

**CITY OF RAWLINS
RAWLINS, WYOMING**

**CONSTRUCTION OF SAGE CREEK
TRANSMISSION PIPELINE**

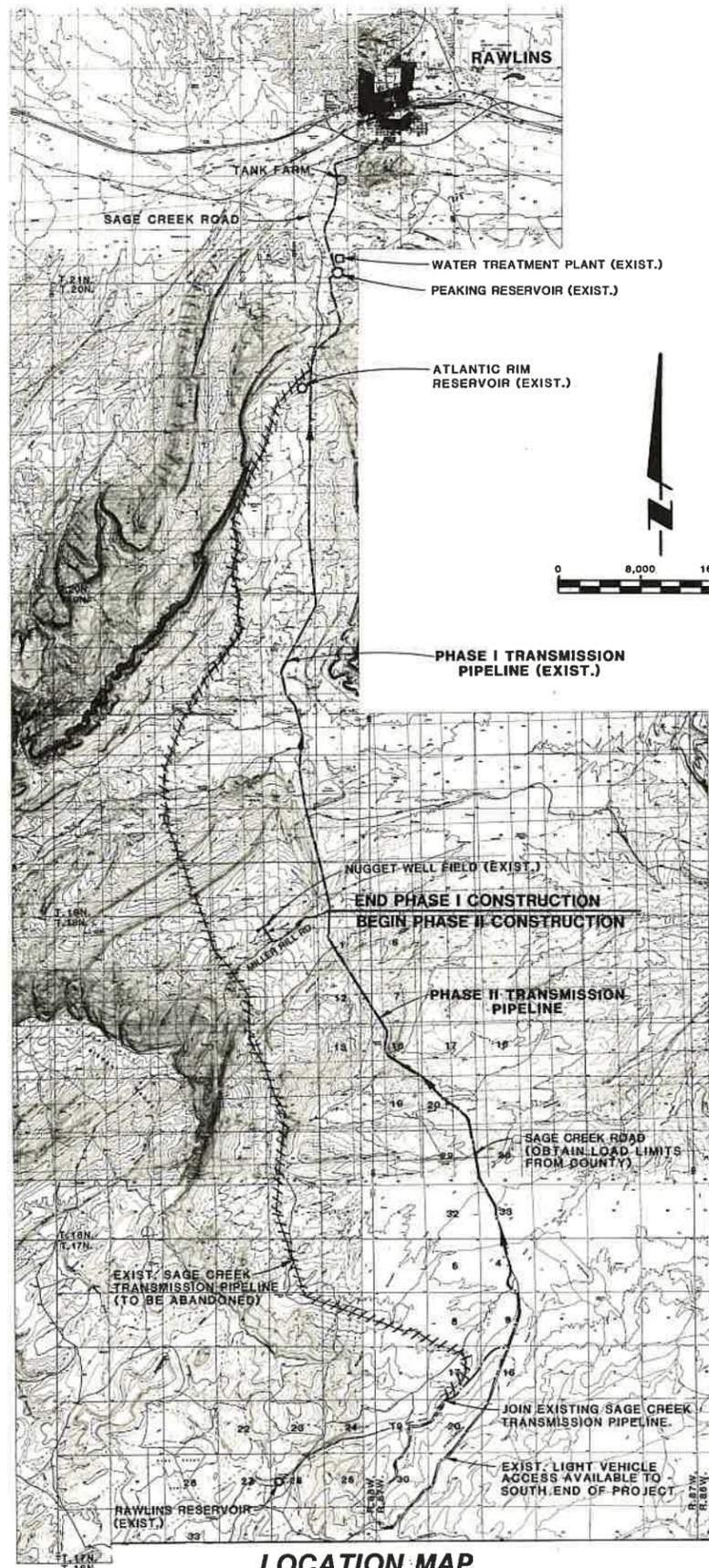
PHASE II

DRAWINGS

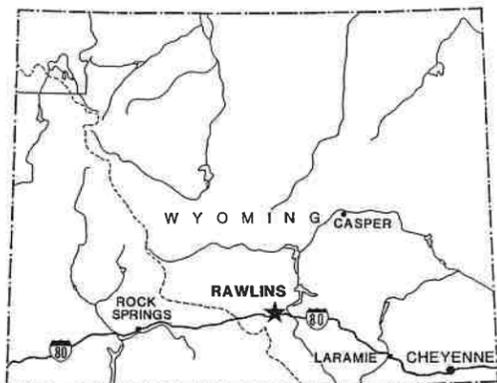
1987

JAMES M. MONTGOMERY, CONSULTING ENGINEERS, INC.

LARAMIE, WYOMING



LOCATION MAP



VICINITY MAP

LIST OF DRAWINGS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LOCATION MAP, VICINITY MAP, LIST OF DRAWINGS, SYMBOLS, ABBREVIATIONS AND GENERAL NOTES
3	HYDRAULIC PROFILE
4	PIPELINE - PLAN AND PROFILE - STA 553+00 TO STA 580+00
5	PIPELINE - PLAN AND PROFILE - STA 580+00 TO STA 606+00
6	PIPELINE - PLAN AND PROFILE - STA 606+00 TO STA 634+00
7	PIPELINE - PLAN AND PROFILE - STA 634+00 TO STA 661+00
8	PIPELINE - PLAN AND PROFILE - STA 661+00 TO STA 688+00
9	PIPELINE - PLAN AND PROFILE - STA 688+00 TO STA 712+00
10	PIPELINE - PLAN AND PROFILE - STA 712+00 TO STA 739+00
11	PIPELINE - PLAN AND PROFILE - STA 739+00 TO STA 766+00
12	PIPELINE - PLAN AND PROFILE - STA 766+00 TO STA 794+00
13	PIPELINE - PLAN AND PROFILE - STA 794+00 TO STA 817+00
14	PIPELINE - PLAN AND PROFILE - STA 817+00 TO STA 844+00
15	PIPELINE - PLAN AND PROFILE - STA 844+00 TO STA 871+00
16	PIPELINE - PLAN AND PROFILE - STA 871+00 TO STA 897+00
17	PIPELINE - PLAN AND PROFILE - STA 897+00 TO STA 925+00
18	PIPELINE - PLAN AND PROFILE - STA 925+00 TO STA 953+00
19	PIPELINE - PLAN AND PROFILE - STA 953+00 TO STA 965+00
20	PIPELINE - PLAN AND PROFILE - STA 965+00 TO STA 990+00
21	PIPELINE - PLAN AND PROFILE - STA 990+00 TO STA 1016+00
22	PIPELINE - PLAN AND PROFILE - STA 1016+00 TO STA 1043+00
23	PIPELINE - PLAN AND PROFILE - STA 1043+00 TO STA 1063+00
24	PIPELINE - PLAN AND PROFILE - STA 1063+00 TO STA 1090+00
25	PIPELINE - PLAN AND PROFILE - STA 1090+00 TO STA 1116+00
26	PIPELINE - PLAN AND PROFILE - STA 1116+00 TO STA 1143+00±
27	PIPELINE DETAILS - I
28	PIPELINE AND MECHANICAL DETAILS
29	PIPELINE DETAILS - II
30	PIPELINE DETAILS - III
31	CATHODIC PROTECTION DETAILS

WARNING
THIS DRAWING
APPROXIMATELY ONE-HALF
ORIGINAL SCALE

I CERTIFY THAT THESE PLANS AND SPECIFICATIONS WERE PREPARED UNDER MY DIRECT CONTROL AND SUPERVISION.

Robert G. Jossis
ROBERT G. JOSSIS
WYOMING P.E. NO. 4066

SYMBOLS

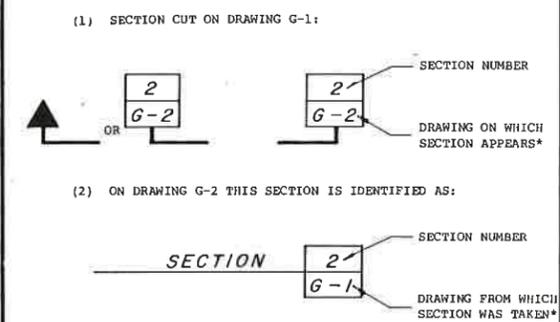
- II — ACCESS MANHOLE
- ⊙ AIR VACUUM / AIR RELEASE VALVE (PLAN)
- ⊙ — AIR VACUUM / AIR RELEASE VALVE (PROFILE)
- ∠ ANGLE
- ⊙ BLOWOFF (PLAN)
- ⊙ — BLOWOFF (PROFILE)
- ⊕ BUTTERFLY VALVE OR GATE VALVE
- ⊕ ELECTRICAL TEST STATION
- G — GAS (EXISTING)
- ≡≡≡≡ OVERHEAD POWER LINES (EXISTING)
- ==== PAVEMENT (EXISTING SHOWN SCREENED IN PLAN VIEW)
- S — SANITARY SEWER (EXISTING)
- SD — STORM DRAIN (EXISTING)
- T — TELEPHONE LINES OR CABLE (EXISTING)
- ⊕ VALVED OUTLET
- W — WATER MAIN (EXISTING)
- ⊕ BENCHMARK
- ⊕ DIAMETER
- ⊕ CENTERLINE
- ≤ LESS THAN OR EQUAL TO
- ⊕ PRESSURE RELIEF/SUSTAINING VALVE
- — — RIGHT-OF-WAY
- — — EASEMENT

ABBREVIATIONS

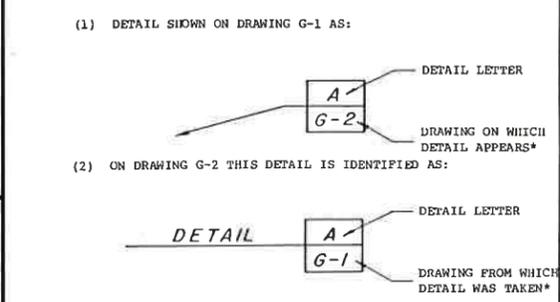
AC	ASBESTOS CEMENT	LB	POUND
AC	ASPHALTIC CONCRETE	LG	LENGTH
ACP	ASBESTOS CEMENT PIPE	LT	LEFT
AH	AHEAD	MAX	MAXIMUM
ALUM	ALUMINUM	MECH	MECHANICAL
APPROX	APPROXIMATELY	MFR	MANUFACTURER
AVAR	AIR VACUUM & AIR RELEASE VALVE	MH	MANHOLE
AWWA	AMERICAN WATERWORKS ASSOC.	MIN	MINIMUM
		M I	MALLEABLE IRON
BK	BACK	NOM	NOMINAL
B F	BUTTERFLY	N	NORTH
B/O	BLOWOFF	NIC	NOT IN CONTRACT
CI	CAST IRON	NO	NUMBER
CLR	CLEARANCE	NPT	NATIONAL PIPE THREAD
CMP	CORRUGATED METAL PIPE	NTS	NOT TO SCALE
CO	COUNTY	OC	ON CENTER
CONC	CONCRETE	OD	OUTSIDE DIAMETER
CONST	CONSTRUCT, CONSTRUCTION	OPNG	OPENING
CONT	CONTINUOUS, CONTINUATION	PSI	POUNDS PER SQUARE INCH
COR	CORNER	PC	POINT OF CURVATURE
CORP	CORPORATION	PE	POLYELECTROLYTE, PLANT EFFLUENT
CPLG	COUPLING	PL	PLATE
DET	DETAIL	PT	POINT
DIA OR	DIAMETER	PT	POINT OF TANGENCY
DIAM	DIAMETER	PVC	POLYVINYL CHLORIDE
DRWG OR	DRAWING		
DWG	DRAWING		
E	EAST	RD	ROAD
E F	EACH FACE	REINF	REINFORCEMENT, REINFORCING
EA	EACH	REQD	REQUIRED
ELEC	ELECTROLYSIS	RT	RIGHT
EL OR	ELEVATION	R/W	RIGHT-OF-WAY
ELEV	ELEVATION	S	SOUTH
EQUIP	EQUIPMENT	SCH	SCHEDULE
ESMT	EASEMENT	SHT	SHEET
EXIST	EXISTING	SPECS	SPECIFICATIONS
FT	FOOT, FEET	SQ	SQUARE
FIG	FIGURE	SS	STAINLESS STEEL
FIN	FINISHED	STA	STATION
FLEX	FLEXIBLE	STD	STANDARD
FLG	FLANGE	STN	STAINLESS
F S	FORGED STEEL	STL	STEEL
GA	GAUGE	THK	THICK
GALV	GALVANIZED	TRANS	TRANSMISSION
		TYP	TYPICAL
HORIZ	HORIZONTAL	VAC	VACUUM
HEX	HEXAGON	VERT	VERTICAL
HWY	HIGHWAY		
IN	INCH, INCHES	W/	WITH
IDENT	IDENTIFICATION	W	WEST
ID	INSIDE DIAMETER	WWM	WELDED WIRE MESH
INV	INVERT ELEVATION		

SECTION AND DETAIL IDENTIFICATION

SECTION IDENTIFICATION



DETAIL IDENTIFICATION



*NOTE: IF PLAN AND SECTION (OR DETAIL CALL-OUT AND DETAIL) ARE SHOWN ON SAME DRAWING, DRAWING NUMBER IS REPLACED BY A LINE.

GENERAL NOTES

- THE FOLLOWING ALTERNATIVE PIPELINE MATERIALS WILL BE CONSIDERED FOR THIS PROJECT (SEE SPECS):
 - MORTAR LINED AND TAPE COATED STEEL PIPE
 - MORTAR LINED AND COATED STEEL PIPE WITH COAL TAR EPOXY TOP COAT
 - MORTAR LINED AND TAPE COATED DUCTILE IRON PIPE
- ALL DRAINAGE DITCHES, WHETHER MAN-MADE OR NATURAL DRAINAGES, AND CUT/FILL SLOPES DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO EXISTING CONDITION. DITCHES SHALL BE RESTORED WITH FLAT BOTTOMS AND NOT "VEED".
- ELEVATIONS SHOWN ON PLAN AND PROFILE SHEETS ARE FROM AERIAL SURVEY AND SHALL BE CONSIDERED ACCURATE TO HALF OF THE CONTOUR INTERVAL SHOWN.
- TOP OF NEW PIPELINE SHALL BE 5'-0" BELOW EXISTING GRADE UNLESS SHOWN OTHERWISE ON THE DRAWINGS. WHERE GRADES OR ELEVATIONS ARE SHOWN ON THE DRAWINGS, THE PIPE SHALL BE LAID TO THE SET GRADE AND ELEVATION TO WITHIN APPROXIMATELY ONE INCH PLUS OR MINUS. WHERE NO GRADES ARE SHOWN ON THE DRAWINGS, THE PIPE SHALL BE LAID TO MAINTAIN A POSITIVE OR NEGATIVE SLOPE AS SHOWN WITH THE REQUIRED MINIMUM COVER AS SHOWN.
- SEE CATHODIC PROTECTION DRAWINGS, SHEET 31, FOR CORROSION PROTECTION REQUIREMENTS.
- SEE DETAIL A, SHEET 28 FOR PIPELINE AND APPURTENANCE MARKER POST REQUIREMENTS.
- PROPERTY OWNERSHIP'S ALONG PIPELINE:

T18N, R88W	T18N, R87W	T17N, R87W
Sec. 1 - J.B. Tuttle Sec. 12 - U.S. BLM	Sec. 7 - J.B. Tuttle Sec. 17 - J.B. Tuttle Sec. 18 - U.S. BLM Sec. 19 - J.B. Tuttle Sec. 20 - U.S. BLM Sec. 28 - U.S. BLM Sec. 29 - J.B. Tuttle Sec. 33 - J.B. Tuttle and U.S. BLM	Sec. 4 - U.S. BLM Sec. 9 - U.S. BLM Sec. 16 - State of WY Sec. 17 - U.S. BLM Sec. 20 - U.S. BLM and Curtis Rochelle
- WORK FROM STATION 1090+00 TO 1142+93 SHALL NOT BEGIN PRIOR TO JULY 15, 1988. SEE SPEC. SECTION 01010-1.05 C.

FILE NO. 12-45-0170

REV	DATE	BY	DESCRIPTION

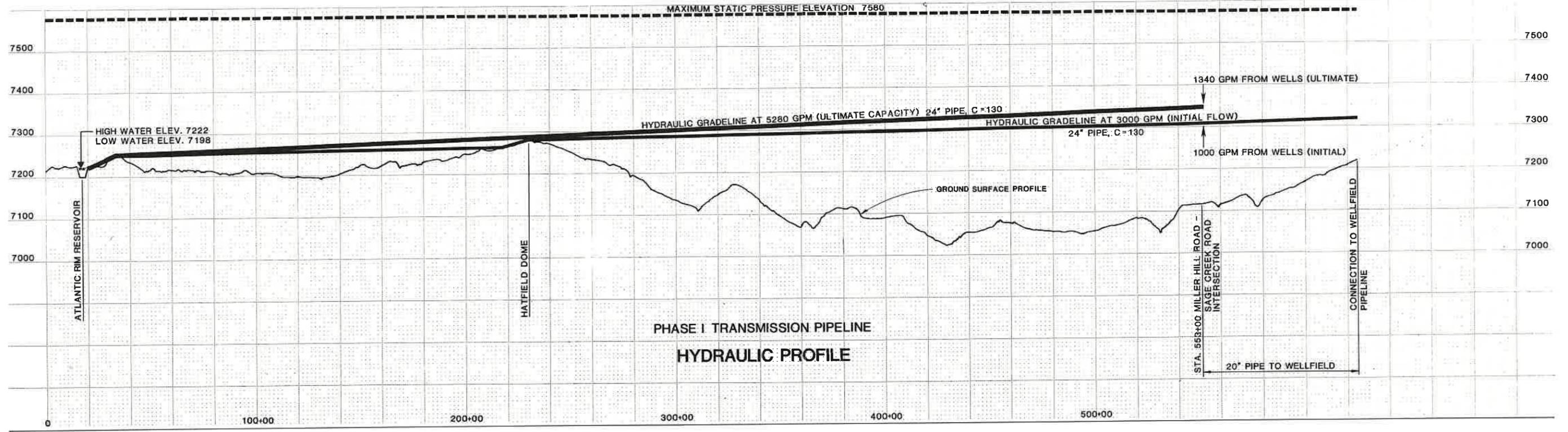
SCALE:	DESIGNED	SUBMITTED	DATE
AS SHOWN	D. Suikonen	Dennis Suikonen	10/16/87
		PROJECT ENGINEER	R.C.E. NO.
			DATE
		RECOMMENDED	
		ROBERT G. JOSSIS	4066
		CHECKED	10/16/87
			R.C.E. NO.
			DATE

JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.
161 Mallard Drive, Boise, ID 83706-3974

APPROVED
Jerry D. Miller
DATE 10-19-87

CITY OF RAWLINS, WYOMING
SAGE CREEK TRANSMISSION PIPELINE - PHASE II
LOCATION MAP, VICINITY MAP, LIST OF DRAWINGS, SYMBOLS, ABBREVIATIONS AND GENERAL NOTES

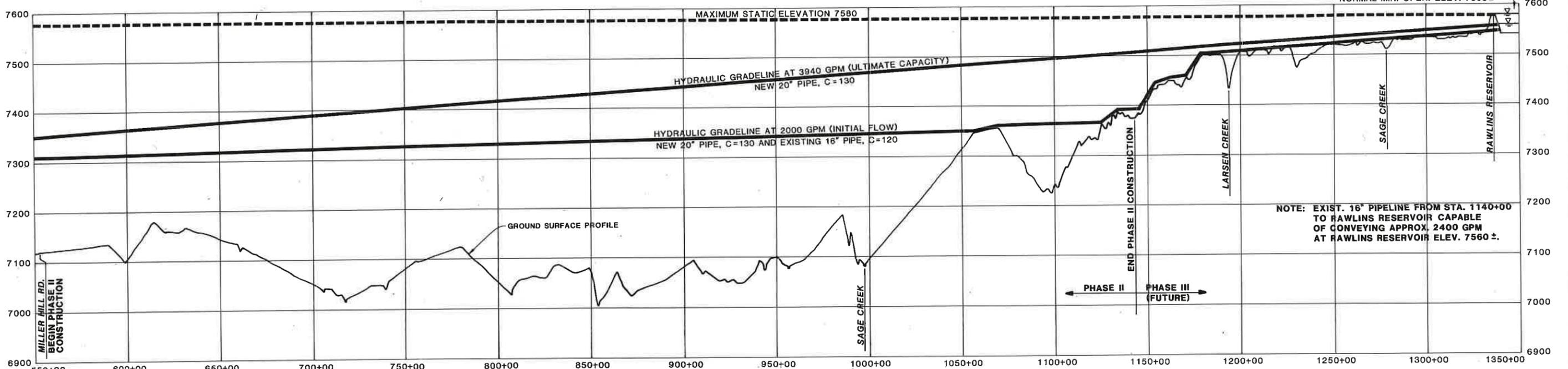
SHEET
2
OF 31 SHEETS



WARNING

THIS DRAWING
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ORIGINAL SCALE

MAX. OPER. ELEV. 7580±
NORMAL MIN. OPER. ELEV. 7560±

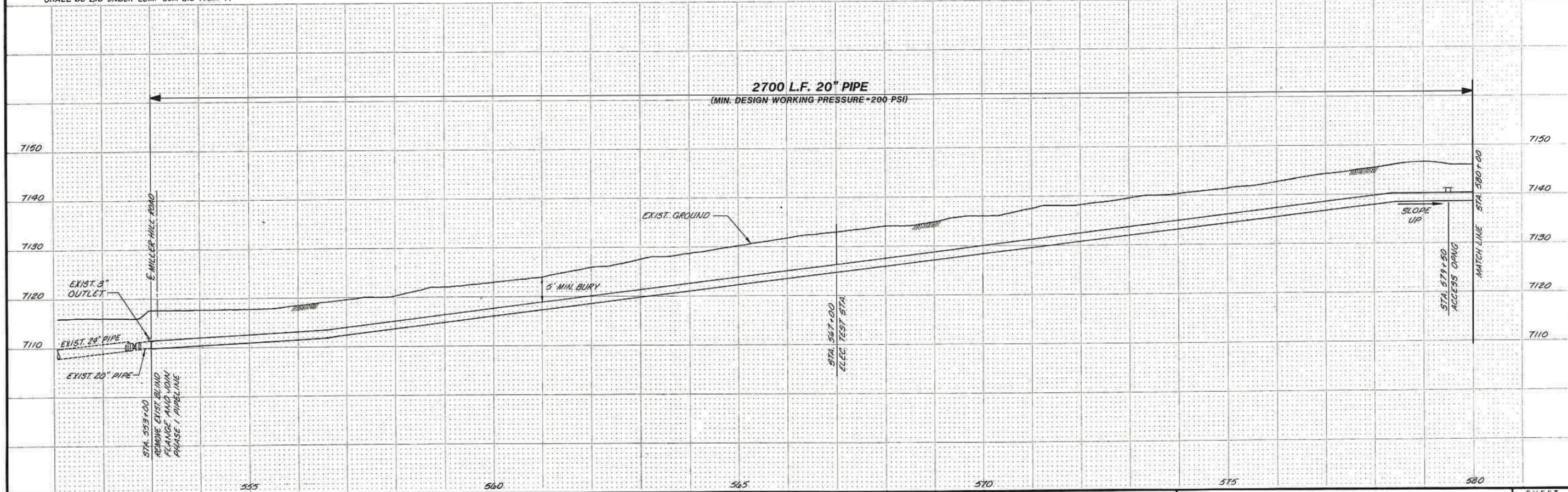
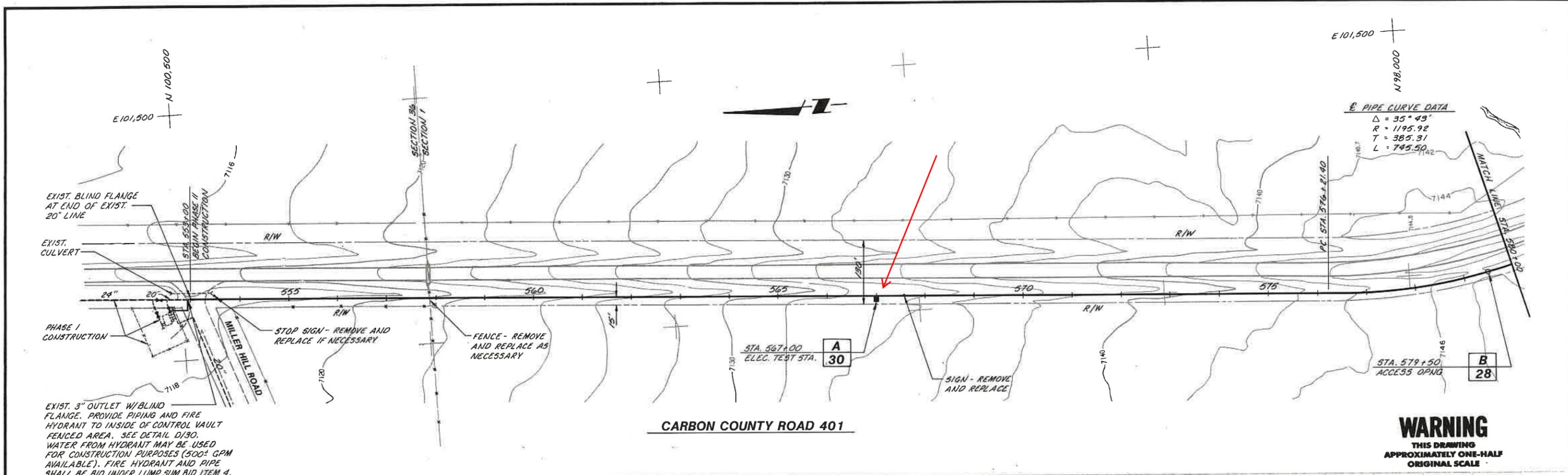


PHASE II AND III TRANSMISSION PIPELINES
HYDRAULIC PROFILE

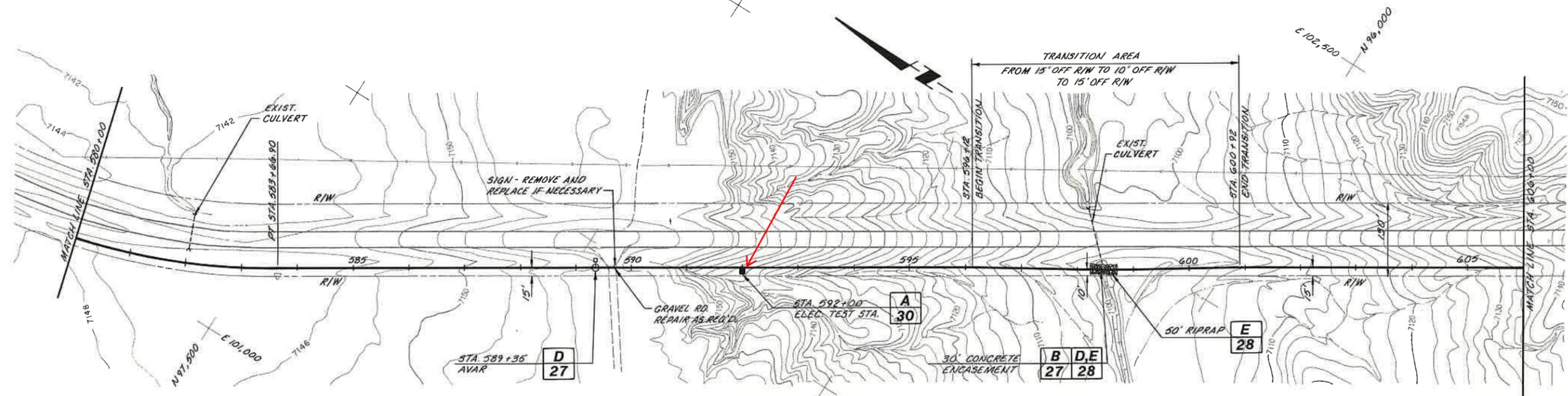
NOTE: EXIST. 16" PIPELINE FROM STA. 1140+00
TO RAWLINS RESERVOIR CAPABLE
OF CONVEYING APPROX. 2400 GPM
AT RAWLINS RESERVOIR ELEV. 7560 ±.

JOB NO. 1245.0110 FILE

SCALE: AS SHOWN		DESIGNED: <i>D. Suikkonen</i> DRAWN: <i>T. Hovad, P. Hovad</i> CHECKED: <i>R. J. Janssen</i>	SUBMITTED: <i>Bunnie Suikkonen</i> PROJECT ENGINEER RECOMMENDED: <i>Kathy J. Janssen</i> JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.	R.C.E. NO. 10/16/87 DATE R.C.E. NO. 406C DATE 10/16/87	APPROVED: <i>Jerry D. Miller</i> DATE 10-19-87 APPROVED: _____ DATE _____	CITY OF RAWLINS, WYOMING SAGE CREEK TRANSMISSION PIPELINE - PHASE II HYDRAULIC PROFILE	SHEET 3 OF 31 SHEETS
REV	DATE	BY	DESCRIPTION				

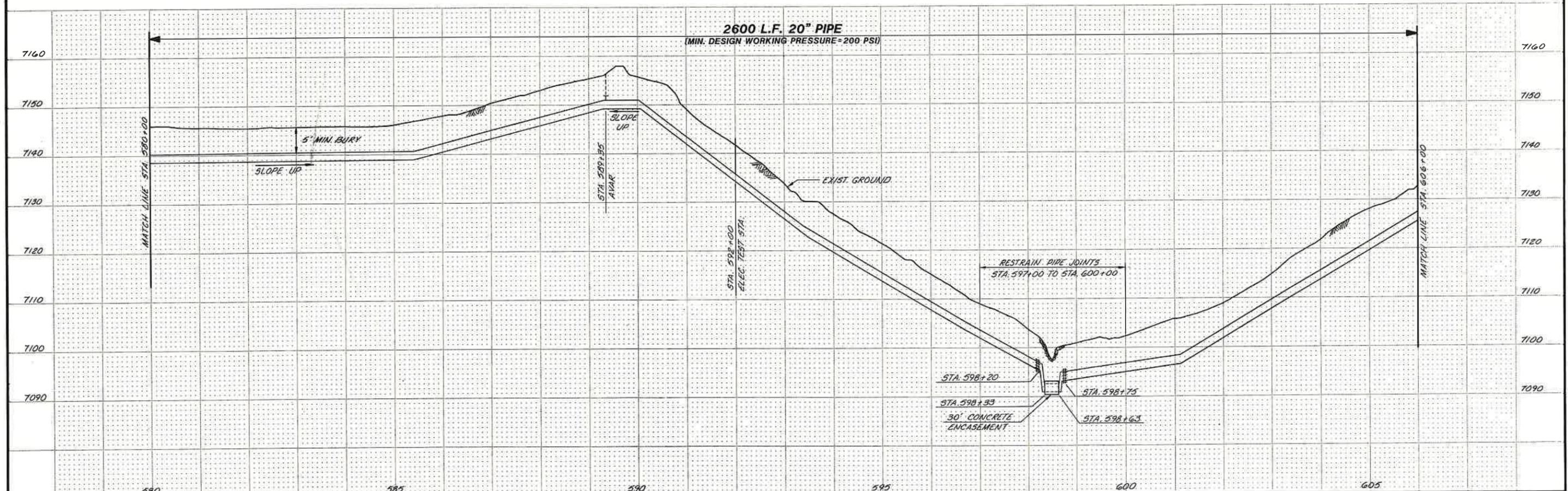


SCALE: HORZ: 1" = 100' VERT: 1" = 10'		DESIGNED <i>D. Suittkonen</i> DRAWN <i>D. Suittkonen</i> CHECKED <i>R. Jensen</i>	SUBMITTED <i>Dennis Suittkonen</i> PROJECT ENGINEER RECOMMENDER <i>Kyle J. Jensen</i> JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.	10/16/87 R.C.E. NO. DATE 4066 R.C.E. NO. DATE	JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC. 161 Mallard Drive, Boise, ID 83706-3974	APPROVED <i>Gregory D. Miller</i> 10-19-87 DATE APPROVED _____ DATE _____	CITY OF RAWLINS, WYOMING SAGE CREEK TRANSMISSION PIPELINE - PHASE II PIPELINE - PLAN AND PROFILE STA. 553+00 TO STA. 580+00	SHEET 4 OF 31 SHEETS
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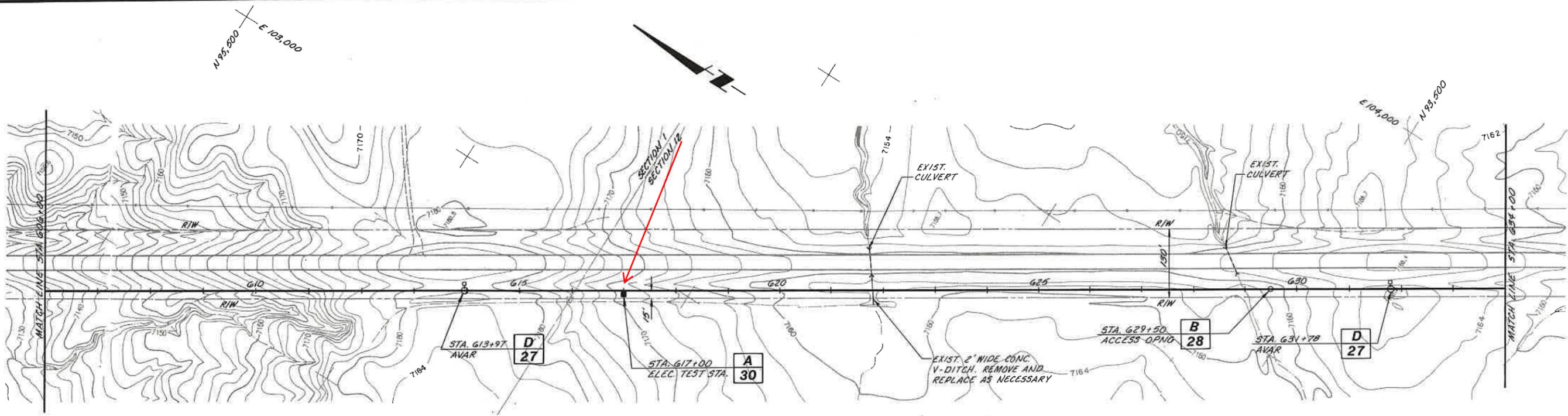


CARBON COUNTY ROAD 401

WARNING
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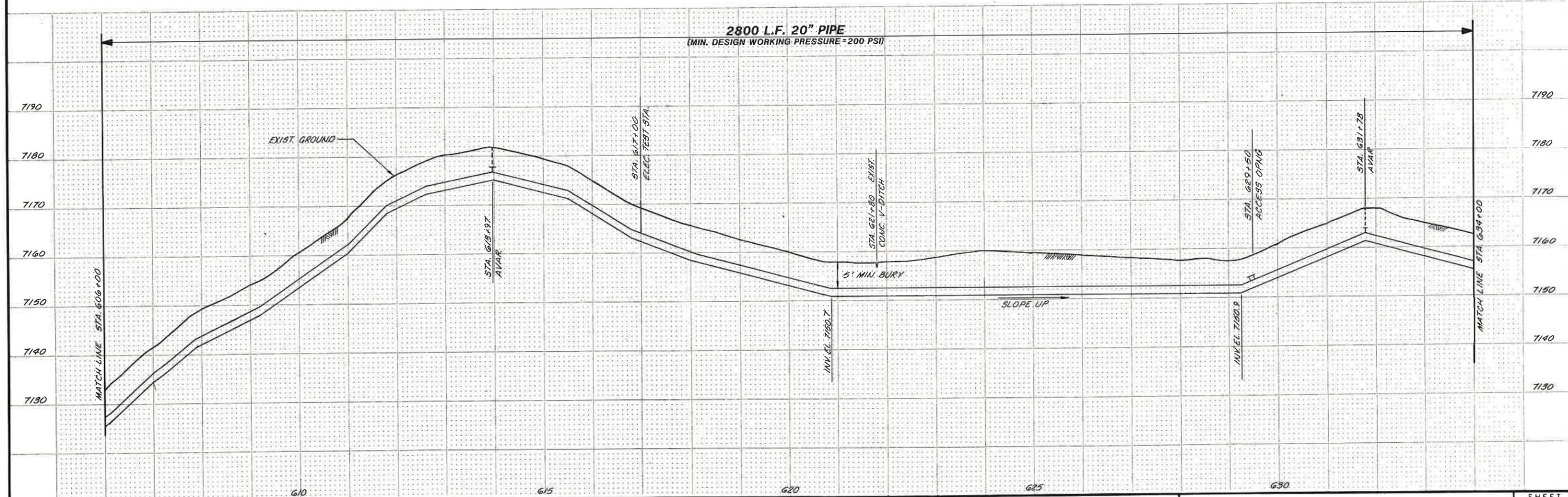


SCALE: HORZ: 1" = 100' VERT: 1" = 10'		DESIGNED <i>D. Suikonen</i> DRAWN <i>D. Suikonen</i> CHECKED <i>R. Morris</i>	SUBMITTED <i>Dennis Suikonen</i> PROJECT ENGINEER RECOMMENDED <i>Robert A. Morris</i> JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.	10/16/87 R.C.E. NO. DATE 4066 10/16/87 R.C.E. NO. DATE	JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC. 161 Mallard Drive, Boise, ID 83706-3974	APPROVED <i>Gerry D. Miller</i> 10-19-87 DATE APPROVED _____ DATE _____	CITY OF RAWLINS, WYOMING SAGE CREEK TRANSMISSION PIPELINE - PHASE II PIPELINE - PLAN AND PROFILE STA. 580+00 TO STA. 606+00	SHEET 5 OF 31 SHEETS
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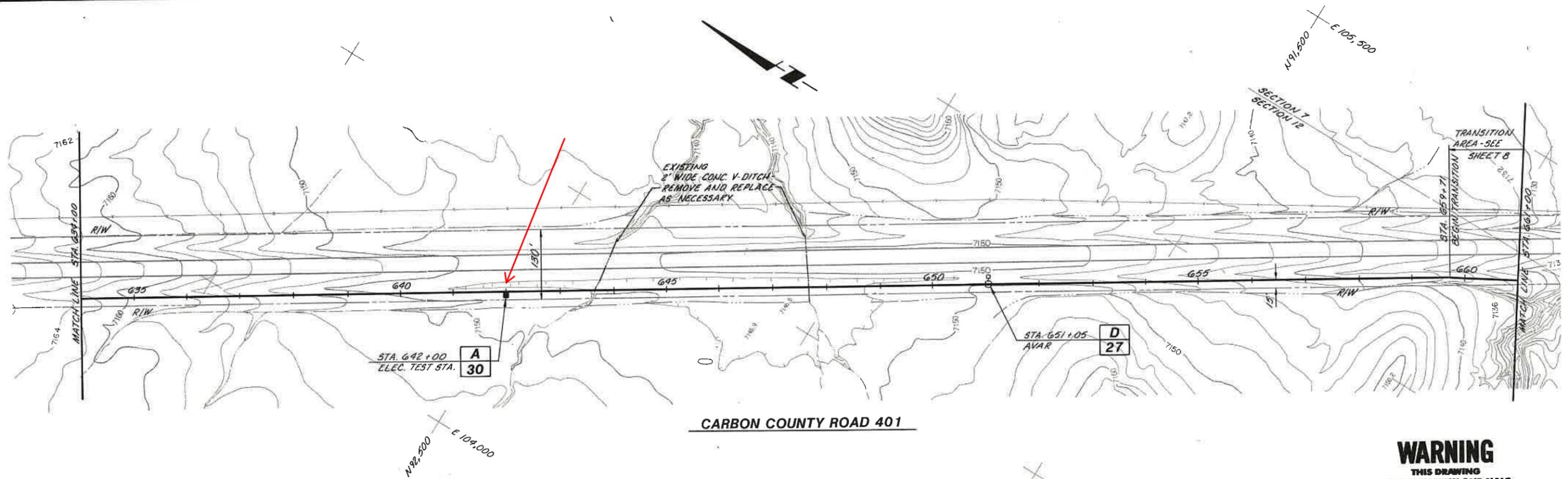
CARBON COUNTY ROAD 401

WARNING
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ORIGINAL SCALE

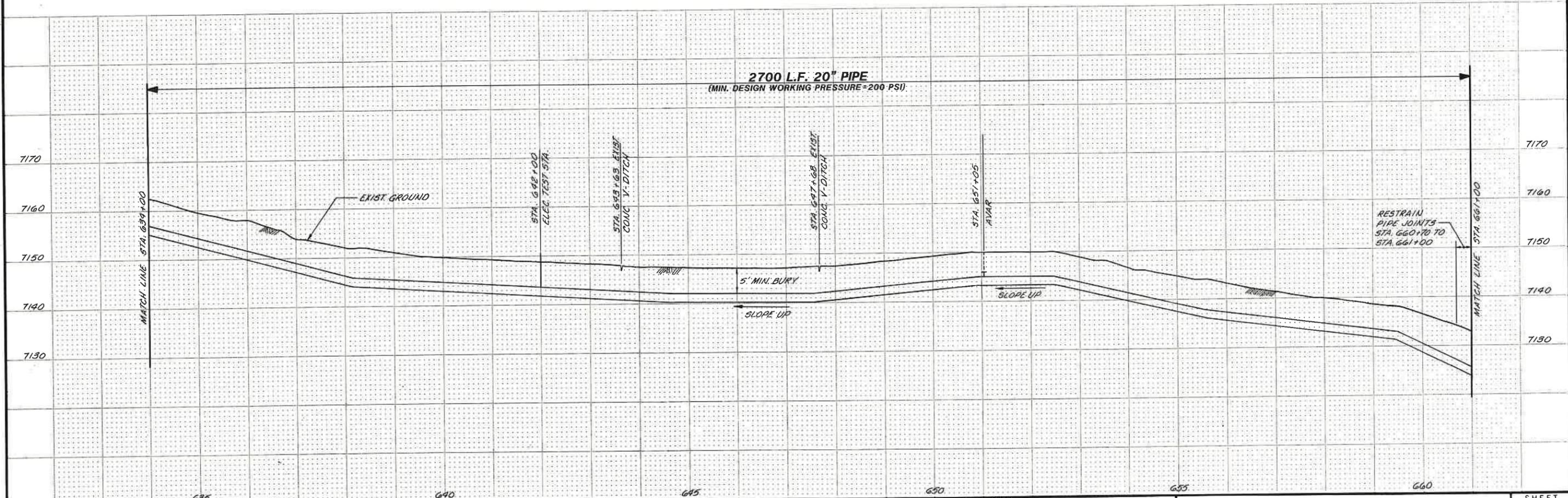


SCALE: HORZ: 1" = 100' VERT: 1" = 10'		DESIGNED <i>D. Suikonen</i> DRAWN <i>J. Hays</i> CHECKED <i>R. Jones</i>	SUBMITTED <i>Dennis Suikonen</i> PROJECT ENGINEER RECOMMENDED <i>Rachel Jones</i> JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.	10/16/87 R.C.E. NO. 4066 DATE 10/16/87	APPROVED _____ DATE _____ APPROVED _____ DATE _____	CITY OF RAWLINS, WYOMING SAGE CREEK TRANSMISSION PIPELINE - PHASE II PIPELINE - PLAN AND PROFILE STA. 606+00 TO STA. 634+00	SHEET 6 OF 31 SHEETS
REV	DATE	BY	DESCRIPTION				

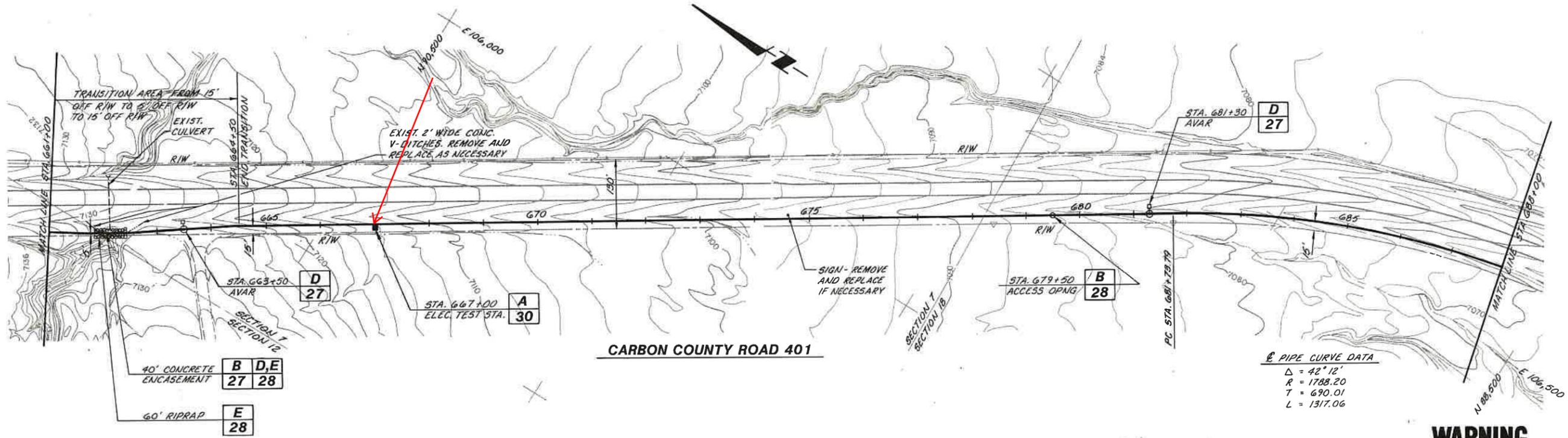
**JAMES M. MONTGOMERY
CONSULTING ENGINEERS, INC.**
161 Mallard Drive, Boise, ID 83706-3974



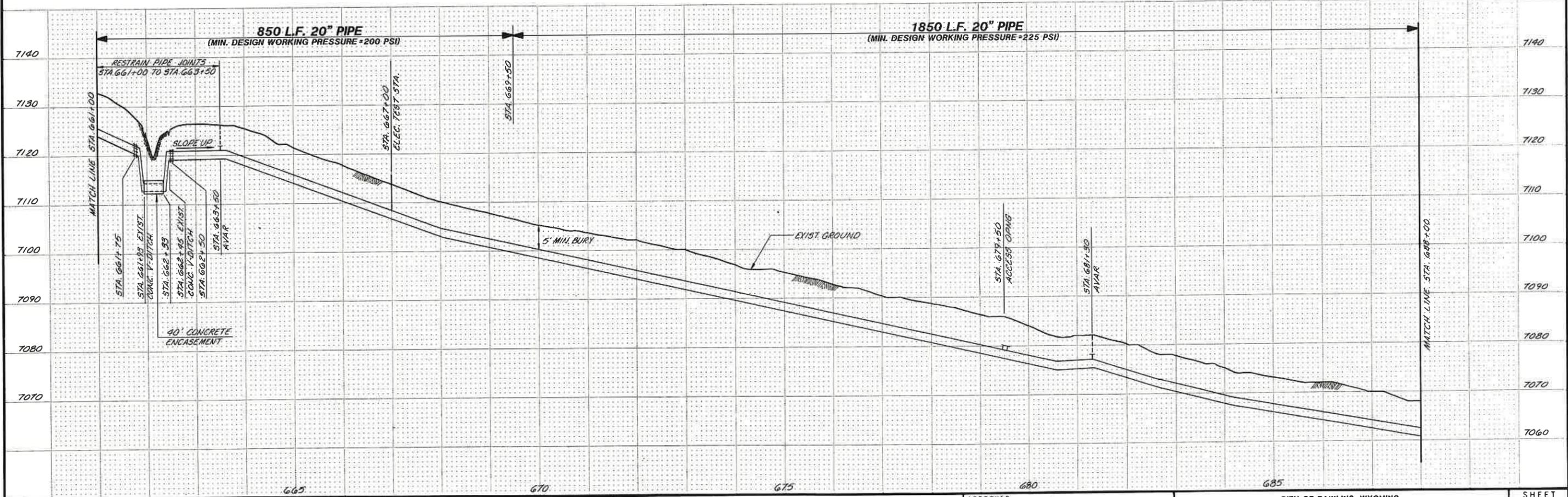
WARNING
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ORIGINAL SCALE



SCALE: HORZ: 1" = 100' VERT: 1" = 10'		DESIGNED: <i>D. Suikonen</i> DRAWN: <i>[Signature]</i> CHECKED: <i>[Signature]</i>	SUBMITTED: <i>Bernie Suikonen</i> PROJECT ENGINEER DATE: 10/16/87	RECOMMENDED: <i>[Signature]</i> DATE: 10/16/87	JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC. 161 Mallard Drive, Boise, ID 83706-3974	APPROVED: <i>[Signature]</i> 10-19-87 DATE: 10-19-87	CITY OF RAWLINS, WYOMING SAGE CREEK TRANSMISSION PIPELINE - PHASE II PIPELINE - PLAN AND PROFILE STA. 634+00 TO STA. 661+00	SHEET 7 OF 31 SHEETS
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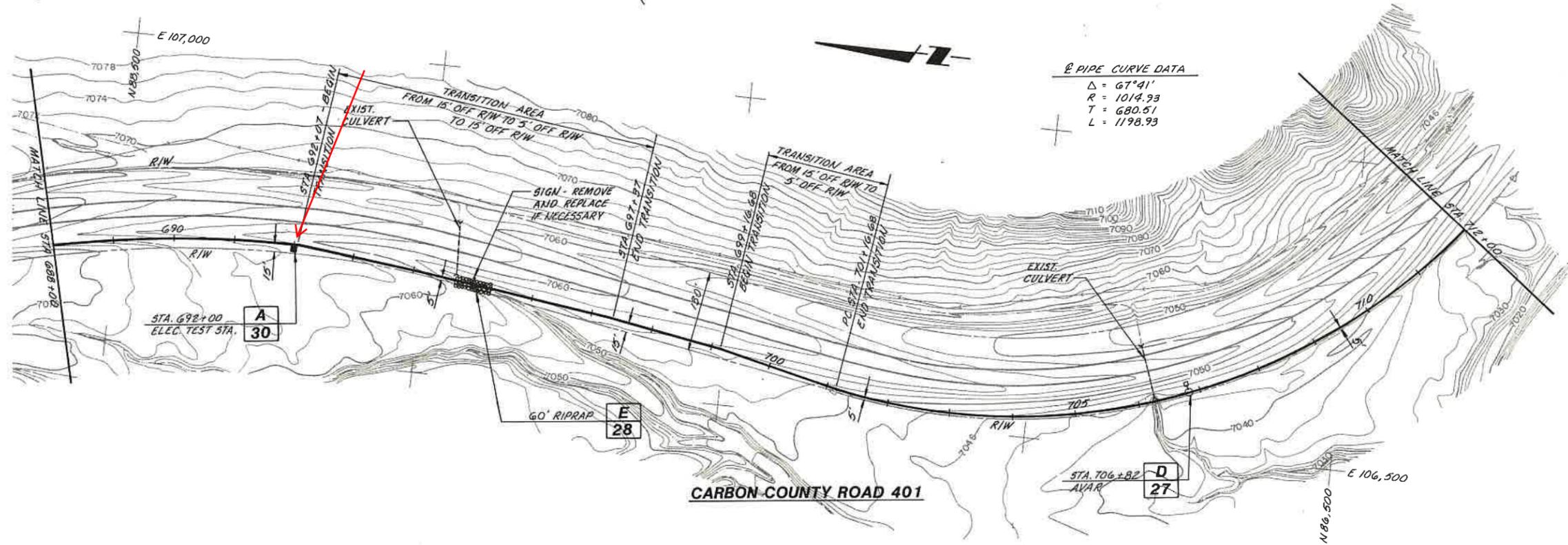


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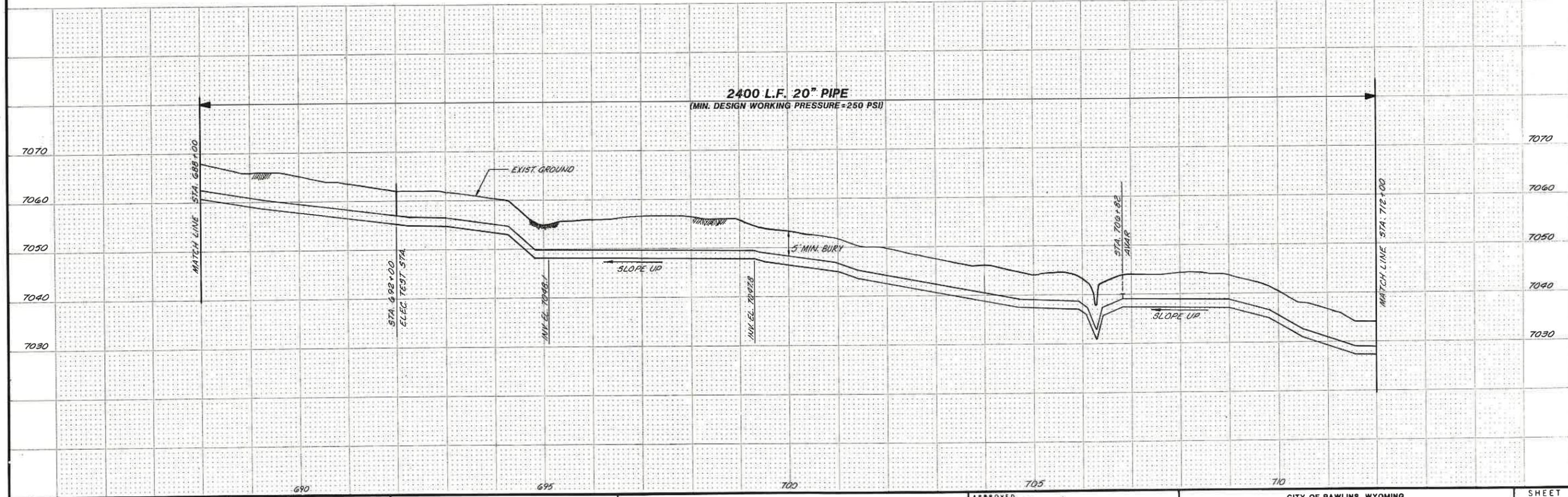
SCALE: HORZ: 1" = 100' VERT: 1" = 10'		DESIGNED: <i>D. Suihkonen</i> DRAWN: <i>M. Hays</i> CHECKED: <i>R. J. Smith</i>	SUBMITTED: <i>Dennis Suihkonen</i> PROJECT ENGINEER R.C.E. NO. _____ DATE: 10/16/87 RECOMMENDED: <i>R. J. Smith</i> JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC. R.C.E. NO. 4066 DATE: 10/16/87	APPROVED: <i>Jerry D. Miller</i> 10-19-87 DATE: _____ APPROVED: _____ DATE: _____	CITY OF RAWLINS, WYOMING SAGE CREEK TRANSMISSION PIPELINE - PHASE II PIPELINE - PLAN AND PROFILE STA. 661+00 TO STA. 688+00	SHEET 8 OF 31 SHEETS
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JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.
 161 Mallard Drive, Boise, ID 83706-3974



E PIPE CURVE DATA
 $\Delta = 67^{\circ}41'$
 $R = 1014.93$
 $T = 680.51$
 $L = 1198.93$

WARNING
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 ORIGINAL SCALE



REV	DATE	BY	DESCRIPTION

SCALE:
 HORZ: 1" = 100'
 VERT: 1" = 10'

DESIGNED *D. Suikonen*
 DRAWN *A. Hays*
 CHECKED *R. Lewis*

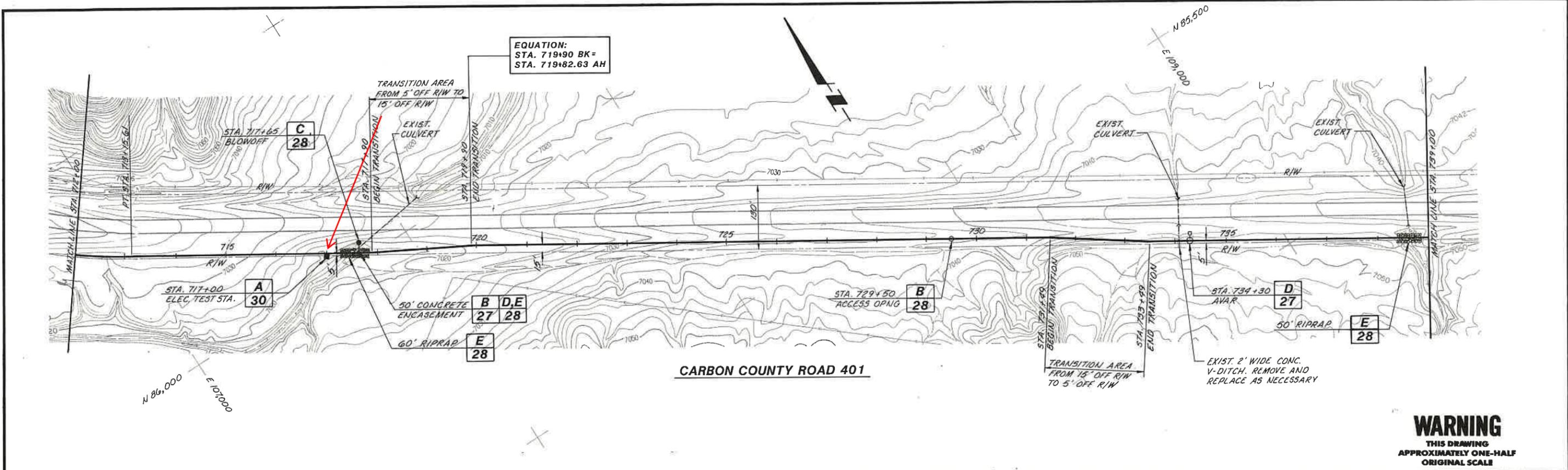
SUBMITTED
Dennis Suikonen
 PROJECT ENGINEER
 DATE 10/14/87
 R.C.E. NO. 4066
 DATE 10/16/87

JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.
 161 Mallard Drive, Boise, ID 83706-3974

APPROVED
Gary D. Miller 10-19-87
 DATE

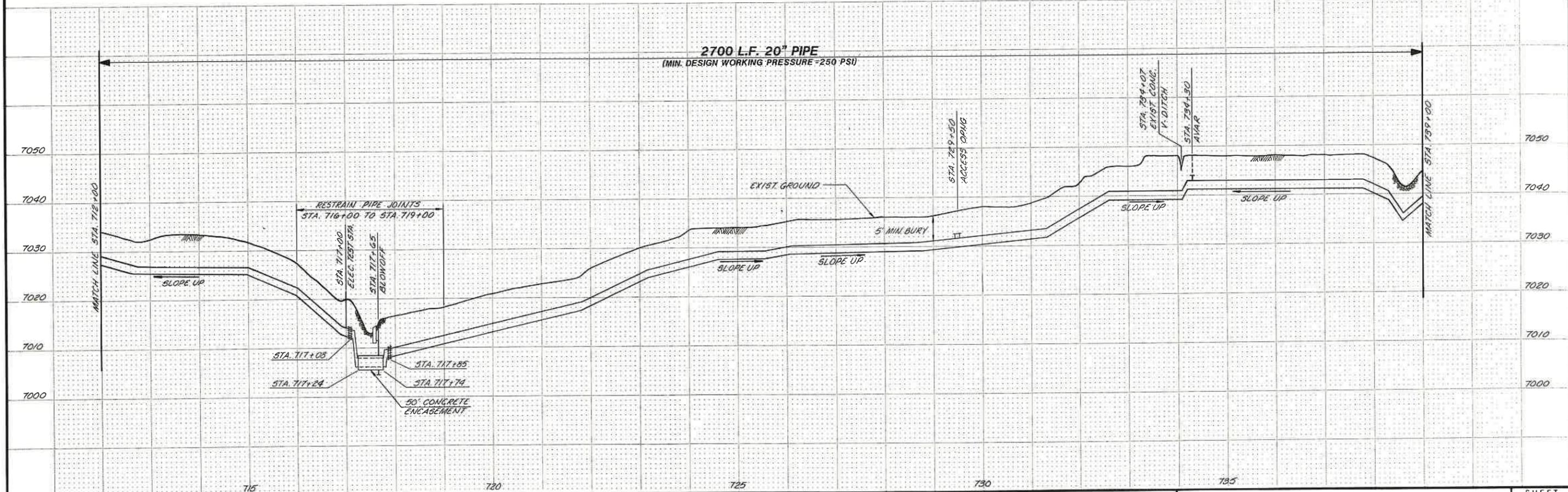
CITY OF RAWLINS, WYOMING
 SAGE CREEK TRANSMISSION PIPELINE - PHASE II
 PIPELINE - PLAN AND PROFILE
 STA. 688+00 TO STA. 712+00

SHEET
9
 OF 31 SHEETS

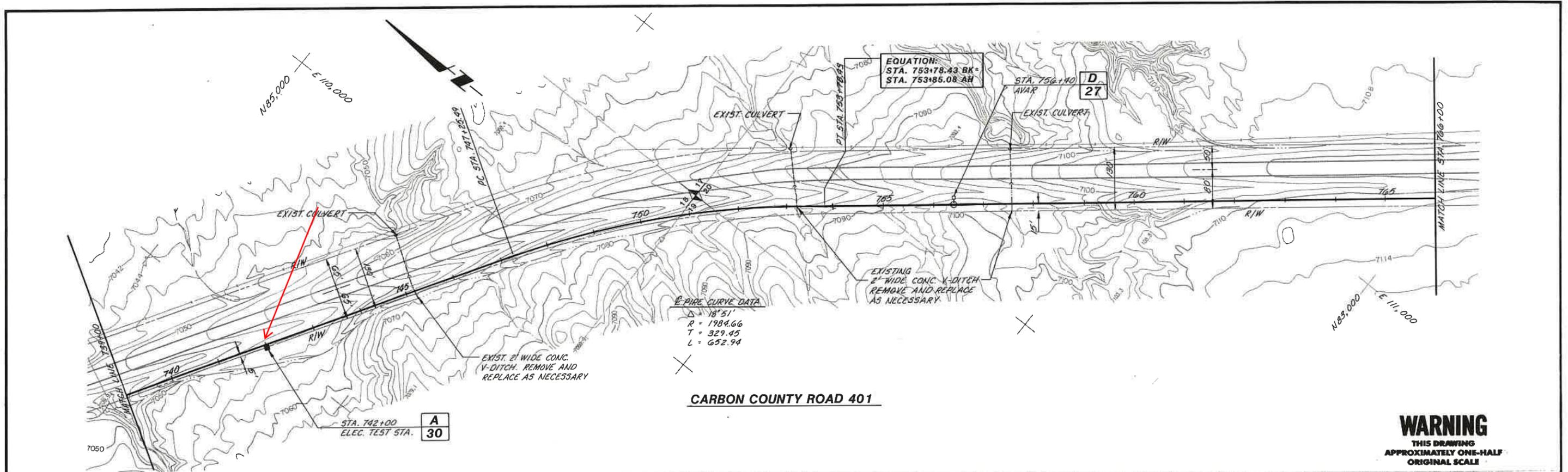


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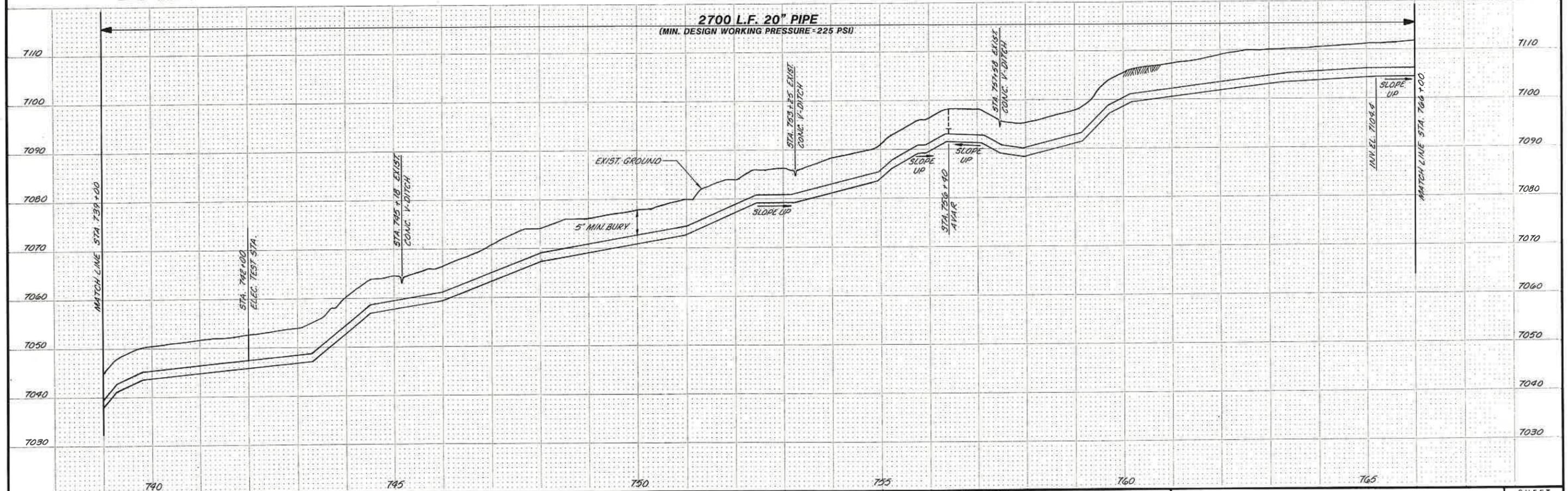


SCALE: HORZ: 1" = 100' VERT: 1" = 10'		DESIGNED: <i>D. Suitkover</i> DRAWN: <i>J. Hays</i> CHECKED: <i>R. Jorin</i>	SUBMITTED <i>Dennis Suitkover</i> PROJECT ENGINEER REGIONAL M.E. & P. <i>James M. Montgomery</i> JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.	R.C.E. NO. 10114/87 DATE R.C.E. NO. 4066 DATE 10/16/87	JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC. 161 Mallard Drive, Boise, ID 83706-3974	APPROVED <i>Gerrard Miller</i> 10-19-87 DATE	CITY OF RAWLINS, WYOMING SAGE CREEK TRANSMISSION PIPELINE - PHASE II PIPELINE - PLAN AND PROFILE STA. 712+00 TO STA. 739+00	SHEET 10 OF 31 SHEETS
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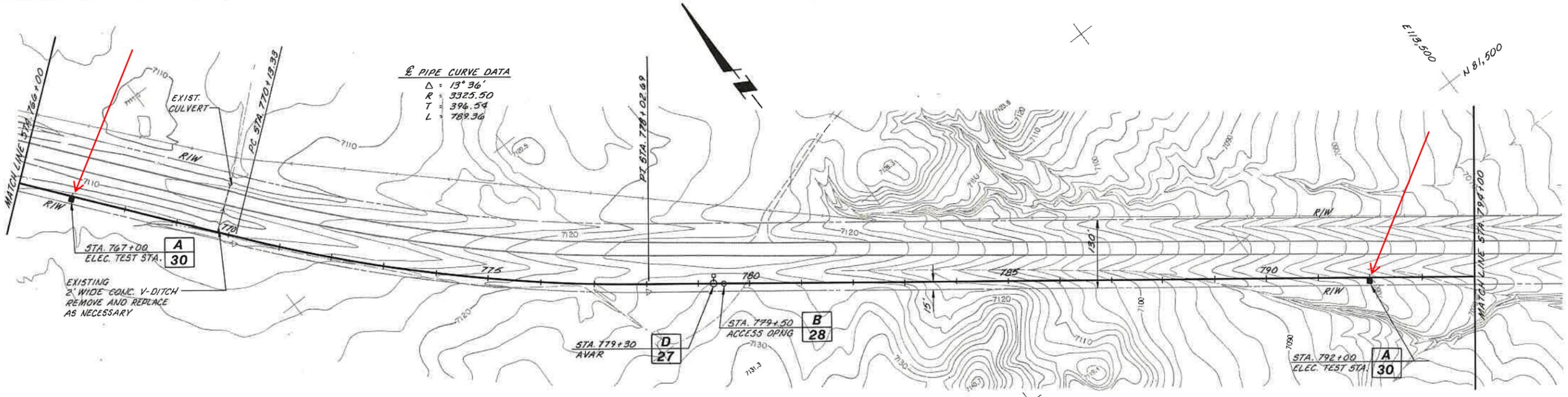
CARBON COUNTY ROAD 401

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ORIGINAL SCALE



SCALE: HORZ: 1" = 100' VERT: 1" = 10'		DESIGNED: <i>D. Suikonen</i> DRAWN: <i>[Signature]</i> CHECKED: <i>[Signature]</i>	SUBMITTED: <i>Dennis Suikonen</i> PROJECT ENGINEER RECOMMENDER: <i>[Signature]</i> JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.	R.C.E. NO. 4066 DATE 10/16/87	APPROVED: <i>[Signature]</i> 10-19-87 DATE	CITY OF RAWLINS, WYOMING SAGE CREEK TRANSMISSION PIPELINE - PHASE II PIPELINE - PLAN AND PROFILE STA. 739+00 TO STA. 766+00	SHEET 11 OF 31 SHEETS
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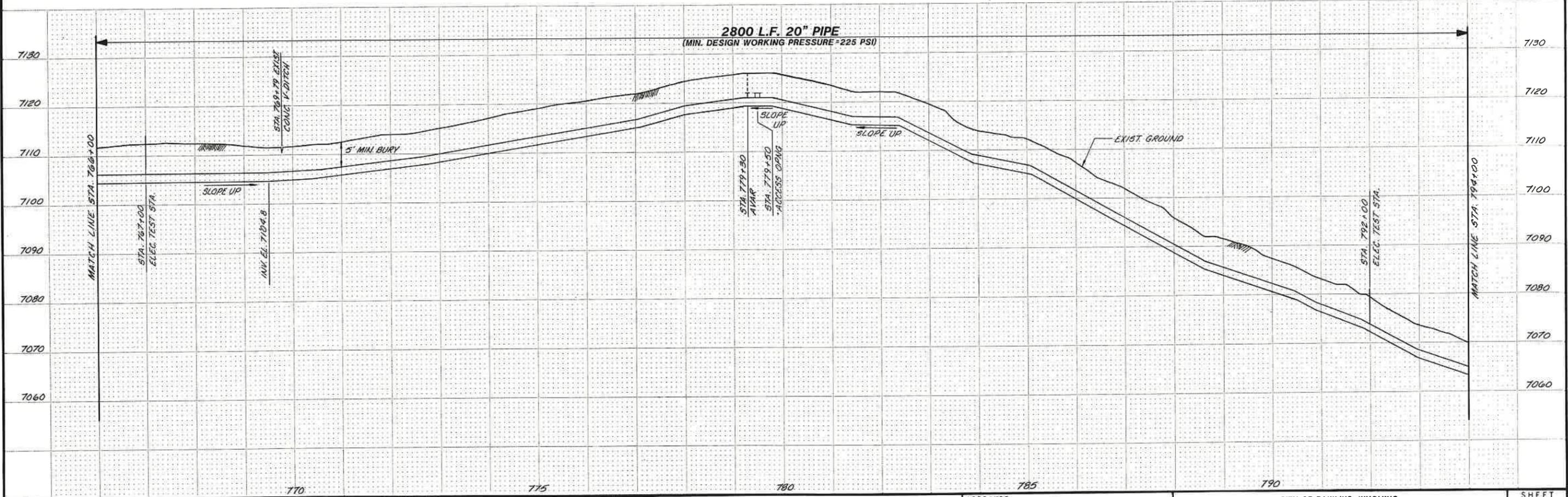
REV	DATE	BY	DESCRIPTION



E PIPE CURVE DATA
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 $R = 3325.50$
 $T = 396.54$
 $L = 789.36$

CARBON COUNTY ROAD 401

WARNING
 THIS DRAWING
 APPROXIMATELY ONE-HALF
 ORIGINAL SCALE



REV	DATE	BY	DESCRIPTION

SCALE:
 HORZ: 1" = 100'
 VERT: 1" = 10'

DESIGNED: *D. Suikonen*
 DRAWN: *D. Suikonen*
 CHECKED: *R. Jarvis*

SUBMITTED: *Dennis Suikonen*
 PROJECT ENGINEER
 R.C.E. NO. *4066* DATE *10/16/87*

RECOMMENDED: *James M. Montgomery*
 JAMES M. MONTGOMERY
 CONSULTING ENGINEERS, INC.
 R.C.E. NO. *4066* DATE *10/16/87*

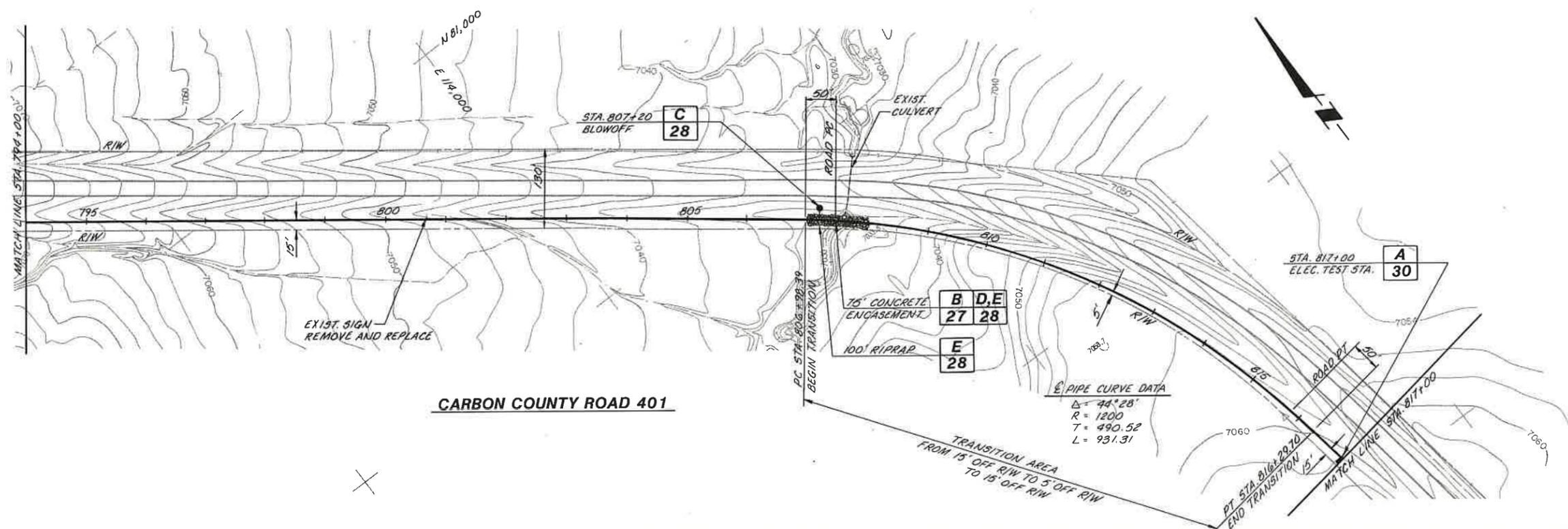
**JAMES M. MONTGOMERY
 CONSULTING ENGINEERS, INC.**

161 Mallard Drive, Boise, ID 83706-3974

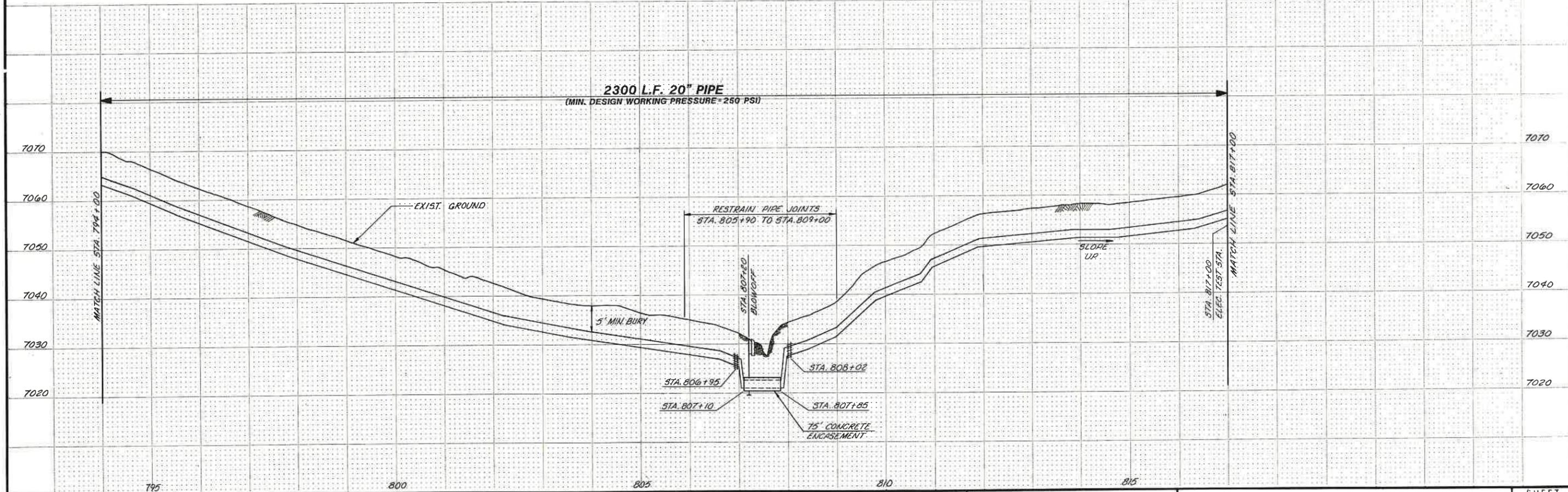
APPROVED: *George D. Miller* **10-19-87**
 DATE

CITY OF RAWLINS, WYOMING
 SAGE CREEK TRANSMISSION PIPELINE - PHASE II
 PIPELINE - PLAN AND PROFILE
 STA. 766+00 TO STA. 794+00

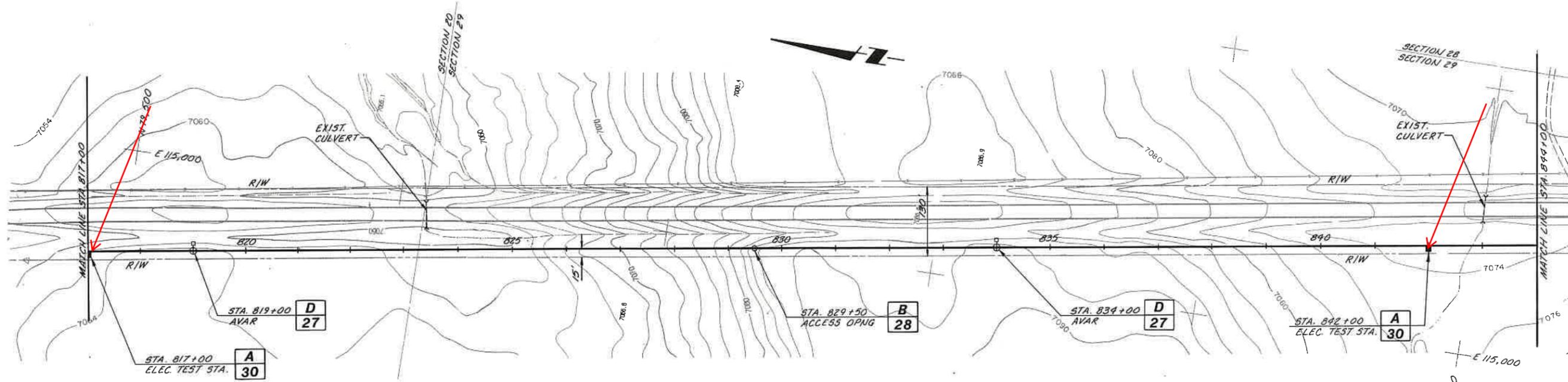
SHEET
12
 OF 31 SHEETS



WARNING
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 ORIGINAL SCALE

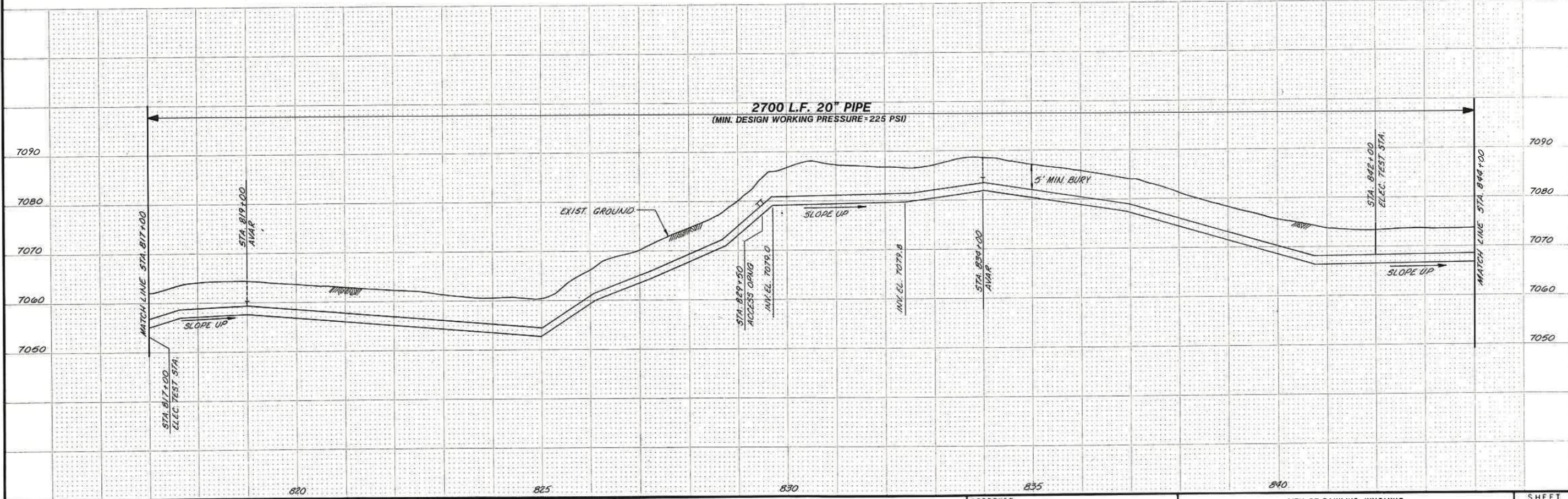


SCALE HORZ: 1" = 100' VERT: 1" = 10'		DESIGNED <i>D. Suikonen</i> DRAWN <i>L. Hays</i> CHECKED <i>R. Jorio</i>	SUBMITTED <i>Bonnie Suikonen</i> PROJECT ENGINEER APPROVED <i>James M. Montgomery</i> JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.	R.C.E. NO. 10/16/87 DATE R.C.E. NO. 10/16/87 DATE	JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC. 161 Mallard Drive, Boise, ID 83706-3974	APPROVED <i>James D. Miller</i> 10-19-87 DATE APPROVED _____ DATE _____	CITY OF RAWLINS, WYOMING SAGE CREEK TRANSMISSION PIPELINE - PHASE II PIPELINE - PLAN AND PROFILE STA. 794+00 TO STA. 817+00	SHEET 13 OF 31 SHEETS
REV	DATE	BY	DESCRIPTION					



CARBON COUNTY ROAD 401

WARNING
THIS DRAWING
APPROXIMATELY ONE-HALF
ORIGINAL SCALE



REV	DATE	BY	DESCRIPTION

SCALE:
HORIZ: 1" = 100'
VERT: 1" = 10'

DESIGNED *D. Suikkonen*
DRAWN *D. Karp*
CHECKED *R. Harris*

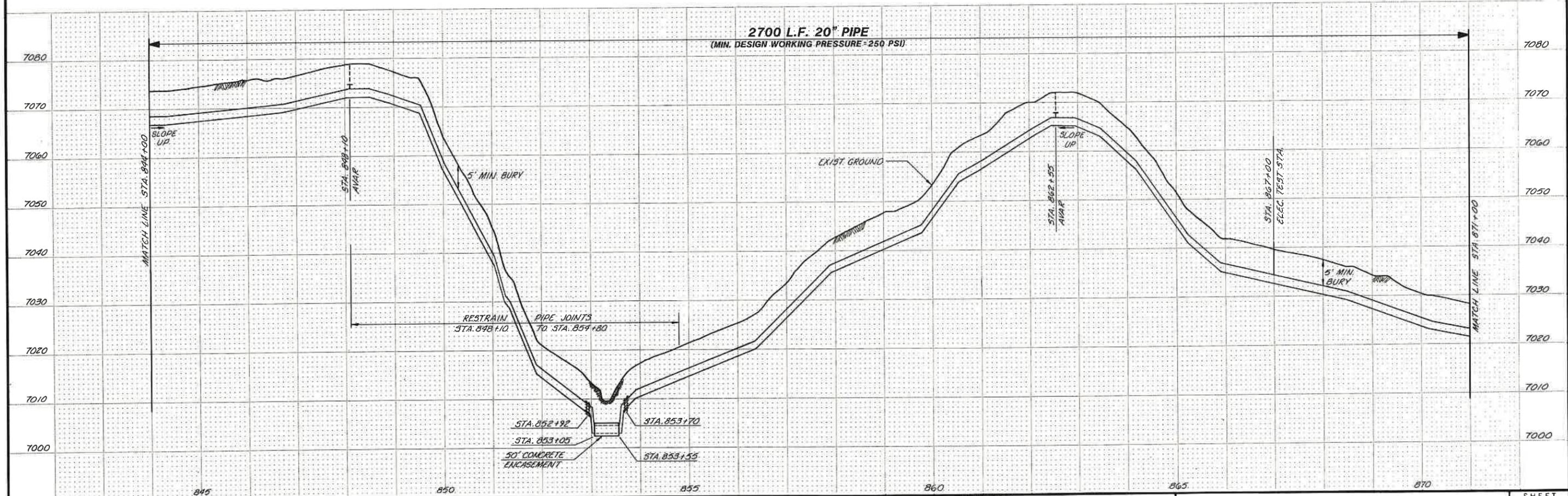
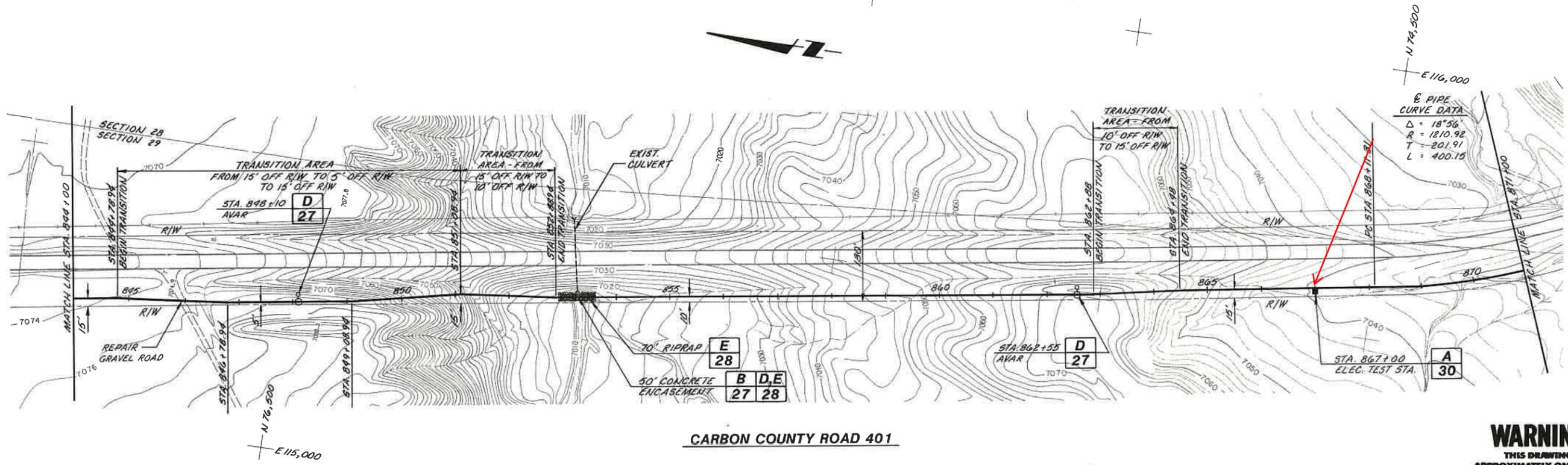
SUBMITTED
Dennis Suikkonen
PROJECT ENGINEER
RECOMMENDED
James M. Montgomery
CONSULTING ENGINEERS, INC.

**JAMES M. MONTGOMERY
CONSULTING ENGINEERS, INC.**
161 Mallard Drive, Boise, ID 83706 3974

APPROVED
Jerry Miller 10-19-87
DATE

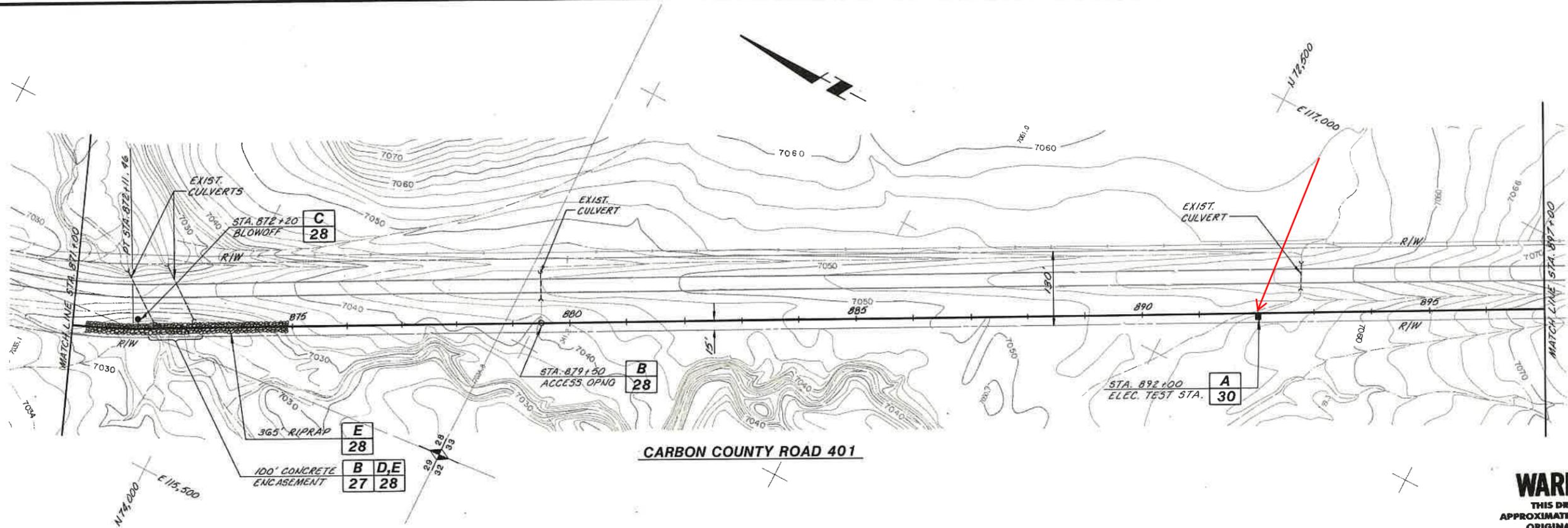
CITY OF RAWLINS, WYOMING
SAGE CREEK TRANSMISSION PIPELINE - PHASE II
PIPELINE - PLAN AND PROFILE
STA. 817+00 TO STA. 844+00

SHEET
14
OF 31 SHEETS



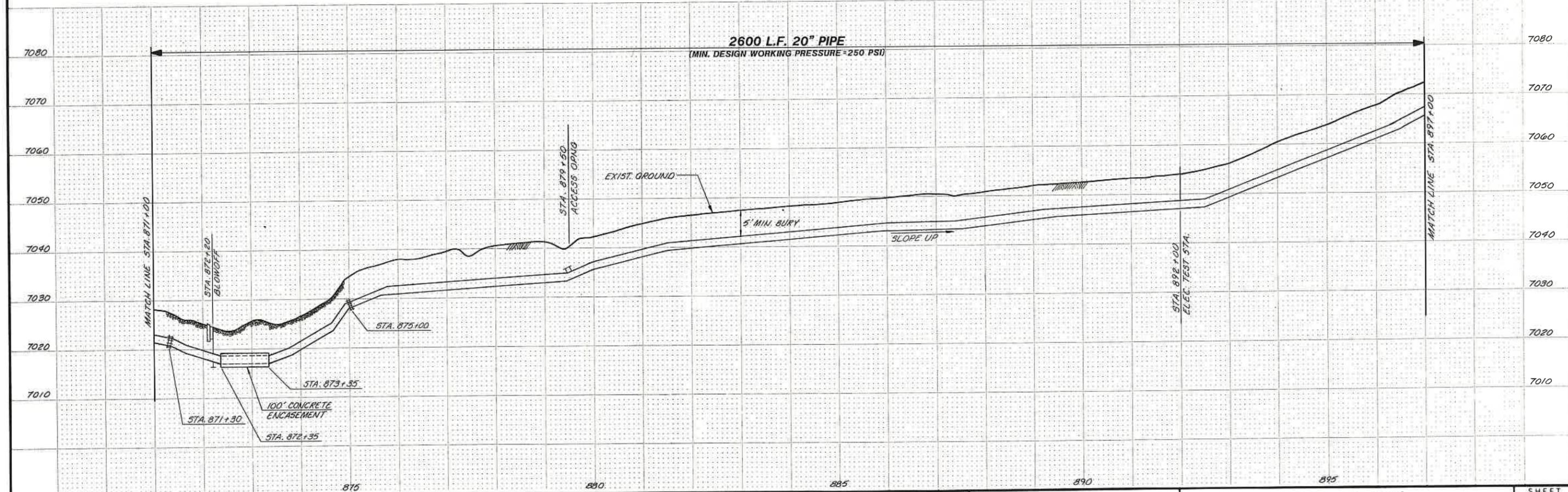
SCALE: HORZ: 1" = 100' VERT: 1" = 10'		DESIGNED: <i>D. Suikonen</i> DRAWN: <i>[Signature]</i> CHECKED: <i>[Signature]</i>	SUBMITTED <i>Dennis Suikonen</i> PROJECT ENGINEER RECOMMENDED <i>[Signature]</i> JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.	R.C.E. NO. 1016/87 DATE 10/16/87 R.C.E. NO. 4066 DATE 10/16/87	APPROVED <i>Garry D. Miller</i> DATE 10-19-87	CITY OF RAWLINS, WYOMING SAGE CREEK TRANSMISSION PIPELINE - PHASE II PIPELINE - PLAN AND PROFILE STA. 844+00 TO STA. 871+00	SHEET 15 OF 31 SHEETS
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REV	DATE	BY	DESCRIPTION

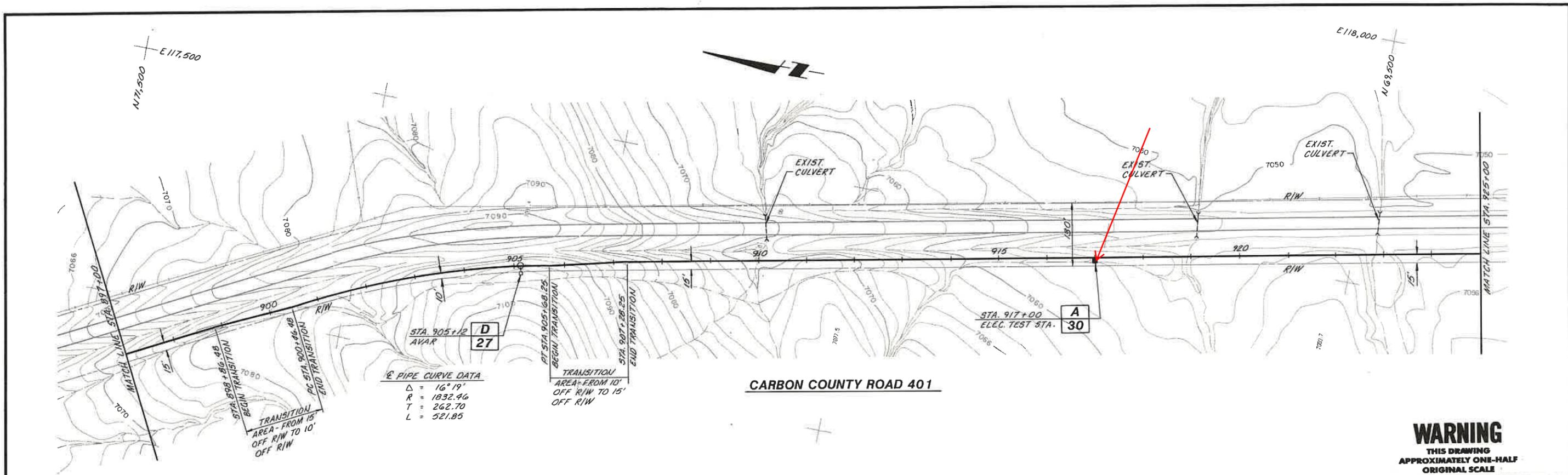


CARBON COUNTY ROAD 401

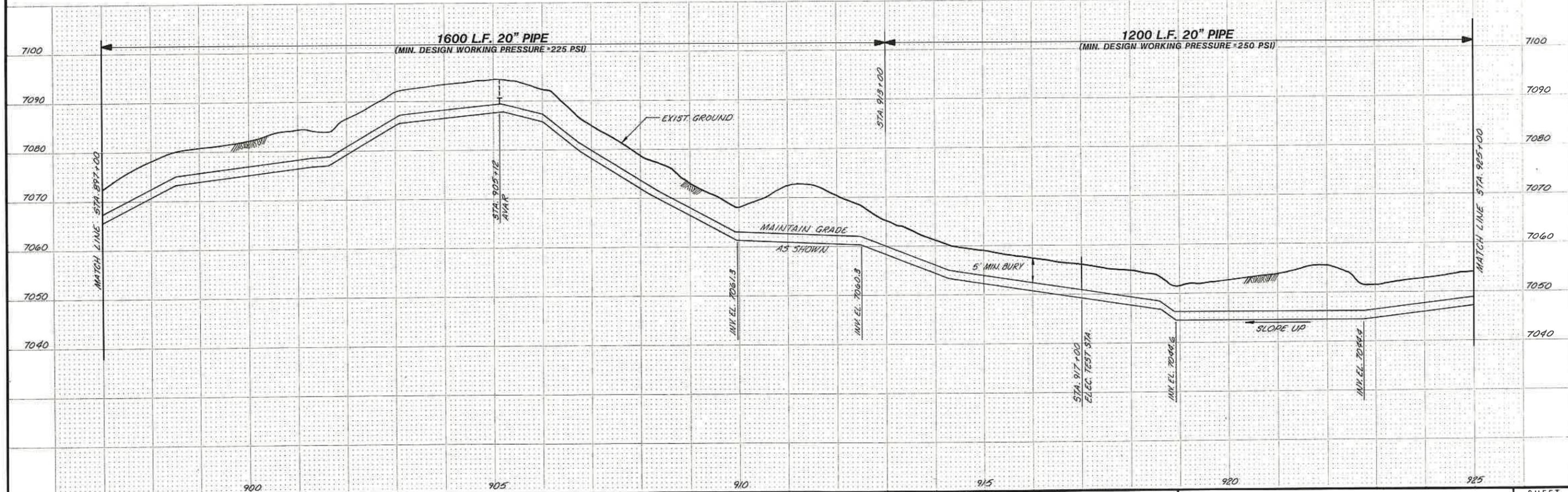
WARNING
THIS DRAWING
APPROXIMATELY ONE-HALF
ORIGINAL SCALE



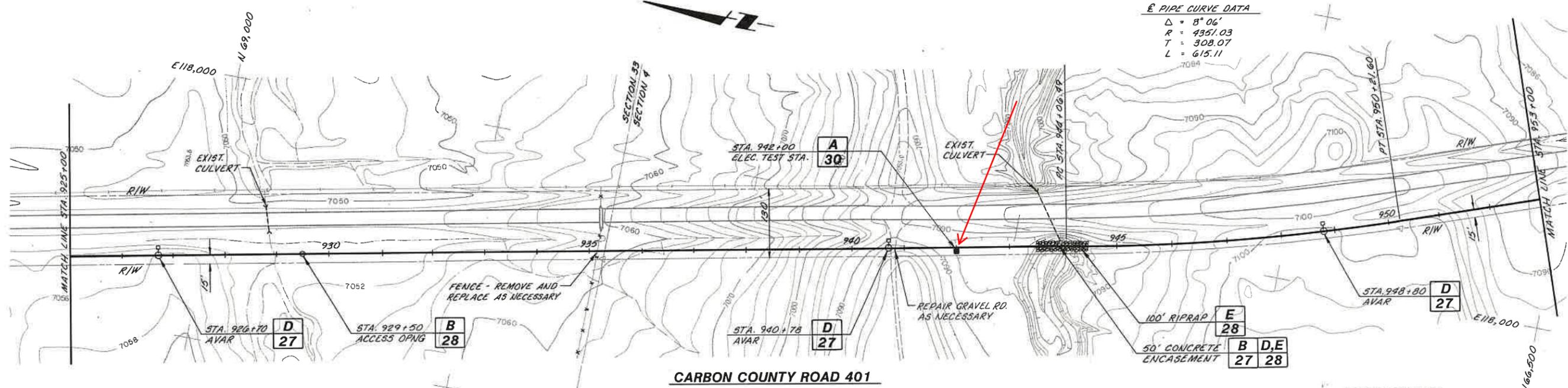
SCALE: HORIZ: 1" = 100' VERT: 1" = 10'		DESIGNED <i>D. Suikkonen</i> DRAWN <i>D. Suikkonen</i> CHECKED <i>R. Jones</i>	SUBMITTED <i>Dennis Suikkonen</i> PROJECT ENGINEER 10/16/87 R.C.E. NO. 406 DATE 10/16/87	JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC. 161 Mallard Drive, Boise, ID 83706-3974	APPROVED <i>Gerry D. Miller</i> 10-19-87 DATE 10-19-87	CITY OF RAWLINS, WYOMING SAGE CREEK TRANSMISSION PIPELINE - PHASE II PIPELINE - PLAN AND PROFILE STA. 871+00 TO STA. 897+00	SHEET 16 OF 31 SHEETS
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WARNING
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 APPROXIMATELY ONE-HALF
 ORIGINAL SCALE

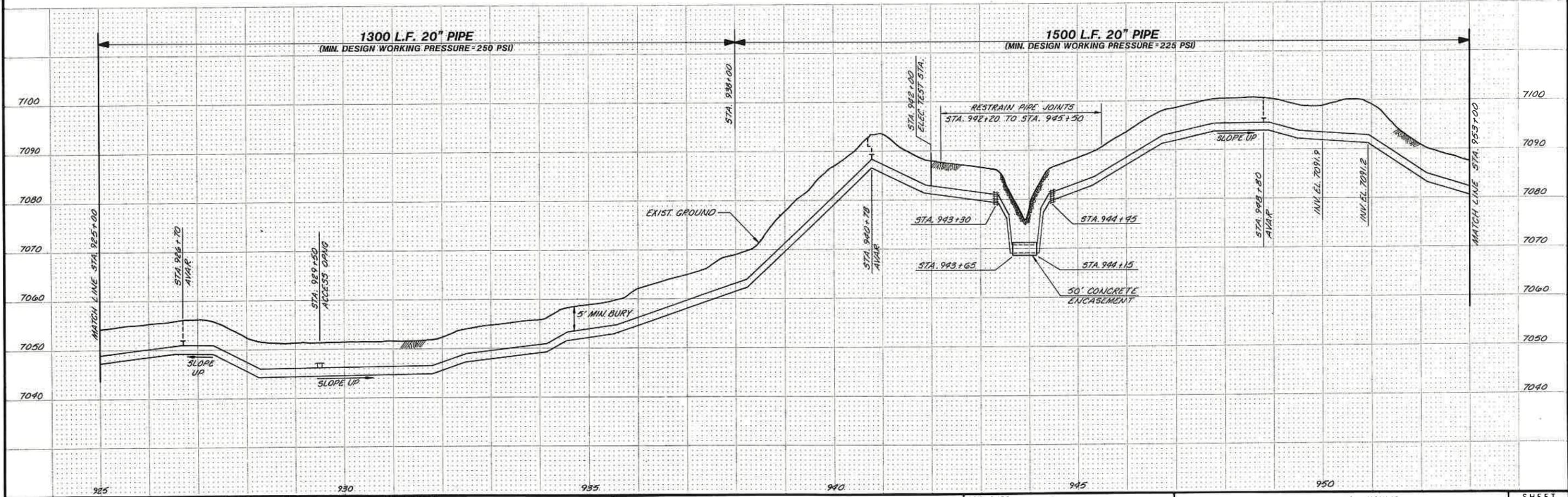


SCALE: HORZ: 1" = 100' VERT: 1" = 10'	DESIGNED <i>D. Suikonen</i> DRAWN <i>D. Suikonen</i> CHECKED <i>R. Strain</i>	SUBMITTED <i>Dennis Suikonen</i> PROJECT ENGINEER RECOMMENDED <i>James M. Montgomery</i> JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.	R.C.E. NO. 10/16/87 DATE R.C.E. NO. 4066 DATE 10/16/87	JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC. 161 Mallard Drive, Boise, ID 83706-3974	APPROVED <i>James D. Miller</i> 10-19-87 DATE APPROVED	CITY OF RAWLINS, WYOMING SAGE CREEK TRANSMISSION PIPELINE - PHASE II PIPELINE - PLAN AND PROFILE STA. 897+00 TO STA. 925+00	SHEET 17 OF 31 SHEETS
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CARBON COUNTY ROAD 401

WARNING
THIS DRAWING
APPROXIMATELY ONE-HALF
ORIGINAL SCALE



REV	DATE	BY	DESCRIPTION

SCALE:
HORIZ: 1" = 100'
VERT: 1" = 10'

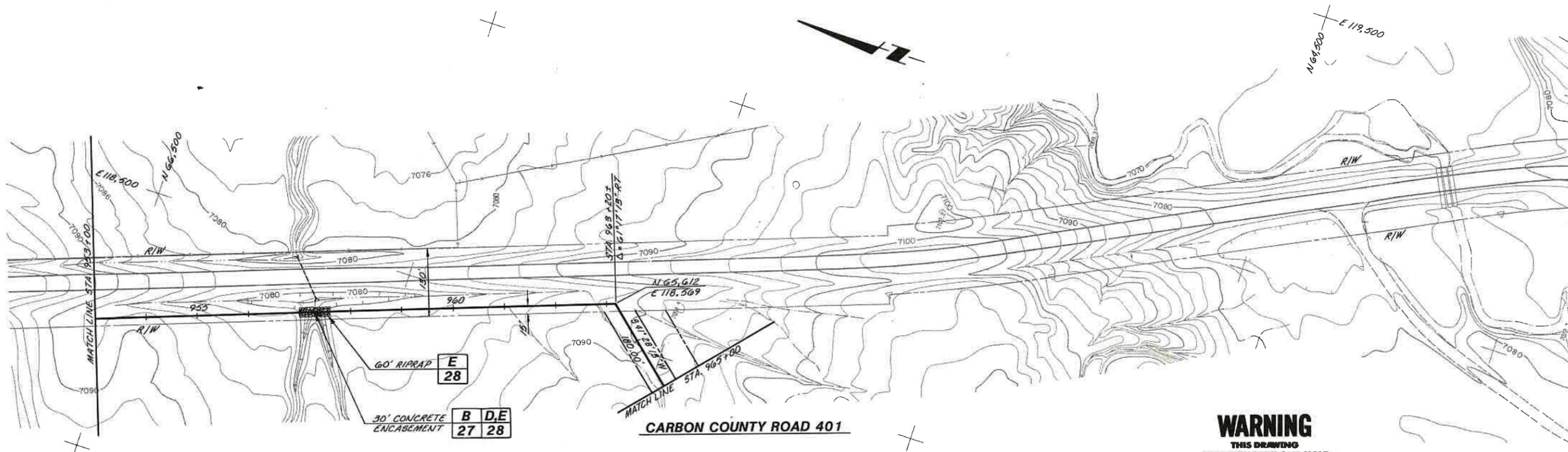
DESIGNED *D. Suikonen*
DRAWN *D. Hays*
CHECKED *R. J. ...*
SUBMITTED *Dennis Suikonen*
PROJECT ENGINEER
RECOMMENDED *James M. Montgomery*
JAMES M. MONTGOMERY
CONSULTING ENGINEERS, INC.

**JAMES M. MONTGOMERY
CONSULTING ENGINEERS, INC.**
161 Mallard Drive, Boise, ID 83706-3974

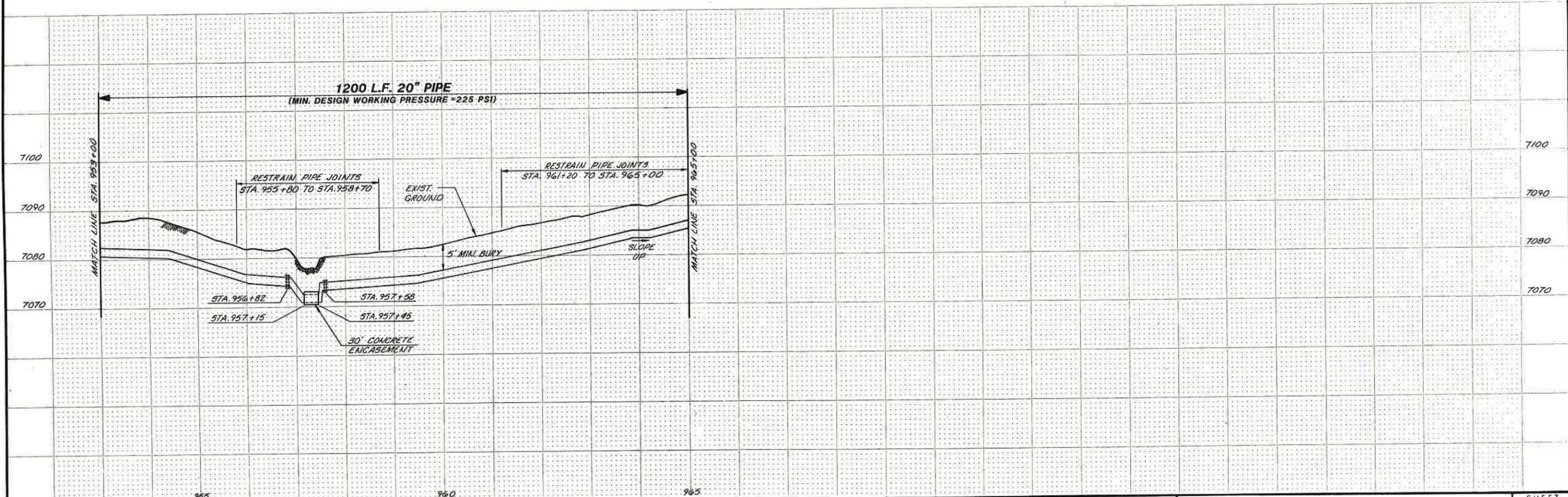
APPROVED *Jerry D. Miller* 10-19-87
DATE

CITY OF RAWLINS, WYOMING
SAGE CREEK TRANSMISSION PIPELINE - PHASE II
PIPELINE - PLAN AND PROFILE
STA. 925+00 TO STA. 953+00

SHEET
18
OF 31 SHEETS



WARNING
THIS DRAWING
APPROXIMATELY ONE-HALF
ORIGINAL SCALE



REV	DATE	BY	DESCRIPTION

SCALE:
HORIZ: 1" = 100'
VERT: 1" = 10'

DESIGNED *D. Suikonen*
PROJECT ENGINEER
DRAWN *A. Hays*
CHECKED *R. Davis*

SUBMITTED *Dennis Suikonen*
PROJECT ENGINEER
RECOMMENDED *James M. Montgomery*
CONSULTING ENGINEERS, INC.

R.C.E. NO. 1016187
DATE 10/16/87

R.C.E. NO. 4066
DATE 10/16/87

**JAMES M. MONTGOMERY
CONSULTING ENGINEERS, INC.**

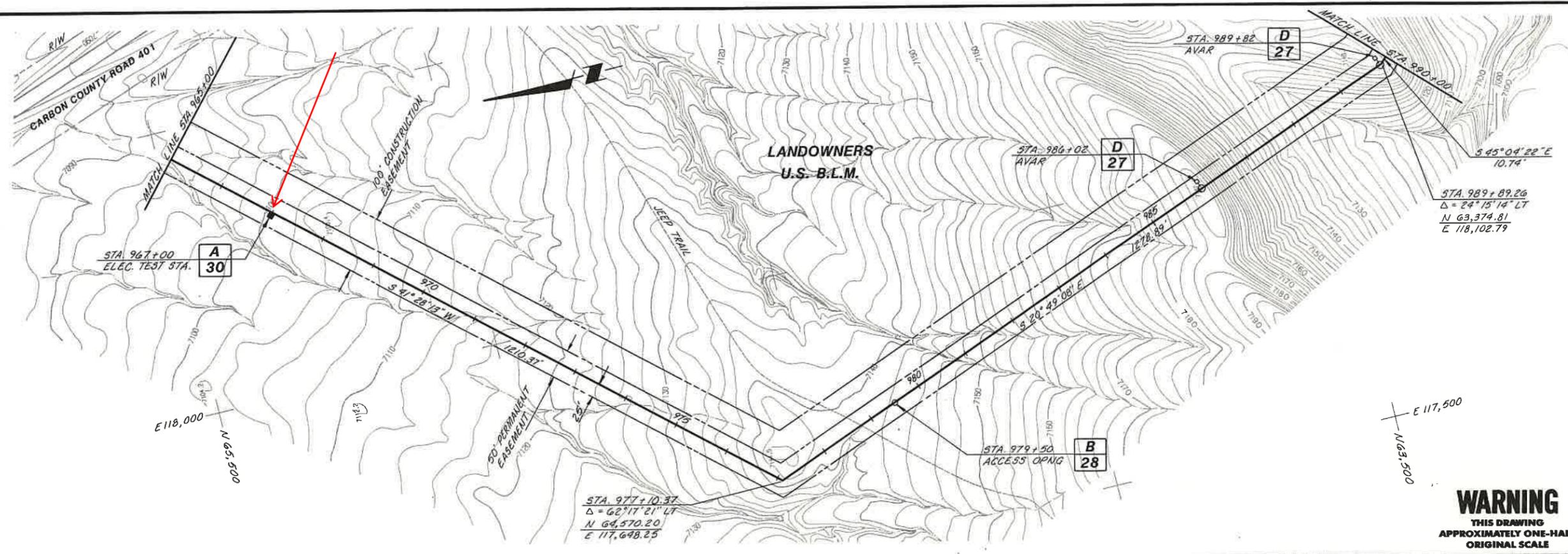
161 Mallard Drive, Boise, ID 83706-3974

APPROVED *Gregory D. Miller* 10-19-87
DATE

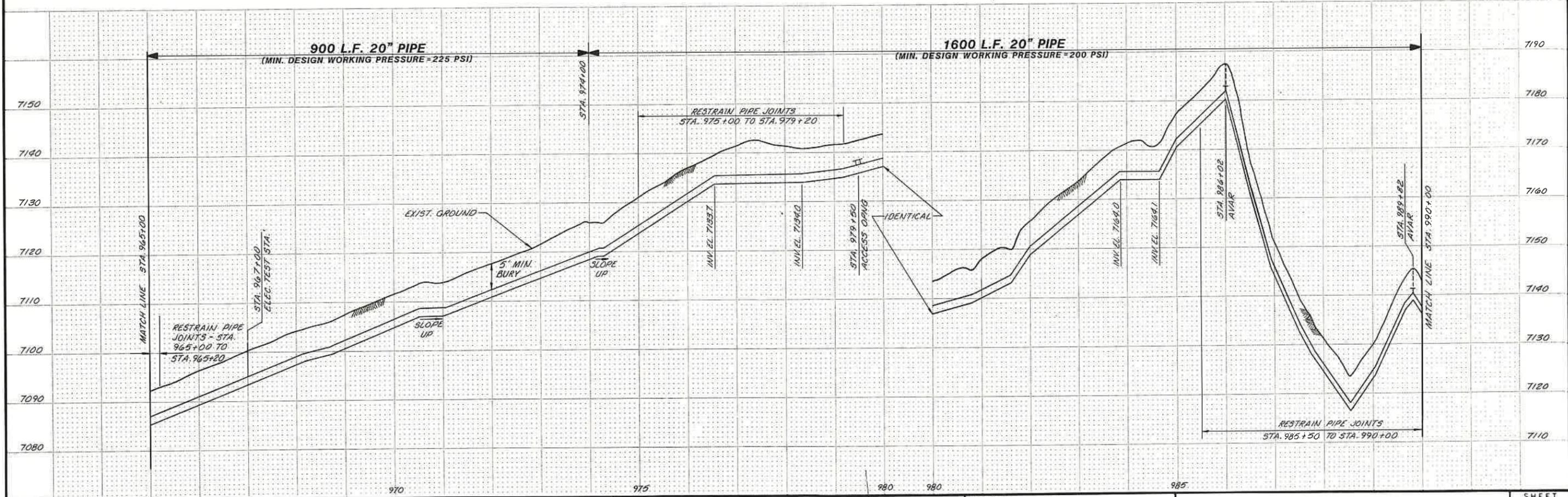
APPROVED _____
DATE

CITY OF RAWLINS, WYOMING
SAGE CREEK TRANSMISSION PIPELINE - PHASE II
PIPELINE - PLAN AND PROFILE
STA. 953+00 TO STA. 965+00

SHEET
19
OF 31 SHEETS



WARNING
 THIS DRAWING
 APPROXIMATELY ONE-HALF
 ORIGINAL SCALE



REV	DATE	BY	DESCRIPTION

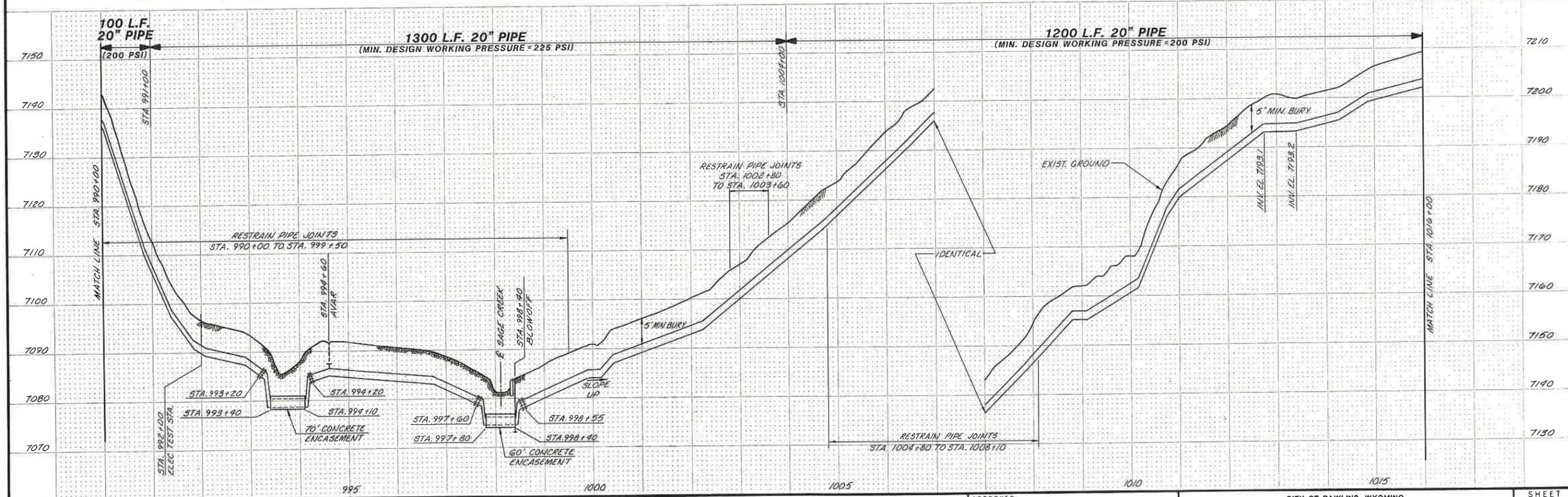
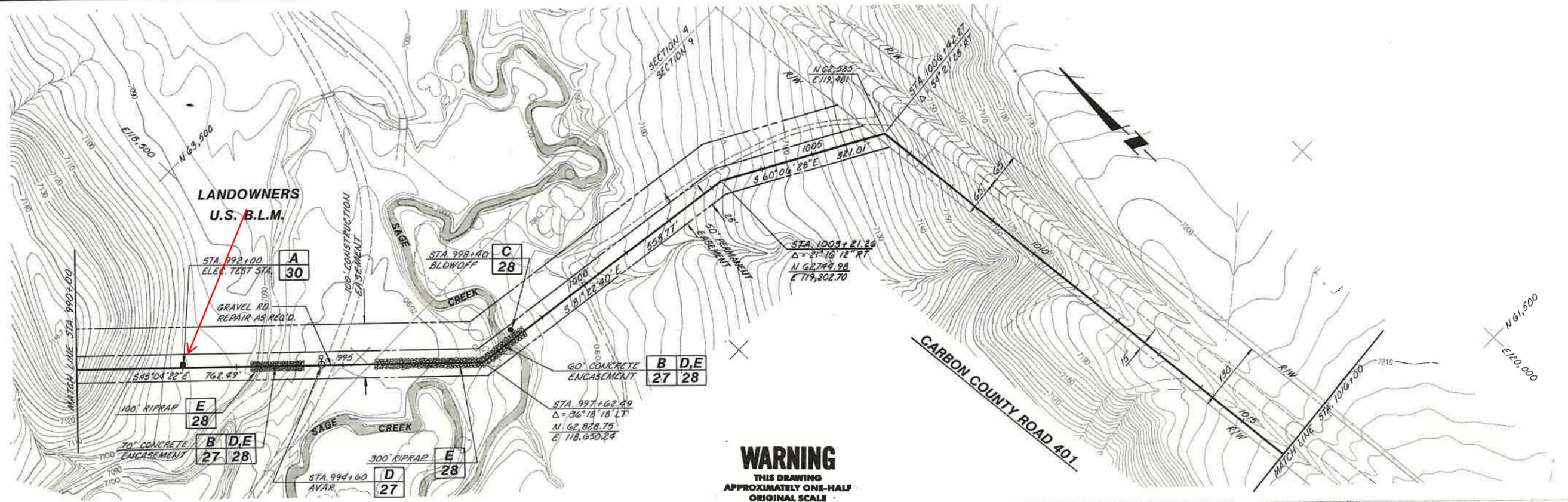
SCALE: HORIZ: 1" = 100' VERT: 1" = 10'	DESIGNED <i>D. Suikonen</i> PROJECT ENGINEER	SUBMITTED <i>Dennis Suikonen</i> PROJECT ENGINEER	R.C.E. NO. 10116187 DATE
CHECKED <i>R. Davis</i>	RECOMMENDED <i>James M. Montgomery</i>	JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.	R.C.E. NO. AS66 DATE 10/16/91

JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.
 161 Mallard Drive, Boise, ID 83706 3974

APPROVED
Gregory Miller 10-19-91
 DATE

CITY OF RAWLINS, WYOMING
 SAGE CREEK TRANSMISSION PIPELINE - PHASE II
 PIPELINE - PLAN AND PROFILE
 STA. 965+00 TO STA. 990+00

SHEET
20
 OF 31 SHEETS



REV	DATE	BY	DESCRIPTION

SCALE
 HORIZ: 1" = 100'
 VERT: 1" = 10'

DESIGNED *D. Suikonen*
 DRAWN *A. Kay*
 CHECKED *R. Davis*

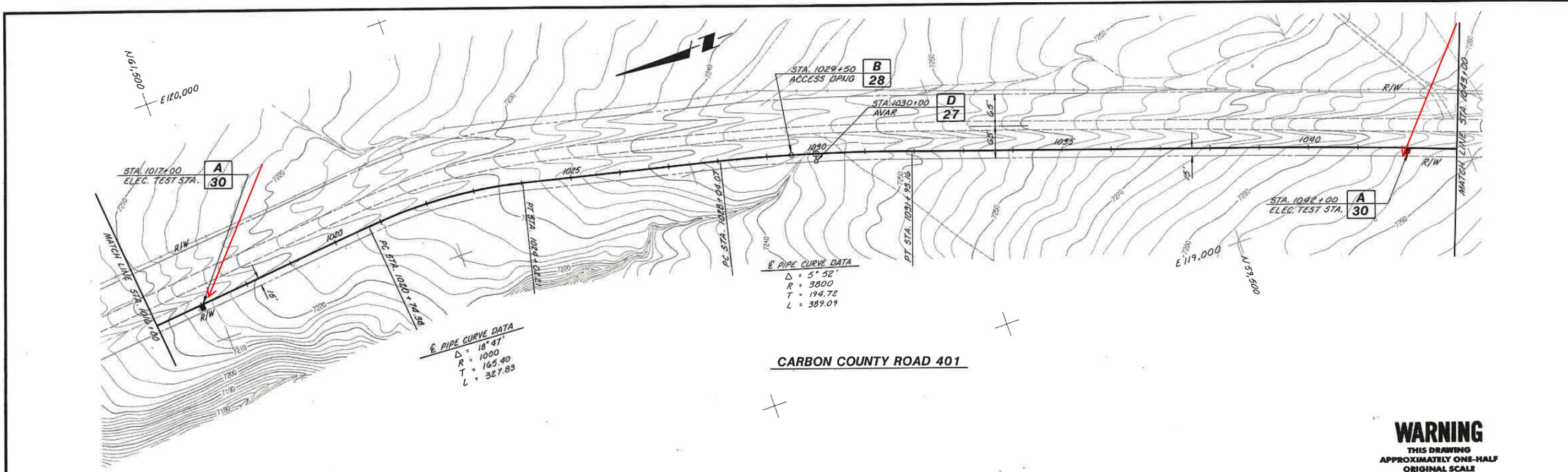
SUBMITTED
Dennis Suikonen
 PROJECT ENGINEER
 RECOMMENDER
James M. Montgomery
 CONSULTING ENGINEERS, INC.

JAMES M. MONTGOMERY
 CONSULTING ENGINEERS, INC.
 161 Mallard Drive, Boise, ID 83706-3974

APPROVED
Gerry D. Miller 10-19-87
 DATE

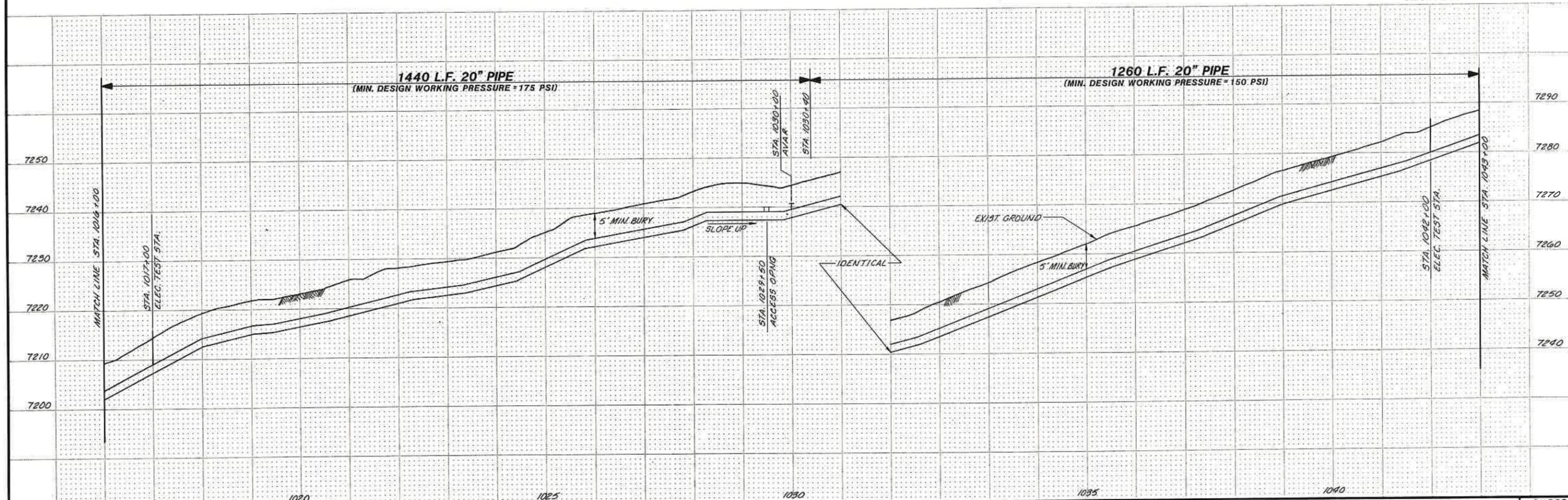
CITY OF RAWLINS, WYOMING
 SAGE CREEK TRANSMISSION PIPELINE - PHASE II
 PIPELINE - PLAN AND PROFILE
 STA. 990+00 TO STA. 1016+00

SHEET
 21
 OF 31 SHEETS



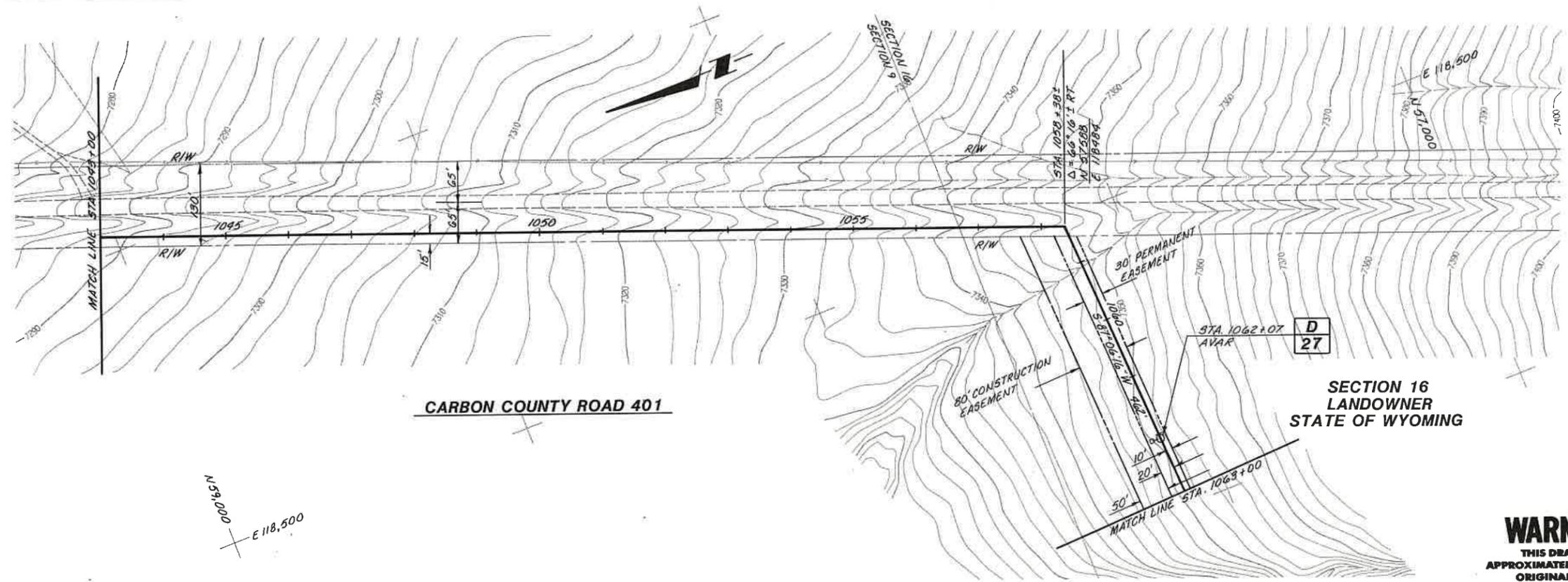
CARBON COUNTY ROAD 401

WARNING
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ORIGINAL SCALE



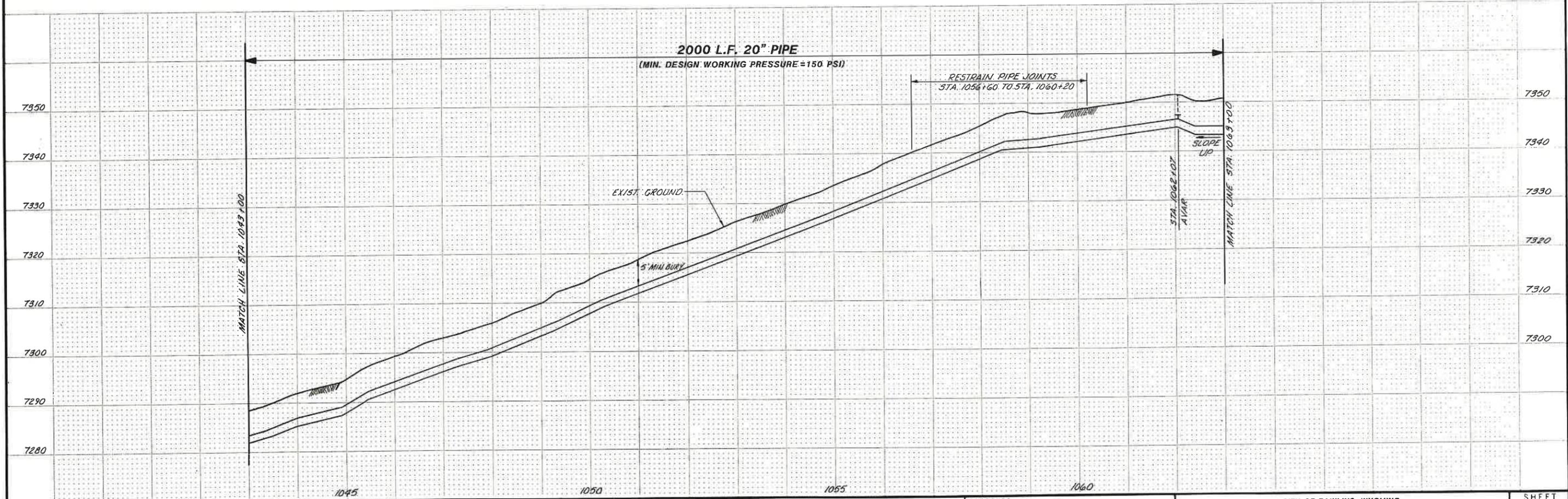
SCALE: HORZ: 1" = 100' VERT: 1" = 10'		DESIGNED <i>D. Suikkonen</i> DRAWN <i>J. Hays</i> CHECKED <i>R. Davis</i>	SUBMITTED <i>Dennis Suikkonen</i> PROJECT ENGINEER R.C.E. NO. <i>10/16/87</i> DATE	RECOMMENDED <i>James M. Montgomery</i> JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC. R.C.E. NO. <i>4006</i> DATE <i>10/18/87</i>	APPROVED <i>Gerry D. Miller</i> 10-19-87 DATE APPROVED _____ DATE _____	CITY OF RAWLINS, WYOMING SAGE CREEK TRANSMISSION PIPELINE - PHASE II PIPELINE - PLAN AND PROFILE STA. 1016+00 TO STA. 1043+00	SHEET 22 OF 31 SHEETS
REV	DATE	BY	DESCRIPTION				

**JAMES M. MONTGOMERY
CONSULTING ENGINEERS, INC.**
161 Mallard Drive, Boise, ID 83706-3974



SECTION 16
LANDOWNER
STATE OF WYOMING

WARNING
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ORIGINAL SCALE



REV	DATE	BY	DESCRIPTION

SCALE:
HORIZ: 1" = 100'
VERT: 1" = 10'

DESIGNED *D. Suikonen*
DRAWN *R. Kay*
CHECKED *R. Strawn*

SUBMITTED
Dennis Suikonen
PROJECT ENGINEER
RECOMMENDED
Robert J. Davis
DATE 10/16/87
R.C.E. NO. 10/16/87

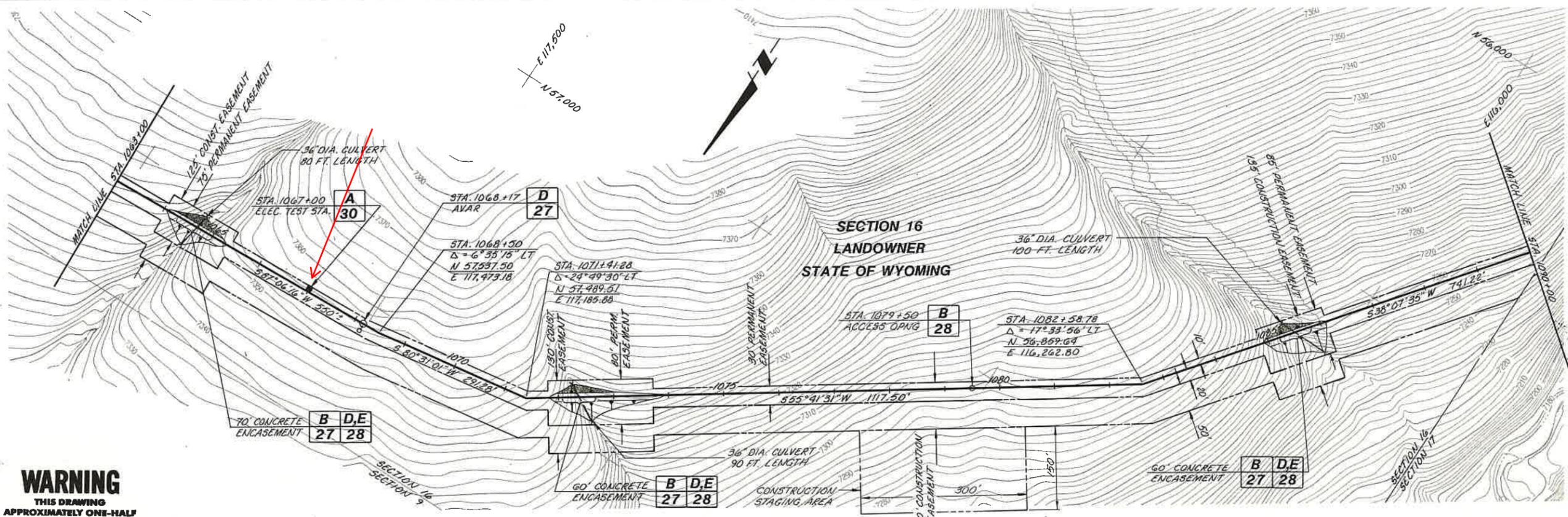
**JAMES M. MONTGOMERY
CONSULTING ENGINEERS, INC.**
161 Mallard Drive, Boise, ID 83706-3974



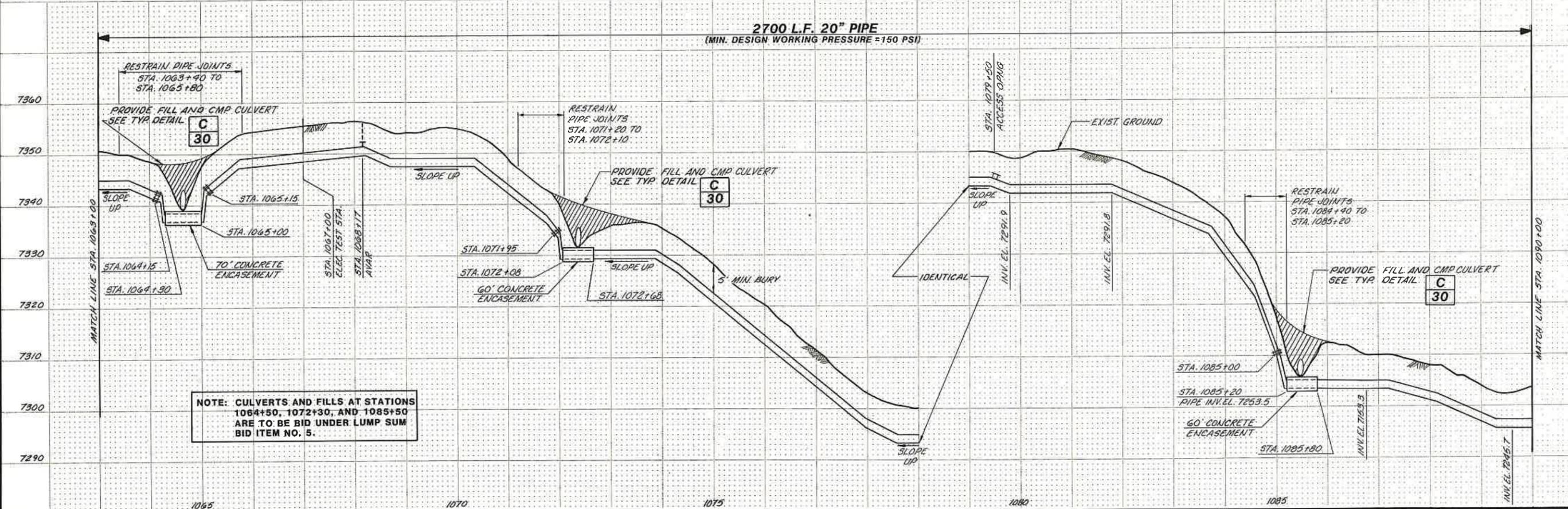
APPROVED
Gerry D. Miller 10-19-87
DATE

CITY OF RAWLINS, WYOMING
SAGE CREEK TRANSMISSION PIPELINE - PHASE II
PIPELINE - PLAN AND PROFILE
STA. 1043+00 TO STA. 1063+00

SHEET
23
OF 31 SHEETS



WARNING
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APPROXIMATELY ONE-HALF
ORIGINAL SCALE

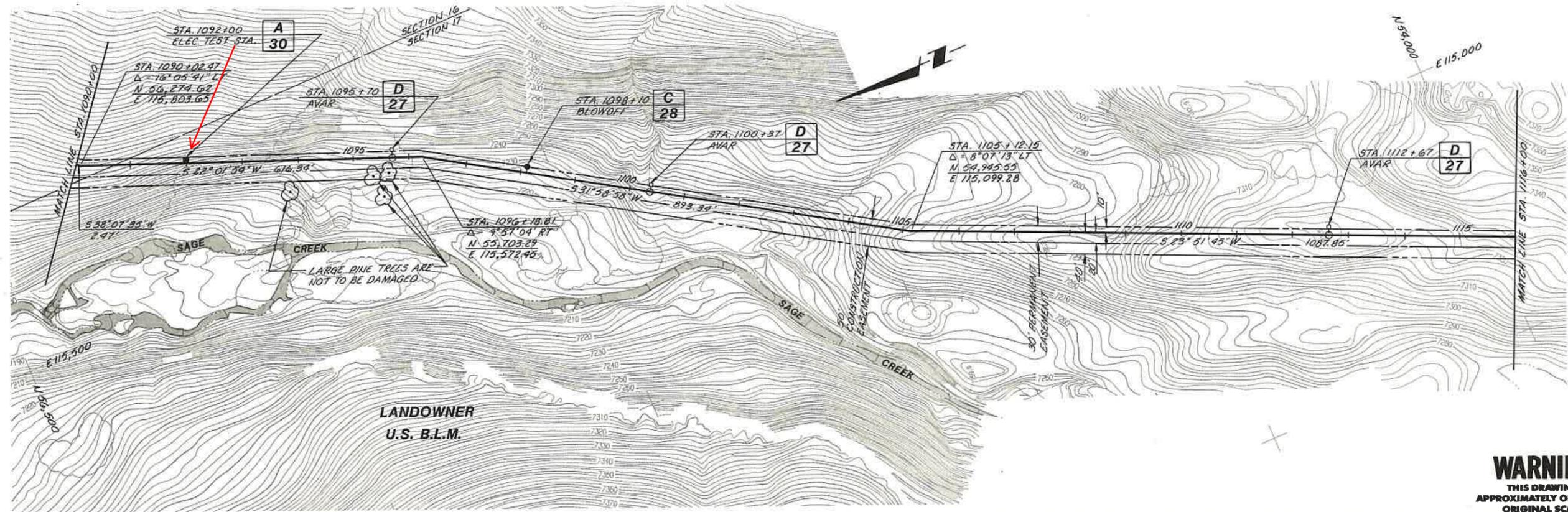


NOTE: CULVERTS AND FILLS AT STATIONS 1064+50, 1072+30, AND 1085+50 ARE TO BE BID UNDER LUMP SUM BID ITEM NO. 5.

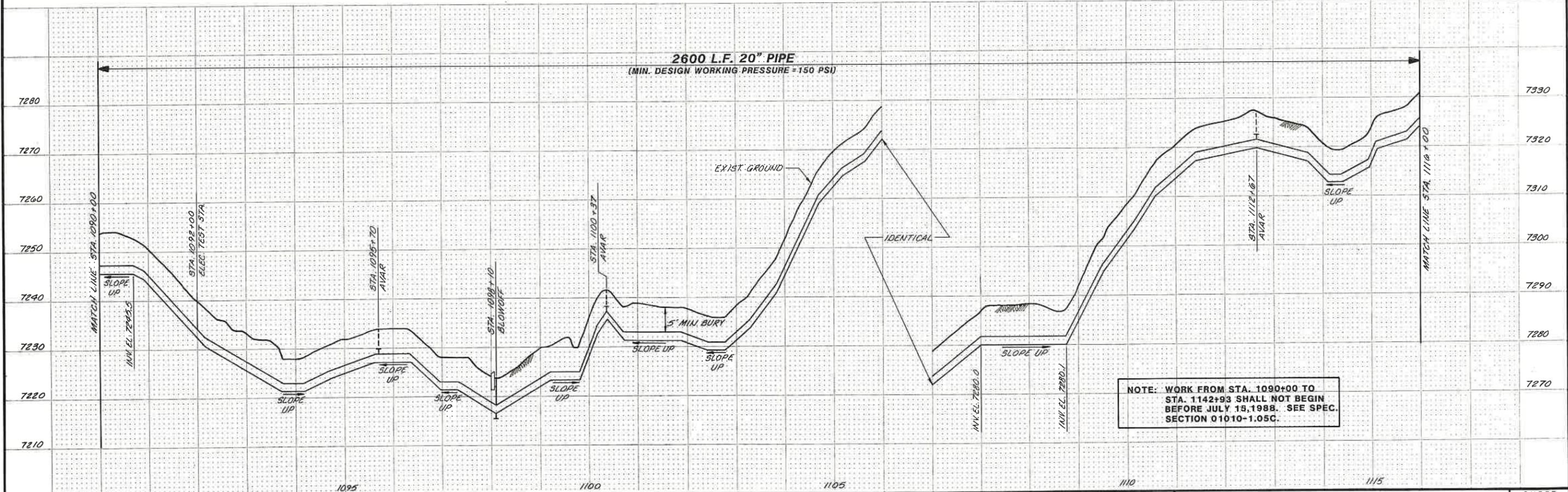
SCALE: HORIZ: 1" = 100' VERT: 1" = 10'		SUBMITTED DESIGNED <i>D. Suithkonen</i> PROJECT ENGINEER DRAWN <i>Chap</i> CHECKED <i>R. Jorris</i>		APPROVED <i>Bernie Suithkonen</i> PROJECT ENGINEER R.C.E. NO. 1016/87 DATE 10/16/87		APPROVED <i>James M. Montgomery</i> PROJECT ENGINEER R.C.E. NO. 4066 DATE 10/16/87		APPROVED <i>James M. Montgomery</i> PROJECT ENGINEER R.C.E. NO. 4066 DATE 10/16/87		APPROVED <i>James M. Montgomery</i> PROJECT ENGINEER R.C.E. NO. 4066 DATE 10/16/87		CITY OF RAWLINS, WYOMING SAGE CREEK TRANSMISSION PIPELINE - PHASE II PIPELINE - PLAN AND PROFILE STA. 1063+00 TO STA. 1090+00		SHEET 24 OF 31 SHEETS
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JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.
161 Mallard Drive, Boise, ID 83706-3974

APPROVED
James M. Montgomery
DATE 10-19-87



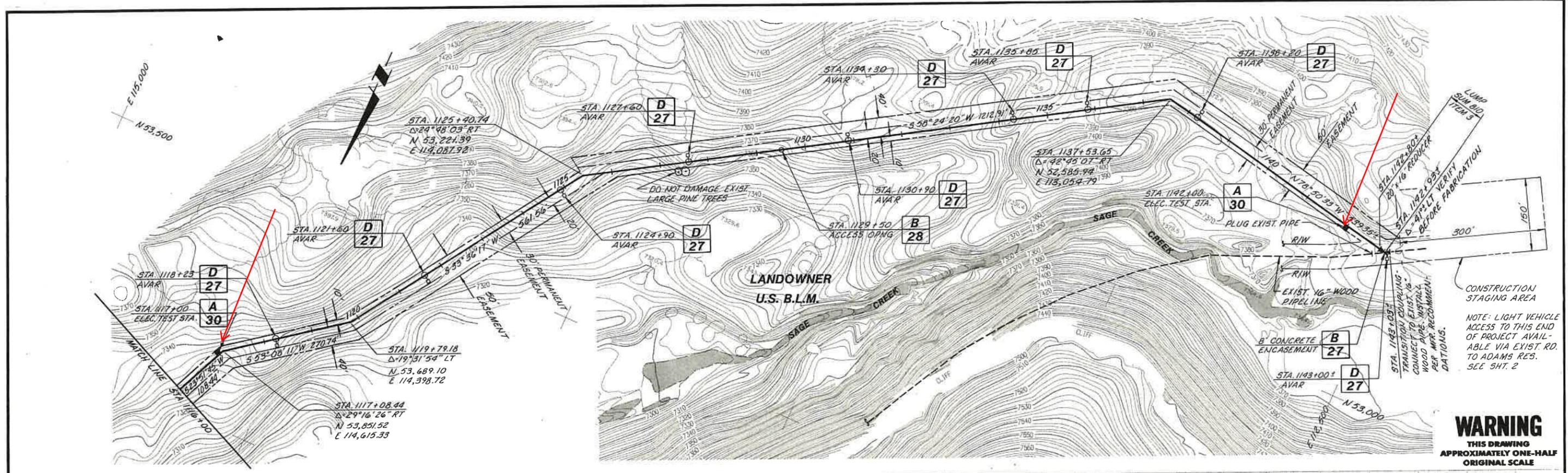
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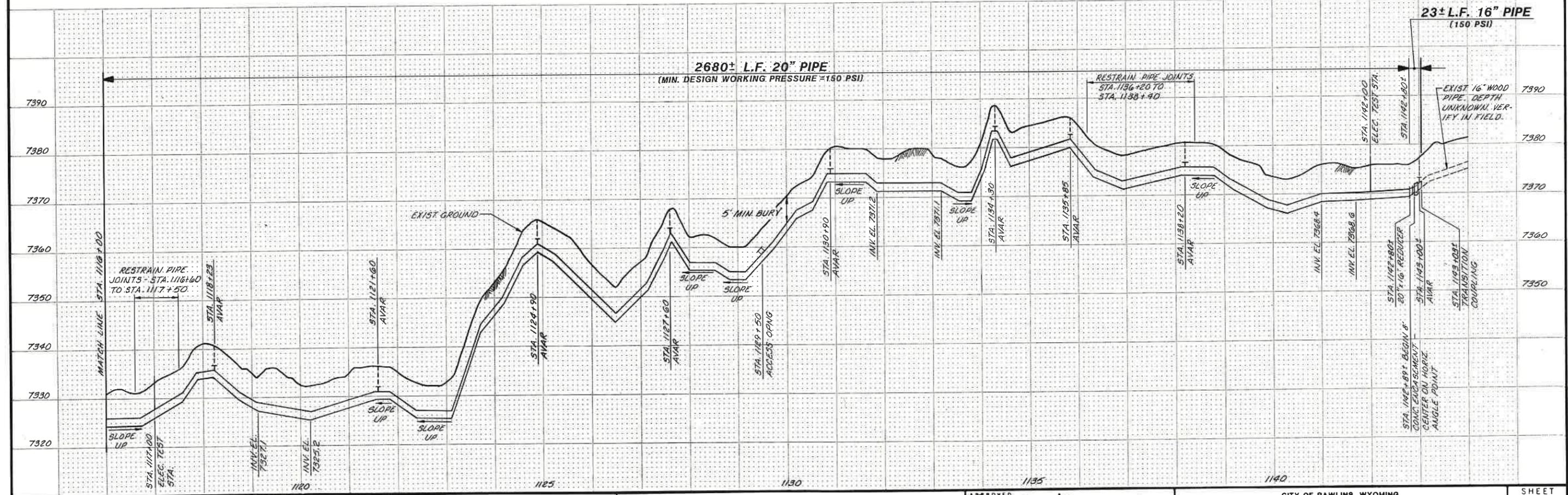
NOTE: WORK FROM STA. 1090+00 TO STA. 1142+93 SHALL NOT BEGIN BEFORE JULY 15, 1988. SEE SPEC. SECTION 01010-1.05C.

SCALE: HORZ.: 1" = 100' VERT.: 1" = 10'		DESIGNED <i>D. Suikonen</i> DRAWN <i>S. Hayward</i> CHECKED <i>R. J. Jansen</i>	SUBMITTED <i>Dennis Suikonen</i> PROJECT ENGINEER RECOMMENDED <i>Ronald J. Jansen</i> JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.	R.C.E. NO. 10116/87 DATE 10/16/87 A.D.C.G. R.C.E. NO. 10116/87 DATE 10/16/87	APPROVED <i>Gerry D. Miller</i> 10-19-87 DATE 10-19-87 APPROVED _____ DATE _____	CITY OF RAWLINS, WYOMING SAGE CREEK TRANSMISSION PIPELINE - PHASE II PIPELINE - PLAN AND PROFILE STA. 1090+00 TO STA. 1116+00	SHEET 25 OF 31 SHEETS
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JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.
 161 Mallard Drive, Boise, ID 83706-3974



WARNING
 THIS DRAWING
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 ORIGINAL SCALE



REV	DATE	BY	DESCRIPTION

SCALE:
 HORIZ: 1" = 100'
 VERT: 1" = 10'

DESIGNED *D. Suikkanen*
 DRAWN *R. Harris*
 CHECKED *R. Jozia*

SUBMITTED
Dennis Suikkanen
 PROJECT ENGINEER
 RECOMMENDED
James M. Montgomery
 JAMES M. MONTGOMERY
 CONSULTING ENGINEERS, INC.

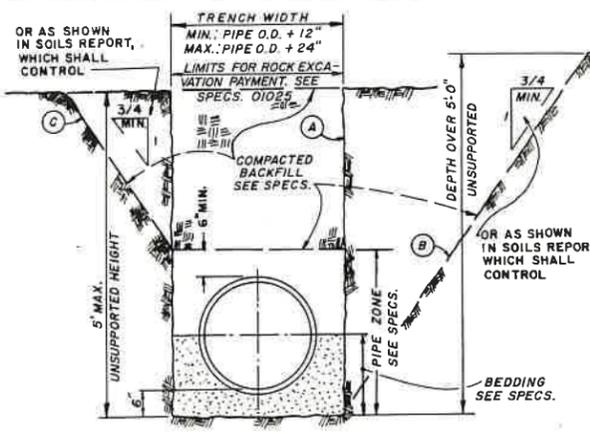
JAMES M. MONTGOMERY
 CONSULTING ENGINEERS, INC.
 161 Mallard Drive, Boise, ID 83706-3974



APPROVED
Gerry D. Miller 10-19-87
 DATE

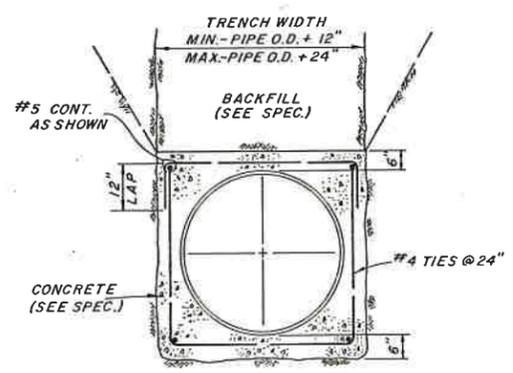
CITY OF RAWLINS, WYOMING
 SAGE CREEK TRANSMISSION PIPELINE - PHASE II
 PIPELINE - PLAN AND PROFILE
 STA. 1116+00 TO STA. 1143+03±

SHEET
26
 OF 31 SHEETS

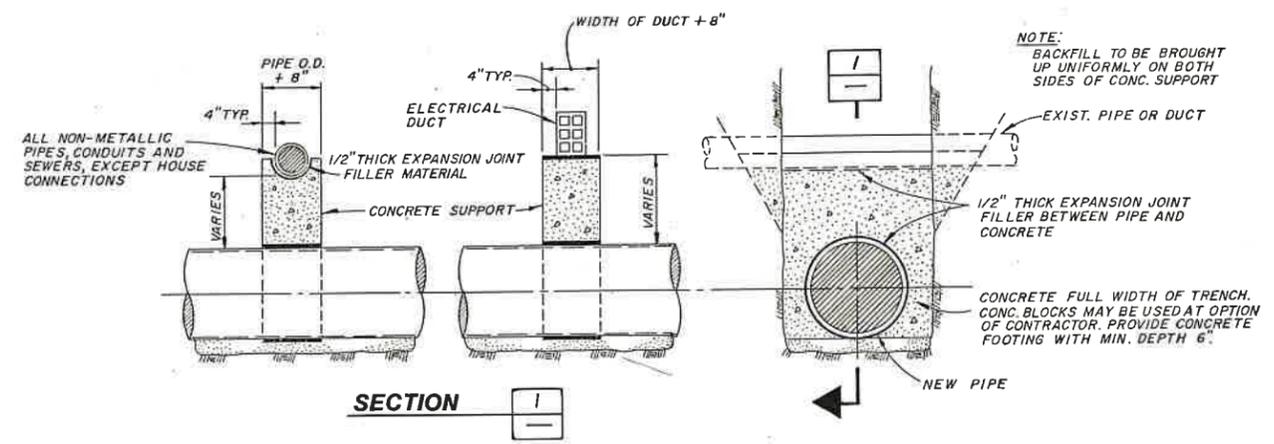


1. ALTERNATIVE TRENCH SECTIONS (A, B, and C) ARE FOR USE ONLY WHERE STABLE, COMPACT SOIL CONDITIONS EXIST. WHERE BOULDERS OR LARGE CONSTRUCTIONS ARE ENCOUNTERED, THE TRENCH SECTIONS MAY BE WIDER & DEEPER THAN THAT SHOWN:
- A. Vertical trench walls-Section
 - For depths up to 5 feet, no trench support is required.
 - For depths exceeding 5 feet, shoring or solid sheathing is required.
 - B. Sloping trench walls-Section
 - Sloping trench wall section shall not be used without approval of engineer, unless specifically designated on plans or specifications.
 - Except as approved by engineer, unsupported sloping trench walls shall not be steeper than 3/4 horis. to 1 vert. or as shown in soils report which shall control.
 - C. Combination of vertical and sloping trench walls-Section
 - Trench depths not exceeding 5 feet shall have vertical walls in pipe zone unless otherwise approved, by engineer, or where specified.
 - For trenches with combined walls and any depth exceeding 5 feet, design calculations by a registered civil engineer and approval by governing agency of supported methods are required.
2. WHERE WET, UNSTABLE OR RUNNING SOIL IS ENCOUNTERED, SOLID SHEATHING IS REQUIRED FOR ALL VERTICAL TRENCH WALLS.
- NOTE: TRENCH SECTIONS SHOWN DO NOT DESIGNATE PAY LINES.

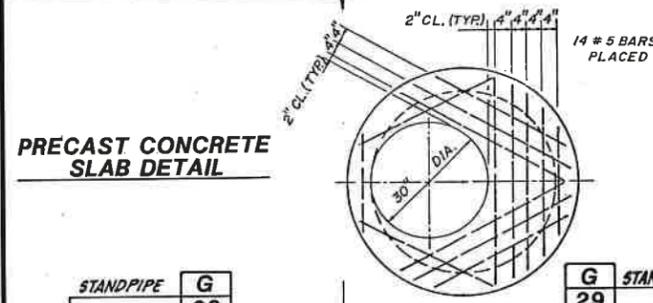
TYPICAL TRENCH SECTION A
VAR



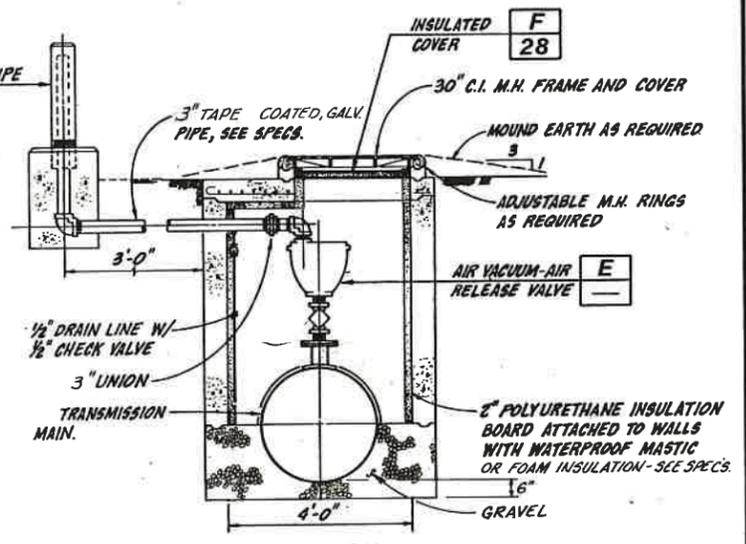
CONCRETE ENCASEMENT DETAIL B
VAR



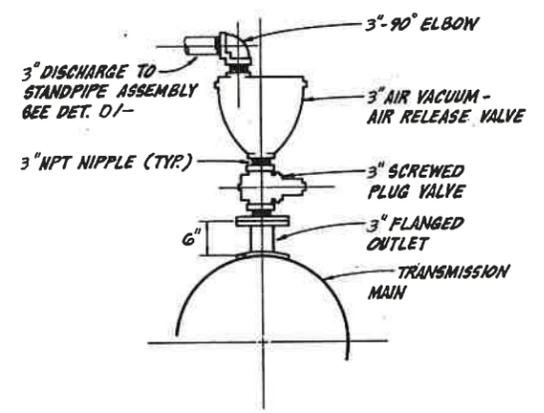
UNDERGROUND UTILITY SUPPORT DETAILS C
VAR



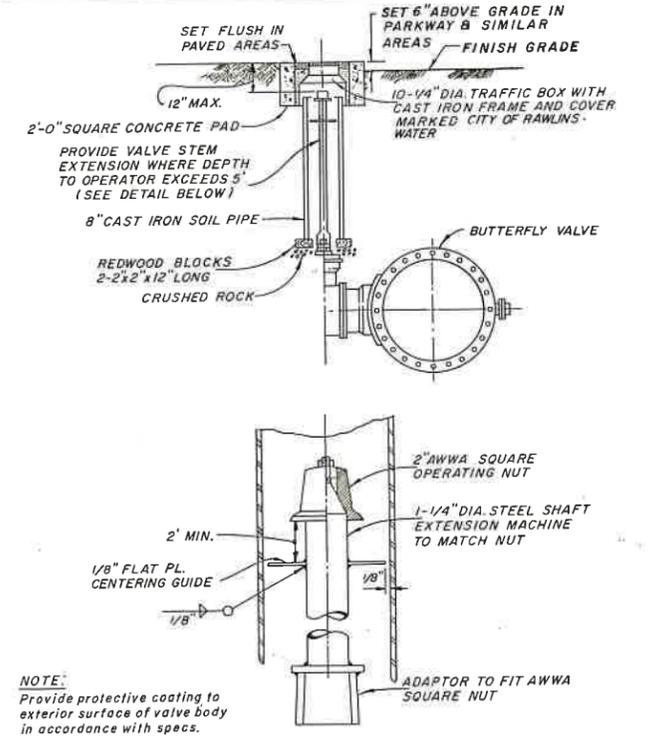
AIR VACUUM AND AIR RELEASE VALVE STRUCTURE D
VAR



AIR VACUUM AND AIR RELEASE VALVE ASSEMBLY E
VAR



BURIED VALVE INSTALLATION F
VAR



PRECAST CONCRETE SLAB DETAIL

WARNING
THIS DRAWING APPROXIMATELY ONE-HALF ORIGINAL SCALE

REV	DATE	BY	DESCRIPTION

SCALE: NONE

DESIGNED: JMM
DRAWN: JMM
CHECKED: JMM

SUBMITTED: *James M. Montgomery*
PROJECT ENGINEER
R.C.E. NO. 4066
DATE 10/16/87

RECOMMENDED: *James M. Montgomery*
JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.
R.C.E. NO. 4066
DATE 10/16/87

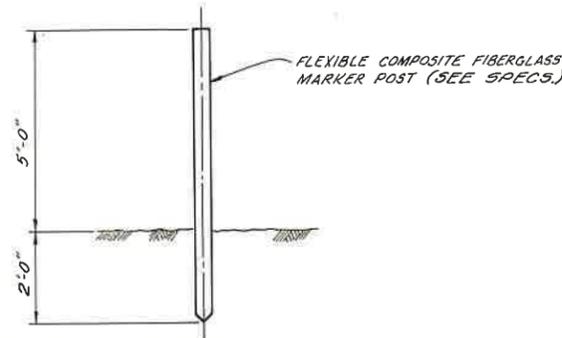
JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.



APPROVED: *James D. Miller* 10-19-87
DATE
APPROVED: _____ DATE

CITY OF RAWLINS, WYOMING
SAGE CREEK TRANSMISSION PIPELINE - PHASE II
PIPELINE DETAILS - I

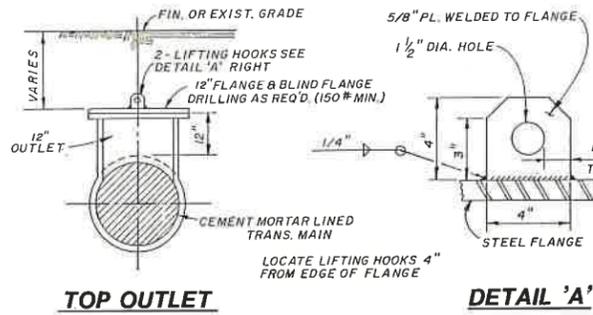
SHEET 27 OF 31 SHEETS



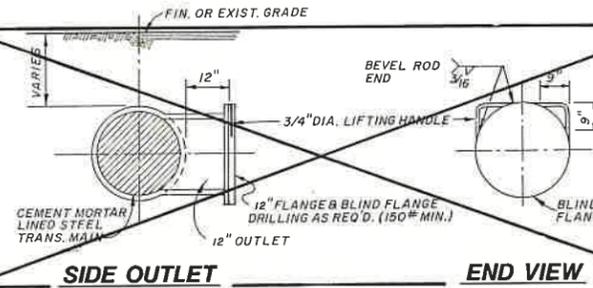
NOTE: MARKER POSTS SHALL BE INSTALLED FOR GENERAL TRANSMISSION PIPELINE LOCATION AT 1000 FT. INTERVALS AND AT ELECTRICAL TEST STATIONS, ACCESS OPENINGS, BURIED VALVES, BLOWOFFS, AND A.V.A.R. VALVES. MARKERS SHALL BE CARSONITE UTILITY I.D. POSTS OR EQUAL & SHALL BE YELLOW WITH REFLECTIVE BLUE LETTERING WITH IDENTIFIERS AS FOLLOWS:

LOCATION	LETTERING
GENERAL PIPELINE LOCATORS AT 1000 FT. INTERVALS	WATER PIPELINE
ELECTRICAL TEST STATIONS	ETS
ISOLATION VALVES	VALVE
ACCESS OPENINGS	PIPELINE ACCESS
BLOWOFFS	BLOWOFF
A.V.A.R. VALVES	AVAR

MARKER POST DETAIL **A**
VAR



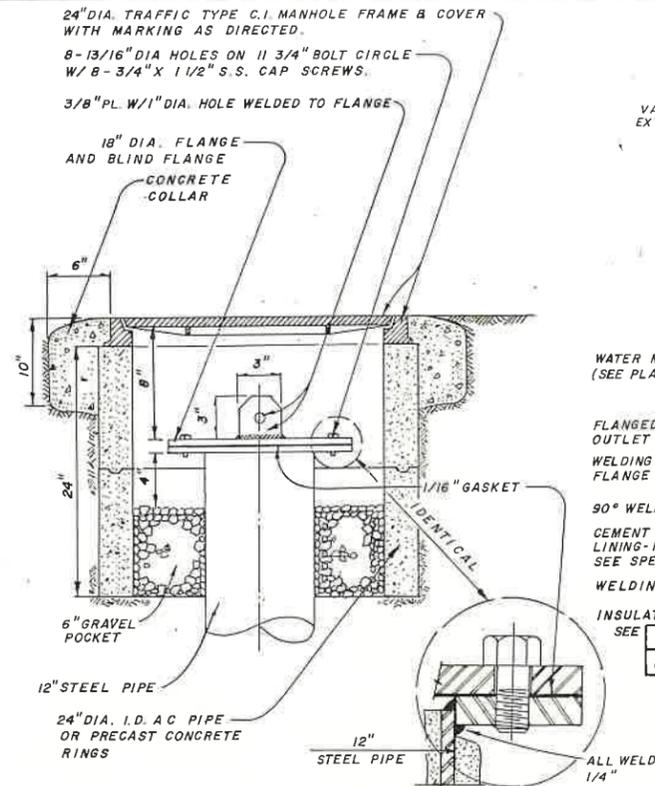
TOP OUTLET **A**



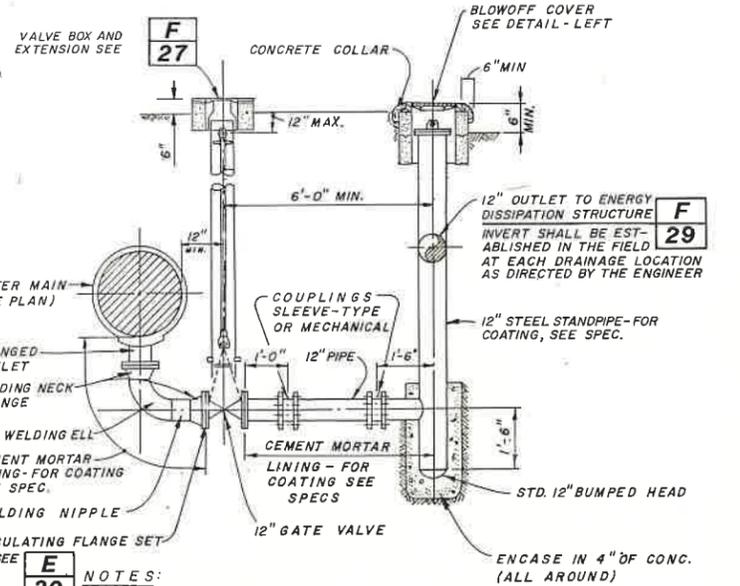
SIDE OUTLET **B**
END VIEW

NOTES:
1. ALL FERROUS SURFACES OF BURIED PIPE AND APPURTENANCES TO BE PROVIDED WITH PROTECTIVE COATINGS PER SPECIFICATIONS.
2. PROVIDE STAINLESS STEEL NUTS, BOLTS AND WASHERS.

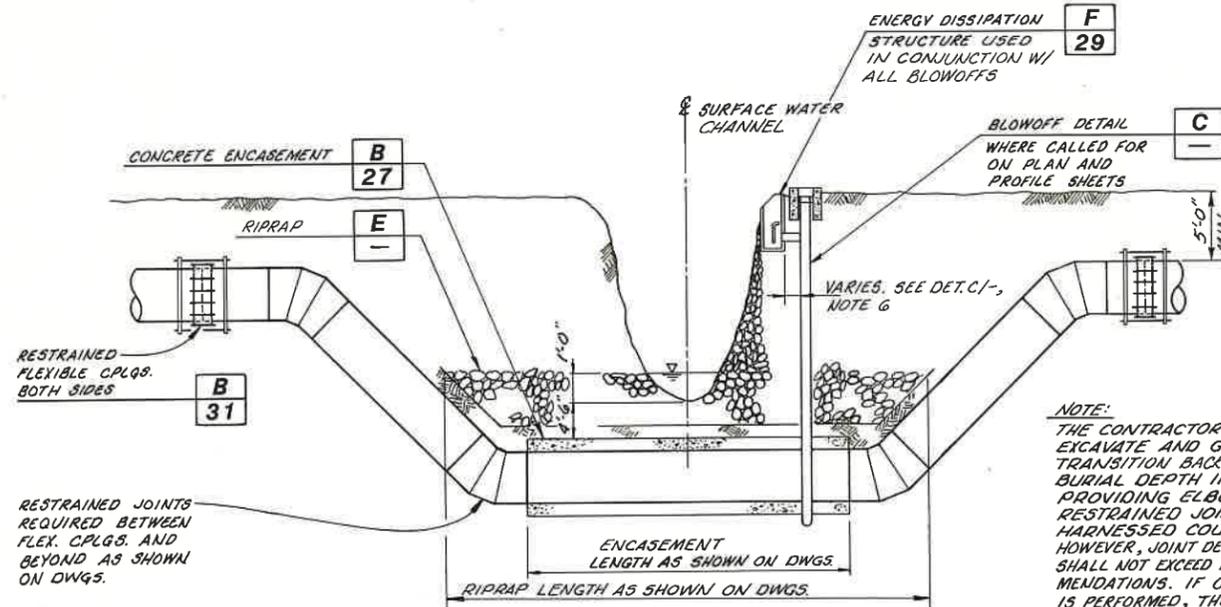
TYPICAL BURIED 12" ACCESS OPENING **B**
VAR



BLOWOFF DETAILS **C**
VAR

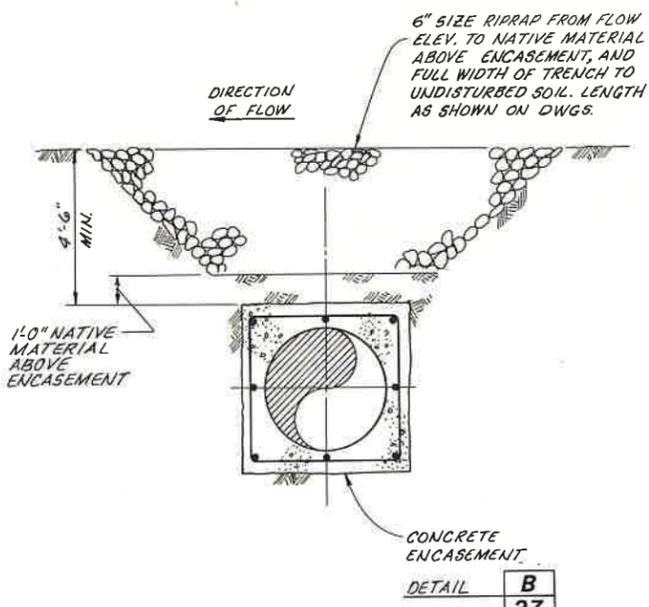


NOTES:
1. FLANGE AND BLIND FLANGE SAME CLASS AS PIPELINE.
2. CEMENT 1/16" THK. FULL COVER GASKET TO FLANGE.
3. ALL EXPOSED FERROUS SURFACES OF BURIED PIPE & APPURTENANCES TO BE PROVIDED WITH PROTECTIVE COATINGS PER SPECIFICATIONS.
4. PROVIDE STAINLESS STEEL NUTS, BOLTS & WASHERS TO BURIED FLANGES & COUPLINGS EXCEPT FOR NON-METALLIC WASHERS AS PART OF INSULATING FLANGE SET.
5. LOCATE BLOWOFFS AND ENERGY DISSIPATION STRUCTURE A MAXIMUM OF 15'-0" FROM RIGHT-OF-WAY BOUNDARY ON SAGE CREEK ROAD.
6. ADJUST HORIZONTAL DISTANCE FROM STANDPIPE TO ENERGY DISSIPATION STRUCTURE AS FIELD CONDITIONS REQUIRE. EA. BLOWOFF SHALL BE PROVIDED W/ A MIN. OF 50' OF 12" PIPE, CUT AS REQ'D.

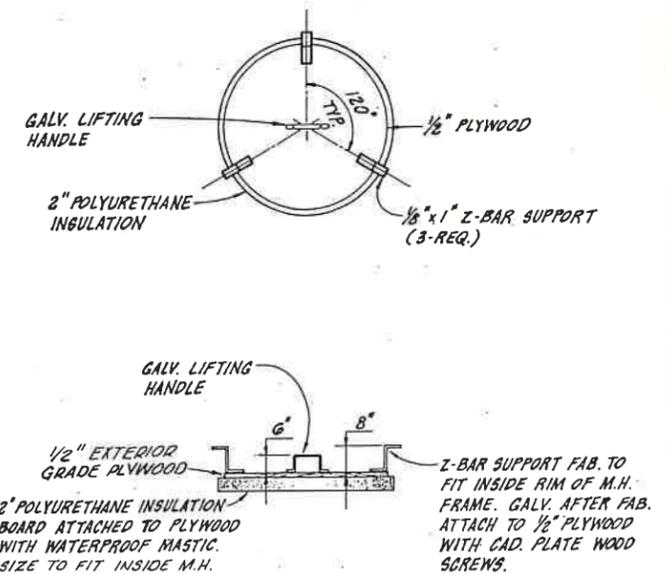


NOTE: THE CONTRACTOR MAY OVER-EXCAVATE AND GRADUALLY TRANSITION BACK TO 5'-0" BURIAL DEPTH IN LIEU OF PROVIDING ELBOWS, RESTRAINED JOINTS AND HARNESSSED COUPLINGS. HOWEVER, JOINT DEFLECTIONS SHALL NOT EXCEED MFR'S RECOMMENDATIONS. IF OVEREXCAVATION IS PERFORMED, THE TOP OF PIPE SHALL NOT BE PLACED MORE THAN 5' BELOW CHANNEL INVERT AND PIPE WALL THICKNESS DESIGN SHALL REFLECT INCREASED PIPE COVER CONDITIONS.

UNDERGROUND CROSSING OF SURFACE WATER COURSE **D**
VAR



RIPRAP DETAIL **E**
VAR



INSULATED COVER **F**
VAR

WARNING
THIS DRAWING APPROXIMATELY ONE-HALF ORIGINAL SCALE

REV	DATE	BY	DESCRIPTION

SCALE: NONE

DESIGNED: JMM
DRAWN: JMM
CHECKED: JMM

SUBMITTED: Dennis Suikkonen, PROJECT ENGINEER, 10/16/87, R.C.E. NO. A066, DATE 10/16/87
RECOMMENDED: James M. Montgomery, CONSULTING ENGINEERS, INC.

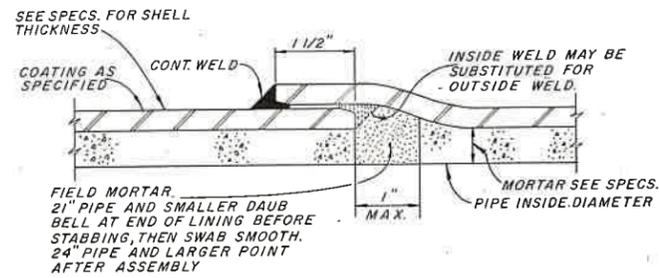
JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.



APPROVED: Jerry D. Miller, 10-19-87, DATE

CITY OF RAWLINS, WYOMING
SAGE CREEK TRANSMISSION PIPELINE - PHASE II
PIPELINE AND MECHANICAL DETAILS

SHEET 28 OF 31 SHEETS



LAP-WELDED SLIP JOINT

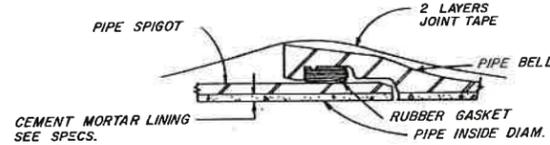


SINGLE-BUTT WELD JOINT

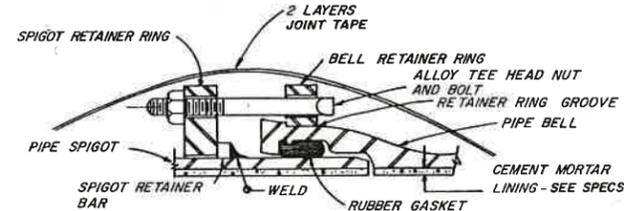


DOUBLE-BUTT WELD JOINT

WELDED STEEL PIPE A
VAR

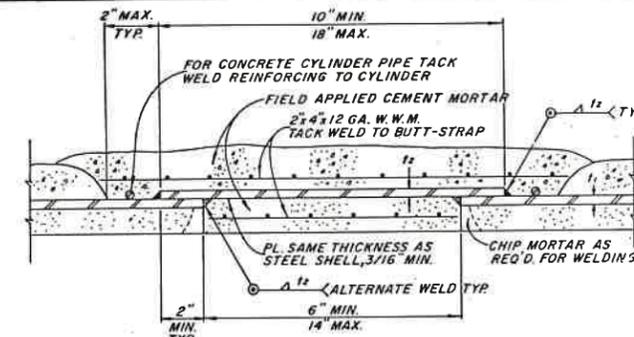


BELL AND SPIGOT RUBBER GASKET JOINT

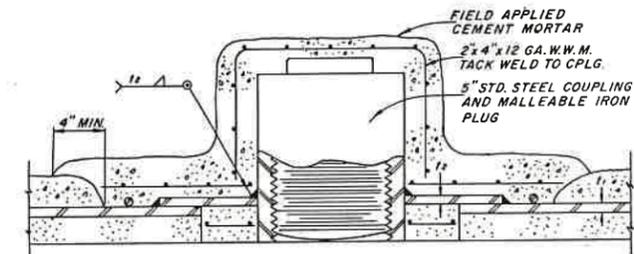


**RESTRAINED JOINT
OR APPROVED EQUAL**

DUCTILE IRON PIPE B
VAR

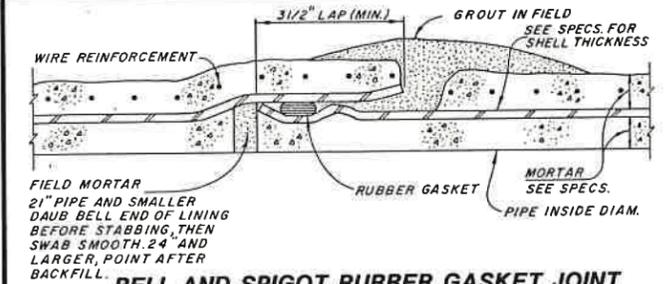


TYPICAL SECTION - BUTT-STRAP JOINT

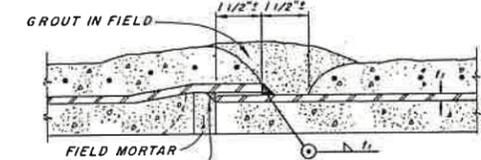


**TYPICAL HANDHOLE
(REQUIRED ON PIPE SMALLER THAN 24\"/>**

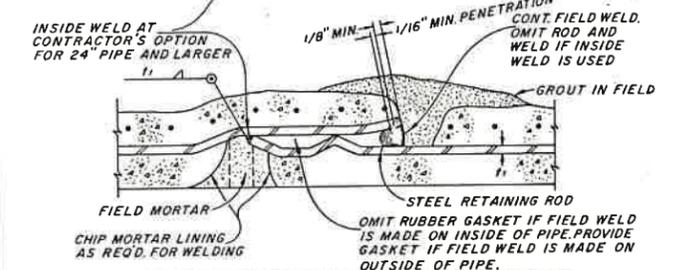
**BUTT-STRAP JOINT FOR
STEEL PIPE - MORTAR LINED AND COATED,
AND WELDED STEEL PIPE** C
VAR



BELL AND SPIGOT RUBBER GASKET JOINT

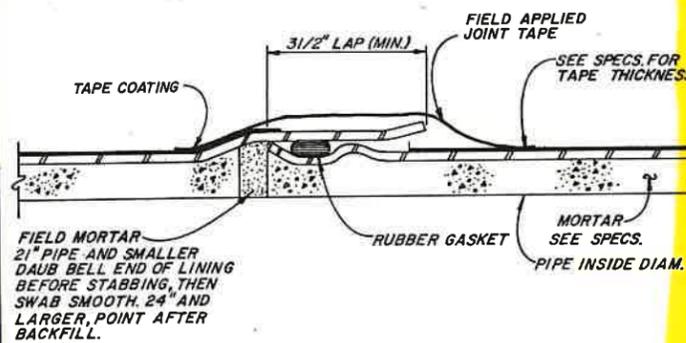


LAP WELDED SLIP JOINT



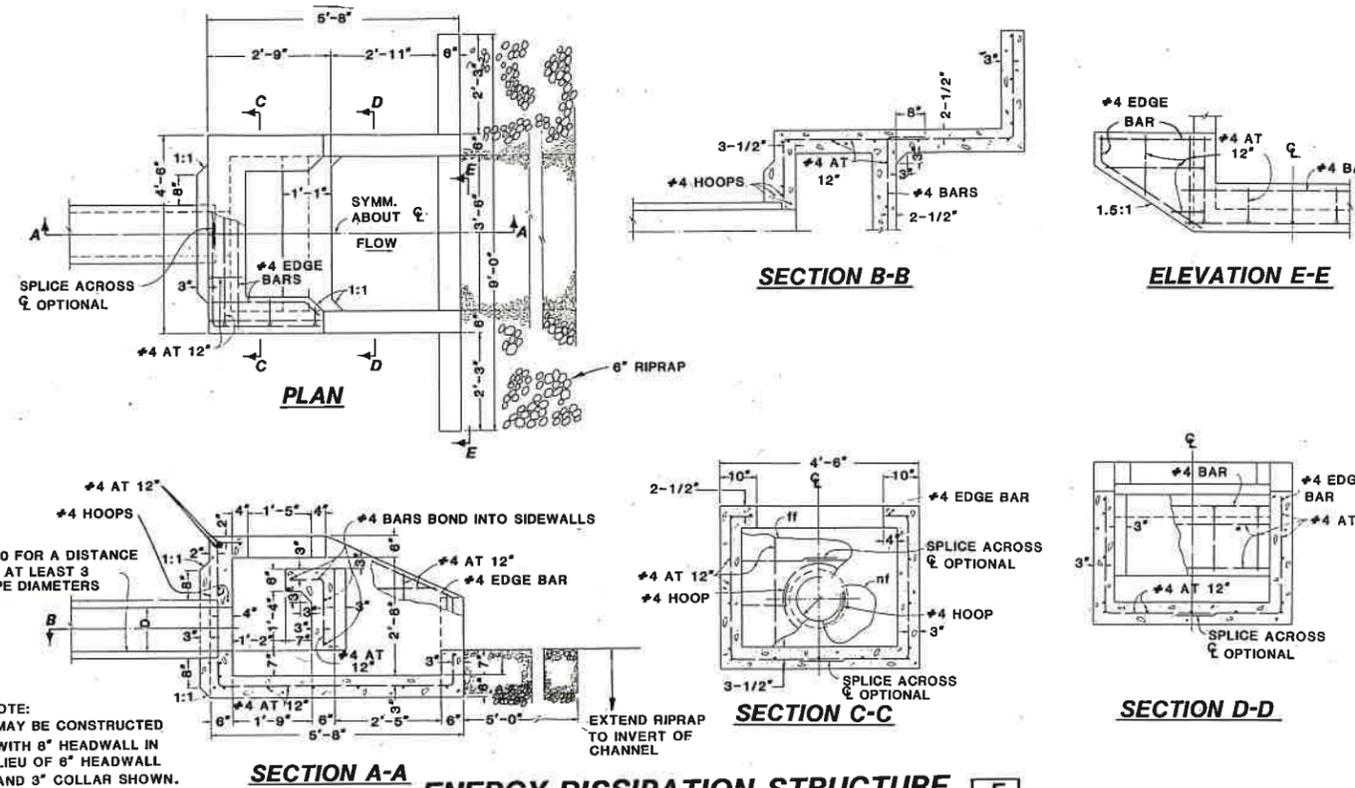
ALTERNATIVE FIELD WELDED JOINT

MORTAR LINED AND COATED STEEL PIPE D
VAR



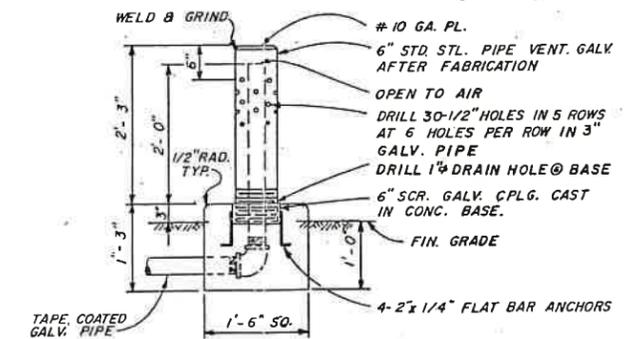
FIELD MORTAR
2 1/2\"/>

**MORTAR LINED AND
TAPE COATED STEEL PIPE** E
VAR



NOTE:
MAY BE CONSTRUCTED
WITH 8\"/>

SECTION A-A ENERGY DISSIPATION STRUCTURE F
VAR



WARNING
THIS DRAWING
APPROXIMATELY ONE-HALF
ORIGINAL SCALE

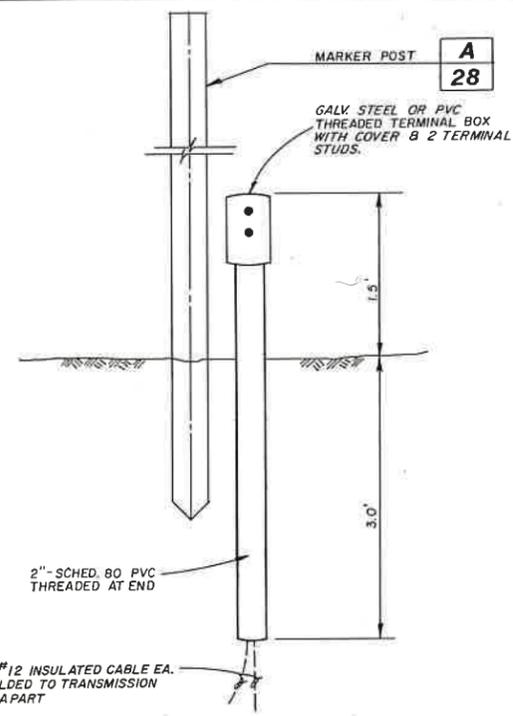
STANDPIPE ASSEMBLY G
VAR

REV	DATE	BY	DESCRIPTION

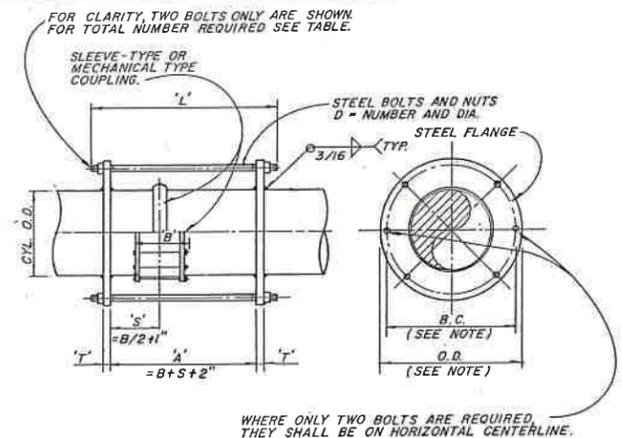
SCALE: NONE	DESIGNED: JMM	SUBMITTED: <i>Dennis Sullivan</i>	10/16/87
	DRAWN: JMM	PROJECT ENGINEER: R.C.E. NO.	DATE
	CHECKED: JMM	RECOMMENDED: <i>[Signature]</i>	10/16/87
		JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.	R.C.E. NO. DATE

JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC. *JMM*

APPROVED: *Jerry D. Miller* 10-19-87 DATE



**SINGLE POINT - TWO WIRE
ELECTROLYSIS TEST STATION FOR
GENERAL POTENTIAL MEASUREMENTS** A
28
VAR

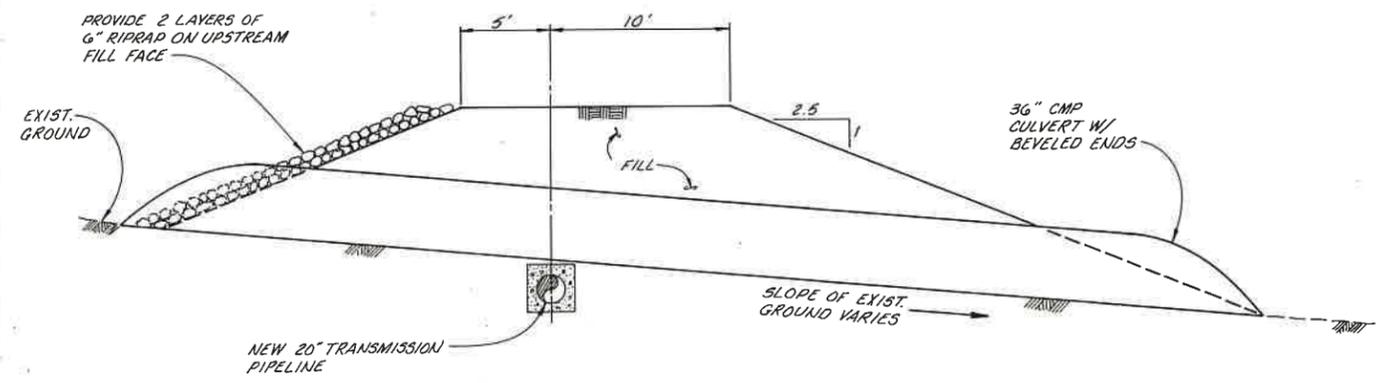


DIMENSIONS IN INCHES

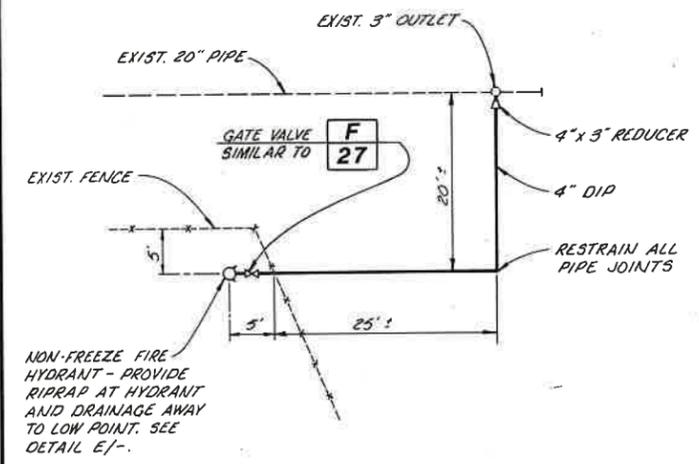
IDENT. MARK	NOM. DIA.	'A'	'T'	'S'	'D'	'L'
I	14"	24	1-1/2	8	2-11/8	30
II	16"	24	1-1/2	8	2-1 1/4	30
III	20"	24	1-1/2	8	2-1 1/4	30
IV	24"	24	1-1/2	8	4-1 1/4	30

1. B.C. (BOLT CIRCLE) AND O.D. (OUTSIDE DIAMETER) SHALL BE SIZED TO ENSURE 1/2" MINIMUM CLEARANCE AROUND COUPLING.
2. CONTRACTOR SHALL VERIFY THE ABOVE DIMENSIONS BASED ON ACTUAL COUPLINGS FURNISHED.
3. COATINGS SHALL BE PROVIDED AS INDICATED IN THE SPECS.
4. BONDING CABLES SHALL BE PROVIDED ON ALL HARNESSED COUPLINGS.

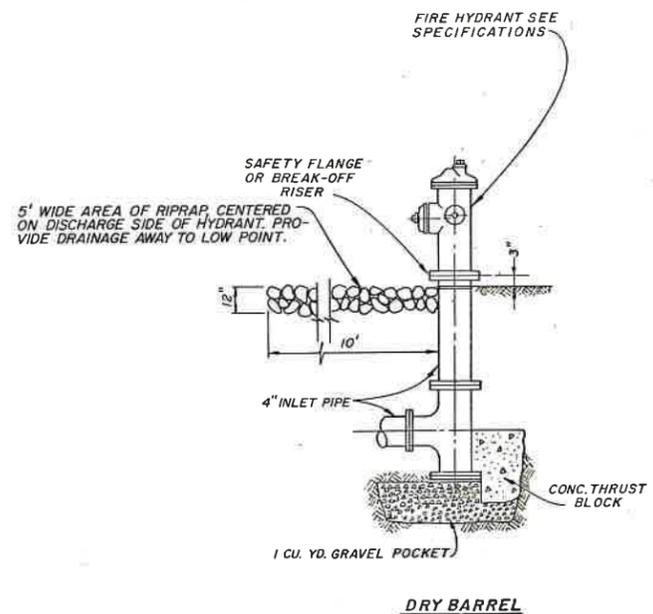
HARNESS SET B
VAR



FILL AND CULVERT DETAIL C
24



HYDRANT IN CONTROL VAULT AREA D
4



- NOTES:
1. All ferrous surfaces of pipe and appurtenances to be provided with protective coatings per specs.
 2. Provide stainless steel nuts, bolts and washers to buried flanges and couplings, except for non-metallic washers to be provided as part of insulating flange set.

NON-FREEZE FIRE HYDRANT E

WARNING
THIS DRAWING
APPROXIMATELY ONE-HALF
ORIGINAL SCALE

JOB NO. 12-245 J110 FILE

REV	DATE	BY	DESCRIPTION

SCALE:
NONE

DESIGNED *D. Suikonen*
DRAWN *A. Hays*
CHECKED *R. Sozin*

SUBMITTED
Dennis Suikonen
PROJECT ENGINEER
RECOMMENDED
Robert J. Sozin
DATE *10/16/87*
R.C.E. NO. *4066*
DATE *10/16/87*

**JAMES M. MONTGOMERY
CONSULTING ENGINEERS, INC.**
161 Mallard Drive, Boise, ID 83706 3974



APPROVED
Garry D. Miller *10-19-87*
DATE
APPROVED
DATE

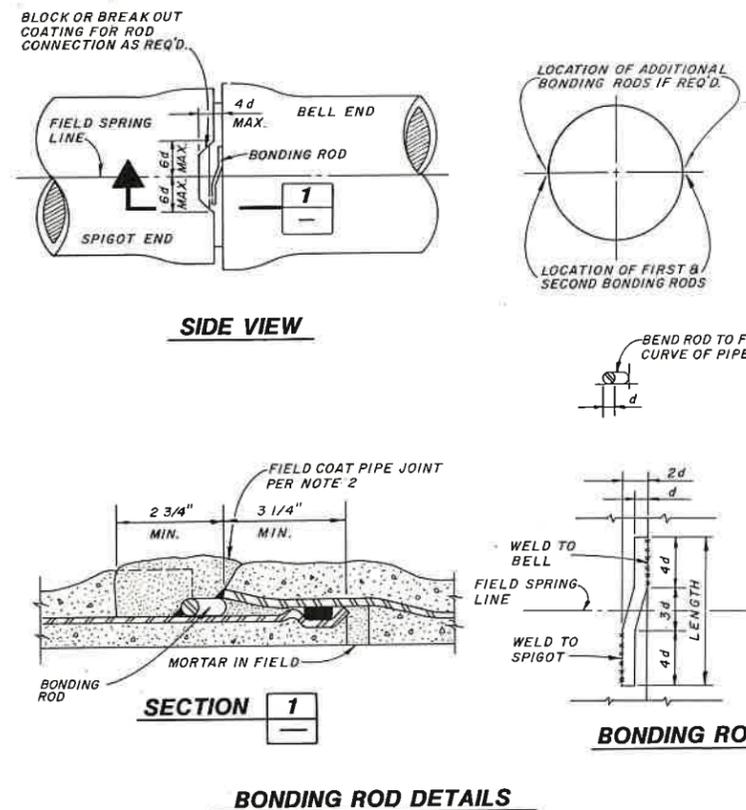
CITY OF RAWLINS, WYOMING	SHEET
SAGE CREEK TRANSMISSION PIPELINE - PHASE II	30
PIPELINE DETAILS - III	OF 31 SHEETS

- FOR LOCATION AND TYPE OF ELECTROLYSIS TEST STATION (ETS), SEE PLANS.
- ALL TEST CONNECTIONS ON BURIED STEEL PIPE TO BE MADE AT EXPOSED FIELD JOINTS. WHERE TEST CONNECTIONS ARE SHOWN 2" APART, THE CONNECTIONS ARE TO BE MADE ON THE SAME SIDE OF THE JOINT. IF CONNECTIONS CANNOT BE MADE EASILY 2" APART LONGITUDINALLY, THEY MAY BE SEPARATED CIRCUMFERENTIALLY INSTEAD.
- ALL TEST CABLE CONNECTIONS ON STEEL PIPE TO BE MADE BY THERMITE WELDING OR BRAZING.
- ALL WELDED OR BRAZED CABLE CONNECTIONS TO BE INSULATED WITH FLEXIBLE DIELECTRIC MATERIAL EQUIVALENT TO BITUMINOUS PIPE COATING.
- DELETED
- IN VICINITY OF UTILITY BOX AND IN VICINITY OF PIPE, PROVIDE TWO FEET OF SLACK COIL IN EACH WIRE.
- ALL UTILITY BOXES FOR ETS ARE TO BE PLACED DIRECTLY ABOVE YELLOW TEST CABLES.
- ALL EXPOSED COPPER (TEST LEADS, BONDS, ETC.) SHALL BE FULLY INSULATED WITH A FLEXIBLE DIELECTRIC MATERIAL EQUIVALENT TO BITUMINOUS PIPE COATING. CEMENT MORTAR AND EPOXY ARE NOT ACCEPTABLE. REMAINDER OF COATING TO BE PLACED OVER THE BITUMINOUS PIPE COATING SHALL BE SAME AS ON ADJACENT PIPE SECTIONS.
- ALL CABLE DIMENSIONS ARE AWG (AMERICAN WIRE GAGE).
- THE OUTER WIRES SHALL BE NO. 4, THE INNER WIRES SHALL BE NO. 12. IF THE CARRIER PIPE DIAMETER IS LESS THAN 12", A NO. 8 WIRE SHALL BE SUBSTITUTED FOR THE NO. 4.
- ALL TEST LEADS AND BONDING CABLES SHALL BE COPPER AND SHALL BE INSULATED WITH 600-VOLT CLASS INSULATION WITH MOISTURE AND ROT RESISTANT CHARACTERISTICS EQUIVALENT TO PVC, PE OR NEOPRENE.
- ALL TEST LEADS AND BONDING CABLES ARE SINGLE CONDUCTOR (1/C), STRANDED WELDING CABLE FOR SIZES NO. 6 AND LARGER, STRANDED OR SOLID FOR SIZES NO. 8 AND SMALLER.
- TEST LEADS SHALL NOT BE SPLICED.
- CABLE COLOR CODING SCHEME:
 - YELLOW AND GREEN TEST CABLES ARE ON CARRIER LINE.
 - YELLOW IS USED TO DESIGNATE SOUTH OR WEST AND GREEN TO DESIGNATE NORTH OR EAST ON THE CARRIER PIPE.
 - RED DESIGNATES A FOREIGN LINE OR STRUCTURE.
 - BLACK DESIGNATES AN ANODE CABLE, EXCEPT THAT ON CURRENT TEST STATION FOR ANODES, CABLE BETWEEN CARRIER LINE AND TEST BOARD SHALL BE YELLOW. SEE STD. DWG. C-242
- THE BANANA JACK OR MALE TERMINAL SHALL BE THE SAME COLOR AS THE TEST CABLE (I.E., YELLOW, GREEN OR RED) TO WHICH IT IS CONNECTED.
- EACH TERMINAL IN TEST BOARD SHALL BE IDENTIFIED ON THE TERMINAL STRIP BY PERMANENT MARKING.
- A ZINC RIBBON SPIRAL OF 20' LINEAL LENGTH SHALL BE INSTALLED IN A CIRCULAR PATTERN AROUND ALL ETS LOCATED IN AREAS WHERE THE PIPELINE RUNS PARALLEL TO HIGH VOLTAGE AC TRANSMISSION LINES, AT THE DISCRETION OF THE ENGINEER.

- FEMALE BANANA PLUGS SHALL BE USED ON ALL TERMINAL TEST BOARDS WHERE AC OR DC VOLTAGES ARE AN ELECTROCUTION HAZARDS (E.G. FAULT CURRENTS OR INDUCED AC FROM PARALLELING AC TRANSMISSION LINES.)
- MALE TERMINALS SHALL BE USED ON ALL TERMINAL TEST BOARDS WHERE THERE IS NO ELECTROCUTION HAZARD.

CATHODIC PROTECTION, TESTING AND BONDING - GENERAL NOTES

A
VAR



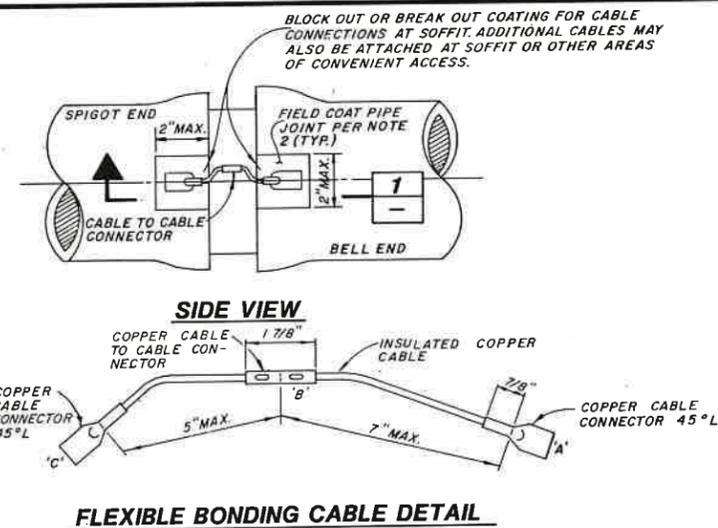
NOM. PIPE DIA. (IN.) / PRESSURE	24	20	16	14	12	8
CYLINDER WALL THICKNESS (IN.)	SEE	SEE	SEE	SEE	SEE	SEE
BONDING ROD DIA. (d) (IN.)	0.25	0.25	0.25	0.25	0.25	0.25
BONDING ROD LENGTH (IN.)	2.25	2.25	2.25	2.25	2.25	2.25
NO. OF RODS PER PIPE JOINT	2	2	2	2	2	2

- NOTES:
- AT THE CONTRACTOR'S OPTION, JOINT BOND MAY BE OF THE RIGID OR FLEXIBLE TYPE, BUT NOT BOTH FOR A CONTINUOUS REACH OF PIPELINE.
 - FIELD COAT PIPE JOINTS WITH THE SAME MATERIAL AS THE PIPE COATING. COVER BONDING CABLES WITH A MINIMUM THICKNESS OF MATERIAL, EQUAL TO THE SPECIFIED PIPE COATING THICKNESS.
 - FOR TESTING OF THE JOINT ELECTRICAL CONTINUITY SEE SPECIFICATION.
 - SEE STD. DETAIL A/- FOR ADDITIONAL NOTES.

WARNING
THIS DRAWING
APPROXIMATELY ONE-HALF
ORIGINAL SCALE

BURIED STEEL PIPE ELECTRICAL BONDING WITH BONDING RODS

B
VAR



NOM. PIPE DIA. (IN.)	24	20	16
CYLINDER WALL THICKNESS (IN.)	SEE	SEE	SPECS.
FLEXIBLE BONDING CABLE SIZE	AWG 10	AWG 10	AWG 2
FLEXIBLE BONDING CABLE LGT. (IN.)	SEE	SEE	DETAIL
NO. OF CABLES PER PIPE JOINT	2	2	2

- NOTES:
- AT THE CONTRACTOR'S OPTION, JOINT BOND MAY BE OF THE RIGID OR FLEXIBLE TYPE, BUT NOT BOTH FOR A CONTINUOUS REACH OF PIPELINE.
 - FIELD COAT PIPE JOINTS WITH THE SAME MATERIAL AS THE PIPE COATING. COVER BONDING CABLES WITH A MINIMUM THICKNESS OF MATERIAL, EQUAL TO THE SPECIFIED PIPE COATING THICKNESS.
 - SEE STD. DRWG. A/- FOR ADDITIONAL NOTES.

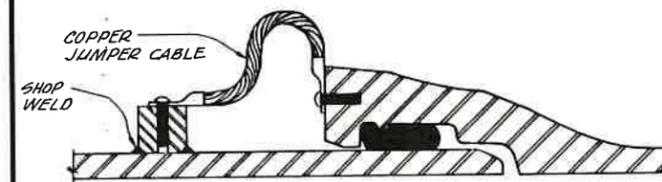
FIELD INSTALLATION PROCEDURE FOR FLEXIBLE BONDING CABLES

- LUG 'A' BRAZED TO BELL END BY PIPE MANUFACTURER.
- CABLE FROM 'A' TO 'B' BRAZED, SOLDERED OR CRIMPED BY PIPE MANUFACTURER TO BOTH 'A' + 'B'.
- LUG 'C' BRAZED TO SPIGOT END BY PIPE MANUFACTURER.
- CABLE FROM 'B' TO 'C' BRAZED, SOLDERED OR CRIMPED AT 'C' BY PIPE MANUFACTURER.
- CONNECTION OF 'B' TO CABLE FROM 'C' TO BE SOLDERED OR CRIMPED IN FIELD.
- AS AN ALTERNATIVE TO STEPS 1-5, CONTRACTOR MAY BREAK OUT COATING IN THE FIELD AND BRAZE OR THERMITE WELD CABLE TO BELL AND SPIGOT.
- CABLE SHALL BE MULTISTRAND COPPER WELDING CABLE FOR MAXIMUM FLEXIBILITY.
- 'A', 'B' AND 'C' TO BE INSULATED WITH RUBBER MASTIC ELECTRICAL INSULATING COMPOUND 1/16" THICK, GATES RUBBER OR APPROVED EQUAL.
- AFTER COMPLETING THE FIELD JOINT AT 'B' IN THE FIELD, TOUCH UP ALL EXPOSED COPPER WITH ELECTRICAL INSULATING COMPOUND 1/16" MIN. GATES RUBBER OR APPROVED EQUAL.
- FOLD CABLE ASSEMBLY INTO JOINT SPACE.

BURIED STEEL PIPE ELECTRICAL BONDING W/ FLEXIBLE BONDING CABLES

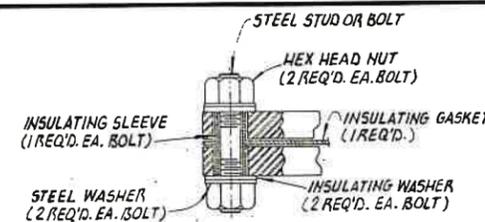
C
VAR

- NOTES:
- TWO COPPER CABLES ARE REQUIRED AT EACH JOINT.
 - TAPE COATING SHALL BE INSTALLED AFTER THE PIPE JOINTS ARE BONDED.



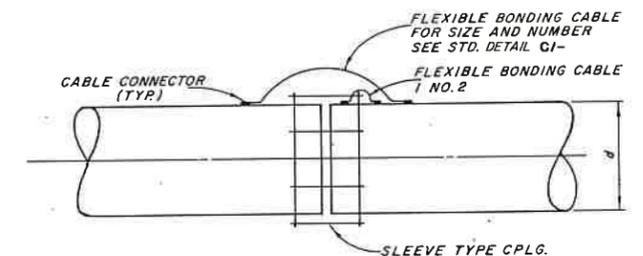
CAST IRON OR DUCTILE IRON PIPE ELECTRICAL BONDING DETAIL

D
VAR



TYPICAL INSULATING FLANGE

E
VAR



- NOTES:
- FLEXIBLE BONDING CABLES SHALL BE LONG ENOUGH TO ALLOW MAXIMUM MOVEMENT OF COUPLING.
 - SEE STD. DETAIL A/- ABOVE FOR ADDITIONAL NOTES.
 - INSULATED BONDING CABLES ARE REQUIRED FOR ALL SLEEVE-TYPE COUPLINGS.

SLEEVE-TYPE COUPLING ELECTRICAL BONDING DETAIL

F
VAR

REV	DATE	BY	DESCRIPTION

SCALE:
NONE

DESIGNED: JMM
DRAWN: JMM
CHECKED: JMM

SUBMITTED
PROJECT ENGINEER
RECOMMENDED
DATE
R.C.E. NO. 10/16/87
DATE
R.C.E. NO. 4066
DATE
10/16/87

JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.

JMM

APPROVED
DATE
APPROVED
DATE

CITY OF RAWLINS, WYOMING
SAGE CREEK TRANSMISSION PIPELINE - PHASE II

CATHODIC PROTECTION DETAILS

SHEET

31

OF 31 SHEETS