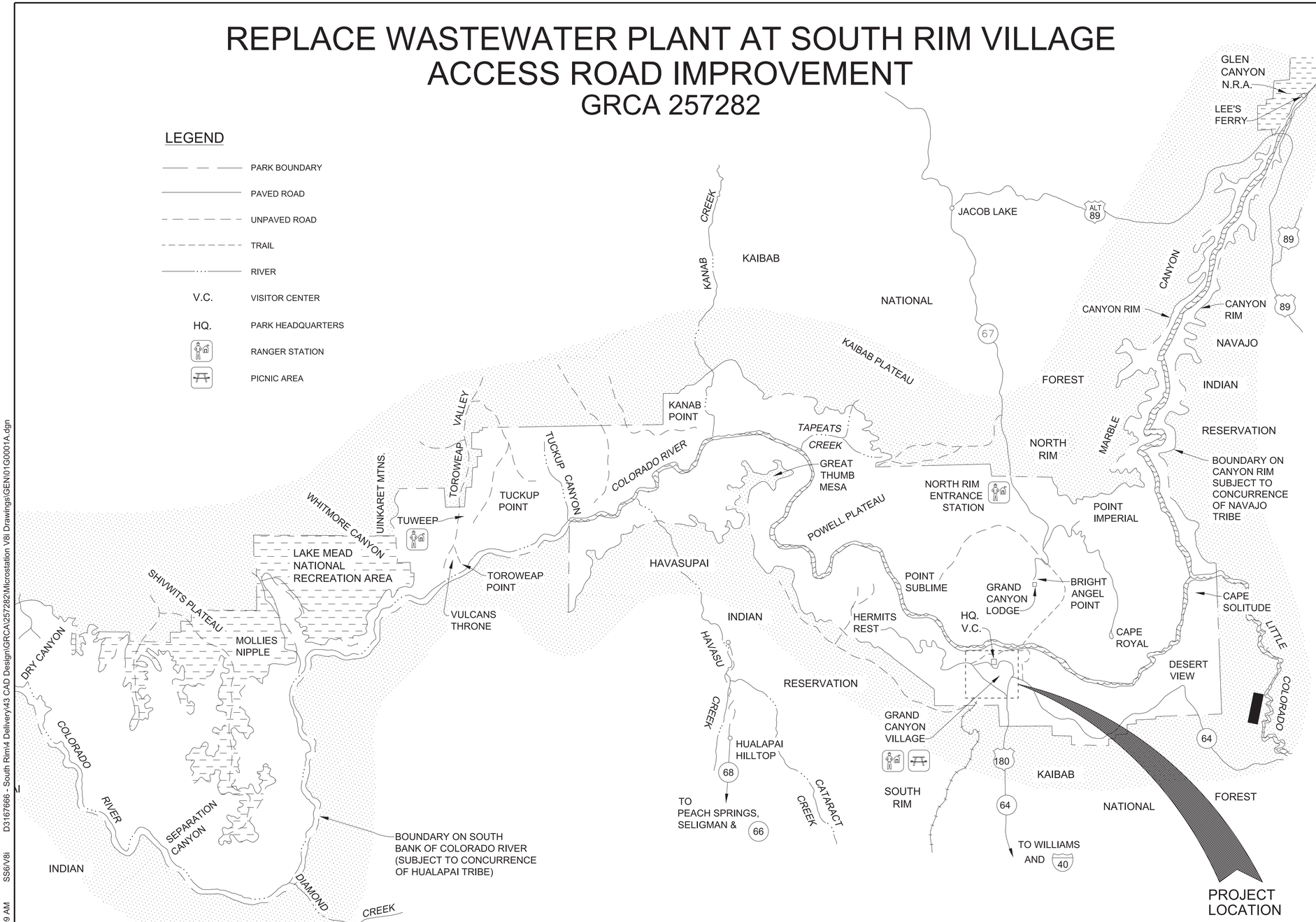
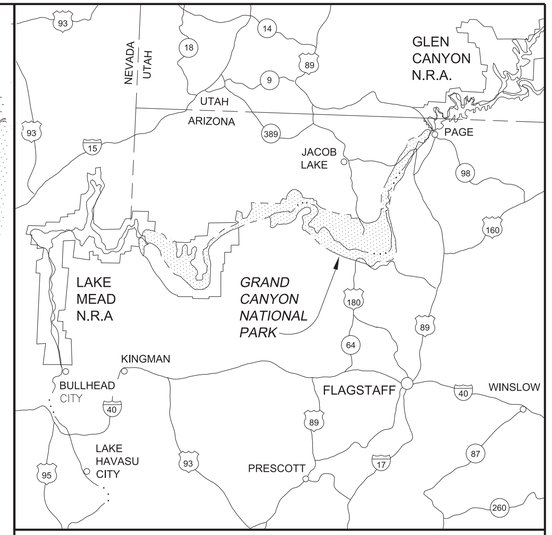
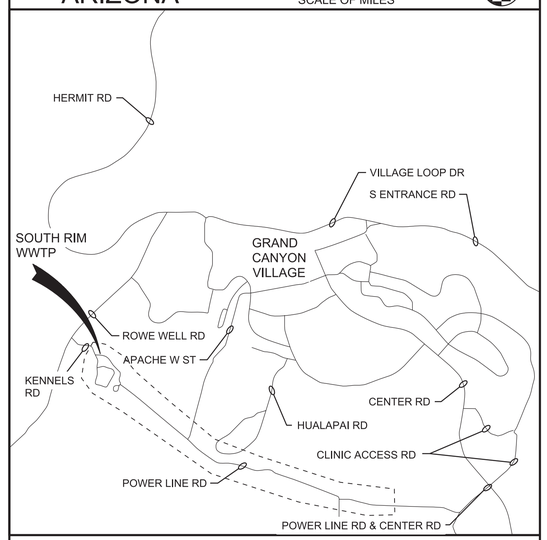
REPLACE WASTEWATER PLANT AT SOUTH RIM VILLAGE
ACCESS ROAD IMPROVEMENT
GRCA 257282





NORTHERN ARIZONA

SCALE OF MILES: 30 0 30



VICINITY MAP

SCALE OF MILES: 0.25 0 0.25

GRAND CANYON NATIONAL PARK
WORLD HERITAGE SITE

SCALE OF MILES: 5 0 5 10

SCALE OF KILOMETERS: 5 0 5 10 15

BASIC DATA: LAND STATUS MAP 113/80,011 7/75; PARK MINI FOLDER 1989; REVISED & REDRAWN 2/91. UPDATED 11/98. SGS.

Registered Professional Engineer (Civil) CERTIFICATE NO. 69777 JAMES MILLS Date Signed 9-30-25 ARIZONA, U.S.A. Expires 9-30-2026

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO

Mark	Sheet	REVISION	Date	Initial

QUALITY DESIGN CERTIFICATION
- ☐ Prepared in Accordance with Design Development (Title I) ____ Drawing No.
- OR
- ☐ Variance from Design Development (Title I) Approved by Superintendent on ____ Date
- OR
- ☐ Construction Drawing Not Preceded by Design Development (Title I)

Project Manager ____ Date

NATIONAL PARK SERVICE

CONSTRUCTION DOCUMENTS

UNITED STATES DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE DENVER SERVICE CENTER

TITLE OF DRAWING
WWTP REPLACEMENT
LOCATION WITHIN PARK
SOUTH RIM VILLAGE
NAME OF PARK
GRAND CANYON NATIONAL PARK

REGION: INTERMOUNTAIN | COUNTY: COCONINO | STATE: ARIZONA

DRAWING NO. 113 175376

PMIS/PKG NO. 257282

SHEET 1 OF 41

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 9/8/2025 PLOT TIME: 10:06:09 AM SS6/V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01\G0001A.dgn

SHEET	SUB SHEET	SHEET TITLE/DESCRIPTION
	01 - GENERAL	
1	01G0001A	COVER SHEET
2	01G0002A	INDEX OF DRAWINGS
3	01G0005A	ABBREVIATIONS
4	01G0010A	LEGEND
5	01C0001A	CIVIL LEGEND
	05 - ROADWAY	
6	05C2000	SITE PLAN
7	05C2100	SURVEY CONTROL PLAN
8	05C2201	LOW WATER CROSSING PLAN AND PROFILE
9	05C3001	TYPICAL SECTION
10	05C4001	PLAN AND PROFILE STATION 8+47.34 TO 12+00
11	05C4002	PLAN AND PROFILE STATION 12+00 TO 19+50
12	05C4003	PLAN AND PROFILE STATION 19+50 TO 28+00
13	05C4004	PLAN AND PROFILE STATION 28+00 TO 36+50
14	05C4005	PLAN AND PROFILE STATION 36+50 TO 45+00
15	05C4006	PLAN AND PROFILE STATION 45+00 TO 54+00
16	05C4007	PLAN AND PROFILE STATION 54+00 TO 59+67.58
17	05C4008	PLAN AND PROFILE STATION 101+90 TO 105+82.96
18	05C5001	METAL CULVERT PIPE COUPLING DETAILS
19	05C5002	CULVERT BACKFILL DETAILS
20	05C5003	CULVERT PIPE COVER AND METAL END SECTION DETAILS
21	05C5004	RIPRAP DETAILS
22	05C5005	MANHOLE FRAME AND COVER ADJUSTMENT DETAILS
23	05C5006	BOULDER PLACEMENT DETAILS
24	05C5007	LOW WATER CROSSING DETAILS
25	05C5008	FIBER ROLL DETAILS
26	05C5009	EROSION CONTROL DETAILS
27	05C5010	OBJECT MARKER DETAILS
28	05C6001	ACCESS ROAD CROSS SECTIONS
29	05C6002	ACCESS ROAD CROSS SECTIONS
30	05C6003	ACCESS ROAD CROSS SECTIONS
31	05C6004	ACCESS ROAD CROSS SECTIONS
32	05C6005	ACCESS ROAD CROSS SECTIONS
33	05C6006	ACCESS ROAD CROSS SECTIONS
34	05C6007	ACCESS ROAD CROSS SECTIONS
35	05C6008	ACCESS ROAD CROSS SECTIONS
36	05C6009	ACCESS ROAD CROSS SECTIONS
37	05C6010	ACCESS ROAD CROSS SECTIONS
38	05C6011	ACCESS ROAD CROSS SECTIONS
39	05C6012	ACCESS ROAD CROSS SECTIONS
40	05C6013	CONNECTOR ROAD CROSS SECTIONS
41	05C6014	CULVERT CROSS SECTIONS

GRCA-257282

PLOT DATE: 9/8/2025 PLOT TIME: 10:07:06 AM SS6/V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i DrawingsIROAD\01G0002A_D3167666.dgn

100% COMPLETE CONSTRUCTION DOCUMENTS

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

A/E FIRM
JACOBS GOVERNMENT SERVICES COMPANY
GREENWOOD VILLAGE, CO

DESIGNED: R COWAN
CADD: R COWAN
TECH. REVIEW: K WEBSTER
DATE: 08/2025

SUB SHEET NO. 01G0002A

TITLE OF SHEET
GENERAL
INDEX OF DRAWINGS

GRAND CANYON, SOUTH RIM

DRAWING NO. 113
175376
PMIS/PKG NO. 257282
SHEET 2 OF 41

ABBREVIATIONS

SYMBOLS

@	AT
Ø	DIAMETER
℄	CONTROL LINE

A

AB	AERATION BASIN
ADD'L	ADDITIONAL
AE	ANALYZER ELEMENT
AFF	ABOVE FINISH FLOOR
AIT	ANALYZER INDICATOR TRANSMITTER
AL	ALUMINUM
ALP	AIR, LOW PRESSURE
APS	ARIZONA PUBLIC SERVICE
ARCH	ARCHITECTURAL
ARWB	ABUSE-RESISTANT GWB

B

BH	BORE HOLE
BTM	BOTTOM
BYP	BYPASS

C

CLR	CLEAR
CDW	COLD DRINKING WATER
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CO	CONTRACTING OFFICER
COL	COLUMN
CONC	CONCRETE
CONT	CONTINUED, CONTINUOUS, CONTINUATION
COORD	COORDINATE

D

D, DR	DRAIN
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DMZ	DEMILITARIZED ZONE
DN	DOWN
DP	DISTRIBUTION PANEL
DPM	DIGITAL POWER METER
DWG	DRAWINGS

E

e	SUPERELEVATION
E	EAST, EASTING
EA	EACH
EF	EACH FACE
EGR	EDGE OF GRAVEL ROAD
EL	ELEVATION
ELEC	ELECTRIC, ELECTRICAL
EQ	EQUAL
EQPT	EQUIPMENT
EW	EACH WAY

F

FBV	FURNISHED BY VENDOR
FD	FLOOR DRAIN
F. EXT	FIRE EXTINGUISHER
FF	FINISH FLOOR
FIT	FLOW INDICATOR TRANSMITTER
FL, FLG	FLANGE(D)
FRP	FIBERGLASS REINFORCED PLASTIC
FT	FEET

G

GALV	GALVANIZED
GEN	GENERATOR
GRS	GREASE
GRT	GRIT
GWB	GYPSUM WALL BOARD

H

HORIZ	HORIZONTAL
HP	HORSE POWER, HIGH POINT
HVAC	HEATING, VENTILATION AND AIR CONDITIONING

I

I&C	INSTRUMENTATION AND CONTROL
IE	INVERT ELEVATION
INF	INFLUENT

L

L	LENGTH
LCP	LOCAL CONTROL PANEL
LCS	LOCAL CONTROL STATION
LE	LEVEL ELEMENT
LF	LINEAR FEET
LIT	LEVEL INDICATOR TRANSMITTER
LLV	LONG LEG VERTICAL
LP	LOW VOLTAGE PANEL, LOW POINT
LSH	LEVEL SWITCH HIGH
LSL	LEVEL SWITCH LOW
LT	LEFT SIDE

M

M	MOTOR
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MIN	MINIMUM
MO	MASONRY OPENING

N

N	NORTH, NORTHING
NO., #	NUMBER
NPS	NATIONAL PARK SERVICE
NPW	NON POTABLE WATER

O

O.C.	ON CENTER
OD	OUTSIDE DIAMETER
OVH	OVERHEAD

P

PDPS	PLANT DRAIN PUMP STATION
PEMB	PRE-ENGINEERED METAL BUILDING
PC	POINT OF CURVATURE
PI	POINT OF INTERSECTION
PIT	PRESSURE INDICATING TRANSMITTER
PJF	PREMOULDED JOINT FILLER
PL	PLATE (STEEL)
POB	POINT OF BEGINNING
POE	POINT OF ENDING
POLY	POLYMER
PS	PUMP STATION
PSH	PRESSURE SWITCH
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVRC	POINT OF VERTICAL REVERSE CURVE
PVT	POINT OF VERTICAL TANGENCY

R

R	RADIUS
REINF	REINFORCED, REINFORCING, REINFORCE
REQD	REQUIRED
RO	ROUGH OPENING
RT	RIGHT SIDE
RR	RAILROAD
RW	RECLAIMED WATER
RW/OF	RECLAIMED WATER, OVERFLOWS

S

SEP	SEPTAGE
SCHD	SCHEDULED
SD	SIGHT DISTANCE
SHLDR	SHOULDER
SIM	SIMILAR
SP	SPACE OR SPACES
SPD	SURGE PROTECTION DEVICE
SQ	SQUARE
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
SST	STAINLESS STEEL
STA	STATION
STRUCT	STRUCTURE, STRUCTURAL
SV	SOLENOID VALVE

T

T&B	TOP AND BOTTOM
T.O.	TOP OF
TOC	TOP OF CONCRETE
TOF	TOP OF FOUNDATION
TOS	TOP OF SLAB
TOW	TOP OF WALL
TYP	TYPICAL

U

ULP	UNIVERSAL LOGIC PLUG
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
UV	ULTRA VIOLET

V

VERT	VERTICAL
VFD	VARIABLE FREQUENCY DRIVE

W

W/	WITH
WF	WIDE FLANGE
WRB	WATER RESISTANT GWB
WRP	WASTE RECLAMATION PLANT
WS	WATER SURFACE, WATERSTOP, WELDED STEEL
WWTP	WASTEWATER TREATMENT PLANT

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

A/E FIRM	JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO
DESIGNED:	R COWAN
CADD:	R COWAN
TECH. REVIEW:	K GRIEBEL
DATE:	08/2025
SUB SHEET NO.	01G0005A
TITLE OF SHEET	GENERAL ABBREVIATIONS
	GRAND CANYON, SOUTH RIM
DRAWING NO.	113 175376
PMIS/PKG NO.	257282
SHEET	3 OF 41

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 9/8/2025 PLOT TIME: 10:05:57 AM SS6\V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01G0005A_D3167666.dgn

SUB SHEET NUMBER DESIGNATION

FACILITY DESIGNATION, SEE LIST BELOW

XXXC0001

INDICATES DRAWING TYPE

1000 SERIES	PLAN
2000 SERIES	ELEVATION
3000 SERIES	SECTION
4000 SERIES	ENLARGED PLAN
5000 SERIES	DETAIL
6000 SERIES	SCHEDULE

INDICATES DISCIPLINE(S):

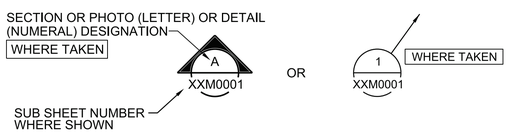
A	ARCHITECTURE
C	CIVIL
D	PROCESS
E	ELECTRICAL
EP	POWER PLAN
EL	LIGHTING PLAN
FP	FIRE PROTECTION
G	GENERAL
I	IRRIGATION
L	LANDSCAPE
M	HVAC
N	INSTRUMENTATION AND CONTROL
P	PLUMBING
S	STRUCTURAL
X	DEMOLITION
Y	YARD PIPING

FACILITY DESIGNATION

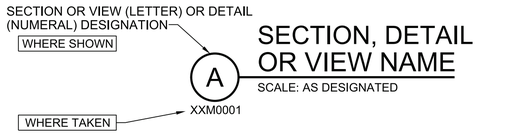
01	GENERAL
05	ROADWAY
06	CIVIL
07	YARD PIPING
08	ELECTRICAL SITE
09	INSTRUMENTATION AND CONTROL
10	ADMINISTRATION BUILDING
12	MAINTENANCE BUILDING
18	VAULT WASTE/SEPTAGE RECEIVING
20	HEADWORKS
22	ODOR CONTROL
25	PROCESS TANKS
32	PROCESS BUILDING
80	DECANT THICKENER DIGESTER
85	DEWATERING AND RECLAIMED WATER PS
87	COMPOST FACILTY
88	COVERED STORAGE

SECTION, DETAIL AND VIEW DESIGNATION

ON DRAWING WHERE DETAIL IS TAKEN:



ON DRAWING WHERE DETAIL IS DRAWN:



STANDARD DETAIL DESIGNATION

ON DRAWING WHERE DETAIL IS TAKEN:

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO	DESIGNED: R COWAN CADD: R COWAN TECH. REVIEW: K GRIEBEL DATE: 08/2025	SUB SHEET NO. 01G0010A	TITLE OF SHEET: GENERAL LEGEND GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 4 OF 41	

PLOT DATE: 9/8/2025 PLOT TIME: 10:06:01 AM SS6/V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01G0010A_D3167666.dgn

GENERAL SITE NOTES:

1. SOURCE OF TOPOGRAPHY SHOWN ON THE CIVIL PLANS ARE BASE MAPS PROVIDED BY ANDERSON PERRY. ADDITIONAL MAPPING HAS BEEN ADDED FROM AS-BUILT DATA AND SUPPLEMENT SURVEY FROM NATIONAL PARK SERVICE. EXISTING CONDITIONS MAY VARY FROM THOSE SHOWN ON THESE PLANS. THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND ADJUST WORK PLAN ACCORDINGLY PRIOR TO BEGINNING CONSTRUCTION.
2. EXISTING TOPOGRAPHY, STRUCTURES, AND SITE FEATURES ARE SHOWN SCREENED AND/OR LIGHT-LINED. NEW FINISH GRADE, STRUCTURES, AND SITE FEATURES ARE SHOWN HEAVY-LINED.
3. HORIZONTAL DATUM: ARIZONA CENTRAL ZONE SPC NAD83 (CORS2011)
4. VERTICAL DATUM: NAVD88 GEOID18
5. MAINTAIN, RELOCATE, OR REPLACE EXISTING SURVEY MONUMENTS, CONTROL POINTS, AND STAKES WHICH ARE DISTURBED OR DESTROYED. PERFORM THE WORK TO PRODUCE THE SAME LEVEL OF ACCURACY AS THE ORIGINAL MONUMENT(S) IN A TIMELY MANNER, AND AT THE CONTRACTOR'S EXPENSE. 60D CONTROL POINTS DO NOT NEED TO BE REPLACED.
6. FOR LOCATION OF CONTROL POINTS ON LOW WATER CROSSING, SEE LOW WATER CROSSING DRAWING.
7. COORDINATES AND DIMENSIONS SHOWN FOR ROADWAY IMPROVEMENTS ARE TO FACE OF CURB OR EDGE OF PAVEMENT.
8. STAGING AREA SHALL BE FOR CONTRACTOR'S EMPLOYEE PARKING, CONTRACTOR'S TRAILERS AND ON-SITE STORAGE OF MATERIALS.
9. PROVIDE TEMPORARY FENCING AS NECESSARY TO MAINTAIN SECURITY AND PROHIBIT ANIMALS FROM ENTERING THE SITE AT ALL TIMES.
10. ELEVATIONS GIVEN ARE TO FINISH GRADE UNLESS OTHERWISE SHOWN.
11. SLOPE UNIFORMLY BETWEEN CONTOURS AND SPOT ELEVATIONS SHOWN.
12. ALL DISTURBED AREAS NOT RECEIVING A HARD SURFACE SHALL BE COVERED WITH 3" CONSERVED TOPSOIL.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING EROSION CONTROL DEVICES DURING CONSTRUCTION. EROSION CONTROL DEVICES FOR GRAVEL CONSTRUCTION ENTRANCE, FIBER ROLL, CHECK DAM, AND SILT FENCE ARE THE MINIMUM REQUIRED.
14. CONTRACTOR SHALL TAKE ALL OTHER MEASURES TO POSITIVELY PRECLUDE EROSION MATERIALS FROM LEAVING THE SITE. CONTRACTOR TO SUBMIT EROSION CONTROL PLAN.

GENERAL UTILITIES NOTES:

1. EXISTING UNDERGROUND UTILITIES OBTAINED FROM AS-BUILTS AND FROM FIELD SURVEY. CONTRACTOR SHALL FIELD VERIFY DEPTH AND LOCATION PRIOR TO EXCAVATION. PROTECT ALL EXISTING UTILITIES DURING CONSTRUCTION.
2. EXISTING PIPING AND EQUIPMENT ARE SHOWN SCREENED AND/OR LIGHT-LINED. NEW PIPING AND EQUIPMENT ARE SHOWN HEAVY-LINED.

CIVIL LEGEND

EXISTING	THIS CONTRACT	
× 157.7	⊗ 158.5	SPOT ELEVATION
155	155	CONTOUR LINE
	3:1	EMBANKMENT AND SLOPE
		DRAINAGEWAY OR DITCH
	CB OR CB	CATCH BASIN OR INLET
		TRENCH DRAIN
	OR	SIGN
	D OR S	MANHOLE
E	E	ELECTRICAL MANHOLE
H	H	ELECTRIC HANDHOLE
		POST OR GUARD POST
		FIRE HYDRANT
		UTILITY POLE
		LIGHT POLE
	BM	BENCH MARK
		OBJECT MARKER
		SURVEY CONTROL POINT OR POINT OF INTERSECTION
		TREE
		PROPERTY LINE
		CENTER LINE, BUILDING
		STAGING AREA LIMITS
	N 1000.00 E 1000.00	STRUCTURE, BUILDING OR FACILITY LOCATION POINT - COORDINATES
OR OR		DEMOLITION
OR	OR	STRUCTURE, BUILDING OR FACILITY
		GRAVEL SURFACING (IN CROSS SECTION VIEW)
		CONCRETE PAVEMENT
		DOUBLE SWING GATE
		CHAIN LINK FENCE
		CULVERT WITH END SECTION
		RIPRAP
		TOE OF FILL/SLOPE STAKE LIMITS
		TOE OF CUT/SLOPE STAKE LIMITS
		CLEARING LIMITS

P	ELECTRICAL DUCTBANK
U	ELECTRICAL UNDERGROUND
T	UNDERGROUND TELECOM
W	WATER LINE
G	NATURAL GAS
S	SEWER LINE
OE	OVERHEAD ELECTRIC
OC	OVERHEAD COMMUNICATION

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

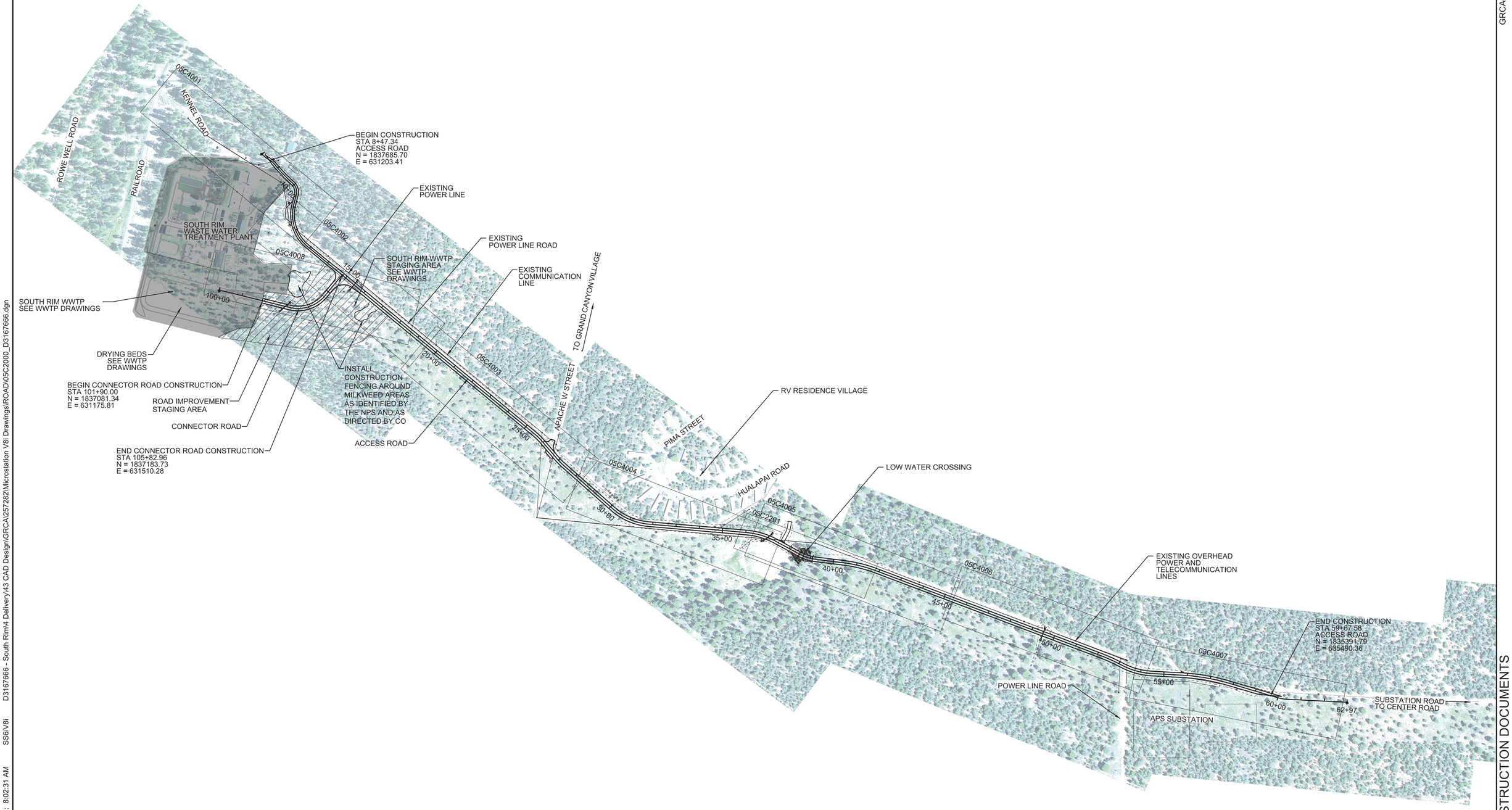
NO SCALE

	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: K ARCHER CADD: B GYAOUROVA TECH. REVIEW: D PETERSON DATE: 08/2025	SUB SHEET NO. 01C0001A	TITLE OF SHEET GENERAL CIVIL LEGEND GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 5 OF 41

PLOT DATE: 9/8/2025 PLOT TIME: 10:05:56 AM SS6\V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01C0001A_D3167666.dgn

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS



N

0 200 400 600

Scale In Feet

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: E NASZKOWSKA CADD: A SEMENENKO TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C2000	TITLE OF SHEET ROADWAY SITE PLAN GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 6 OF 41

PLOT DATE: 9/11/2025 PLOT TIME: 8:02:31 AM SS6/V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C2000_D3167666.dgn

100% COMPLETE CONSTRUCTION DOCUMENTS

CONTROL TABLE:

PT#	NORTHING	EASTING	ELEV.	LAT.	LONG.	HGT	DESC.
1	1836055.55	633122.35	6871.90	36d02'45.260527"	-112d08'34,445076"	6796.68	CNPT SET 1X1
2	1836060.51	633417.42	6868.33	36d02'45.316314"	-112d08'30,851872"	6793.11	CNPT SET 1X1
3	1835879.40	633928.02	6894.56	36d02'43.536807"	-112d08'24,628683"	6819.35	CNPT SET 60D
4	1835730.45	634313.54	6898.72	36d02'42.072398"	-112d08'19,929657"	6823.51	CNPT SET 60D
5	1835572.47	634820.14	6902.84	36d02'40.521435"	-112d08'13,755935"	6827.63	CNPT SET 60D
6	1836088.23	632845.27	6872.94	36d02'45.577298"	-112d08'37,820252"	6797.71	CNPT SET 60D
7	1836156.39	632519.07	6861.97	36d02'46.243876"	-112d08'41,794685"	6786.74	CNPT SET 60D
8	1836433.26	632432.75	6864.84	36d02'48.980099"	-112d08'42,853878"	6789.60	CNPT SET 60D
9	1836652.68	632191.58	6853.28	36d02'51.144545"	-112d08'45,797214"	6778.04	CNPT SET 60D
10	1836861.09	631938.04	6842.17	36d02'53.199712"	-112d08'48,890818"	6766.93	CNPT SET 60D
11	1837094.83	631655.13	6823.27	36d02'55.504796"	-112d08'52,342968"	6748.02	CNPT SET 60D
12	1837260.70	631445.49	6811.11	36d02'57.140256"	-112d08'54,900958"	6735.86	CNPT SET 60D
13	1837408.12	631274.28	6797.28	36d02'58.594242"	-112d08'56,990253"	6722.02	CNPT SET 60D
14	1837560.03	631334.41	6800.58	36d03'00.097978"	-112d08'56,262424"	6725.31	CNPT SET 60D
15	1837658.61	631242.98	6797.74	36d03'01.070821"	-112d08'57,378774"	6722.47	CNPT SET 60D
16	1837696.67	631051.50	6786.08	36d03'01.442640"	-112d08'59,711843"	6710.81	CNPT SET 60D
17	1836478.69	632433.44	6865.82	36d02'49.429367"	-112d08'42,846694"	6790.58	FND 1.5IN IP 'USDI 17Z AZ 1956 NPS'
19	1835450.91	635170.85	6910.60	36d02'39.327014"	-112d08'09,481784"	6835.39	CNPT 19 SET 60D
20	1835364.03	635461.94	6912.93	36d02'38.474300"	-112d08'05,934477"	6837.73	CNPT 20 SET 60D
21	1837820.31	630909.40	6784.02	36d03'02.662075"	-112d09'01,446040"	6708.75	CNPT 21 SET MAG
22	1837537.23	631273.00	6797.99	36d02'59.871065"	-112d08'57,009588"	6722.73	TBM
23	1836105.81	633102.91	6876.05	36d02'45.757137"	-112d08'34,683194"	6800.82	TBM
100	1836061.19	632940.29	6873.07	36d02'45.312102"	-112d08'36,662320"	6797.85	CNPT 1/2IN RBC
101	1837409.71	630828.96	6775.33	36d02'58.599380"	-112d09'02,413666"	6700.07	FND MAGSPK
102	1837408.99	630936.82	6781.86	36d02'58.594869"	-112d09'01,100041"	6706.59	FND ALCAP
103	1837491.32	631019.39	6788.53	36d02'59.411020"	-112d09'00,096884"	6713.26	FND HUB + MAG
104	1837433.73	631155.45	6792.10	36d02'58.844702"	-112d08'58,438253"	6716.84	FND MAGSPK

N

200 100 0 200 400

SCALE: 1" = 200'

SURVEY NOTES:
1. ALL UNITS ARE IN INTERNATIONAL FEET.

PROJECT CONTROL:
1. PROJECT COORDINATES ARE BASED ON NGS OPUS SOLUTION ON POINT 100. ADDITIONAL CONTROL POINTS WERE ESTABLISHED USING RTK AND CONVENTIONAL SURVEY METHODS.

OPUS SOLUTION INFORMATION:
CORS SITES USED:

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AI8807	FRED ECC REF DIMPLE	N365917.978	W1122957.135	109353.6
AI8822	FERN ECC REF DIMPLE	N352030.723	W1122717.007	83065.1
DP9944	GRAND CANYON ST 1 ARP	N360252.797	W1120744.905	1316.9

STATIC FILE OBSERVED ON 06/25/2024 BETWEEN 9:03:24 AM AND 6:23:46 PM, DURATION = 9:20:23.

HORIZONTAL POSITIONS:
HORIZONTAL POSITIONS ARE ARIZONA CENTRAL (ZONE 0202) STATE PLANE NAD83(2011) GRID.

BASIS OF BEARINGS ARE BASED ON A GRID BEARING OF S49°06'06"E FROM CONTROL POINT 21 TO CONTROL POINT 100 PER NAD83(2011).

BASIS OF ELEVATIONS ARE BASED ON AN NGS OPUS SOLUTION AT CONTROL POINT 100, HAVING AN OPUS DERIVED ELEVATION OF 6873.072 FEET NAVD88.

NOTE: ELEVATIONS ESTABLISHED UTILIZING STATIC GPS METHODS AND GEOID 18.

ABBREVIATIONS:
GPS: GLOBAL POSITIONING SYSTEM
NGS: NATIONAL GEODETIC SURVEY
OPUS: ONLINE POSITIONING USER SERVICE
M: METER
PID: POINT ID
RTK: REAL-TIME KINMATIC

SYMBOL:
- CONTROL POINT MARKER SET BY SURVEY
- TEMPORARY BENCH MARK (TBM)
- CONTROL POINT MARKER FOUND DURING SURVEY

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

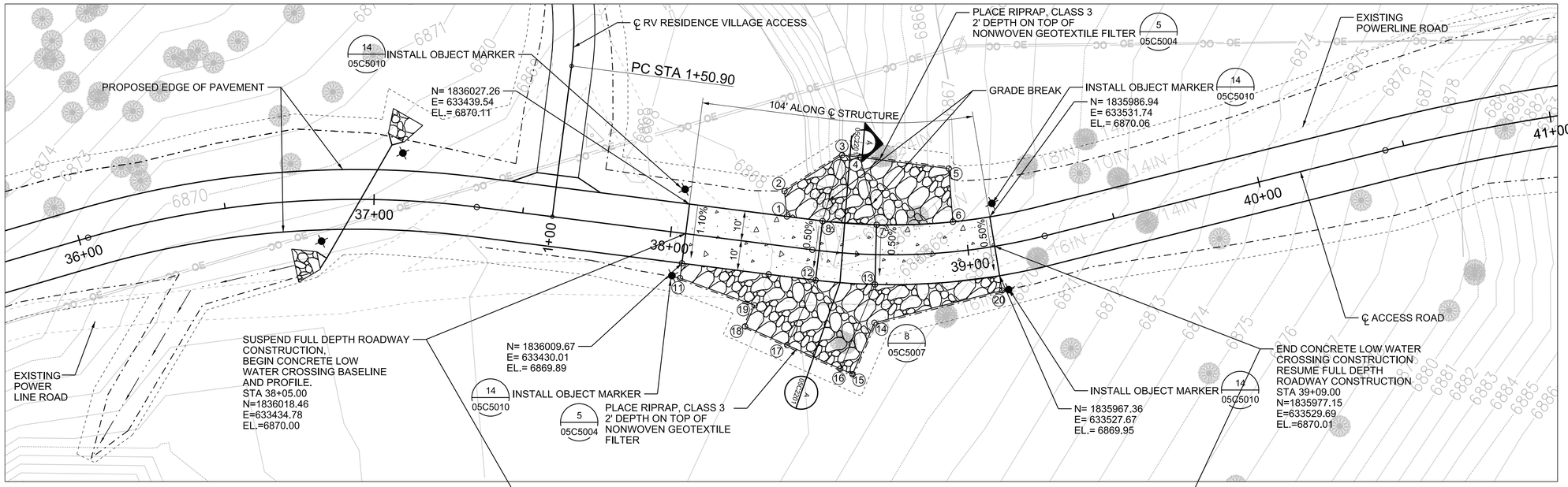
REGISTERED LAND SURVEYOR CERTIFICATE NO. 72650 KEVIN HASHEM DATE SIGNED 08/04/25 ARIZONA, U.S.A.

A/E FIRM	CERTERRA -C BELOW RANCHO CUCAMONGA, CA
DESIGNED:	K HASHEM
CADD:	M ROCIO
TECH. REVIEW:	K HASHEM
DATE:	08/2025
SUB SHEET NO.	05C2100
TITLE OF SHEET	ROADWAY SURVEY CONTROL PLAN GRAND CANYON, SOUTH RIM
DRAWING NO.	113 175376
PMIS/PKG NO.	257282
SHEET	7 OF 41

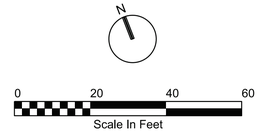
GRCA-257282

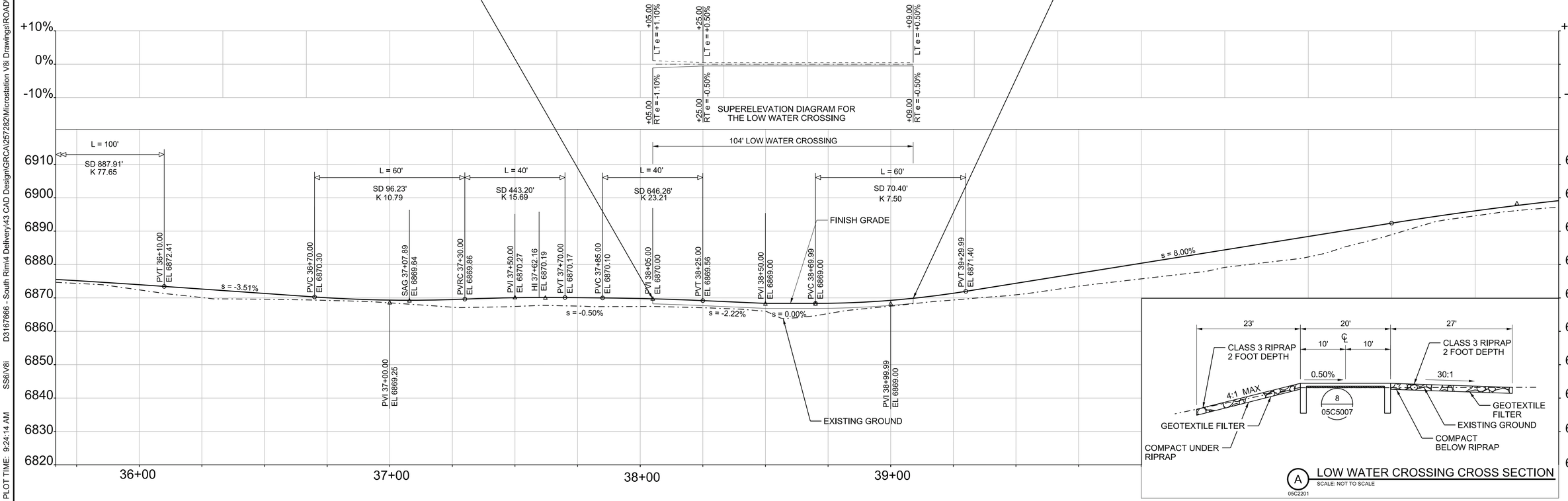
100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: $PLOTDATE PLOT TIME: $PLOTTIME SS6V8I



RIPRAP POINTS			
POINT #	NORTHING	EASTING	ELEVATION
1	1836011.60	633468.44	6869.32
2	1836019.80	633470.75	6867.78
3	1836024.11	633493.11	6863.75
4	1836021.17	633498.54	6863.71
5	1836007.01	633524.75	6866.94
6	1835989.85	633519.62	6869.55
7	1835998.17	633495.40	6869.05
8	1836005.89	633479.02	6869.05
11	1836005.27	633427.63	6868.54
12	1835988.20	633469.69	6868.95
13	1835979.71	633487.71	6868.94
14	1835967.81	633482.91	6868.30
15	1835954.39	633469.85	6868.50
16	1835957.55	633466.69	6868.00
17	1835971.36	633452.97	6867.90
18	1835982.33	633442.07	6868.32
19	1835987.75	633447.61	6868.83
20	1835962.47	633526.65	6869.47





A LOW WATER CROSSING CROSS SECTION
SCALE: NOT TO SCALE
05C2201

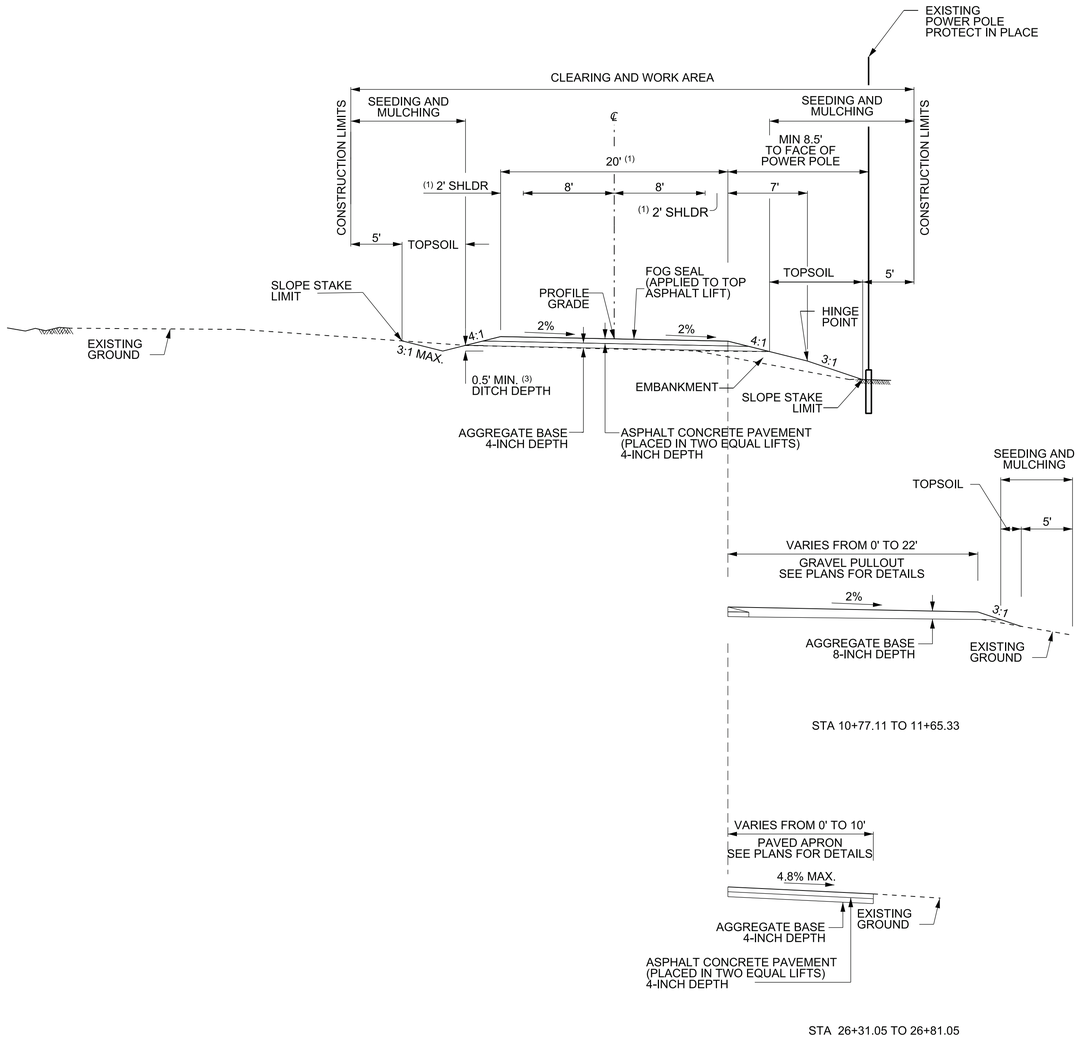
25 0 25 50 HORIZ.
10 0 10 20 VERT.
SCALE OF FEET

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO	DESIGNED: EN/VO	SUB SHEET NO. 05C2201	TITLE OF SHEET: ROADWAY LOW WATER CROSSING PLAN AND PROFILE	DRAWING NO. 113 175376
	CADD: D FARRAY			PMIS/PKG NO. 257282
	TECH. REVIEW: D STEWART		GRAND CANYON, SOUTH RIM	SHEET 8 OF 41
	DATE: 08/2025			

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 9/11/2025 PLOT TIME: 9:24:14 AM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C2201_D3167666.dgn



STA 10+77.11 TO 11+65.33

STA 26+31.05 TO 26+81.05

ACCESS ROAD
STA 8+47.34 TO 38+05.00
STA 39+09.00 TO 59+67.58 (2)
CONNECTOR ROAD
STA 101+90.00 TO 105+82.96

GENERAL SHEET NOTES

A. CONSTRUCT PAVED APRON AND APPROACH ROAD AT LOCATIONS:
STA 26+32 (LT) APPROACH ROAD
STA 26+55 (RT) PAVED APRON
STA 37+60 (LT) PAVED APRON

B. STATIONS SHOWN ARE APPROXIMATE LOCATIONS. ACTUAL LOCATIONS TO BE FIELD VERIFIED.

C. REFER TO SPECIFICATIOIN 31 23 23B FILL AND BACKFILL FOR FILL TYPE AND TOPSOIL DEPTH.

SHEET NOTES

(1) FROM STA 8+47.34 TO STA 14+00.00 (LT) SHOULDER WIDTH = 0'

(1) FROM STA 14+00.00 TO STA 14+50.00 LT SHOULDER WIDTH TRANSITION FROM 0' TO 2'

(1) FROM STA 8+47.34 TO STA 14+35.35 (RT) SHOULDER WIDTH = 0'

(2) FROM STA 8+47.34 TO STA 14+35.35 (RT) SHOULDER WIDTH = 0'

(3) FROM STA 11+43 TO STA 26+00 DITCH DEPTH 0.75', BACK SLOPE OF THE DITCH 4:1

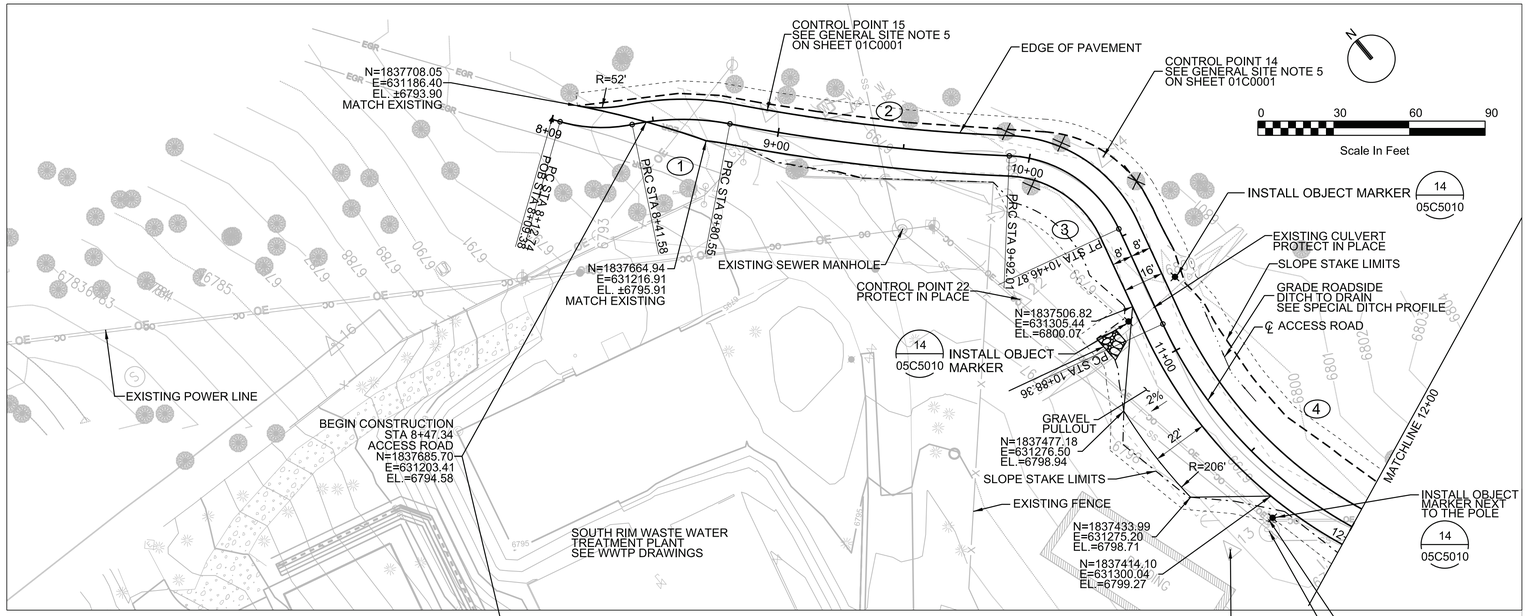
NO SCALE

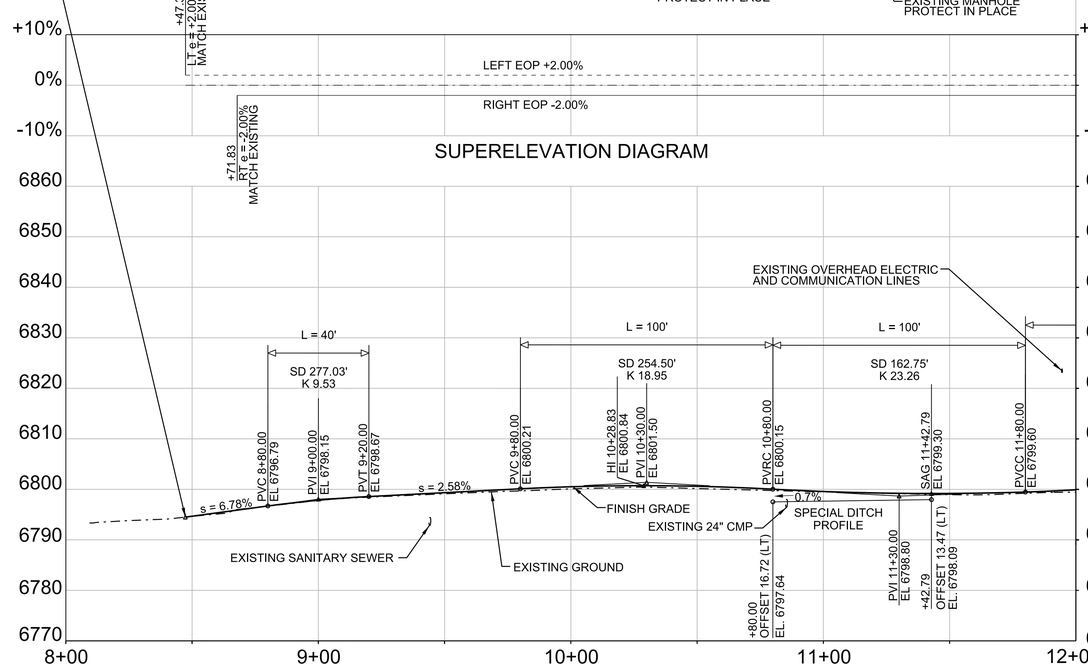
A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: E NASZKOWSKA CADD: A SEMENENKO TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C3001	TITLE OF SHEET ROADWAY TYPICAL SECTION GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 9 OF 41	

PLOT DATE: 9/9/2025 PLOT TIME: 5:08:07 PM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i DrawingsIROAD\05C3001_D3167666.dgn
GRCA-257282
100% COMPLETE CONSTRUCTION DOCUMENTS

Element/Curve Number	Point Type	Station	Northing	Easting	Radius	Length	Delta / Theta	Rotation Direction
1	PRC	8+41.58	1837688.55	631198.40				
1	PI	8+61.32	1837679.30	631215.84	100	38.98	22°19'57"	Right
1	CC		1837600.21	631151.53				
1	PRC	8+80.55	1837664.11	631228.45				
2	PRC	8+80.55	1837664.11	631228.45				
2	PI	9+36.38	1837621.17	631264.13	750.77	111.45	8°30'21"	Left
2	CC		1838143.87	631805.93				
2	PRC	9+92.01	1837583.98	631305.76				
3	PRC	9+92.01	1837583.98	631305.76				
3	PI	10+22.57	1837563.62	631328.55	50	54.86	62°52'07"	Right
3	CC		1837546.69	631272.45				
3	PT	10+46.87	1837534.05	631320.83				
L1	PT	10+46.87	1837534.05	631320.83				
L1	PC	10+88.36	1837493.91	631310.34				
4	PC	10+88.36	1837493.91	631310.34				
4	PI	12+00.70	1837385.21	631281.94	176	199.97	65°06'02"	Left
4	CC		1837449.41	631480.62				
4	PT	12+88.33	1837313.69	631368.57				
L2	PT	12+88.33	1837313.69	631368.57				
L2	PC	25+48.29	1836511.53	632340.17				
5	PC	25+48.29	1836511.53	632340.17				
5	PI	25+70.91	1836497.13	632357.62	266	45.13	9°43'17"	Right
5	CC		1836306.40	632170.82				
5	PT	25+93.42	1836479.99	632372.38				
L3	PT	25+93.42	1836479.99	632372.38				
L3	PC	26+92.69	1836404.76	632437.16				
6	PC	26+92.69	1836404.76	632437.16				
6	PI	27+10.83	1836391.02	632449.00	266	36.23	7°48'10"	Left
6	CC		1836578.34	632638.72				
6	PT	27+28.92	1836379.01	632462.59				
L4	PT	27+28.92	1836379.01	632462.59				
L4	PC	30+12.66	1836191.14	632675.23				
7	PC	30+12.66	1836191.14	632675.23				
7	PI	31+00.52	1836132.96	632741.07	266	169.72	36°33'23"	Left
7	CC		1836390.48	632851.35				
7	PT	31+82.37	1836125.45	632828.61				
L5	PT	31+82.37	1836125.45	632828.61				
L5	PC	36+03.06	1836089.48	633247.76				
8	PC	36+03.06	1836089.48	633247.76				
8	PI	36+69.72	1836083.78	633314.17	320	131.43	23°31'58"	Right
8	CC		1835770.65	633220.39				
8	PT	37+34.50	1836052.04	633372.78				
L6	PT	37+34.50	1836052.04	633372.78				
L6	PC	38+47.73	1835998.11	633472.35				
9	PC	38+47.73	1835998.11	633472.35				
9	PI	38+87.37	1835979.24	633507.21	210	78.36	21°22'44"	Left
9	CC		1836182.77	633572.35				
9	PT	39+26.09	1835974.37	633546.54				
L7	PT	39+26.09	1835974.37	633546.54				
L7	PC	40+43.69	1835959.91	633663.26				
10	PC	40+43.69	1835959.91	633663.26				
10	PI	41+17.06	1835950.90	633736.07	614	146.05	13°37'42"	Right
10	CC		1835350.57	633587.80				
10	PT	41+89.73	1835924.98	633804.71				
L8	PT	41+89.73	1835924.98	633804.71				
L8	PC	52+10.74	1835564.28	634759.88				
11	PC	52+10.74	1835564.28	634759.88				
11	PI	52+62.74	1835545.91	634808.52	830	103.87	7°10'12"	Right
11	CC		1834787.80	634466.66				
11	PRC	53+14.60	1835521.62	634854.50				
12	PRC	53+14.60	1835521.62	634854.50				
12	PI	53+82.56	1835489.86	634914.58	310	133.79	24°43'38"	Left
12	CC		1835795.69	634999.35				
12	PT	54+48.39	1835486.15	634982.43				
L9	PT	54+48.39	1835486.15	634982.43				
L9	PC	55+78.65	1835479.04	635112.49				
13	PC	55+78.65	1835479.04	635112.49				
13	PI	56+80.41	1835473.48	635214.10	870	202.6	13°20'33"	Right
13	CC		1834610.34	635064.99				
13	PT	57+81.25	1835444.63	635311.68				
L10	PT	57+81.25	1835444.63	635311.68				
L10	PC	59+97.14	1835383.41	635518.71				

CC- CENTER OF CURVE
PRC- POINT OF REVERSE CURVATURE





GENERAL NOTES

1. ADD OBJECT MARKERS AT ALL CULVERTS ON BOTH SIDES OF THE ROAD, AND AT SS MANHOLES AND UTILITY POLES THAT ARE WITHIN CONSTRUCTION LIMITS.
2. SEE SHEET 05C4008 FOR CONNECTOR ROAD PLAN AND PROFILE.
3. SEE SHEETS 05C5001, 05C5002, 05C5003, AND 05C5004 FOR DRAINAGE DETAILS.
4. ADJUST GRADES AS NEEDED TO TIE TO EXISTING RIPRAP LINED CHANNEL BETWEEN STA. 54+00 AND 57+50 (RT).
5. SEE SHEET 05C5010 FOR SIGN POST DETAILS.
6. INSERT STANDARD 45-DEGREE PIPE ELBOW BETWEEN END OF PIPE AND METAL END SECTION AS SHOWN ON PLANS.

LEGEND
X - REMOVAL OF EXISTING TREE
(X) - CURVE NUMBER

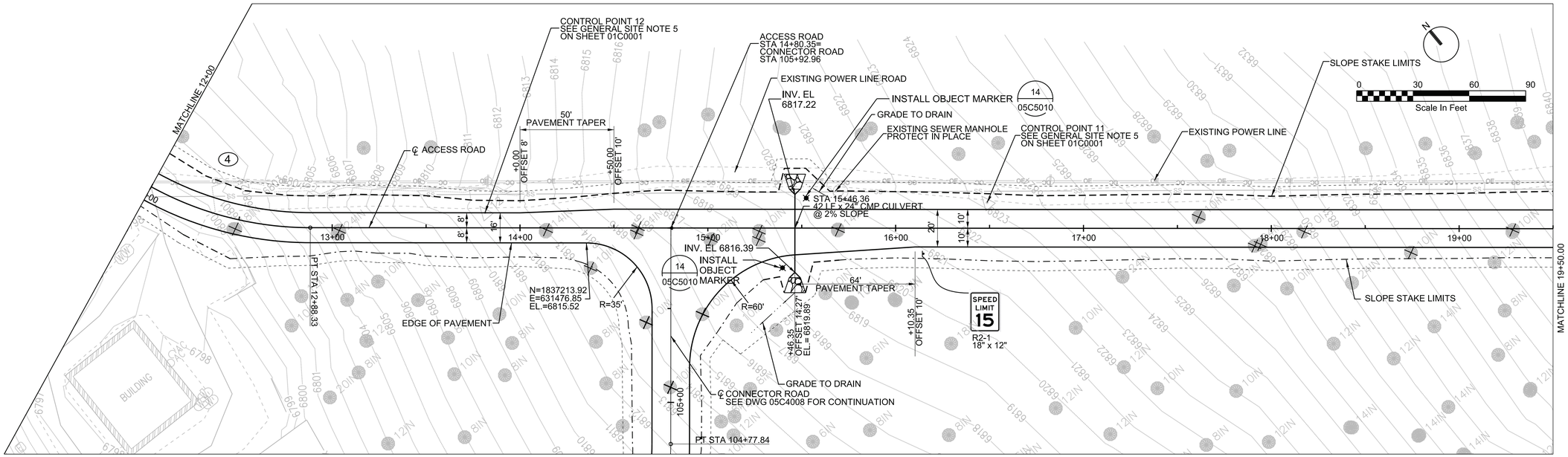
FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

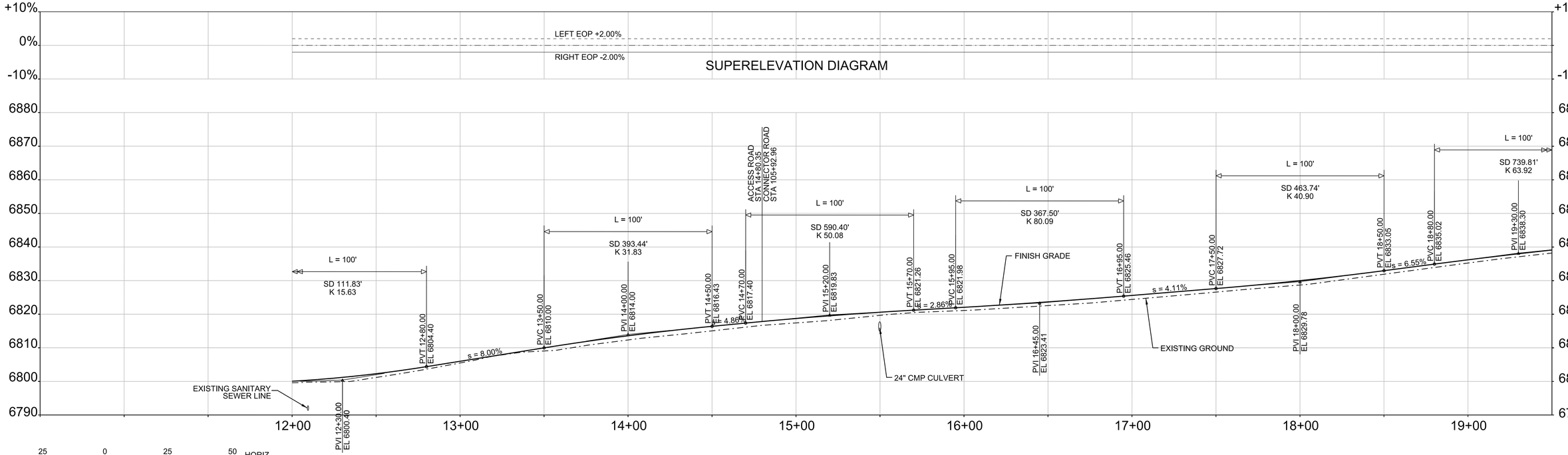
A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY; GREENWOOD VILLAGE, CO	DESIGNED: E NASZKOWSKA CADD: A SEMENENKO TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C4001	TITLE OF SHEET: ROADWAY PLAN AND PROFILE STATION 8+47.34 TO 12+00 GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 10 OF 41

PLOT DATE: 9/10/2025 PLOT TIME: 8:44:38 AM SS6\V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8I Drawings\ROAD\05C4001_D3167666.dgn

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS





25 0 25 50 HORIZ.
10 0 10 20 VERT.
SCALE OF FEET

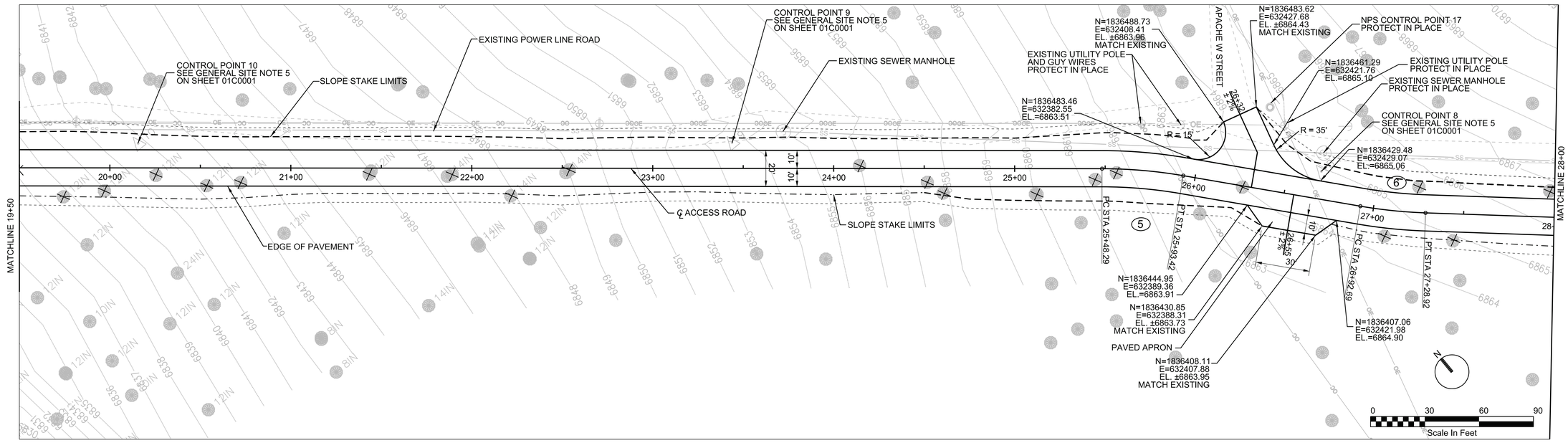
LEGEND
- REMOVAL OF EXISTING TREE
(X) - CURVE NUMBER

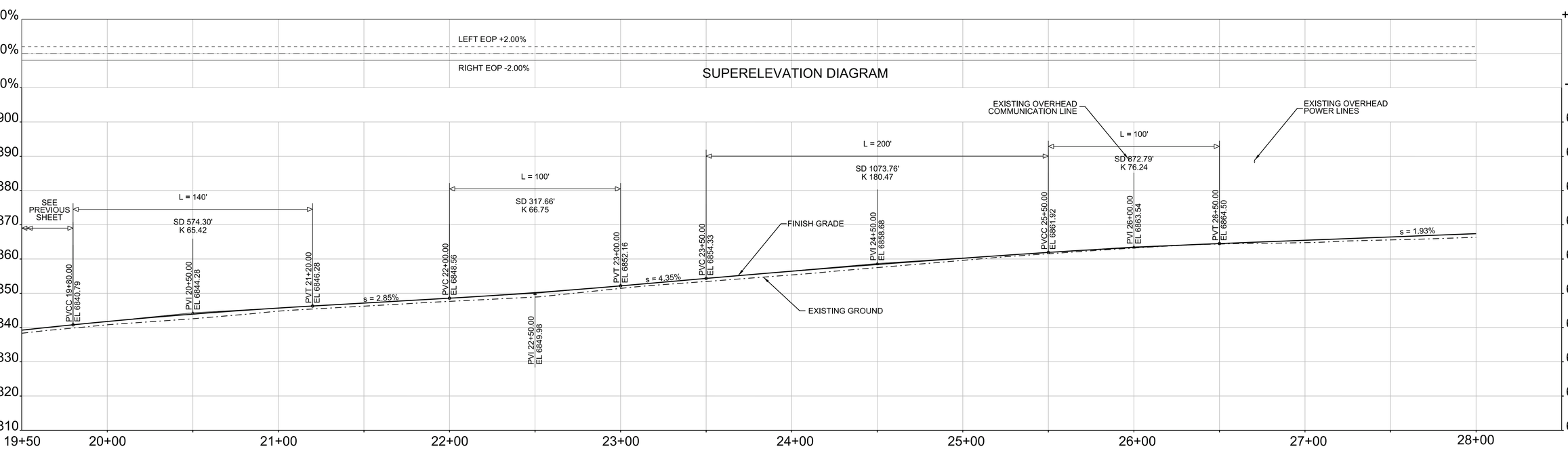
FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: E NASZKOWSKA CADD: A SEMENENKO TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C4002	TITLE OF SHEET ROADWAY PLAN AND PROFILE STATION 12+00 TO 19+50 GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 11 OF 41

PLOT DATE: 9/9/2025 PLOT TIME: 4:41:41 PM SS6/V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C4002_D3167666.dgn

100% COMPLETE CONSTRUCTION DOCUMENTS





25 0 25 50 HORIZ.
10 0 10 20 VERT.
SCALE OF FEET

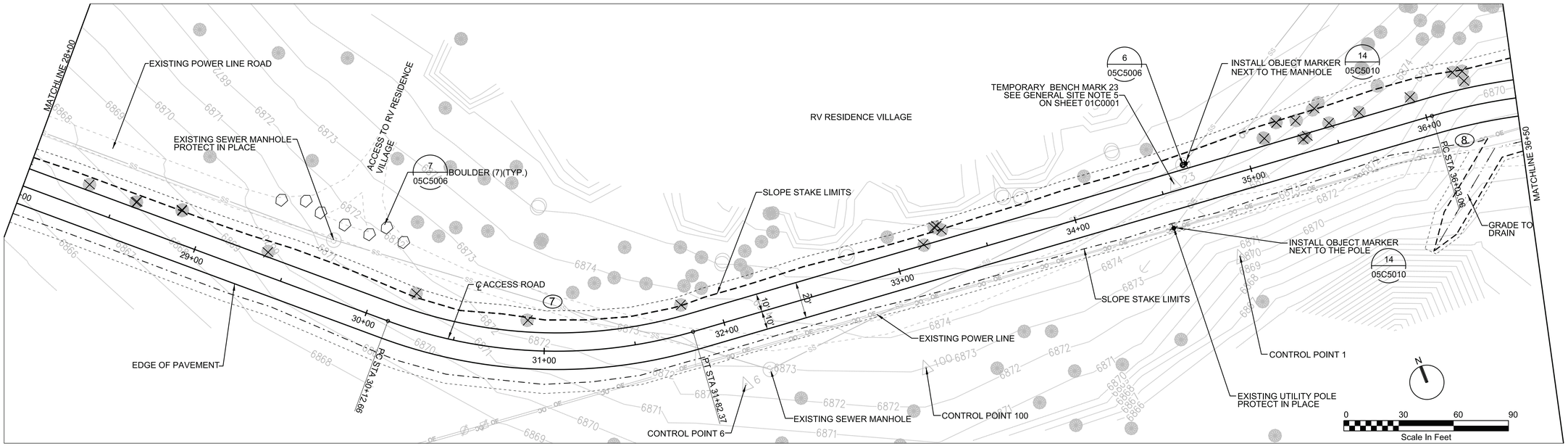
LEGEND
- REMOVAL OF EXISTING TREE
(X) - CURVE NUMBER

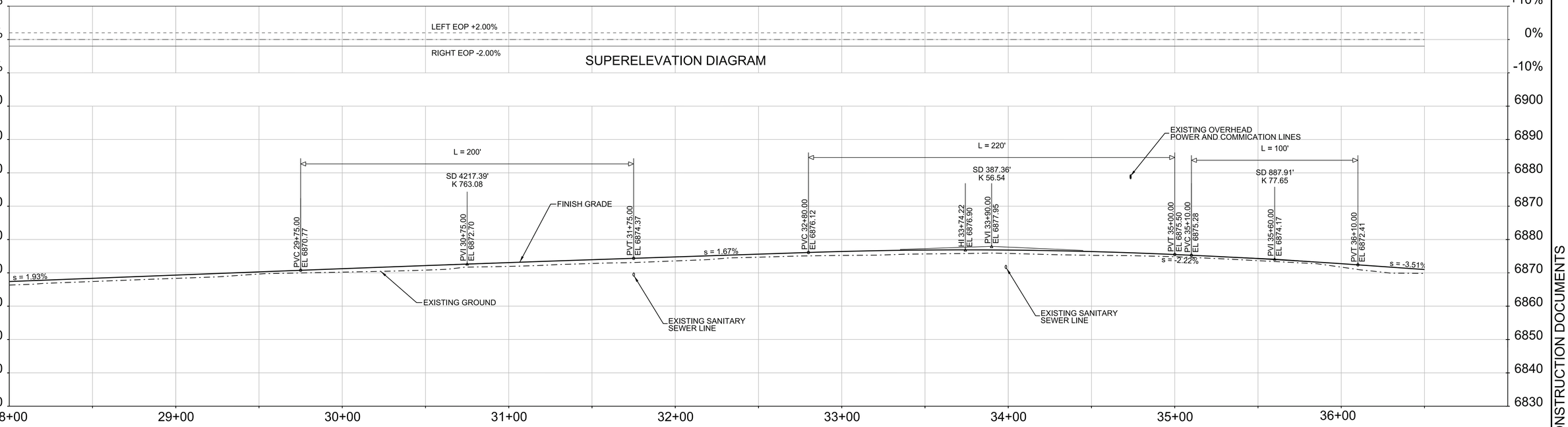
FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO	DESIGNED: E NASZKOWSKA	SUB SHEET NO. 05C4003	TITLE OF SHEET: ROADWAY PLAN AND PROFILE STATION 19+50 TO 28+00	DRAWING NO. 113 175376
	CADD: A SEMENENKO			PMIS/PKG NO. 257282
	TECH. REVIEW: J MILLS			SHEET 12 OF 41
	DATE: 08/2025		GRAND CANYON, SOUTH RIM	

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 9/9/2025 PLOT TIME: 4:41:28 PM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C4003_D3167666.dgn





25 0 25 50 HORIZ.
10 0 10 20 VERT.
SCALE OF FEET

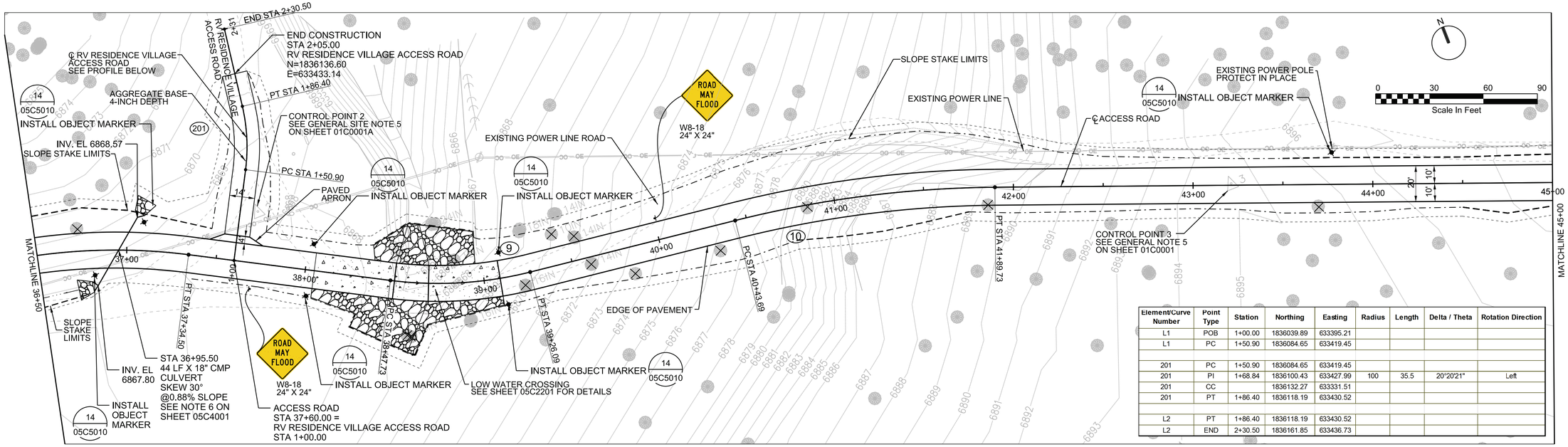
LEGEND
× - REMOVAL OF EXISTING TREE
(X) - CURVE NUMBER

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: E NASZKOWSKA CADD: A SEMENENKO TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C4004	TITLE OF SHEET ROADWAY PLAN AND PROFILE STATION 28+00 TO 36+50 GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 13 OF 41

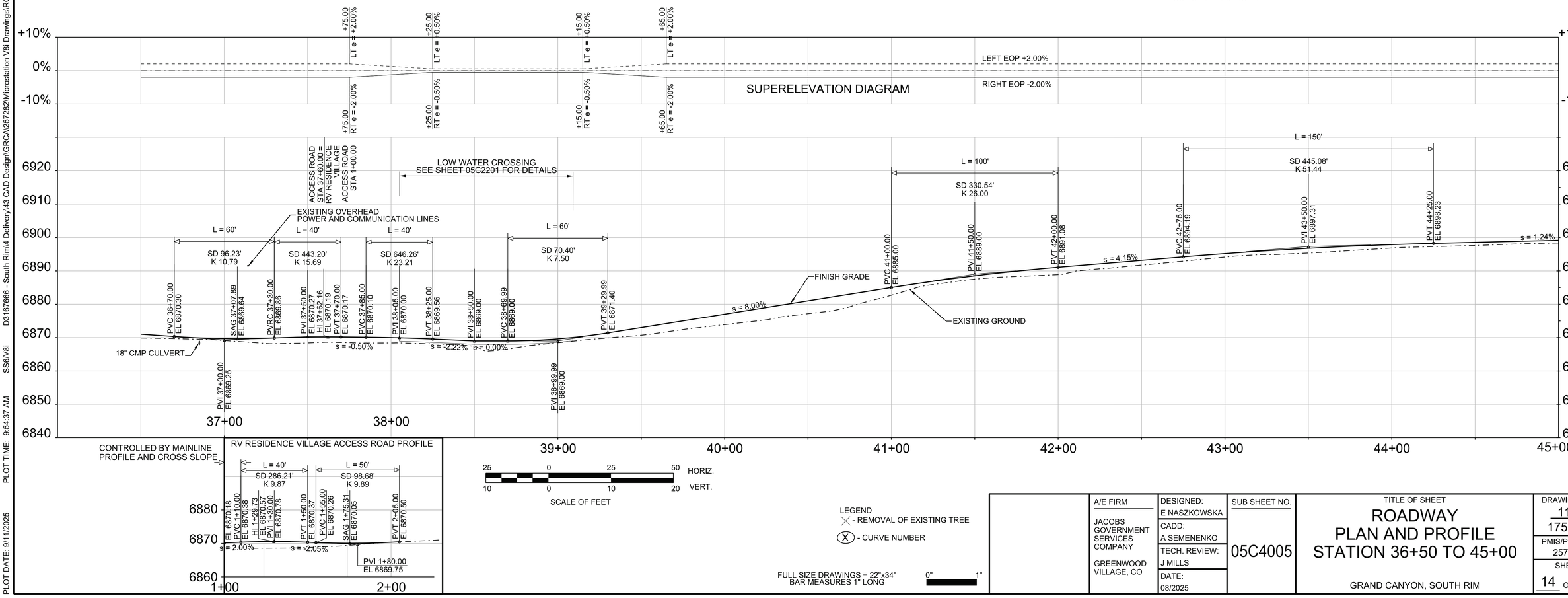
PLOT DATE: 9/11/2025 PLOT TIME: 8:13:00 AM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C4004_D3167666.dgn

100% COMPLETE CONSTRUCTION DOCUMENTS



Element/Curve Number	Point Type	Station	Northing	Easting	Radius	Length	Delta / Theta	Rotation Direction
L1	POB	1+00.00	1836039.89	633395.21				
L1	PC	1+50.90	1836084.65	633419.45				
201	PC	1+50.90	1836084.65	633419.45				
201	PI	1+68.84	1836100.43	633427.99	100	35.5	20°20'21"	Left
201	CC		1836132.27	633331.51				
201	PT	1+86.40	1836118.19	633430.52				
L2	PT	1+86.40	1836118.19	633430.52				
L2	END	2+30.50	1836161.85	633436.73				

CC - CENTER OF CURVE



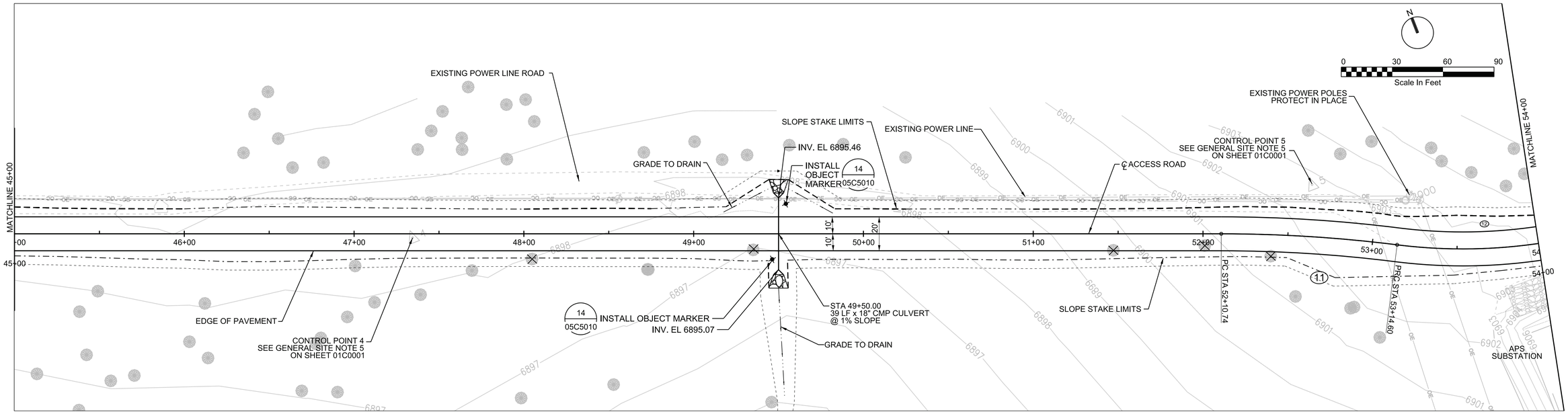
25 0 25 50 HORIZ.
10 0 10 20 VERT.
SCALE OF FEET

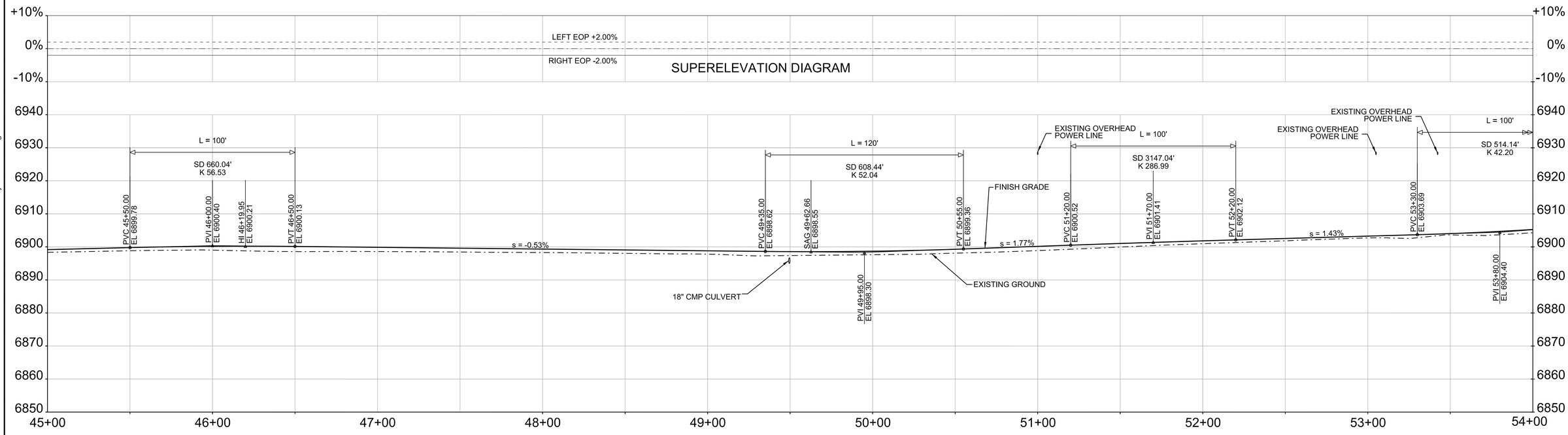
LEGEND
× - REMOVAL OF EXISTING TREE
(X) - CURVE NUMBER

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY; GREENWOOD VILLAGE, CO	DESIGNED: E NASZKOWSKA CADD: A SEMENENKO TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C4005	TITLE OF SHEET: ROADWAY PLAN AND PROFILE STATION 36+50 TO 45+00 GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 14 OF 41

PLOT DATE: 9/11/2025 PLOT TIME: 9:54:37 AM D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i SS6\V8i DrawingsIROAD\05C4005_D3167666.dgn
100% COMPLETE CONSTRUCTION DOCUMENTS





25 0 25 50 HORIZ.
10 0 10 20 VERT.
SCALE OF FEET

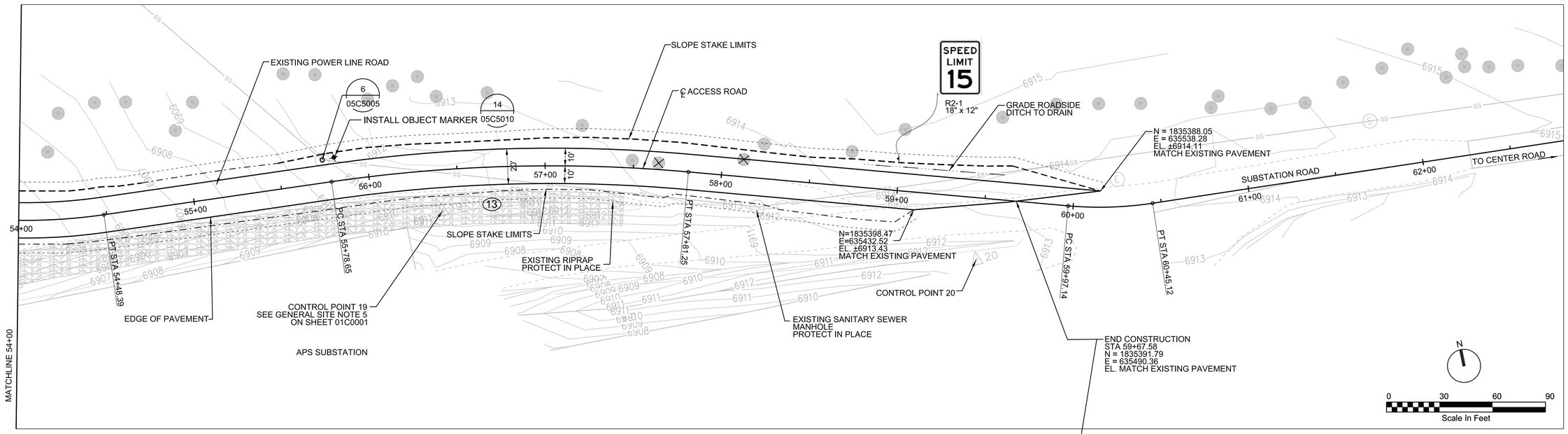
LEGEND
- REMOVAL OF EXISTING TREE
(X) - CURVE NUMBER

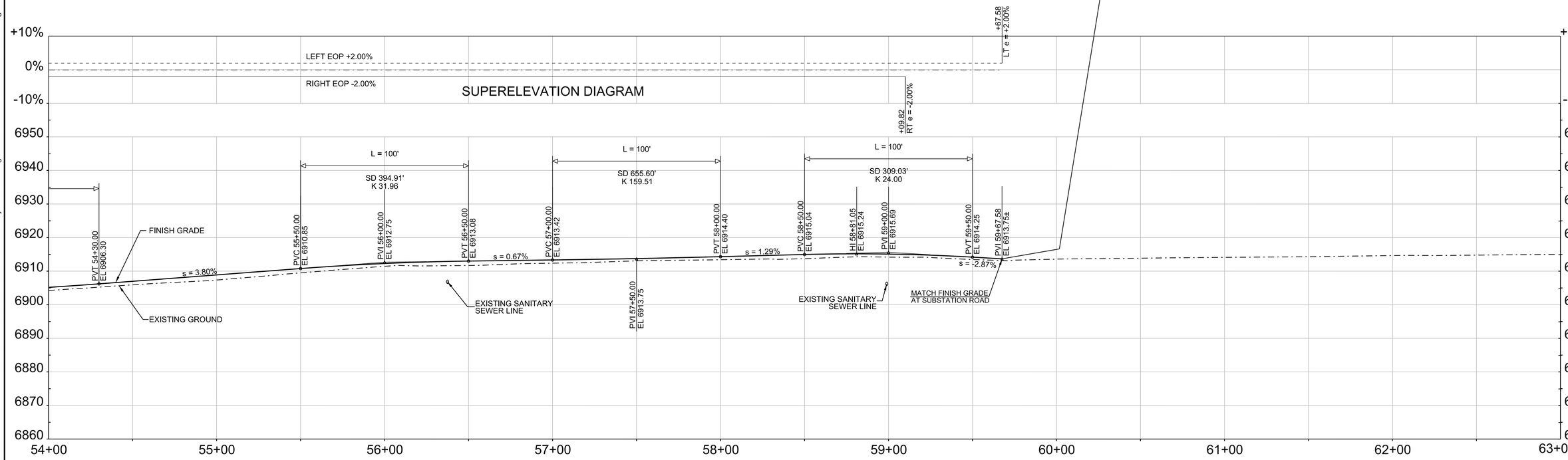
FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO	DESIGNED: E NASZKOWSKA CADD: A SEMENENKO TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C4006	TITLE OF SHEET: ROADWAY PLAN AND PROFILE STATION 45+00 TO 54+00 GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 15 OF 41

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 9/11/2025 PLOT TIME: 9:54:31 AM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C4006_D3167666.dgn





25 0 25 50 HORIZ.
10 0 10 20 VERT.
SCALE OF FEET

LEGEND
- REMOVAL OF EXISTING TREE
(X) - CURVE NUMBER

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO	DESIGNED: E NASZKOWSKA CADD: A SEMENENKO TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C4007	TITLE OF SHEET: ROADWAY PLAN AND PROFILE STATION 54+00 to 59+67.58 GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 16 OF 41	

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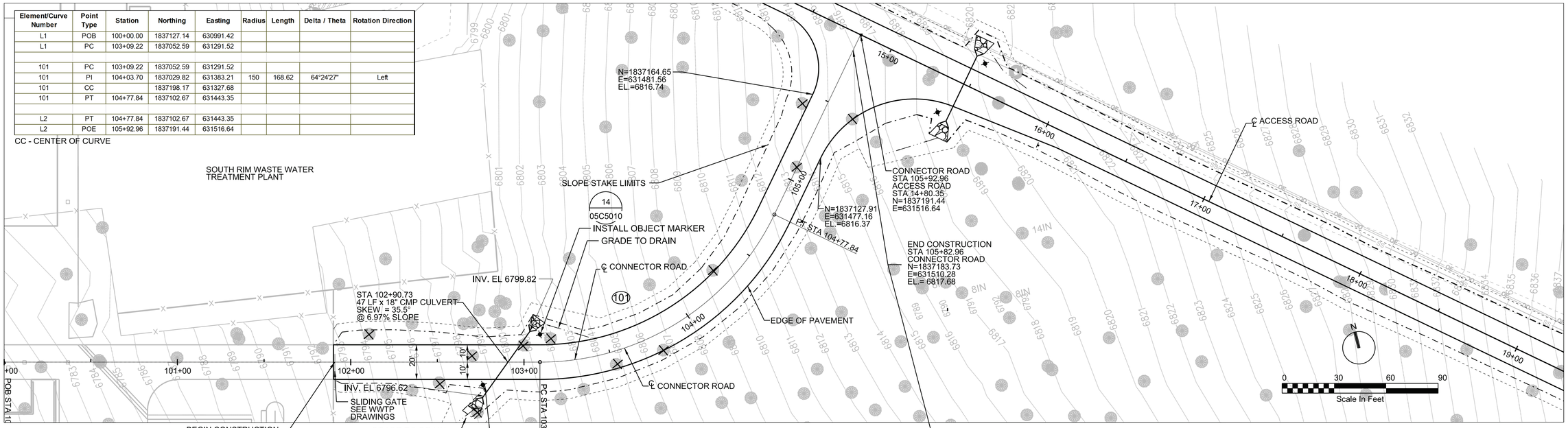
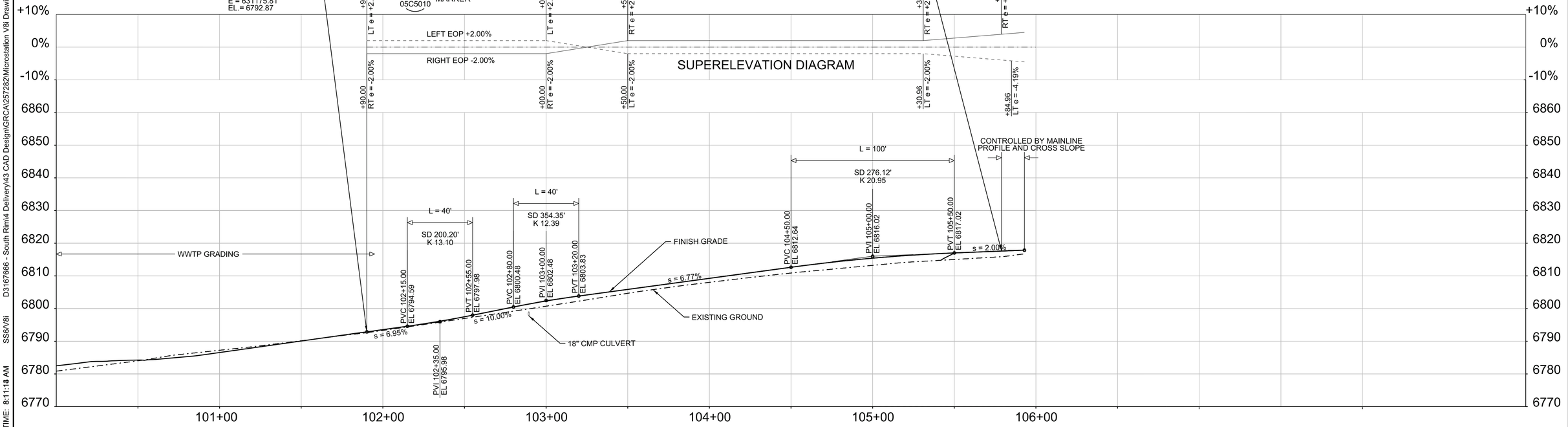
GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

Element/Curve Number	Point Type	Station	Northing	Easting	Radius	Length	Delta / Theta	Rotation Direction
L1	POB	100+00.00	1837127.14	630991.42				
L1	PC	103+09.22	1837052.59	631291.52				
101	PC	103+09.22	1837052.59	631291.52				
101	PI	104+03.70	1837029.82	631383.21	150	168.62	64°24'27"	Left
101	CC		1837198.17	631327.68				
101	PT	104+77.84	1837102.67	631443.35				
L2	PT	104+77.84	1837102.67	631443.35				
L2	POE	105+92.96	1837191.44	631516.64				

CC - CENTER OF CURVE





25 0 25 50 HORIZ.
10 0 10 20 VERT.
SCALE OF FEET

LEGEND
× - REMOVAL OF EXISTING TREE
(X) - CURVE NUMBER

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

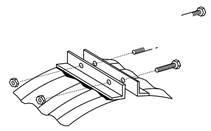
	A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO	DESIGNED: E NASZKOWSKA CADD: A SEMENENKO TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO.: 05C4008	TITLE OF SHEET: ROADWAY PLAN AND PROFILE CONNECTOR ROAD STATION 101+90 TO 105.82.96 GRAND CANYON, SOUTH RIM	DRAWING NO.: 113 175376 PMIS/PKG NO.: 257282 SHEET: 17 OF 41

PLOT DATE: 9/11/2025 PLOT TIME: 8:11:13 AM SS6\V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C4008_D3167666.dgn

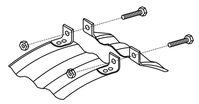
GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

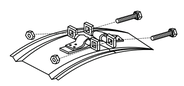
COUPLING BANDS FOR METAL PIPE CULVERT [1]					
CORRUGATION SIZE [2] INCHES	ROUND PIPE DIAMETER INCHES	ELIPTICAL PIPE SPAN x RISE INCHES	MINIMUM BAND WIDTH (INCHES) w		
			ANNULAR CORRUGATED BANDS [3]	HELICALLY CORRUGATED BANDS [4]	SEMI-CORRUGATED BANDS [5]
1½ × ¼	UNDERDRAIN [6]	—	10.5	7	10.5
2⅔ × ½	12 to 36	17 x 13 to 42 x 29	7	12	
	42 to 72	49 x 33 to 83 x 57	10.5	12	
	78 to 84	—	10.5	12	10.5
3 × 1	36 to 72	60 x 46 to 81 x 59	12	14	10.5
	78 to 144	87 x 64 to 142 x 91	12	14	10.5
5 × 1	36 to 72	60 x 46 to 81 x 59	20	22	
	78 to 144	87 x 64 to 142 x 91	20	22	



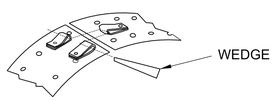
BAND ANGLE



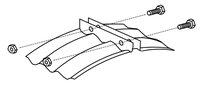
OVAL LUG



BAR & STRAP

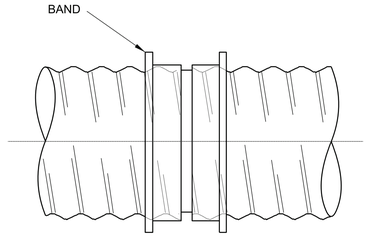


WEDGE AND STRAP



INTERNAL FLANGE

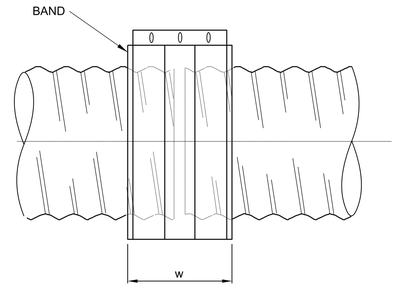
STANDARD BAND CONNECTIONS



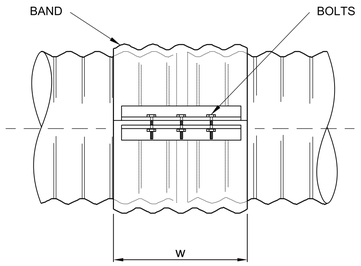
SLEEVE JOINT

SMOOTHER SLEEVE WITH CENTER STOP.
STAB TYPE JOINT

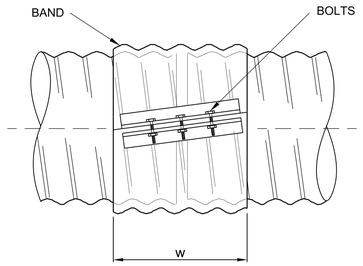
SMOOTH SLEEVE BAND



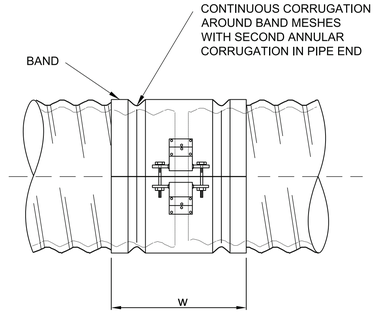
FLAT BAND



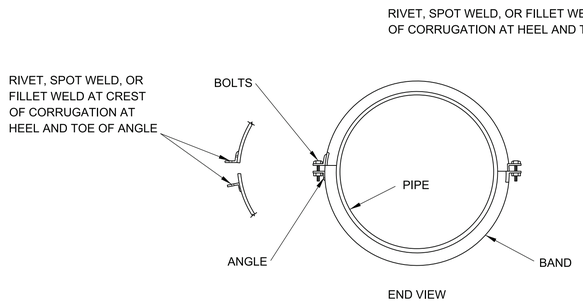
SIDE VIEW



SIDE VIEW



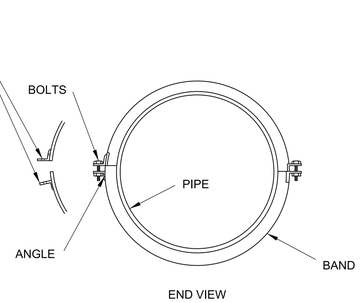
SIDE VIEW



END VIEW

ANNULAR BAND

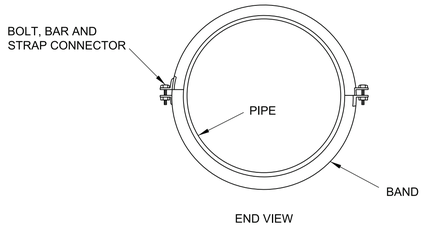
SECOND ANGLE CONNECTION OPTIONAL TO 42" DIAMETER, REQUIRED ABOVE 42" DIAMETER



END VIEW

HELICAL BAND

SECOND ANGLE CONNECTION OPTIONAL TO 42" DIAMETER, REQUIRED ABOVE 42" DIAMETER



END VIEW

SEMI-CORRUGATED BAND

GENERAL SHEET NOTES

A. OTHER TYPES OF COUPLING BANDS OR FASTENING DEVICES THAT COMPLY WITH THE JOINT PERFORMANCE CRITERIA OF AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, DIVISION II SECTION 26 MAY BE USED

B. ALL NEW AND REPLACEMENT CULVERTS TO BE CMP WITH POLYMER COATING INSIDE AND OUT.

SHEET NOTES

1. FABRICATE ANNULAR, HELICAL AND SEMI-CORRUGATED TYPE COUPLING BANDS FROM THE SAME METAL AS THE CONNECTING PIPE. PROVIDE COUPLING BANDS NOT MORE THAN 3 NOMINAL SHEET THICKNESSES THINNER THAN THE THICKNESS OF THE PIPE TO BE CONNECTED, AND NO THINNER THAN 0.052 INCH FOR STEEL OR 0.048 INCH FOR ALUMINUM. FASTEN COUPLING BANDS WITH THE FOLLOWING DIAMETER OF BOLT:

   3/8" FOR 18" ROUND CULVERT (21" × 15" ELLIPTICAL PIPE) OR LESS

   1/2" FOR 21" ROUND CULVERT (24" × /18" ELLIPTICAL PIPE) OR MORE, SEE NOTE 1

2. FOR HELICALLY CORRUGATED PIPE WITH REROLLED ENDS, THE NOMINAL CORRUGATIONS SIZE REFERS TO THE DIMENSION OF THE END CORRUGATION IN THE PIPE.

3. USE ANNULAR CORRUGATED BANDS WITH PIPES HAVING ANNULAR CORRUGATIONSOR WITH HELICAL PIPE HAVING REROLLED END TO FORM ANNULAR CORRUGATIONS. A 10.5 INCH BAND IS ACCEPTABLE ON PIPE ENDS REROLLED WITH 2 2/3" × 1/2 " CORRUGATIONS. SEE NOTE 1. A 12 INCH BAND IS ACCEPTABLE ON PIPE ENDS REROLLED WITH 3" × 1" PIPE CORRUGATIONS. SEE NOTE 1 AND 2.

4. USE HELICAL CORRUGATED BANDS WITH PIPES HAVING HELICALLY CORRUGATED ENDS.

5. THE MINIMUM BAND WIDTHS SHOWN FOR 3" x 1" AND 5" x 1" CORRUGATED SIZES APPLY TO

   2 2/3" x 1/2" CORRUGATIONS ON REROLLED PIPE ENDS.

6. SMOOTH SLEEVE-TYPE COUPLERS AND FLAT BANDS MAY BE USED FOR PIPE DIAMETERS OF 12" OR LESS. USE A MATCHING METAL HAVING A NOMINAL THICKNESS OF NOT LESS THAN 0.040 INCH FOR STEEL, OR 0.036 INCH FOR ALUMINUM, OR A PLASTIC WITH AN EQUIVALENT STRENGTH TO METAL.

1 METAL CULVERT PIPE COUPLING DETAILS

SCALE: NOT TO SCALE

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO	DESIGNED: V ORTIZ CADD: A SEMENENKO TECH. REVIEW: D STEWART DATE: 08/2025	SUB SHEET NO. 05C5001	TITLE OF SHEET: ROADWAY METAL CULVERT PIPE COUPLING DETAILS, GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 18 OF 41

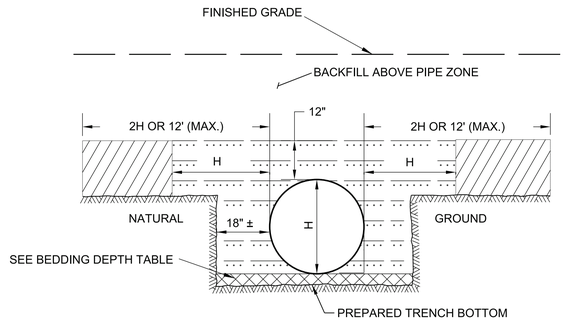
GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 9/8/2025 PLOT TIME: 10:06:51 AM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i DrawingsIROAD\05C5001_D3167666.dgn

GENERAL SHEET NOTES

A. H EQUALS THE DIAMETER OF ALL ROUND PIPE CULVERTS OR THE RISE DIMENSION OF ALL ELLIPTICAL PIPE CULVERTS.



ABOVE AND BELOW NATURAL GROUND

MINIMUM SPACING	
DIAMETER OR SPAN	SPACING
UP TO 48"	24"
48" AND UP	HALF DIAMETER OR SPAN OR 36", WHICHEVER IS LESS

BEDDING DEPTH	
PIPE SIZE (H)	DEPTH
12" TO 54"	4"
> 54"	6"

LEGEND:

BEDDING MATERIAL (UNCOMPACTED)

EMBANKMENT BACKFILL MATERIAL PLACED IN LAYERS NOT EXCEEDING 6" COMPACTED DEPTH.

PIPE ZONE TRENCH BACKFILL MATERIAL PLACED IN LAYERS NOT EXCEEDING 6" COMPACTED DEPTH; OR LEAN CONCRETE

2 CULVERT BACKFILL DETAILS
SCALE: NOT TO SCALE

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

A/E FIRM
JACOBS GOVERNMENT SERVICES COMPANY
GREENWOOD VILLAGE, CO

DESIGNED: V ORTIZ
CADD: A SEMENENKO
TECH. REVIEW: D STEWART
DATE: 08/2025

SUB SHEET NO. 05C5002

TITLE OF SHEET
ROADWAY CULVERT BACKFILL DETAILS
GRAND CANYON, SOUTH RIM

DRAWING NO. 113 175376
PMIS/PKG NO. 257282
SHEET 19 OF 41

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 9/8/2025 PLOT TIME: 10:07:43 AM SS6\V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i DrawingsIROAD\05C5002_D3167666.dgn

METAL ROUND PIPE CULVERT												
FILL HEIGHT AND METAL THICKNESS TABLE FOR HELICAL LOCKSEAM AND WELDED SEAM PIPE CULVERT												
		STEEL										
PIPE SIZE DIAMETER INCHES	MINIMUM COVER INCHES	2⅔" x ½" CORRUGATIONS					3" x 1" CORRUGATIONS					
		METAL THICKNESS (INCH/GAGE)										
		0.064/16	0.079/14	0.109/12	0.138/10	0.168/8	0.064/16	0.079/14	0.109/12	0.138/10	0.168/8	
		MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE (FEET)										
12	12	100	100	100	100	100						
15	12	100	100	100	100	100						
18	12	100	100	100	100	100						
21	12	100	100	100	100	100						
24	12	100	100	100	100	100						
30	12	85	100	100	100	100						
36	12	71	89	100	100	100	81	100	100	100	100	

3 ROUND METAL PIPE COVER DETAIL
SCALE: NOT TO SCALE

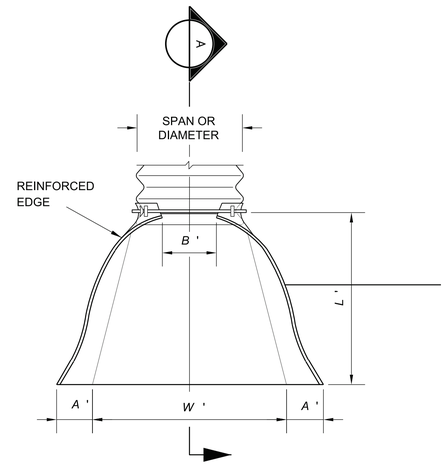
GENERAL SHEET NOTES

ROUND METAL PIPE CULVERT

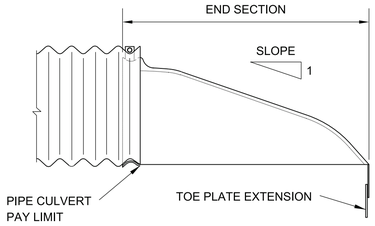
A. THE FILL HEIGHTS IN THE TABLE ARE FOR HELICAL LOCKSEAM AND WELDED SEAM PIPE ONLY. FILL HEIGHTS FOR CULVERT PIPE WITH ANNULAR CORRUGATIONS ARE MORE RESTRICTIVE THAN THOSE OF HELICAL LOCKSEAM AND WELDED SEAM PIPE. OBTAIN APPROVAL BEFORE FURNISHING ANNULAR CORRUGATION PIPE.

B. MEASURE MINIMUM COVER FROM THE TOP OF THE PIPE CULVERT TO THE SUBGRADE FOR FLEXIBLE PAVEMENTS, AND TO THE TOP OF THE PAVEMENT FOR RIGID PAVEMENTS. MEASURE MAXIMUM FILL HEIGHT FROM THE TOP OF THE PIPE TO THE TOP OF THE PAVEMENT FOR BOTH FLEXIBLE AND RIGID PAVEMENT.

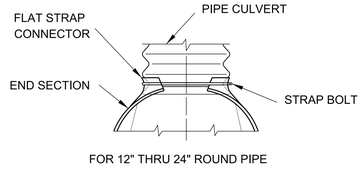
END SECTIONS FOR ROUND PIPE CULVERT										
PIPE SIZE DIAMETER INCHES	METAL THICKNESS				DIMENSIONS INCHES					SLOPE APPROX.
	STEEL		ALUMINUM							
	INCHES	GAGE	INCHES	GAGE	A (MIN)	B (MAX)	H (MIN)	L (±2")	W (MAX)	
12	0.064	16	0.060	16	5	7	6	21	44	2¼
15	0.064	16	0.060	16	6	8	6	26	52	2¼
18	0.064	16	0.060	16	7	10	6	31	58	2⅛
21	0.064	16	0.060	16	8	12	6	36	66	2⅛
24	0.064	16	0.060	16	9	13	6	41	72	2⅛
30	0.079	14	0.075	14	11	16	8	51	88	2⅛
36	0.079	14	0.075	14	13	19	9	60	105	2



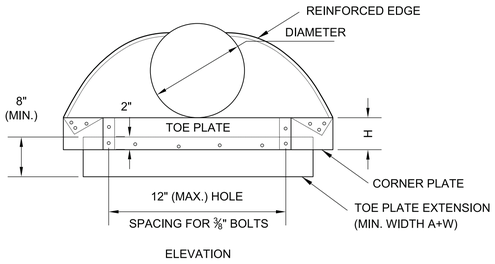
PLAN



SECTION A-A



DESIGN A
CONNECTION TO ANNULAR
CORRUGATED METAL PIPE



ROUND PIPE CULVERT

4 METAL END SECTIONS
SCALE: NOT TO SCALE

GENERAL SHEET NOTES

END SECTIONS FOR ROUND METAL PIPE CULVERT

A. VARIATIONS IN DESIGN AND DIMENSIONS ARE PERMITTED TO ALLOW FOR MANUFACTURER'S STANDARDS.

B. FABRICATE MULTIPLE PIECE BODIES WITH LAP SEAMS TIGHTLY JOINED BY 3" RIVETS OR BOLTS. FABRICATE END SECTION CENTER PANELS 8 FOR 60" AND LARGER DIAMETER PIPE AND EQUIVALENT ELLIPTICAL PIPE FROM 0.138 INCH STEEL OR 0.135 INCH ALUMINUM.

C. FABRICATE CONNECTOR SECTION, CORNER PLATE AND TOE PLATE EXTENSIONS FROM THE SAME METAL THICKNESS AS THE PANEL BODY. USE TOE PLATE EXTENSION WHERE SHOWN ON THE PLANS.

D. WARP EMBANKMENT SLOPES TO MATCH THE SLOPE OF THE FLARED END SECTIONS.

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

	A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY; GREENWOOD VILLAGE, CO	DESIGNED: V ORTIZ CADD: A SEMENENKO TECH. REVIEW: D STEWART DATE: 08/2025	SUB SHEET NO.: 05C5003	TITLE OF SHEET: ROADWAY CULVERT PIPE COVER AND METAL END SECTION DETAILS GRAND CANYON, SOUTH RIM	DRAWING NO.: 113 / 175376 PMIS/PKG NO.: 257282 SHEET: 20 OF 41

GRCA-257282

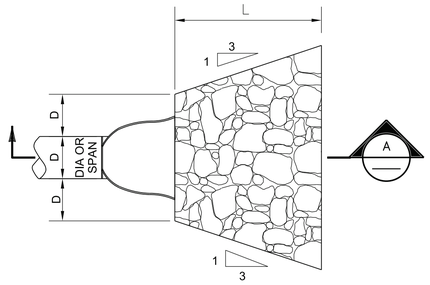
100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 9/8/2025 PLOT TIME: 2:04:14 PM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C5003_D3167666.dgn

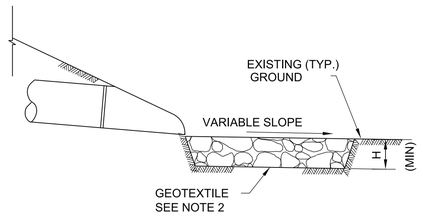
GENERAL SHEET NOTES

A. USE FOR APRONS SERVING CULVERTS WITH SLOPES OF LESS THAN 10%.

B. FURNISH GEOTEXTILE FILTER CONFORMING TO SPECIFICATIONS SECTION 31 37 00 RIPRAP AND BOULDERS.



PLAN



SECTION A

PROTECTIVE APRON AT CULVERT OUTLET WITHOUT DITCH

OUTLET WITHOUT DITCH
PROTECTIVE APRON DIMENSIONS AND ESTIMATED QUANTITIES

	CULVERT SIZE D (inches)	RIPRAP CLASS	LENGTH OF APRON L (FEET)	DEPTH OF APRON H (FEET)	ESTIMATED RIPRAP QUANTITY (CY)	ESTIMATED GEOTEXTILE QUANTITY (SY)
WITH END SECTION	12	2	4	1.5	1	5
	15	2	4	1.5	1	5
	18	2	6	1.5	2.2	9
	24	2	8	1.5	3.9	14
	30	3	12.5	2	10.9	28
	36	3	16	2	15.6	37
	42	4	21	2.5	34.1	63
	48	4	24	2.5	44.5	79

5 CULVERT RIPRAP DETAILS
SCALE: NOT TO SCALE

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

A/E FIRM
JACOBS GOVERNMENT SERVICES COMPANY
GREENWOOD VILLAGE, CO

DESIGNED: V ORTIZ
CADD: A SEMENENKO
TECH. REVIEW: D STEWART
DATE: 08/2025

SUB SHEET NO. 05C5004

TITLE OF SHEET
ROADWAY RIPRAP DETAILS
GRAND CANYON, SOUTH RIM

DRAWING NO. 113 175376
PMIS/PKG NO. 257282
SHEET 21 OF 41

100% COMPLETE CONSTRUCTION DOCUMENTS

GRCA-257282

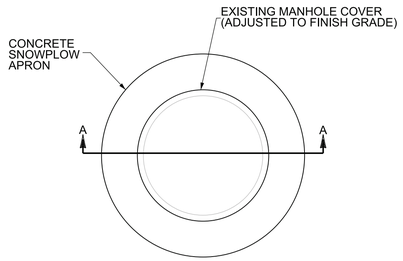
PLOT DATE: 9/9/2025 PLOT TIME: 4:43:07 PM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C5004_D3167666.dgn

GENERAL SHEET NOTES

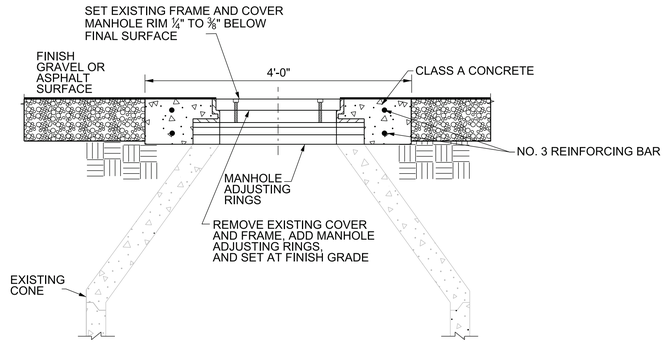
A. VERIFY ALL EXISTING CONDITIONS PRIOR TO ORDERING PARTS FOR ADJUSTING VALVE COVERS AND MANHOLES. SUBMIT PROPOSED ADJUSTMENT DETAILS TO THE CONTRACTING OFFICER 14 DAYS IN ADVANCE OF PROPOSED MANHOLE ADJUSTMENT WORK.

B. COAT ALL NEW EXPOSED CONCRETE RINGS INSIDE SANITARY SEWER MANHOLES CONFORMING TO SPECIFICATION 33 05 13B MANHOLES.

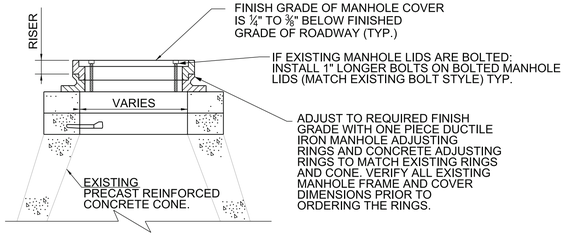
C. ADD CONCRETE SNOWPLOW APRON IF ANY PART OF THE MANHOLE COVER IS WITHIN THE PAVED ASPHALT ROADWAY.



CONCRETE SNOWPLOW APRON PLAN



SECTION A-A



TYPICAL ADJUSTMENT OF MANHOLE FRAME AND COVER WITHOUT CONCRETE SNOWPLOW APRON SECTION

6 MANHOLE FRAME AND COVER ADJUSTMENT DETAIL

SCALE: NOT TO SCALE

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

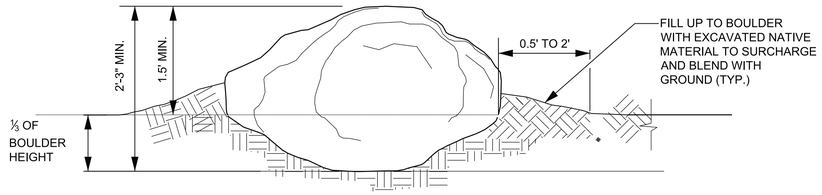
	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: J MILLS CADD: A SEMENENKO TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C5005	TITLE OF SHEET ROADWAY MANHOLE FRAME AND COVER ADJUSTMENT DETAILS GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 22 OF 41

PLOT DATE: 9/9/2025 PLOT TIME: 4:43:05 PM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C5005_D3167666.dgn

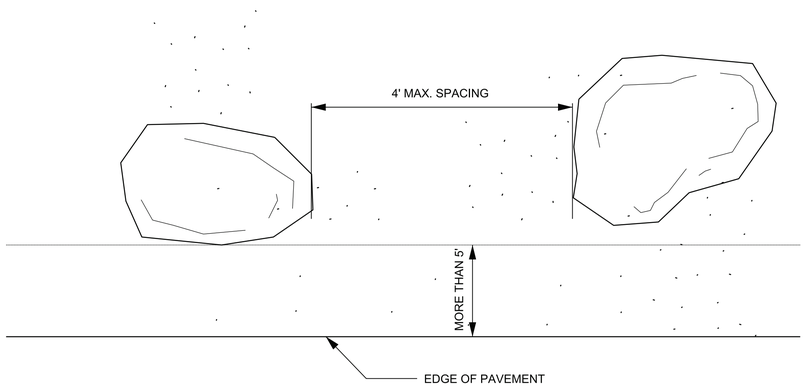
100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 9/8/2025 PLOT TIME: 10:07:06 AM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C5006_D3167666.dgn

GRCA-257282



BARRIER BOULDER PLACEMENT DETAIL



GENERAL SHEET NOTES

A. BOULDER LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE. PLACE AS DIRECTED BY THE CONTRACTING OFFICER IN COORDINATION WITH THE NPS.

B. PLACE BOULDERS WEATHERED SIDE UP.

C. PLACE BOULDERS RANDOMLY WITHIN THE MAXIMUM SPACING. VARY NUMBER OF BOULDERS AS DIRECTED BY CONTRACTING OFFICER.

D. BURY BOULDER TO 1/3 OF BOULDER HEIGHT.

E. BOULDERS TO BE PROVIDED FROM LOCAL SOURCE AND SHALL MATCH THE CHARACTERISTICS OF BOULDERS INDIGENOUS TO GRAND CANYON NATIONAL PARK.

F. AFTER EMBANKMENT, EXCAVATION, AND BOULDER PLACEMENT IS COMPLETE, SCARIFY OR OTHERWISE ROUGHEN ALL SURFACES BETWEEN THE BOULDERS AND ACCESS TO RV RESIDENCE VILLAGE TO DETER VEHICULAR TRAFFIC USE.

G. DISTANCE FROM EDGE OF PAVEMENT TO FACE OF BOULDERS WILL BE MORE THAN 5' OR AS DETERMINED BY CONTRACTING OFFICER.

7 BOULDER PLACEMENT DETAIL

SCALE: NOT TO SCALE

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

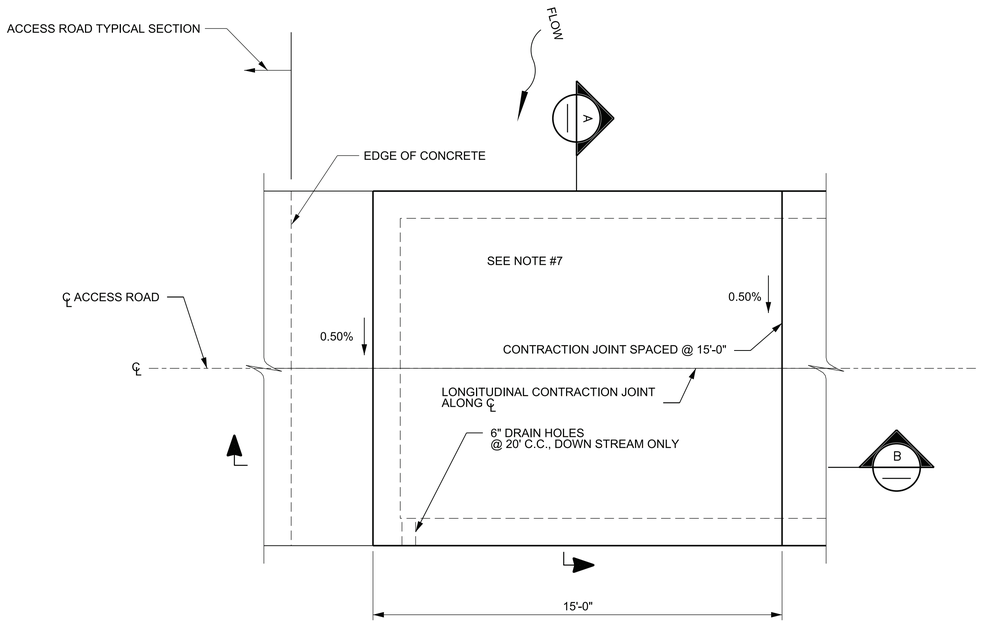
0" 1"

	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: E NASZKOWSKA CADD: D FARRAY TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C5006	TITLE OF SHEET ROADWAY BOULDER PLACEMENT DETAILS GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 23 OF 41

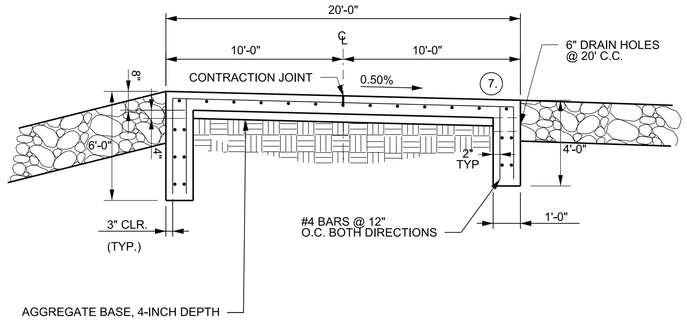
100% COMPLETE CONSTRUCTION DOCUMENTS

SHEET NOTES

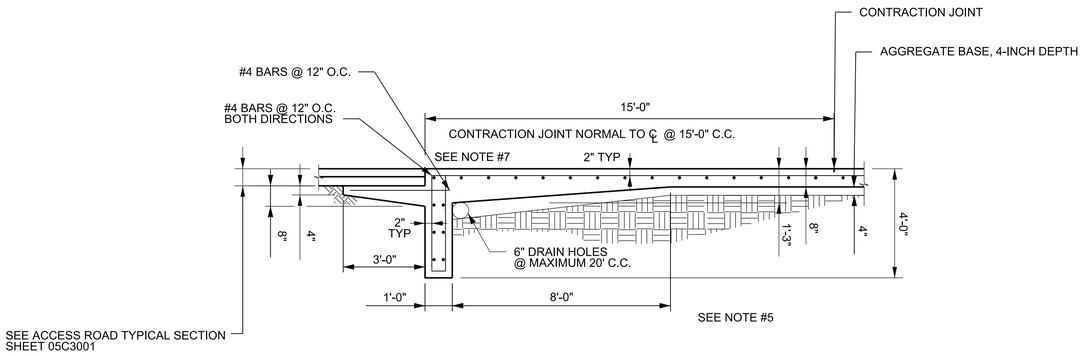
1. USE CLASS A (AE) STRUCTURAL CONCRETE.
2. USE TYPE II LOW ALKALI CEMENT AND SUBMIT MIX DESIGN FOR APPROVAL.
3. USE EPOXY-COATED REINFORCING STEEL.
4. SCREEN 6" DRAIN HOLES TO PREVENT MATERIAL LOSS UNDER LOW WATER CROSSING.
5. SECTION B-B DETAIL APPLIES TO BOTH ENDS OF CONCRETE LOW WATER CROSSING.
6. FOR CONTRACTION JOINTS, SEE DETAIL THIS SHEET.
7. PROVIDE A GROOVED TRANSVERSE TINE FINISH ACCORDING TO SECTION 03 30 00 CAST-IN-PLACE CONCRETE.



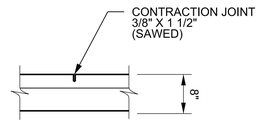
PARTIAL PLAN VIEW



SECTION A



SECTION B



TYPICAL CONTRACTION JOINT DETAIL

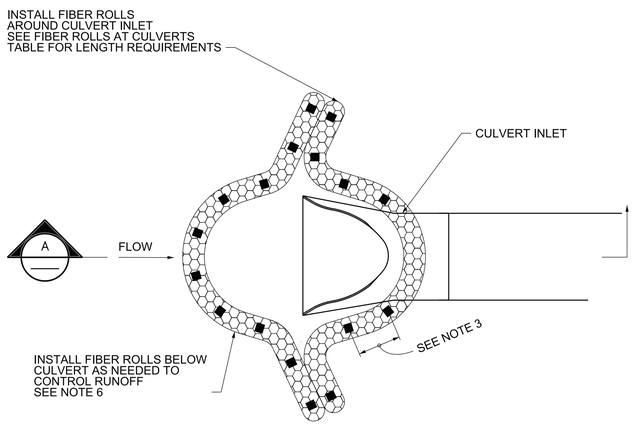
8 LOW WATER CROSSING
SCALE: NOT TO SCALE
05C2201

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

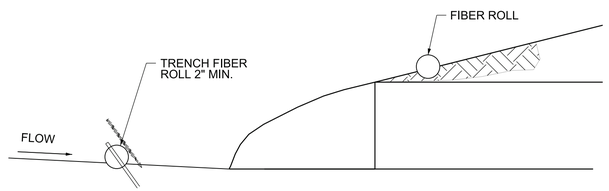
	A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO	DESIGNED: W KOHLER; CADD: A SEMENENKO; TECH. REVIEW: W KOHLER; DATE: 08/2025	SUB SHEET NO. 05C5007	TITLE OF SHEET: ROADWAY LOW WATER CROSSING DETAILS; GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376; PMIS/PKG NO. 257282; SHEET 24 OF 41

100% COMPLETE CONSTRUCTION DOCUMENTS

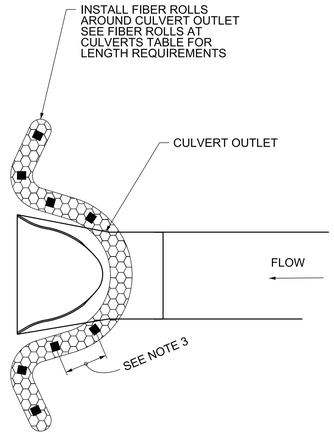
PLOT DATE: 9/8/2025 PLOT TIME: 10:07:07 AM SS6/V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i DrawingsIROAD\05C5007_D3167666.dgn



FIBER ROLL AT CULVERT INLET PLAN



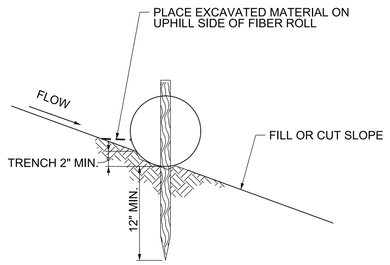
SECTION A



FIBER ROLL AT CULVERT OUTLET

SHEET NOTES

1. REPAIR ALL RILLS AND GULLIES AND COMPACT BEFORE INSTALLATION.
2. INSTALL FIBER ROLLS ALONG SLOPE CONTOURS. FOR ANY 20-FOOT SECTION OF FIBER ROLL, DO NOT ALLOW THE FIBER ROLL TO VARY MORE THAN 5% FROM LEVEL.
3. STAKE FIBER ROLLS IN PLACE WITH 1-INCH X 1-INCH OR 1-INCH Ø WOOD STAKES. SPACE STAKES 4-FOOT O.C. MAX. ON SLOPES AND 2-FOOT O.C. MAX. AT CULVERTS. STAKE FIBER ROLLS 6 INCHES FROM EACH END.
4. DRIVE STAKES INTO UNDISTURBED SOIL AT LEAST 12 INCHES DEEP. EXPOSE STAKES 2 INCHES ABOVE TOP OF FIBER ROLL.
5. FOR FIBER ROLLS ON BARE SOIL, CONSTRUCT TRENCHES PARALLEL TO THE CONTOUR. PLACE FIBER ROLLS IN CONTINUOUS CONTACT WITH TRENCH BOTTOM AND SIDES. TAMP SOIL BACKFILL AGAINST UPSTREAM SIDE OF FIBER ROLL TO ENSURE STORM WATER IS FORCED TO FLOW THROUGH FIBER ROLL RATHER THAN UNDER IT.
6. PLACE FIBER ROLLS ALL THE WAY AROUND THE INLET WHEN THE DISTURBANCE IS ON BOTH THE ROAD AND AROUND THE CULVERT AND ALL WATER ENTERING THE CULVERT IS CROSSING THE DISTURBANCE.



STAKE DETAIL

FIBER ROLL AT CULVERTS*	
CULVERT SIZE	9" ∅ FIBER ROLL LENGTH (FT)
24" OR SMALLER	10
30" TO 48"	20
54" OR LARGER	30

*APPROXIMATE LENGTH SHOWN FOR ROLLS ACROSS THE TOP OF THE CULVERT INLET ONLY. ADJUST LENGTH AS NEEDED DUE TO SITE-SPECIFIC CONDITIONS.

9 FIBER ROLL DETAIL
SCALE: NOT TO SCALE

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

A/E FIRM
JACOBS GOVERNMENT SERVICES COMPANY
GREENWOOD VILLAGE, CO

DESIGNED: V ORTIZ
CADD: A SEMENENKO
TECH. REVIEW: J MILLS
DATE: 08/2025

SUB SHEET NO. 05C5008

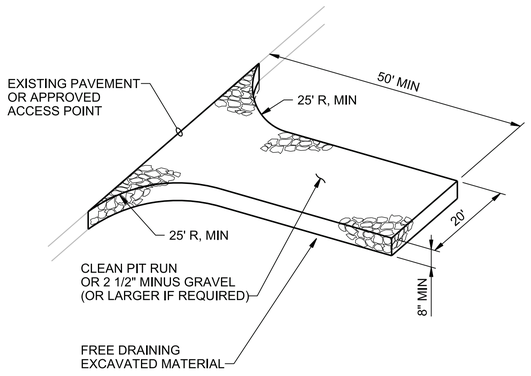
TITLE OF SHEET
ROADWAY FIBER ROLL DETAILS
GRAND CANYON, SOUTH RIM

DRAWING NO. 113 175376
PMIS/PKG NO. 257282
SHEET 25 OF 41

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 9/11/2025 PLOT TIME: 8:12:58 AM SS6/V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i DrawingsIROAD\05C5008_D3167666.dgn

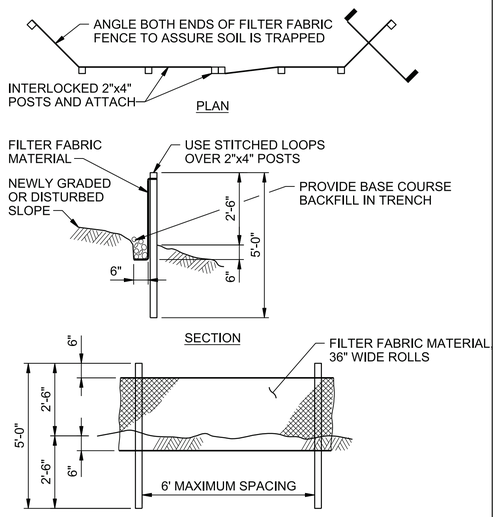


NOTES:

1. ADDITIONAL GRAVEL MAY HAVE TO BE ADDED PERIODICALLY TO MAINTAIN PROPER FUNCTION OF THE PAD.
2. REMOVE GRAVEL ENTRANCE AND REPLACE WITH NEW BASE COURSE PRIOR TO COMPLETION OF ACCESS ROAD.

10 GRAVEL CONSTRUCTION ENTRANCE

SCALE: NOT TO SCALE

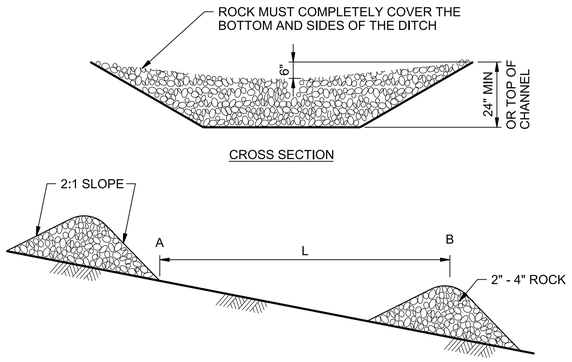


NOTES:

1. BURY BOTTOM OF FILTER FABRIC 6" VERTICALLY BELOW FINISHED GRADE.
2. 2"x4" DOUGLAS FIR OR STEEL FENCE POSTS.
3. STITCHED LOOPS TO BE INSTALLED DOWNHILL SIDE OF SLOPE.
4. COMPACT ALL AREAS OF FILTER FABRIC TRENCH.

11 SILT FENCE

SCALE: NOT TO SCALE



L = THE DISTANCE SUCH THAT POINTS A AND B ARE OF EQUAL ELEVATIONS

DAM SPACING

MAINTENANCE STANDARDS:

1. ANY SEDIMENT DEPOSITION OF MORE THAN 0.5 FEET SHALL BE REMOVED SO THAT THE CHANNEL IS RESTORED TO ITS DESIGN CAPACITY.
2. THE CHANNEL SHALL BE EXAMINED FOR SIGNS OF SCOURING AND EROSION OF THE BED AND BANKS. IF SCOURING OR EROSION HAS OCCURRED, AFFECTED AREAS SHALL BE PROTECTED BY RIP-RAP OR AN EROSION CONTROL BLANKET OR NET.

12 CHECK DAMS

SCALE: NOT TO SCALE

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

	A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY; GREENWOOD VILLAGE, CO	DESIGNED: V ORTIZ CADD: A SEMENENKO TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C5009	TITLE OF SHEET: ROADWAY EROSION CONTROL DETAILS GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 26 OF 41

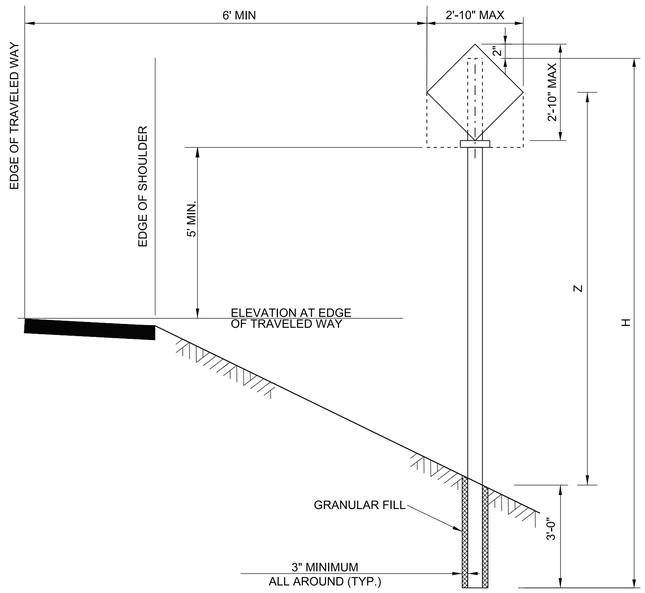
GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

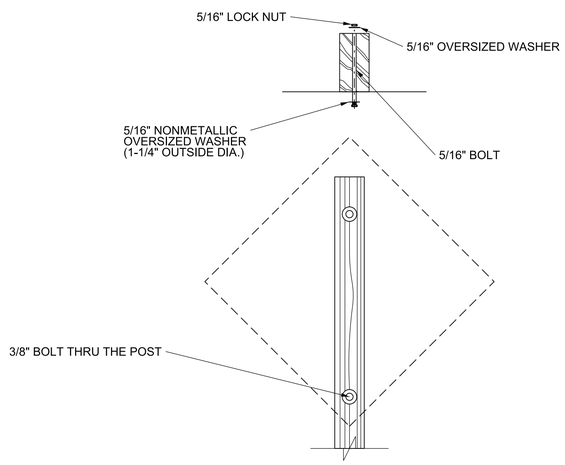
PLOT DATE: 9/8/2025 PLOT TIME: 10:07:46 AM SS6/V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i DrawingsIROAD\05C5009_D3167666.dgn

SHEET NOTES

1. H INDICATES OVERALL POST LENGTH. SELECT POST LENGTHS TO FIT FIELD CONDITIONS.
2. Z IS THE HEIGHT FROM THE GROUND LINE TO MID-HEIGHT OF SIGN.

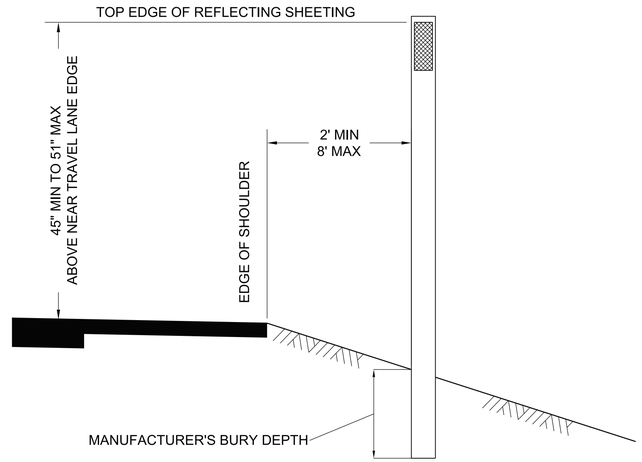


SINGLE POST SIGNS

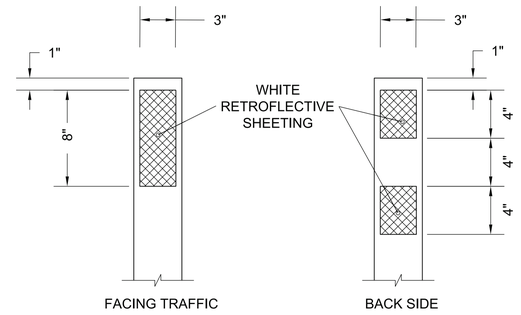


TYPICAL MOUNTING FOR SIGNS WITHOUT ANGLES

13 **SINGLE SIGN POST**
SCALE: NOT TO SCALE



FLEXIBLE OBJECT MARKER GROUND MOUNTED DETAIL



REFLECTIVE SHEETING DETAIL

14 **OBJECT MARKER DETAILS**
SCALE: NOT TO SCALE

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

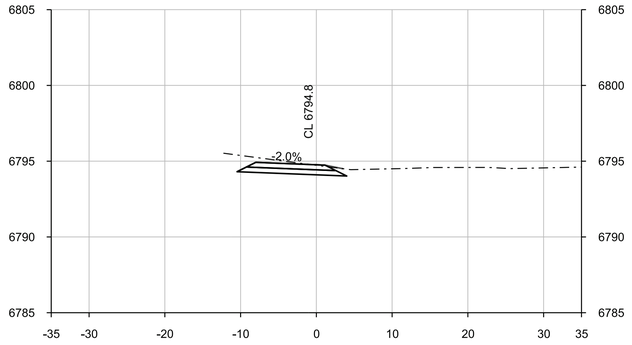
0" 1"

	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: CADD: A SEMENENKO TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C5010	TITLE OF SHEET ROADWAY OBJECT MARKER DETAILS GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 27 OF 41

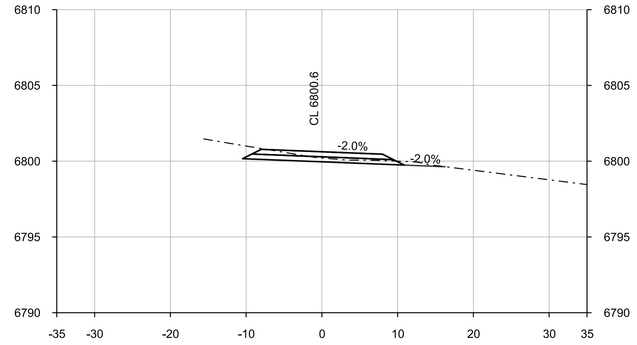
GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

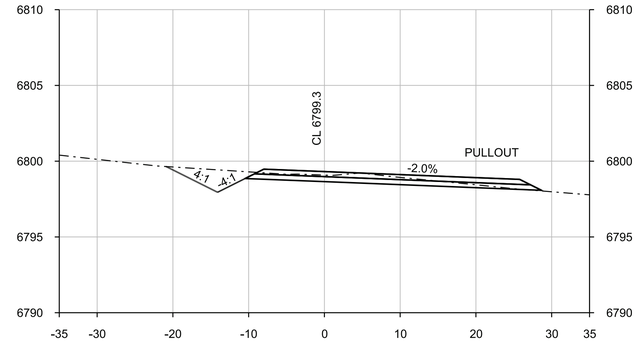
PLOT DATE: 9/11/2025 PLOT TIME: 8:12:58 AM SS6\V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C5010_D3167666.dgn



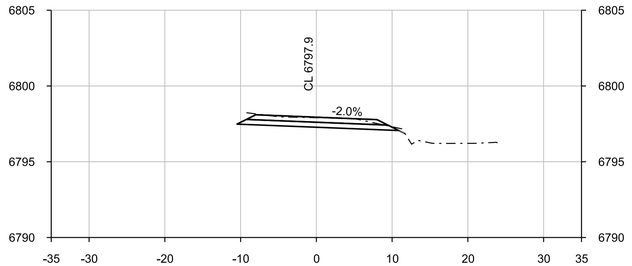
8+50



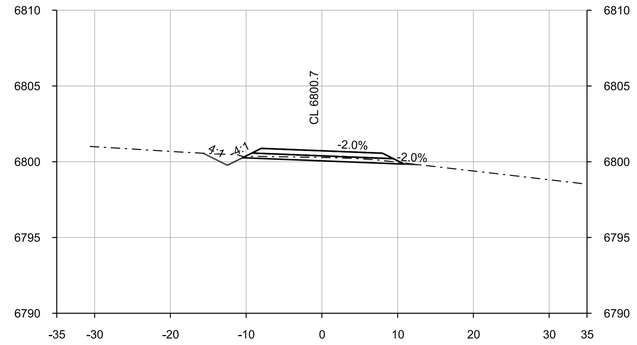
10+00



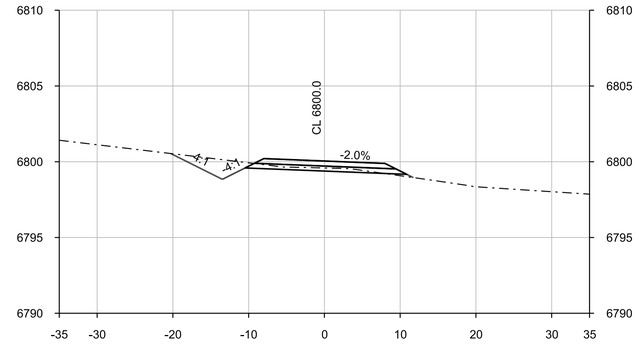
11+50



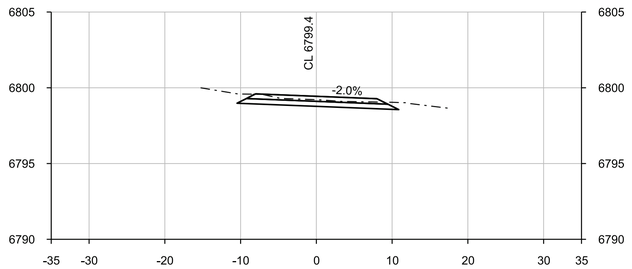
9+00



10+50



12+00



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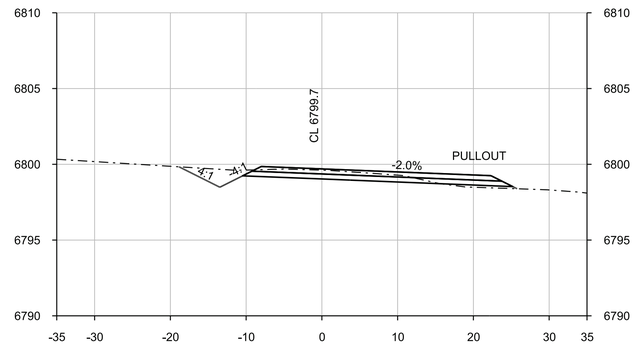

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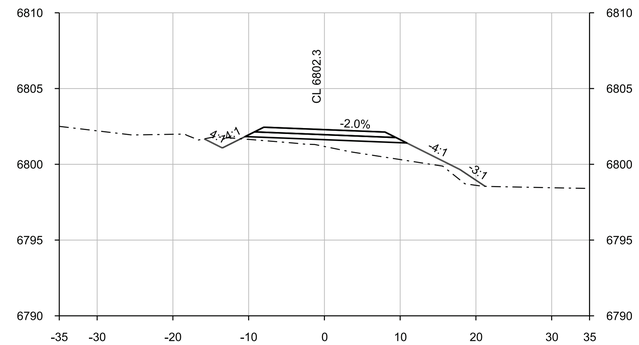

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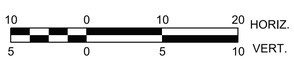


FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

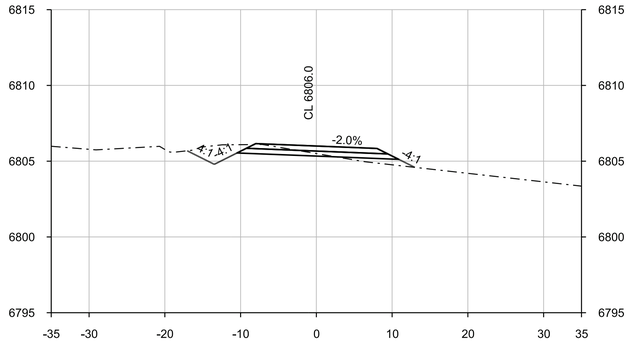
0" 1"

	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: D FARRAY CADD: D FARRAY TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C6001	TITLE OF SHEET ROADWAY ACCESS ROAD CROSS SECTIONS GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 28 OF 41

PLOT DATE: 9/8/2025 PLOT TIME: 10:07:20 AM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C6001_D3167666.dgn

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS



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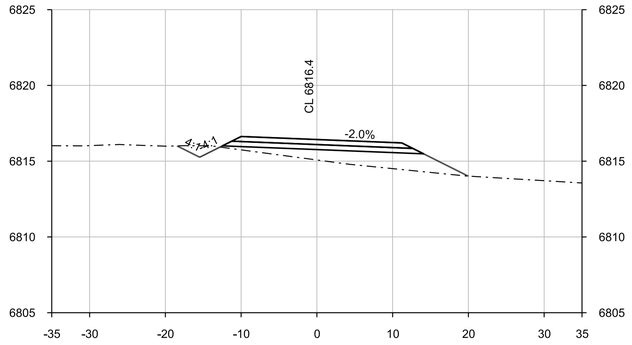

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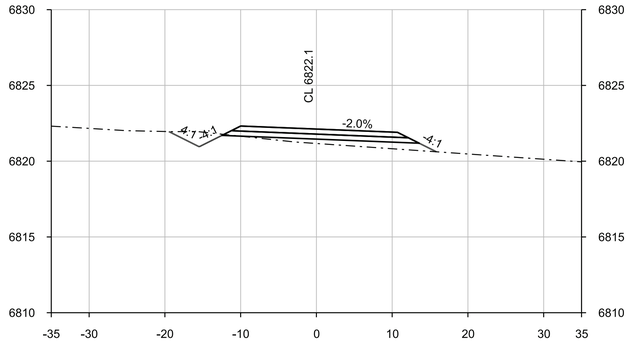

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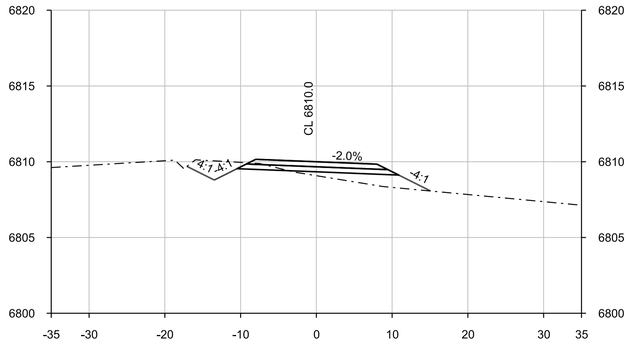

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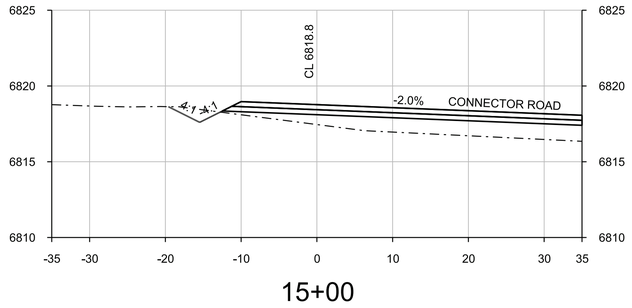

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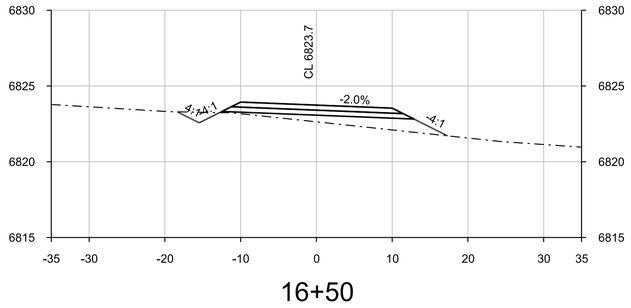

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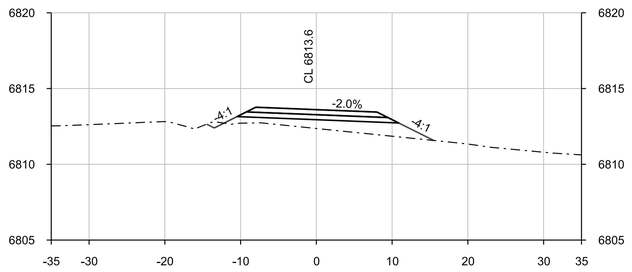

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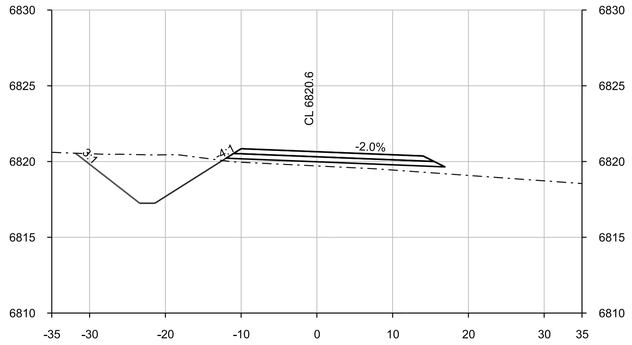

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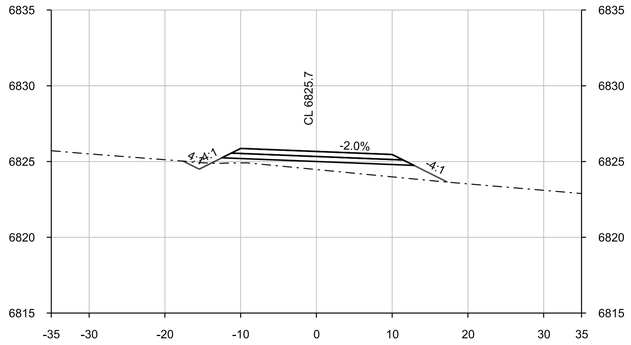


17+00

10 0 10 20 HORIZ.
5 0 5 10 VERT.
SCALE OF FEET

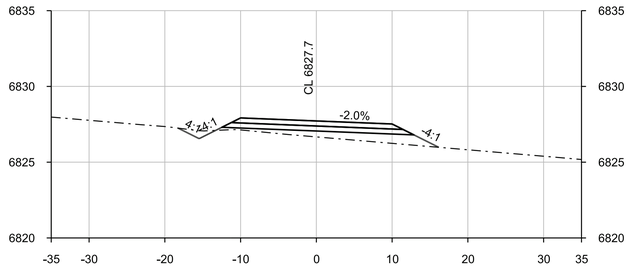
FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: D FARRAY CADD: D FARRAY TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C6002	TITLE OF SHEET ROADWAY ACCESS ROAD CROSS SECTIONS GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 29 OF 41

PLOT DATE: 9/8/2025 PLOT TIME: 10:07:24 AM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C6002_D3167666.dgn

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS



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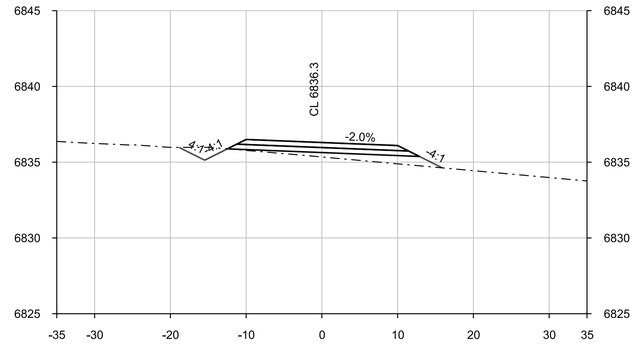

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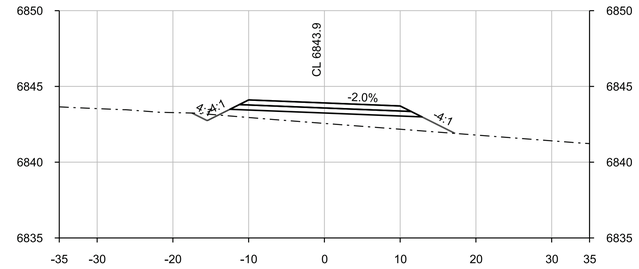

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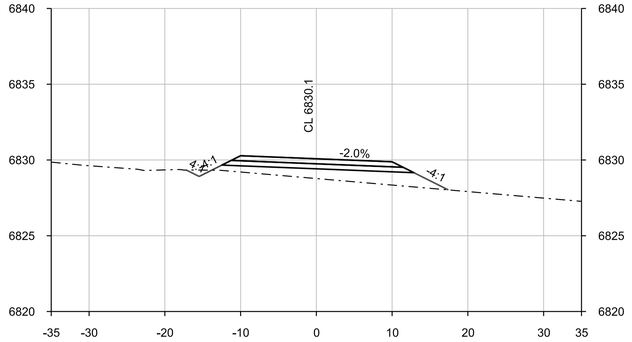

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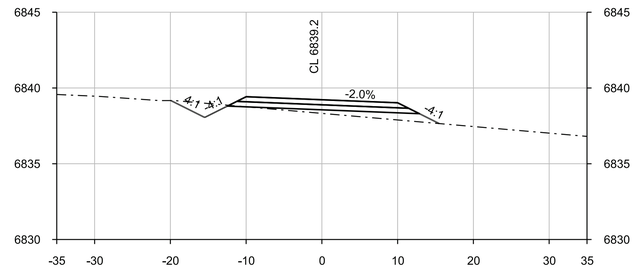

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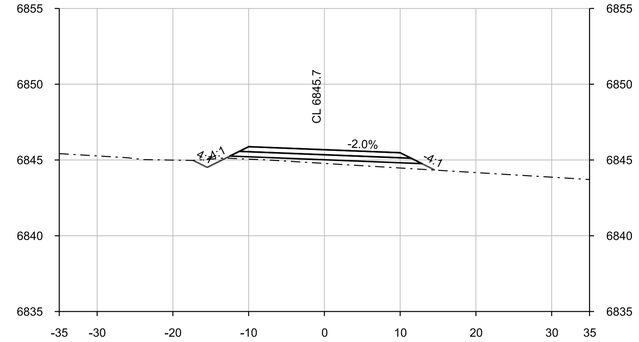

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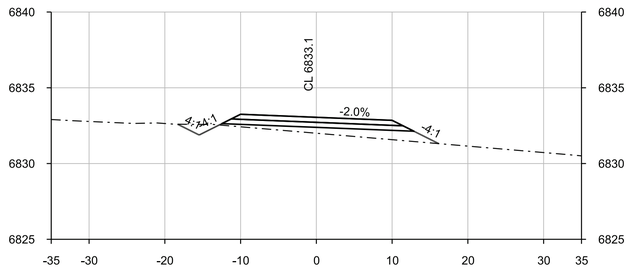

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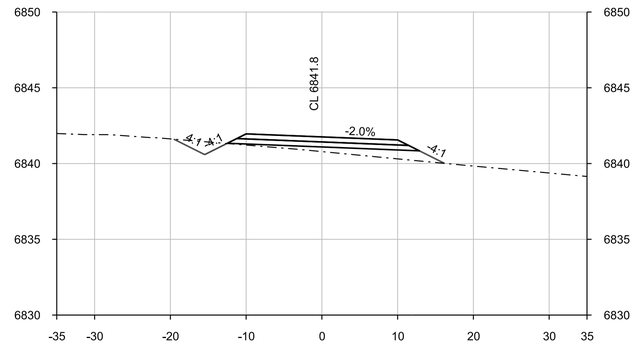

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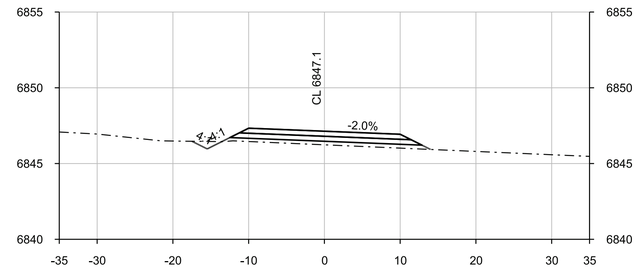

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PLOT DATE: 9/8/2025 PLOT TIME: 10:07:42 AM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C6003_D3167666.dgn

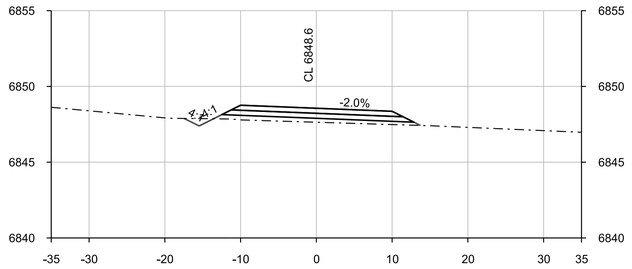
10 0 10 20 HORIZ.
5 0 5 10 VERT.
SCALE OF FEET

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: D FARRAY CADD: D FARRAY TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C6003	TITLE OF SHEET ROADWAY ACCESS ROAD CROSS SECTIONS GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 30 OF 41

100% COMPLETE CONSTRUCTION DOCUMENTS

GRCA-257282



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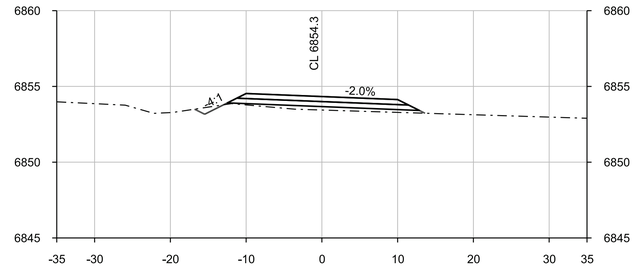

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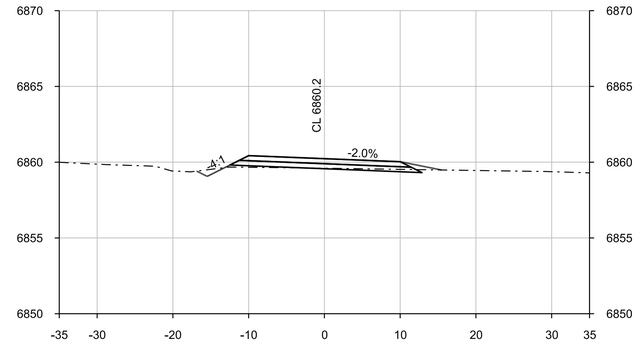

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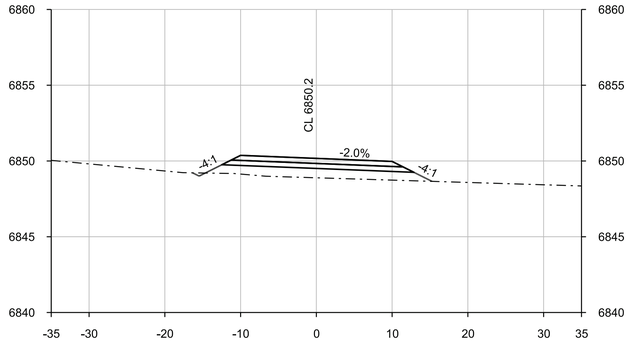

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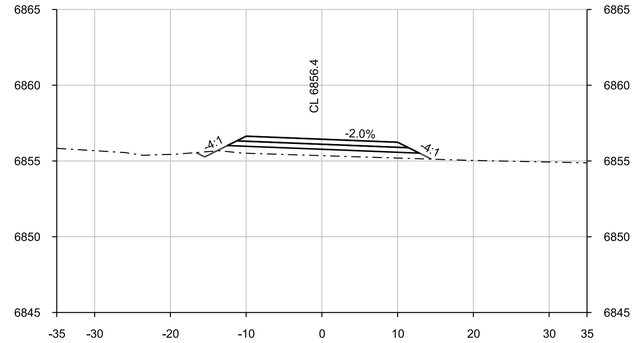

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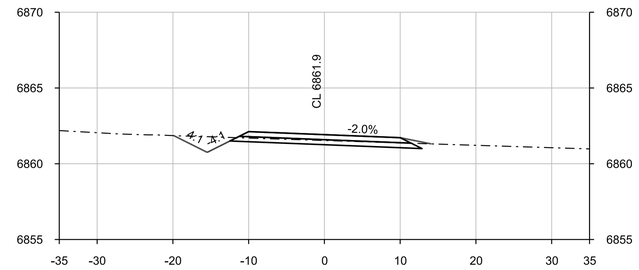

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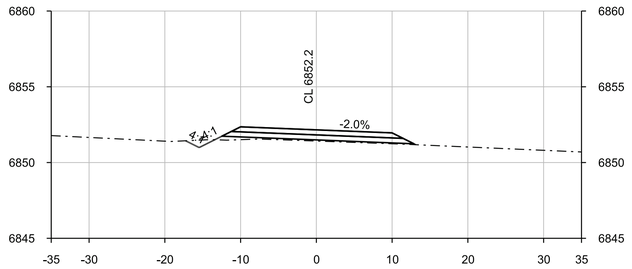

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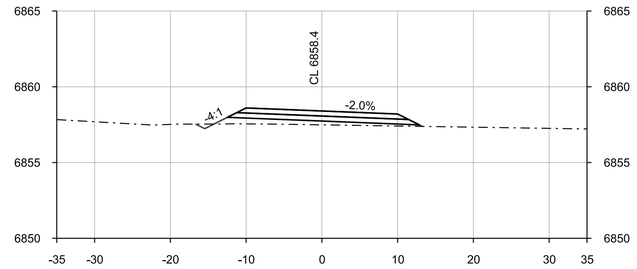

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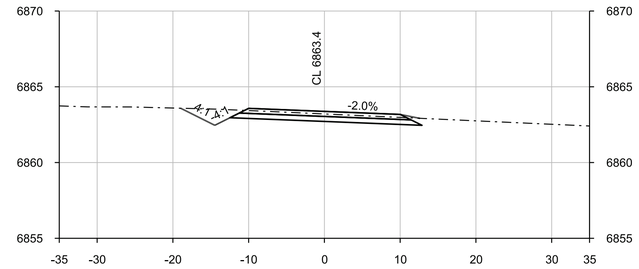


26+00

10 0 10 20 HORIZ.
5 0 5 10 VERT.
SCALE OF FEET

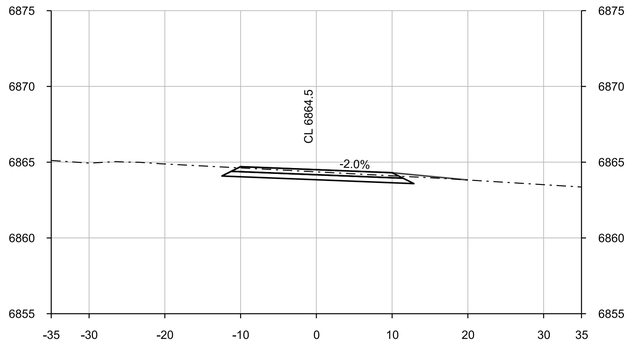
FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: D FARRAY CADD: D FARRAY TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C6004	TITLE OF SHEET ROADWAY ACCESS ROAD CROSS SECTIONS GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 31 OF 41

PLOT DATE: 9/8/2025 PLOT TIME: 10:07:23 AM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C6004_D3167666.dgn

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS



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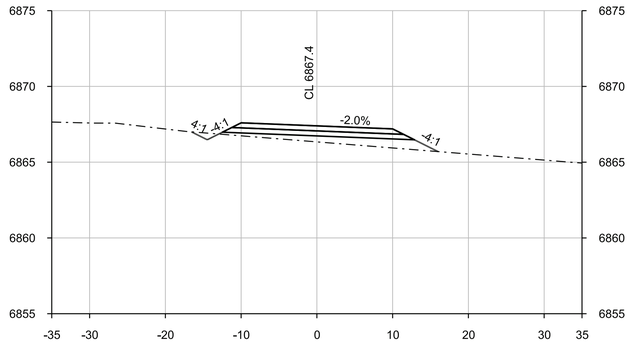

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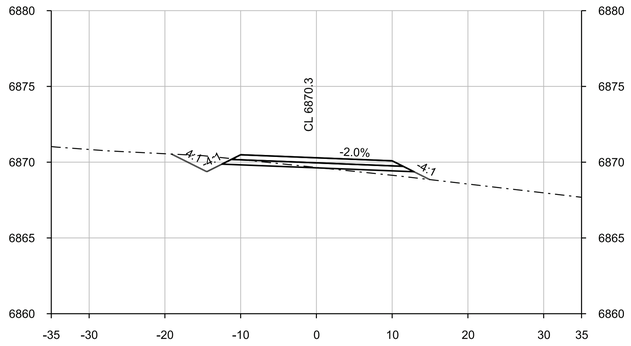

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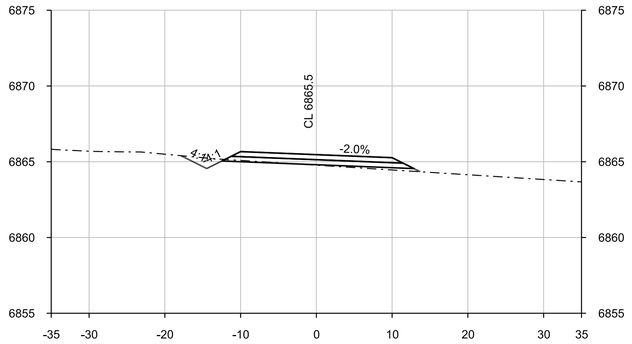

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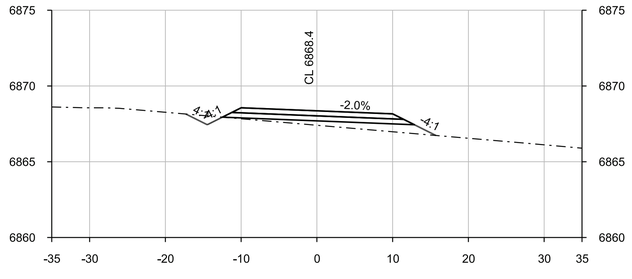

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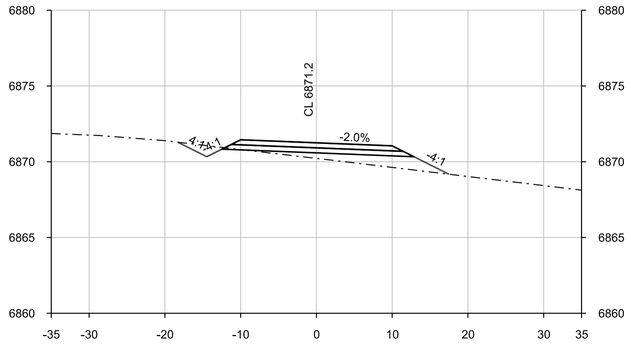

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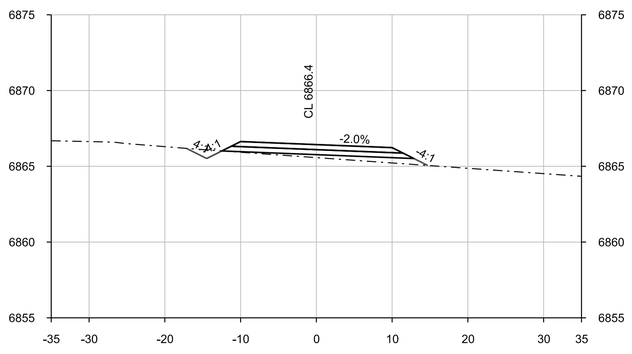

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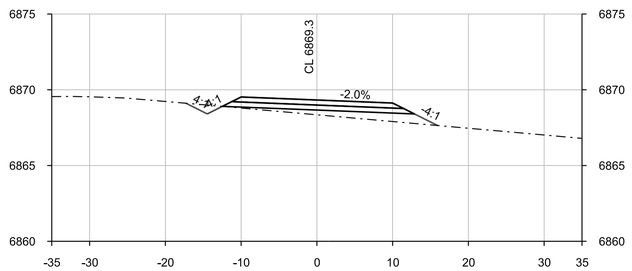

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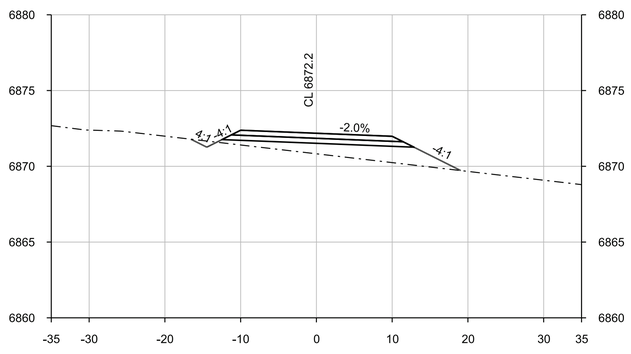


30+50

10 0 10 20 HORIZ.
5 0 5 10 VERT.
SCALE OF FEET

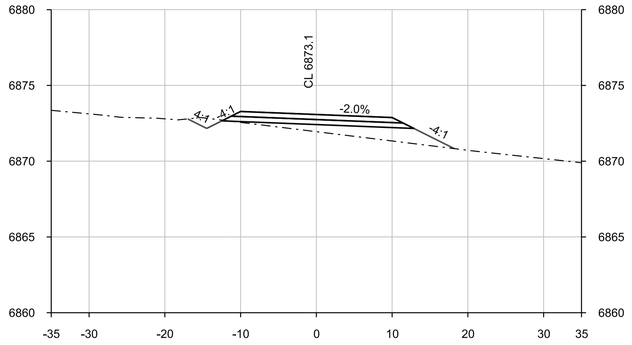
FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: D FARRAY CADD: D FARRAY TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C6005	TITLE OF SHEET ROADWAY ACCESS ROAD CROSS SECTIONS GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 32 OF 41

100% COMPLETE CONSTRUCTION DOCUMENTS

GRCA-257282

PLOT DATE: 9/8/2025 PLOT TIME: 10:07:24 AM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C6005_D3167666.dgn



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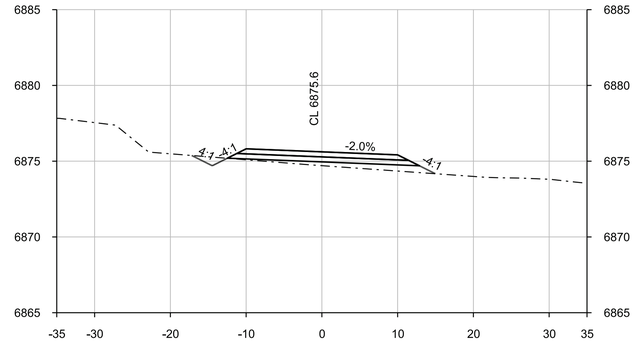

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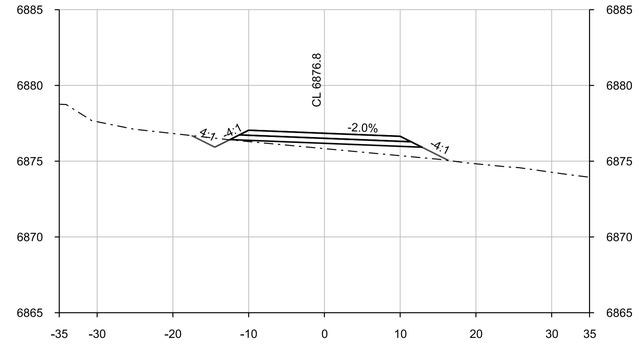

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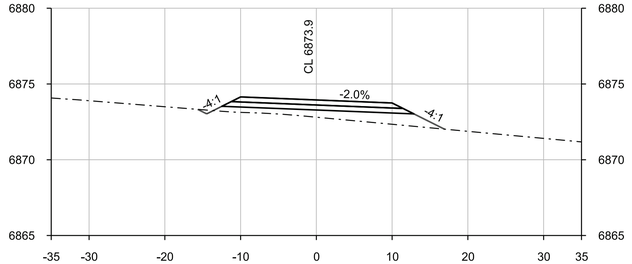

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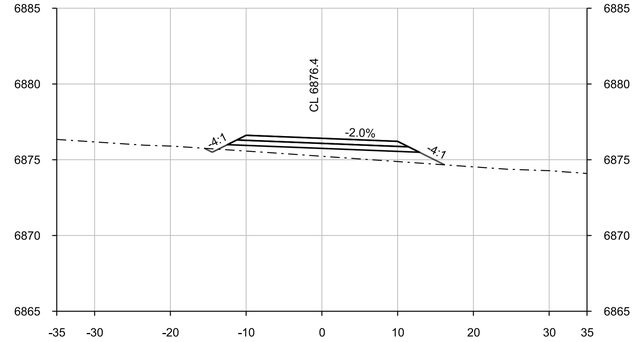

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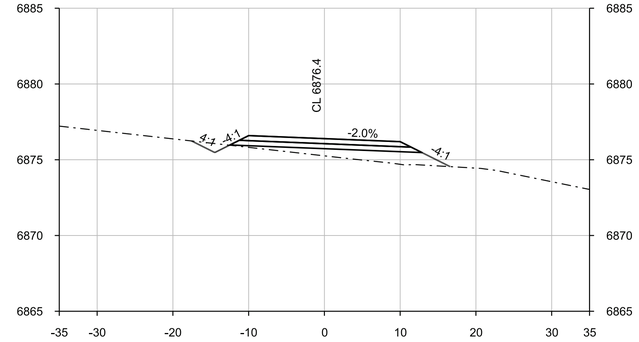

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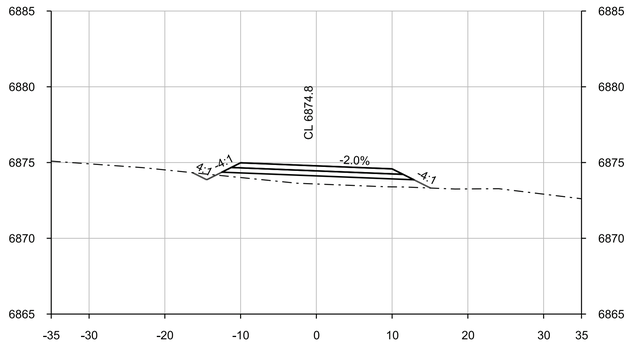

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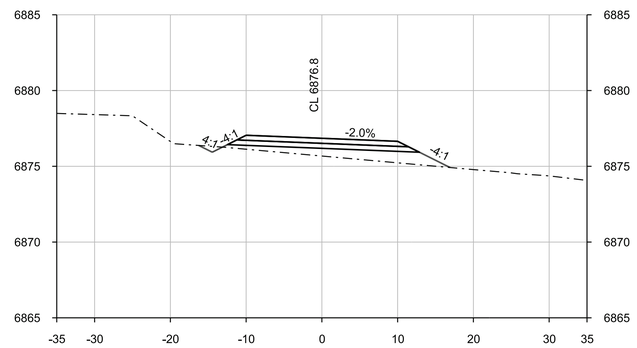

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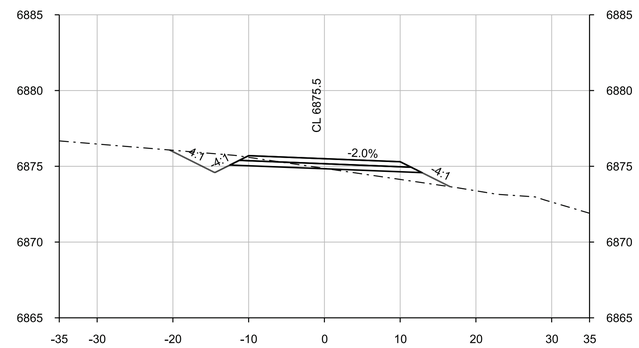


35+00

10 0 10 20 HORIZ.
5 0 5 10 VERT.
SCALE OF FEET

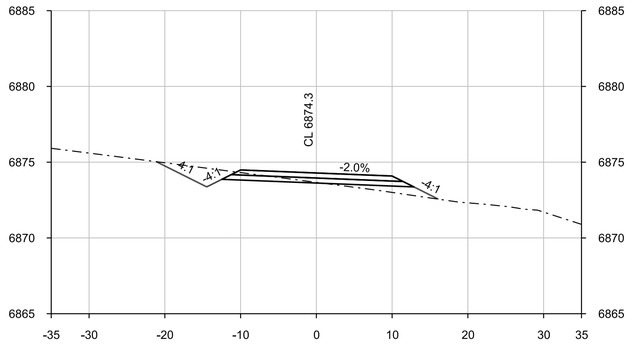
FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: D FARRAY CADD: D FARRAY TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C6006	TITLE OF SHEET ROADWAY ACCESS ROAD CROSS SECTIONS GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 33 OF 41

PLOT DATE: 9/8/2025 PLOT TIME: 10:07:00 AM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C6006_D3167666.dgn

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS



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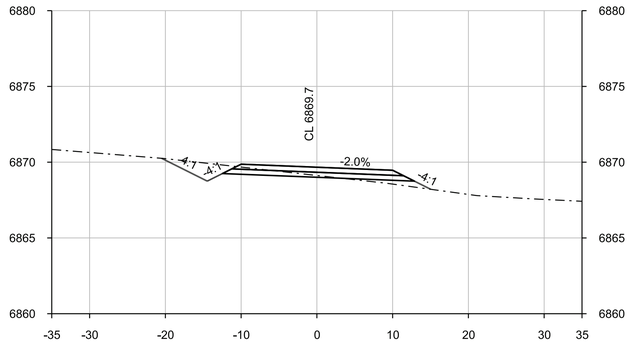

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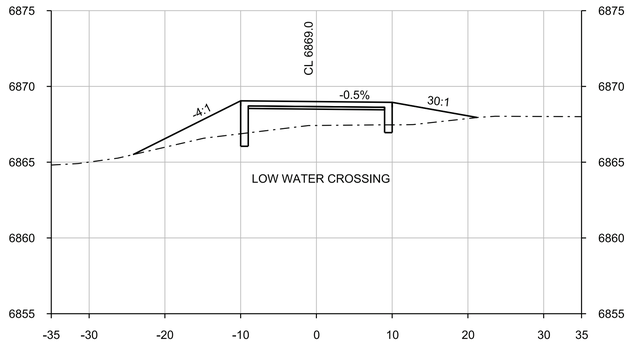

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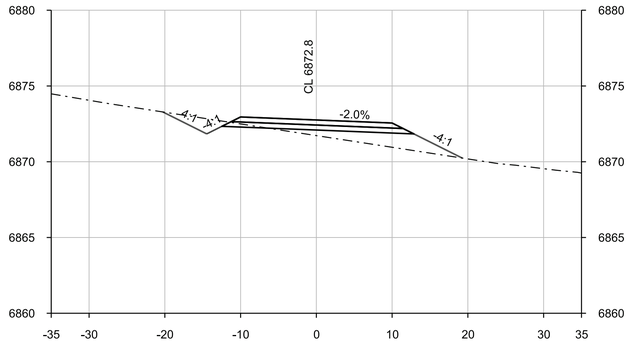

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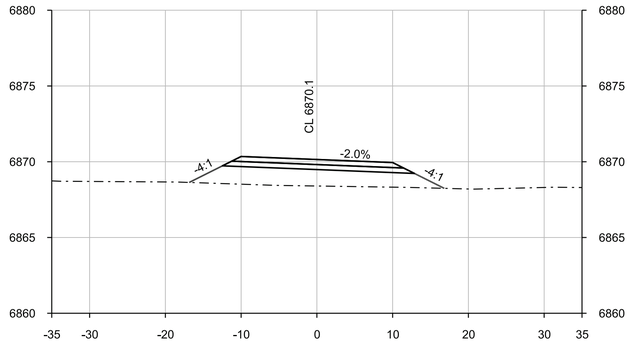

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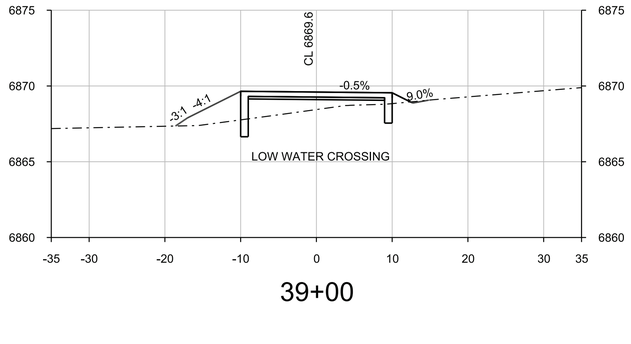

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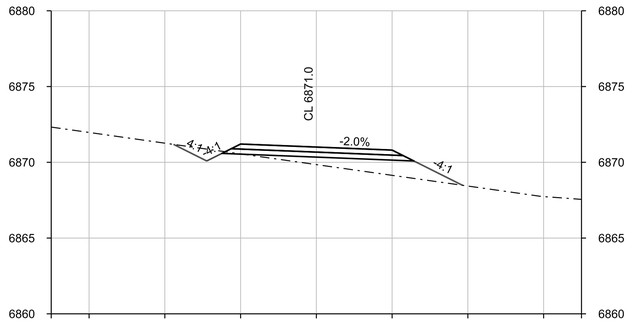

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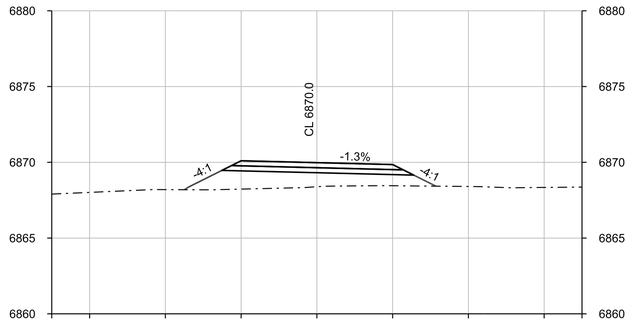

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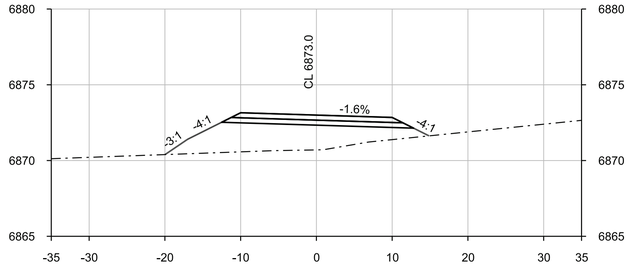


39+50

10 0 10 20 HORIZ.
5 0 5 10 VERT.
SCALE OF FEET

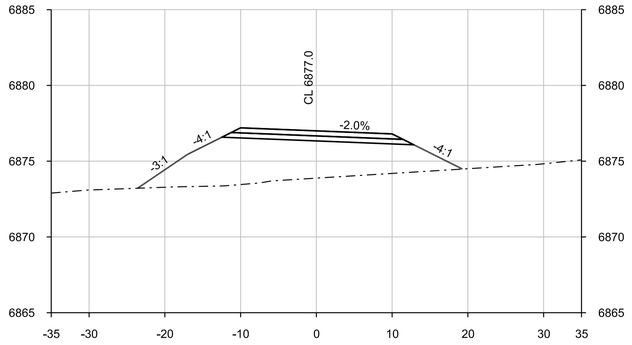
FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: D FARRAY CADD: D FARRAY TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C6007	TITLE OF SHEET ROADWAY ACCESS ROAD CROSS SECTIONS GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 34 OF 41

PLOT DATE: 9/8/2025 PLOT TIME: 10:07:00 AM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C6007_D3167666.dgn

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS



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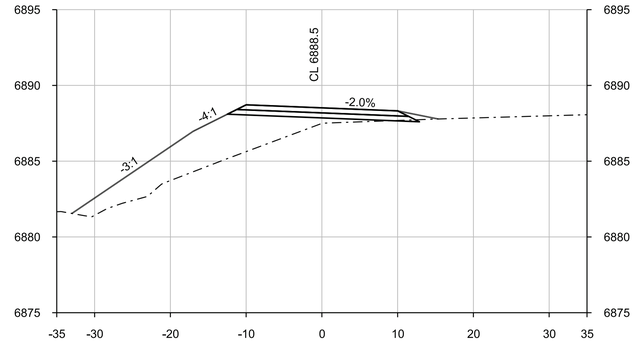

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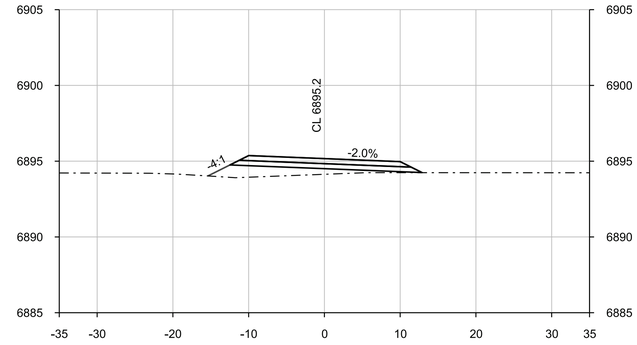

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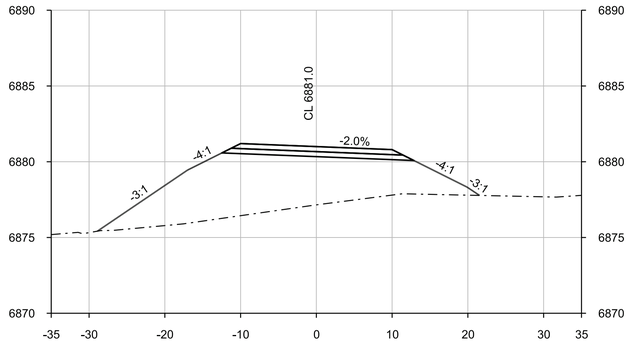

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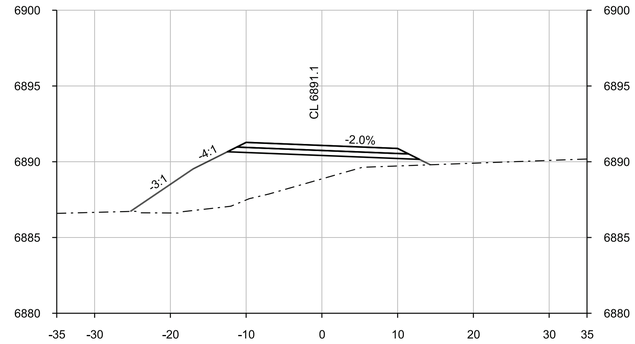

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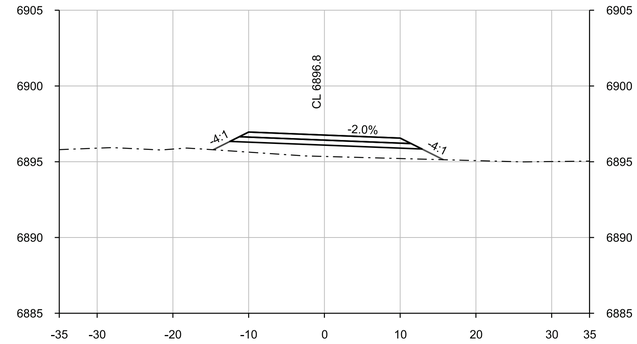

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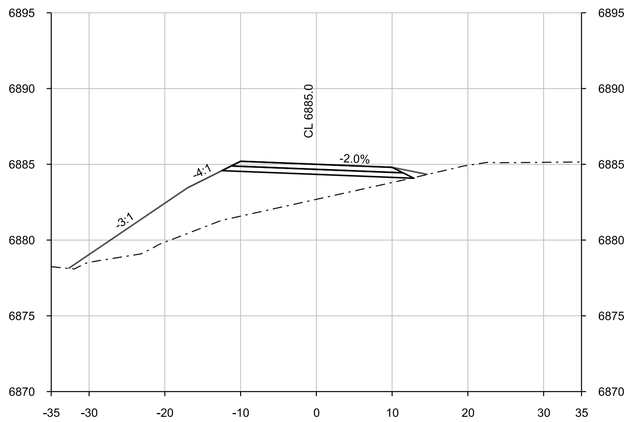

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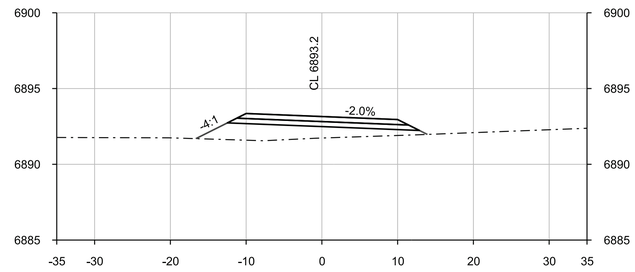

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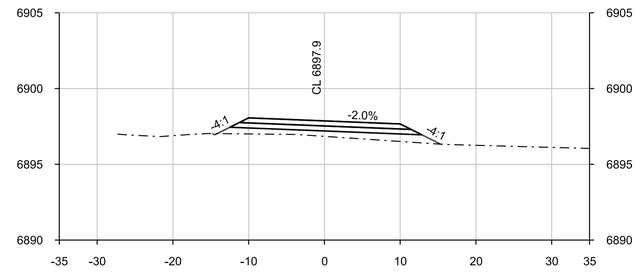

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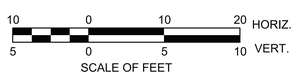


FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

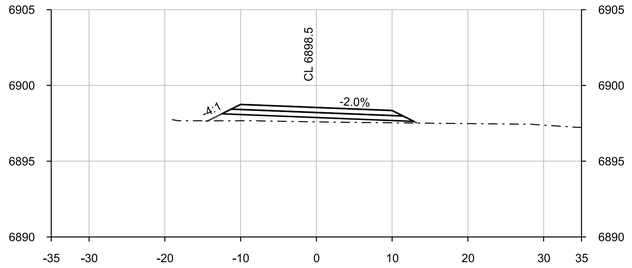
0" 1"

	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: D FARRAY CADD: D FARRAY TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C6008	TITLE OF SHEET ROADWAY ACCESS ROAD CROSS SECTIONS GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 35 OF 41

PLOT DATE: 9/8/2025 PLOT TIME: 10:06:54 AM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C6008_D3167666.dgn

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS



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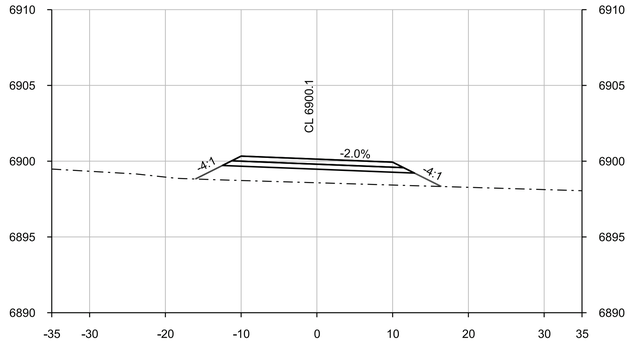

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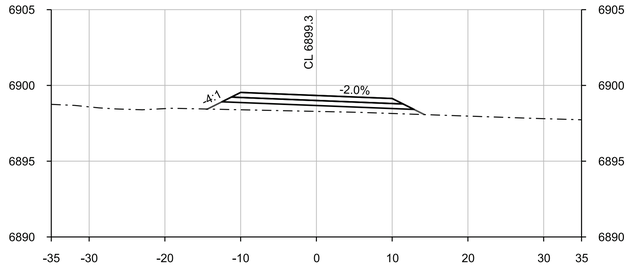

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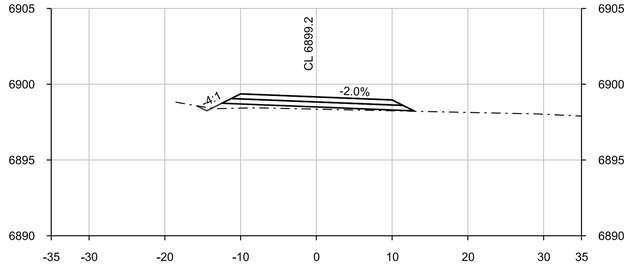

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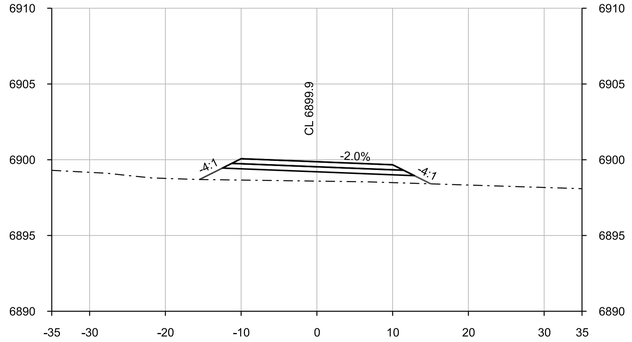

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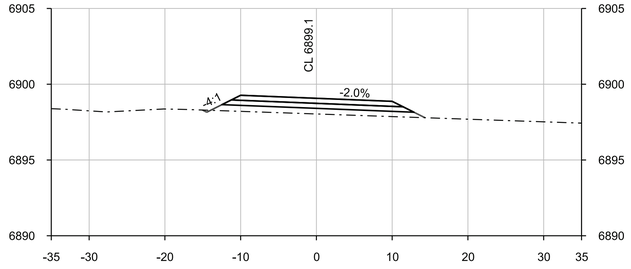

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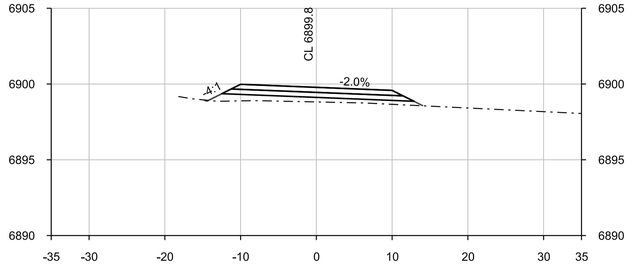

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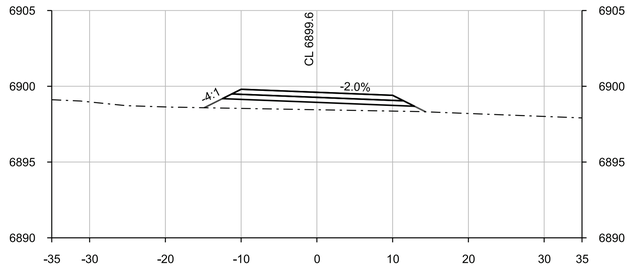

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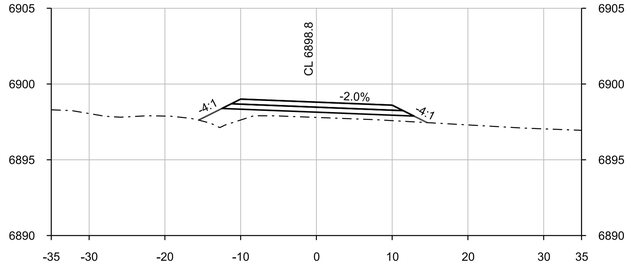

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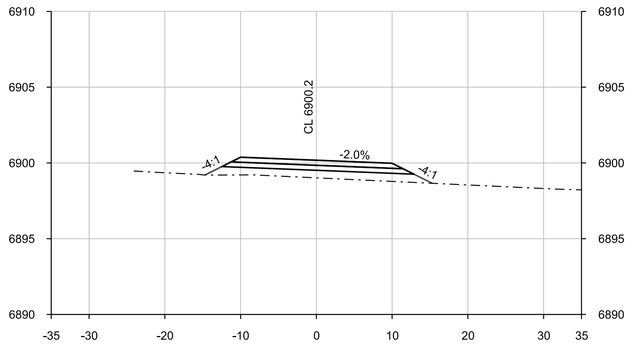


46+00

10 0 10 20 HORIZ.
5 0 5 10 VERT.
SCALE OF FEET

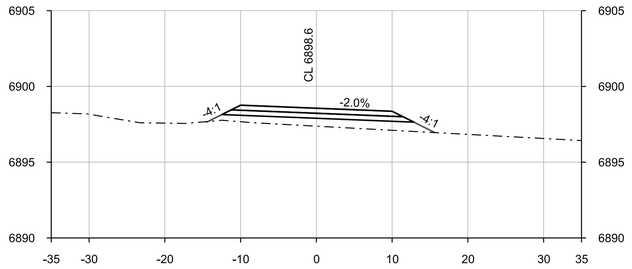
FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: D FARRAY CADD: D FARRAY TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C6009	TITLE OF SHEET ROADWAY ACCESS ROAD CROSS SECTIONS GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 36 OF 41

PLOT DATE: 9/8/2025 PLOT TIME: 10:07:44 AM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C6009_D3167666.dgn

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS



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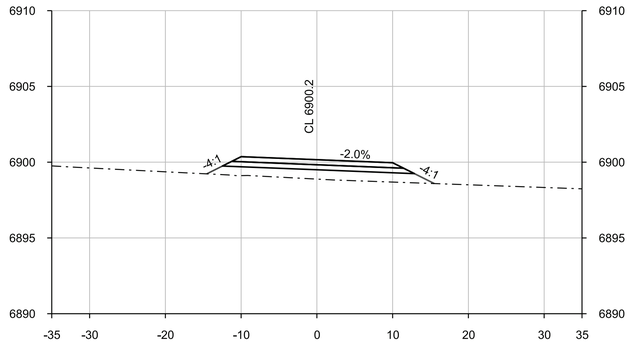

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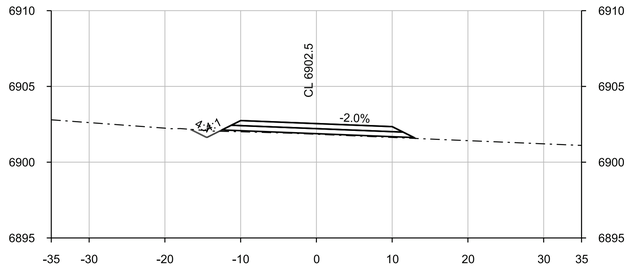

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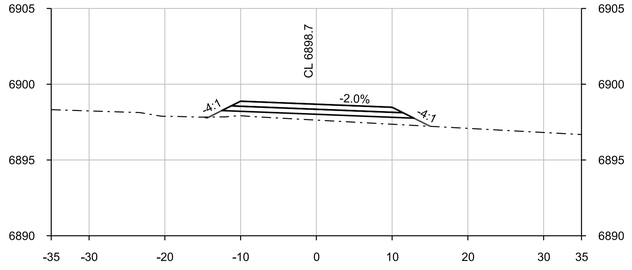

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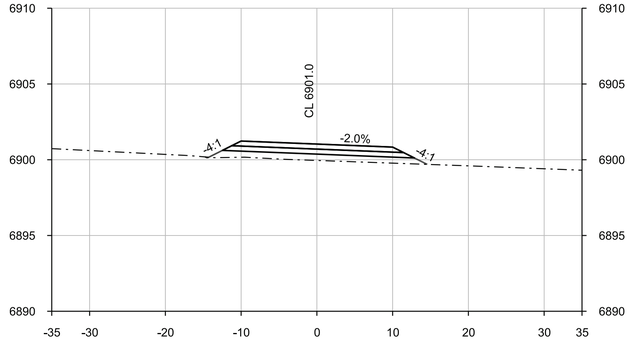

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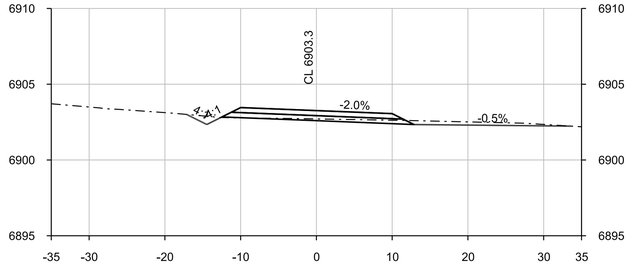

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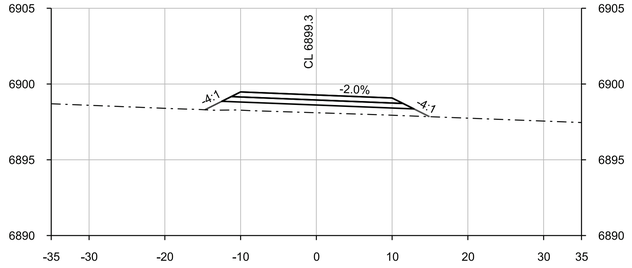

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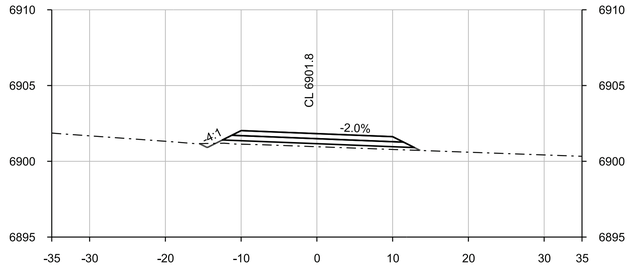

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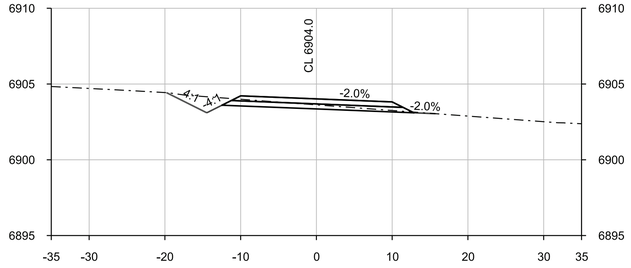


53+50

10 0 10 20 HORIZ.
5 0 5 10 VERT.
SCALE OF FEET

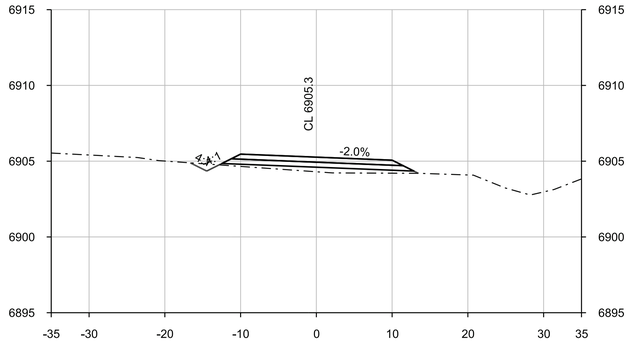
FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: D FARRAY CADD: D FARRAY TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C6010	TITLE OF SHEET ROADWAY ACCESS ROAD CROSS SECTIONS GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 37 OF 41

PLOT DATE: 9/8/2025 PLOT TIME: 10:07:09 AM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C6010_D3167666.dgn

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS



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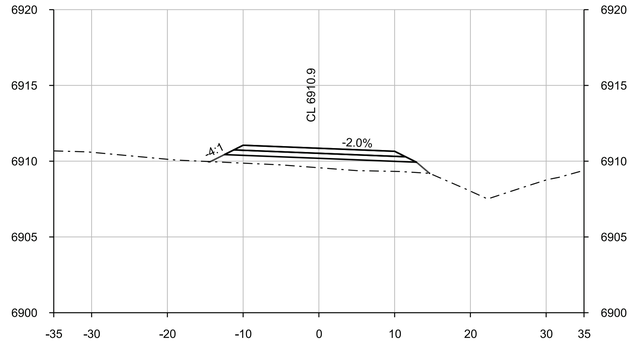

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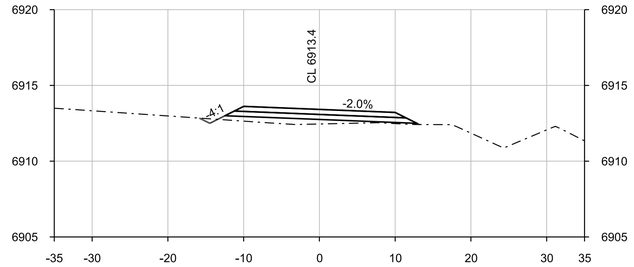

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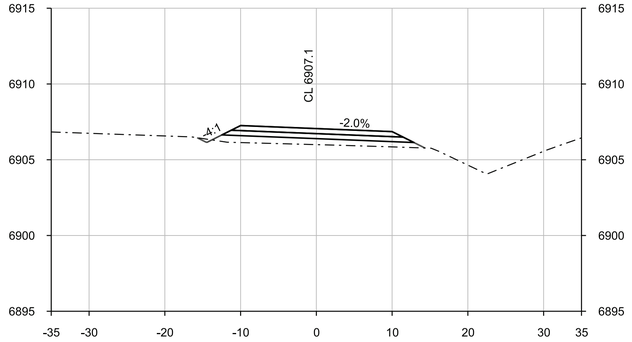

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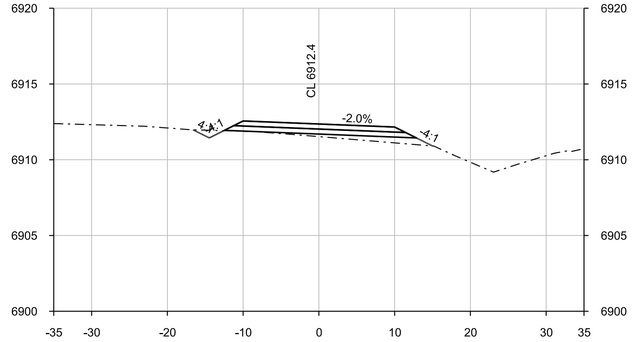

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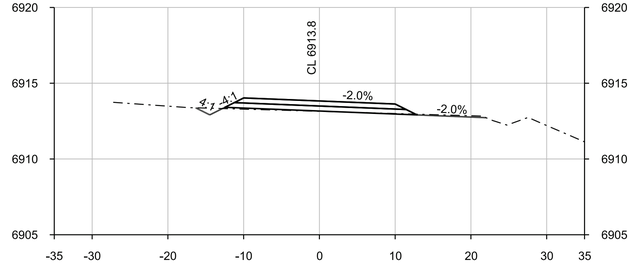

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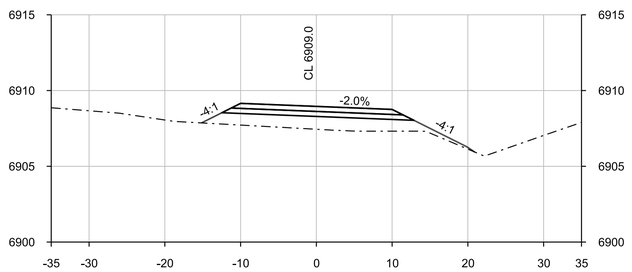

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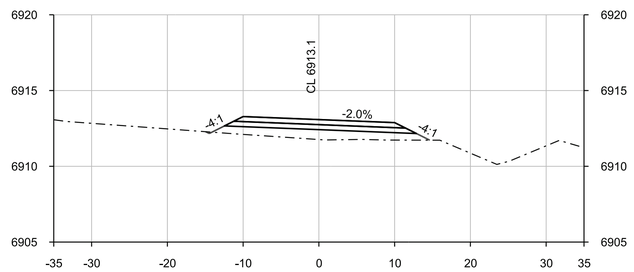
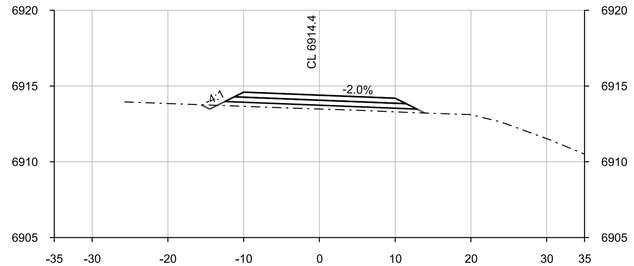


56+50



58+00

10 0 10 20 HORIZ.
5 0 5 10 VERT.
SCALE OF FEET

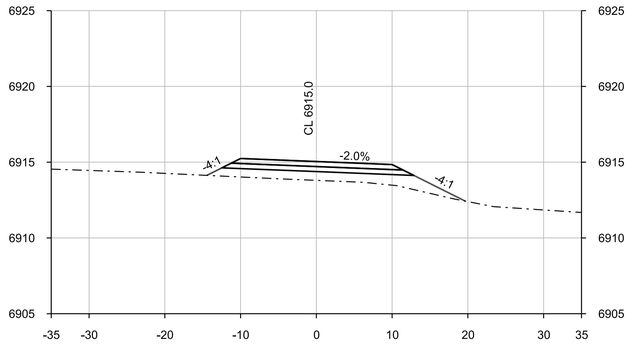
FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: D FARRAY CADD: D FARRAY TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C6011	TITLE OF SHEET ROADWAY ACCESS ROAD CROSS SECTIONS GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 38 OF 41

PLOT DATE: 9/8/2025 PLOT TIME: 10:07:07 AM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C6011_D3167666.dgn

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS



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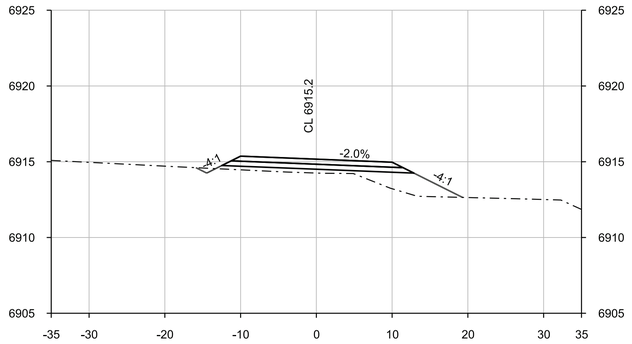

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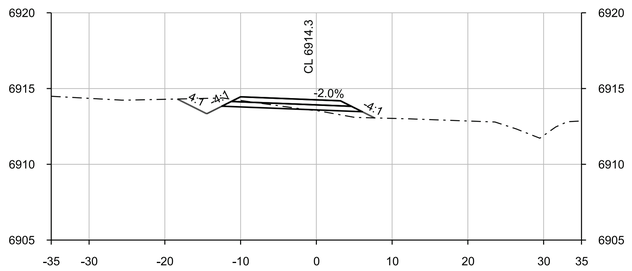


59+50

10 0 10 20 HORIZ.
5 0 5 10 VERT.
SCALE OF FEET

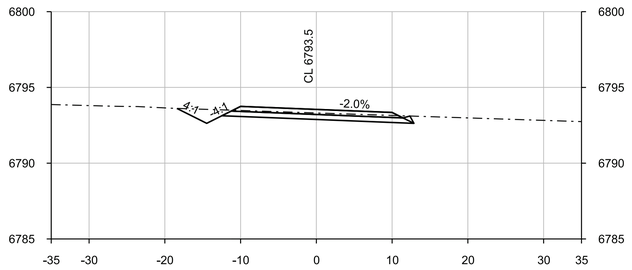
FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: D FARRAY CADD: D FARRAY TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C6012	TITLE OF SHEET ROADWAY ACCESS ROAD CROSS SECTIONS GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 39 OF 41

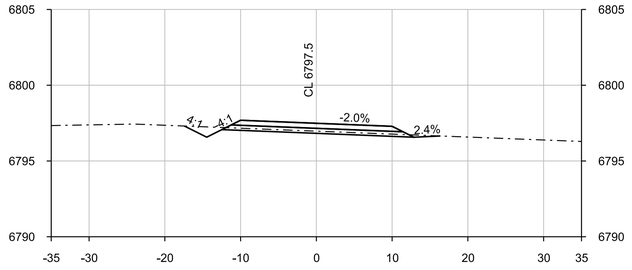
PLOT DATE: 9/8/2025 PLOT TIME: 10:07:26 AM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C6012_D3167666.dgn

GRCA-257282

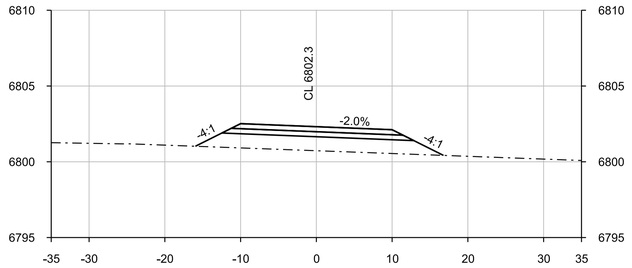
100% COMPLETE CONSTRUCTION DOCUMENTS



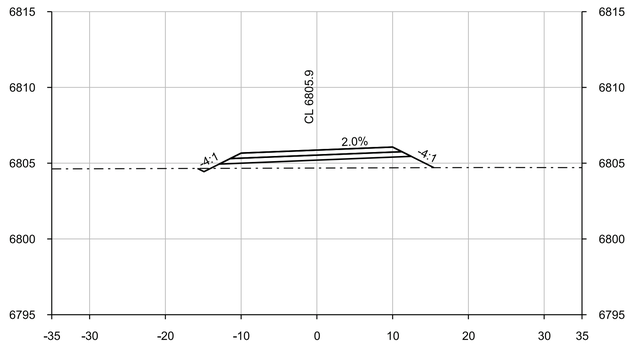
102+00



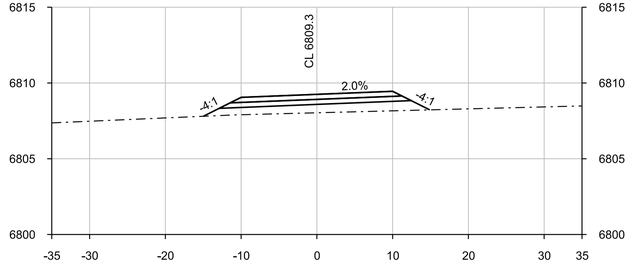
102+50



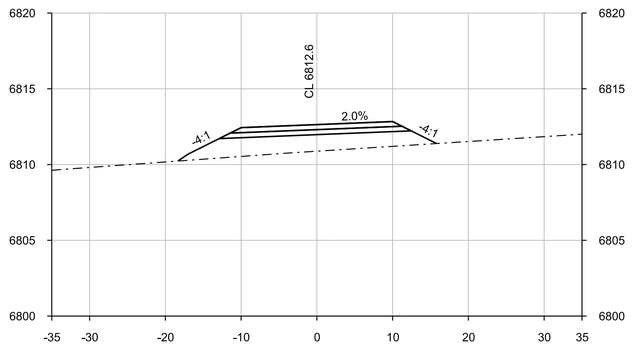
103+00



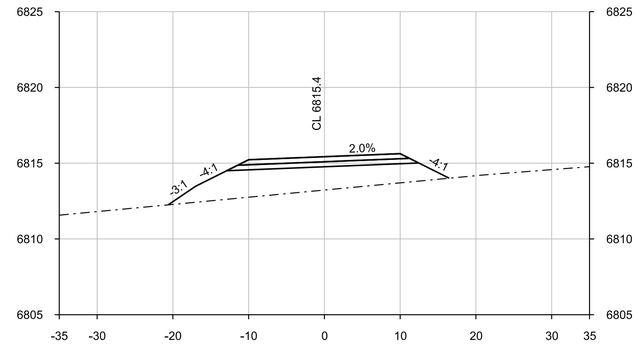
103+50



104+00



104+50



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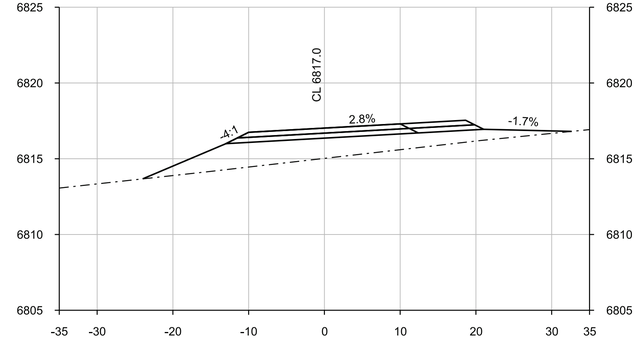

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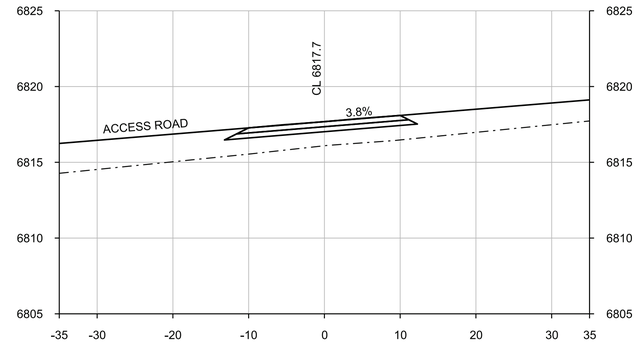


105+83

10 0 10 20 HORIZ.
5 0 5 10 VERT.
SCALE OF FEET

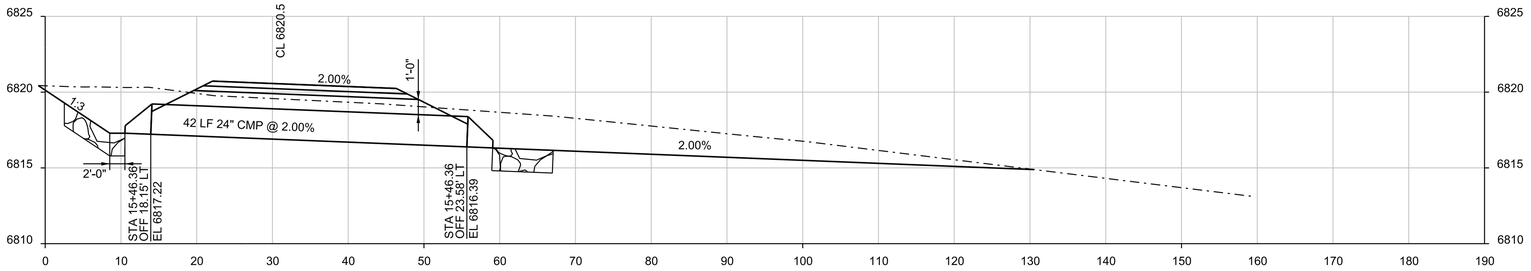
FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: D FARRAY CADD: D FARRAY TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C6013	TITLE OF SHEET ROADWAY CONNECTOR ROAD CROSS SECTIONS GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 40 OF 41

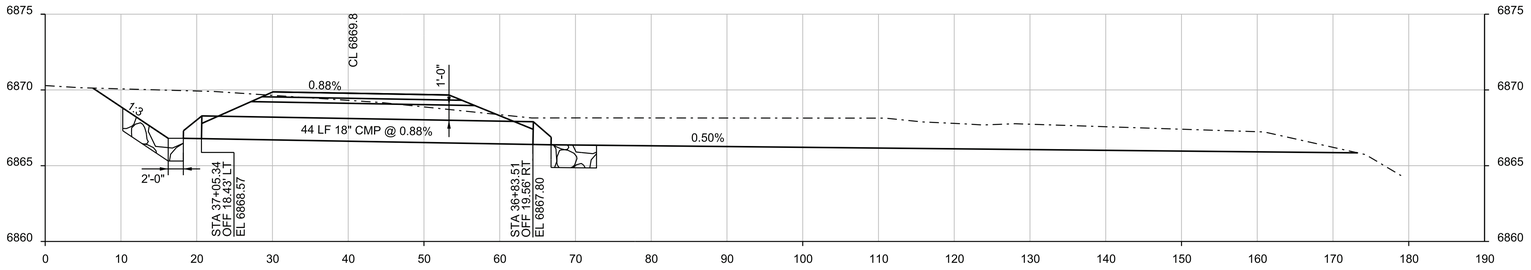
PLOT DATE: 9/8/2025 PLOT TIME: 10:07:36 AM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\ROAD\05C6013_D3167666.dgn

GRCA-257282

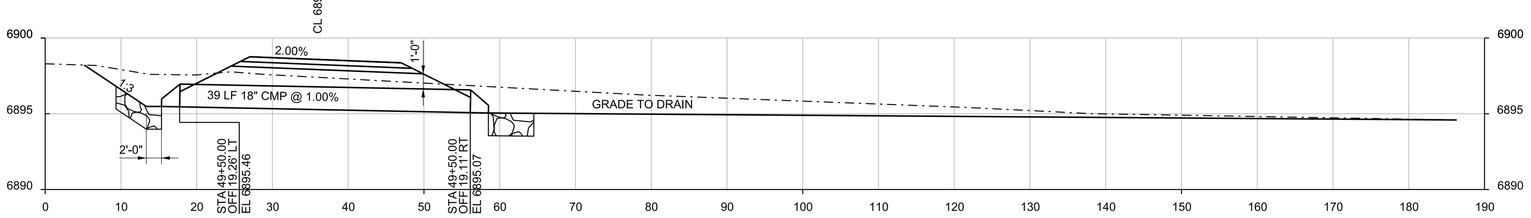
100% COMPLETE CONSTRUCTION DOCUMENTS



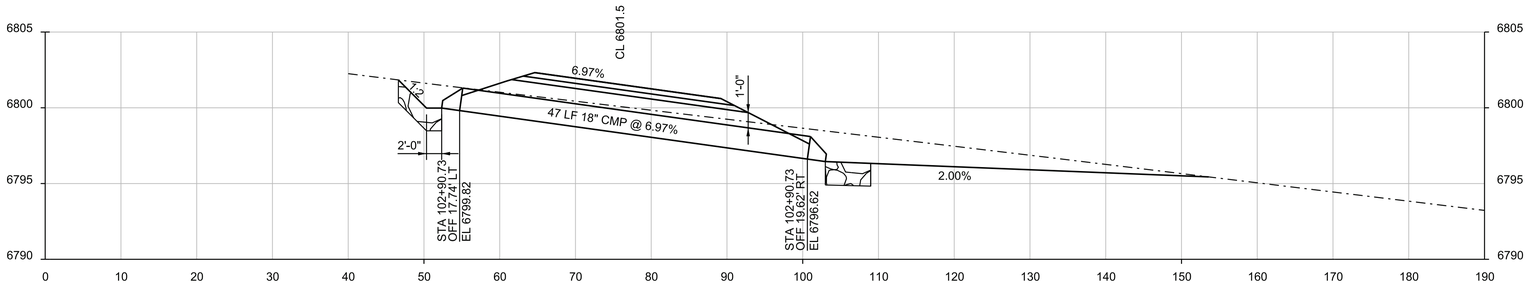
STA 15+46.36 ACCESS ROAD



STA 36+95.50 ACCESS ROAD



STA 49+50.00 ACCESS ROAD



STA 102+90.73 CONNECTOR ROAD

10 0 10 20 HORIZ.
5 0 5 10 VERT.
SCALE OF FEET

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: D FARRAY CADD: D FARRAY TECH. REVIEW: J MILLS DATE: 08/2025	SUB SHEET NO. 05C6014	TITLE OF SHEET ROADWAY CULVERT CROSS SECTIONS GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 41 OF 41

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100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 9/8/2025 PLOT TIME: 10:07:10 AM SS6\V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i D