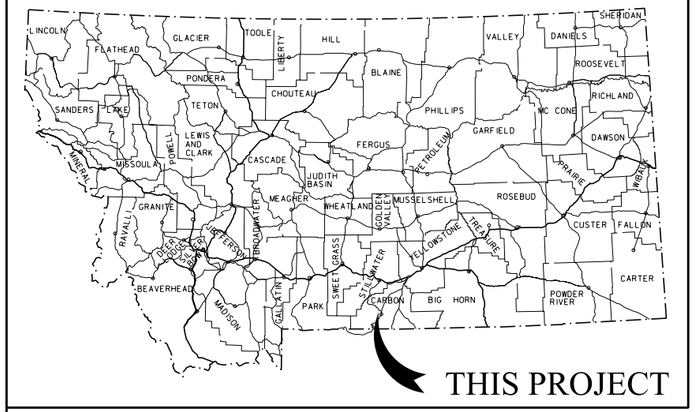


MONTANA DEPARTMENT OF TRANSPORTATION

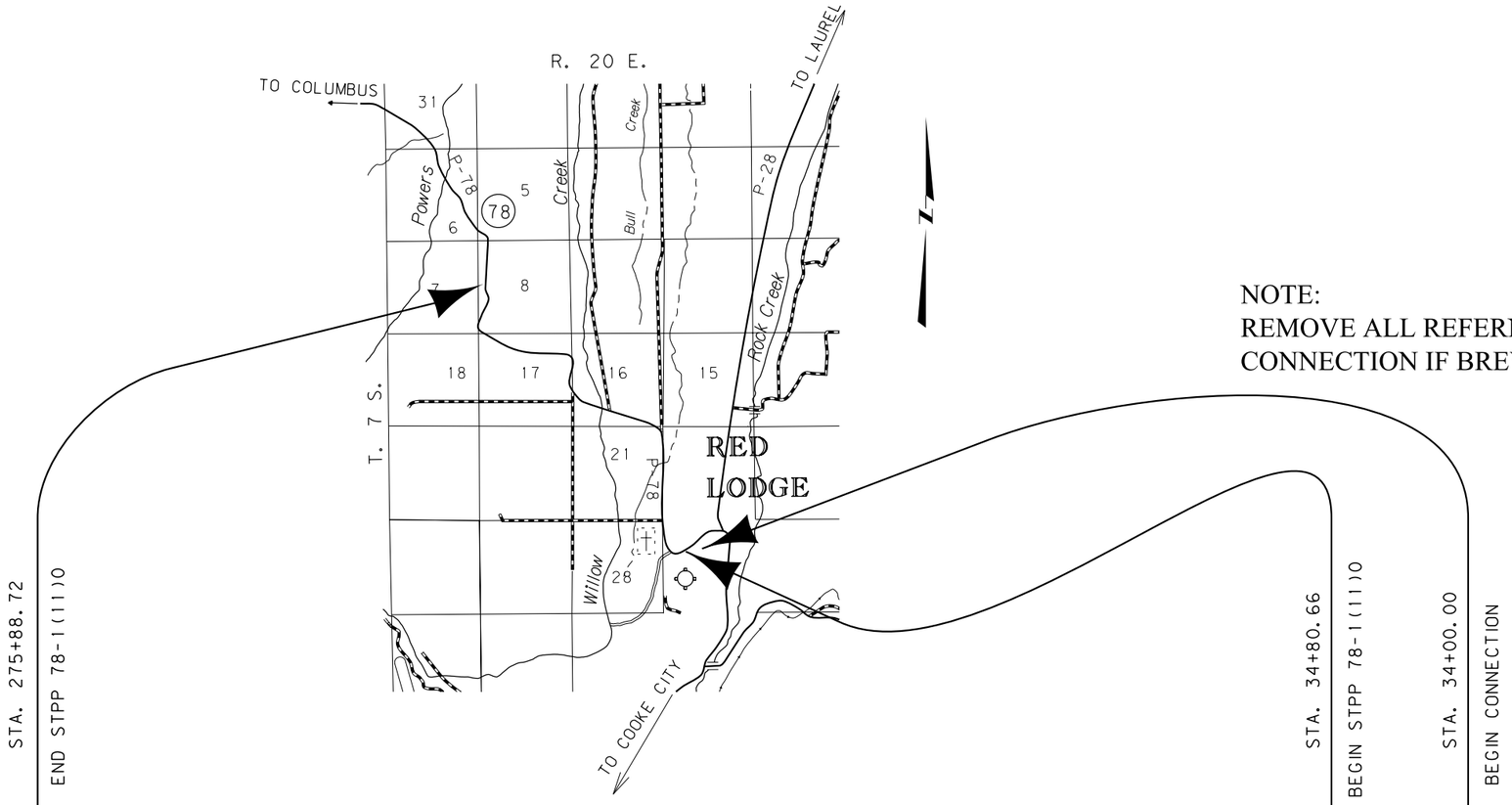
PRESENT 2010	A.D.T.	= 1770
LETTING 2012	A.D.T.	= 1870
DESIGN 2032	A.D.T.	= 3290
	D.H.V.	= 530
	TRUCKS	= 2.8%
	V.	= 55 MPH
	18 KIP ESAL'S	= 25
	GROWTH RATE	= 2.9%

FEDERAL AID PROJECT STPP 78-1(11)0
GRADE, GRAVEL PL. MIX SURF.
RED LODGE - NW
CARBON COUNTY

CSF= 0.99961552

SURFACING SOURCES -
CONTRACTOR FURNISHED

LENGTH 4.6 MILES



NOTE:
REMOVE ALL REFERNCES IN THE PLANS TO THE CONNECTION IF BREWERY HILL PROJECT IS LET FIRST

PLANS PREPARED BY

RELATED PROJECTS

ASSOCIATED PROJECT AGREEMENT NUMBERS	
R/W & I.C.	
P.E.	STPP 78-1(11)0

MONTANA DEPARTMENT OF TRANSPORTATION	
APPROVED : _____ 20 ____ MICHAEL T. TOOLEY DIRECTOR OF TRANSPORTATION BY _____ HIGHWAYS ENGINEER	MONTANA PAUL R. FERRY 8425PE REGISTERED PROFESSIONAL ENGINEER
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION	
APPROVED : _____ DIVISION ADMINISTRATOR	_____ DATE

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\4890rdtl001.dgn	DESIGNED BY	KEVIN ST. GEORGE	9/12/2010	ROAD PLANS	PRELIMINARY AGR
2		2/13/2013	REVIEWED BY	RYAN DAHLKE			
1		9:36:30 AM CPS - U2113	CHECKED BY	KEVIN FARRY		UPN 4890	

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NOTES

BASIS OF PLAN QUANTITIES

(QUANTITIES FOR ESTIMATING PURPOSES ONLY)

COMP. AGGREGATE WEIGHT	= 3750 LBS. PER CUBIC YARD
COMP. WEIGHT OF PL. MIX BIT. SURF.	= 4167 LBS. PER CUBIC YARD
ASPHALT CEMENT - GRADE S - 3/4" AGG.	= 5.2% OF PL.MIX BIT.SURF.
ASPHALT CEMENT - GRADE S - 1/2" AGG.	= 5.8% OF PL.MIX BIT.SURF.
ASPHALT CEMENT - GRADE D	= 6.0% OF PL.MIX BIT.SURF.
HYDRATED LIME	= 1.4% OF PL.MIX BIT.SURF.
BITUMINOUS MATERIAL	= 8.5 LBS. PER GAL.
TACK (ASPHALT SURFACES)	= 0.025 GAL. PER SQ.YARD (UNDILUTED)
TACK (ALL OTHER SURFACES)	= 0.05 GAL. PER SQ.YARD (UNDILUTED)
SEAL	= 0.42 GAL. PER SQ.YARD
COVER	= 25 LBS. PER SQ.YARD

APPROACHES

CONSTRUCT APPROACHES TO A 24' FINISHED TOP ON A 34' SUBGRADE UNLESS NOTED OTHERWISE IN THE PLANS.

PROVIDE THE FOLLOWING SURFACING:
0.20' PLANT MIX BITUMINOUS SURF.
0.60' CRUSHED AGGREGATE COURSE

PLANT MIX SURFACE ALL PUBLIC APPROACHES TO R/W.

QUANTITIES FOR ONE PUBLIC APPROACH:

AVERAGE LENGTH	= 67	linear feet
PLANT MIX BITUMINOUS SURF.	= 25	tons
CRUSHED AGGREGATE COURSE	= 51	cubic yards
ASPHALT CEMENT	= 1.30	tons
PRIME	=	tons

PLANT MIX SURFACE ALL PRIVATE APPROACHES TO R/W.

QUANTITIES FOR ONE PRIVATE APPROACH:

AVERAGE LENGTH	= 99	linear feet
PLANT MIX BITUMINOUS SURF.	= 37	tons
CRUSHED AGGREGATE COURSE	= 75	cubic yards
ASPHALT CEMENT	= 1.92	tons
PRIME	=	tons

GRAVEL SURFACE ALL FARM FIELD APPROACHES TO R/W WITH A 12' WIDE PLANT MIX STRIP ADJACENT AND PARALLEL TO THE ROADWAY.

QUANTITIES FOR ONE FARM FIELD APPROACH:

AVERAGE LENGTH	= 55	linear feet
PLANT MIX BITUMINOUS SURF.	= 4	tons
CRUSHED AGGREGATE COURSE	= 42	cubic yards
ASPHALT CEMENT	= 0.2	tons
PRIME	=	tons

MAILBOXES & MAILBOX TURNOUTS

CONSTRUCT MAILBOX TURNOUTS AT LOCATIONS SHOWN IN THE PLANS OR AS STAKED BY THE ENGINEER.

PROVIDE THE FOLLOWING SURFACING:
MAINLINE linear feet PLANT MIX BITUMINOUS SURF.
MAINLINE linear feet CRUSHED AGGREGATE COURSE

QUANTITIES FOR ONE APPROACH MAILBOX TURNOUT (FOR ESTIMATING PURPOSES ONLY):

AVERAGE LENGTH	= 69	linear feet
PLANT MIX BITUMINOUS SURF.	= 11	tons
CRUSHED AGGREGATE COURSE	= 20	cubic yards
ASPHALT CEMENT	= 0.6	tons
PRIME	=	tons

LIMITED ACCESS CONTROL

THIS PROJECT IS A LIMITED ACCESS CONTROL FACILITY. OBTAIN APPROVAL FROM THE CHIEF OF THE RIGHT-OF-WAY BUREAU PRIOR TO ADDING, DELETING OR RELOCATING ANY APPROACHES.

CLEARING AND GRUBBING

CLEAR AND GRUB TO CONSTRUCTION LIMITS. INCLUDE THE COST OF CLEARING AND GRUBBING IN THE UNIT PRICE BID FOR UNCLASSIFIED EXCAVATION

TEMPORARY EROSION AND SEDIMENT CONTROL

REFER TO SECTION 208 OF THE MDT DETAILED DRAWINGS FOR EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES.

ALL INSTALLED TEMPORARY EROSION CONTROL MATERIALS IN OR ADJACENT TO WATERS OF THE U.S. MUST BE COMPOSED AND CONSTRUCTED OF 100% BIODEGRADABLE FIBERS, NETING AND STITCHING.

UTILITIES

CALL THE UTILITIES UNDERGROUND LOCATION CENTER (1-800-424-5555) OR OTHER NOTIFICATION SYSTEM FOR THE MARKING AND LOCATION OF ALL LINES AND SERVICE BEFORE EXCAVATING. ALL CLEARANCES OR DEPTHS PROVIDED FOR UTILITIES ARE FROM EXISTING GROUND LINE.

PUBLIC LAND SURVEY MONUMENTS

ALL MONUMENTS TO BE REMOVED AND RELOCATED OR RESET BY STATE FORCES.

MISC. TO BE MOVED OR REMOVED BY OTHERS

ALL PRIVATELY OWNED SIGNS TO BE REMOVED BY OWNER.
ALL STATE-OWNED SIGNS TO BE MOVED BY STATE FORCES.

COMBINATION SCALE FACTOR

ALL COORDINATES ARE STATE PLANE (SEE CONTROL DIAGRAM).
CSF FROM THE BEGINNING OF PROJECT TO RP 5.1 IS 0.99961552.

WETLANDS

WETLANDS EXIST ADJACENT TO THE ROADWAY AND BEYOND THE PROJECT LIMITS. WETLAND AREAS AND PERMITTED WETLAND IMPACT AREAS WITHIN THE PROJECT LIMITS HAVE BEEN DELINEATED AND ARE SHOWN ON THE PLANS. ANY ACTION IMPACTING WETLAND AREAS WITHOUT THE APPROPRIATE PERMITTING IS THE RESPONSIBILITY OF THE CONTRACTOR.

DELINEATED WETLAND AREAS

PERMITTED WETLAND IMPACTED AREAS

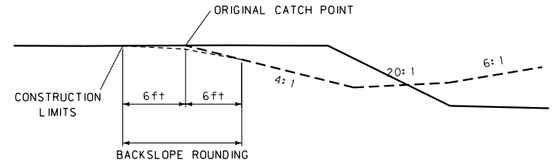
WETLAND NUMBER	acres DELINEATED WETLAND AREA	acres IMPACTED WETLAND AREA	STATION
WL-2	0.07	0.05	64+71 - 66+20 LT
WL-3	0.02	0.0	70+43 - 70+97 RT
WL-4	2.05	0.14	72+59 - 82+34 LT
WL-5	0.58	0.09	87+47 - 90+44 LT
WL-6	0.03	0.0	113+78 - 115+00 RT
WL-7	0.78	0.18	112+80 RT - 121+82 LT
WL-8	1.63	0.11	144+85 LT - 149+75 RT
WL-9	1.69	0.47	161+70 LT - 168+65 RT
WL-10	0.33	0.14	199+78 RT - 201+36 LT
WL-11	0.78	0.13	219+90 RT - 222+97 LT
WL-12	0.76	0.11	229+31 RT - 235+00 LT
WL-13	1.40	0.30	250+52 LT - 253+93 RT
WL-14	0.29	0.08	266+95 LT - 269+09 RT
TOTAL	10.41	1.80	

SOILS INFORMATION

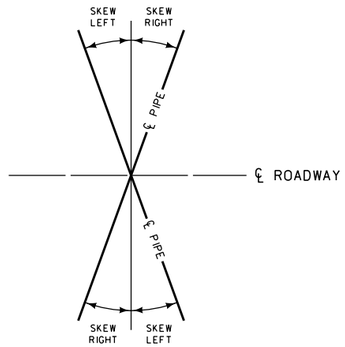
THE SOILS INFORMATION ON THE PLAN, PROFILE & CROSS SECTION SHEETS IS A BRIEF SUMMARY OF THE SOILS CLASSES. TO OBTAIN ANY ADDITIONAL AVAILABLE SOILS INFORMATION, CONTACT THE MDT GEOTECHNICAL SECTION AT (406) 444-6281.

BACKSLOPE ROUNDING

BACKSLOPE ROUNDING IS NOT MEASURED FOR PAYMENT. INCLUDE THE COST OF BACKSLOPE ROUNDING IN THE UNIT PRICE BID FOR UNCLASSIFIED EXCAVATION.



SKEW DIAGRAM



SUMMARY

CULVERTS (INCLUDED IN CULVERT SUMMARY RECAP)

STATION	BASIC BID ITEMS											PIPE OPTIONS in		COATING *	END SECTIONS		cubic yards				square yards	linear feet	SKEW ANGLE	CULVERT IN PL. in x ft	REMARKS
	CULVERT PIPE in	linear feet				cubic yards					square yards						FOUND-ATION MATERIAL	BEDDING MATERIAL	CLASS "DD" CONCRETE	CULVERT RIPRAP	GEOTEX-TILE #	HEIGHT OF COVER			
		LENGTH OF PIPE	RELAY CULVERT	CLEAN CULVERT	REMOVE CULVERT	CULVERT EXC. **	FOUND-ATION MATERIAL	BEDDING MATERIAL	CLASS "DD" CONCRETE	CULVERT RIPRAP CLASS I	GEOTEX-TILE #	CONCRETE STEEL - 2 2/3 x 1/2 CORR. ALUMINUM - 2 2/3 x 1/2 CORR.	CLASS OR THK.		LEFT	RIGHT				CLASS I					
42+23					56																			36" x 56' CMP	
42+28					58																			18" x 58' CMP	
45+67	72 x 48	132			80			64.2	6.2			72 RCB			2:1 SLOPE	2:1 SLOPE		64.2	6.2			3.2	23 LT	6'-5" x 4'-9" x 80' SPPA	PRYDE DITCH
46+00					48																			3" x 10" x 24' RCB 2" x 10" x 24' RCB	65' RT
45+96	72 x 36	130			78			63.2	6.0			72 RCB			2:1 SLOPE	2:1 SLOPE		63.2	6.0			2.3	24 LT	65" x 48" x 78' CMPA	HAARA DITCH
47+77	72 x 36	132			82			64.2	6.0			72 RCB			SQ.	SQ.		64.2	6.0			2.4	40 LT	48" x 82' CMP	MARYOTT DITCH
48+32	24	116			60				2			24 RCP	CL 3		SQ.	SQ.			2			2	17 LT	24" x 60' CMP	MCDONALD DITCH
68+42	24	86			60							24 RCP	CL 3		FETS	FETS						2.1		24" x 60' CMP	MCDONALD DITCH
81+45					60																			24" x 60' CMP	
86+00					60																			18" x 60' CMP	
91+55					41																			96" x 24" x 41' RCB	MCDONALD DITCH
91+77	96 x 36	126						90.3	1		41.8	96 RCB			SEE DETAIL	SEE DETAIL		90.3	1		41.8	2.2	38 LT		MCDONALD DITCH
118+68	36	118			54							36 RCP	CL 2		FETS	FETS						4.9	30 LT	36" x 54' CMP	IRRIGATION REPLACE EXISTING PIPE WITH IRR. DITCH - RT
136+82	24	90			52							24 RCP 24 CSP 24 CAP	CL 3 .109 .105		FETS FETS FETS	FETS FETS FETS						4.0		18" x 52' CMP	DRAINAGE
138+77	36	92			56							36 RCP	CL 2		FETS	FETS						3.8	12 LT	36" x 56' CMP	IRRIGATION
148+34					80																			60" x 80' CMP	WILLOW CREEK
148+58	96	198						261	11.6	72		96 CSP	.109		2:1 BEVEL	2:1 BEVEL		261	11.6	72		14.9	28 LT		WILLOW CREEK
163+69					64																			36" x 64' CMP	WILLOW CREEK TRIBUTARY
164+65	84	114					74	78	10.4	26	260	84 CSP	.109		2:1 BEVEL	2:1 BEVEL	74	78	10.4	26	260	8.9	8 LT		WILLOW CREEK TRIBUTARY
165+92					97																			18" x 97' CMP	60' - 148' LT
169+24	24	138							1.9			24 RCP BROKE BACK	CL 3		CONC. CUTOFF WALLS	CONC. CUTOFF WALLS						7.8	18 LT		IRRIGATION
11+77	24	52			34							24 RCP	CL 3		CONC. CUTOFF WALLS	CONC. CUTOFF WALLS							13 LT	18" x 40' CMP	ROATS LANE ALIGNMENT IRR
200+35	84	128					85	135	6.8	16	301	84 CSP	.109		2:1 BEVEL	2:1 BEVEL	85	135	6.8	16	301	7.3	24 RT		WILLOW CREEK TRIBUTARY
200+88					56																			48" x 56' CMP	WILLOW CREEK TRIBUTARY
205+06					60																			24" x 60' CMP	IRRIGATION
208+32					140																			18" x 140' CMP	IRRIGATION SYPHON
TOTAL	~	~			1376	~	159	755.9	51.9	114	602.8	~	~		~	~	~	~	~	~	~	~	~	~	

STABILIZATION
* SEE STANDARD SPEC. SECT.
** FOR INFORMATION ONLY

02/13/2013
Highways & Engineering
Division

HYDRAULIC DATA SUMMARY *

STATION	STREAM NAME (IF NAMED)	SIZE / TYPE STRUCTURE (1)(1A)(4)	DESIGN FLOOD			BASE FLOOD (1%)		OVERTOPPING FLOOD (2)(3)			REMARKS (FLOOD OF RECORD, Qp(max), etc.) (5)
			MAGNITUDE (cfs)	FREQUENCY (%)	H.W. ELEV. (ft.)	MAGNITUDE (cfs)	H.W. ELEV. (ft.)	MAGNITUDE (cfs)	APPROX. FREQUENCY (%)	H.W. ELEV. (ft.)	
148+58	WILLOW CREEK	96" CSP	314	2	5515.5	378	5516.6	475	0.4	5523.2	
164+65	TRIBUTARY OF WILLOW CREEK	84" CSP	104	2	5507.2	125	5507.7	331	0.1	5516.2	
200+35	TRIBUTARY OF WILLOW CREEK	84" CSP	142	2	5471.3	170	5471.7	248	0.2	5474.6	
221+69	TRIBUTARY OF WILLOW CREEK	84" CSP	80	2	5431.2	96	5431.6	415	0.1	5450.1	
231+77	TRIBUTARY OF WILLOW CREEK	84" CSP	68	2	5442.6	82	5443.0	422	0.1	5454.6	
252+69		36" DRAIN	32	2	5447.8	48	5449.2	103	0.3	5470.5	
267+23		30" DRAIN	26	2	5462.9	38	5464.6	72	0.3	5476.5	

NOTES :

* H.W. ELEVATIONS SHOWN ARE BASED UPON PEAK FLOW ANALYSIS UNLESS NOTED IN REMARKS COLUMN.

(1) STRUCTURE SIZE OR TYPE AND RELATED HYDRAULIC DATA MAY NOT REFLECT CHANGES MADE DUE TO R/W OR OTHER CONSIDERATIONS (I.E., STOCKPASS ADDED, STRUCTURE SIZE OR TYPE CHANGED, ROAD GRADE CHANGED DURING CONSTRUCTION, ETC.)

(1A) BRIDGE LENGTH SHOWN EQUALS THE WATER SURFACE WIDTH IN THE OPENING AT THE DESIGN H.W. ELEVATION MEASURED NORMAL TO FLOW.

(2) OVERTOPPING IS DEFINED AS FLOW OVER THE ROAD, FLOW THROUGH A SIGNIFICANT RELIEF STRUCTURE OR FLOW OVER THE BASIN DIVIDE WHICHEVER IS LOWER.

(3) FOR THOSE CROSSINGS NOTED BY Qp(max) IN THE REMARKS COLUMN OVERTOPPING DOES NOT OCCUR AND THE FLOOD MAGNITUDE LISTED CORRESPONDS TO THE FLOOD OF SECTION 650.115 (a) (1) (ii) OF FEDERAL-AID POLICY GUIDE; SUBCHAPTER G, PART 650, SUBPART A (DEC. 1991)
THE FLOOD SPECIFIED IS SUBJECT TO STATE-OF-THE-ART CAPABILITY TO ESTIMATE THE EXCEEDANCE PROBABILITY.
(PIPES 0.5%; BRIDGE .2%)

(4) HIGH WATER ELEVATIONS MAY VARY SLIGHTLY DEPENDING UPON THE PIPE OPTION SELECTED.

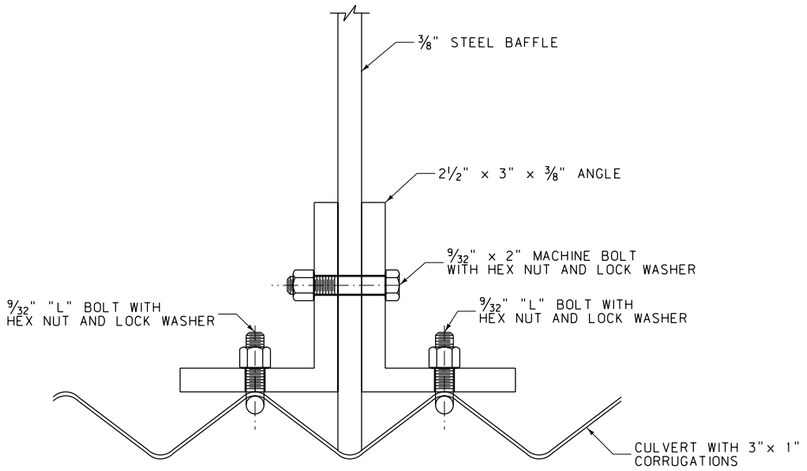
(5) PROCEDURE MEMORANDUM NO.10, HYDRAULICS MANUAL CHAPTER 9 APPENDIX H.

EXCEEDANCE PROBABILITIES

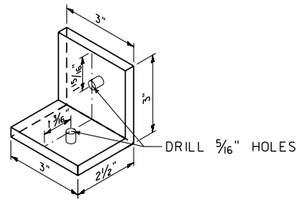
25 YEAR	4 % CHANCE
50 YEAR	2 % CHANCE
100 YEAR	1 % CHANCE
200 YEAR	.5% CHANCE
500 YEAR	.2% CHANCE

STATION 148+58 - PIPE FILL RETAINERS

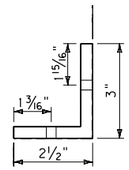
NOT TO SCALE



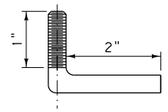
BRACKET DETAIL



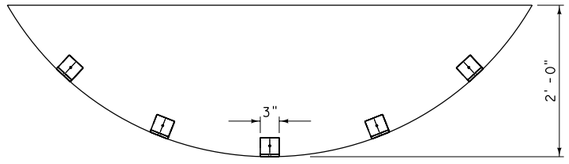
ANGLE DETAIL



SIDE VIEW

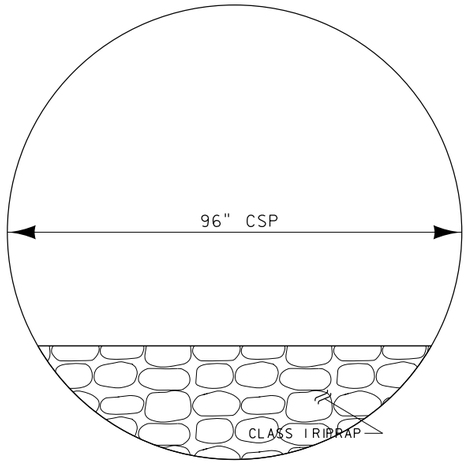


"L" BOLT



FILL RETAINER - BRACKET LOCATIONS

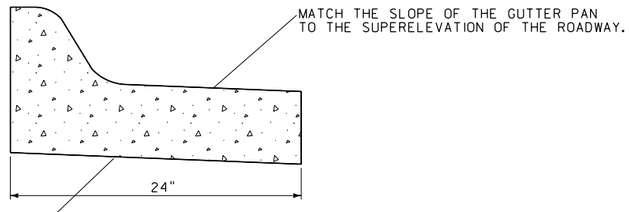
NOTE: ATTACH BRACKETS ALONG BOTTOM OF FILL RETAINER USING A SPACING OF 1'-6".



CULVERT FILL RETAINER DETAIL

NOTE: 1. INSTALL FILL RETAINERS AT 20' INTERVALS IN PIPE BEGINING AFTER OUTLET END CONCRETE BACKFILL RETAINER. FILL AREA BETWEEN WITH CLASS I RIPRAP (SEE FISH PASSAGE DETAIL, SHEET NO. _)
2. INSTALL CONCRETE BACKFILL RETAINERS AT THE INLET AND OUTLET PIPE ENDS PER MDT DETAILED DRAWING NO. 603-30.

SPILL CURB DETAIL

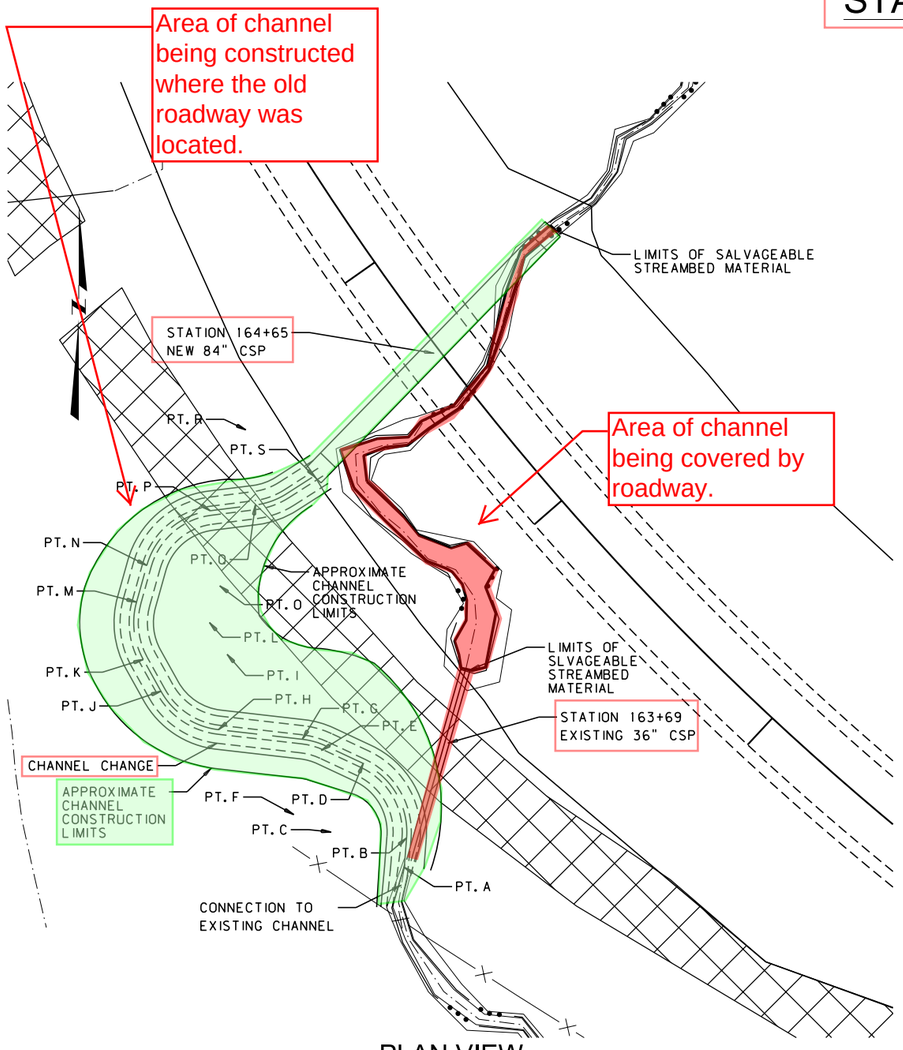


SEE DETAIL DRAWING NO. 609-05 FOR COMPLETE CURB AND GUTTER DIMENSIONS AND CONSTRUCTION NOTES.

01/28/2013
Highways & Engineering Division

STATION 164+65: CHANNEL CHANGE

NOT TO SCALE



PLAN VIEW

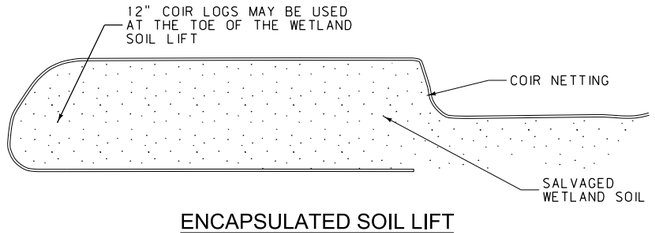
CHANNEL CHANGE COORDINATE TABLE				
POINT	NORTHING (FT)	EASTING (FT)	ELEVATION (FT)	DESCRIPTION
A	352007.3	2025226.2	5506.5	BEGIN CHANNEL CHANGE
B	352017.0	2025227.0	5506.1	
C	352018.9	2025202.1	~	PI FOR 25' RADIUS ARC
D	352041.6	2025212.7	5505.9	
E	352047.3	2025200.3	5505.7	
F	352024.7	2025189.7	~	PI FOR 25' RADIUS ARC
G	352049.5	2025192.6	5505.4	
H	352052.7	2025164.9	5505.1	
I	352077.6	2025167.8	~	PI FOR 25' RADIUS ARC
J	352065.4	2025145.9	5505.0	
K	352075.9	2025140.1	5504.7	
L	352088.1	2025161.9	~	PI FOR 25' RADIUS ARC
M	352094.8	2025137.9	5504.5	
N	352106.9	2025141.3	5504.2	
O	352100.2	2025165.3	~	PI FOR 25' RADIUS ARC
P	352125.0	2025162.2	5504.0	
Q	352126.9	2025177.1	5503.8	
R	352151.7	2025173.9	5503.7	
S*	352135.9	2025196.9	5503.5	END CHANNEL CHANGE AT NEW PIPE INLET

* COORDINATES ARE APPROXIMATE AND BASED ON INSTALLATION OF NEW PIPE.

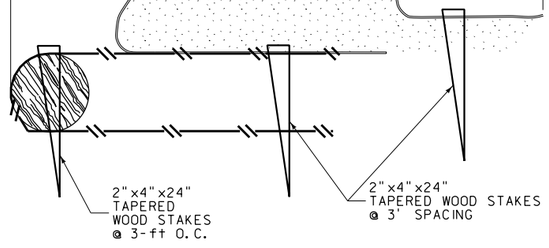
CHANNEL CHANGE QUANTITIES							
STATIONS	CHANNEL EXCAVATION (yd³)	COIR NETTING# (yd²)	12" COIR LOGS (ft)	STREAMBED MATERIAL (yd³)	WETLAND SOIL ## (yd³)	NATIVE FILL MATERIAL (yd³)	WILLOW CUTTINGS * (each)
164+65	780	1000	480	13.5	145	57	700

INCLUDED IN THE COST PER SQUARE FOOT OF EROSION CONTROL FABRIC-BIODEGRADABLE.
INLCUDED IN THE COST PER SQUARE YARD OF WETLAND SOIL- SALVAGE AND PLACE.
* FOR INFORMATIONAL PURPOSES ONLY. WILLOW CUTTINGS PAID FOR AS LUMP SUM. SEE SPECIAL PROVISIONS.

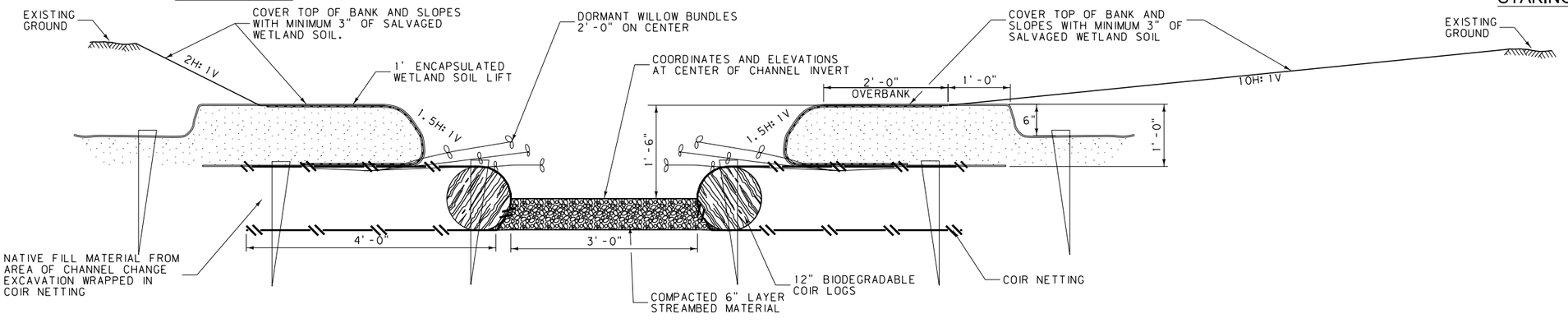
NOTES:
1. DO NOT PLACE ANY EROSION CONTROL FABRIC BELOW STREAMBED MATERIAL.
2. SEE PLAN SPECIAL PROVISION, "STATION 164+65: CHANNEL CHANGE" FOR DESCRIPTION OF 3" THICK SALVAGED VEGETATION MAT.
3. PROVIDE STREAMBED MATERIAL AS DESCRIBED IN PLAN SPECIAL PROVISION, "STREAMBED MATERIAL"
4. COMPACT SALVAGED VEGETATION MATERIAL PER MDT STANDARD SPECIFICATIONS SECTION 203.03.3.



ENCAPSULATED SOIL LIFT



STAKING DETAIL

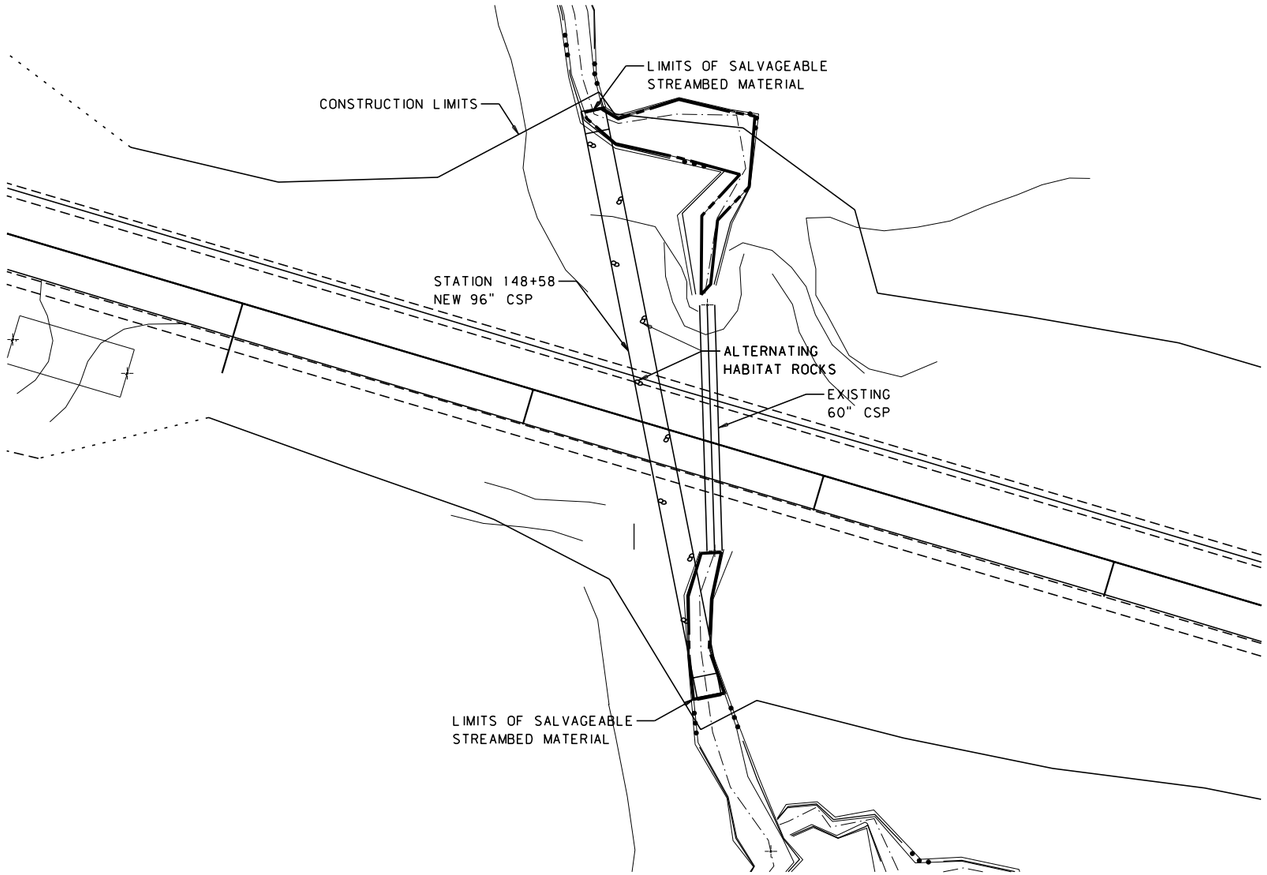


CHANNEL TYPICAL SECTION - LOOKING DOWNSTREAM

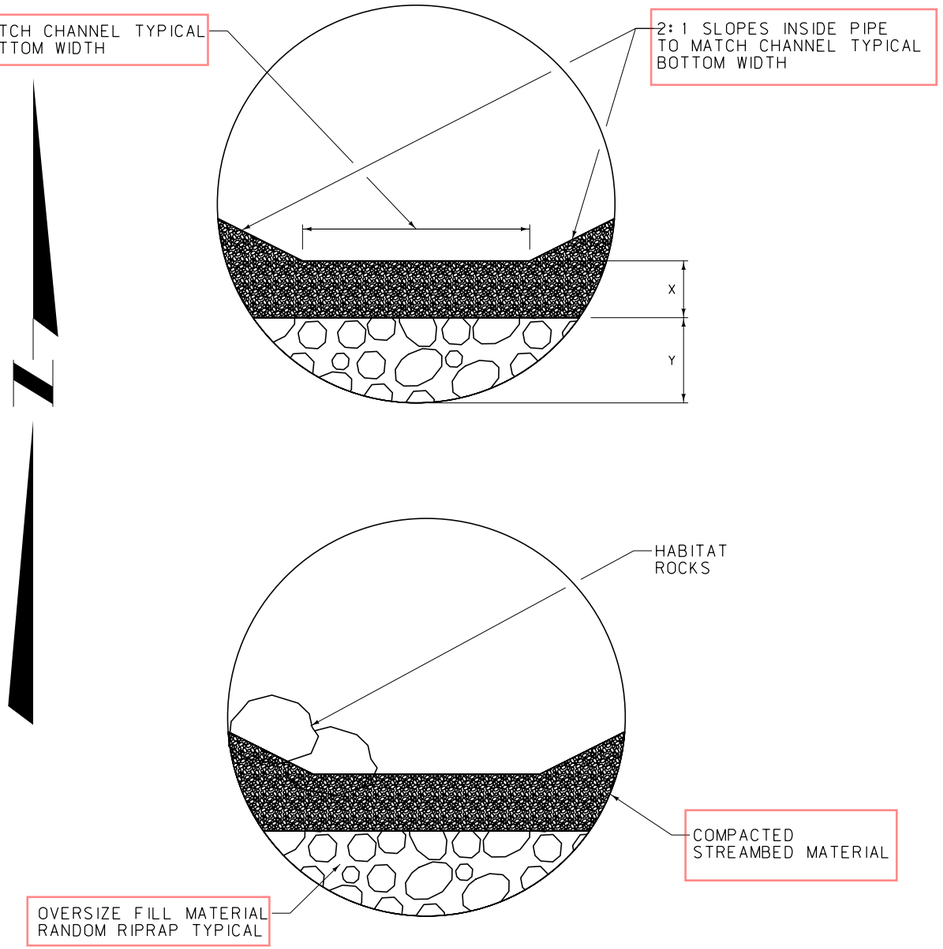
3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\4890rddethy1.dgn	DESIGNED BY	J. R. TAYLOR	6-21-2011	HYDRAULICS PLANS	PRELIMINARY PIH
2		1/28/2013	REVIEWED BY			CARBON COUNTY	RED LODGE - NW / UPN 4890 / STPP 78-1(11)0
1		12:06:07 PM CPS-U2113	CHECKED BY				SHEET NO. 23 OF 49

01/28/2013
Highways & Engineering Division

SALVAGEABLE STREAMBED MATERIAL



STATION 148+58: SALVAGEABLE STREAMBED MATERIAL LIMITS

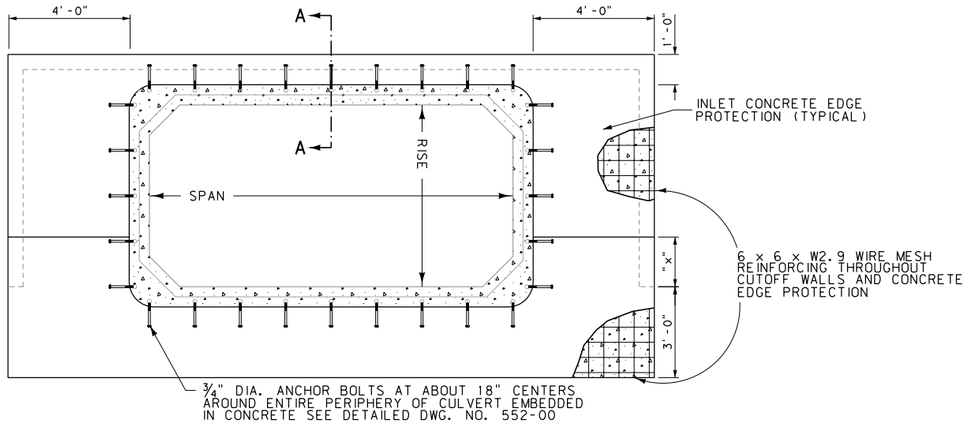


FISH PASSAGE - PIPE EMBEDMENT

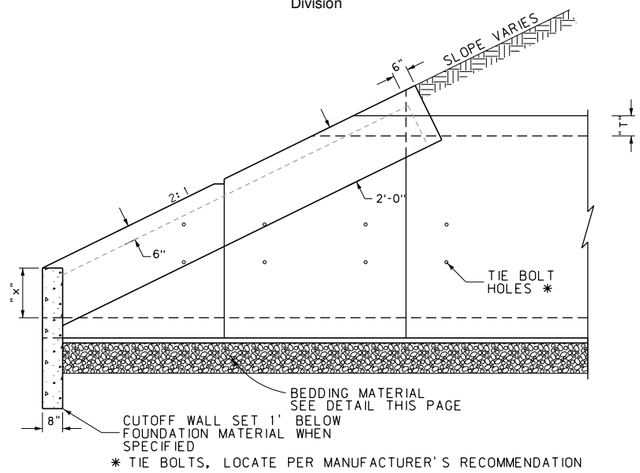
STATION	feet X	feet Y	TYPICAL CHANNEL BOTTOM WIDTH	cubic yards: SALVAGEABLE STREAMBED MATERIAL *	cubic yards: STREAMBED MATERIAL	cubic yards: RANDOM RIPRAP CLASS 1	each: HABITAT ROCKS **	REMARKS
148+58	1.0	2.0	7.0	51	55	72	18	WILLOW CREEK
164+65	1.0	1.5	3.0	34	31	26	10	TRIBUTARY OF WILLOW CREEK
200+66	1.0	1.5	4.0	46	35	29	12	TRIBUTARY OF WILLOW CREEK
221+69	1.0	1.5	4.0	25	45	44	16	TRIBUTARY OF WILLOW CREEK
231+77	1.0	1.5	4.0	22	45	37	14	TRIBUTARY OF WILLOW CREEK
TOTAL			~	~	211	208	70**	

* FOR INFORMATIONAL PURPOSES ONLY, INCLUDED IN THE COST OF STREAMBED MATERIAL.
** FOR INFORMATIONAL PURPOSES ONLY, INLCUDED IN THE COST OF CLASS I RIPRAP.

NOTES:
1. PROVIDE CLASS I RANDOM RIPRAP PER MDT STANDARD SPECIFICATION SECTION 701.06.2.
2. ALTERNATE HABITAT ROCKS LT AND RT OF CHANNEL BOTTOM AT 20 FOOT INTERVALS INSIDE PIPE. SEE SPECIAL PROVISION, "FISH PASSAGE-PIPE EMBEDMENT" FOR A DESCRIPTION OF THE HABITAT ROCKS.
3. SEE PLAN SPECIAL PROVISION, "STREAMBED MATERIAL" FOR DESCRIPTION OF REMOVAL LIMITS FOR SALVAGEABLE STREAMBED MATERIAL.
4. PROVIDE ADDITIONAL STREAMBED MATERIAL AS DESCRIBED IN PLAN SPECIAL PROVISION, "STREAMBED MATERIAL".
5. SALVAGEABLE STREAMBED MATERAIL QUANTITY IS AN ESTIMATE, ACTUAL QUANTITY OF SALVAGEABLE STREAMBED MATERIAL MAY DIFFER.

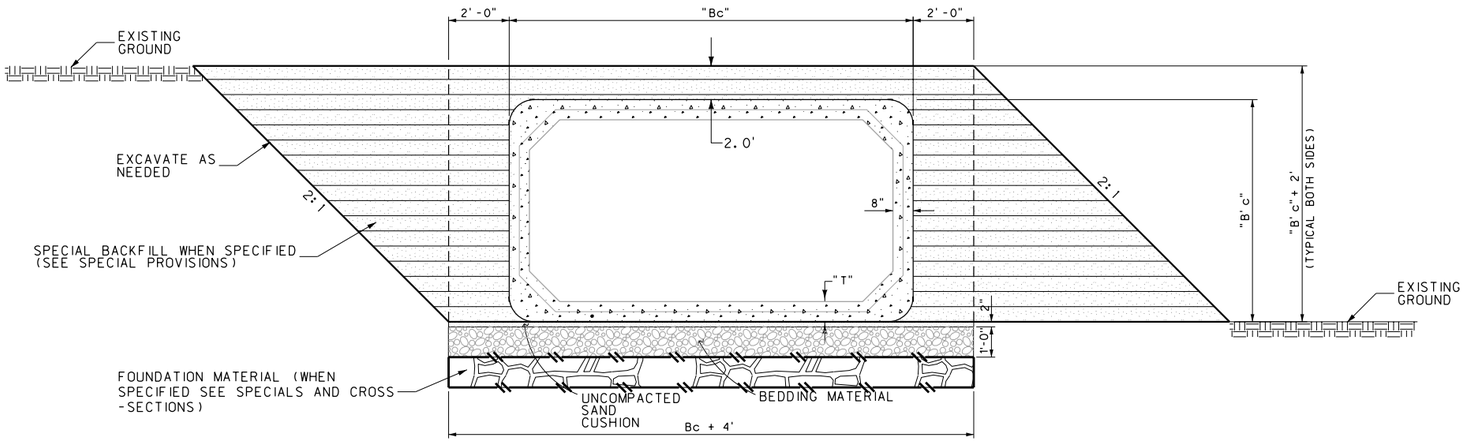


FRONT ELEVATION



* TIE BOLTS, LOCATE PER MANUFACTURER'S RECOMMENDATION

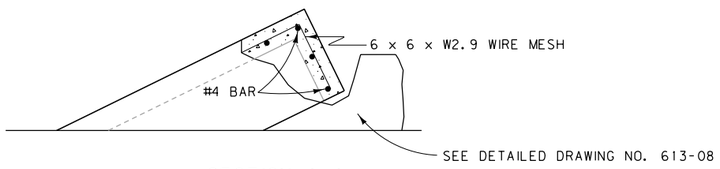
SIDE ELEVATION



EXCAVATION TYPICAL

BEDDING DETAIL

FILL TYPICAL



SECTION A-A

NOTE: SPECIAL BACKFILL SHALL BE PLACED 2' OVER PIPE UNLESS THE FILL REQUIREMENTS CANNOT BE MET.

NOTE: COMPACT SOIL MATERIAL IN LAYERS NOT MORE THAN 6" THICK FOR THE REMAINDER OF THE LOWER 30% OF ITS HEIGHT. BACKFILL IN CONFORMANCE TO SUBGRADE WITH THE APPLICABLE PROVISIONS OF THE STANDARD SPECIFICATIONS.

NOTE: HANDLE BOX CULVERT SECTIONS AND END SECTIONS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. IMPROPER HANDLING MAY DAMAGE THE BOX CULVERT OR END SECTION. REPAIR OR REPLACE DAMAGED SECTIONS AT CONTRACTOR EXPENSE PER 2006 MDT STANDARD SPECIFICATIONS SECTION 603.03.1.

NOTE: EXCAVATE A SUFFICIENT AMOUNT TO PROVIDE A SAFE WORKING ENVIRONMENT AND TO ALLOW ACHIEVEMENT OF ALL CULVERT INSTALLATION AND COMPACTION REQUIREMENTS. SLOPE BENCH OR PROVIDE SHORING FOR ALL EXCAVATIONS IN ACCORDANCE WITH THE U.S. DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION. SPECIAL BACKFILL QUANTITY IS BASED ON 2:1 SLOPES.

DIMENSIONS												
STATION	SPAN (ft.)	RISE (ft.)	LENGTH (ft.)	"T" (in.)	"Bc" (ft.)	"x" (ft.)	"B'c" (ft.)	① CLASS "DD" CONCRETE (cu.yd.)	② BEDDING MATERIAL (cu.yd.)	SPECIAL BACKFILL (cu.yd.)	RIPRAP CLASS _ (cu.yd.) OUTLET	COVER (ft.)
45+67	6	4	132	8	7.33	1.67	5.33	6.2	64.2	~	~	2.3
45+96	6	3	130	8	7.33	2.67	4.33	6.0	63.2	~	~	3.2
47+77	6	3	132	8	7.33	2.67	4.33	6.0	64.2	~	~	2.4

① INCLUDES CUTOFF WALLS FOR BOTH INLET AND OUTLET ENDS AND EDGE PROTECTION FOR INLET AND OUTLET ENDS.

② INCLUDES 2" UNCOMPACTED SAND CUSHION.

NOTE: INCLUDE REINFORCING MATERIAL IN THE UNIT PRICE BID PER CUBIC YARD OF CONCRETE.
INCLUDE ANCHOR BOLTS IN THE UNIT PRICE BID PER LINEAR FOOT OF CULVERT.
PROVIDE BOXES MEETING ASTM C1577 IN LOCATIONS WITH 2' OF COVER OR LESS.
PROVIDE BOXES MEETING ASTM C1577 IN LOCATIONS WITH MORE THAN 2' OF COVER. (SEE SPECIAL PROVISIONS)
QUANTITIES ARE BASED ON THE DIMENSIONS IN THE TABLE.

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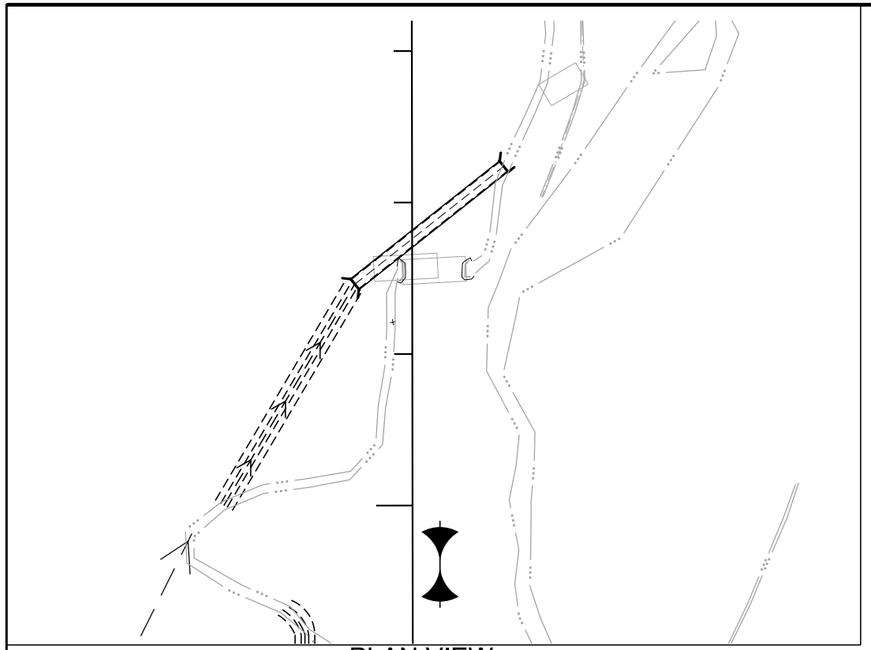
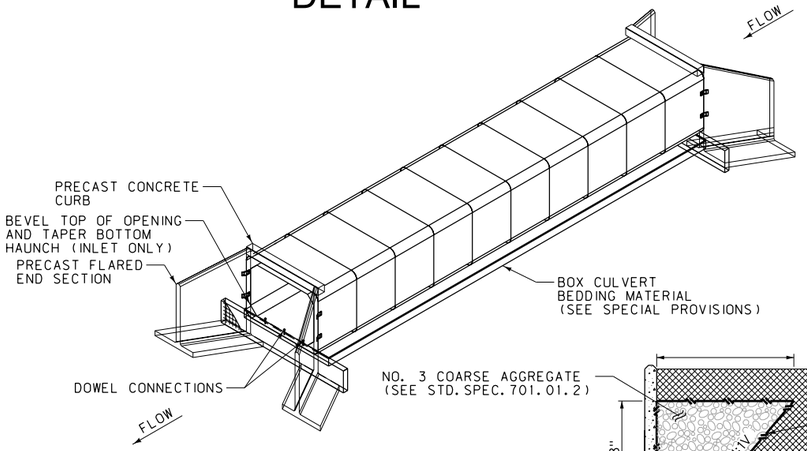
Division

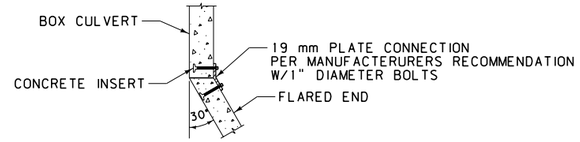
DETAIL



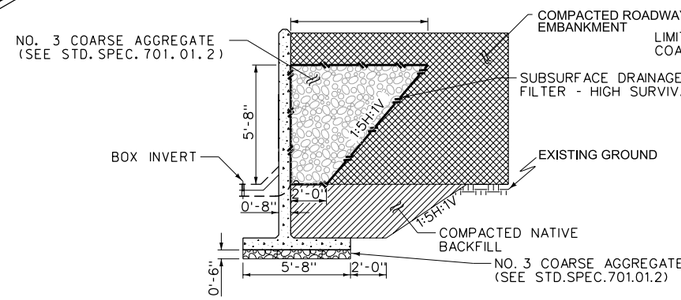
PLAN VIEW
SCALE~ 1:500



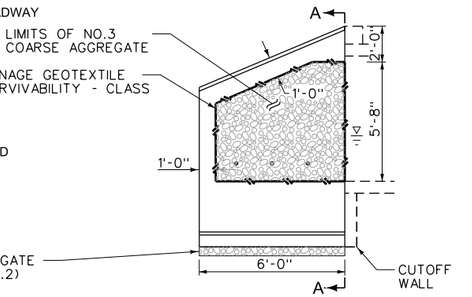
ISOMETRIC VIEW
OUTLET END



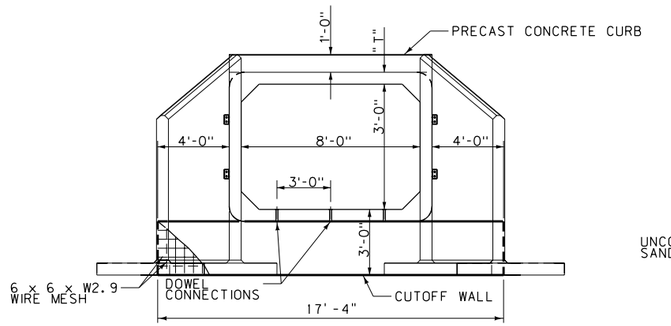
30°PLATE
CONNECTION PLATE DETAIL



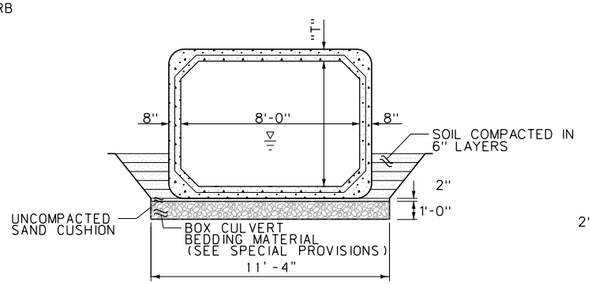
PRECAST FLARED END SECTION
BEDDING AND BACKFILL DETAIL
SECTION A-A



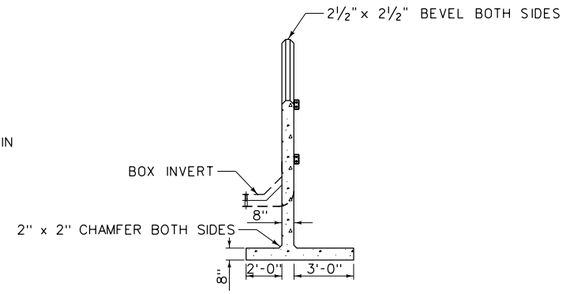
PRECAST FLARED END SECTION
BEDDING AND BACKFILL DETAIL
SIDE VIEW



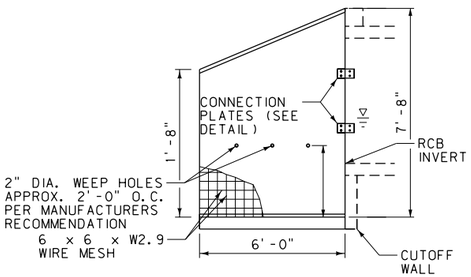
PRECAST SINGLE CELL BOX CULVERT
WITH CUTOFF WALL AND 30° FLARED END SECTIONS



BOX CULVERT BEDDING DETAIL



PRECAST FLARED END SECTION DETAIL
END VIEW



PRECAST FLARED END SECTION DETAIL
SIDE VIEW

* QUANTITIES											
STATIONS	SPAN (ft)	RISE (ft)	LENGTH (ft)	"T" (in)	WALL (in)	① END SECTION OUTLET	① END SECTION INLET	② BOX CULVERT BEDDING MATERIAL (cu.yd.)	COVER (ft)	No. 3 COARSE AGGREGATE (cu.yd.)	SUBSURFACE DRAINAGE GEOTEXTILE FILTER - HIGH SURVIVABILITY - CLASS "B" (sq.ft.)
91+77	8	3	126.0	8	8	1	1	90.3	4.3	12.0	41.8

* FOR ESTIMATING PURPOSES ONLY.

① INCLUDE PRECAST FLARED END SECTIONS, CUTOFF WALLS (PRECAST OR POURED IN PLACE), PRECAST CONCRETE CURB,GEOTEXTILE, AND NO.3 COARSE AGGREGATE IN THE UNIT PRICE BID PER LINEAR FOOT OF CULVERT.

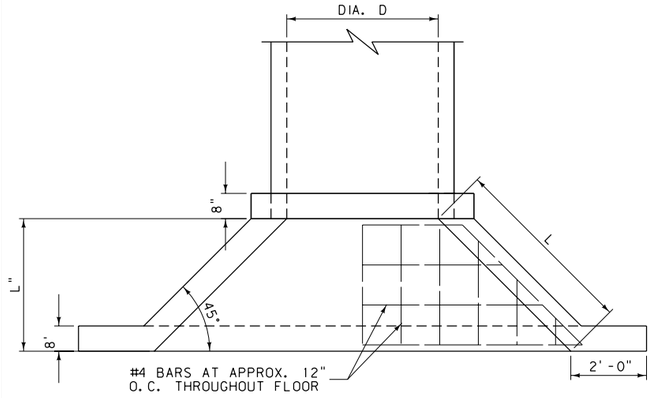
② INCLUDES 2" UNCOMPACTED SAND CUSHION.

NOTE: INCLUDE DOWELS AND CONNECTION PLATES IN THE UNIT PRICE BID PER LINEAR FOOT OF CULVERT.
PROVIDE BOX CULVERTS MEETING AASHTO M273 IN LOCATIONS WITH 2' OF COVER OR LESS.
PROVIDE BOXES MEETING AASHTO M259 IN LOCATIONS WITH MORE THAN 2' OF COVER.
SEE CROSS SECTIONS FOR FOUNDATION MATERIAL AS REQUIRED.

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\4890rdpbc002.dgn	DESIGNED BY	J. R. TAYLOR	5-11-2011	HYDRAULICS PLANS	PRELIMINARY PIH	RED LODGE - NW / STPP 78-1(11)0
2		1/28/2013	REVIEWED BY					
1		12:06:55 PM CPS - U2113	CHECKED BY			CARBON COUNTY		CFS=0.99961552 / UPN 4890 / SHEET NO. 26 OF 49

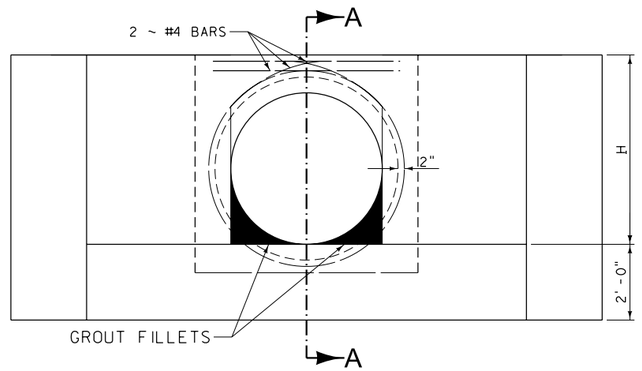
01/28/2013
Highways & Engineering Division

DETAIL

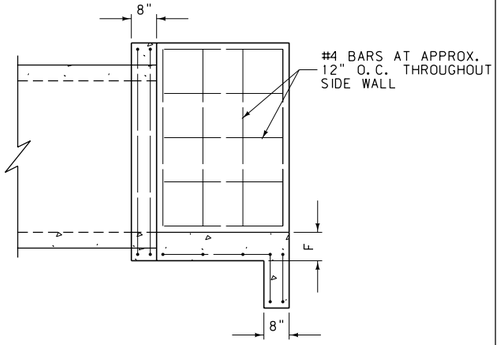


NOTE: CHAMFER ALL EXPOSED CORNERS 1". REINFORCING STEEL TO BE NOT LESS THAN 1½" TO NEAREST FACE OF CONCRETE.

PLAN VIEW
NO SCALE

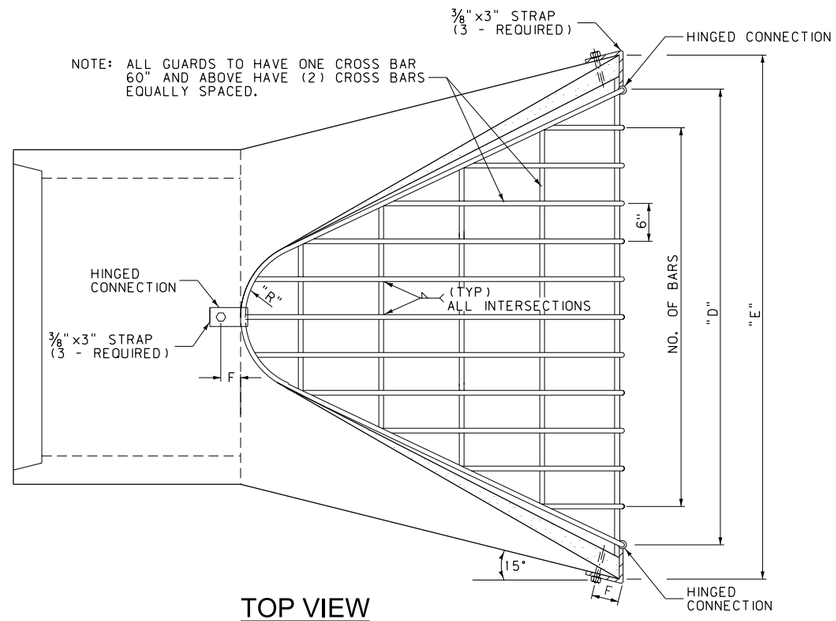


ELEVATION VIEW
NO SCALE

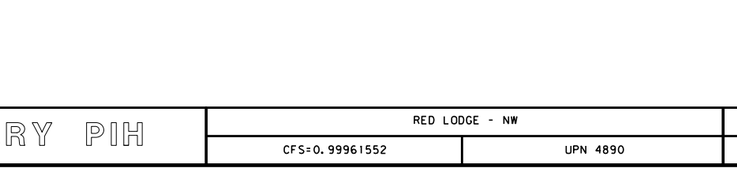


SECTION A-A
NO SCALE

FLAT-BOTTOM CONCRETE TRANSITION STRUCTURE												
STATION	CULVERT		CLASS "DD" CONCRETE (yd^3)		#4 REBAR	DIMENSION TABLE						
	DIA. D	AREA (ft^2)	INLET	OUTLET	(lbs.)	A	B	H	L	L"	F	L'
48+32	24"	3.14	1.08	0.94	165.0	1'-6"	1'-6"	3'-0"	3'-0"	2'-1"	7½"	2'-6"



TOP VIEW
NO SCALE



SIDE VIEW
NO SCALE

TRASHRACK*														
STATION	PIPE SIZE	"T"	BAR SIZE θ	NO. OF BARS	BOLT SIZE & LENGTH	SLOPE	RADIUS "R"	"A"	"B"	"C"	"D"	"E"	"F"	θ°
68+42	24"	3"	⅝"	7	⅝"×5½"	2.5:1	6½"	48"	8½"	2"	48"	56"	4"	112°

* FOR INFORMATIONAL PURPOSES. TRASHRACK PAID PER EACH.

NOTE:

1. ALL STRUCTURAL STEEL FOR TRASHGUARDS MUST CONFORM TO THE REQUIREMENTS FOR ASTM A-36 STRUCTURAL CARBON STEEL.
2. PAINT ONE COAT OF RED OXIDE PRIMER AND TWO COATS OF ALUMINUM PAINT.
3. BECAUSE OF VARIABLE FORMS BEING USED, TAKE FIELD MEASUREMENT OF FLARED ENDS BEFORE FABRICATING TRASHGUARD.

01/28/2013
Highways & Engineering Division

UTILITIES CROSSING
133+53 PWR - 21' CLEAR
137+00 GAS UNKNOWN DEPTH
141+87 TEL UNKNOWN DEPTH
141+87 GAS UNKNOWN DEPTH
144+57 PWR UNKNOWN DEPTH
153+82 TEL UNKNOWN DEPTH

130+00 | 140+00 | 150+00

WL-8

N 73° 29' 21" W

134+75
24" CMP IN PLACE LT.
REMOVE

134+75
NEW 18"
APP. PIPE LT.

136+82
NEW 24" RCP DR.

136+82
18" CMP DR.
IN PLACE REMOVE

138+77
NEW 36" RCP IRR.

138+77
36" CMP IRR.
IN PLACE REMOVE

142+63
18" CMP IN PLACE LT.
REMOVE

142+63
NEW 18"
APP. PIPE LT.

142+63
NEW 18"
APP. PIPE RT.

148+34
60" CMP DR.
IN PLACE REMOVE

148+58
NEW 96" CSP DR.

150+50
18" CMP IN PLACE LT.
REMOVE

150+50
NEW 18"
APP. PIPE LT.

151+70
15" CMP IN PLACE RT.
REMOVE

154+25
15" CMP IN PLACE RT.
REMOVE

154+25
NEW 18"
APP. PIPE RT.

157+60
NEW 18"
APP. PIPE LT.

158+95
NEW 18"
APP. PIPE LT.

158+95
18" CMP IN PLACE LT.
REMOVE

TS 157+53.23

SC 159+91.23

134+75
PRIVATE APP LT.

142+63
PUBLIC APP LT.
WITH APPROACH MAILBOX TURNOUT
5 NEW MAILBOXES

142+63
PUBLIC APP RT.

150+50
FARM FIELD APP LT.

154+25
PUBLIC APP RT.

157+60
PRIVATE APP LT.
WITH APPROACH MAILBOX TURNOUT
1 NEW MAILBOX

158+95
PRIVATE APP LT.

5580 5570 5560 5550 5540 5530 5520 5510 5500

130+40.00
EL. 5,556.34

0.255%
-0.650%
1,000' VC

CORE LOG # 4890-30
STA. 130+98
23.0' RT.

+82

+77

141+20.00
EL. 5,549.32

-0.650%
-3.910%
450' VC

CORE LOG # 4890-31
STA. 141+82
3.0' RT.

148+20.00
EL. 5,521.95

+58

-3.910%
+1.690%
650' VC

CORE LOG # 4890-34
STA. 148+70
14.0' RT.

152+80.00
EL. 5,529.72

+1.690%
+0.300%
270' VC

CORE LOG # 4890-32
STA. 153+53
146.0' RT.

+0.300%

130 135 140 145 150 155

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\4890rdplp002.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	RED LODGE - NW / STPP 78-1(11)0
2		1/28/2013	REVIEWED BY				
1		12:09:43 PM CPS-U2113	CHECKED BY		CARBON COUNTY		CFS = 0.99961552 / UPN 4890 / SHEET NO. 43 OF 49

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01/28/2013
Highways & Engineering Division

UTILITIES CROSSING
159+03 PWR - 25' CLEAR
161+58 GAS UNKNOWN DEPTH
167+38 GAS UNKNOWN DEPTH
141+87 GAS UNKNOWN DEPTH
144+57 PWR UNKNOWN DEPTH
153+82 TEL UNKNOWN DEPTH

160+00
170+00
180+00

CORE HOLE

WL-9

MP 3

PI = 165+55.13
Δ = 71° 58' 36" (RT)
Rc = 960'
Ls = 208'
θs = 6° 12' 25" (RT)
Δc = 59° 33' 45" (RT)
Ts = 802.50'
Lc = 997.98'
Es = 228.77'
S = 0.08%

CS 169+59.21
ST 171+67.21
SC 159+61.23
TS 157+53.23

N 1° 30' 45" W

TS 178+72.38
SC 180+80.38

PI = 189+23.34
Δ = 89° 06' 25" (LT)
Rc = 960'
Ls = 208'
θs = 6° 12' 25"
Δc = 76° 41' 34" (LT)
Ts = 1,050.96'
Lc = 1,285.00'
Es = 389.82'
S = 0.08%

159+50
NEW 18" APP. PIPE RT.

163+69
36" CMP DR. IN PLACE REMOVE

164+65
NEW 84" CSP DR.

165+92
18" CMP DR. IN PLACE REMOVE

169+24
NEW 24" RCP BROKE-BACK IRR.

175+90
NEW 18" APP. PIPE RT.

159+50
PRIVATE APP RT.

165+50
PUBLIC APP LT.
SEE DETAILS

175+90
PRIVATE APP RT.

161+10 - 167+40
OBLITERATE ROADWAY LT.

163+50
CH. CH. LT.
SEE DETAILS

166+00 TO 169+00
IRR. DITCH LT.
SEE SPECIAL PROVISIONS

159+80.00
EL. 5,531.82

+0.300%
-3.300%
400' VC
500' VC
-3.300%
+0.000%
+0.000%
-1.150%
600' VC
-1.150%
-1.850%
1,200' VC

165+60.00
EL. 5,512.68

170+60.00
EL. 5,512.68

180+00.00
EL. 5,501.87

+65
+24

CORE LOG # 4890-32
STA. 153+53
16.0' RT.

CORE LOG # 4890-14
STA. 163+74
47.0' LT.

CORE LOG # 4890-15
STA. 166+03
22.0' RT.

5550
5540
5530
5520
5510
5500
5490
5480
5470

155 160 165 170 175 180

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\4890rdplp003.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	RED LODGE - NW	STPP 78-1(11)0
2		1/28/2013	REVIEWED BY					
1		12:09:57 PM CPS-U2113	CHECKED BY		CARBON COUNTY		CFS = 0.99961552 UPN 4890	SHEET NO. 44 OF 49

CUT	FILL
0	456
0	491
0	478
0	184

MONTANA DEPARTMENT OF TRANSPORTATION

c:\dgn\4890rdlay001.dgn	DESIGNED BY	KEVIN ST. GEORGE	8/21/2014
2/25/2015	REVIEWED BY	JEREMY TERRY	8/21/2014
1:58:30 PM CPS - U2160	CHECKED BY	JERRY SABOL	10/8/2014

MAINLINE CROSS SECTIONS

CARBON COUNTY

RED LODGE - NORTHWEST

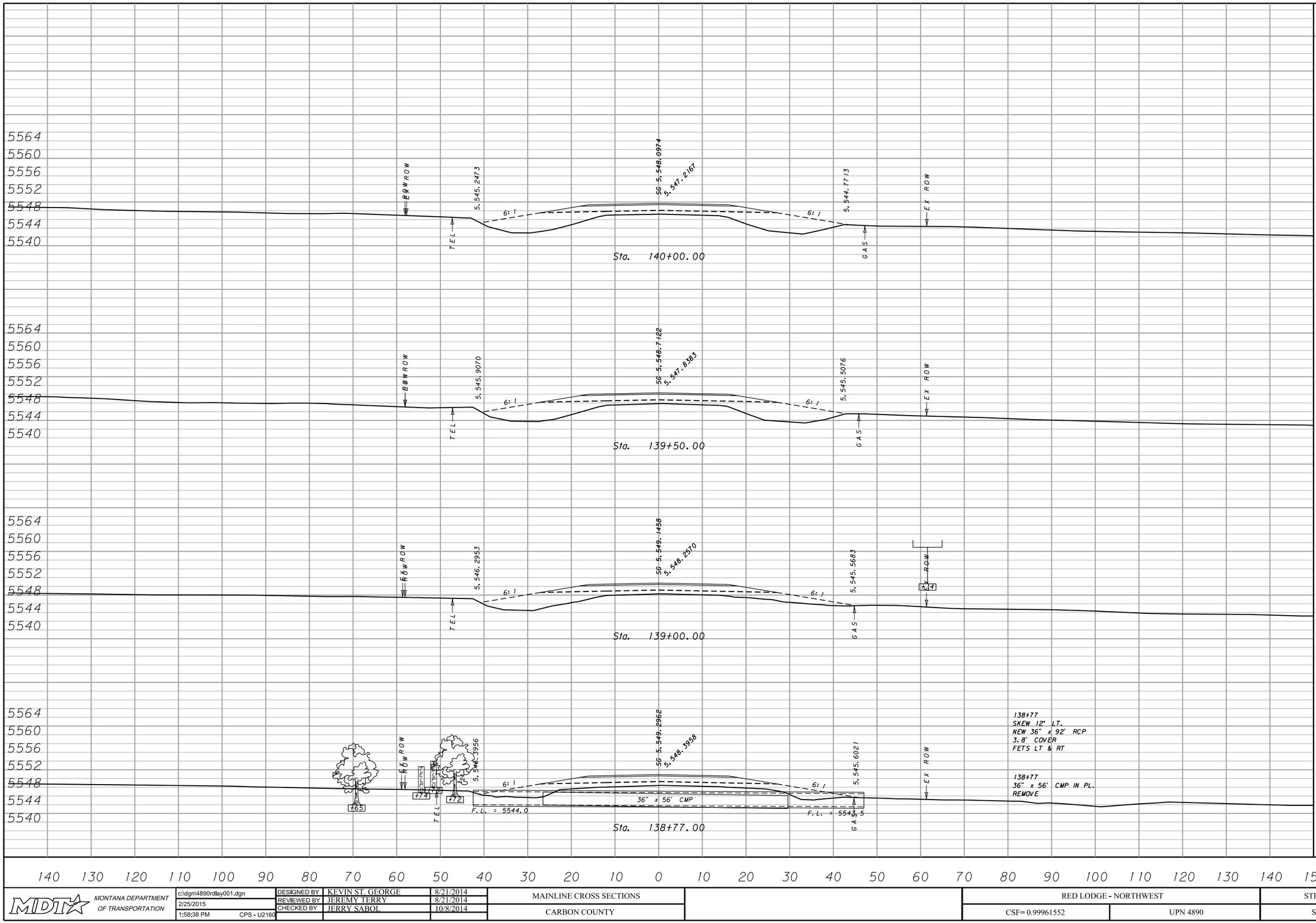
CSF= 0.99961552

UPN 4890

STPP 78-1(11)1

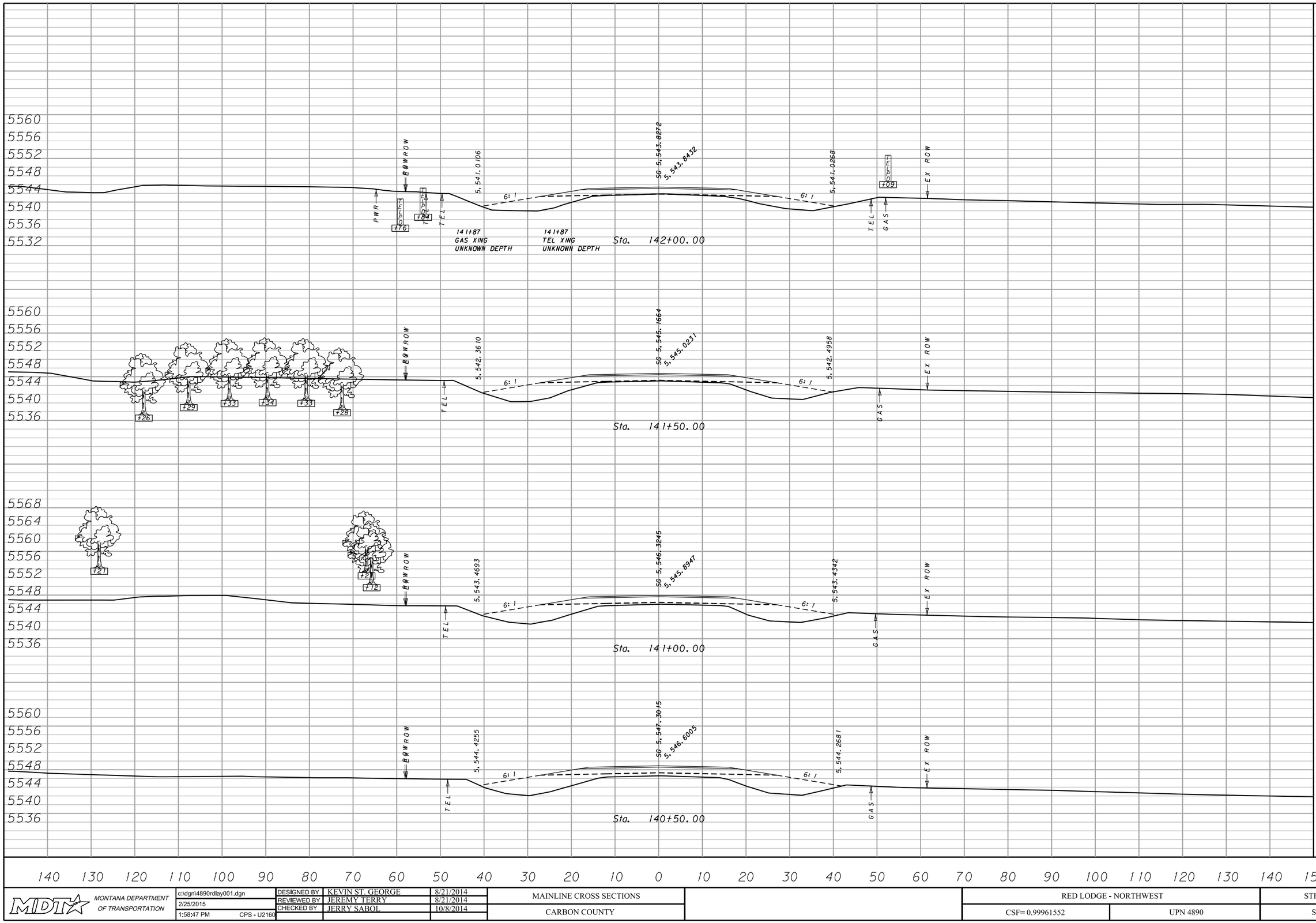
SHEET 66

CUT	FILL
0	470
0	424
0	164
0	209



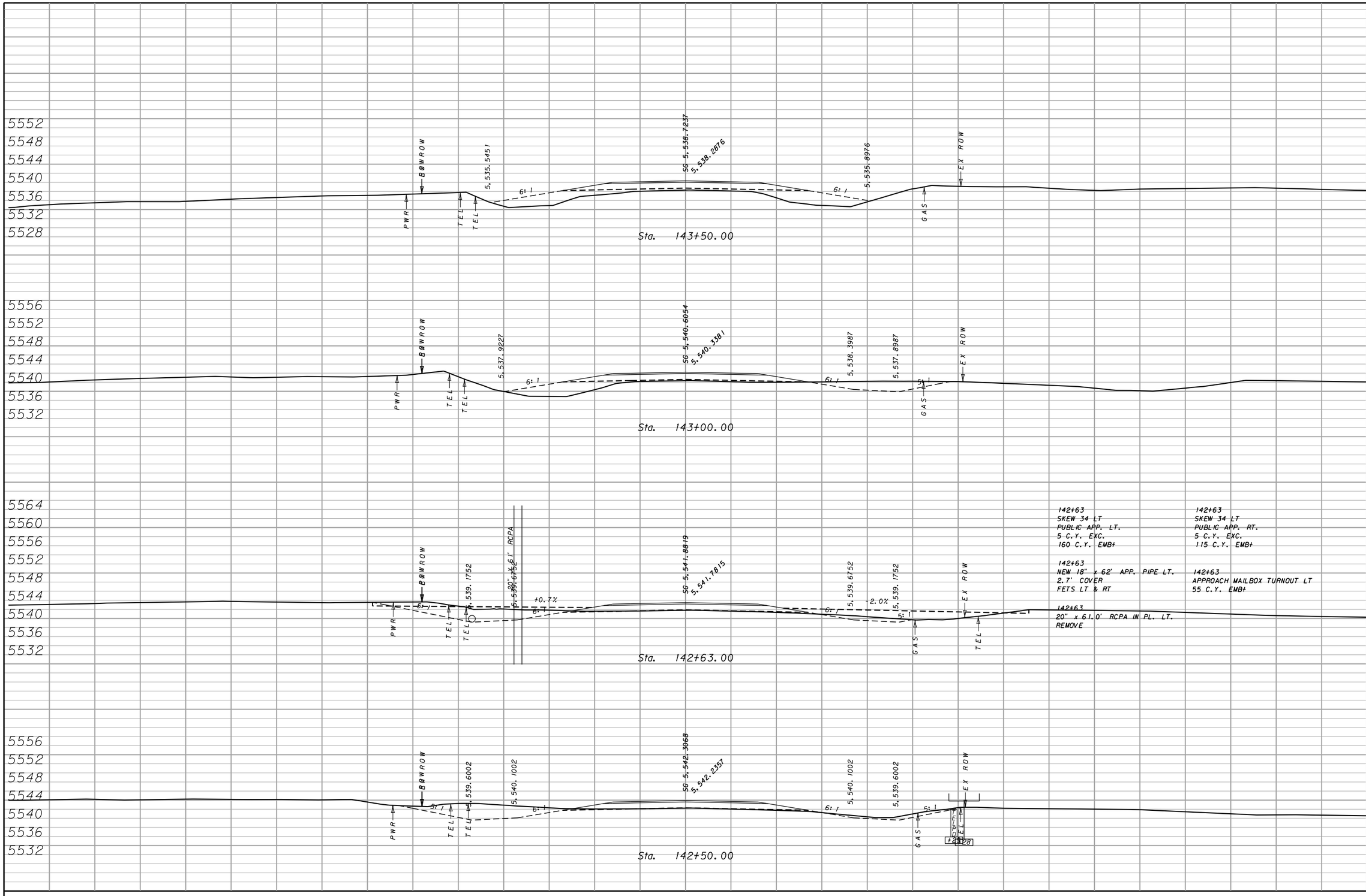
MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\4890rdlay001.dgn	DESIGNED BY	KEVIN ST. GEORGE	8/21/2014	MAINLINE CROSS SECTIONS	RED LODGE - NORTHWEST / STPP 78-1(11)1
	2/25/2015	REVIEWED BY	JEREMY TERRY	8/21/2014		
	1:58:38 PM CPS - U2160	CHECKED BY	JERRY SABOL	10/8/2014	CARBON COUNTY	CSF= 0.99961552 / UPN 4890 / SHEET 67

CUT	FILL
0	323
0	372
0	417
0	455



MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\4890rdlay001.dgn	DESIGNED BY	KEVIN ST. GEORGE	8/21/2014	MAINLINE CROSS SECTIONS
	2/25/2015	REVIEWED BY	JEREMY TERRY	8/21/2014	
	1:58:47 PM CPS - U2160	CHECKED BY	JERRY SABOL	10/8/2014	CARBON COUNTY

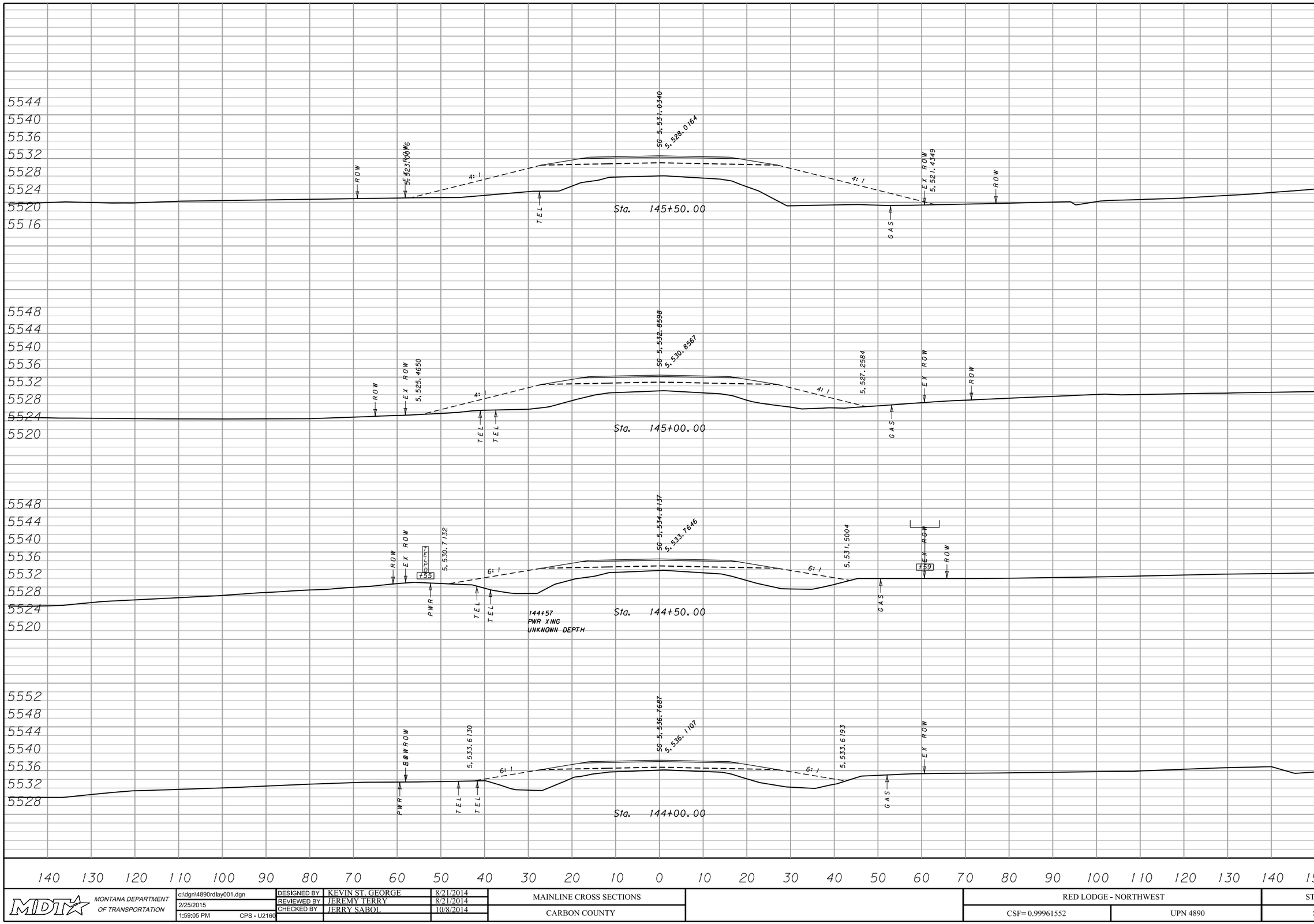
RED LODGE - NORTHWEST		STPP 78-1(11)1
CSF= 0.99961552	UPN 4890	SHEET 68



CUT	FILL
39	289
94	137
44	34
82	212

MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\4890rdlay001.dgn	DESIGNED BY	KEVIN ST. GEORGE	8/21/2014	MAINLINE CROSS SECTIONS
	2/25/2015	REVIEWED BY	JEREMY TERRY	8/21/2014	
	1:58:56 PM CPS - U2160	CHECKED BY	JERRY SABOL	10/8/2014	CARBON COUNTY

RED LODGE - NORTHWEST		STPP 78-1(11)1
CSF= 0.99961552	UPN 4890	SHEET 69



CUT	FILL
0	846
0	607
0	491
0	385

MONTANA DEPARTMENT OF TRANSPORTATION

c:\dgn\4890rdlay001.dgn	DESIGNED BY	KEVIN ST. GEORGE	8/21/2014
2/25/2015	REVIEWED BY	JEREMY TERRY	8/21/2014
1:59:05 PM CPS - U2160	CHECKED BY	JERRY SABOL	10/8/2014

MAINLINE CROSS SECTIONS

CARBON COUNTY

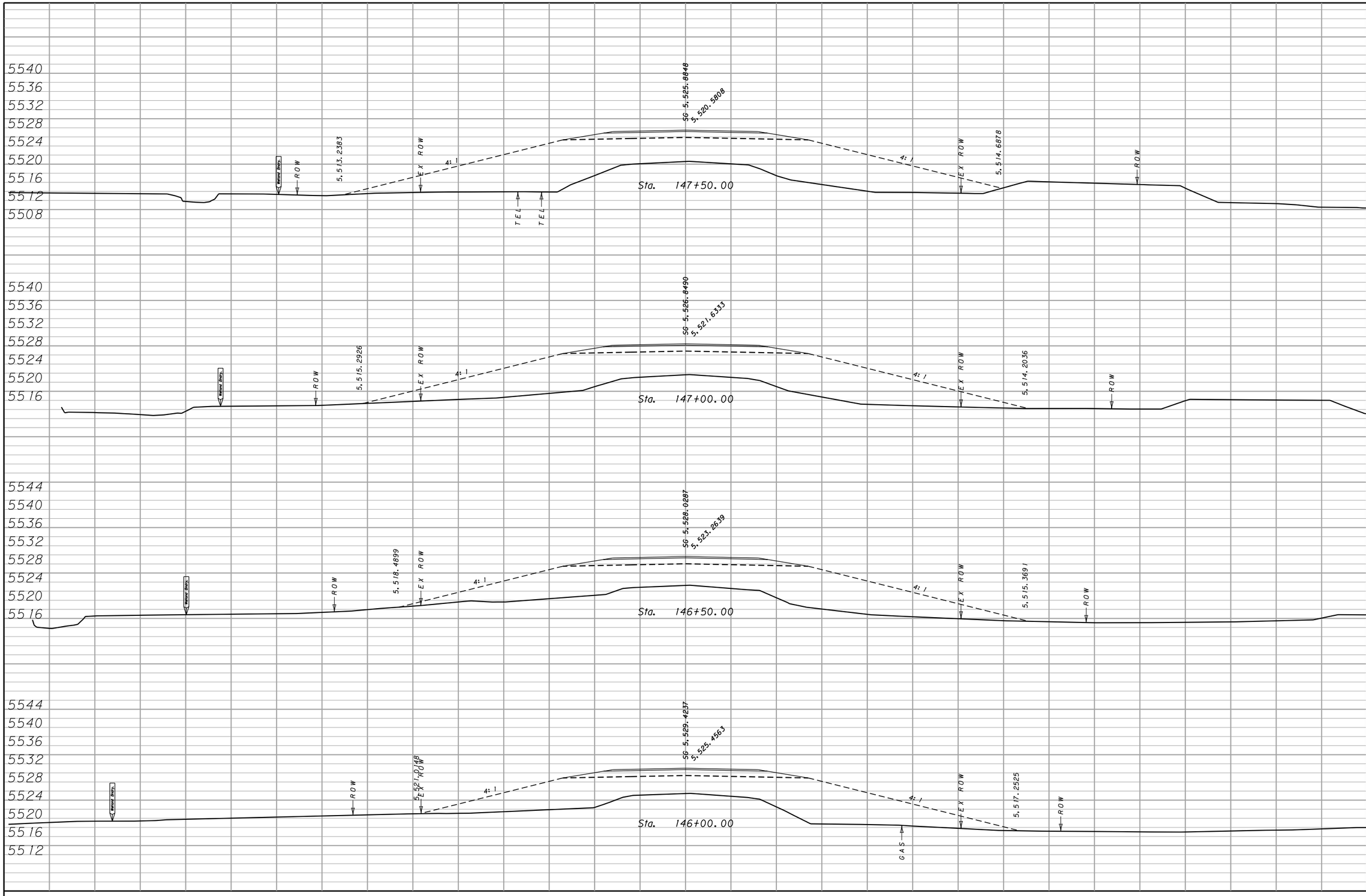
RED LODGE - NORTHWEST

CSF= 0.99961552

UPN 4890

STPP 78-1(11)1

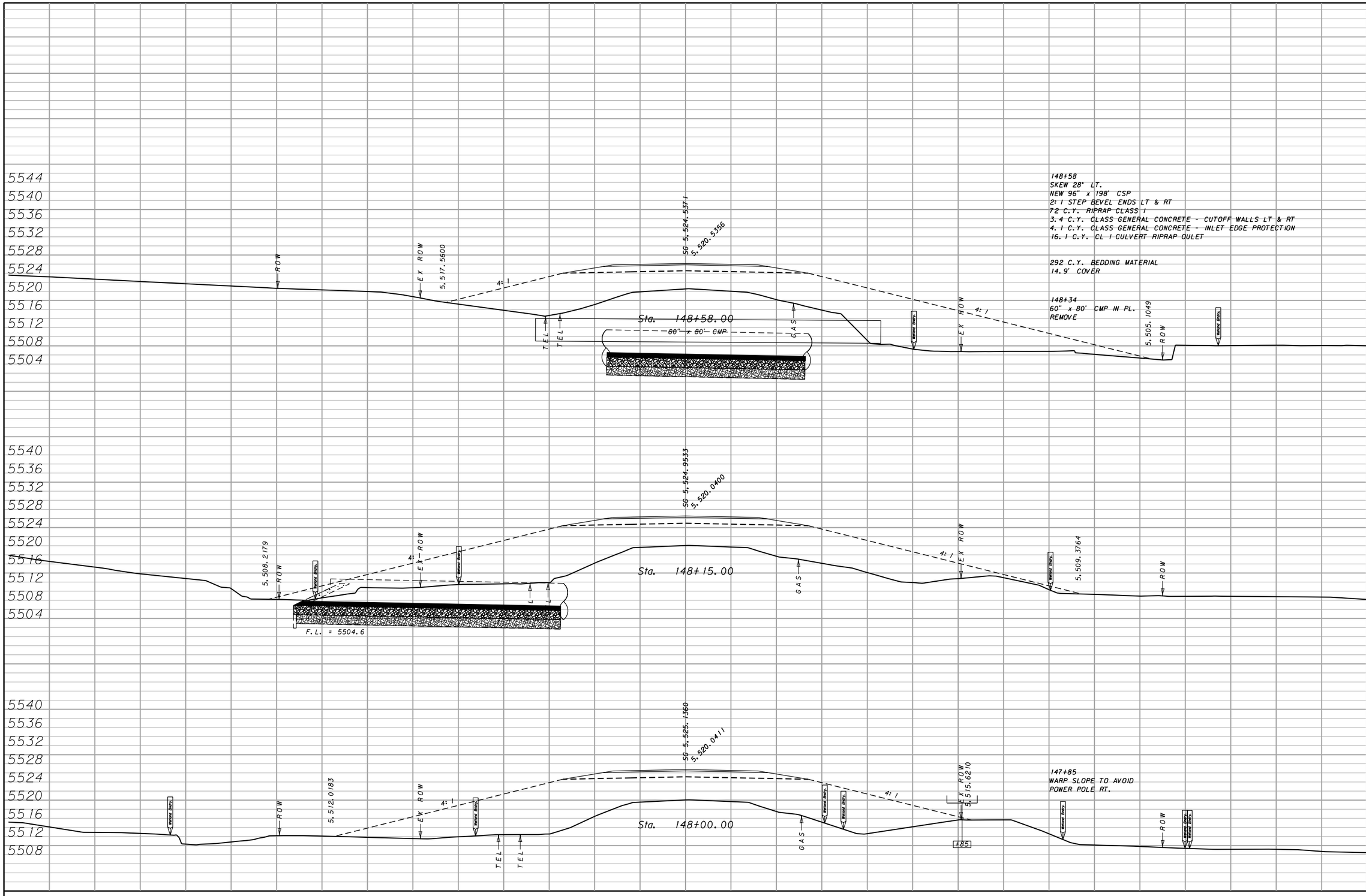
SHEET 70



CUT	FILL
0	1681
0	1495
0	1337
0	1158

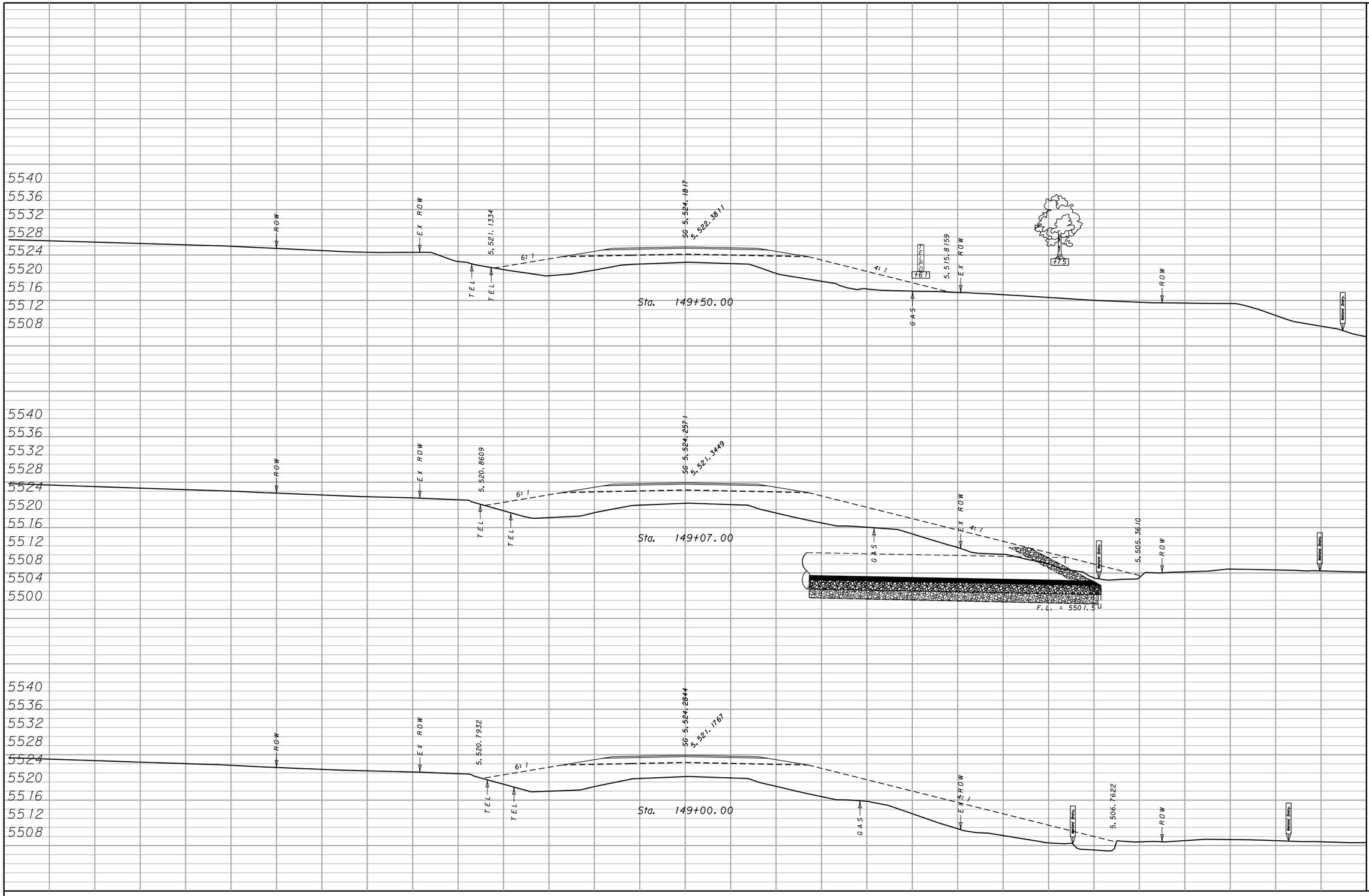
MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\4890rdlay001.dgn	DESIGNED BY	KEVIN ST. GEORGE	8/21/2014	MAINLINE CROSS SECTIONS	RED LODGE - NORTHWEST / STPP 78-1(11)1
	2/25/2015	REVIEWED BY	JEREMY TERRY	8/21/2014		
	1:59:14 PM CPS - U2160	CHECKED BY	JERRY SABOL	10/8/2014	CARBON COUNTY	CSF= 0.99961552 / UPN 4890 / SHEET 71

CUT	FILL
0	1602
0	550
0	1757

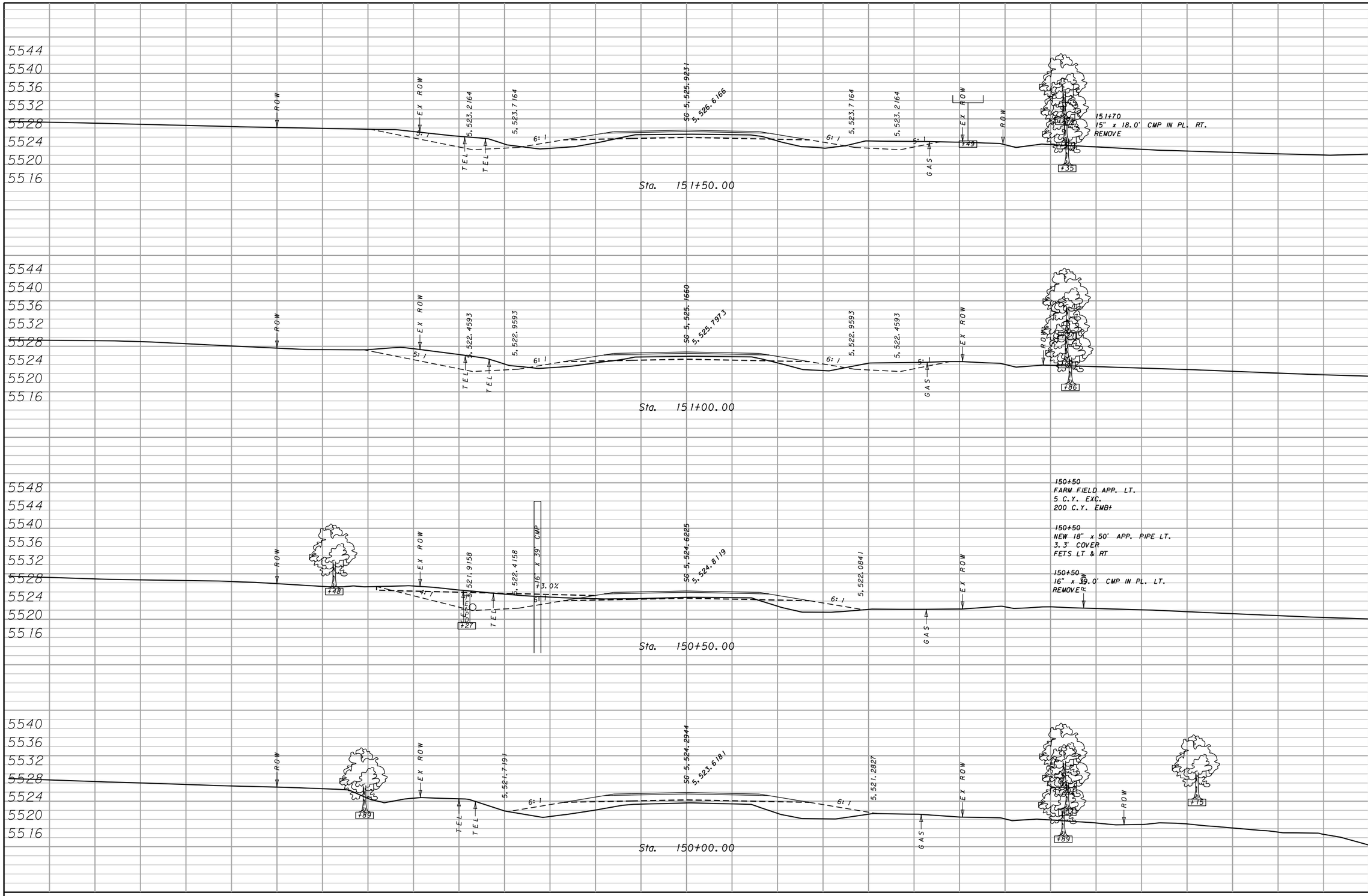


MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\4890rdlay001.dgn	DESIGNED BY	KEVIN ST. GEORGE	8/21/2014	MAINLINE CROSS SECTIONS		RED LODGE - NORTHWEST	STPP 78-1(11)1
	2/25/2015	REVIEWED BY	JEREMY TERRY	8/21/2014				
	1:59:23 PM CPS - U2160	CHECKED BY	JERRY SABOL	10/8/2014	CARBON COUNTY		CSF= 0.99961552 UPN 4890	SHEET 72

CUT	FILL
0	740
0	163
0	1280



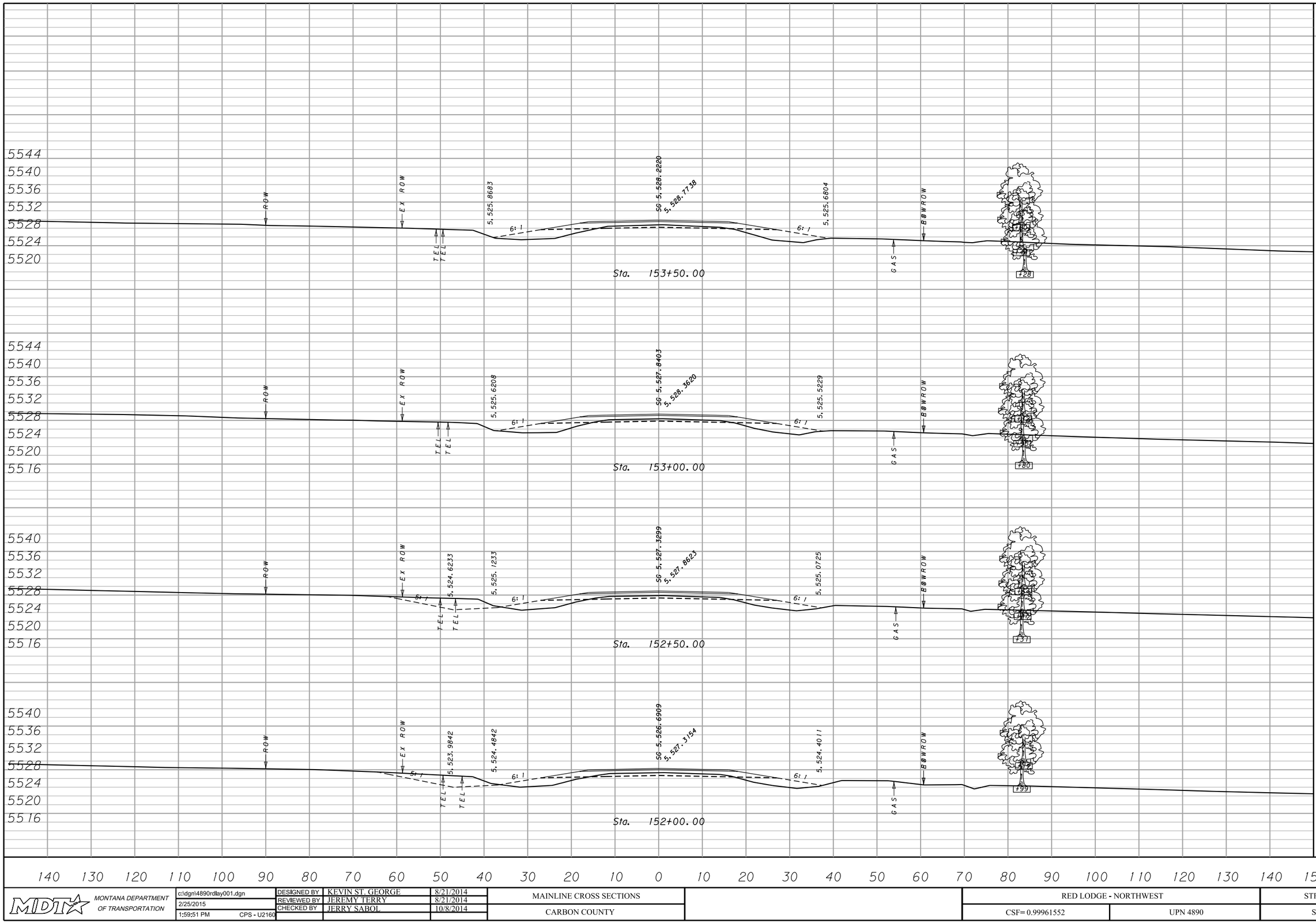
MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\4890rdlay001.dgn	DESIGNED BY	KEVIN ST. GEORGE	8/21/2014	MAINLINE CROSS SECTIONS	RED LODGE - NORTHWEST / STPP 78-1(11)1
	2/25/2015	REVIEWED BY	JEREMY TERRY	8/21/2014		
	1:59:33 PM CPS - U2160	CHECKED BY	JERRY SABOL	10/8/2014	CARBON COUNTY	CSF= 0.99961552 / UPN 4890 / SHEET 73



CUT	FILL
162	148
190	158
97	269
0	498

140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\4890rdlay001.dgn	DESIGNED BY	KEVIN ST. GEORGE	8/21/2014	MAINLINE CROSS SECTIONS		RED LODGE - NORTHWEST	STPP 78-1(11)1
	2/25/2015	REVIEWED BY	JEREMY TERRY	8/21/2014				
	1:59:42 PM CPS - U2160	CHECKED BY	JERRY SABOL	10/8/2014	CARBON COUNTY		CSF= 0.99961552 UPN 4890	SHEET 74



CUT	FILL
0	210
35	193
72	183
106	166

MONTANA DEPARTMENT OF TRANSPORTATION

c:\dgn\4890rdlay001.dgn	DESIGNED BY	KEVIN ST. GEORGE	8/21/2014
2/25/2015	REVIEWED BY	JEREMY TERRY	8/21/2014
1:59:51 PM CPS - U2160	CHECKED BY	JERRY SABOL	10/8/2014

MAINLINE CROSS SECTIONS

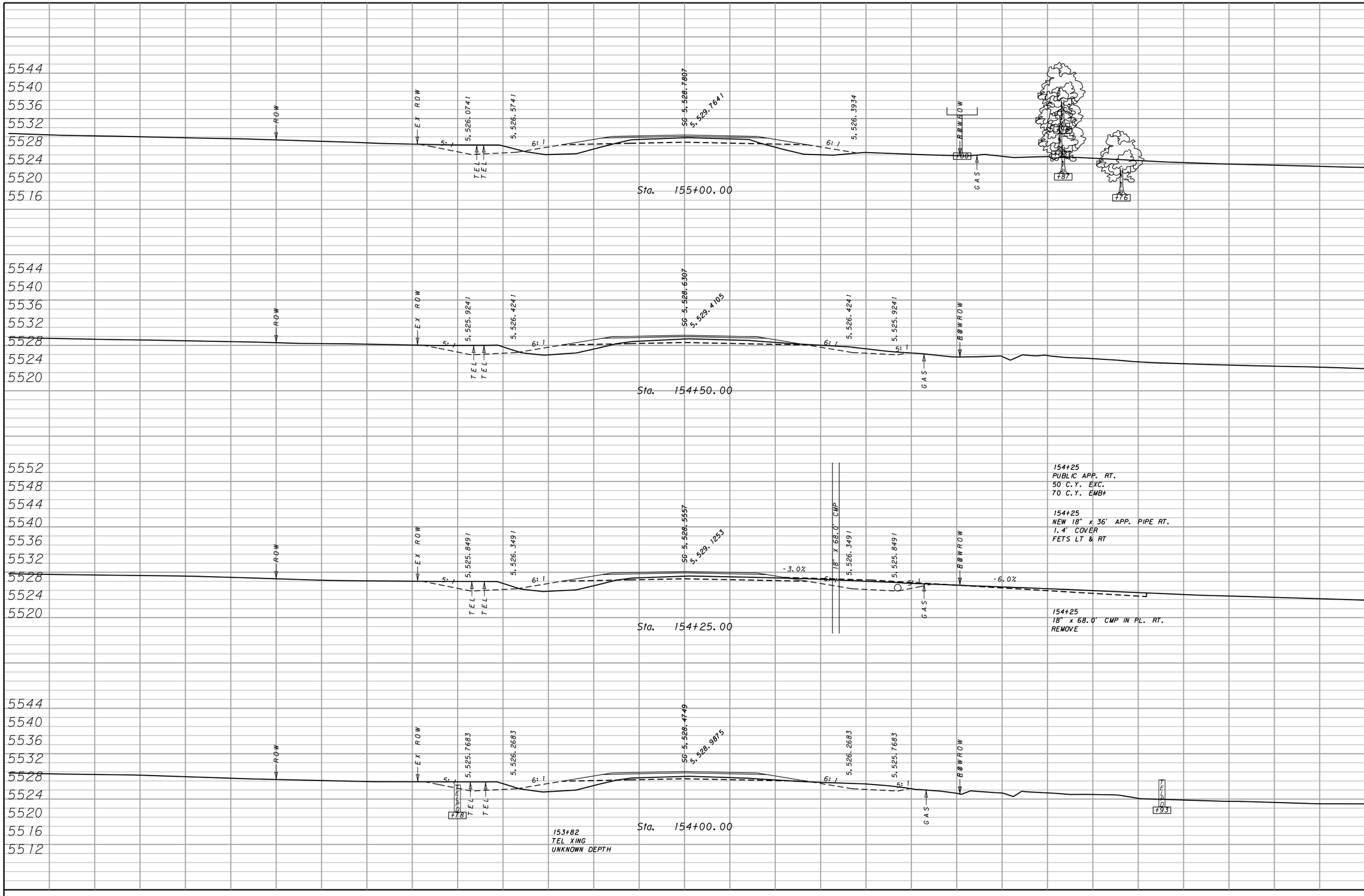
CARBON COUNTY

RED LODGE - NORTHWEST

CSF= 0.99961552 | UPN 4890

STPP 78-1(11)1

SHEET 75



CUT	FILL
66	151
50	67
50	73
40	186

140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

MONTANA DEPARTMENT OF TRANSPORTATION

c:\dgn\4890rdlay001.dgn
2/25/2015
2:00:00 PM CPS - U2160

DESIGNED BY	KEVIN ST. GEORGE	8/21/2014
REVIEWED BY	JEREMY TERRY	8/21/2014
CHECKED BY	JERRY SABOL	10/8/2014

MAINLINE CROSS SECTIONS

CARBON COUNTY

RED LODGE - NORTHWEST

CSF= 0.99961552 | UPN 4890

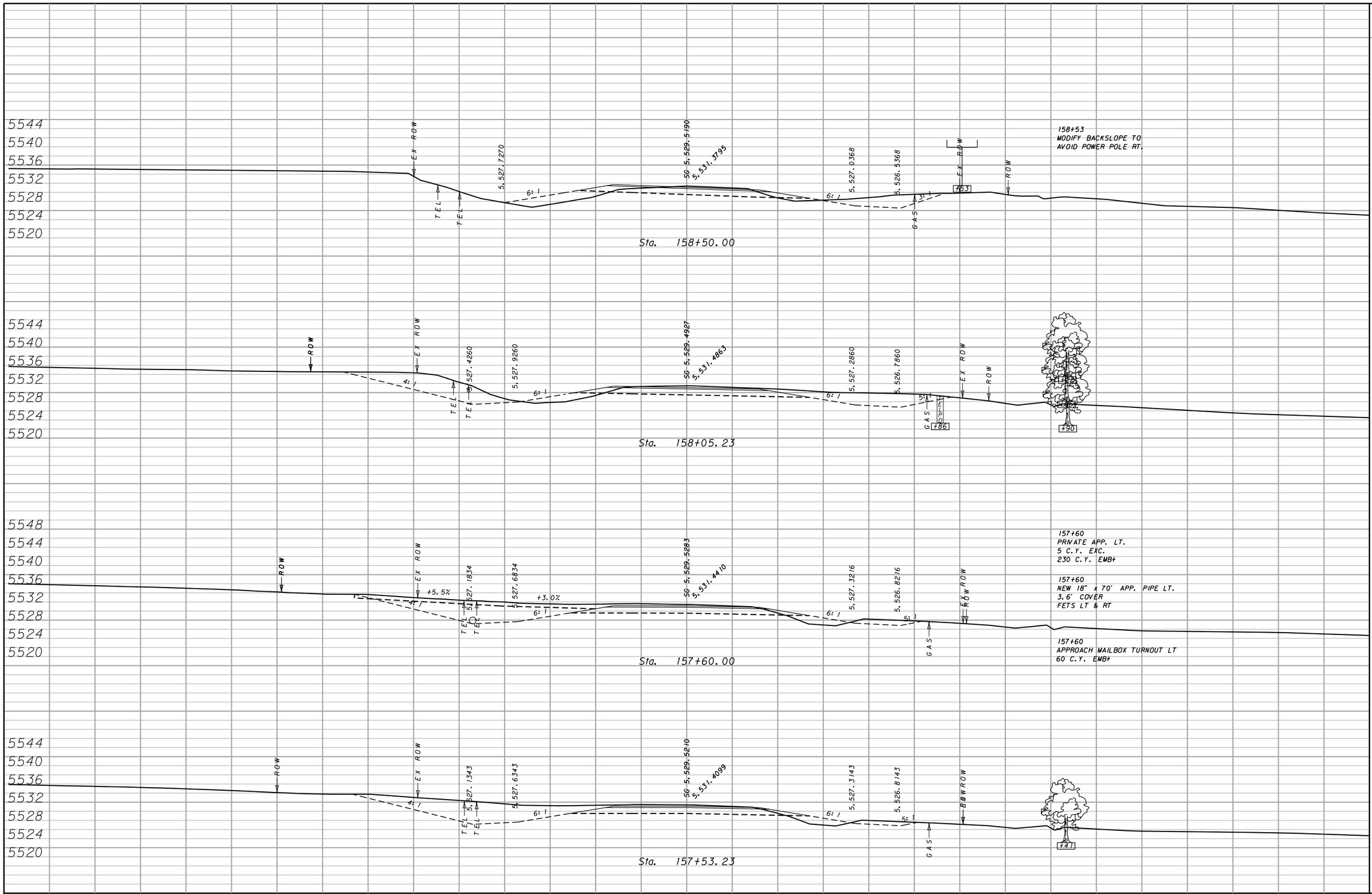
STPP 78-1(11)1

SHEET 76

CUT	FILL
134	86
89	115
68	148
56	167

140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

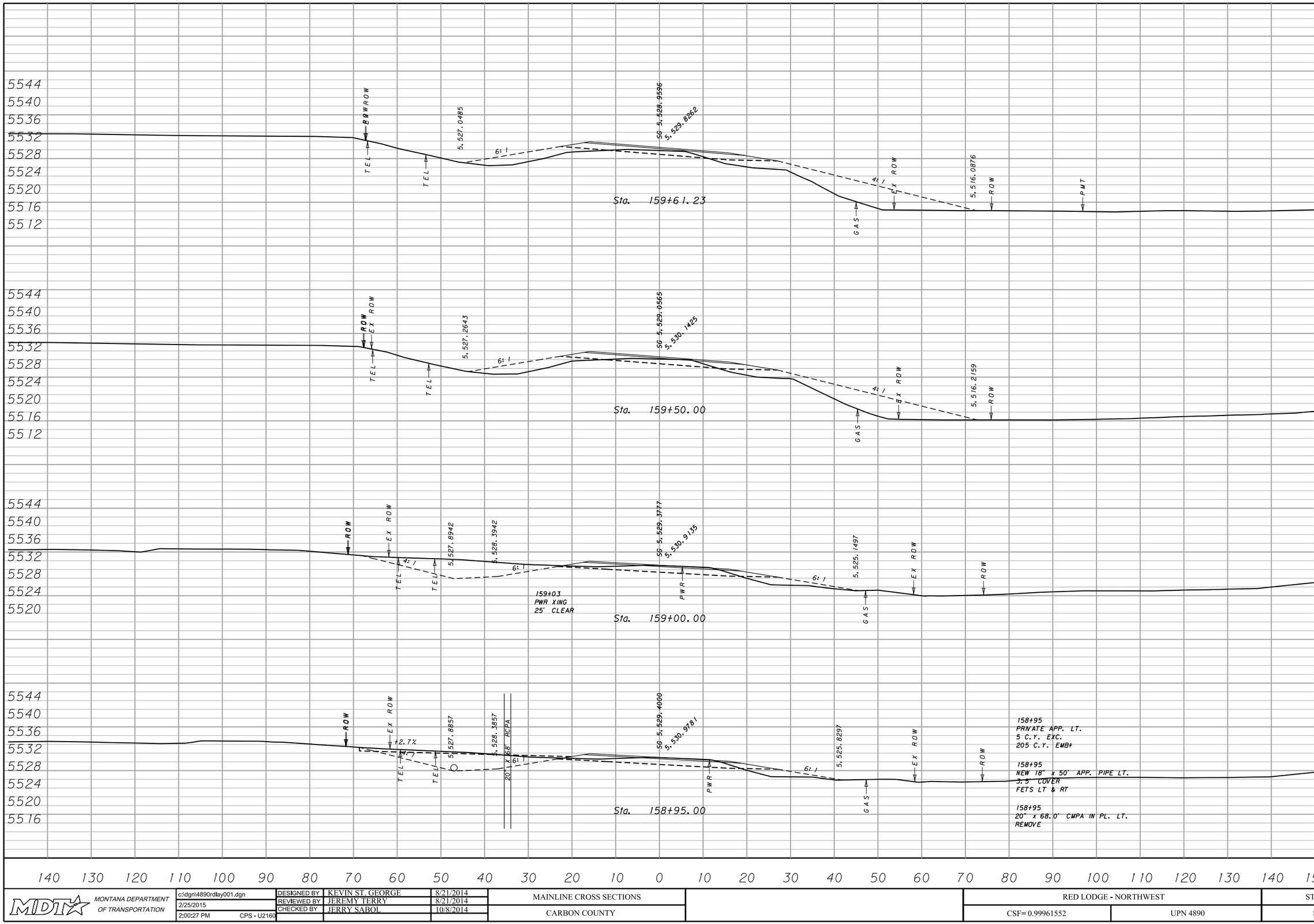
MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\4890rdlay001.dgn	DESIGNED BY	KEVIN ST. GEORGE	8/21/2014	MAINLINE CROSS SECTIONS		RED LODGE - NORTHWEST	STPP 78-1(11)1
	2/25/2015	REVIEWED BY	JEREMY TERRY	8/21/2014				
	2:00:09 PM CPS - U2160	CHECKED BY	JERRY SABOL	10/8/2014	CARBON COUNTY		CSF= 0.99961552 / UPN 4890	SHEET 77



CUT	FILL
189	71
303	39
44	5
247	57

140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\4890rdlay001.dgn	DESIGNED BY	KEVIN ST. GEORGE	8/21/2014	MAINLINE CROSS SECTIONS	RED LODGE - NORTHWEST / STPP 78-1(11)1
	2/25/2015	REVIEWED BY	JEREMY TERRY	8/21/2014	CARBON COUNTY	CSF= 0.99961552 / UPN 4890 / SHEET 78
	2:00:18 PM CPS - U2160	CHECKED BY	JERRY SABOL	10/8/2014		



CUT	FILL
0	103
99	261
20	8
129	85

MONTANA DEPARTMENT OF TRANSPORTATION

c:\dgn\4890rdlay001.dgn
2/25/2015
2:00:27 PM CPS - U2160

DESIGNED BY	KEVIN ST. GEORGE	8/21/2014
REVIEWED BY	JEREMY TERRY	8/21/2014
CHECKED BY	JERRY SABOL	10/8/2014

MAINLINE CROSS SECTIONS

CARBON COUNTY

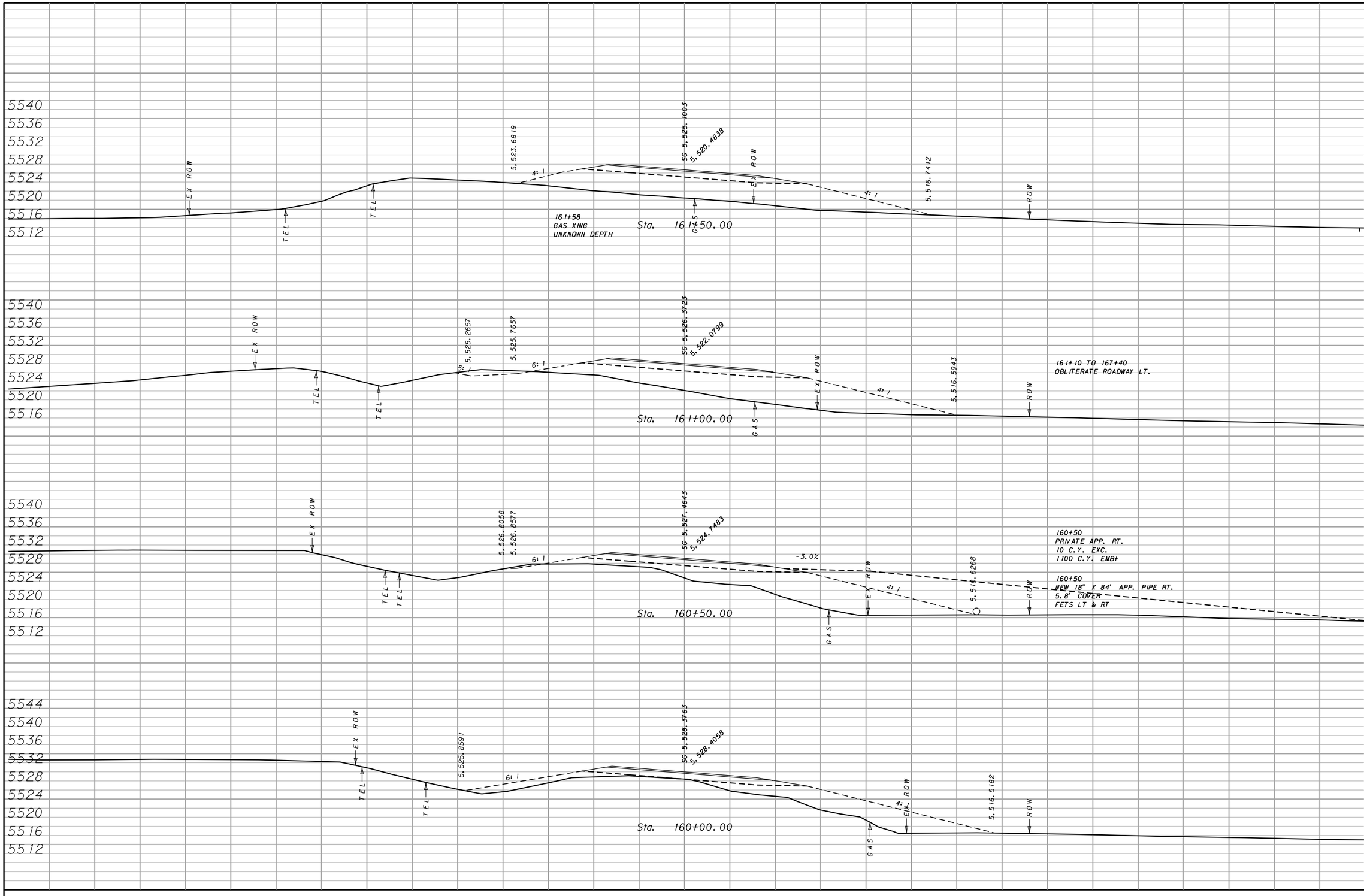
RED LODGE - NORTHWEST

CSF= 0.99961552

UPN 4890

STPP 78-1(11)1

SHEET 79



CUT	FILL
12	774
14	745
2	634
0	407

MONTANA DEPARTMENT OF TRANSPORTATION

c:\dgn\4890rdlay001.dgn
2/25/2015
2:00:36 PM CPS - U2160

DESIGNED BY	KEVIN ST. GEORGE	8/21/2014
REVIEWED BY	JEREMY TERRY	8/21/2014
CHECKED BY	JERRY SABOL	10/8/2014

MAINLINE CROSS SECTIONS

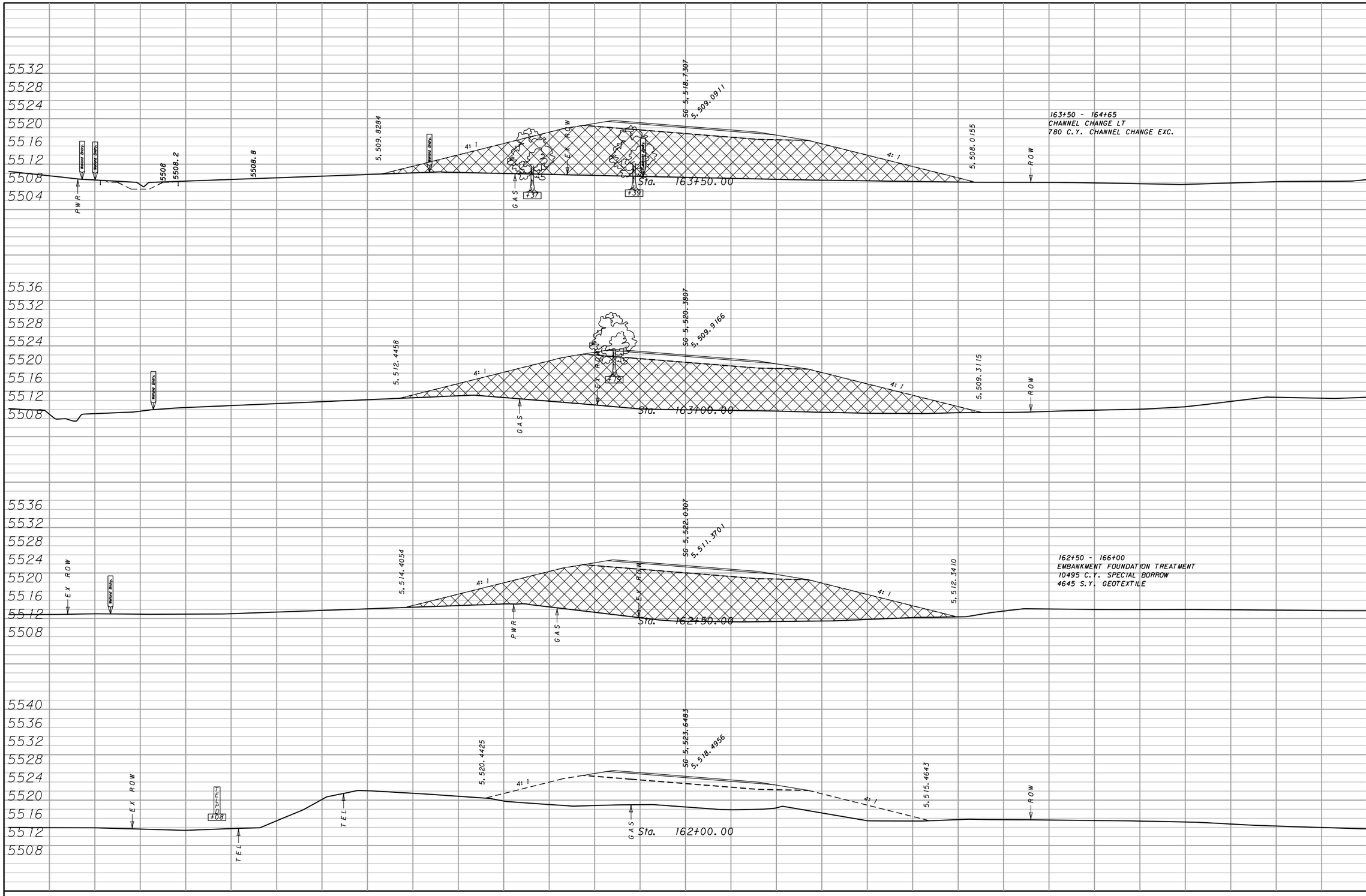
CARBON COUNTY

RED LODGE - NORTHWEST

CSF= 0.99961552 | UPN 4890

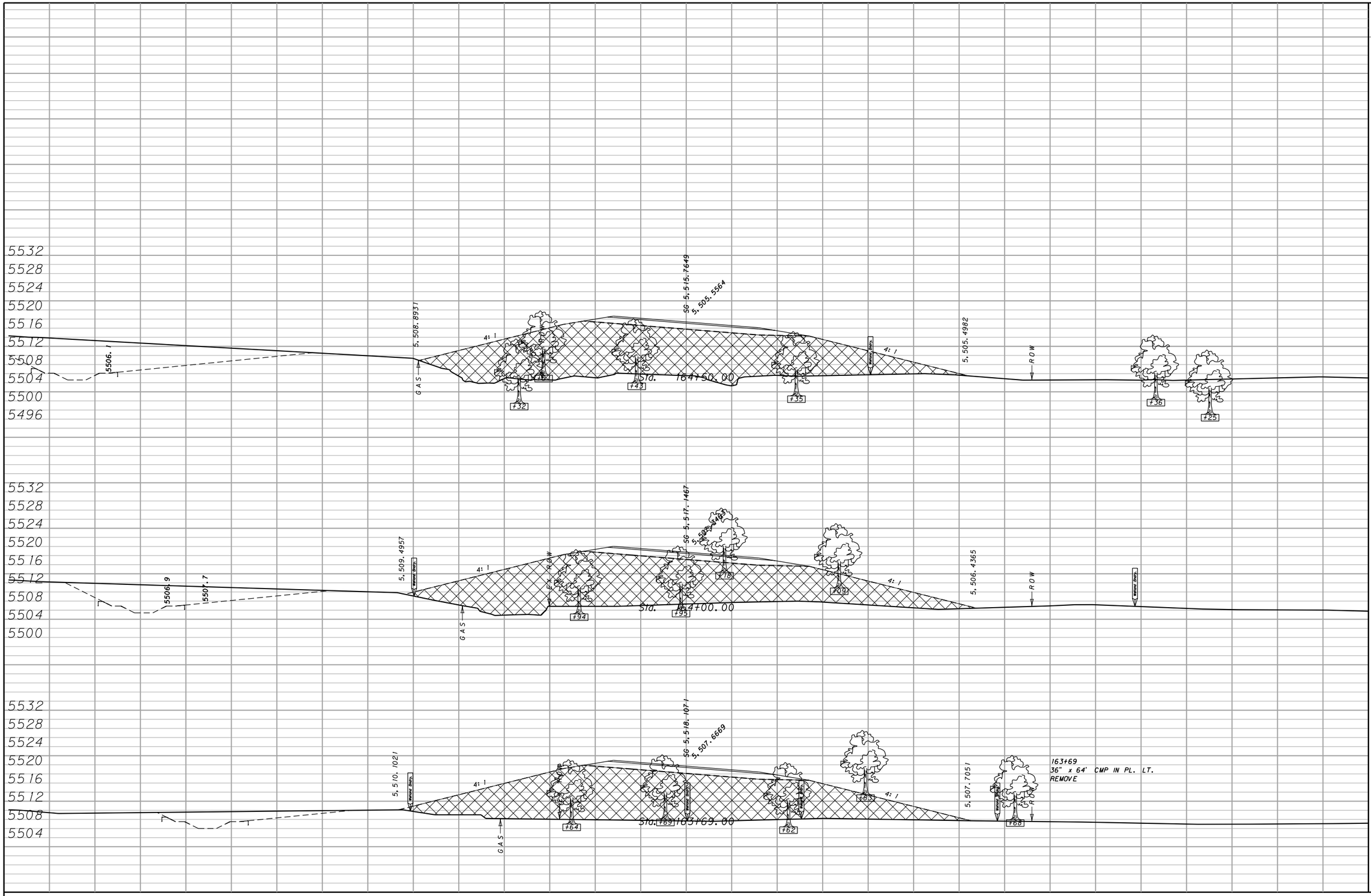
STPP 78-1(11)1

SHEET 80



CUT	FILL
0	1763
0	1722
0	1268
0	819

MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\4890rdlay001.dgn	DESIGNED BY	KEVIN ST. GEORGE	8/21/2014	MAINLINE CROSS SECTIONS	RED LODGE - NORTHWEST / STPP 78-1(11)1
	2/25/2015	REVIEWED BY	JEREMY TERRY	8/21/2014		
	2:00:45 PM CPS - U2160	CHECKED BY	JERRY SABOL	10/8/2014	CARBON COUNTY	CSF= 0.99961552 / UPN 4890 / SHEET 81



CUT	FILL
0	1867
0	1140
0	677

MONTANA DEPARTMENT OF TRANSPORTATION

c:\dgn\4890rdlay001.dgn
2/25/2015
2:00:53 PM CPS - U2160

DESIGNED BY	KEVIN ST. GEORGE	8/21/2014
REVIEWED BY	JEREMY TERRY	8/21/2014
CHECKED BY	JERRY SABOL	10/8/2014

MAINLINE CROSS SECTIONS

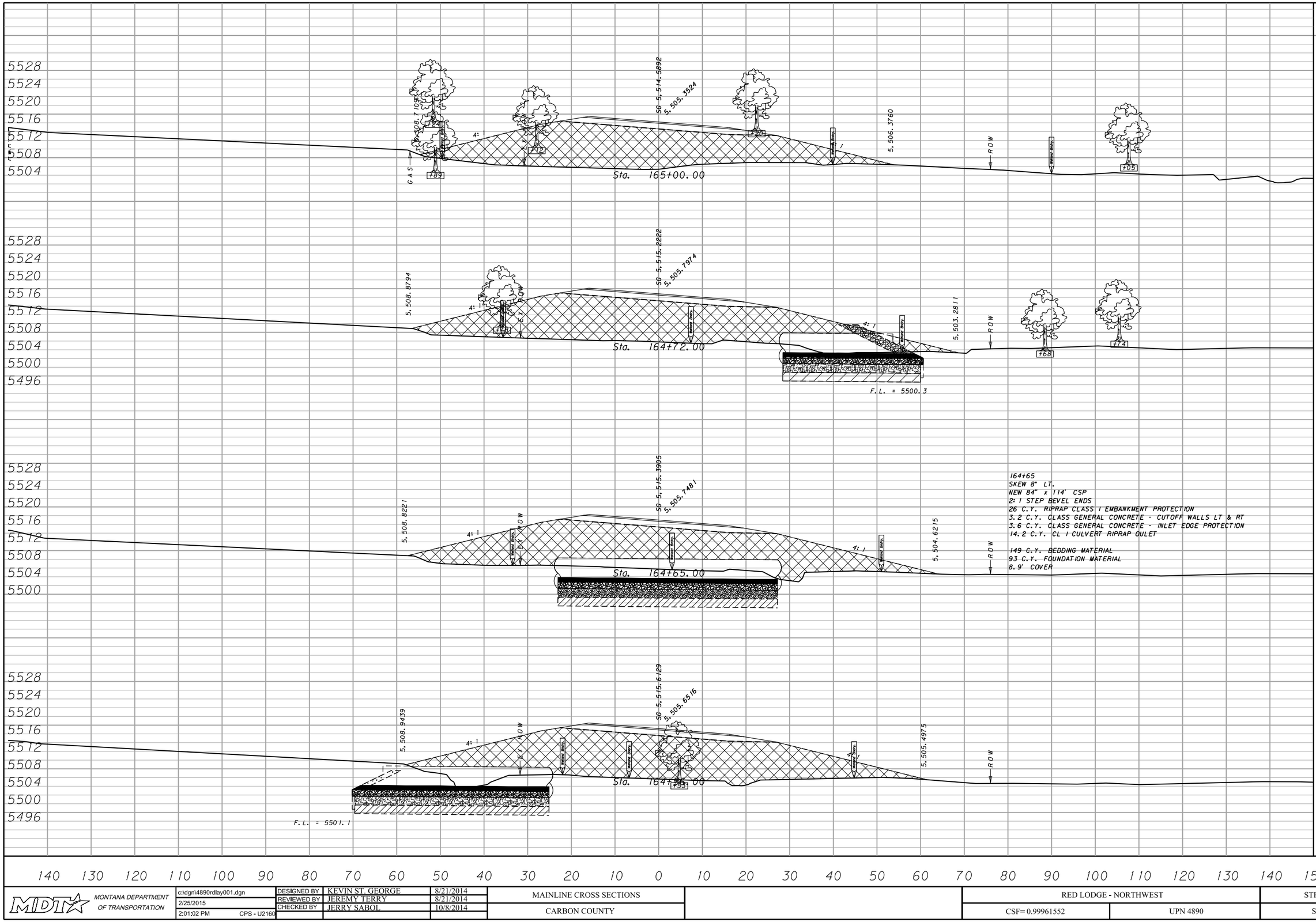
CARBON COUNTY

RED LODGE - NORTHWEST

CSF= 0.99961552 | UPN 4890

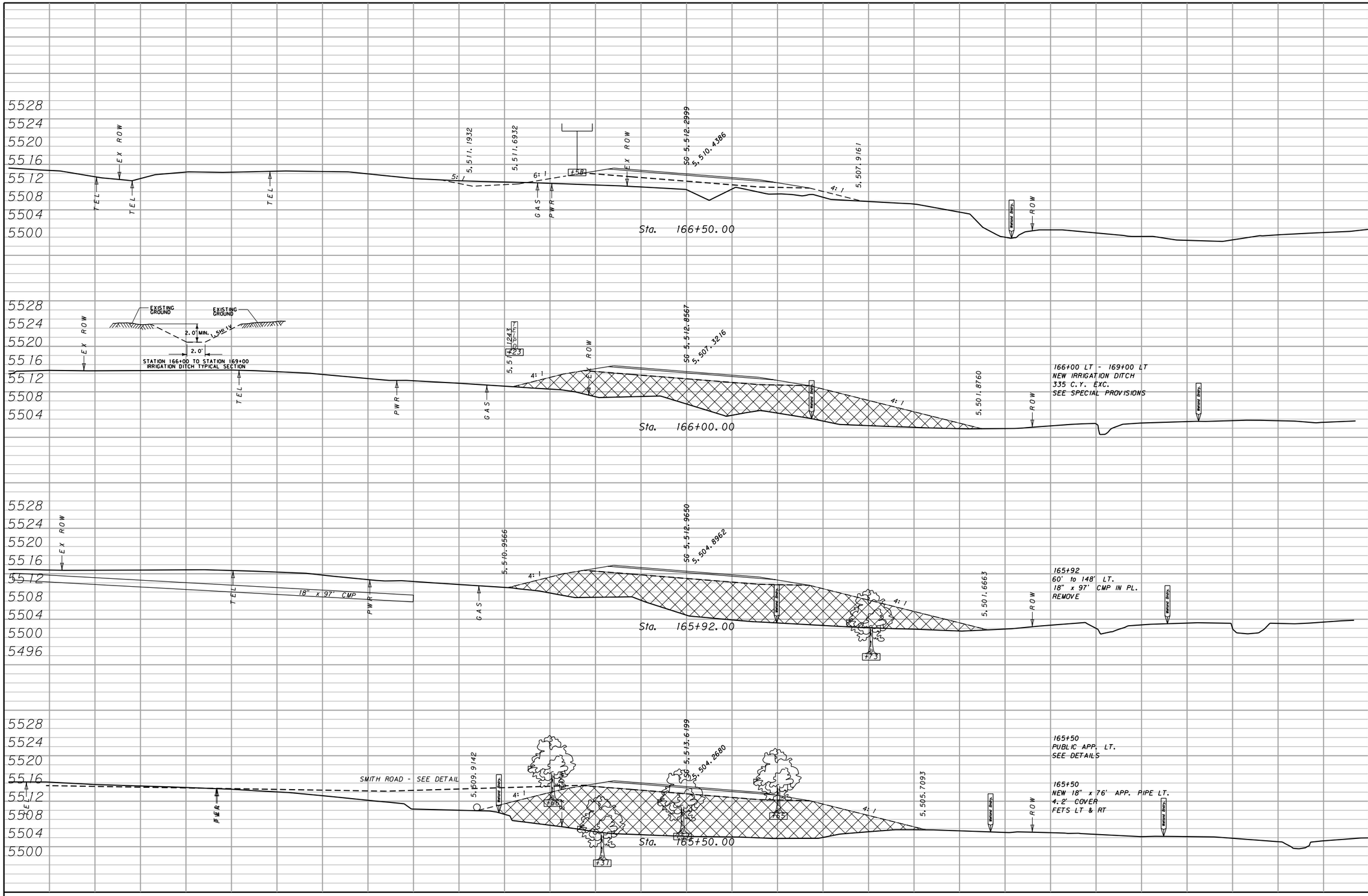
STPP 78-1(11)1

SHEET 82



CUT	FILL
0	874
0	240
0	313
0	219

MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\4890rdlay001.dgn	DESIGNED BY	KEVIN ST. GEORGE	8/21/2014	MAINLINE CROSS SECTIONS	RED LODGE - NORTHWEST / STPP 78-1(11)1
	2/25/2015	REVIEWED BY	JEREMY TERRY	8/21/2014		
	2:01:02 PM CPS - U2160	CHECKED BY	JERRY SABOL	10/8/2014	CARBON COUNTY	CSF= 0.99961552 / UPN 4890 / SHEET 83



CUT	FILL
10	682
0	179
0	1088
0	1384

MONTANA DEPARTMENT OF TRANSPORTATION

c:\dgn\4890rdlay001.dgn
2/25/2015
2:01:12 PM CPS - U2160

DESIGNED BY	KEVIN ST. GEORGE	8/21/2014
REVIEWED BY	JEREMY TERRY	8/21/2014
CHECKED BY	JERRY SABOL	10/8/2014

MAINLINE CROSS SECTIONS

CARBON COUNTY

RED LODGE - NORTHWEST

CSF= 0.99961552 | UPN 4890

STPP 78-1(11)1

SHEET 84

02/13/2013
Highways & Engineering Division

SUMMARY

SURFACING

STATION FROM	STATION TO	linear feet GROSS	linear feet NET	linear feet +	linear feet -	FOR	tons HYDRATED LIME	AGGREGATE square yds COVER TYPE I	AGGREGATE tons PLANT MIX BIT. SURF. GRADE S	AGGREGATE cubic yards SELECT SURFACING	AGGREGATE cubic yards CRUSHED AGG. COURSE	BITUMINOUS MATERIAL tons ASPHALT CEMENT PG 64-28	BITUMINOUS MATERIAL tons SEAL CRS-2P	BITUMINOUS MATERIAL square yds AGG. TREAT	REMARKS
34+80.66	36+19.22	138.56	138.56					600	125		282	6.5	1.1	600	TYP. NO. 1
36+19.22	49+00.00	1280.78	1280.78					3983	752		2396	39.1	7.1	4649	TYP. NO. 2
49+00.00	49+47.00	47.00	47.00					148	27		83	1.4	0.3	163	TRANS TYP. NO. 2 TO TYP. NO. 3
49+47.00	51+70.00	233.00	233.00					835	164		414	8.5	1.5	864	TRANS TYP. NO. 3 TO TYP. NO. 4
51+70.00	52+52.83	82.83	82.83					357	76		172	3.9	0.6	368	TYP. NO. 4
52+52.83	54+00.00	147.17	147.17					634	135		310	7.0	1.1	657	TRANS TYP. NO. 4 TO TYP. NO. 5
54+00.00	54+29.00	29.00	29.00					109	23		55	1.2	0.2	114	TRANS TYP. NO. 5 TO TYP. NO. 6
54+29.00	54+39.00	10.00	10.00					32	7		17	0.4	0.1	34	TYP. NO. 6
54+39.00	54+69.00	30.00	30.00					93	21		80	1.1	0.2	106	TYP. NO. 7
54+69.00	54+79.00	10.00	10.00					31	7		19	0.4	0.1	35	TYP. NO. 8
54+79.00	55+12.83	33.83	33.83					105	24		65	1.2	0.2	120	TRANS TYP. NO. 8 TO TYP. NO. 9
55+12.83	66+11.00	1098.17	1098.17					3415	765		2120	39.8	6.1	3931	TYP. NO. 9
66+11.00	66+41.00	30.00	30.00					91	20		58	1.0	0.2	102	TRANS TYP. NO. 9 TO TYP. NO. 10
66+41.00	68+57.00	216.00	216.00					787	169		446	8.8	1.4	837	TRANS TYP. NO. 10 TO TYP. NO. 11
68+57.00	71+22.00	275.00	275.00					1142	245		588	12.7	2.0	1203	TYP. NO. 9
71+22.00	80+35.75	913.75	913.75					2841	637		1767	33.2	5.2	3271	TYP. NO. 13
80+35.75	80+65.75	30.00	30.00					91	20		58	1.0	0.2	102	TRANS TYP. NO. 9 TO TYP. NO. 10
80+65.75	82+81.75	216.00	216.00					787	169		446	8.8	1.4	837	TRANS TYP. NO. 10 TO TYP. NO. 11
82+81.75	101+21.18	1839.43	1839.43					6037	1342		3634	69.9	11.0	6840	TYP. NO. 9
101+21.18	103+55.18	234.00	234.00					780	174		480	9.0	1.4	889	TRANS TYP. NO. 9 TO TYP. NO. 16
103+55.18	275+88.72	17223.54	17223.54					61353	13604		37455	707.6	110.0	69278	TYP. NO. 17
						ADDITIONAL SURFACING		5153	3543	67	6422	175.5	9.2	5814	
		24188.72	24188.72												
TOTAL							1147	89404	22049	67	57367	1138.0	160.6	100814	

ADDITIONAL SURFACING

STATION FROM	STATION TO	linear feet GROSS	linear feet NET	FOR	tons HYDRATED LIME	AGGREGATE square yds COVER TYPE I	AGGREGATE tons PLANT MIX BIT. SURF. GRADE S	AGGREGATE cubic yards SELECT SURFACING	AGGREGATE cubic yards CRUSHED AGG. COURSE	BITUMINOUS MATERIAL tons ASPHALT CEMENT PG 64-28	BITUMINOUS MATERIAL tons SEAL CRS- 2P	BITUMINOUS MATERIAL square yds AGG. TREAT	REMARKS
36+50.00	49+47.00	1297.00	1297.00				218		330	11.3		2	PATH - TYP.NO.2
49+47.00	55+12.83	535.83	535.83				88		130	4.6		1	CURBED PATH - TYP.NO.3
55+12.83	66+41.00	1128.17	1128.17				190		287	9.9		2	PATH - TYP.NO.2
66+41.00	71+92.00	521.00	521.00				87		126	4.5		0	CURBED PATH - TYP.NO.3
71+92.00	80+65.75	1355.00	1355.00				147		223	7.6		1	PATH - TYP.NO.2
80+65.75	86+17.00	40.00	40.00				79		117	4.1		1	CURBED PATH - TYP.NO.3
86+17.00	96+96.00	1079.00	1079.00				168		275	9.4		2	PATH - TYP.NO.2
96+96.00	97+66.00	40.00	40.00				7		9	0.4		0	CURBED PATH - TYP.NO.3
97+66.00	103+55.18	589.18	589.18				99		150	5.2		1	PATH - TYP.NO.2
						3417	490	67	791	25.5	6.1	3635	AIRPORT ROAD
						1068	153		247	8.0	1.9	1136	WILLOW CREEK ROAD
						668	96		154	5.0	1.2	710	ROATS LANE
							62		141	4.3		323	241+50 - APPROACH LT
				21 - PUBLIC APPROACHES			525		1071	27.3			
				21 - PRIVATE APPROACHES			777		1575	40.3			
				13 - FARM FIELD APPROACHES			52		546	2.6			
				12 - MAILBOX TURNOUTS			132		240	7.2			
TOTAL		~	~			5153	3543	67	6422	175.5	9.2	5814	

GRADING

STATION	cubic yards UNCL. EXC.	cubic yards UNCL. BORROW	cubic yards EMB.+	REMARKS
34+80.66				
	4587		4587	
44+69				
	7774		7774	
52+81				
	131826	166277	298103	
275+88.72				
	8435		12857	ADDITIONAL GRADING
TOTAL	152622	166277	# 323321	

FOR INFORMATION ONLY

OBLITERATE ROADWAY

STATION FROM	STATION TO	stations OBLIT-ERATE ROADWAY	REMARKS
9+65	15+84	4.3	AIRPORT RD. - LT
17+17	21+60	5.0	AIRPORT RD. - LT
106+50	110+05	4.0	RT. - SEE DETAIL
111+00	121+10	10.6	RT.
161+10	167+40	6.2	LT.
183+40	191+70	10.4	RT.
TOTAL		40.5	

ADDITIONAL GRADING

STATION FROM	STATION TO	cubic yards INCL. IN ROADWAY UNCL. EXC.	cubic yards INCL. IN ROADWAY EMB.+	cubic yards ADD. UNCL. EXC.	REMARKS
36+19.22		2340	1355		AIRPORT ROAD CONNECTION LT
36+19.22		5	125		PUBLIC APPROACH RT
44+35		5	40		CROSS WALK LT
44+72		5	90		PUBLIC APPROACH LT
48+62		25	95		PUBLIC APPROACH LT
50+24		10	220		PUBLIC APPROACH LT
53+53		10	95		PUBLIC APPROACH LT
54+54		15	65		PUBLIC APPROACH RT
56+21		15	70		PUBLIC APPROACH LT
59+24		5	55		PUBLIC APPROACH LT
64+52		5	85		PUBLIC APPROACH LT
64+69		5	45		FARM FIELD APPROACH - 190' LT
66+09.27	66+76	40			DRAINAGE DITCH RT
66+76			10		DITCH BLOCK RT
68+50			20		DITCH BLOCK LT
71+37		15	85		FARM FIELD APPROACH LT
71+37			35		PUBLIC APPROACH RT
80+50	91+50	735			IRRIGATION DITCH LT
81+00	82+50	35	195		IRRIGATION DITCH RT
85+62			40		FARM FIELD APPROACH LT
85+62		15	50		PUBLIC APPROACH RT
97+21		10	80		FARM FIELD APPROACH LT
97+21			30		PUBLIC APPROACH RT
104+50		15	65		PRIVATE APPROACH RT
104+50			35		APPROACH MAILBOX TURNOUT - RT
110+00		15	80		FARM FIELD APPROACH LT
110+00		390	400		WILLOW CREEK ROAD CONNECTION RT
118+68		45			IRRIGATION DITCH - RT
119+50		30	185		PRIVATE APPROACH RT
126+84		15	65		PRIVATE APPROACH LT
126+84		25	110		PRIVATE APPROACH RT
134+75		20	90		PRIVATE APPROACH LT
142+63		5	135		PUBLIC APPROACH LT
142+63		5	95		PUBLIC APPROACH RT
142+63			45		APPROACH MAILBOX TURNOUT - LT
150+50		5	165		FARM FIELD APPROACH LT
154+25		50	60		PUBLIC APPROACH RT
157+60		5	190		PRIVATE APPROACH LT
157+60			50		APPROACH MAILBOX TURNOUT - LT
158+95		5	170		PRIVATE APPROACH LT
163+50	164+65	780			CHANNEL CHANGE - LT
159+50		10	1830		PRIVATE APPROACH RT
165+50		195	925		ROATS LANE CONNECTION LT
166+00	169+00	335			IRRIGATION DITCH LT
175+90		15	90		PRIVATE APPROACH RT
181+11			460		PRIVATE APPROACH RT
181+11			80		APPROACH MAILBOX TURNOUT - RT
185+00		15	570		PRIVATE APPROACH RT
185+00			80		APPROACH MAILBOX TURNOUT - RT
192+32		30	65		PUBLIC APPROACH RT
192+32			20		APPROACH MAILBOX TURNOUT - RT
197+15		5	150		PRIVATE APPROACH LT
200+67	201+11	25			IRRIGATION DITCH LT
201+86		10	585		PUBLIC APPROACH LT
202+89		15	440		PRIVATE APPROACH RT
208+58		95	180		PRIVATE APPROACH LT
208+58		5	180		PUBLIC APPROACH RT
208+58			60		APPROACH MAILBOX TURNOUT - RT
213+32		65	195		PRIVATE APPROACH LT
216+81		5	130		PRIVATE APPROACH LT
219+16		5	165		PRIVATE APPROACH LT
219+16		5	310		PRIVATE APPROACH RT
219+16			45		APPROACH MAILBOX TURNOUT - RT
226+13		1300	90		PUBLIC APPROACH LT
226+13		5	160		PUBLIC APPROACH RT
226+13		25	35		APPROACH MAILBOX TURNOUT - LT
226+13			40		APPROACH MAILBOX TURNOUT - RT
227+50		35	60		PRIVATE APPROACH RT
232+50		5	85		PUBLIC APPROACH RT
241+50		2210	125		PRIVATE APPROACH LT
241+50		50	35		APPROACH MAILBOX TURNOUT - LT
243+50		380	80		FARM FIELD APPROACH LT
245+50			70		FARM FIELD APPROACH RT
257+50		5	35		FARM FIELD APPROACH LT
258+80		5	165		FARM FIELD APPROACH RT
264+50		5	115		FARM FIELD APPROACH LT
270+33		5	320		FARM FIELD APPROACH LT
271+50		10	545		PRIVATE APPROACH RT
271+50			95		APPROACH MAILBOX TURNOUT - RT
272+00	275+88.72	910			DIGOUT EXCAVATION
273+30		5	165		PRIVATE APPROACH LT
274+43		10	75		FARM FIELD APPROACH RT
SUBTOTAL		10505	13680		

SUMMARY

DIGOUT EXCAVATION *

STATION		cubic yards		square yards	REMARKS
		DIGOUT EXC.	SPECIAL BORROW	GEOTEXTILE PERM. EROS. CNTRL. HIGH SURV. CLASS B	
FROM	TO				
272+00	275+88.72	910	1355	2331	
TOTAL		910	1355	2331	

* SEE DETAIL SHEET

TYPE II RIPRAP CHUTE

STATION		cubic yards	square yards	REMARKS
		RIPRAP CLASS II	TURF REINFORCEMENT MAT	
FROM	TO			
80+50		6.3	9.4	RT
TOTAL		6.3	9.4	

PAVEMENT MARKINGS

ITEM	UNIT	INTERIM APPLICA-TION *	FINAL APPLICA-TION	TOTAL
YELLOW PAINT	GAL	314		628
WHITE PAINT		348		696
WORDS & SYMBOLS - WHITE PAINT		16		32
YELLOW EPOXY			212	212
WHITE EPOXY			231	231
WORDS & SYMBOLS - WHITE EPOXY			11	11
YELLOW CURB EPOXY			23	23
YELLOW PAINT - CL MULTIUSE PATH			7	7

* TWO INTERIM APPLICATIONS REQUIRED

STORM DRAIN

STATION	linear feet	cubic yards		each			REMARKS
	RCP IRRIGATION CLASS 3	GRANULAR BEDDING MATERIAL	TRENCH EXC. *	DROP INLET TYPE V	DROP INLET TYPE III	END SECTION	
	12"			RIGHT	RIGHT	FETS	
49+00.00	21	3			1	1	
54+00.00	8	3		1			CONNECTED TO DI AT STA.54+08.83
54+08.83	33	3		1		1	
66+09.27	19	3			1	1	
70+82.00	19	3		1		1	
80+50.00	19	3			1	1	
85+20.75	37	3		1		1	
92+50.00	20	3			1	1	
96+76.00	20	3			1	1	
SUBTOTAL							
TOTAL	142	27	~	4	5	8	

* FOR INFORMATION ONLY

CURB

STATION		linear feet		REMARKS
		CONCRETE CURB AND GUTTER		
FROM	TO	LEFT	RIGHT	
34+80.66	36+02.53	121.87		INCLUDES 50' RADIUS
34+80.66	36+02.53		121.87	INCLUDES 49.2' RADIUS
49+47.00	54+39.00		492.00	INCLUDES 25' RADIUS
66+41.00	71+22.00		481.00	INCLUDES 25' RADIUS
80+65.75	85+47.00		481.25	INCLUDES 25' RADIUS
SUBTOTAL		121.87	1576.12	
TOTAL		1697.99		

CHANNEL RESTORATION & FISH PASSAGE

STATION	square yards			feet	cubic yards							lump sum	each	REMARKS
	COCONUT BLANKET	COIR NETTING TYPE A	COIR NETTING TYPE B	12" COIR LOGS	COMPACTED WETLAND SOIL	RANDOM RIPRAP CL. I	NATIVE FILL MATERIAL	3" THICK SALV-VEG MATERIAL	REMOVEABLE NATIVE STREAMBED MATERIAL *	STREAM-BED MATERIAL	CHANNEL EXC.	WILLOW CUTTINGS	HABITAT ROCKS **	
148+58						72			51	55			18	
164+65	380	500	500	1350	70	26	57	55	34	45	780	1	10	
200+66						29			46	35			12	
221+69						44			25	45			16	
231+77						37			22	45			14	
TOTAL	380	500	500	1350	70	208	57	55	* 178	211	780	1	** 70	

* FOR INFORMATIONAL PURPOSES ONLY, INCLUDED IN THE COST OF STREAMBED MATERIAL.
** FOR INFORMATIONAL PURPOSES ONLY, INLCUDED IN THE COST OF CLASS I RIPRAP.

TOPSOIL & SEEDING

STATION		cubic yards	acres							REMARKS
		TOPSOIL SALVAGING & PLACING	SEED			FERTILIZER		CONDITION SEEDBED	MULCH	
FROM	TO		NO. 1	NO. 2	NO. 3	NO. 1	NO. 2			
34+00	64+00	1574	2.0	0.1	2.0	2.0	0.1	4.0	0.1	
64+00	94+00	3312	2.8	0.1	2.0	2.8	0.1	4.8	0.1	
94+00	124+00	2121	3.7		2.0	3.7		5.7		
124+00	154+00	1753	2.7	0.1	2.0	2.7	0.1	4.7	0.1	
154+00	184+00	1996	3.4	0.1	2.0	3.4	0.1	5.4	0.1	
184+00	214+00	2381	4.4	0.2	2.0	4.4	0.2	6.4	0.2	
214+00	244+00	3063	4.5	1.4	2.0	4.5	1.4	6.5	1.4	
244+00	274+00	3344	6.4.	0.3	2.0	6.4.	0.3	8.4	0.3	
274+00	275+88.22	122	0.1	0.1	0.1	0.1	0.1	0.2	0.1	
TOTAL		19666	23.6	2.4	16.1	23.6	2.4	39.7	2.4	

RUMBLE STRIPS

STATION		miles		gals	REMARKS
		RUMBLE STRIPS		FOG SEAL SS-1	
FROM	TO	CONTIN-UOUS	INTER-MITTENT		
110+32.00	275+88.22	5.8		342	
SUBTOTAL		5.8			
TOTAL		5.8		* 339	

* FOR INFORMATION ONLY. INCLUDE IN THE COST OF RUMBLE STRIPS

SUMMARY

APPROACH PIPE (INCLUDED IN CULVERT SUMMARY RECAP)

STATION	BASIC BID ITEMS					PIPE OPTIONS in				END SECTIONS		linear feet	SKEW ANGLE	REMOVE CULVERT in x ft	REMARKS
	CULVERT PIPE in	linear feet				CONCRETE - CLASS 2	STEEL - 2 2/3 x 1/2 CORR 0.109" THK	ALUMINUM - 2 2/3 x 1/2 CORR 0.105" THK	CORRUGATED POLYETHYLENE PIPE	LEFT	RIGHT	HEIGHT OF COVER			
		LENGTH OF PIPE	REMOVE CULVERT	RELAY CULVERT	CLEAN CULVERT										
36+19.22 LT	18	48				18	18	18	18	FETS	FETS	2.0			36+19.22 LT
36+19.22 RT	18	52	70			18	18	18	18	FETS	FETS	2.7		15" X 70' CMP	36+19.22 RT
17+00 LT	18	36				18	18	18	~	FETS	FETS	0.8			17+00 AIRPORT ROAD CONNECTION
44+35 RT	12	20				12	12	12	~	SQ.	SQ.				44+35 RT
44+72 LT	18	80				18	18	18	18	FETS	FETS	2.0			44+72 LT
48+62 LT	18	42				18	18	18	18	FETS	FETS	2.0			48+62 LT
50+24 LT	18	38				18	18	18	~	FETS	FETS	1.6			50+24 LT
53+53 LT	18	46	40			18	18	18	~	FETS	FETS	1.8		15" X 40' CMP	53+53 LT
54+54 RT			70			18	18	18						15" X 70"	54+54 RT
56+21 LT	18	38	36			18	18	18	~	FETS	FETS	1.6		15" X 36' CMP	56+21 LT
59+24 LT	18	36	36			18	18	18	~	FETS	FETS	1.3		15" X 36' CMP	59+24 LT
64+52 LT	18	40	40			18	18	18	18	FETS	FETS	2.0		15" x 40' CMP	64+52 LT
64+69 LT	18	40				18	18	18	18	FETS	FETS	2.0			64+69 190' LT
66+22 LT			28											15" x 28' CMP	66+22 LT
71+37 LT	18	38				18	18	18	~	FETS	FETS	1.6			71+37 LT
71+37 RT	18		70											18" X 70' CMP	71+37 RT
85+62 LT	18	38				18	18	18	~	FETS	FETS	1.6			85+62 LT
97+21 LT	18	38				18	18	18	~	FETS	FETS	1.6			97+21 LT
97+21 RT	18		63											18" X 63' CMP	97+21 RT
104+50 RT	18	50				18	18	18	~	FETS	FETS	1.3			104+50 RT
110+00 LT	18	38				18	18	18	~	FETS	FETS	1.6			110+00 LT
110+00 RT	18	42				18	18	18	18	FETS	FETS	2.3			110+00 RT
119+50 RT	18	50	60			18	18	18	18	FETS	FETS	3.3		18" x 60' CMP	119+50 RT
126+84 LT	18	36	60			18	18	18	~	FETS	FETS	1.5		24" x 60' CMP	126+84 LT
126+84 RT	18	36	40			18	18	18	~	FETS	FETS	1.4		18" x 40' CMP	126+84 RT
134+75 LT	18	36	75			18	18	18	~	FETS	FETS	1.5		24" x 75' CMPA	134+75 LT
142+63 LT	18	62	61			18	18	18	18	FETS	FETS	2.7		20" x 61' RCPA	142+63 LT
150+50 LT	18	50	39			18	18	18	18	FETS	FETS	3.3		16" x 39' CMP	150+50 LT
154+25 RT	18	36	68			18	18	18	~	FETS	FETS	1.4		18" x 68' CMP	154+25 RT
157+60 LT	18	70				18	18	18	18	FETS	FETS	3.6			157+60 LT
158+95 LT	18	50	68			18	18	18	18	FETS	FETS	3.3		20" x 68' RCPA	158+95 LT
159+50 RT	18	98				18	18	18	18	FETS	FETS	9.1			159+50 RT
165+50 LT	18	76	68			18	18	18	18	FETS	FETS	4.2			165+50 LT
175+90 RT	18	38				18	18	18	~	FETS	FETS	1.6			175+90 RT
181+11 RT	18	66				18	18	18	18	FETS	FETS	3.1			181+11 RT
185+00 RT	18	64				18	18	18	18	FETS	FETS	2.9			185+00 RT
192+32 RT	18	52	35			18	18	18	~	FETS	FETS	1.5		18" x 35' CMP	192+32 RT
197+15 LT	18	48	55			18	18	18	18	FETS	FETS	3.0		14" x 55' CMP	197+15 LT
201+86 LT	18	52	60			18	18	18	18	FETS	FETS	2.7		16" x 60' RCP	201+86 LT
202+89 LT			40											16" x 40' CMP	202+89 LT
202+89 RT	18	66	32			18	18	18	18	FETS	FETS	3.1		16" x 32' CMP	202+89 RT
208+58 LT	18	54				18	18	18	18	FETS	FETS	3.7			208+58 LT
208+58 RT	18	68				18	18	18	18	FETS	FETS	3.5			208+58 RT
213+32 LT	18	56	40			18	18	18	18	FETS	FETS	3.9		15" x 40' RCP	213+32 LT
216+81 LT	18	44	54			18	18	18	18	FETS	FETS	2.5		15" x 54' RCP	216+81 LT
219+16 LT	18	42	27			18	18	18	18	FETS	FETS	2.2		15" x 27" RCP	219+16 LT
219+16 RT	18	68				18	18	18	18	FETS	FETS	3.5			219+16 RT
226+13 LT	18	62				18	18	18	18	FETS	FETS	2.7			226+13 LT
226+13 RT	18	66				18	18	18	18	FETS	FETS	3.1			226+13 RT
227+50 RT	18	34				18	18	18	~	FETS	FETS	1.3			227+50 RT
232+50 RT	18	40				18	18	18	~	FETS	FETS	1.9			232+50 RT
241+50 LT	18	70				18	18	18	18	FETS	FETS	3.7			241+50 LT
243+50 LT	18	38				18	18	18	~	FETS	FETS	1.5			243+50 LT
245+50 RT	18	42				18	18	18	18	FETS	FETS	2.2			245+50 RT
256+82			36											15" x 36' CMP	256+82
257+50 LT	18	44				18	18	18	18	FETS	FETS	2.5			257+50 LT
258+80 RT	18	46	43			18	18	18	18	FETS	FETS	2.8		15" x 43' CMP	258+80 RT
264+50 LT	18	42				18	18	18	18	FETS	FETS	2.2			264+50 LT
270+33 LT	18	52	40			18	18	18	18	FETS	FETS	3.5		15" x 40' CMP	270+33 LT
273+30 LT	18	50	53			18	18	18	18	FETS	FETS	3.2		15" x 53' CMP	273+30 LT
274+43 RT	18	34				18	18	18	~	FETS	FETS	1.1			274+43 RT
TOTAL	~	~	1507			~	~	~	~	~	~	~	~	~	

MAILBOXES

STATION	each		REMARKS
	MAIL-BOXES	MULITPLE MAILBOX SUPPORT	
104+50	1		RT
142+63	5	1	LT
157+60	1		LT
181+11	1		RT
185+00	1		RT
192+32	1		RT
208+58	22	5	RT
219+16	2		RT
226+13	5	1	LT
226+13	5	1	RT
241+50	1		LT
271+50	1		RT
TOTAL	46	8	

WATER LINE INSULATION

STATION	square feet	cubic yards	REMARKS
	INSULATION	TRENCH EXC. *	
96+90 - 97+50	960	40	RT
SUBTOTAL			
TOTAL	960	~	

100% STATE FUNDED
* FOR INFORMATION ONLY

WATER VALVE BOXES

STATION	each		REMARKS
	ADJUST WATER VALVE BOX		
	LEFT	RIGHT	
36+11		1	
36+17		3	
85+53		1	
85+57		1	
85+94		1	
89+95		1	
96+87		1	
97+44		1	
SUBTOTAL		10	
TOTAL	10		

100% STATE FUNDED

SUMMARY

CULVERTS (INCLUDED IN CULVERT SUMMARY RECAP)

STATION	BASIC BID ITEMS											PIPE OPTIONS in		COATING *	END SECTIONS		cubic yards				square yards	linear feet	SKEW ANGLE	CULVERT IN PL. in x ft	REMARKS
	CULVERT PIPE in	linear feet				cubic yards					square yards						FOUND-ATION MATERIAL	BEDDING MATERIAL	CLASS "DD" CONCRETE	CULVERT RIPRAP	GEOTEX-TILE #	HEIGHT OF COVER			
		LENGTH OF PIPE	RELAY CULVERT	CLEAN CULVERT	REMOVE CULVERT	CULVERT EXC. **	FOUND-ATION MATERIAL	BEDDING MATERIAL	CLASS "DD" CONCRETE	CULVERT RIPRAP CLASS I	GEOTEX-TILE #	CONCRETE STEEL - 2 2/3 x 1/2 CORR. ALUMINUM - 2 2/3 x 1/2 CORR.	CLASS OR THK.		LEFT	RIGHT				CLASS I					
42+23					56																			36" x 56' CMP	
42+28					58																			18" x 58' CMP	
45+67	72 x 48	132			80			64.2	6.2			72 RCB			2:1 SLOPE	2:1 SLOPE		64.2	6.2			3.2	23 LT	6'-5" x 4'-9" x 80' SPPA	PRYDE DITCH
46+00					48																			3" x 10" x 24' RCB 2" x 10" x 24' RCB	65' RT
45+96	72 x 36	130			78			63.2	6.0			72 RCB			2:1 SLOPE	2:1 SLOPE		63.2	6.0			2.3	24 LT	65" x 48" x 78' CMPA	HAARA DITCH
47+77	72 x 36	132			82			64.2	6.0			72 RCB			SQ.	SQ.		64.2	6.0			2.4	40 LT	48" x 82' CMP	MARYOTT DITCH
48+32	24	116			60				2			24 RCP	CL 3		SQ.	SQ.			2			2	17 LT	24" x 60' CMP	MCDONALD DITCH
68+42	24	86			60							24 RCP	CL 3		FETS	FETS						2.1		24" x 60' CMP	MCDONALD DITCH
81+45					60																			24" x 60' CMP	
86+00					60																			18" x 60' CMP	
91+55					41																			96" x 24" x 41' RCB	MCDONALD DITCH
91+77	96 x 36	126						90.3	1		41.8	96 RCB			SEE DETAIL	SEE DETAIL		90.3	1		41.8	2.2	38 LT		MCDONALD DITCH
118+68	36	118			54							36 RCP	CL 2		FETS	FETS						4.9	30 LT	36" x 54' CMP	IRRIGATION REPLACE EXISTING PIPE WITH IRR. DITCH - RT
136+82	24	90			52							24 RCP 24 CSP 24 CAP	CL 3 .109 .105		FETS FETS FETS	FETS FETS FETS						4.0		18" x 52' CMP	DRAINAGE
138+77	36	92			56							36 RCP	CL 2		FETS	FETS						3.8	12 LT	36" x 56' CMP	IRRIGATION
148+34					80																			60" x 80' CMP	WILLOW CREEK
148+58	96	198						261	11.6	72		96 CSP	.109		2:1 BEVEL	2:1 BEVEL		261	11.6	72		14.9	28 LT		WILLOW CREEK
163+69					64																			36" x 64' CMP	WILLOW CREEK TRIBUTARY
164+65	84	114					74	78	10.4	26	260	84 CSP	.109		2:1 BEVEL	2:1 BEVEL	74	78	10.4	26	260	8.9	8 LT		WILLOW CREEK TRIBUTARY
165+92					97																			18" x 97' CMP	60' - 148' LT
169+24	24	138							1.9			24 RCP BROKE BACK	CL 3		CONC. CUTOFF WALLS	CONC. CUTOFF WALLS						7.8	18 LT		IRRIGATION
11+77	24	52			34							24 RCP	CL 3		CONC. CUTOFF WALLS	CONC. CUTOFF WALLS							13 LT	18" x 40' CMP	ROATS LANE ALIGNMENT IRR
200+35	84	128					85	135	6.8	16	301	84 CSP	.109		2:1 BEVEL	2:1 BEVEL	85	135	6.8	16	301	7.3	24 RT		WILLOW CREEK TRIBUTARY
200+88					56																			48" x 56' CMP	WILLOW CREEK TRIBUTARY
205+06					60																			24" x 60' CMP	IRRIGATION
208+32					140																			18" x 140' CMP	IRRIGATION SYPHON
TOTAL	~	~			1376	~	159	755.9	51.9	114	602.8	~	~		~	~	~	~	~	~	~	~	~	~	

STABILIZATION
* SEE STANDARD SPEC. SECT.
** FOR INFORMATION ONLY

02/13/2013
Highways & Engineering
Division

HYDRAULIC DATA SUMMARY *

STATION	STREAM NAME (IF NAMED)	SIZE / TYPE STRUCTURE (1)(1A)(4)	DESIGN FLOOD			BASE FLOOD (1%)		OVERTOPPING FLOOD (2)(3)			REMARKS (FLOOD OF RECORD, Qp(max), etc.) (5)
			MAGNITUDE (cfs)	FREQUENCY (%)	H.W. ELEV. (ft.)	MAGNITUDE (cfs)	H.W. ELEV. (ft.)	MAGNITUDE (cfs)	APPROX. FREQUENCY (%)	H.W. ELEV. (ft.)	
148+58	WILLOW CREEK	96" CSP	314	2	5515.5	378	5516.6	475	0.4	5523.2	
164+65	TRIBUTARY OF WILLOW CREEK	84" CSP	104	2	5507.2	125	5507.7	331	0.1	5516.2	
200+35	TRIBUTARY OF WILLOW CREEK	84" CSP	142	2	5471.3	170	5471.7	248	0.2	5474.6	
221+69	TRIBUTARY OF WILLOW CREEK	84" CSP	80	2	5431.2	96	5431.6	415	0.1	5450.1	
231+77	TRIBUTARY OF WILLOW CREEK	84" CSP	68	2	5442.6	82	5443.0	422	0.1	5454.6	
252+69		36" DRAIN	32	2	5447.8	48	5449.2	103	0.3	5470.5	
267+23		30" DRAIN	26	2	5462.9	38	5464.6	72	0.3	5476.5	

NOTES :

* H.W. ELEVATIONS SHOWN ARE BASED UPON PEAK FLOW ANALYSIS UNLESS NOTED IN REMARKS COLUMN.

(1) STRUCTURE SIZE OR TYPE AND RELATED HYDRAULIC DATA MAY NOT REFLECT CHANGES MADE DUE TO R/W OR OTHER CONSIDERATIONS (I.E., STOCKPASS ADDED, STRUCTURE SIZE OR TYPE CHANGED, ROAD GRADE CHANGED DURING CONSTRUCTION, ETC.)

(1A) BRIDGE LENGTH SHOWN EQUALS THE WATER SURFACE WIDTH IN THE OPENING AT THE DESIGN H.W. ELEVATION MEASURED NORMAL TO FLOW.

(2) OVERTOPPING IS DEFINED AS FLOW OVER THE ROAD, FLOW THROUGH A SIGNIFICANT RELIEF STRUCTURE OR FLOW OVER THE BASIN DIVIDE WHICHEVER IS LOWER.

(3) FOR THOSE CROSSINGS NOTED BY Qp(max) IN THE REMARKS COLUMN OVERTOPPING DOES NOT OCCUR AND THE FLOOD MAGNITUDE LISTED CORRESPONDS TO THE FLOOD OF SECTION 650.115 (a) (1) (ii) OF FEDERAL-AID POLICY GUIDE; SUBCHAPTER G, PART 650, SUBPART A (DEC. 1991)
THE FLOOD SPECIFIED IS SUBJECT TO STATE-OF-THE-ART CAPABILITY TO ESTIMATE THE EXCEEDANCE PROBABILITY.
(PIPES 0.5%; BRIDGE .2%)

(4) HIGH WATER ELEVATIONS MAY VARY SLIGHTLY DEPENDING UPON THE PIPE OPTION SELECTED.

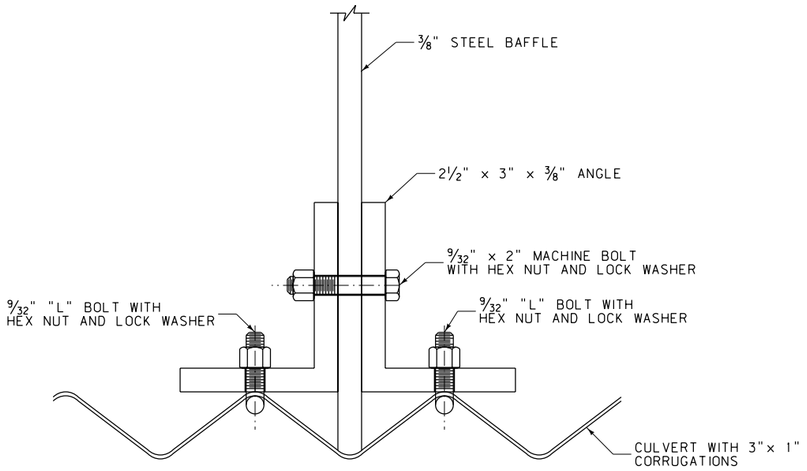
(5) PROCEDURE MEMORANDUM NO.10, HYDRAULICS MANUAL CHAPTER 9 APPENDIX H.

EXCEEDANCE PROBABILITIES

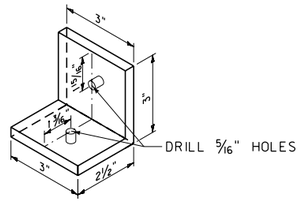
25 YEAR	4 % CHANCE
50 YEAR	2 % CHANCE
100 YEAR	1 % CHANCE
200 YEAR	.5% CHANCE
500 YEAR	.2% CHANCE

STATION 148+58 - PIPE FILL RETAINERS

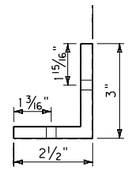
NOT TO SCALE



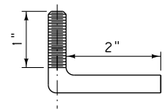
BRACKET DETAIL



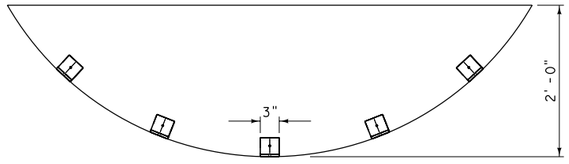
ANGLE DETAIL



SIDE VIEW

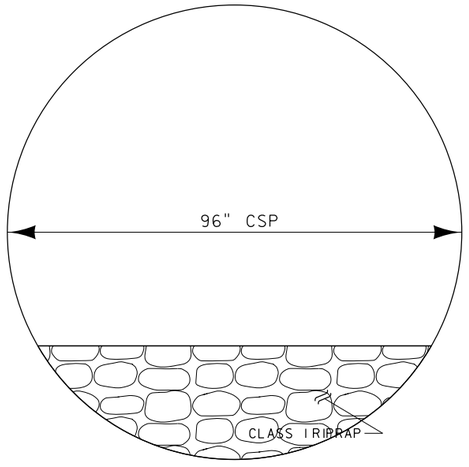


"L" BOLT



FILL RETAINER - BRACKET LOCATIONS

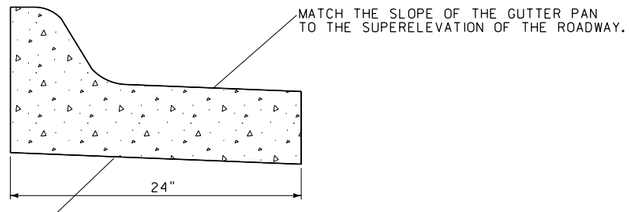
NOTE: ATTACH BRACKETS ALONG BOTTOM OF FILL RETAINER USING A SPACING OF 1'-6".



CULVERT FILL RETAINER DETAIL

NOTE: 1. INSTALL FILL RETAINERS AT 20' INTERVALS IN PIPE BEGINING AFTER OUTLET END CONCRETE BACKFILL RETAINER. FILL AREA BETWEEN WITH CLASS I RIPRAP (SEE FISH PASSAGE DETAIL, SHEET NO. _)
2. INSTALL CONCRETE BACKFILL RETAINERS AT THE INLET AND OUTLET PIPE ENDS PER MDT DETAILED DRAWING NO. 603-30.

SPILL CURB DETAIL



SEE DETAIL DRAWING NO. 609-05 FOR COMPLETE CURB AND GUTTER DIMENSIONS AND CONSTRUCTION NOTES.

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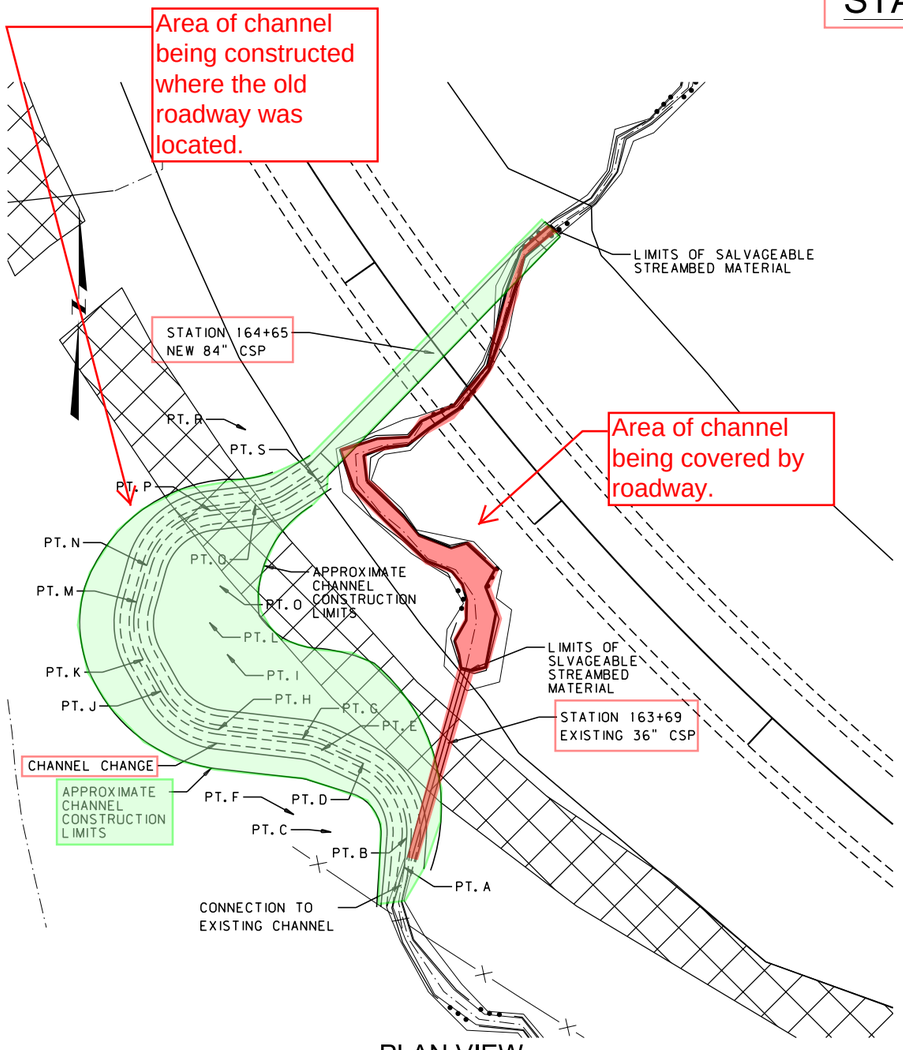
STATION 164+65: CHANNEL CHANGE

NOT TO SCALE



PLAN VIEW

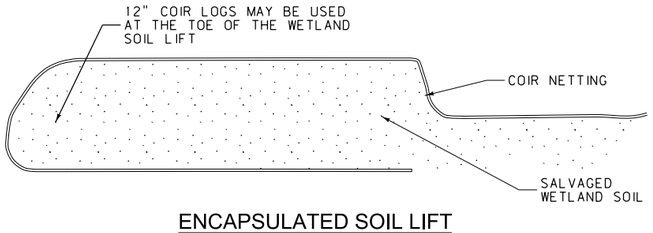
CHANNEL CHANGE COORDINATE TABLE				
POINT	NORTHING (FT)	EASTING (FT)	ELEVATION (FT)	DESCRIPTION
A	352007.3	2025226.2	5506.5	BEGIN CHANNEL CHANGE
B	352017.0	2025227.0	5506.1	
C	352018.9	2025202.1	~	PI FOR 25' RADIUS ARC
D	352041.6	2025212.7	5505.9	
E	352047.3	2025200.3	5505.7	
F	352024.7	2025189.7	~	PI FOR 25' RADIUS ARC
G	352049.5	2025192.6	5505.4	
H	352052.7	2025164.9	5505.1	
I	352077.6	2025167.8	~	PI FOR 25' RADIUS ARC
J	352065.4	2025145.9	5505.0	
K	352075.9	2025140.1	5504.7	
L	352088.1	2025161.9	~	PI FOR 25' RADIUS ARC
M	352094.8	2025137.9	5504.5	
N	352106.9	2025141.3	5504.2	
O	352100.2	2025165.3	~	PI FOR 25' RADIUS ARC
P	352125.0	2025162.2	5504.0	
Q	352126.9	2025177.1	5503.8	
R	352151.7	2025173.9	5503.7	
S*	352135.9	2025196.9	5503.5	END CHANNEL CHANGE AT NEW PIPE INLET

* COORDINATES ARE APPROXIMATE AND BASED ON INSTALLATION OF NEW PIPE.

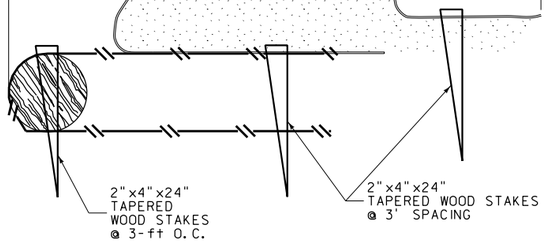
CHANNEL CHANGE QUANTITIES							
STATIONS	CHANNEL EXCAVATION (yd³)	COIR NETTING# (yd²)	12" COIR LOGS (ft)	STREAMBED MATERIAL (yd³)	WETLAND SOIL ## (yd³)	NATIVE FILL MATERIAL (yd³)	WILLOW CUTTINGS * (each)
164+65	780	1000	480	13.5	145	57	700

INCLUDED IN THE COST PER SQUARE FOOT OF EROSION CONTROL FABRIC-BIODEGRADABLE.
INLCUDED IN THE COST PER SQUARE YARD OF WETLAND SOIL- SALVAGE AND PLACE.
* FOR INFORMATIONAL PURPOSES ONLY. WILLOW CUTTINGS PAID FOR AS LUMP SUM. SEE SPECIAL PROVISIONS.

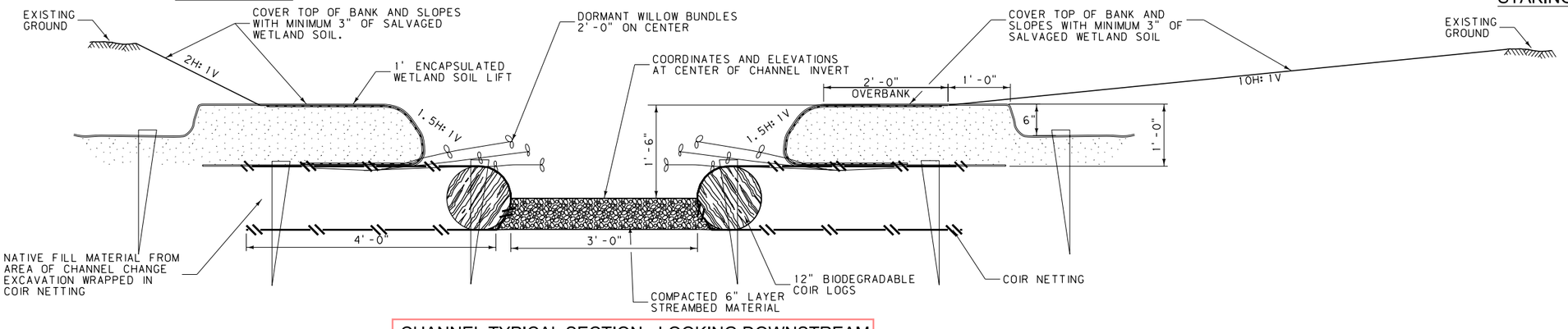
NOTES:
1. DO NOT PLACE ANY EROSION CONTROL FABRIC BELOW STREAMBED MATERIAL.
2. SEE PLAN SPECIAL PROVISION, "STATION 164+65: CHANNEL CHANGE" FOR DESCRIPTION OF 3" THICK SALVAGED VEGETATION MAT.
3. PROVIDE STREAMBED MATERIAL AS DESCRIBED IN PLAN SPECIAL PROVISION, "STREAMBED MATERIAL"
4. COMPACT SALVAGED VEGETATION MATERIAL PER MDT STANDARD SPECIFICATIONS SECTION 203.03.3.



ENCAPSULATED SOIL LIFT



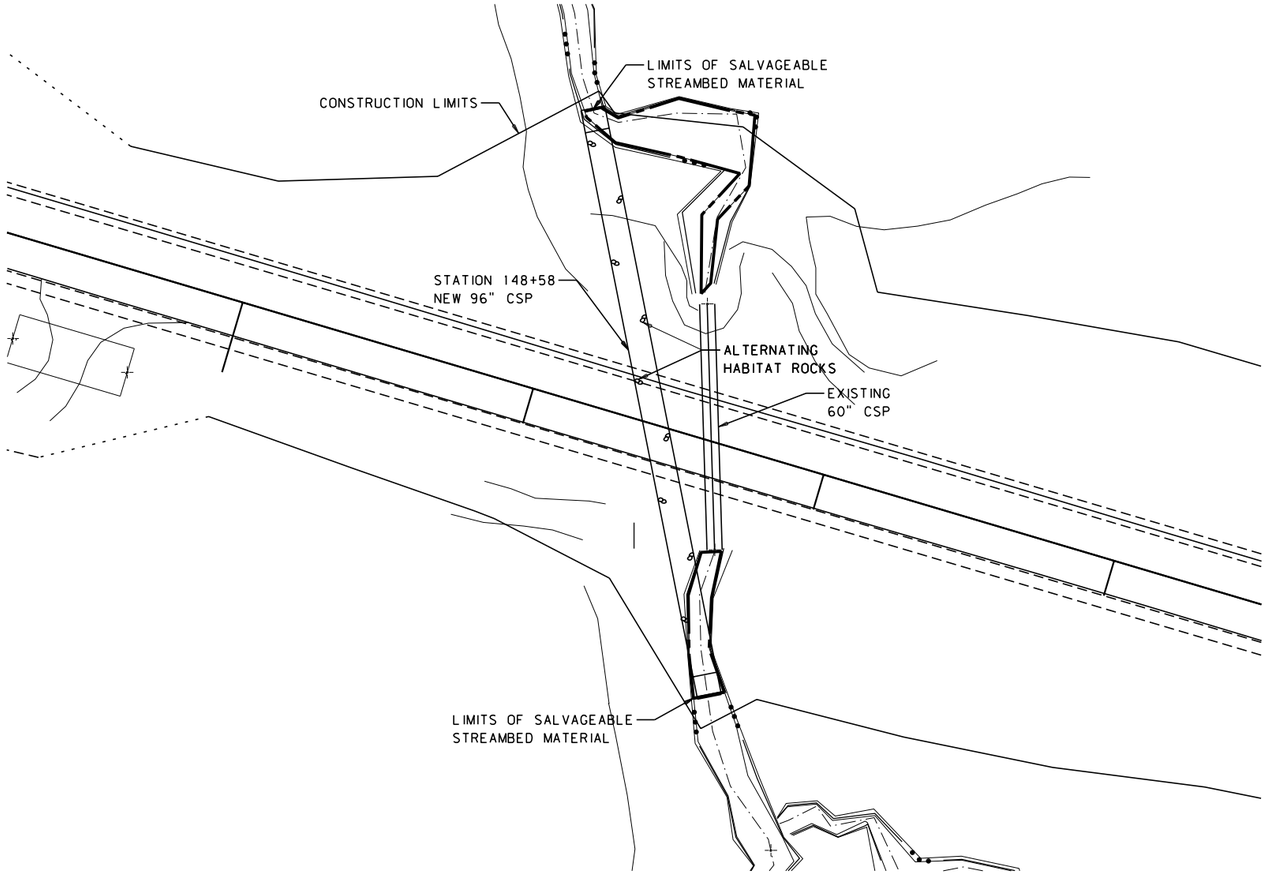
STAKING DETAIL

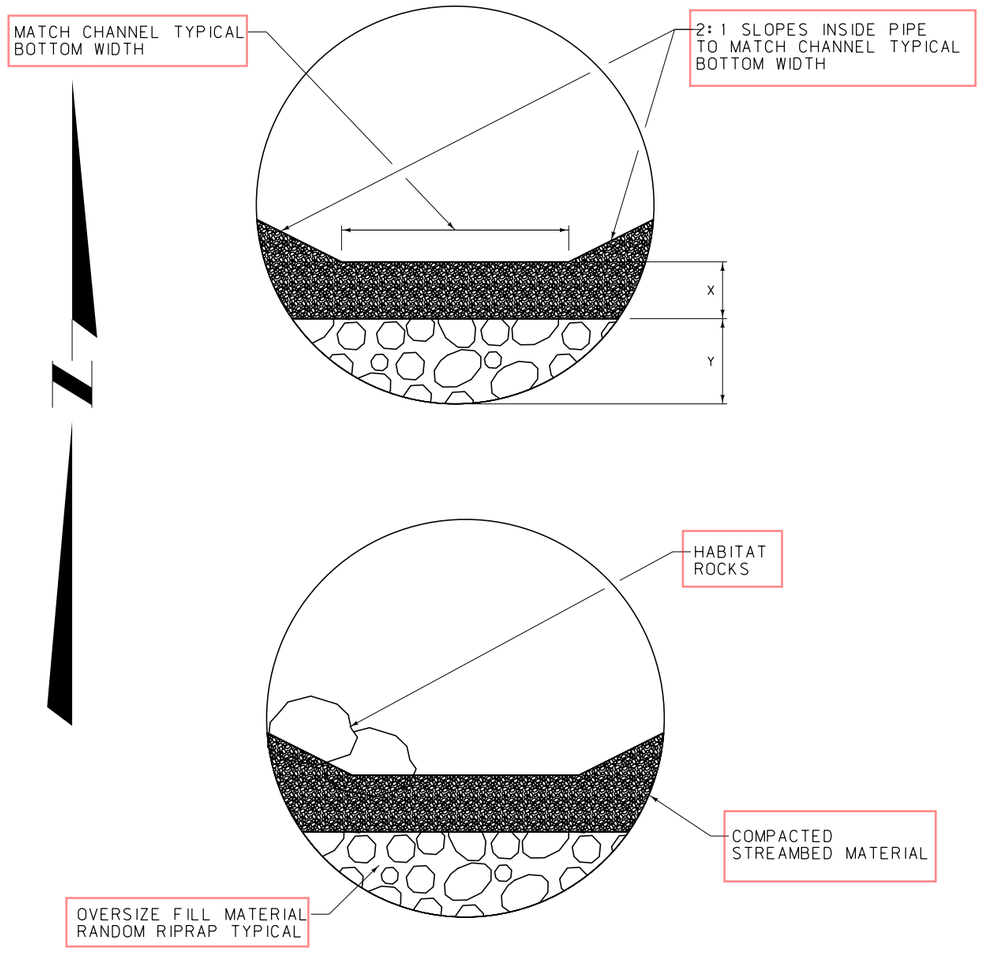


CHANNEL TYPICAL SECTION - LOOKING DOWNSTREAM

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\4890rddethy1.dgn	DESIGNED BY	J. R. TAYLOR	6-21-2011	HYDRAULICS PLANS	RED LODGE - NW / UPN 4890 / STPP 78-1(11)0
2		1/28/2013	REVIEWED BY				SHEET NO. 23 OF 49
1		12:06:07 PM CPS-U2113	CHECKED BY			CARBON COUNTY	PRELIMINARY PIH

SALVAGEABLE STREAMBED MATERIAL





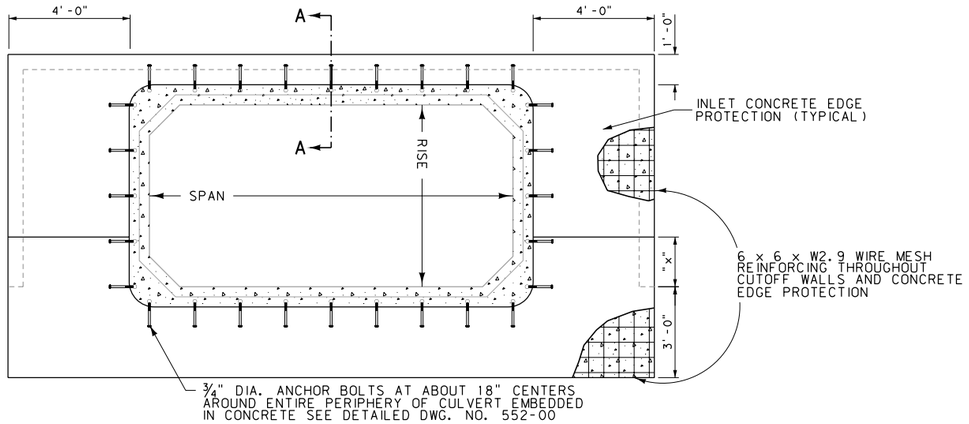
STATION 148+58: SALVAGEABLE STREAMBED MATERIAL LIMITS

FISH PASSAGE - PIPE EMBEDMENT

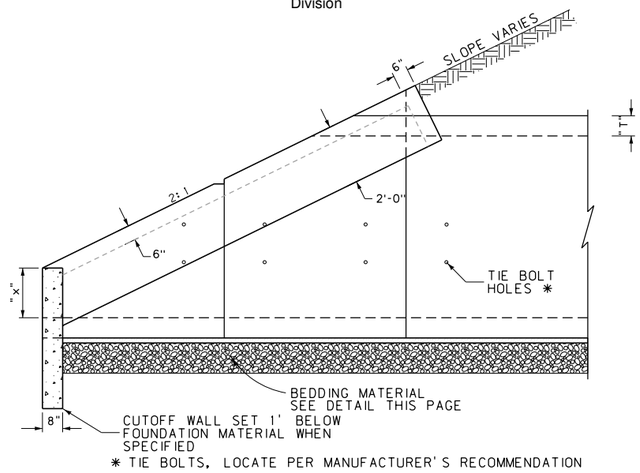
STATION	feet		TYPICAL CHANNEL BOTTOM WIDTH	cubic yards			each	REMARKS
	X	Y		SALVAGEABLE STREAMBED MATERIAL *	STREAMBED MATERIAL	RANDOM RIPRAP CLASS 1	HABITAT ROCKS **	
148+58	1.0	2.0	7.0	51	55	72	18	WILLOW CREEK
164+65	1.0	1.5	3.0	34	31	26	10	TRIBUTARY OF WILLOW CREEK
200+66	1.0	1.5	4.0	46	35	29	12	TRIBUTARY OF WILLOW CREEK
221+69	1.0	1.5	4.0	25	45	44	16	TRIBUTARY OF WILLOW CREEK
231+77	1.0	1.5	4.0	22	45	37	14	TRIBUTARY OF WILLOW CREEK
TOTAL			~	~	211	208	70**	

* FOR INFORMATIONAL PURPOSES ONLY, INCLUDED IN THE COST OF STREAMBED MATERIAL.
** FOR INFORMATIONAL PURPOSES ONLY, INLCUDED IN THE COST OF CLASS I RIPRAP.

NOTES:
1. PROVIDE CLASS I RANDOM RIPRAP PER MDT STANDARD SPECIFICATION SECTION 701.06.2.
2. ALTERNATE HABITAT ROCKS LT AND RT OF CHANNEL BOTTOM AT 20 FOOT INTERVALS INSIDE PIPE. SEE SPECIAL PROVISION, "FISH PASSAGE-PIPE EMBEDMENT" FOR A DESCRIPTION OF THE HABITAT ROCKS.
3. SEE PLAN SPECIAL PROVISION, "STREAMBED MATERIAL" FOR DESCRIPTION OF REMOVAL LIMITS FOR SALVAGEABLE STREAMBED MATERIAL.
4. PROVIDE ADDITIONAL STREAMBED MATERIAL AS DESCRIBED IN PLAN SPECIAL PROVISION, "STREAMBED MATERIAL".
5. SALVAGEABLE STREAMBED MATERAIL QUANTITY IS AN ESTIMATE, ACTUAL QUANTITY OF SALVAGEABLE STREAMBED MATERIAL MAY DIFFER.

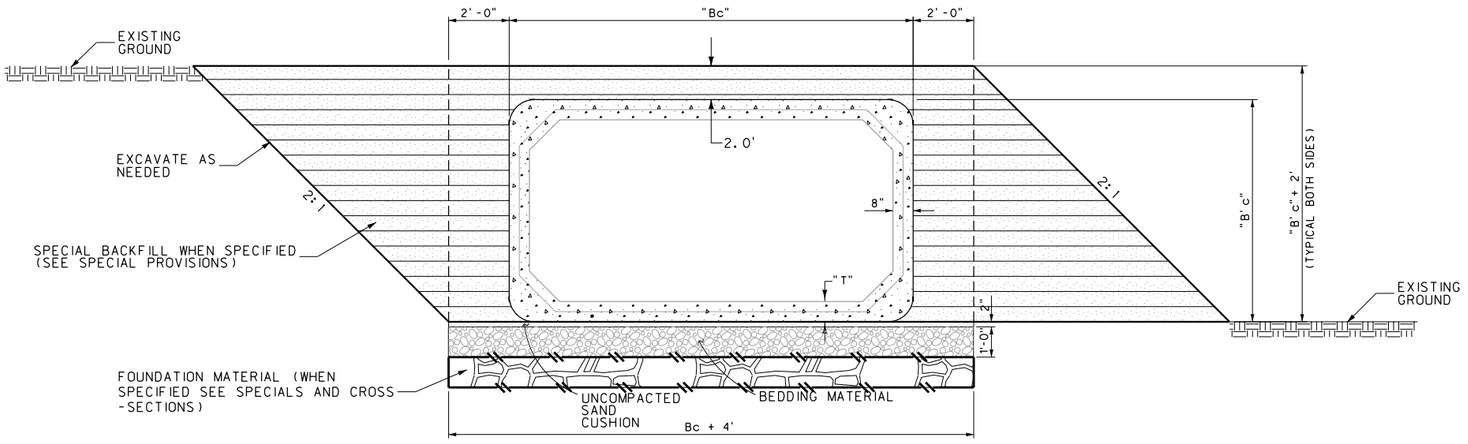


FRONT ELEVATION



* TIE BOLTS, LOCATE PER MANUFACTURER'S RECOMMENDATION

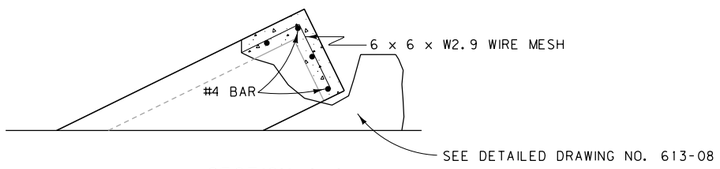
SIDE ELEVATION



EXCAVATION TYPICAL

BEDDING DETAIL

FILL TYPICAL



SECTION A-A

NOTE: SPECIAL BACKFILL SHALL BE PLACED 2' OVER PIPE UNLESS THE FILL REQUIREMENTS CANNOT BE MET.

NOTE: COMPACT SOIL MATERIAL IN LAYERS NOT MORE THAN 6" THICK FOR THE REMAINDER OF THE LOWER 30% OF ITS HEIGHT. BACKFILL IN CONFORMANCE TO SUBGRADE WITH THE APPLICABLE PROVISIONS OF THE STANDARD SPECIFICATIONS.

NOTE: HANDLE BOX CULVERT SECTIONS AND END SECTIONS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. IMPROPER HANDLING MAY DAMAGE THE BOX CULVERT OR END SECTION. REPAIR OR REPLACE DAMAGED SECTIONS AT CONTRACTOR EXPENSE PER 2006 MDT STANDARD SPECIFICATIONS SECTION 603.03.1.

NOTE: EXCAVATE A SUFFICIENT AMOUNT TO PROVIDE A SAFE WORKING ENVIRONMENT AND TO ALLOW ACHIEVEMENT OF ALL CULVERT INSTALLATION AND COMPACTION REQUIREMENTS. SLOPE BENCH OR PROVIDE SHORING FOR ALL EXCAVATIONS IN ACCORDANCE WITH THE U.S. DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION. SPECIAL BACKFILL QUANTITY IS BASED ON 2:1 SLOPES.

DIMENSIONS												
STATION	SPAN (ft.)	RISE (ft.)	LENGTH (ft.)	"T" (in.)	"Bc" (ft.)	"x" (ft.)	"B'c" (ft.)	① CLASS "DD" CONCRETE (cu.yd.)	② BEDDING MATERIAL (cu.yd.)	SPECIAL BACKFILL (cu.yd.)	RIPRAP CLASS _ (cu.yd.) OUTLET	COVER (ft.)
45+67	6	4	132	8	7.33	1.67	5.33	6.2	64.2	~	~	2.3
45+96	6	3	130	8	7.33	2.67	4.33	6.0	63.2	~	~	3.2
47+77	6	3	132	8	7.33	2.67	4.33	6.0	64.2	~	~	2.4

① INCLUDES CUTOFF WALLS FOR BOTH INLET AND OUTLET ENDS AND EDGE PROTECTION FOR INLET AND OUTLET ENDS.

② INCLUDES 2" UNCOMPACTED SAND CUSHION.

NOTE: INCLUDE REINFORCING MATERIAL IN THE UNIT PRICE BID PER CUBIC YARD OF CONCRETE.
INCLUDE ANCHOR BOLTS IN THE UNIT PRICE BID PER LINEAR FOOT OF CULVERT.
PROVIDE BOXES MEETING ASTM C1577 IN LOCATIONS WITH 2' OF COVER OR LESS.
PROVIDE BOXES MEETING ASTM C1577 IN LOCATIONS WITH MORE THAN 2' OF COVER. (SEE SPECIAL PROVISIONS)
QUANTITIES ARE BASED ON THE DIMENSIONS IN THE TABLE.

FOR MDT INTERNAL DISTRIBUTION ONLY

01/28/2013
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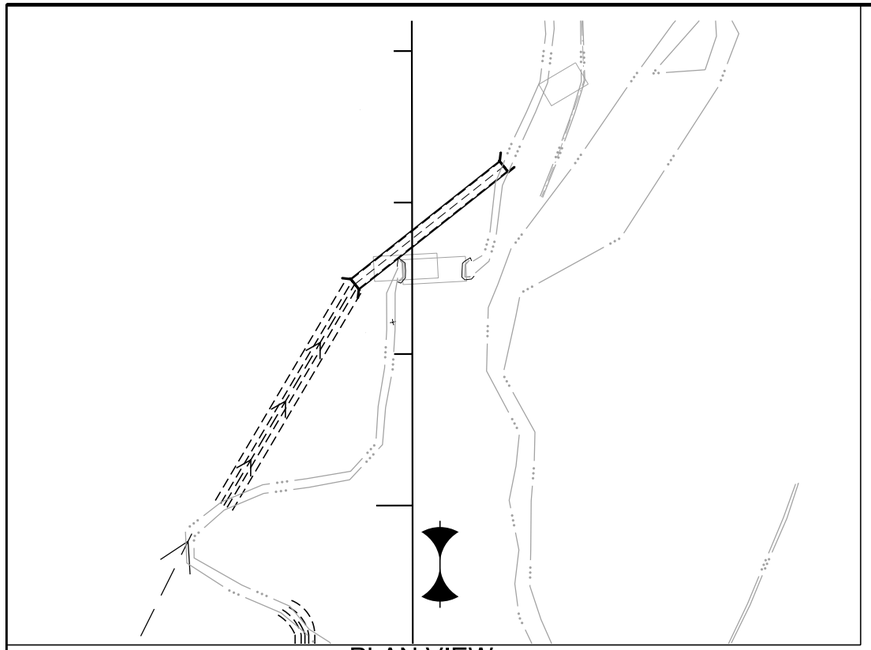
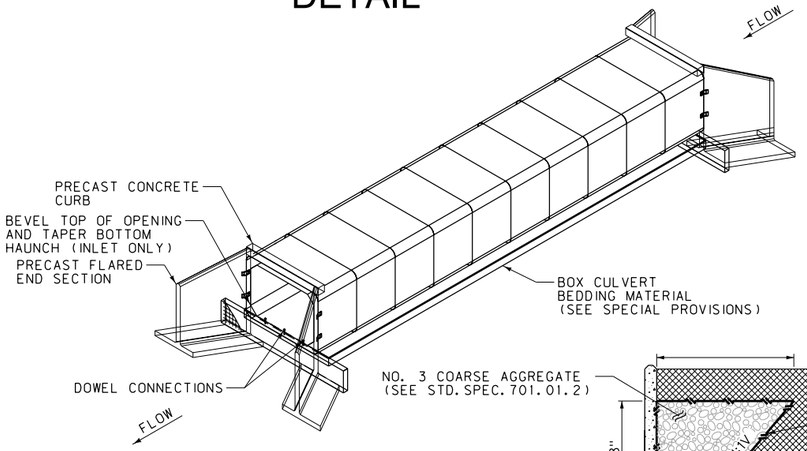
Division

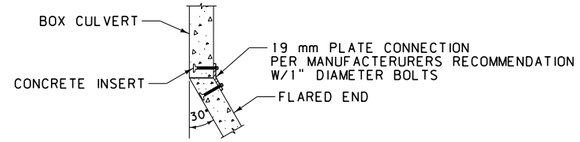
DETAIL



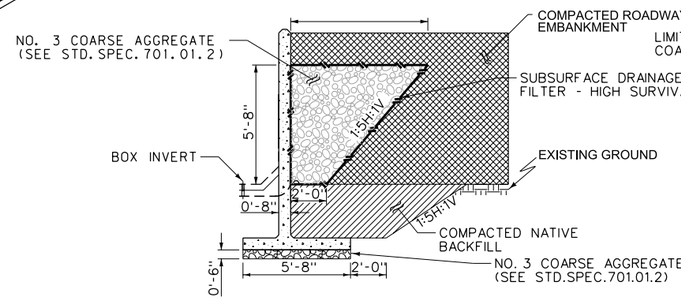
PLAN VIEW
SCALE~ 1:500



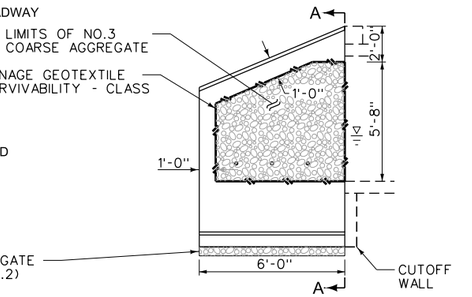
ISOMETRIC VIEW
OUTLET END



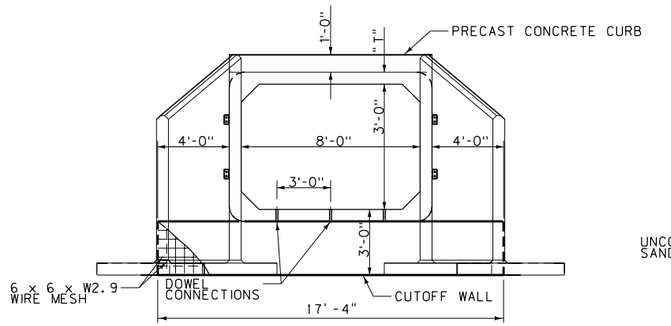
30°PLATE
CONNECTION PLATE DETAIL



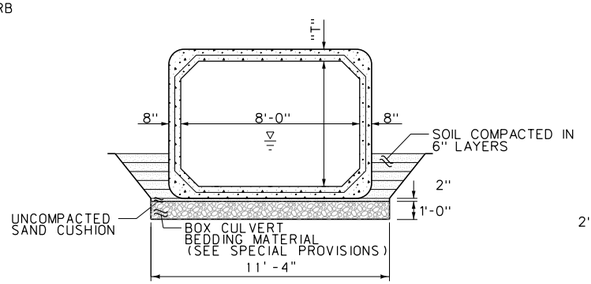
PRECAST FLARED END SECTION
BEDDING AND BACKFILL DETAIL
SECTION A-A



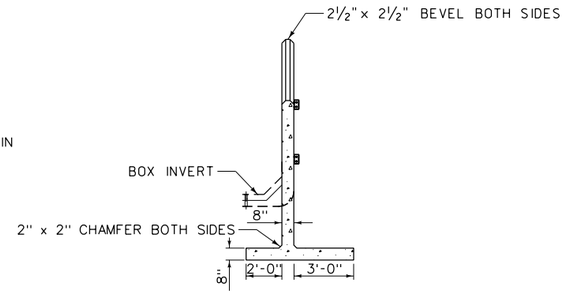
PRECAST FLARED END SECTION
BEDDING AND BACKFILL DETAIL
SIDE VIEW



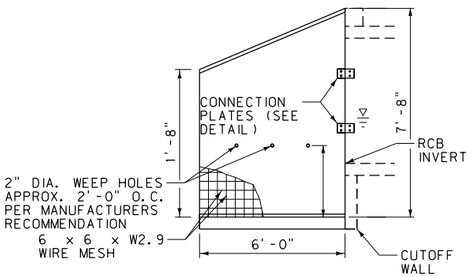
PRECAST SINGLE CELL BOX CULVERT
WITH CUTOFF WALL AND 30° FLARED END SECTIONS



BOX CULVERT BEDDING DETAIL



PRECAST FLARED END SECTION DETAIL
END VIEW



PRECAST FLARED END SECTION DETAIL
SIDE VIEW

* QUANTITIES											
STATIONS	SPAN (ft)	RISE (ft)	LENGTH (ft)	"T" (in)	WALL (in)	① END SECTION OUTLET	① END SECTION INLET	② BOX CULVERT BEDDING MATERIAL (cu.yd.)	COVER (ft)	No. 3 COARSE AGGREGATE (cu.yd.)	SUBSURFACE DRAINAGE GEOTEXTILE FILTER - HIGH SURVIVABILITY - CLASS "B" (sq.ft.)
91+77	8	3	126.0	8	8	1	1	90.3	4.3	12.0	41.8

* FOR ESTIMATING PURPOSES ONLY.

① INCLUDE PRECAST FLARED END SECTIONS, CUTOFF WALLS (PRECAST OR POURED IN PLACE), PRECAST CONCRETE CURB,GEOTEXTILE, AND NO.3 COARSE AGGREGATE IN THE UNIT PRICE BID PER LINEAR FOOT OF CULVERT.

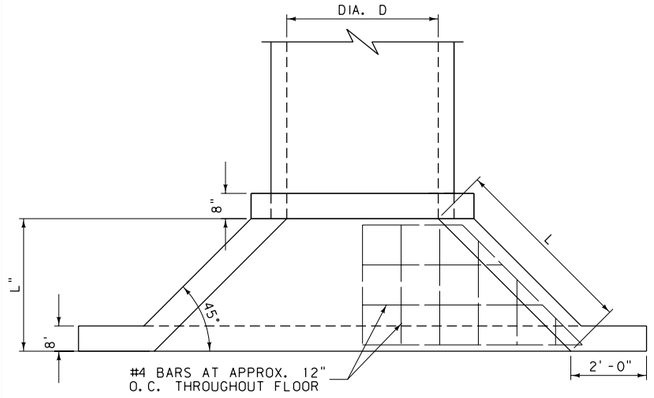
② INCLUDES 2" UNCOMPACTED SAND CUSHION.

NOTE: INCLUDE DOWELS AND CONNECTION PLATES IN THE UNIT PRICE BID PER LINEAR FOOT OF CULVERT.
PROVIDE BOX CULVERTS MEETING AASHTO M273 IN LOCATIONS WITH 2' OF COVER OR LESS.
PROVIDE BOXES MEETING AASHTO M259 IN LOCATIONS WITH MORE THAN 2' OF COVER.
SEE CROSS SECTIONS FOR FOUNDATION MATERIAL AS REQUIRED.

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\4890rdpbc002.dgn	DESIGNED BY	J. R. TAYLOR	5-11-2011	HYDRAULICS PLANS	PRELIMINARY PIH	RED LODGE - NW / STPP 78-1(11)0
2		1/28/2013	REVIEWED BY					
1		12:06:55 PM CPS - U2113	CHECKED BY			CARBON COUNTY		CFS=0.99961552 / UPN 4890 / SHEET NO. 26 OF 49

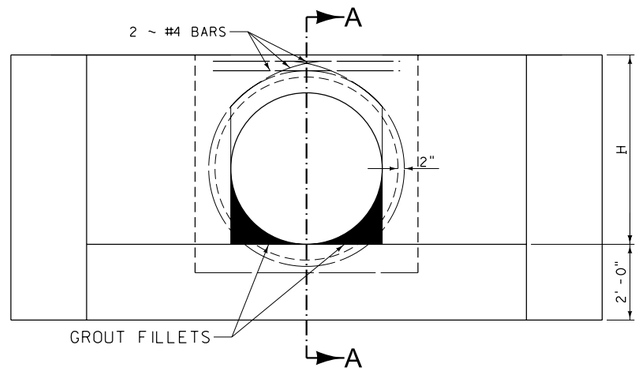
01/28/2013
Highways & Engineering Division

DETAIL

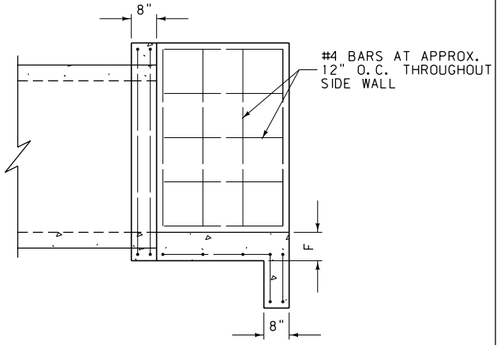


NOTE: CHAMFER ALL EXPOSED CORNERS 1". REINFORCING STEEL TO BE NOT LESS THAN 1½" TO NEAREST FACE OF CONCRETE.

PLAN VIEW
NO SCALE

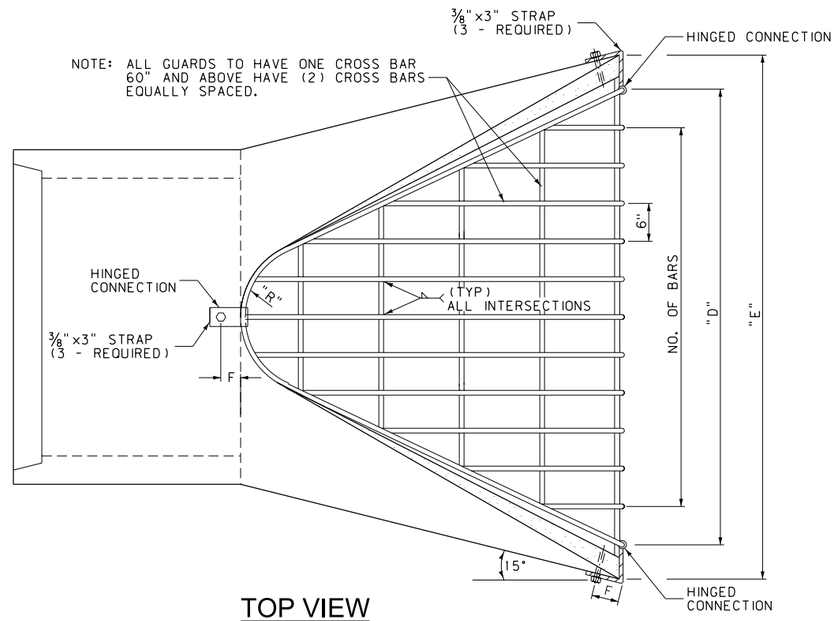


ELEVATION VIEW
NO SCALE

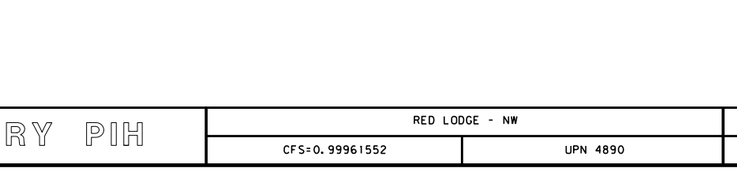


SECTION A-A
NO SCALE

FLAT-BOTTOM CONCRETE TRANSITION STRUCTURE												
STATION	CULVERT		CLASS "DD" CONCRETE (yd^3)		#4 REBAR	DIMENSION TABLE						
	DIA. D	AREA (ft^2)	INLET	OUTLET	(lbs.)	A	B	H	L	L"	F	L'
48+32	24"	3.14	1.08	0.94	165.0	1'-6"	1'-6"	3'-0"	3'-0"	2'-1"	7½"	2'-6"



TOP VIEW
NO SCALE



SIDE VIEW
NO SCALE

TRASHRACK*														
STATION	PIPE SIZE	"T"	BAR SIZE θ	NO. OF BARS	BOLT SIZE & LENGTH	SLOPE	RADIUS "R"	"A"	"B"	"C"	"D"	"E"	"F"	θ°
68+42	24"	3"	⅝"	7	⅝"×5½"	2.5:1	6½"	48"	8½"	2"	48"	56"	4"	112°

* FOR INFORMATIONAL PURPOSES. TRASHRACK PAID PER EACH.

NOTE:

1. ALL STRUCTURAL STEEL FOR TRASHGUARDS MUST CONFORM TO THE REQUIREMENTS FOR ASTM A-36 STRUCTURAL CARBON STEEL.
2. PAINT ONE COAT OF RED OXIDE PRIMER AND TWO COATS OF ALUMINUM PAINT.
3. BECAUSE OF VARIABLE FORMS BEING USED, TAKE FIELD MEASUREMENT OF FLARED ENDS BEFORE FABRICATING TRASHGUARD.

Statement of Qualifications (SOQ) must be received a minimum of 14 calendar days prior to the bid opening as specified in the Invitation for Bids.

3) Adjustments may be necessary to minimize disturbance to existing vegetation or other stream features and to field-fit the design. Ensure all adjustments are approved by PM prior to execution of the work. The PM will coordinate the proposed changes with the MDT District Biologist prior to approval.

C. Measurement and Payment. Include all costs associated with using a prequalified Stream Restoration Contractor in the associated bid items.

42. FISH PASSAGE – PIPE EMBEDMENT

A. Description. This work includes the embedment and placement of fill material inside the CSP drainage pipes to be installed at stations 148+58, 164+65, 200+35, 221+69 and 231+77.

B. Construction Requirements.

1) Install new pipes to the flowline invert elevations listed in the plan cross sections. Pipes are to be embedded based in accordance with the plans and details. For fish passage concerns pipes have been embedded in order to maintain sediment within the pipe invert.

2) At Station 148+58 install fill retainers as indicated in the plan details, place oversized material between the fill retainers. Install concrete backfill retainers at inlet and outlet of station 148+58 pipe per MDT Detailed Drawing No. 603-30.

3) Place Class I Riprap to the depths shown in the plan details.

4) Place Streambed Material on top of the oversized material to the depth shown in the plan details. Streambed Material quantities have been adjusted up 10% to account for filling of voids within the oversized material. Thoroughly mix native and non-native streambed materials if non-native streambed material is required in order to fill culverts to specified depths.

Compact Streambed material to a minimum 80% of maximum density at ±2.0% moisture content.

5) Match the upstream and downstream stream channel typical bottom width within the pipe for the length of the pipe. Construct 2:1 side slopes as necessary to match the stream bottom width within pipe, see plan details.

6) Place Habitat Rocks as shown in the plans details. Habitat rocks are a minimum of 12” and a maximum of 24” at the longest measurement. Insure that habitat rocks are buried a minimum of 6” and a maximum of 10” into the streambed material.

C. Materials.

1) Provide Class I Random Riprap meeting MDT Standard Specifications Section 701.06.2.

2) Provide Streambed Material meeting the gradation in the Streambed Material special provision.

D. Basis of Payment.

1) Include the cost of all materials, handling, equipment, tools and labor necessary to install Class I Riprap and the Habitat Rocks in the contract unit bid price per cubic yard of Class I Random Riprap.

2) Include the cost of all materials, handling, equipment, tools and labor necessary to place streambed material in the contract unit bid price per cubic yard of Streambed Material.

43. STATION 164+65: 225’ CHANNEL CHANGE

A. Description. This work includes all necessary work required to complete the 225’ channel change upstream of the new pipe at station 164+65 in accordance with the plans and details.

B. Construction Requirements. Perform construction of new channel in the dry or non-flowing conditions separated from the existing channel flow.

1) Construct the new channel change as shown in the detail and plan cross sections included in the plan set. A portion of the channel change will be located within the PTW.

Channel Change coordinates shown in detail are taken at the centerline of the channel invert facing downstream. Limits shown for 10H: 1V RT overbank and 2H: 1V LT overbank slopes are approximate.

2) Install bottom of coir log parallel to the channel alignment and set into a 6-inch deep trench at base of channel bank so that top of log is 6 inches above top of streambed material.

3) Compact 6" thick layer of Streambed material to a minimum 80% of maximum density at ± 2.0% moisture content.

4) Place 2"x 4"x 24" wood stakes at 3 feet on center for the length of the channel change at the locations shown in the channel change details.

5) Place a minimum 3" thick layer of salvaged wetland topsoil in the areas indicated on the Channel Typical Section in the Channel Change detail or as directed by Project Manager.

6) Use salvaged wetland topsoil in the encapsulated soil lift.

7) Place and compact Native Fill Material as shown in plan details in accordance with MDT Standard Specifications Section 203.03.3.

8) Willow Bundles. Install live, dormant willow bundles every 2 feet at the locations shown on the plan detail and as directed by the Project Manager.

a) A willow bundle consists of a minimum of three live willow sprigs per bundle.

b) Collect willows from within 20 miles of the project site.

C. Materials.

1) Salvaged Wetland Material. See Wetland Topsoil Salvage, Storage and Placement special provision.

2) Native Fill Material. The material to be used in the lower layer of the channel change is to be taken from the area excavated outside the PTW for the channel change.

3) Coir Logs. Provide coir logs consisting of an inner core made of 100% biodegradable coir fibers bound by high strength coir fiber netting. Provide 12" diameter biodegradable coir logs in 10 feet lengths, and with a minimum unit weight of 9lbs/ft^3.

4) Coir Netting. Provide coir netting comprised of 100% spun coir and meeting ASTM material standards; ASTM-3776C, ASTM D 4595-86, and ASTM D 4595. Rolls of coir netting need to be wide enough to provide a constant layer when wrapped around compacted fill material as shown in plan details.

Provide coir netting with a maximum opening area of 25%, a unit weight of 26.6-oz/yd^2 (900 g/m^2) and a maximum permissible shear stress of 4.6-lb/ft^2 or greater.

5) Tapered Wood Stakes. Provide untreated natural 2"x 4" x 24" tapered wood stakes.

6) Provide streambed material meeting the gradation shown in the Streambed Material special provision.

D. Basis of Payment.

1) Include the cost of all materials, handling, equipment, tools and labor necessary to excavate the channel change in the contract unit bid price per cubic yard of Excavation – Unclassified Channel.

2) Include the cost of all materials, handling, equipment, tools and labor necessary to install Streambed Material and to salvage native streambed material in the contract unit bid price per cubic yard of Streambed Material.

3) Include the cost of all materials; including tapered wood stakes, handling, equipment, tools and labor necessary to install 12" Coir Logs in the contract unit bid price per lineal foot of Coir Logs.

4) Include the cost of all materials, handling, equipment, tools and labor necessary to install Coir Netting in the contract unit bid price per square yard of Coir Erosion Control Net.

5) Include the cost of all materials handling, equipment, tools and labor necessary to salvage existing wetland material and place salvaged wetland topsoil in the contract unit bid price per cubic yard of Wetland Soil – Salvage and Place.

6) Include the cost of all materials handling, equipment, tools and labor necessary to place and compact Native Fill Material in the contract unit bid price per cubic yard of Excavation – Unclassified Channel.

7) Include the cost of all materials handling, equipment, tools and labor necessary to harvest and install willow bundles in the contract unit bid price per lump sum of Willow Cuttings.

44. WETLAND TOPSOIL SALVAGE, STORAGE AND PLACEMENT

A. Description. This work includes the salvaging, stockpiling and placement of wetland topsoil in conformance with the lines, grades and depths shown in the Contract Documents or as ordered by the Project Manager. Wetland Topsoil is defined as the surface layer of soil within delineated wetland areas.

B. Construction Requirements.

1) Salvageable Wetland Topsoil Identification – Salvage Staking Limits.

Salvageable Wetland Topsoil is defined as any area of wetland that is impacted by the construction limits (shown as impacted wetlands in plan set) of the project and listed on the Wetlands Summary in the plan set, except at the following locations;

- Station 162+50 to Station 166+00 RT and LT
- Station 230+50 to Station 233+50 LT and RT

Stake and flag wetland topsoil salvage limits at least 7 days prior to topsoil salvage operations. Notify and coordinate with the Project Manager 3 calendar days prior to initiating salvaging activities. Do not salvage wetland topsoil until salvage locations have been certified weed free unless specified otherwise. Do not clear and grub or apply herbicide to soil salvage locations prior to review and approval by the Project Manager.

2) Topsoil Salvage – Removal Depths.

a) Salvage wetland topsoil to a depth of 2-feet minimum along mainline or as directed by the Project Manager.

Salvage additional acceptable wetland topsoil in locations directed by the Project Manager.

b) Remove wetland topsoil in a single lift and direct haul to an approved stockpile site.

c) Stockpile wetland topsoil separate from all other construction materials including fill material and regular topsoil.

(1) Minimize disturbance to wetland topsoil while handling and stockpiling.

(2) Stockpile heights are not to exceed 10 feet.

(3) Protect stockpiles with a cover of seed mix approved by the Project Manager.

(4) Fence the stockpile areas with a high visibility fence to discourage disturbance of the stockpile. Provide a fence made of ultraviolet stabilized high density polyethylene or polypropylene, a minimum of 4 feet high, and in a color of yellow or orange. Provide untreated stakes.

Install the fence according to the manufacturers specifications or as indicated by the Project Manager. Install the fence not less than 3 feet from the base of the stockpile.

d) Placement of wetland topsoil on channel change. Roughen the areas where wetland topsoil will be placed. Place stockpiled wetland topsoil as indicated in the plans and details. Do not place salvaged wetland topsoil when a condition exists, such as frozen or water

saturated soil that may be detrimental to the successful application, incorporation, or soil structure.

e) Compaction of Topsoil. Restrict equipment movement, including light trucks, traversing the channel change site to minimize disturbance of areas were salvage wetland topsoil has been placed. Minimize the number of access routes to accomplish the work to prevent over compaction of wetland topsoil.

f) Disposal of unacceptable wetland topsoil. If wetland topsoil is determined to be unacceptable by a soils lab or by the Project Manager before the topsoil is removed for salvage, dispose of the unacceptable topsoil material legally in locations approved by the Project Manager.

C. Method of Measurement. Stockpiled wetland topsoil is not separately measured for payment. Topsoil stockpile fencing and temporary construction roads are not separately measured for payment.

D. Basis of Payment. Include the cost of all materials handling, equipment, tools and labor necessary for Salvaging, stockpiling and placing wetland topsoil, fencing around stockpiles, temporary construction roads necessary for salvaging and stockpiling, and disposal of unacceptable wetland topsoil in the contract unit bid price per cubic yard of Wetland Soil – Salvage and Place.

45. STATION 46+00 RT: RCB REMOVAL

A. Description. This work includes the removal of the existing double cell RCB to the RT of the PTW at station 46+00, and the repair and reconstruction of the irrigation ditch banks.

B. Construction Requirements. Remove the existing double-RCB in a manner that least disturbs the existing irrigation ditch banks.

1) Restore and repair disturbed irrigation ditch banks to their original height and shape.

2) Reconstruct the berm separating the two irrigation ditches to a height equal to the irrigation ditch top of banks to the LT and RT of the ditches. Construct the berm in accordance with special provision, “Irrigation Ditch Embankment”.

C. Materials.

Repair and reconstruct irrigation ditch banks in accordance with special provision, “Irrigation Ditch Embankment”.

D. Basis of Payment. Include the cost of all materials handling, equipment, tools and labor necessary to repair and restore irrigation ditch banks in the contract unit bid price per lineal foot of Remove Culvert.

46. SIPHONS

A. Description. Irrigation siphons to be installed at station 240+72 and station 261+08.

B. Materials.

1) Station 240+72: Provide Class B50 Reinforced Concrete Low-Head Pressure Pipe meeting ASTM C361.

2) Station 261+08: Provide Class B25 Reinforced Concrete Low-Head Pressure Pipe meeting ASTM C361.

C. Construction Requirements.

1) Bed siphon pipes per MDT Standard Detailed Drawing 603-18.

2) Field Cast Concrete bends are not allowed.

3) Station 240+72. Construct new outlet irrigation ditches from outlets of new concrete division structure per plans, cross-sections, details and special provisions.

a) North Irrigation Ditch – Station 240+78 RT to Station 242+36 RT

(1) Slope = 0.006-ft/ft