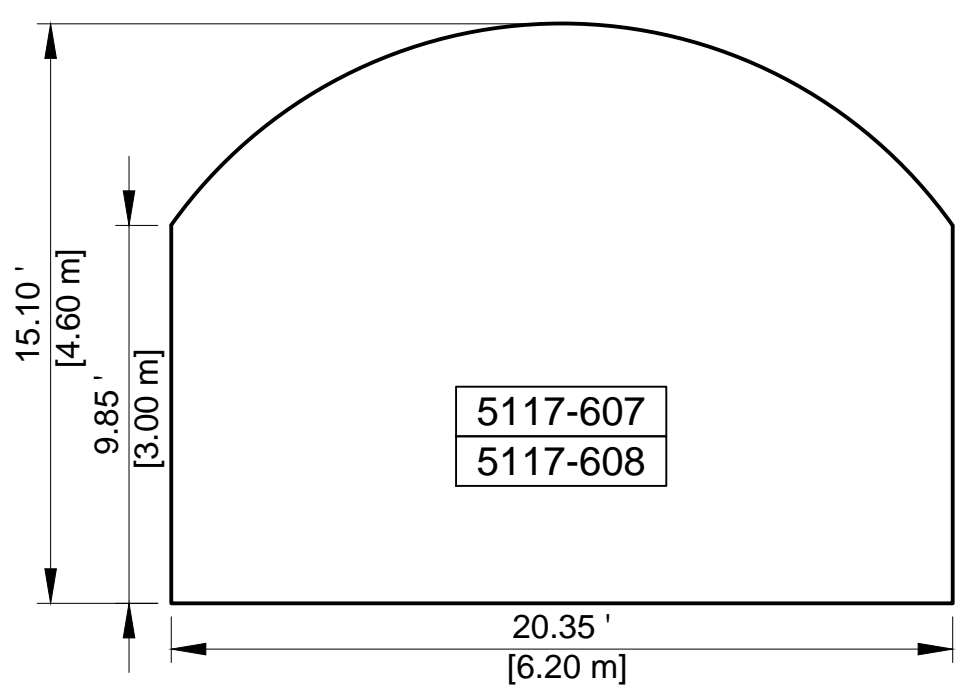
**A SECTIONS - WCD 200kt**  
SCALE 1" = 5'



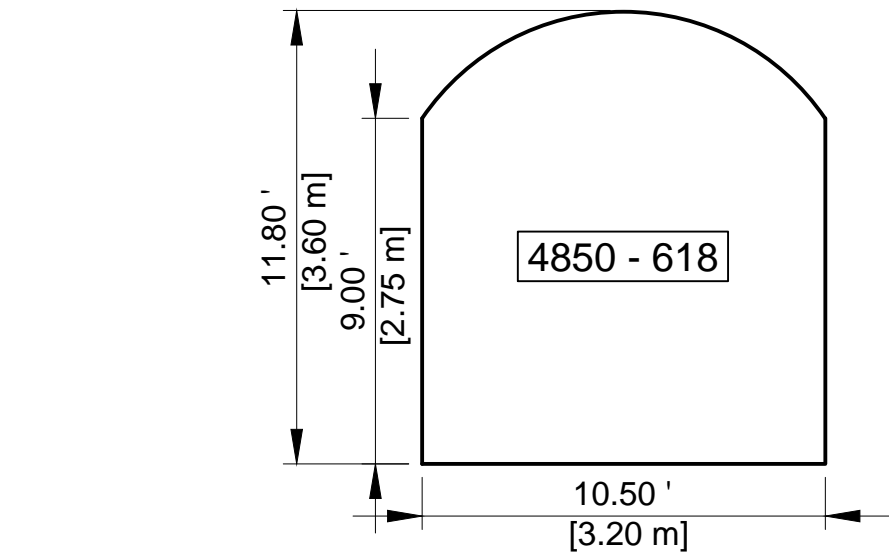
**B SECTIONS - WCD 200kt**  
SCALE 1" = 5'



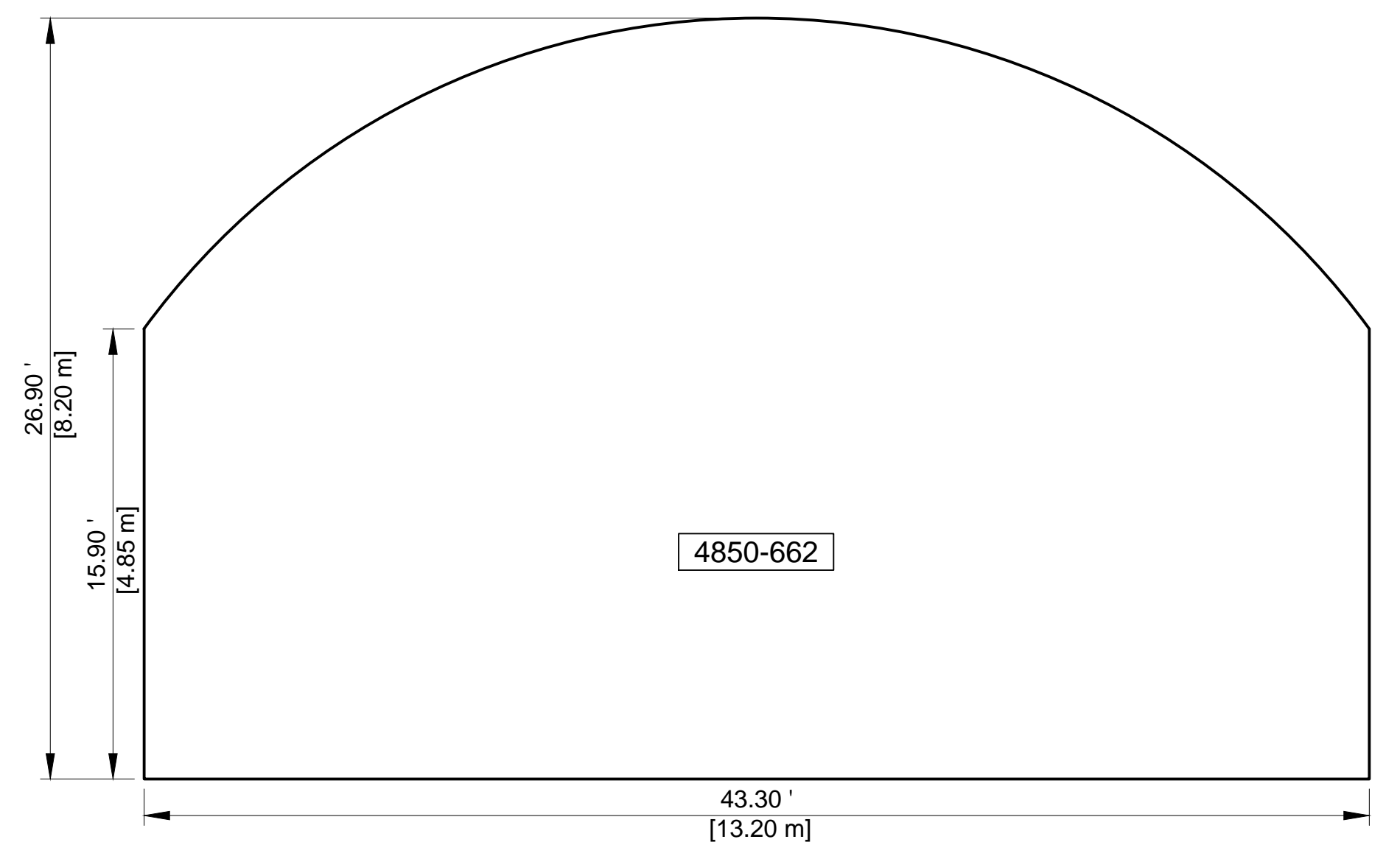
**C SECTION - WCD 200kt**  
SCALE 1" = 5'



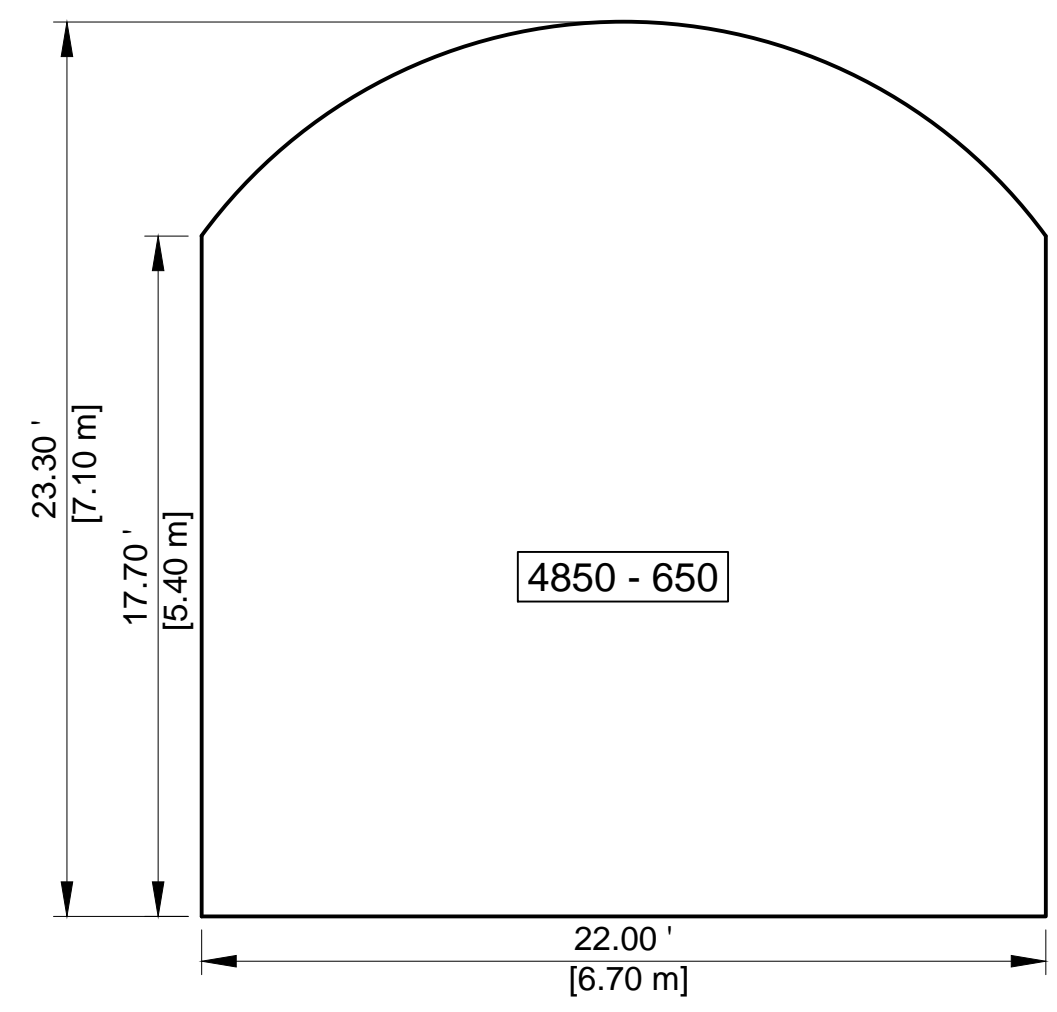
**H J SECTION**  
SCALE 1" = 5'



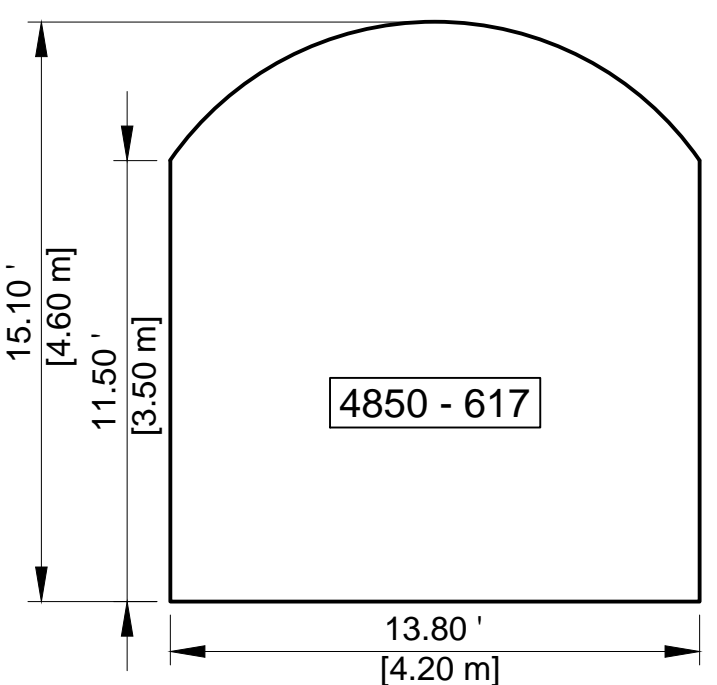
**D L SECTION - WCD 200kt**  
SCALE 1" = 5'



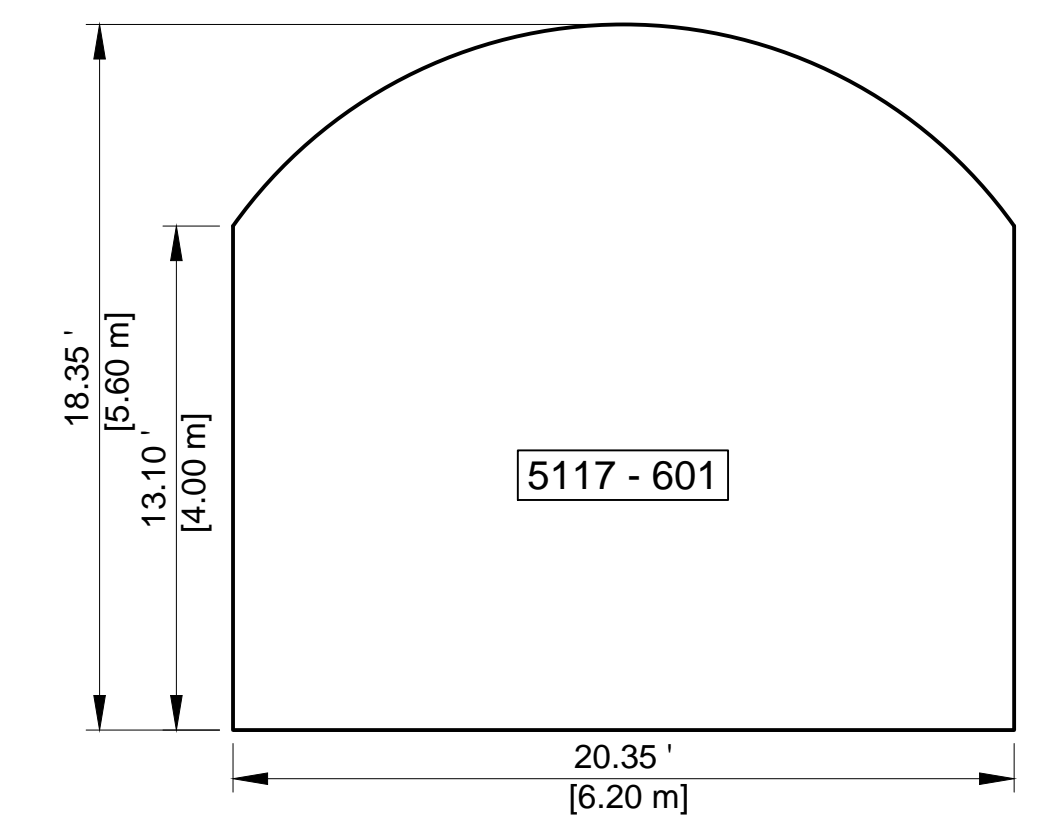
**K SECTION**  
SCALE 1" = 5'



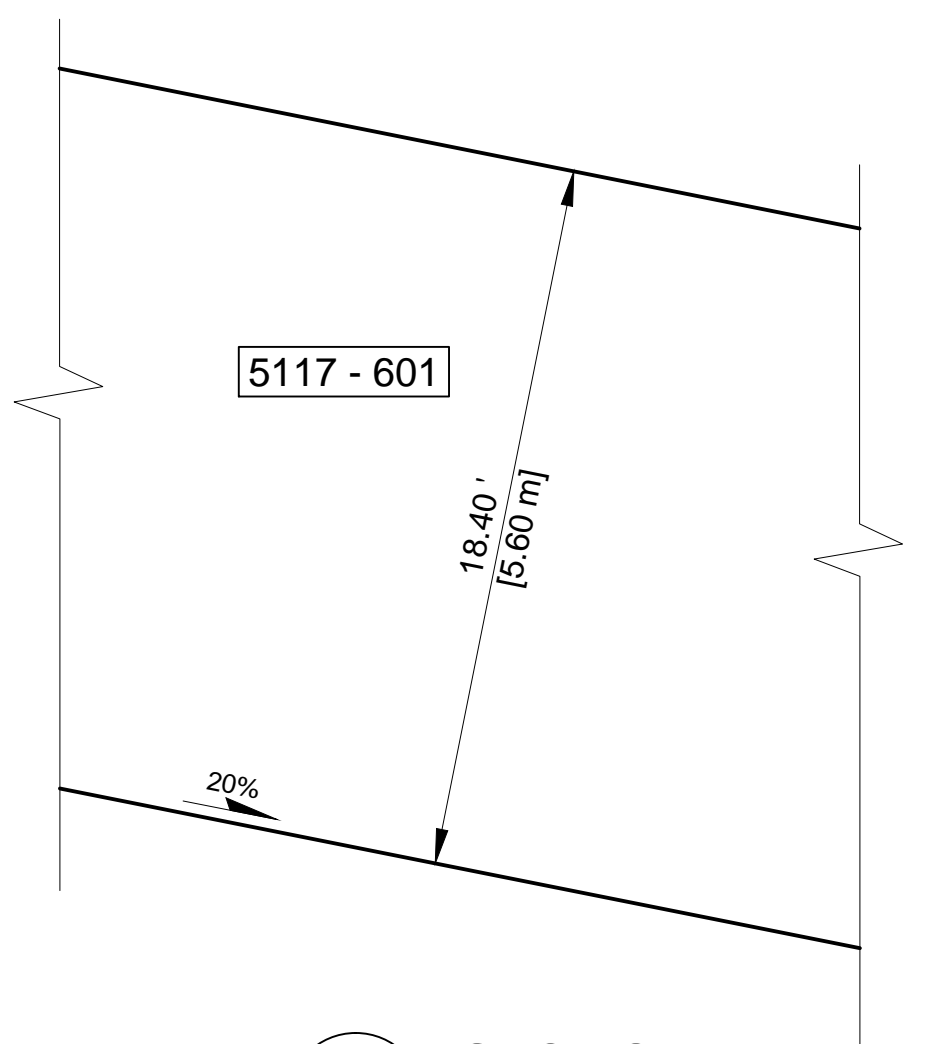
**E SECTION**  
SCALE 1" = 5'



**M SECTION**  
SCALE 1" = 5'



**F SECTION**  
SCALE 1" = 5'



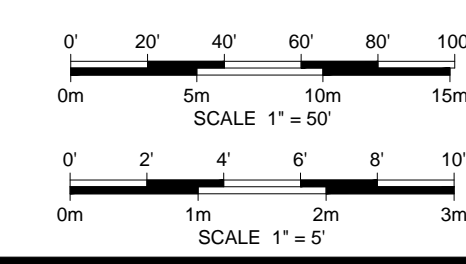
**G SECTION**  
SCALE 1" = 5'

**NOTE:**  
1. ALL DIMENSIONS ARE IN DECIMAL FEET AND METERS UNLESS OTHERWISE NOTED.  
2. FORMER HOMESTAKE MINE COORDINATES (FEET) SHOWN FOR REFERENCE.

Drawing File: N:\11\11-21793\_A\_4850.dwg, 06-22-2011 10:14 AM, User: J. J. [unreadable] | Location: G:\CADD\11-21793 | Project: 11-21793 | Revision: 01  
 22 JUL 2011 11:21:39 AM  
 SCALE 1" = 50'

**NOT FOR CONSTRUCTION**

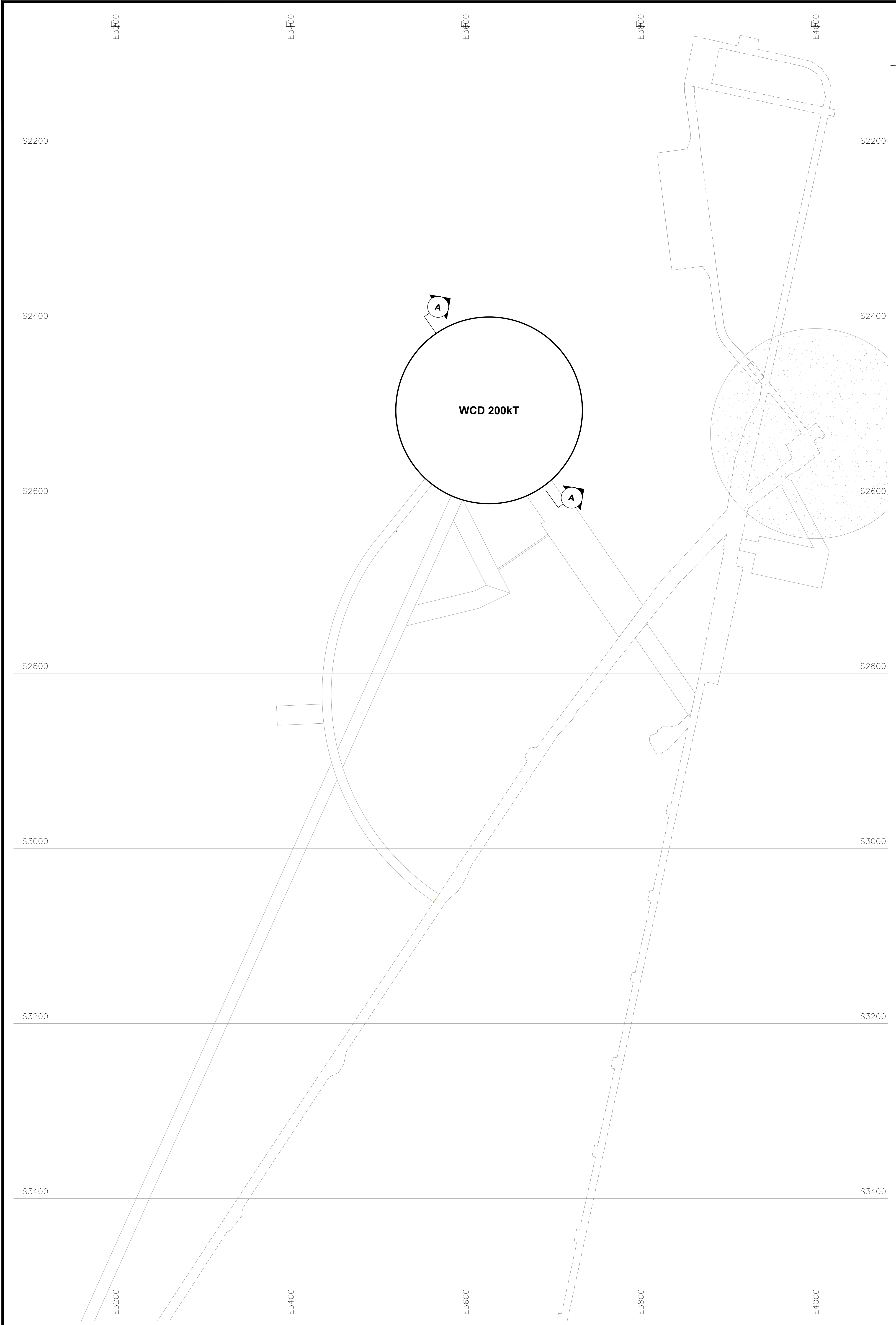
22 JUL 2011	WTW	50% CONCEPTUAL DESIGN REVIEW			
REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK
PROJECT: DUSEL-LBNE CONCEPTUAL EXCAVATION DESIGN LEAD, LAWRENCE COUNTY, SOUTH DAKOTA					
TITLE: <b>WCD 200kt ACCESS DRIFT EXCAVATIONS DETAILS</b>					
PROJECT No.	113-81779	FILE No.	06-GEC-DRFT-01		
DESIGN	WTW	07/11	SCALE	AS SHOWN	REV. A
CADD	AKW	07/11			
CHECK	WTW	07/11			
REVIEW	WTW	07/11	<b>GEC-DRFT-01</b>		





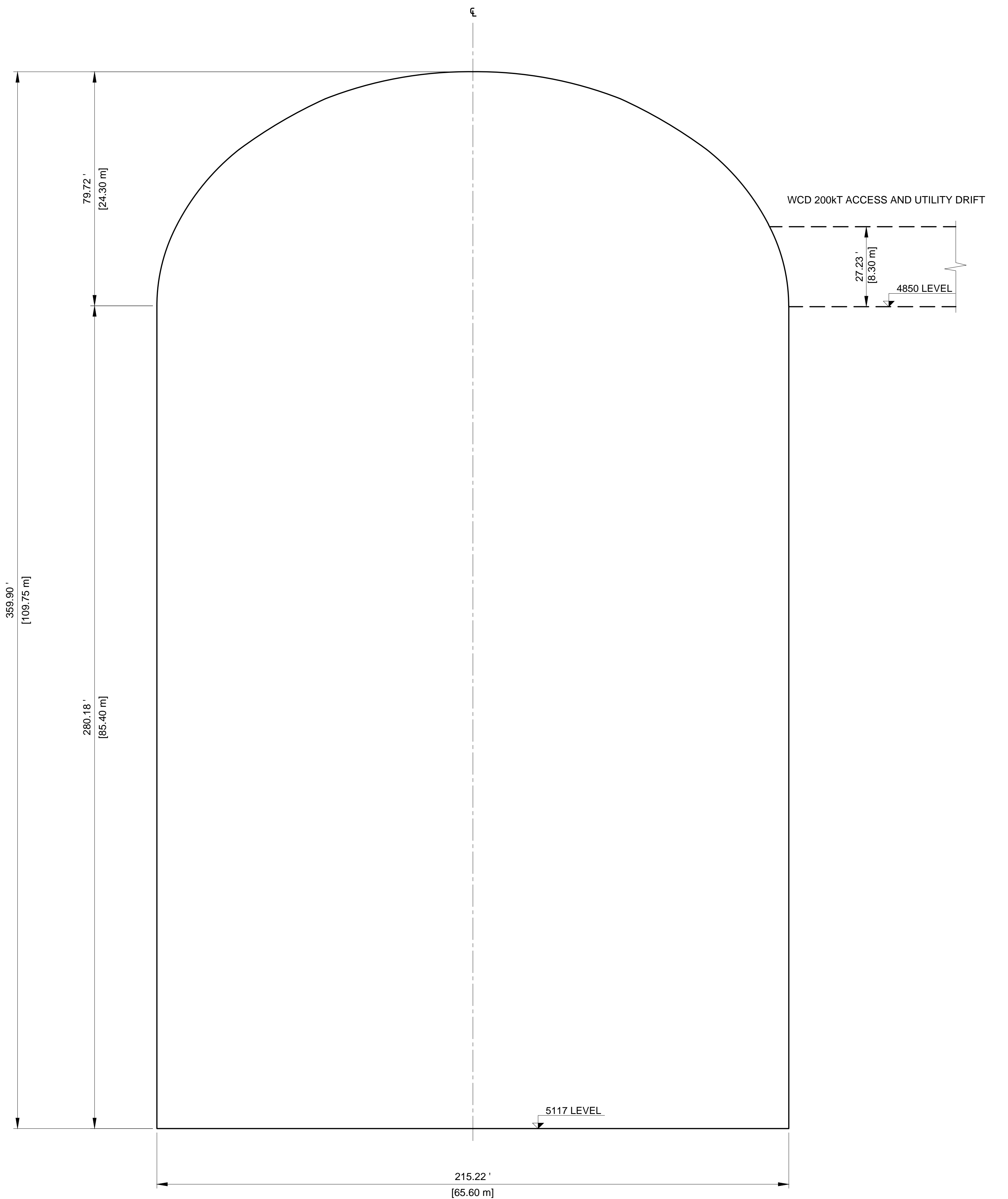




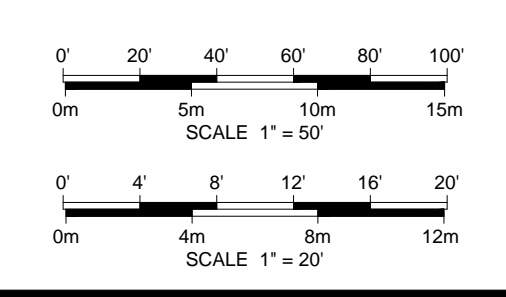


**PLAN**  
SCALE 1" = 50'

- NOTE:**
1. ALL DIMENSIONS ARE IN DECIMAL FEET AND METERS UNLESS OTHERWISE NOTED.
  2. FORMER HOMESTAKE MINE COORDINATES (FEET) SHOWN FOR REFERENCE.



**A SECTION - WCD 200kT**  
SCALE 1" = 20'



**NOT FOR CONSTRUCTION**

PROJECT	DUSEL-LBNE CONCEPTUAL EXCAVATION DESIGN LEAD, LAWRENCE COUNTY, SOUTH DAKOTA		
TITLE	WCD 200kT EXCAVATION		
PROJECT No.	113-81779	FILE No.	12-GEC-LC1-01
DESIGN	WTW	07/11	SCALE AS SHOWN REV. A
CADD	AKW	07/11	
CHECK	WTW	07/11	
REVIEW	WTW	07/11	<b>GEC-LC1-01</b>

**Golder Associates**  
DENVER, COLORADO



**NOTE:**  
 1. THIS DRAWING IS INTENDED TO SHOW THE CONCEPTS OF THE EXCAVATION SEQUENCE. THE DETAILED MEANS AND METHODS ARE THE CONTRACTOR'S RESPONSIBILITY.

**SEQUENCE STAGE 1**

- EXCAVATE RAMP TO DOME.
- EXCAVATE 5117 DRIFT INTO CENTER OF WCD.

**SEQUENCE STAGE 2**

- EXCAVATE TOP LEVEL OF DOME AND INSTALL SUPPORT.
- EXCAVATE RAISE BORE ELEVATION 4722 L AND 5117 L.

**SEQUENCE STAGE 3**

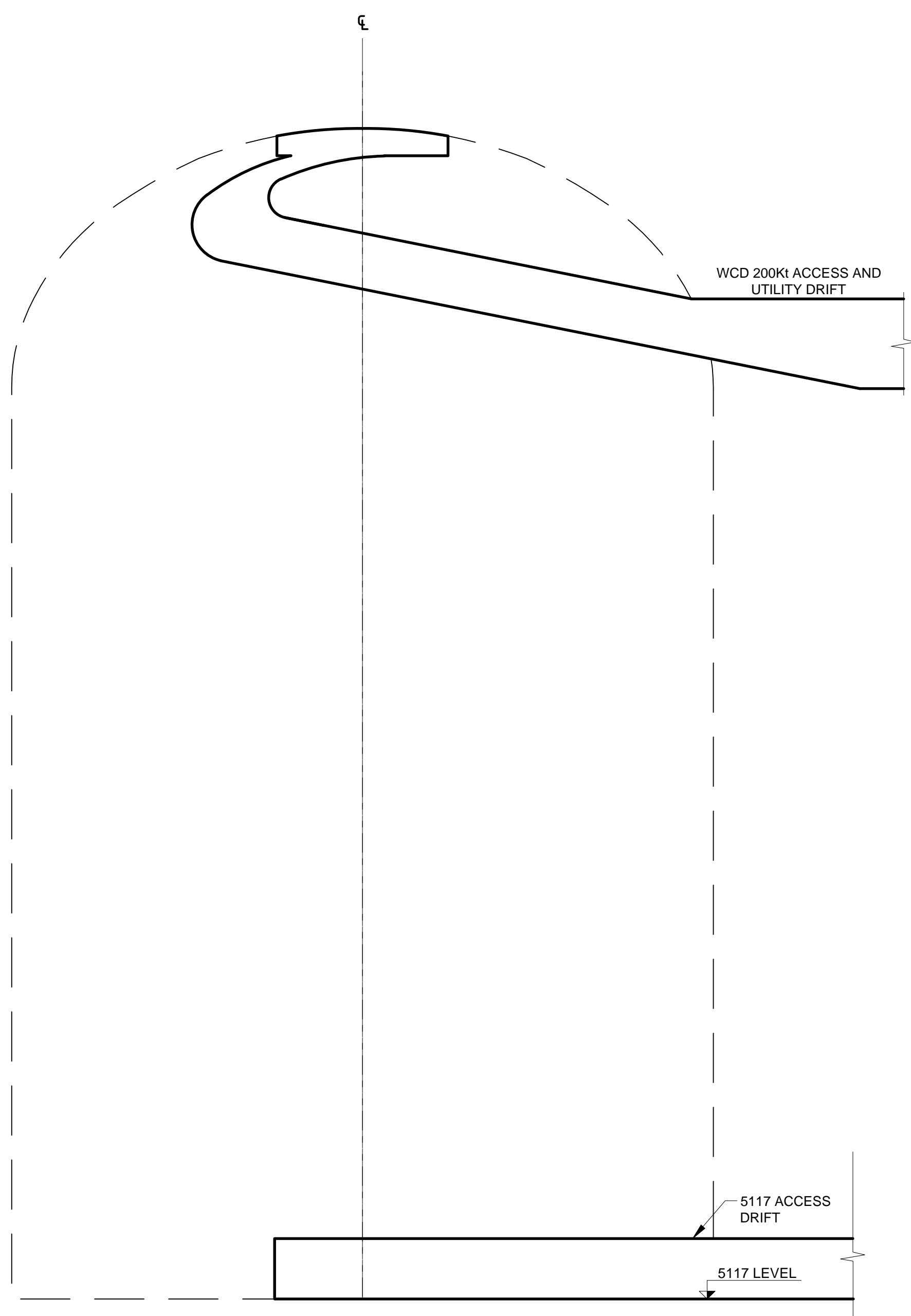
- EXCAVATE SECOND LEVEL OF DOME AND INSTALL SUPPORT.

**SEQUENCE STAGE 4**

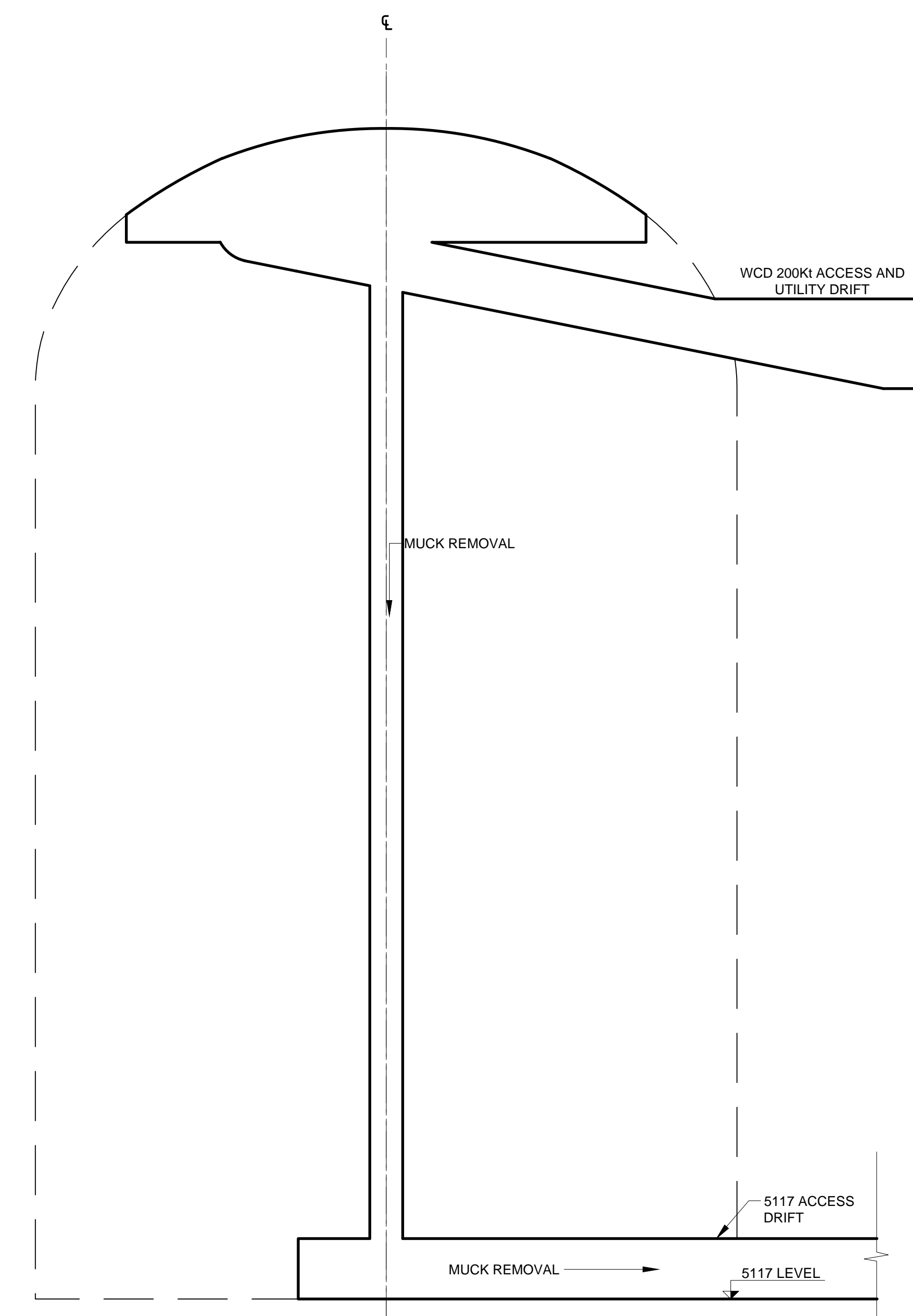
- EXCAVATE THIRD LEVEL OF DOME AND INSTALL SUPPORT.

**SEQUENCE STAGE 5 TO COMPLETION**

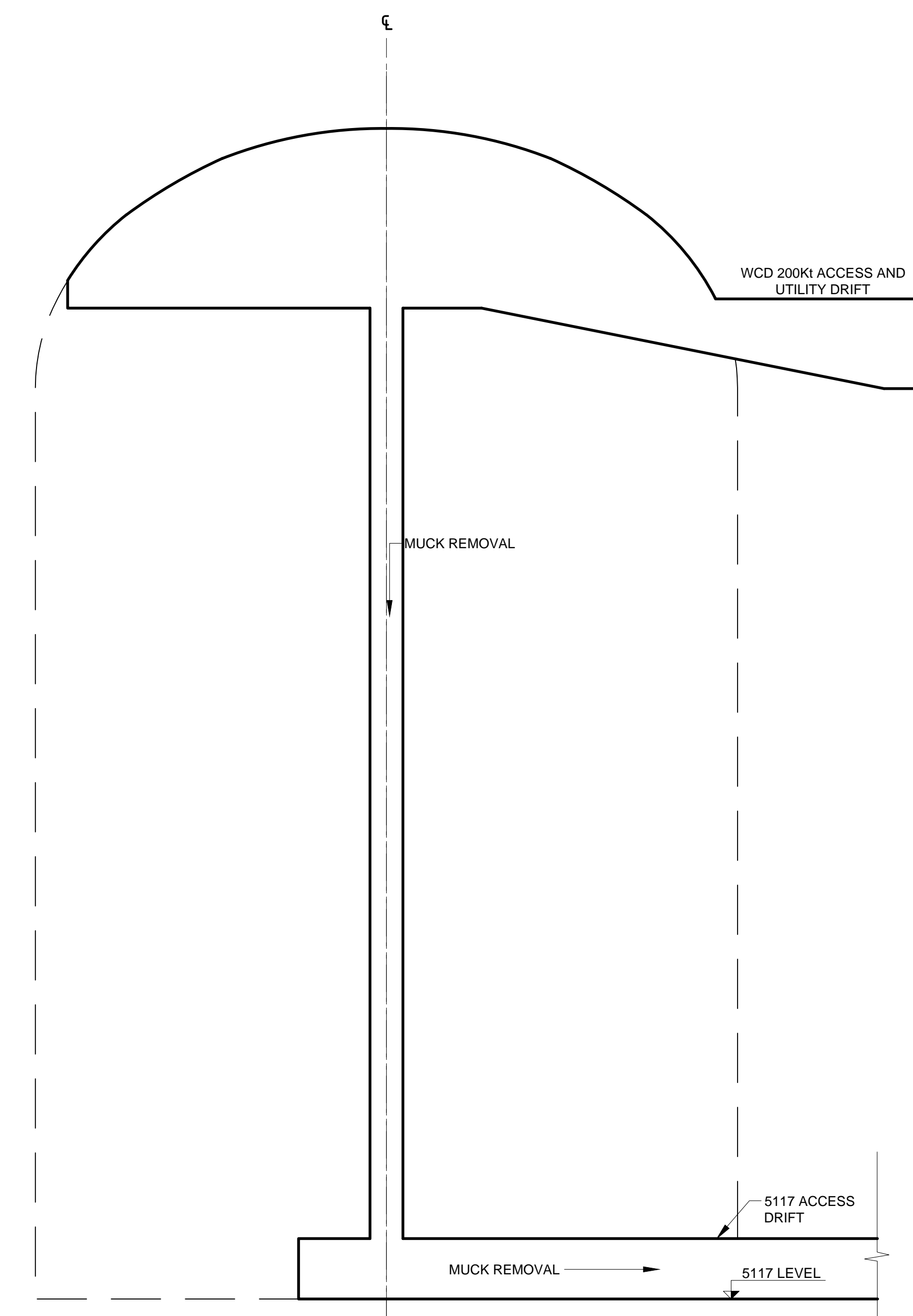
- EXCAVATE BENCHES IN TANK, INSTALLING ROCK SUPPORT AS WALLS ARE EXPANDED. ACCESS FROM 4850.



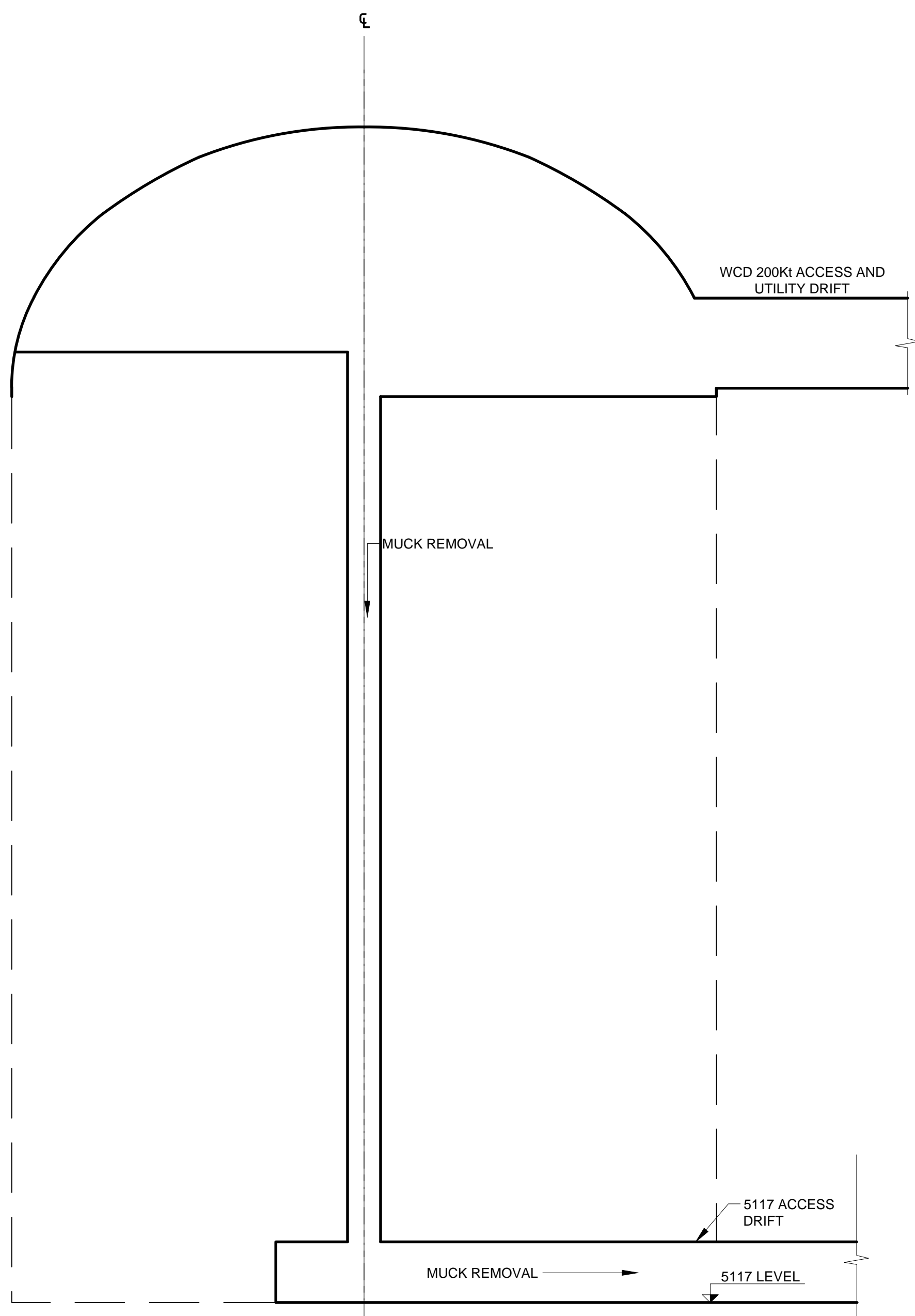
**1 SECTION - WCD 200kt - STAGE 1**  
 SCALE 1" = 30'



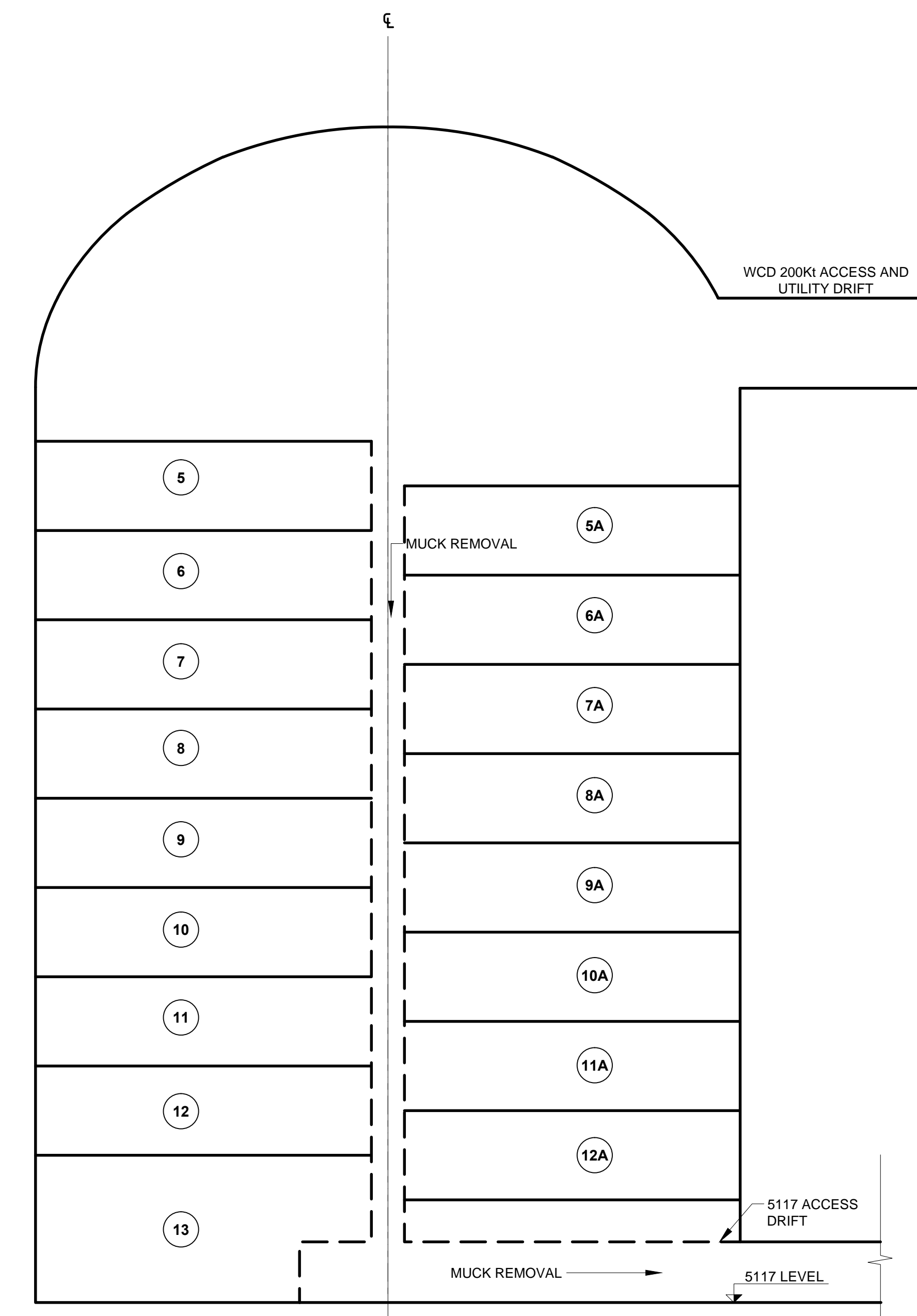
**2 SECTION - WCD 200kt - STAGE 2**  
 SCALE 1" = 30'



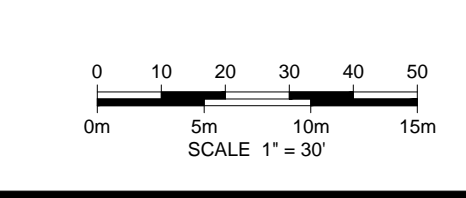
**3 SECTION - WCD 200kt - STAGE 3**  
 SCALE 1" = 30'



**4 SECTION - WCD 200kt - STAGE 4**  
 SCALE 1" = 30'



**5 SECTION - WCD 200kt - STAGE 5 TO COMPLETION**  
 SCALE 1" = 30'



**NOT FOR CONSTRUCTION**

22JULY2011	WTW	50% CONCEPTUAL DESIGN REVIEW			
REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK
PROJECT DUSEL-LBNE CONCEPTUAL EXCAVATION DESIGN LEAD, LAWRENCE COUNTY, SOUTH DAKOTA					
TITLE <b>WCD 200KT EXCAVATION SEQUENCE</b>					
PROJECT No.	113-81779	FILE No.	13-GECS-LC1-01		
DESIGN	WTW	07/11	SCALE	AS SHOWN	REV. A
CADD	AKW	07/11			
CHECK	WTW	07/11			
REVIEW	WTW	07/11	<b>GECS-LC1-01</b>		







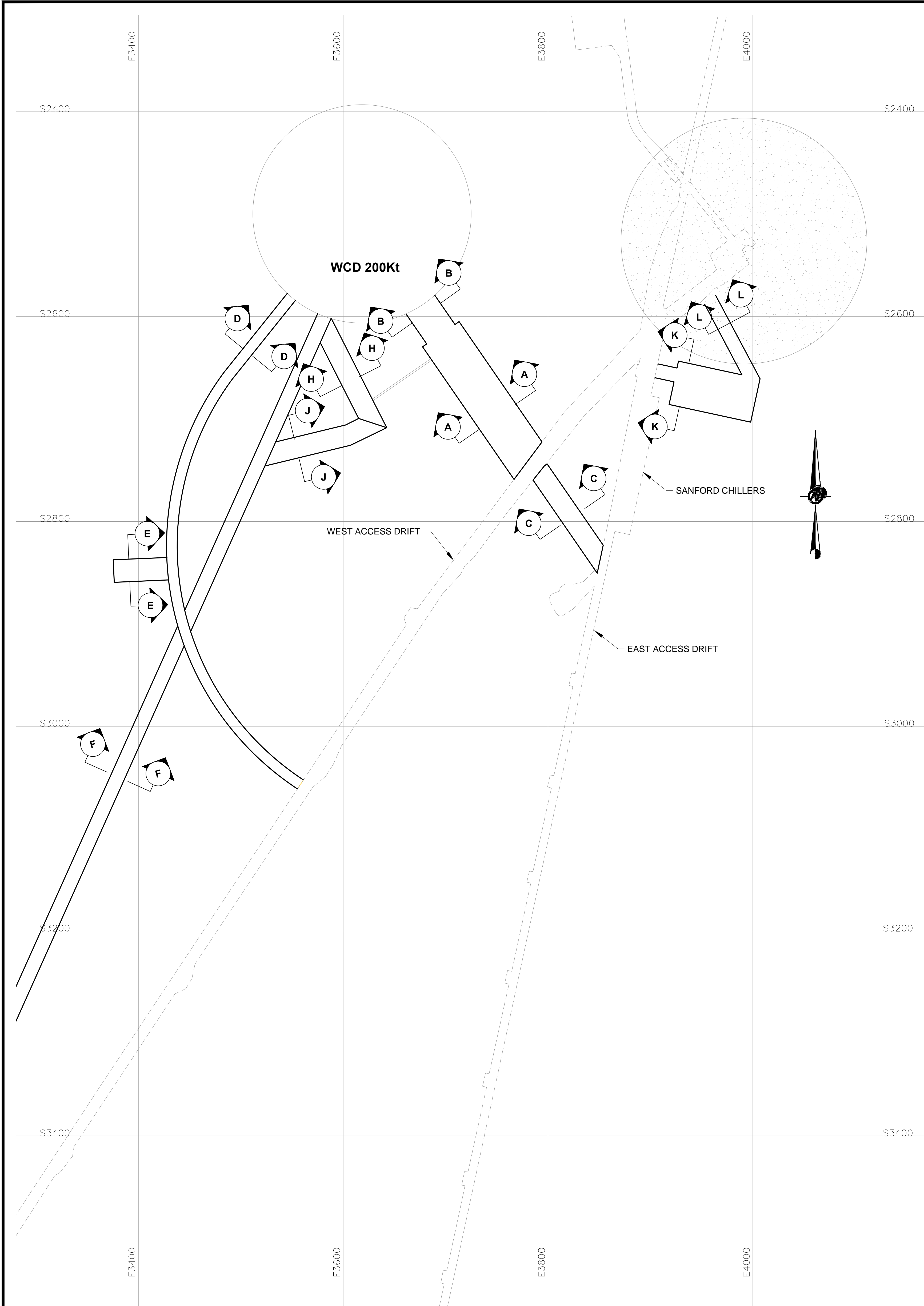






**NOTE:**

1. FOR ROCK SUPPORT NOTES SEE DRAWING NO. GSP-GEN-1.
2. FORMER HOMESTAKE MINE COORDINATES (FEET) SHOWN FOR REFERENCE.

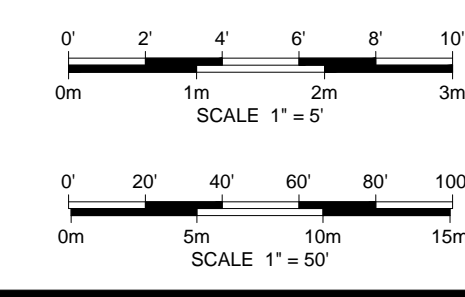


**PLAN**  
SCALE 1" = 50'

**CROSS SECTIONS TO BE INCLUDED**

Drawing File: N:\11\113-81779\_A\_400.dwg, 11:00:00 AM, 07/22/11, 16:40:00, 11:00:00 AM, 07/22/11, 16:40:00, 11:00:00 AM, 07/22/11, 16:40:00

**NOT FOR CONSTRUCTION**



REV	DATE	DES	50% CONCEPTUAL DESIGN REVIEW	CADD	CHK	R/W
22	07/20/11	WTW				

PROJECT: DUSEL-LBNE CONCEPTUAL EXCAVATION DESIGN LEAD, LAWRENCE COUNTY, SOUTH DAKOTA

TITLE: **WCD 200KT ACCESS DRIFT ROCK SUPPORT**

PROJECT No.	113-81779	FILE No.	16-GSP-DRFT-01
DESIGN	WTW	07/11	SCALE AS SHOWN REV. A
CADD	AKW	07/11	
CHECK	WTW	07/11	
REVIEW	WTW	07/11	<b>GSP-DRFT-01</b>

DENVER, COLORADO



