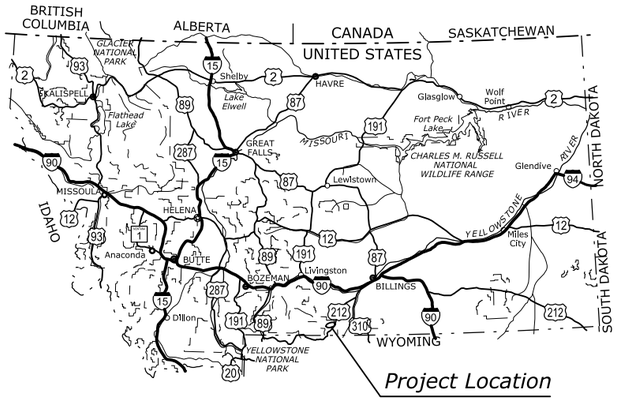
STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	A.1

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION



MONTANA KEY MAP

PLANS FOR PROPOSED PROJECT

MT PFH 101(1)

WEST FORK ROCK CREEK ROAD RECONSTRUCTION

CUSTER NATIONAL FOREST
CARBON COUNTY
MONTANA

LENGTH 2.813 MILES

95% REVIEW
NOT FOR CONSTRUCTION

See A.2 for Index to Sheets

TYPE OF CONSTRUCTION:

Grading, base, paving, walls, and drainage

DESIGN DESIGNATION:

ADT (2014)	*1,752*
SADT (2014)	*2,958*
ADT (2034)	*1,927*
SADT (2034)	*3,254*
V	*35 MPH*
e (max)	*6%*

SPECIFICATION:

Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-03 US Customary Units

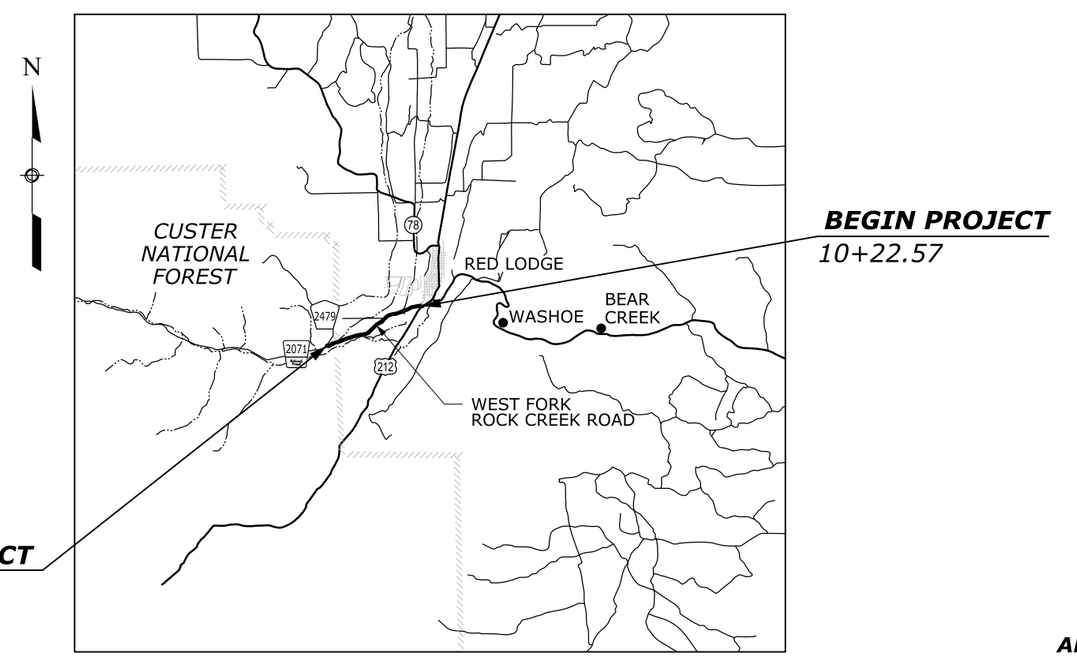
FEDERAL LANDS HIGHWAY
COMMITMENT TO EXCELLENCE

PLANS PREPARED BY

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

WESTERN FEDERAL LANDS HIGHWAY DIVISION
VANCOUVER, WASHINGTON

PROJECT MANAGER
G. GIFFORD



SCALE IN MILES
2 1 0 2 4

APPROVED:

_____ *DATE* _____

Director, Project Delivery,
Western Federal Lands Highway Division

Designed by: T. Phan | Checked by: M. Moen | 11/2014 | 11/2014

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STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	A.2

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A.1 TITLE SHEET
A.2 INDEX TO SHEETS
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B. SUMMARIES
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I. RETEAINING WALLS
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J. TEMPORARY TRAFFIC CONTROL
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L. UTILITIES
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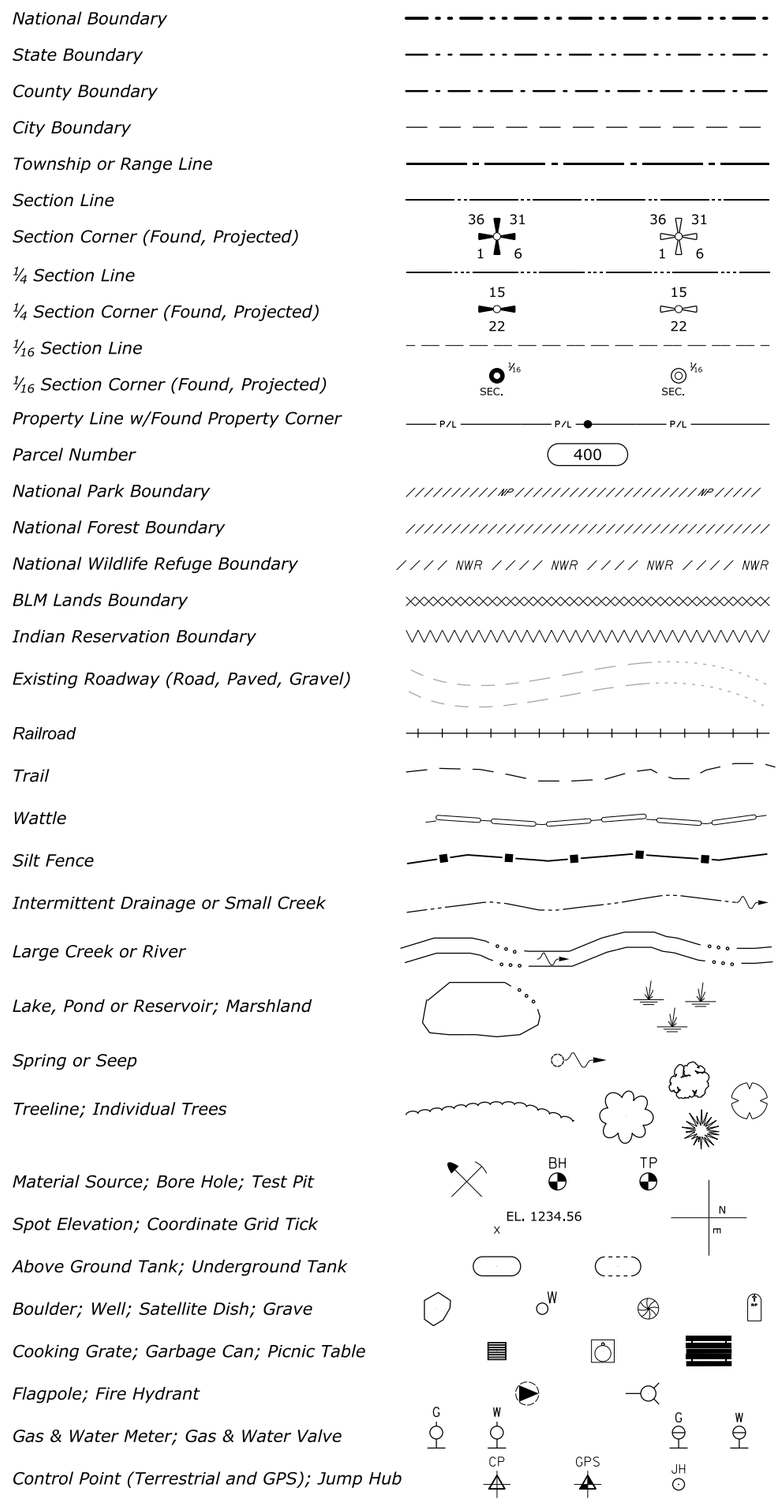
Δ	total central angle
Δc	curve central angle
Ø	diameter
θs	spiral central angle
abut.	abutment
ADT	average daily traffic
AH	ahead
appr.	approach
BK	back
BM	bench mark
BP	balance point
br.	bridge
brg.	bearing
cc or c. to c.	center to center
℄	centerline
clr.	clear
CMP	corrugated metal pipe
col.	column
conc.	concrete
conn.	connection
constr. jt.	construction joint
cont.	continuous
CS	point of curve to spiral
ctrs.	centers
CUFT	cubic foot (feet)
culv.	culvert
CUYD	cubic yard(s)
D	diameter
DHV	design hourly volume
dia.	diameter
diag.	diagonal
diaph.	diaphragm
dist.	distance
drwg(s).	drawing(s)
E	east
e	superelevation rate
El. 94.16 ft	elevation with number
elev.	elevation
emb.	embankment
EP	edge of pavement
EQ or eq.	equation
ER	edge of road
EW	edge of water
exc.	excavation
exp. jt.	expansion joint
fin.	finish
flg.	flange
ft2	square foot
ft3	cubic foot (feet)
ftg.	footing
ga.	gage (gauge)
galv.	galvanized
hdwl.	headwall
hex.	hexagon
HW	high water
ID	inside diameter
jt.	joint
L	length of curve
lam.	lamination
lat.	latitude
LNFT	linear foot (feet)
long.	longitudinal
LPSM	lump sum
Ls	length of spiral
lt. or LT	left
LW	low water
M.L.	main line
M.P.	mile post
matl.	material
max.	maximum
MGAL	thousand gallon
min.	minimum
mon.	monument
N	north
NC	normal crown
o. c.	on center
o. to o.	out to out
OD	outside diameter
OG	original ground
PC	point of curve
PCC	point of compound curve
PCS	point of curve to spiral
PI	point of intersection
pl.	plate
POC	point on curve
POS	point on spiral
POT	point on tangent
PS	point of tangent to spiral
PSC	point of spiral to curve
PST	point of spiral to tangent
PT	point of tangent
pvmt.	pavement
R	radius
R.	range
R/W	right-of-way
rdwy.	roadway
reinf.	reinforcement
reqd.	required
rt. or RT	right
rte.	route
S	south
SADT	seasonal average daily traffic
SC	point of spiral to curve
sec.	section
shldr.	shoulder
SLRY	slurry unit
spa.	spacing, spaces or spaced
SQFT	square foot
SQYD	square yard
SRS	point of spiral to reverse spiral
SS	point of spiral to spiral (no curve)
ST	point of spiral to tangent
STA, Sta.	station
std.	standard
stgr.	stringer
stiff.	stiffener
struc.	structural
STS	point of spiral to tangent spiral
sym.	symmetrical
T	tangent distance
T.	township
TBM	temporary bench mark
thd.	thread
TS	point of tangent to spiral
Ts	tangent distance (spiraled curve)
typ.	typical
V	design speed
vph	vehicles per hour
VPI	vertical point of intersection
W	west
yd2	square yard
yd3	cubic yard(s)

NOTE:

1. Other symbols used in the plans will be shown in a legend on the appropriate plan sheet.



STATE	PROJECT	SHEET NUMBER
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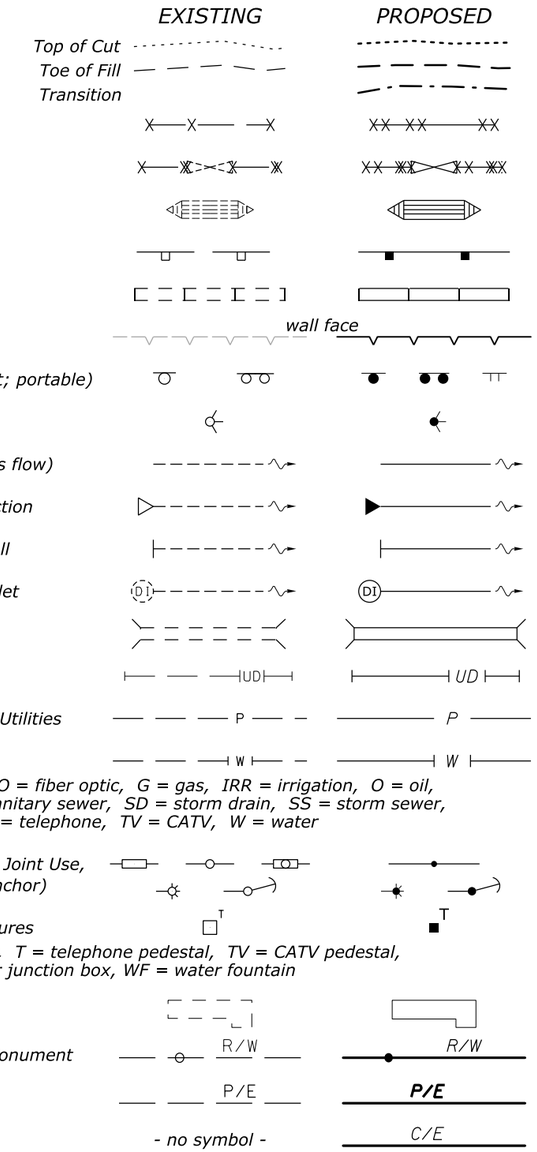
North Arrow



NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY DETAIL

PLAN SYMBOLS AND ABBREVIATIONS

DETAIL APPROVED FOR USE 11/2001

REVISED: 9/2005 1/2007 10/2009

DETAIL W101-1

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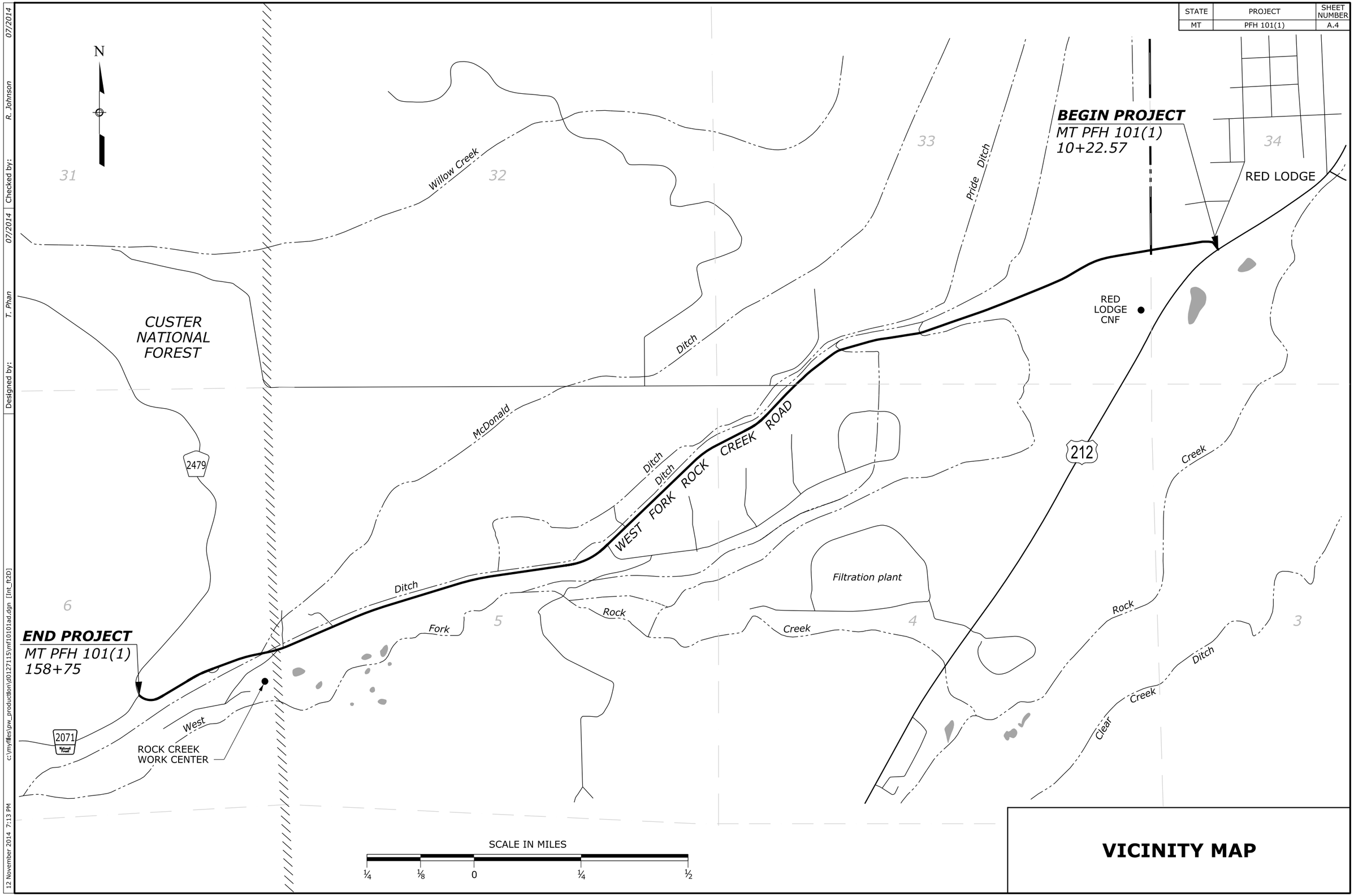
STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	A.4



VICINITY MAP

Designed by: T. Phan 07/2014 | Checked by: R. Johnson 07/2014

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SUMMARY OF QUANTITIES, (SCHEDULE A)

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	B.1

AMEND	Line Item No.	Pay Item Number	Pay Item Description	Unit	Sheet and Description: SECTION C TYPICAL SECTIONS	SECTION D PLAN & PROFILE	SECTION E APPROACH ROADS	SECTION G DRAINAGE	SECTION F EROSION CONTROL	SECTION H SAFETY FEATURES AND MISCELLANEOUS	SECTION I RETAINING WALLS	SECTION J TEMPORARY TRAFFIC CONTROL	SECTION K PERMANENT TRAFFIC CONTROL	- ALLOWANCE	Estimated Quantities: Bid Schedule	Remarks and/or Determination of Estimated Quantity
	A1000	15101-0000	MOBILIZATION	LPSM											ALL	
	A1020	15201-0000	CONSTRUCTION SURVEY AND STAKING	LPSM											ALL	
	A1040	15301-0010	CONTRACTOR QUALITY CONTROL AND ASSURANCE	LPSM											ALL	
	A1060	15401-0000	CONTRACTOR TESTING	LPSM											ALL	
	A1080	15501-0000	CONSTRUCTION SCHEDULE	LPSM											ALL	
	A1100	15705-0100	SOIL EROSION CONTROL, SILT FENCE	LNFT					869					31	900	
	A1120	15705-1500	SOIL EROSION CONTROL, SEDIMENT WATTLE	LNFT					16,648					352	17,000	
	A1140	15706-0300	SOIL EROSION CONTROL, SANDBAG	EACH					250					50	300	
	A1160	15801-0000	WATERING FOR DUST CONTROL	MGAL											2,000	
	A1180	20101-0000	CLEARING AND GRUBBING	ACRE		9.5	0.5							0.5	10.5	
	A1200	20301-1900	REMOVAL OF PIPE CULVERT	EACH				13						2	15	
	A1220	20301-2400	REMOVAL OF SIGN	EACH									21	5	26	
	A1240	20401-0000	ROADWAY EXCAVATION	CUYD		20,420	160								20,580	
	A1260	20402-0000	SUBEXCAVATION	CUYD	1,206									200	1,406	
	A1280	20411-0000	SELECT BORROW	TON	2,380	14,600	1,510							1,500	19,990	
	A1300	20701-1200	EARTHWORK GEOTEXTILE, TYPE IV-A	SQYD	4,000		300							500	4,800	
	A1320	25101-3000	PLACED RIPRAP, CLASS 3	CUYD				80						20	100	
	A1340	25702-0000	ALTERNATE RETAINING WALL (Cut Side)	SQFT							3,060			140	3,200	
	A1360	25702-0000	ALTERNATE RETAINING WALL (Fill Side)	SQFT							1,625			75	1,700	
	A1380	30101-2000	AGGREGATE BASE GRADING D	TON	32,910		800							500	34,210	
	A1400	40101-5600	SUPERPAVE PAVEMENT, 1/2-INCH OR 3/4-INCH NOMINAL MAXIMUM SIZE AGGREGATE, 0.3 TO <3 MILLION ESAL	TON	11,280		371							200	11,851	
	A1420	40105-3000	ANTISTRIP ADDITIVE, TYPE 3	TON	113		3							1	117	
	A1460	41201-1000	TACK COAT GRADE CSS-1, CSS-1H, SS-1, OR SS-1H	TON	21		1							1	23	
	A1480	60103-0000	CONCRETE, HEADWALL	EACH				7							7	
	A1500	60201-0400	12-INCH PIPE CULVERT	LNFT				204						16	220	
	A1520	60201-0600	18-INCH PIPE CULVERT	LNFT				175						25	200	
	A1540	60201-0800	24-INCH PIPE CULVERT	LNFT				211						19	230	
	A1560	60201-1000	36-INCH PIPE CULVERT	LNFT				136						14	150	
	A1580	60201-1200	48-INCH PIPE CULVERT	LNFT				5							5	

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Date Completed: In Progress
Report Date: 11/19/14

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SUMMARY OF QUANTITIES, (SCHEDULE A)

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	B.2

AMEND	Line Item No.	Pay Item Number	Pay Item Description	Unit	Sheet and Description: SECTION C TYPICAL SECTIONS	SECTION D PLAN & PROFILE	SECTION E APPROACH ROADS	SECTION G DRAINAGE	SECTION F EROSION CONTROL	SECTION H SAFETY FEATURES AND MISCELLANEOUS	SECTION I RETAINING WALLS	SECTION J TEMPORARY TRAFFIC CONTROL	SECTION K PERMANENT TRAFFIC CONTROL	- ALLOWANCE	Estimated Quantities: Bid Schedule	Remarks and/or Determination of Estimated Quantity
	A1600	60220-1200	6 FEET SPAN, 4 FEET RISE PRECAST REINFORCED CONCRETE BOX CULVERT	LNFT				145						15	160	
	A1620	60412-2000	REMOVE AND RESET MANHOLE FRAME AND COVER (Storm)	EACH											1	
	A1640	60506-0000	UNDERDRAIN SYSTEM with 6" Perforated Pipe	LNFT	2,575										2,575	
	A1660	60907-1000	PAVED DITCH, ASPHALT Type 2	LNFT		575								25	600	
	A1680	60907-1000	PAVED DITCH, ASPHALT Type 1	LNFT		150								25	175	
	A1700	61921-1000	REMOVE AND RESET FENCE	LNFT		5,105								750	5,855	
	A1720	62201-0200	DUMP TRUCK, 8 CUBIC YARD MINIMUM CAPACITY	HOUR											160	
	A1740	62201-0350	BACKHOE	HOUR											120	
	A1760	62201-3400	HYDRAULIC EXCAVATOR, 1 CUBIC YARD MINIMUM CAPACITY WITH THUMB ATTACHMENT	HOUR											120	
	A1780	62201-3750	CHAIN SAW	HOUR											30	
	A1800	62301-0000	GENERAL LABOR	HOUR											160	
	A1820	62406-0300	PLACING CONSERVED TOPSOIL, 4-INCH DEPTH	ACRE		3.6								0.4	4.0	
	A1840	62510-2000	SEEDING, HYDRAULIC METHOD	ACRE					3.6					0.4	4.0	
	A1860	62515-2000	MULCHING, HYDRAULIC METHOD	ACRE					3.6					0.4	4.0	
	A1880	62901-0000	ROLLED EROSION CONTROL PRODUCT	SQYD					2,000					250	2,250	
	A1900	63302-0000	SIGN SYSTEM	SQFT									135	25	160	
	A1920	63308-0000	OBJECT MARKER	EACH									8	2	10	
	A1940	63309-0000	DELINEATOR	EACH									294	20	314	
	A1960	63401-0300	PAVEMENT MARKINGS, TYPE B, SOLID (white)	LNFT									59,300		59,300	
	A1980	63401-0300	PAVEMENT MARKINGS, TYPE B, SOLID (yellow)	LNFT									59,300		59,300	
	A2000	63501-1000	TEMPORARY TRAFFIC CONTROL, TRAFFIC AND SAFETY SUPERVISOR	LPSM											ALL	
	A2020	63502-0600	TEMPORARY TRAFFIC CONTROL, BARRICADE TYPE 3	EACH								8		2	10	
	A2040	63502-1300	TEMPORARY TRAFFIC CONTROL, DRUM	EACH								400		10	410	
	A2060	63502-1500	TEMPORARY TRAFFIC CONTROL, WARNING LIGHT TYPE A	EACH								120			120	
	A2080	63502-3100	TEMPORARY TRAFFIC CONTROL, TRAFFIC SIGNAL SYSTEM	EACH								2			2	

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Date Completed: In Progress
Report Date: 11/19/14

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STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	B.3

SUMMARY OF QUANTITIES, (SCHEDULE A)

AMEND	Line Item No.	Pay Item Number	Pay Item Description	Unit	Sheet and Description										Estimated Quantities	Remarks and/or Determination of Estimated Quantity
					SECTION C	SECTION D	SECTION E	SECTION G	SECTION F	SECTION H	SECTION I	SECTION J	SECTION K	-		
					TYPICAL SECTIONS	PLAN & PROFILE	APPROACH ROADS	DRAINAGE	EROSION CONTROL	SAFETY FEATURES AND MISCELLANEOUS	RETAINING WALLS	TEMPORARY TRAFFIC CONTROL	PERMANENT TRAFFIC CONTROL	ALLOWANCE	Bid Schedule	
	A2100	63502-3200	TEMPORARY TRAFFIC CONTROL, RELOCATING TRAFFIC SIGNAL SYSTEM	EACH								2			2	
	A2120	63503-0400	TEMPORARY TRAFFIC CONTROL, CONCRETE BARRIER	LNFT								500			500	
	A2140	63503-0700	TEMPORARY TRAFFIC CONTROL, PAVEMENT MARKINGS	LNFT											12,000	
	A2160	63504-1000	TEMPORARY TRAFFIC CONTROL, CONSTRUCTION SIGN	SQFT								429		150	579	
	A2180	63506-0600	TEMPORARY TRAFFIC CONTROL, PILOT CAR	HOUR								1,000			1,000	
	A2200	63509-1000	TEMPORARY TRAFFIC CONTROL, FLAGGER	FXHR								4,000			4,000	
	A2220	64620-0400	REMOVE AND RESET MAILBOX	EACH		14									20	

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Date Completed: In Progress
Report Date: 11/19/14

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SUMMARY OF QUANTITIES, (SCHEDULE B)

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	B.4

AMEND	Line Item No.	Pay Item Number	Pay Item Description	Unit	Sheet and Description: SECTION C TYPICAL SECTIONS	SECTION D PLAN & PROFILE	SECTION E APPROACH ROADS	SECTION G DRAINAGE	SECTION F EROSION CONTROL	SECTION H SAFETY FEATURES AND MISCELLANEOUS	SECTION I RETAINING WALLS	SECTION J TEMPORARY TRAFFIC CONTROL	SECTION K PERMANENT TRAFFIC CONTROL	- ALLOWANCE	Estimated Quantities: Bid Schedule	Remarks and/or Determination of Estimated Quantity
	B1000	15101-0000	MOBILIZATION	LPSM											ALL	
	B1020	15201-0000	CONSTRUCTION SURVEY AND STAKING	LPSM											ALL	
	B1040	15301-0010	CONTRACTOR QUALITY CONTROL AND ASSURANCE	LPSM											ALL	
	B1060	15401-0000	CONTRACTOR TESTING	LPSM											ALL	
	B1080	15501-0000	CONSTRUCTION SCHEDULE	LPSM											ALL	
	B1100	15705-0100	SOIL EROSION CONTROL, SILT FENCE	LNFT					869					31	900	
	B1120	15705-1500	SOIL EROSION CONTROL, SEDIMENT WATTLE	LNFT					16,648					352	17,000	
	B1140	15706-0300	SOIL EROSION CONTROL, SANDBAG	EACH					250					50	300	
	B1160	15801-0000	WATERING FOR DUST CONTROL	MGAL											2,000	
	B1180	20101-0000	CLEARING AND GRUBBING	ACRE		9.5	0.5							0.5	10.5	
	B1200	20301-1900	REMOVAL OF PIPE CULVERT	EACH				13						2	15	
	B1220	20301-2400	REMOVAL OF SIGN	EACH									21	5	26	
	B1240	20401-0000	ROADWAY EXCAVATION	CUYD		20,420	160								20,580	
	B1260	20402-0000	SUBEXCAVATION	CUYD	1,206									200	1,406	
	B1280	20411-0000	SELECT BORROW	TON	2,380	14,600	1,510							1,500	19,990	
	B1300	20701-1200	EARTHWORK GEOTEXTILE, TYPE IV-A	SQYD	4,000		300							500	4,800	
	B1320	25101-3000	PLACED RIPRAP, CLASS 3	CUYD				80						20	100	
	B1340	25126-0000	REMOVE AND RESET BOULDER	EACH		20								5	25	
	B1360	25702-0000	ALTERNATE RETAINING WALL (Fill Side)	SQFT							3,060			140	3,200	
	B1380	25702-0000	ALTERNATE RETAINING WALL (Fill Side)	SQFT							1,625			75	1,700	
	B1400	30101-2000	AGGREGATE BASE GRADING D	TON	19,760		800							500	21,060	
	B1420	31004-0000	RECYCLED AGGREGATE SURFACE	CUYD	6,690										6,690	
	B1440	40101-5600	SUPERPAVE PAVEMENT, 1/2-INCH OR 3/4-INCH NOMINAL MAXIMUM SIZE AGGREGATE, 0.3 TO <3 MILLION ESAL	TON	11,280		371							200	11,851	
	B1460	40105-3000	ANTISTRIP ADDITIVE, TYPE 3	TON	113		3							1	117	
	B1500	41201-1000	TACK COAT GRADE CSS-1, CSS-1H, SS-1, OR SS-1H	TON	21		1							1	23	
	B1520	60103-0000	CONCRETE, HEADWALL	EACH				7							7	
	B1540	60201-0400	12-INCH PIPE CULVERT	LNFT				204						16	220	
	B1560	60201-0600	18-INCH PIPE CULVERT	LNFT				175						25	200	
	B1580	60201-0800	24-INCH PIPE CULVERT	LNFT				211						19	230	

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Date Completed: In Progress
Report Date: 11/19/14

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SUMMARY OF QUANTITIES, (SCHEDULE B)

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	B.5

AMEND	Line Item No.	Pay Item Number	Pay Item Description	Unit	Sheet and Description: SECTION C TYPICAL SECTIONS	SECTION D PLAN & PROFILE	SECTION E APPROACH ROADS	SECTION G DRAINAGE	SECTION F EROSION CONTROL	SECTION H SAFETY FEATURES AND MISCELLANEOUS	SECTION I RETAINING WALLS	SECTION J TEMPORARY TRAFFIC CONTROL	SECTION K PERMANENT TRAFFIC CONTROL	- ALLOWANCE	Estimated Quantities: Bid Schedule	Remarks and/or Determination of Estimated Quantity
	B1600	60201-1000	36-INCH PIPE CULVERT	LNFT				136						14	150	
	B1620	60201-1200	48-INCH PIPE CULVERT	LNFT				5							5	
	B1640	60220-1200	6 FEET SPAN, 4 FEET RISE PRECAST REINFORCED CONCRETE BOX CULVERT	LNFT				145						15	160	
	B1660	60412-2000	REMOVE AND RESET MANHOLE FRAME AND COVER (Storm)	EACH											1	
	B1680	60506-0000	UNDERDRAIN SYSTEM with 6" Perforated Pipe	LNFT	2,575										2,575	
	B1700	60907-1000	PAVED DITCH, ASPHALT	LNFT		575								25	600	
	B1720	60907-1000	PAVED DITCH, ASPHALT Type 1	LNFT		150								25	175	
	B1740	61921-1000	REMOVE AND RESET FENCE	LNFT		5,105								750	5,855	
	B1760	62201-0200	DUMP TRUCK, 8 CUBIC YARD MINIMUM CAPACITY	HOUR											160	
	B1780	62201-0350	BACKHOE	HOUR											120	
	B1800	62201-3400	HYDRAULIC EXCAVATOR, 1 CUBIC YARD MINIMUM CAPACITY WITH THUMB ATTACHMENT	HOUR											120	
	B1820	62201-3750	CHAIN SAW	HOUR											30	
	B1840	62301-0000	GENERAL LABOR	HOUR											160	
	B1860	62406-0300	PLACING CONSERVED TOPSOIL, 4-INCH DEPTH	ACRE		3.6								0.4	4.0	
	B1880	62510-2000	SEEDING, HYDRAULIC METHOD	ACRE					3.6					0.4	4.0	
	B1900	62515-2000	MULCHING, HYDRAULIC METHOD	ACRE					3.6					0.4	4.0	
	B1920	62901-0000	ROLLED EROSION CONTROL PRODUCT	SQYD					2,000					250	2,250	
	B1940	63302-0000	SIGN SYSTEM	SQFT									135	25	160	
	B1960	63308-0000	OBJECT MARKER	EACH									8	2	10	
	B1980	63309-0000	DELINEATOR	EACH									294	20	314	
	B2000	63401-0300	PAVEMENT MARKINGS, TYPE B, SOLID (white)	LNFT									59,300		59,300	
	B2020	63401-0300	PAVEMENT MARKINGS, TYPE B, SOLID (yellow)	LNFT									59,300		59,300	
	B2040	63501-1000	TEMPORARY TRAFFIC CONTROL, TRAFFIC AND SAFETY SUPERVISOR	LPSM											ALL	
	B2060	63502-0600	TEMPORARY TRAFFIC CONTROL, BARRICADE TYPE 3	EACH								8		2	10	
	B2080	63502-1300	TEMPORARY TRAFFIC CONTROL, DRUM	EACH								400		10	410	
	B2100	63502-1500	TEMPORARY TRAFFIC CONTROL, WARNING LIGHT TYPE A	EACH								120			120	

MileStone: 95% PS&E
Date Completed: In Progress
Report Date: 11/19/14

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STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	B.6

SUMMARY OF QUANTITIES, (SCHEDULE B)

AMEND	Line Item No.	Pay Item Number	Pay Item Description	Unit	Sheet and Description										Estimated Quantities	Remarks and/or Determination of Estimated Quantity
					SECTION C	SECTION D	SECTION E	SECTION G	SECTION F	SECTION H	SECTION I	SECTION J	SECTION K	-		
					TYPICAL SECTIONS	PLAN & PROFILE	APPROACH ROADS	DRAINAGE	EROSION CONTROL	SAFETY FEATURES AND MISCELLANEOUS	RETAINING WALLS	TEMPORARY TRAFFIC CONTROL	PERMANENT TRAFFIC CONTROL	ALLOWANCE	Bid Schedule	
	B2120	63502-3100	TEMPORARY TRAFFIC CONTROL, TRAFFIC SIGNAL SYSTEM	EACH								2			2	
	B2140	63502-3200	TEMPORARY TRAFFIC CONTROL, RELOCATING TRAFFIC SIGNAL SYSTEM	EACH								2			2	
	B2160	63503-0400	TEMPORARY TRAFFIC CONTROL, CONCRETE BARRIER	LNFT								500			500	
	B2180	63503-0700	TEMPORARY TRAFFIC CONTROL, PAVEMENT MARKINGS	LNFT											12,000	
	B2200	63504-1000	TEMPORARY TRAFFIC CONTROL, CONSTRUCTION SIGN	SQFT								429		150	579	
	B2220	63506-0600	TEMPORARY TRAFFIC CONTROL, PILOT CAR	HOUR								1,000			1,000	
	B2240	63509-1000	TEMPORARY TRAFFIC CONTROL, FLAGGER	FXHR								4,000			4,000	

MileStone: 95% PS&E
Date Completed: In Progress
Report Date: 11/19/14

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STATE	PROJECT	SHEET NUMBER
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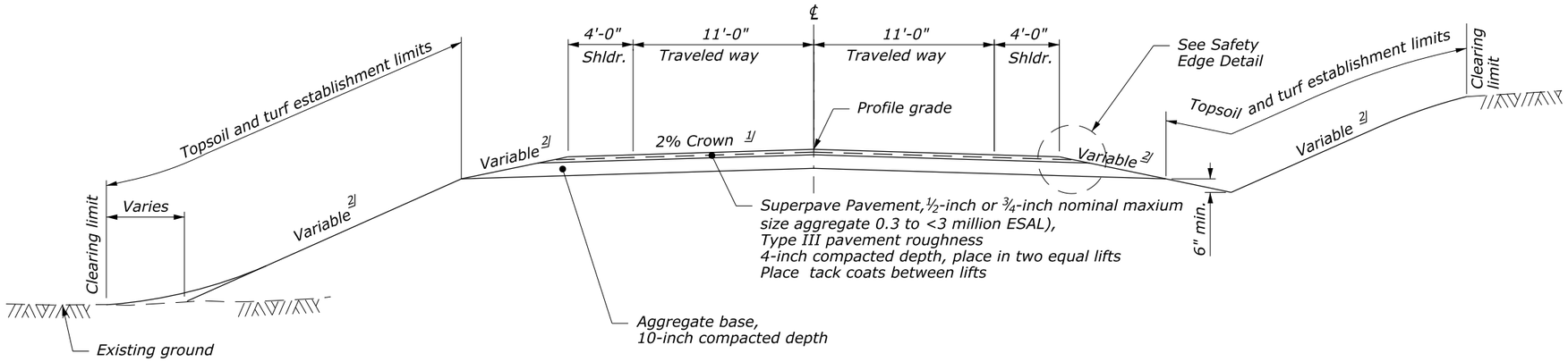
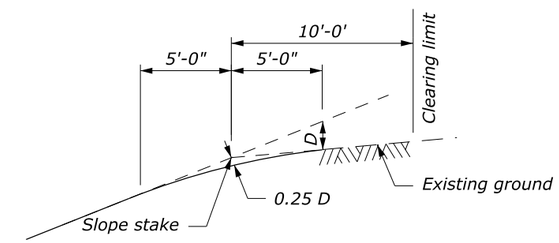
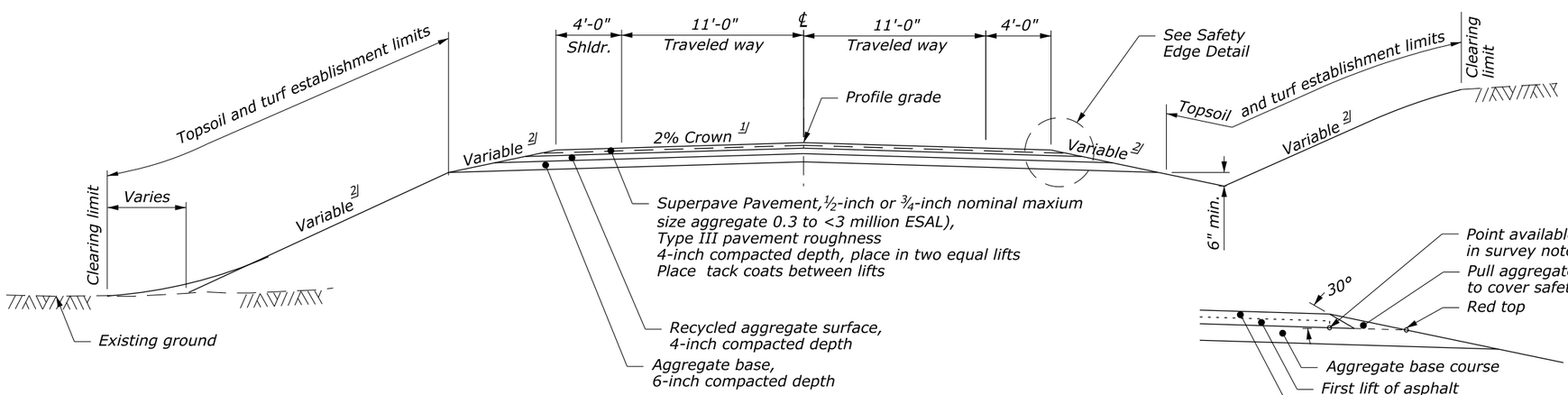


WEST FORK ROCK CREEK ROAD (SCHEUDLE A)
10+22.57 to 158+75.00



CUT SLOPE 4/ 5/
ROUNDING DETAIL



WEST FORK ROCK CREEK ROAD (SCHEDULE B)
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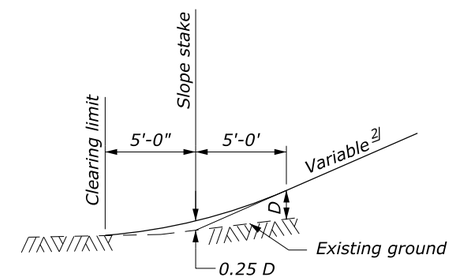
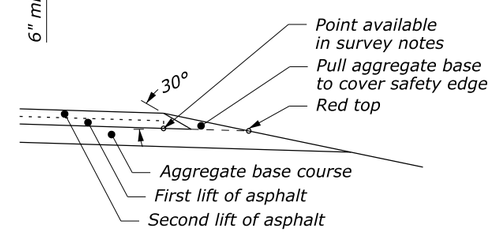


FILL SLOPE 4/ 5/
ROUNDING DETAIL



SAFETY EDGE DETAIL

FOOTNOTE:

1/ Superelevate roadway on curves at the rate 'e' as indicated on the plan and profile curve data.

2/ Construct slopes as shown in the Staking Report.

3/ For approach road quantities see Sheet E.1

4/ For cut heights less than "D" reduce "D" to the cut height dimension and reduce the front slope rounding distance proportionally.

5/ Disregard rounding details when slope stake is too close to the Right of Way or construction easement.

PAVEMENT STRUCTURE QUANTITIES

ITEM	DESCRIPTION	UNIT	(SCHEDULE A) QUANTITIES 3/	(SCHEDULE B) QUANTITIES 3/	ESTIMATING VALUE
30101-2000	AGGREGATE BASE GRADING D	TON	32,910	19,760	1.97 TONS/CUYD
31004-0000	RECYCLED AGGREGATE SURFACE	CUYD	--	6,690	
40101-5600	SUPERPAVE PAVEMENT, 1/2-INCH OR 3/4-INCH NOMINAL MAXIMUM SIZE AGGREGATE, 0.3 TO <3 MILLION ESAL	TON	11,280	11,280	1.94 TONS/CUYD
40105-3000	ANTISTRIP ADDITIVE, TYPE 3	TON	113	113	1% of 40101-5600
41201-1000	TACK COAT GRADE CSS-1, CSS-1H, SS-1, SS-1H	TON	21	21	0.1 GAL/SQYD, 240 GAL/TON

TYPICAL SECTIONS

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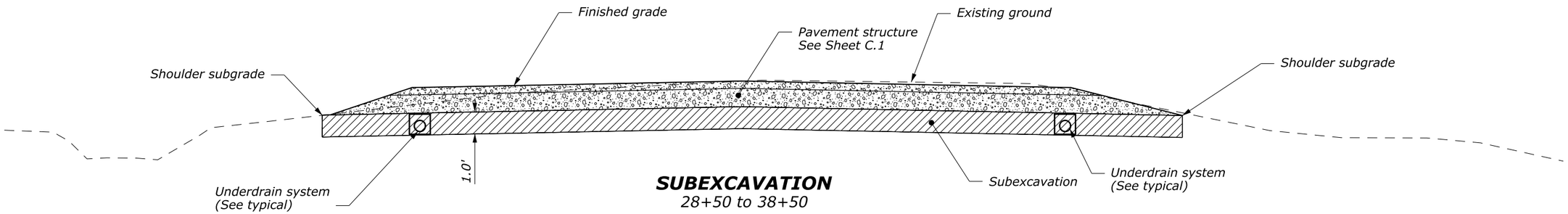
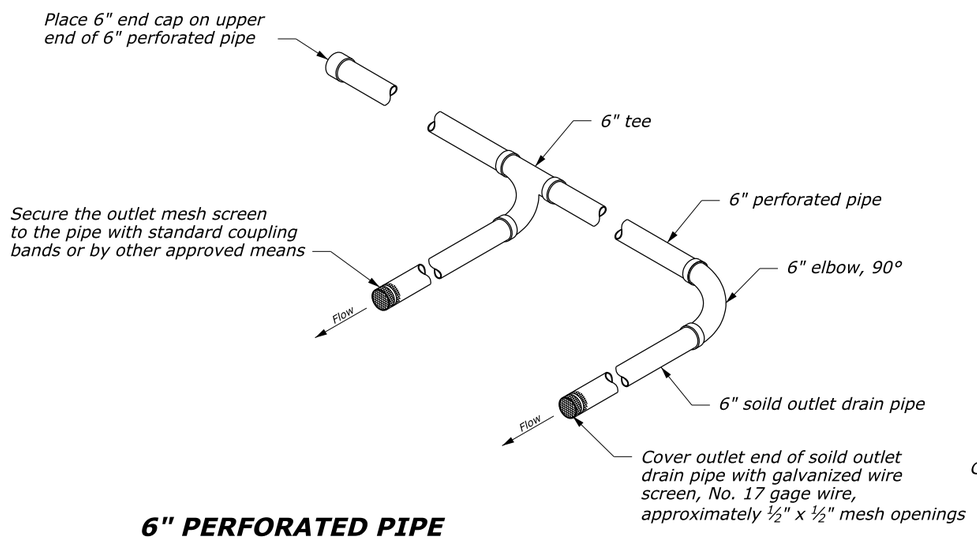


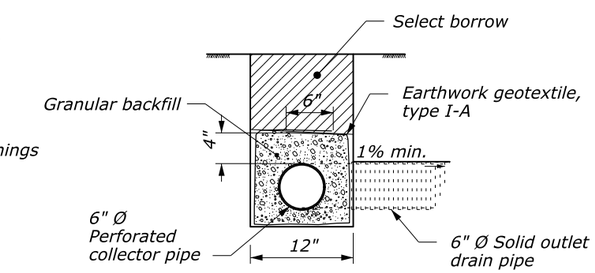
SUBEXCAVATION
28+50 to 38+50



6" PERFORATED PIPE
UNDERDRAIN SYSTEM DETAILS

ITEM 60506-0000
UNDERDRAIN SYTEM WITH 6" PERFORATED 1/

Location	PERF PIPE (LNFT)	GRAULAR BACKFILL (CUYD)	90° 6" Elbow (Each)	6" "TEE" (Each)	6" Solid outlet drain pipe (lnft)	6" END CAP (each)	Geotexile (SQFT)	Outlet Mesh Screens (Each)
28+50 to 38+50 RT	1,000	8	1	2	60	1	4,500	3
28+50 to 38+50 LT	1,000	8	1	2	60	1	4,500	3
20+00 to 25+75 LT 2/	575	5	0	0	50	1	2,600	1
Total	**2,575**	**21**	**2**	**4**	**170**	**3**	**11,600**	**7**



TYPICAL SECTION

SUBEXCAVATION AND BACKFILL QUANTITIES

ITEM	DESCRIPTION	UNIT	QUANTITIES
20402-0000	SUBEXCAVATION	CUYD	1,206
20411-0000	SELECT BORROW	TON	2,380
20701-1200	EARTHWORK GEOTEXTILE, TYPE IV-A	SQYD	4,000

FOOTNOTE:

1/ Payment per linear foot of underdrain system. All other quantities are for informtion only

2/ Connect 6" solid outlet drain pipe to perforated collect pie and daylight to roadway ditch.

SUBEXCAVATION DETAILS AND QUANTITIES

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PLAN AND PROFILE QUANTITIES

ITEM	DESCRIPTION	UNIT	QUANTITY	NOTES
20101-0000	Clearing and grubbing	ACRE	9.5	
20401-0000	Roadway excavation 1/	CUYD	20,420	
20411-0000	Select borrow (roadway embankment)	TON	14,600	1.97 TON/CUYD
62406-0300	Placing conserved topsoil, 4-inch depth	ACRE	3.6	

ITEM 60412-2000 REMOVE AND RESET MANHOLE FRAME AND COVER (Storm)

LOCATION	LT/RT	QUANTITY (EACH)
11+10	RT	1
	TOTAL	1

ITEM 60907-1000 PAVE DITCH, ASPHALT, TYPE 1

LOCATION	LT/RT	QUANTITY (LNFT)
10+30 TO 12+00	LT	150
	TOTAL	150

ITEM 60907-1000 PAVE DITCH, ASPHALT, TYPE 2

LOCATION	LT/RT	QUANTITY (LNFT)
20+25 TO 26+00	RT	575
	TOTAL	575

ITEM 61921-1000 REMOVE AND RESET FENCE

LOCATION	LT/RT	QUANTITY (LNFT)
12+00 to 13+00	LT	100
15+50 to 19+50	LT	400
21+00 to 26+00	RT	500
28+00 to 30+00	RT	200
33+75 to 49+70	RT	1,595
52+50 to 53+50	LT	100
53+00 to 54+50	RT	150
55+25 to 58+50	RT	325
60+50 to 63+00	RT	250
68+50 to 72+50	LT	400
74+00 to 75+50	LT	150
79+50 to 80+50	LT	100
121+50 to 124+50	LT	300
140+30 to 141+00	LT	70
142+25 to 143+20	RT	95
149+90 to 153+60	LT	370
	TOTAL	5,105

ITEM 64620-0400 REMOVE AND RESET MAILBOX

LOCATION	LT/RT	QUANTITY (LNFT)	NOTES
59+23	LT	1	
86+38	RT	1	
88+54	RT	1	
93+50	RT	1	
99+22	LT	1	
102+69	RT	2	
112+85	RT	1	
122+10	LT	5	Five mailboxes on one structure
138+80	RT	1	
	TOTAL	14	

FOOTNOTE:

1/ Quantities include 6,464 cuyd of existing pavement excavation and 4,155 cuyd of topsoil excavation. Excavation "bar" in the bottom of Plan & Profile Sheets includes roadway and topsoil excavation only

TABULATION OF PLAN QUANTITIES

Designed by: T. Phan 11/2014 Checked by: M. Moen 11/2014
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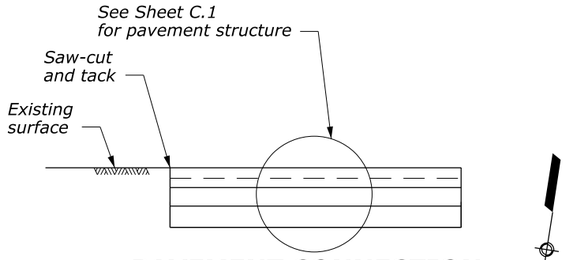
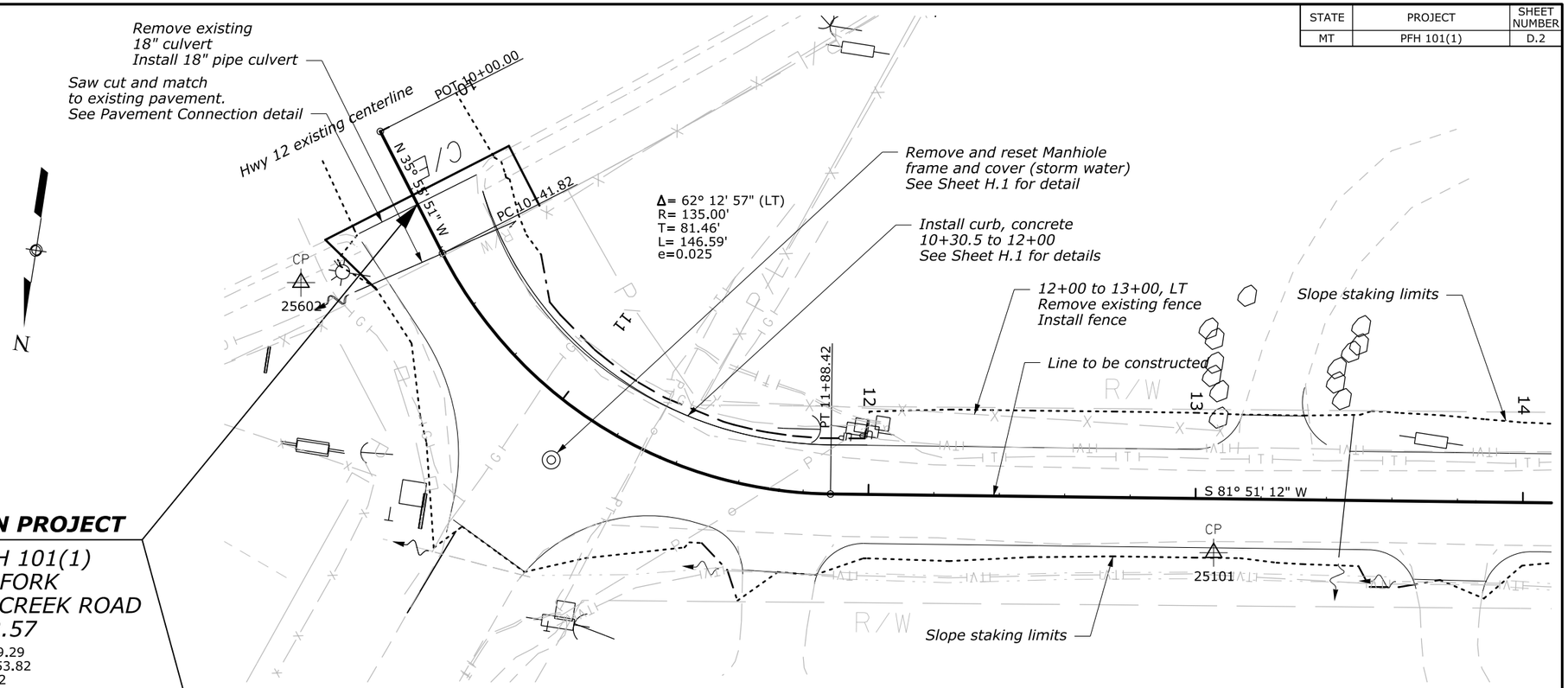


PAVEMENT CONNECTION DETAIL



BEGIN PROJECT

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WEST FORK
ROCK CREEK ROAD
10+22.57

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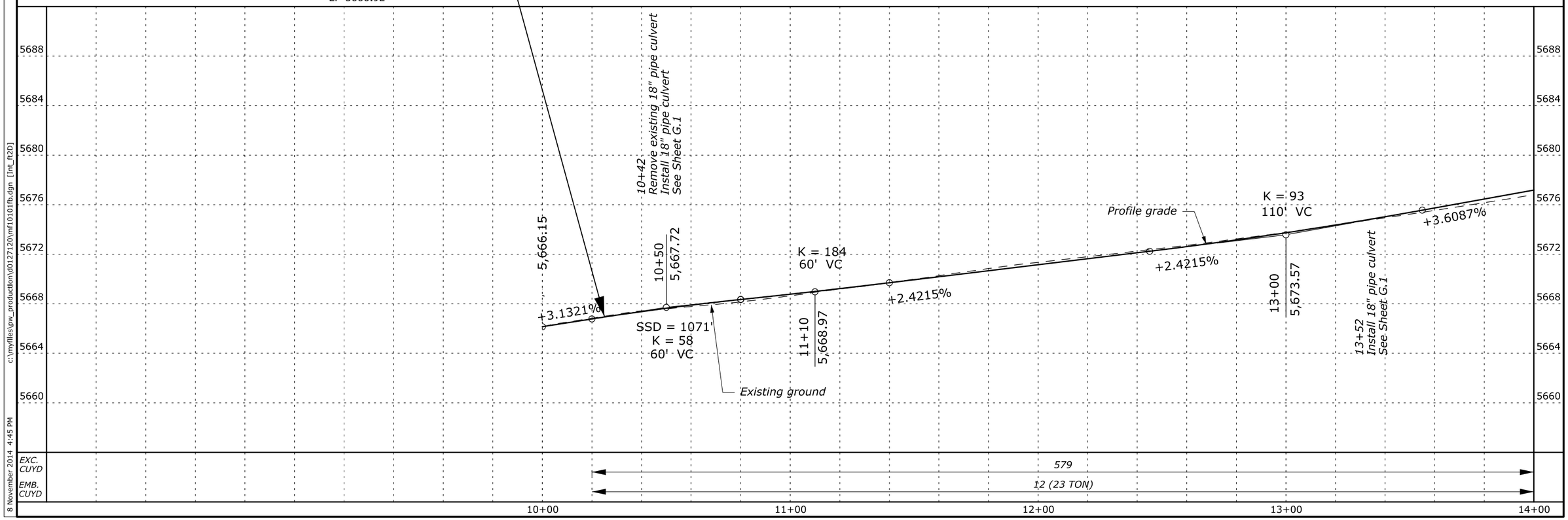
E= 2031453.82
El=5666.92



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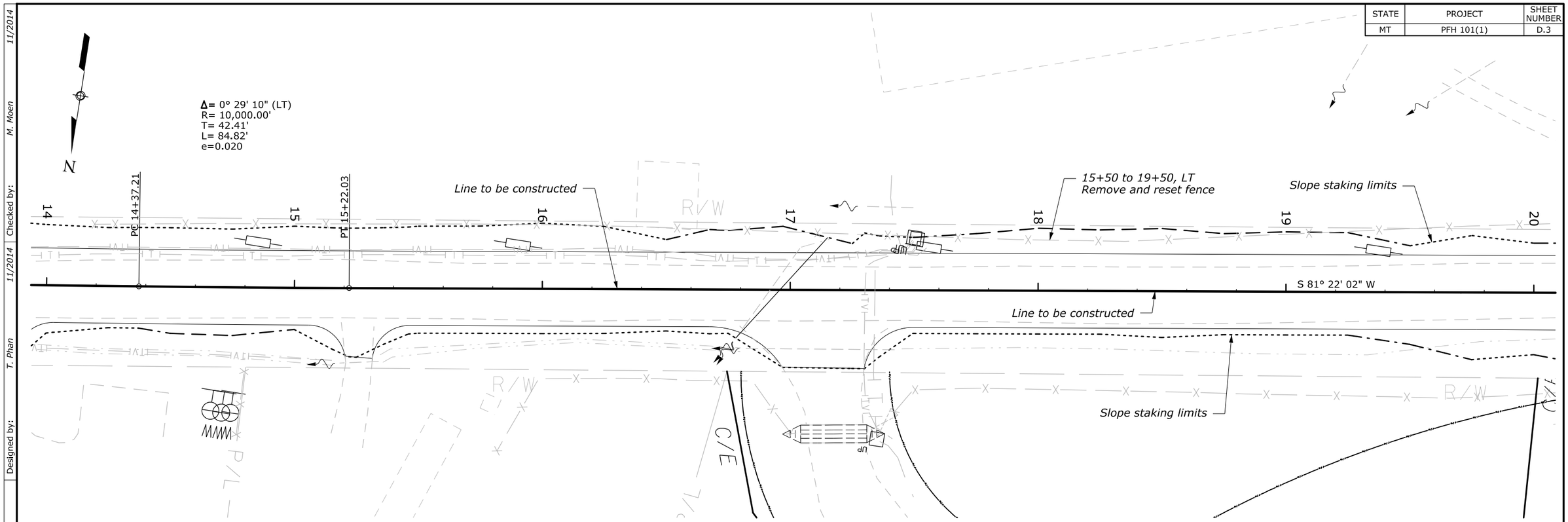

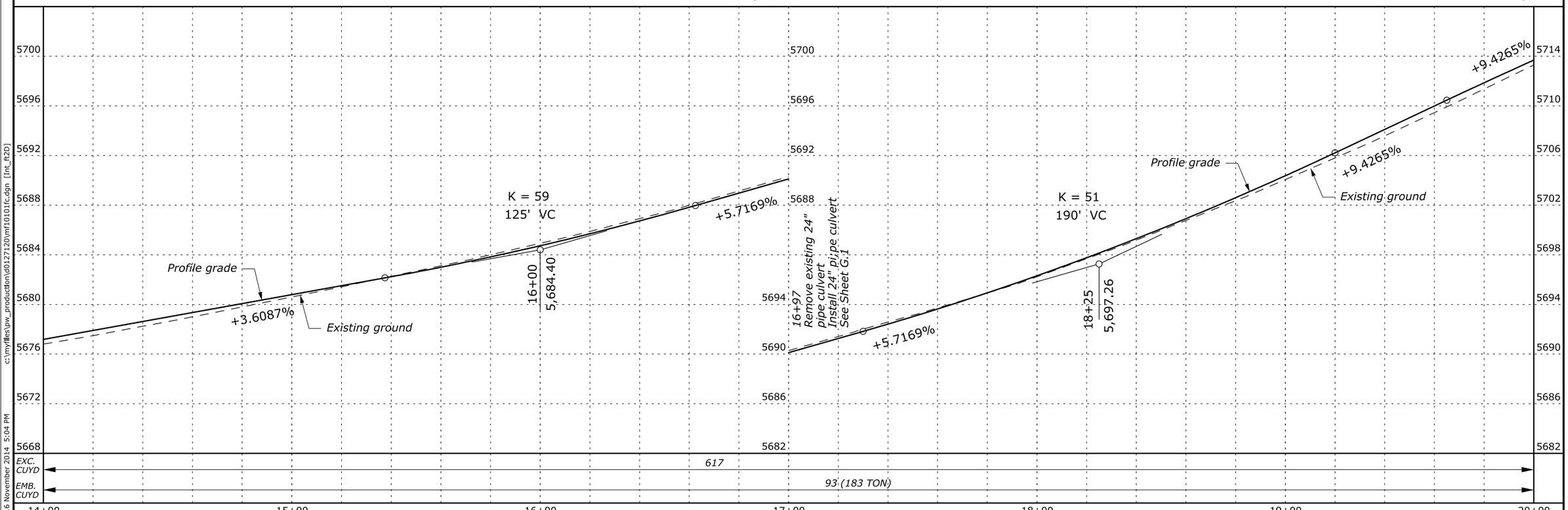

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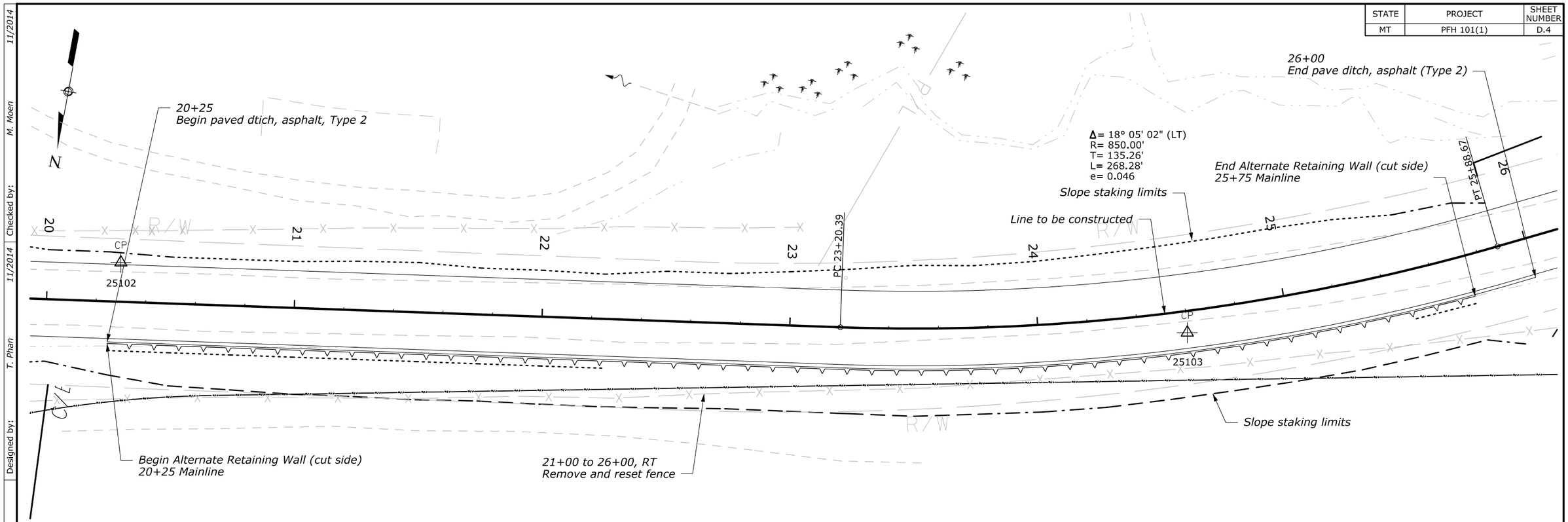

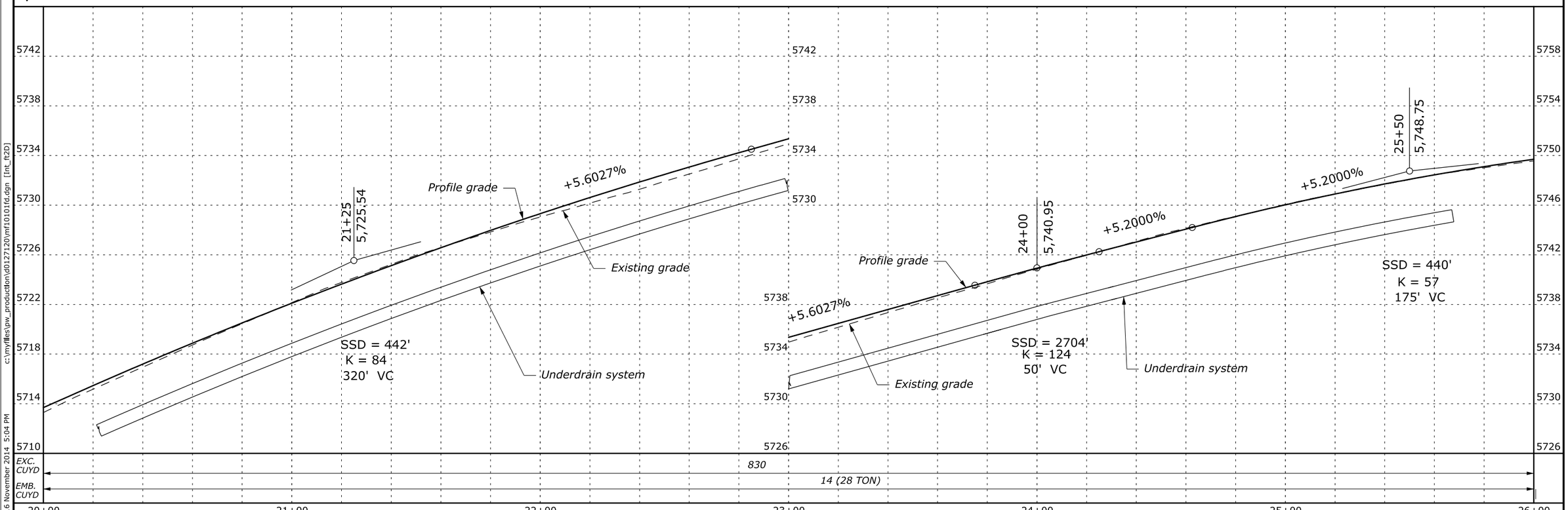

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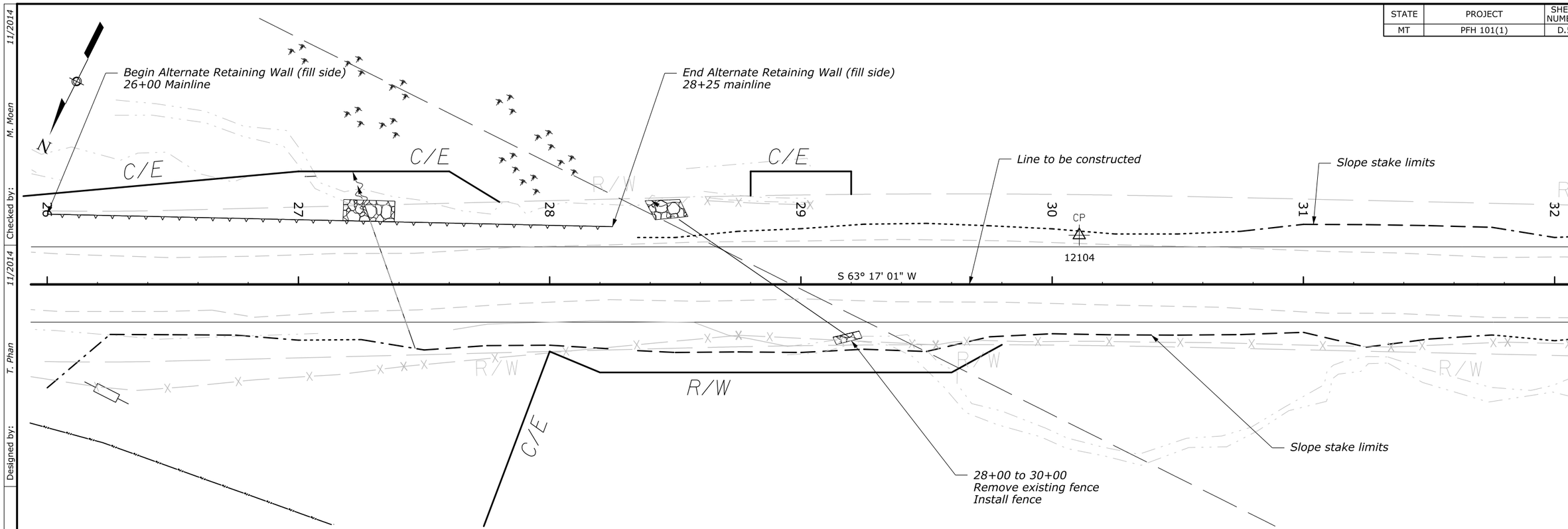

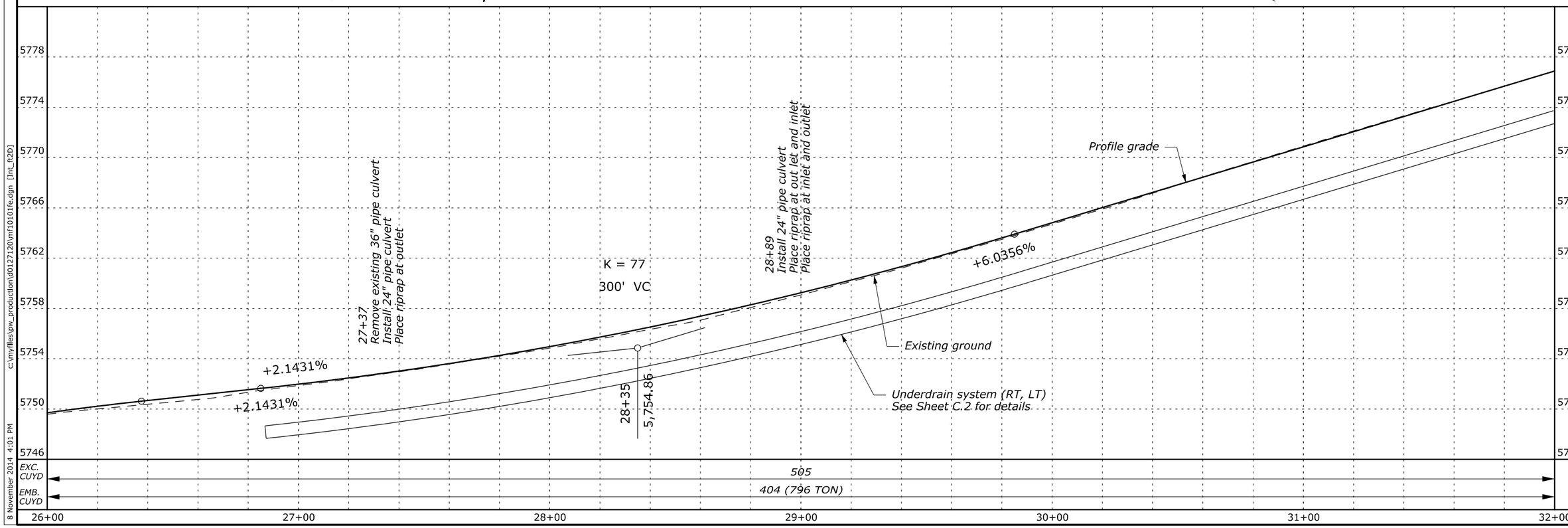

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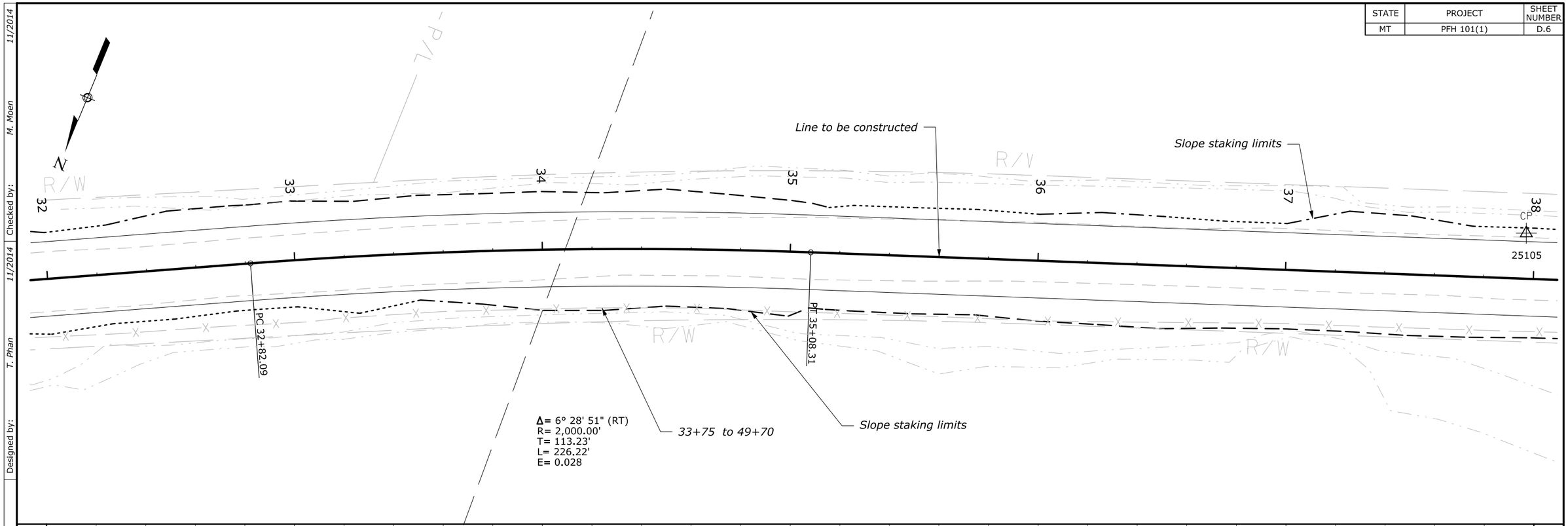

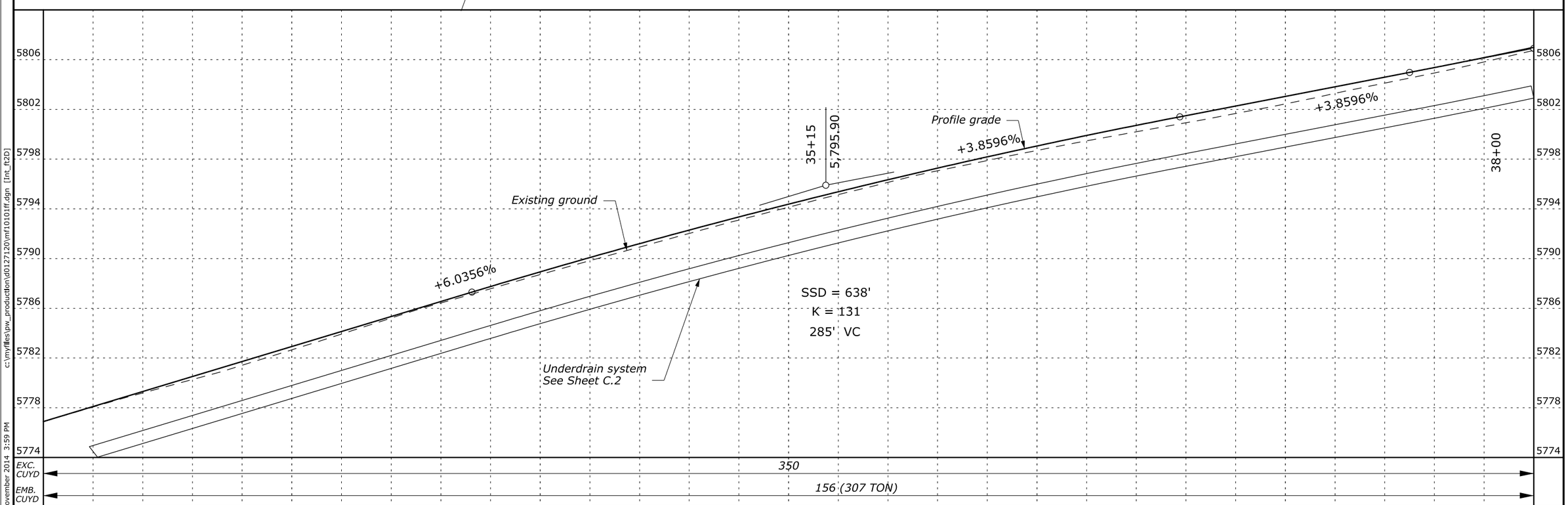

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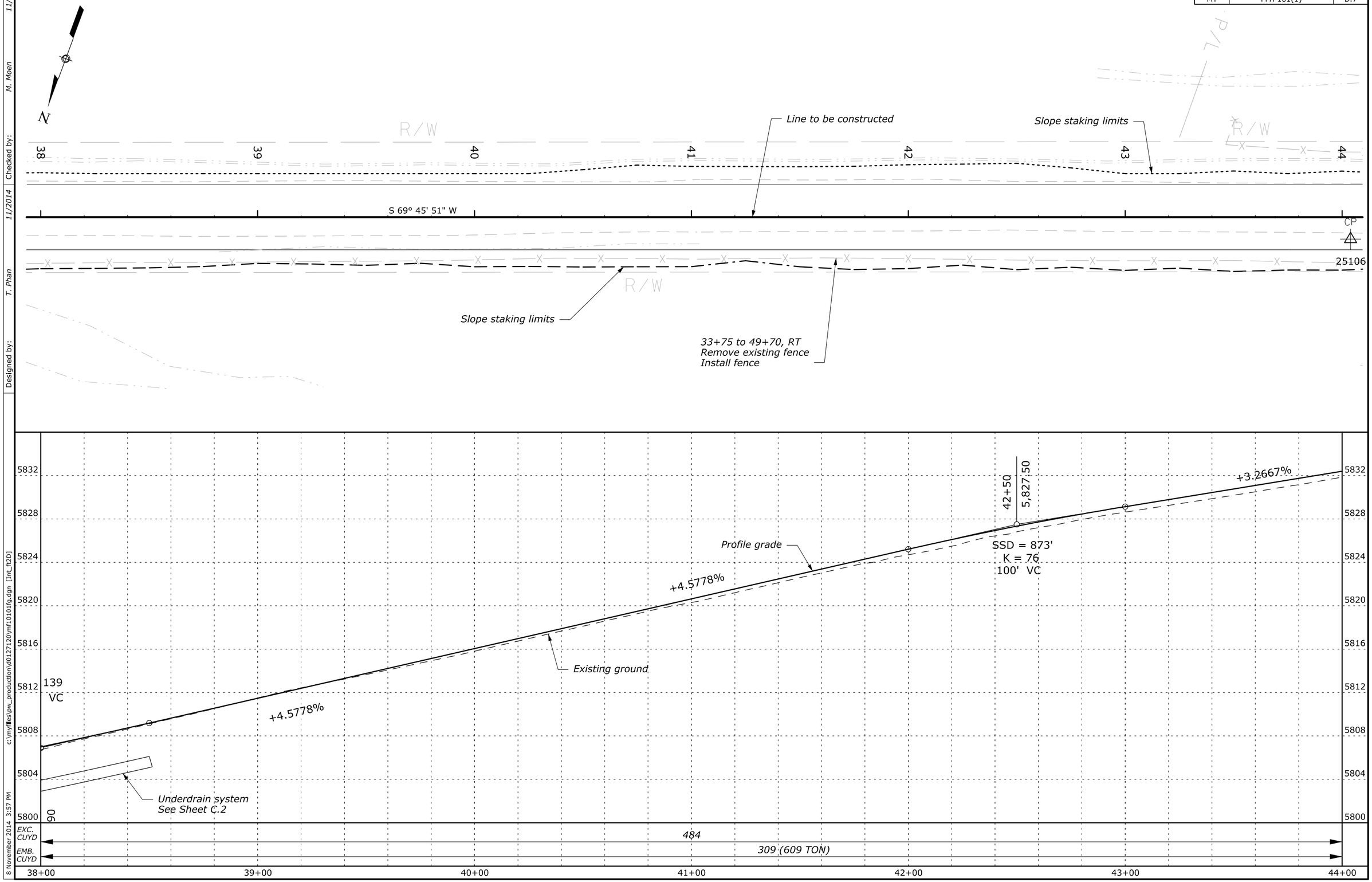

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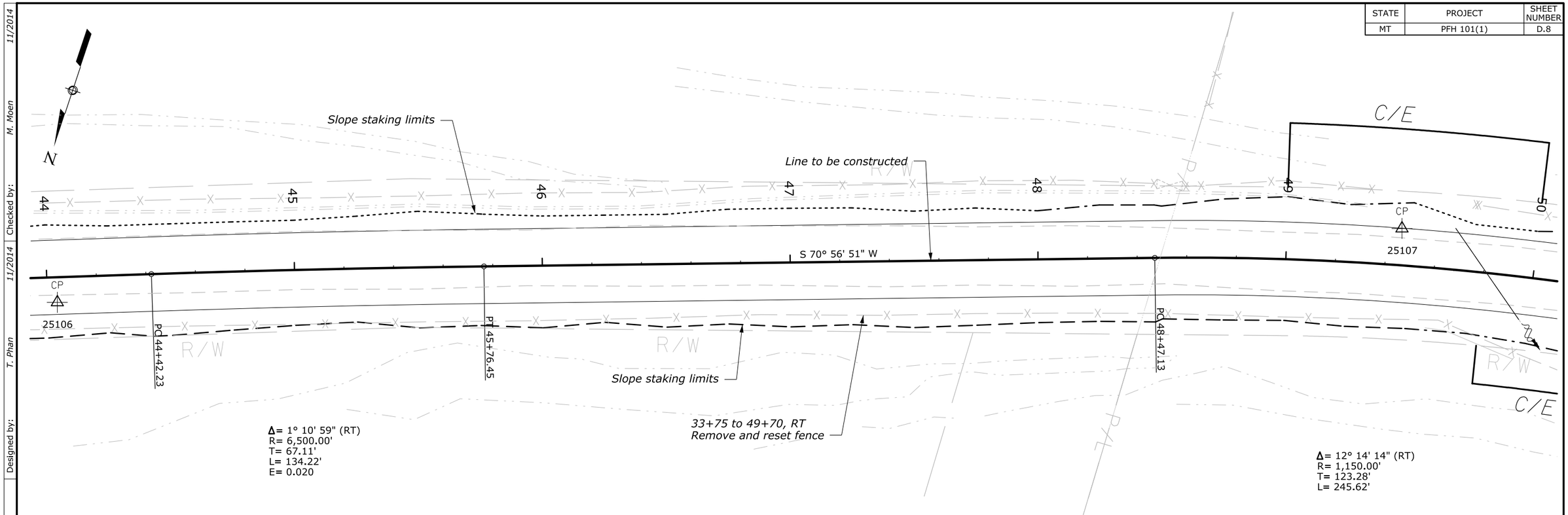

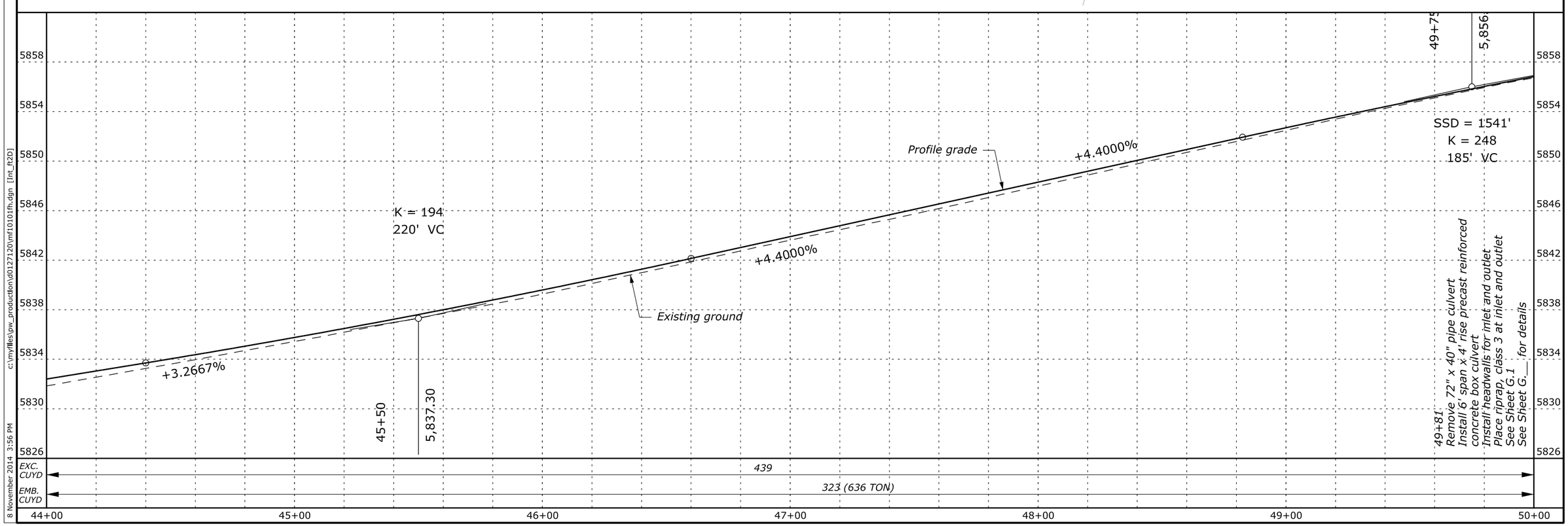

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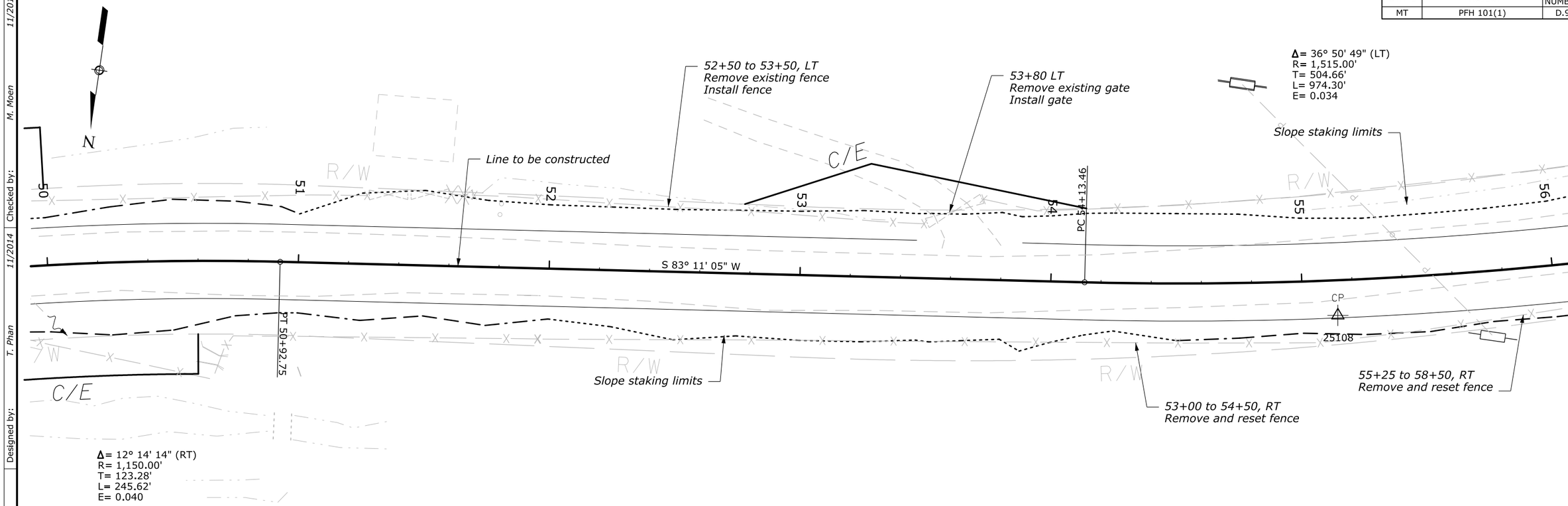

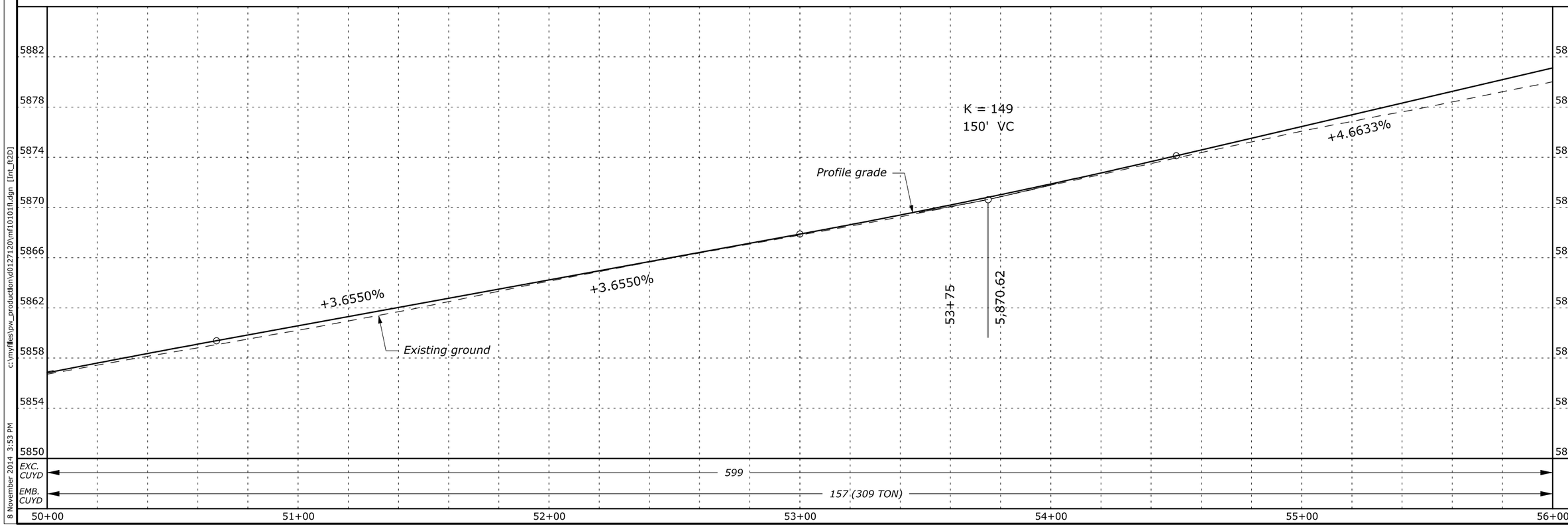

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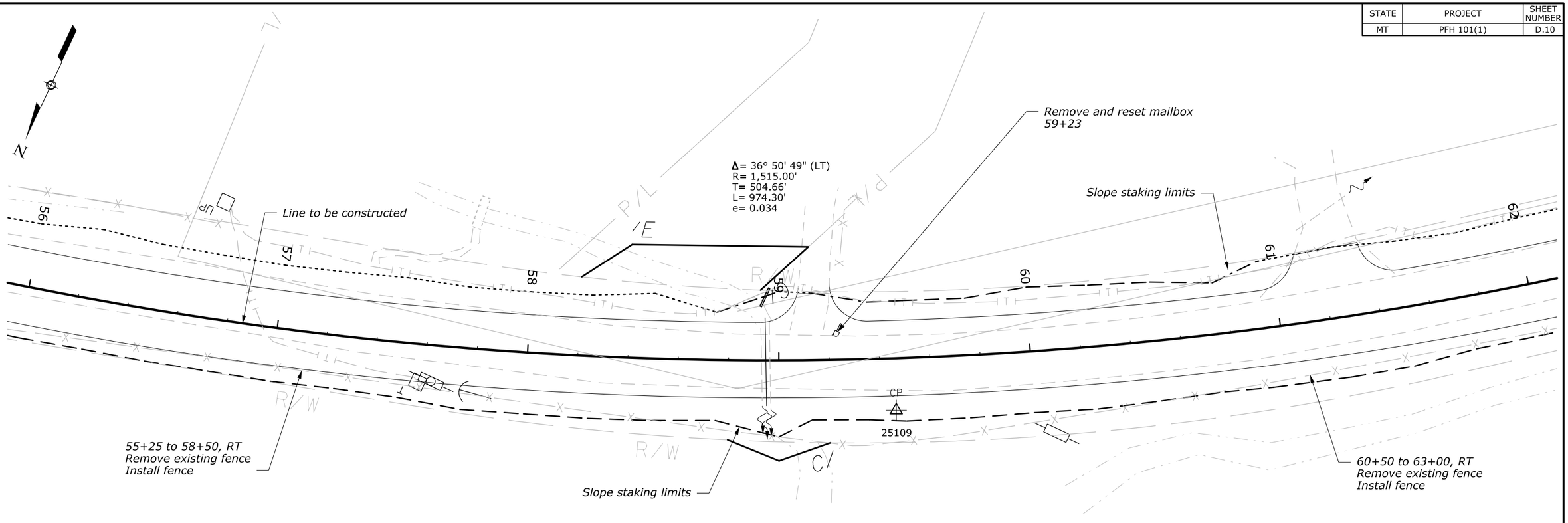

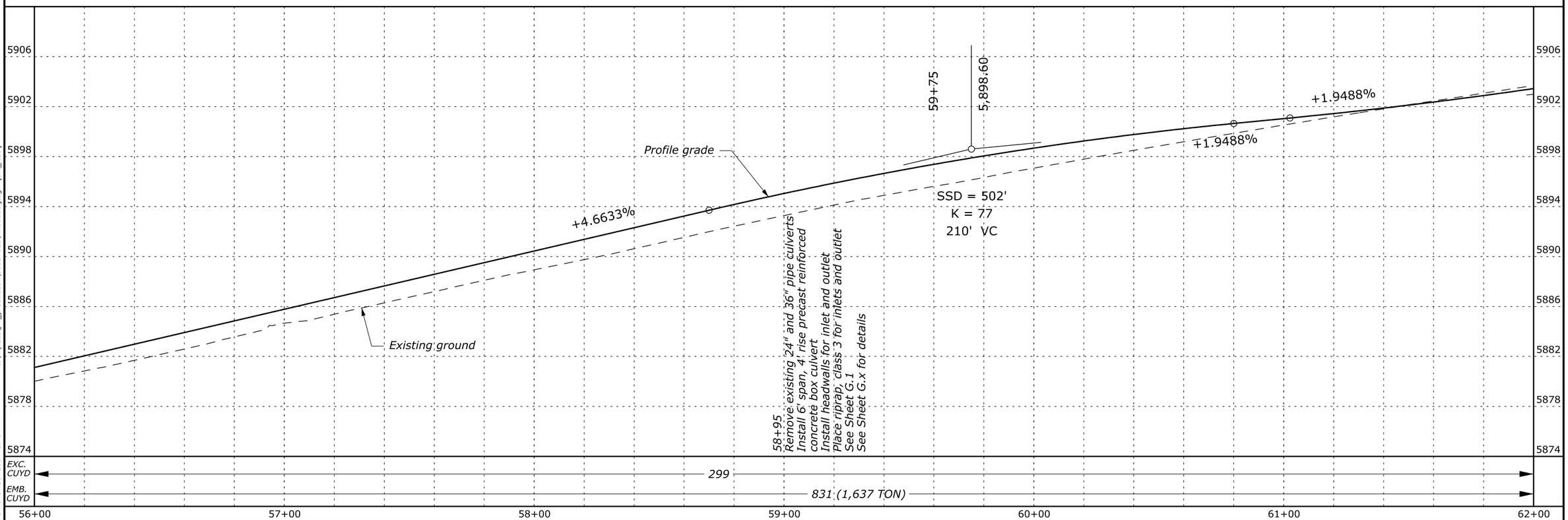

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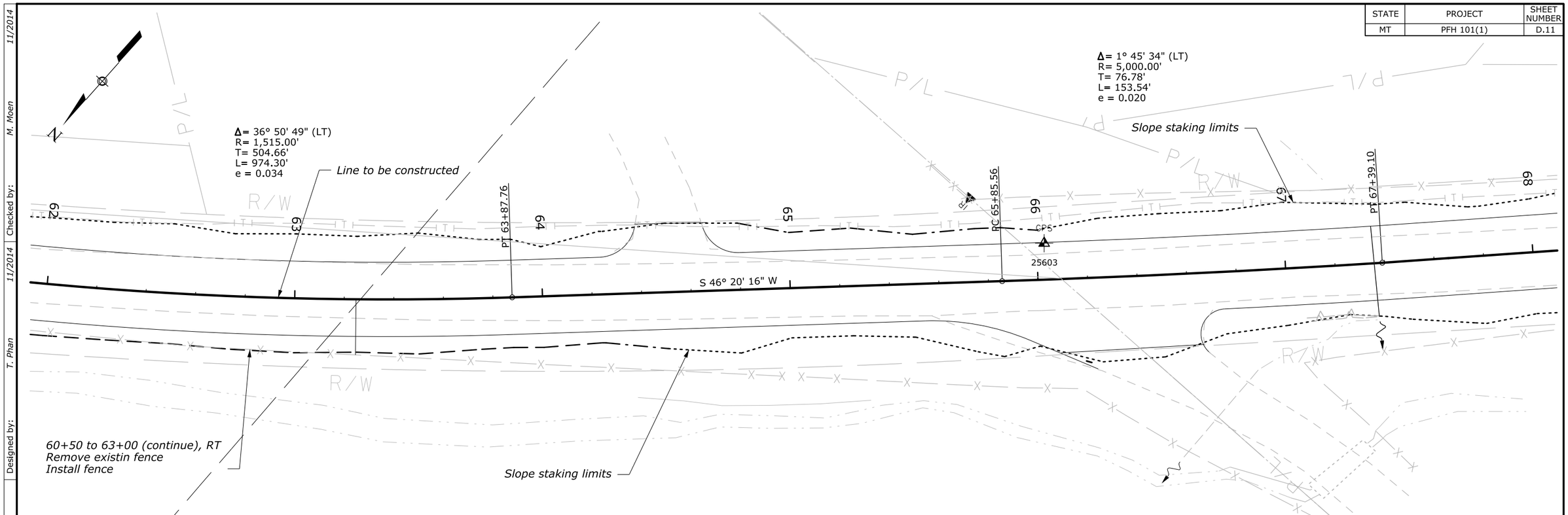

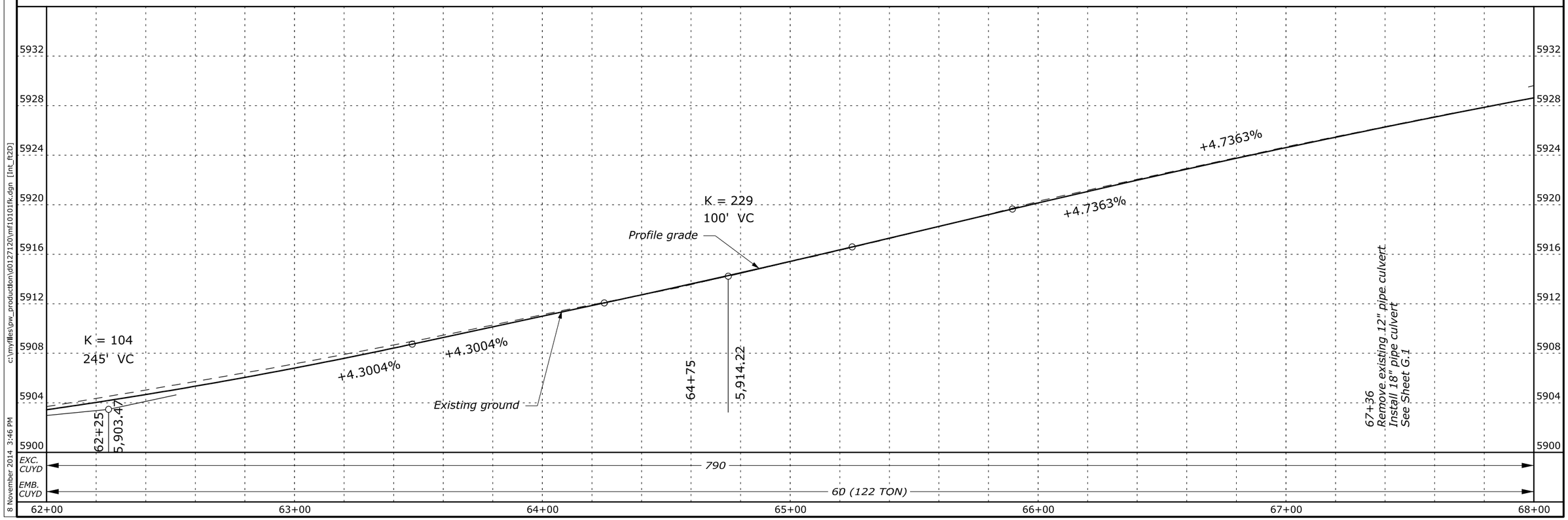

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STATE	PROJECT	SHEET NUMBER
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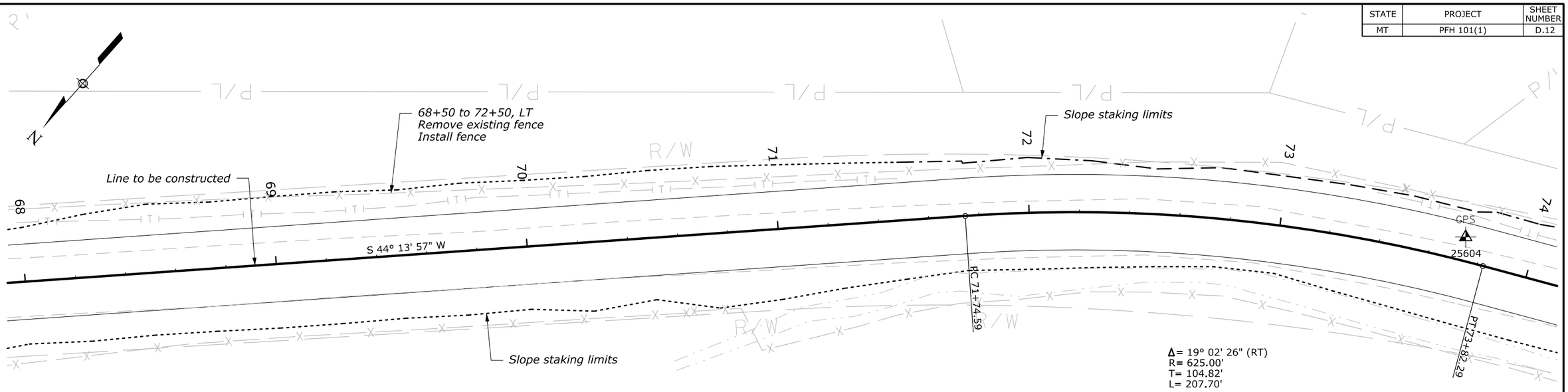
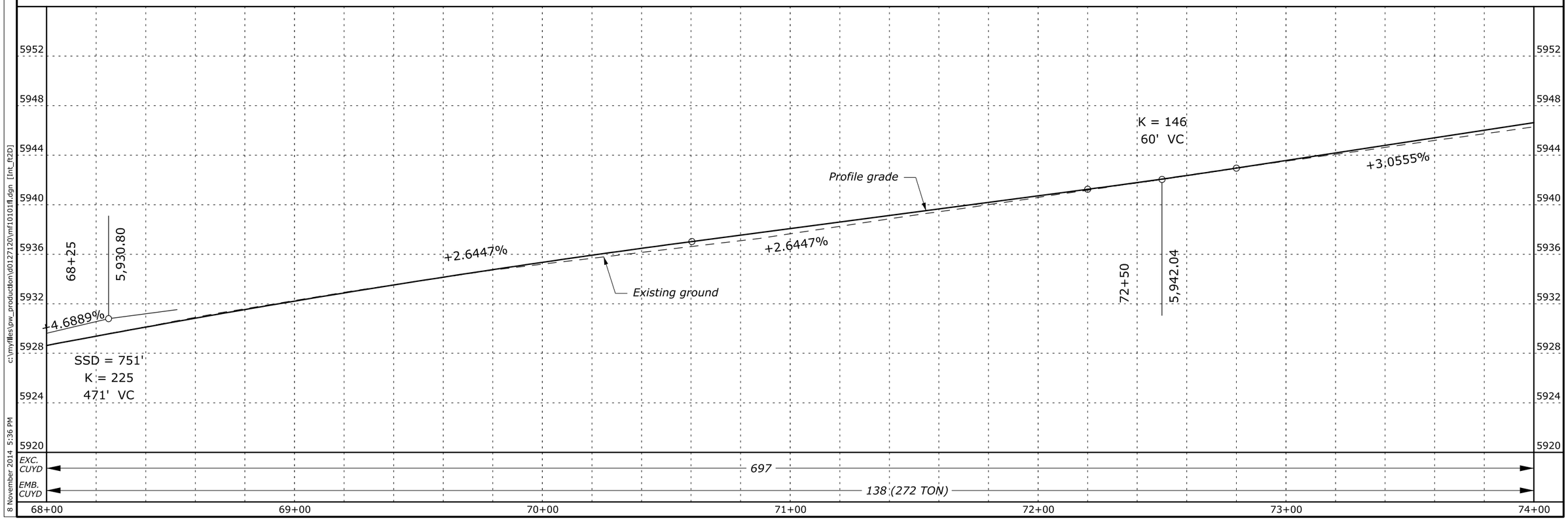


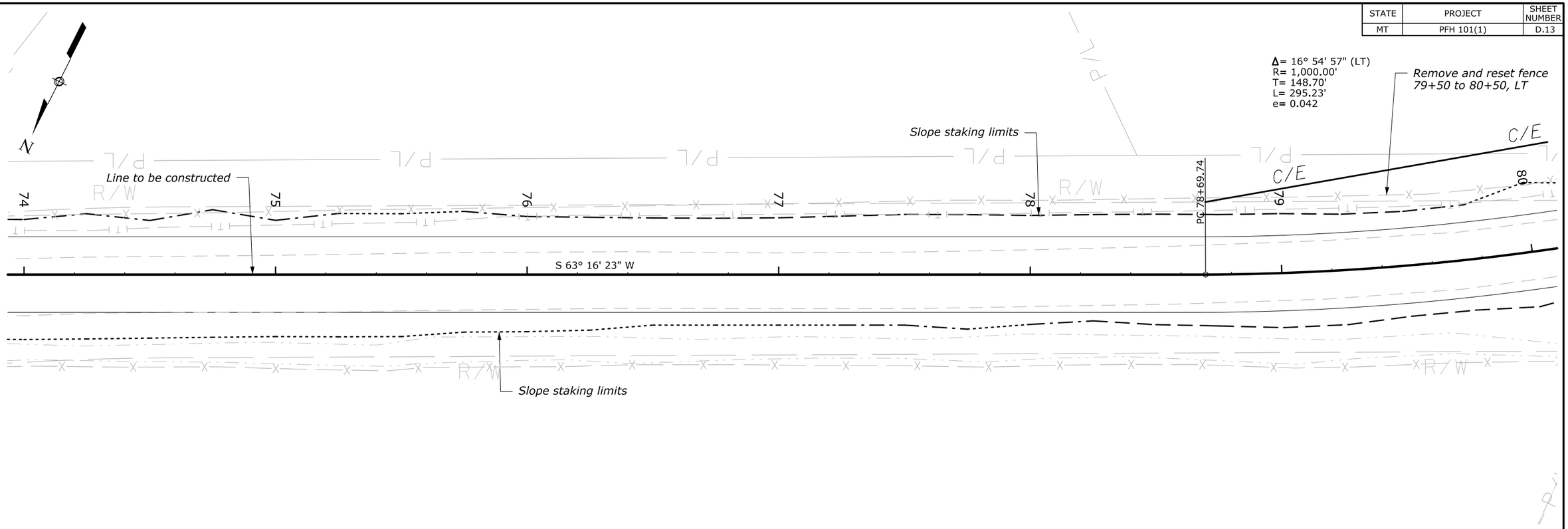


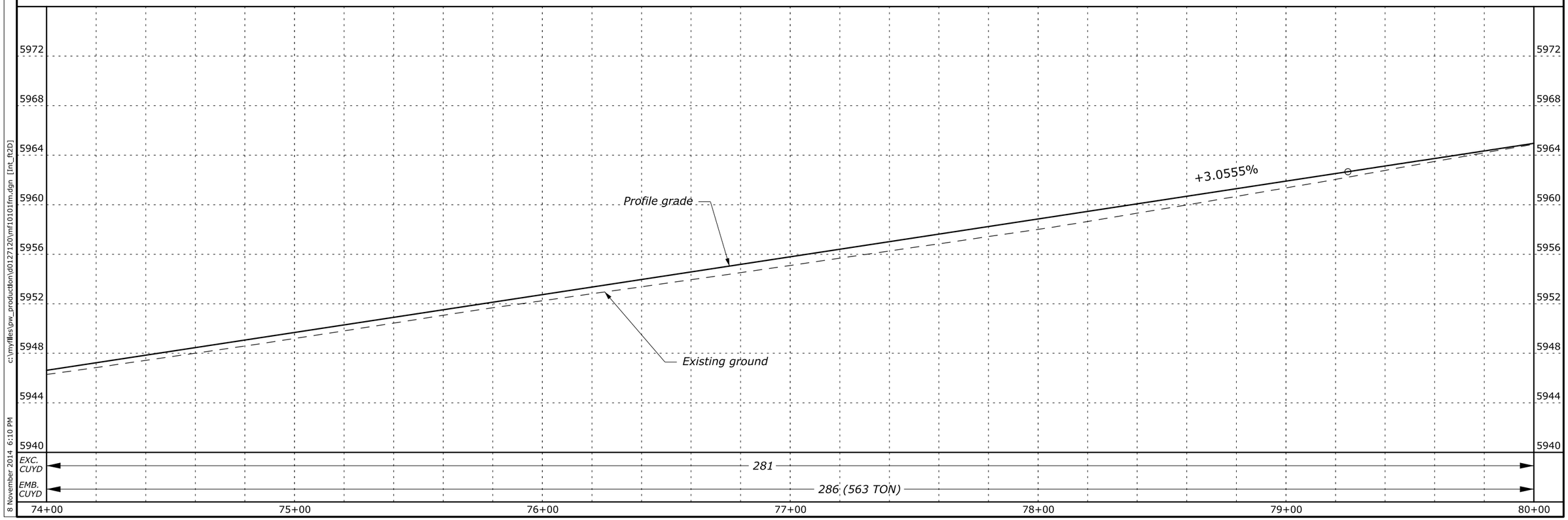
Designed by: T. Phan 11/2014 Checked by: M. Moen 11/2014

c:\myfiles\pw_production\d0127120\mf10101fl.dgn [Int_ft2D]

8 November 2014 5:36 PM

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	D.13



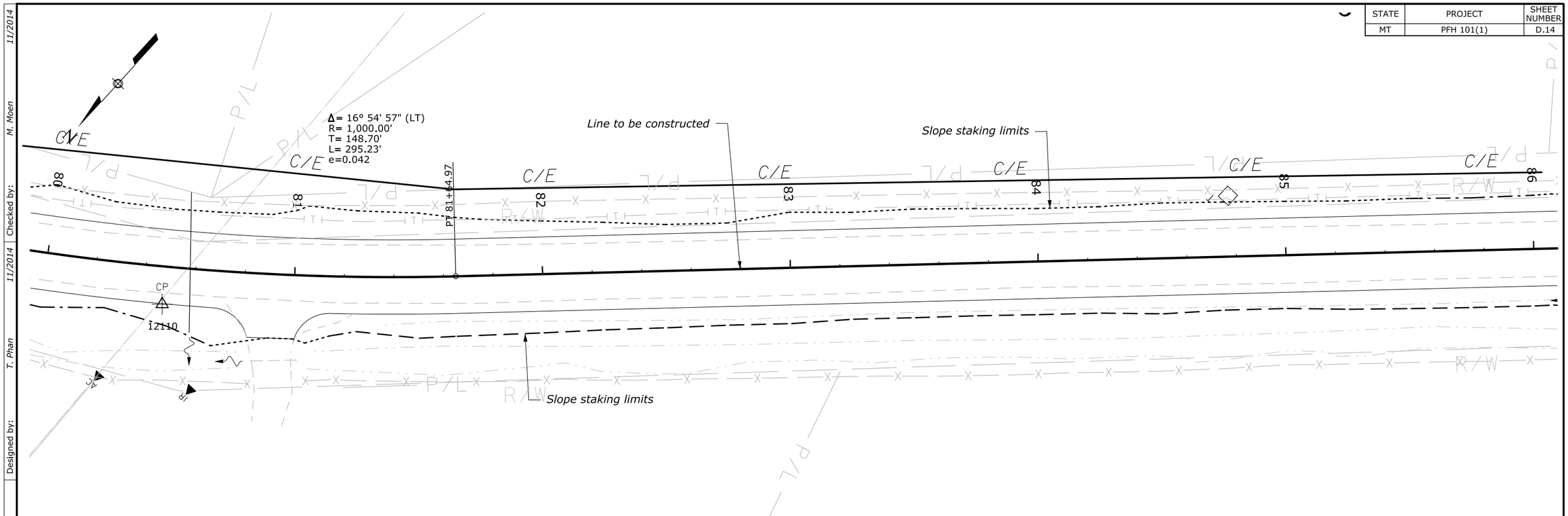


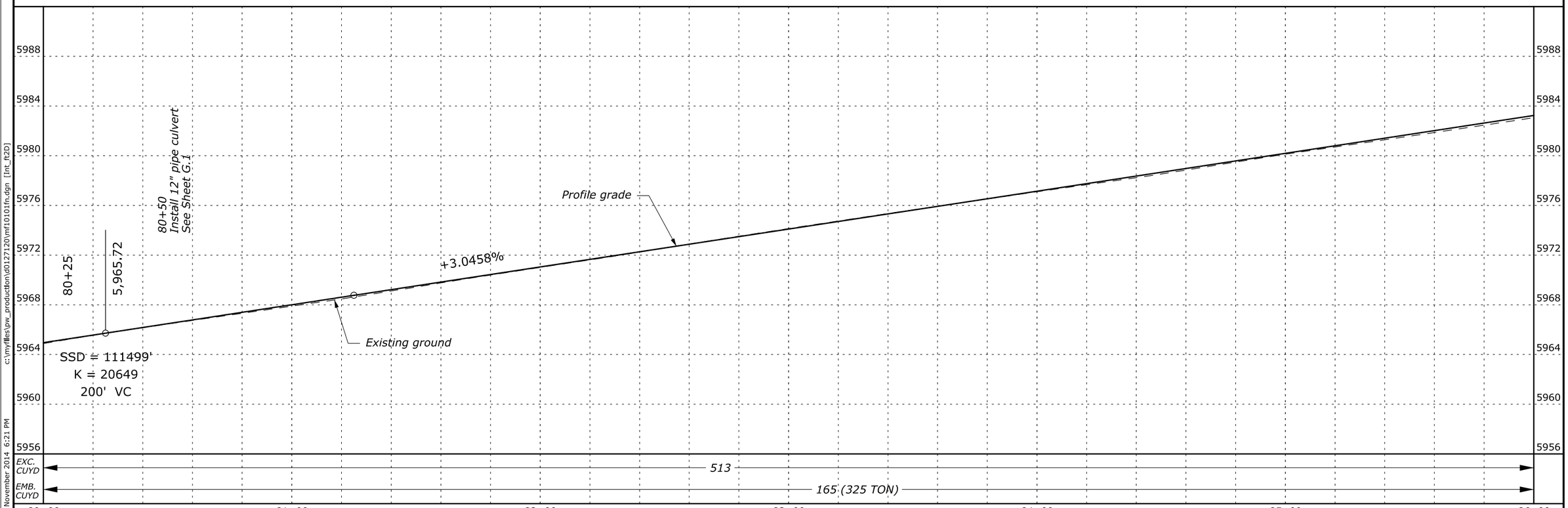
Designed by: T. Phan 07/2014 Checked by: M. Mowen 07/2014

c:\myfiles\pw_production\d0127120\mf10101fm.dgn [Int_ft2D]

8 November 2014 6:10 PM

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	D.14



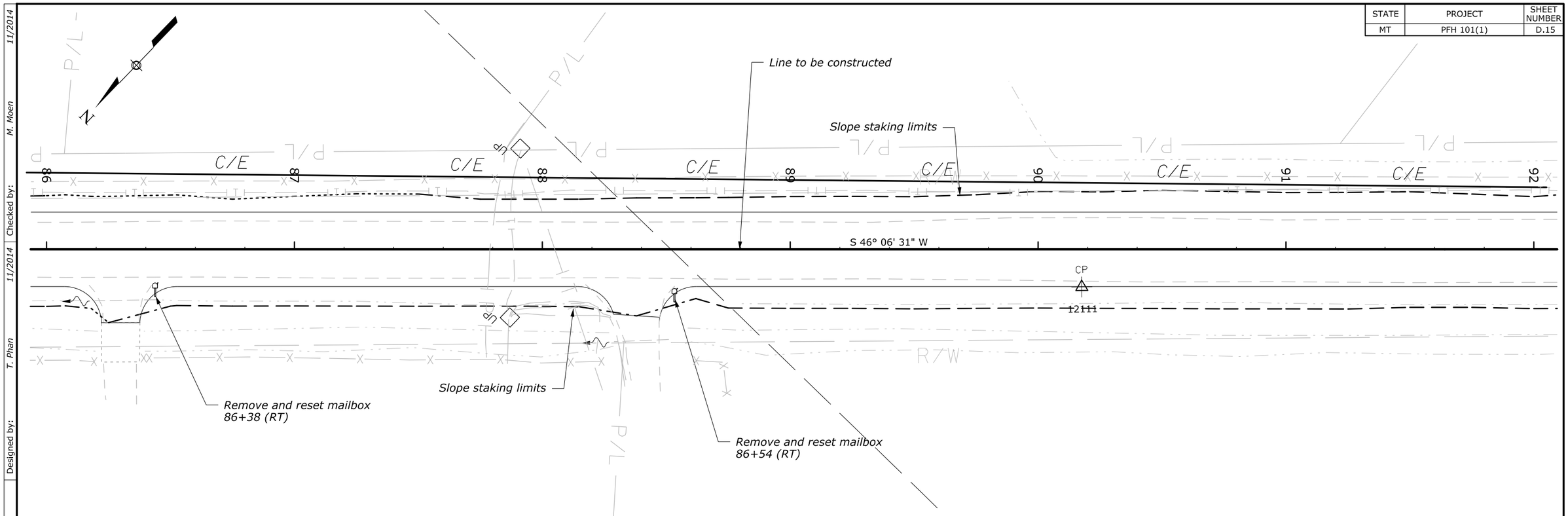


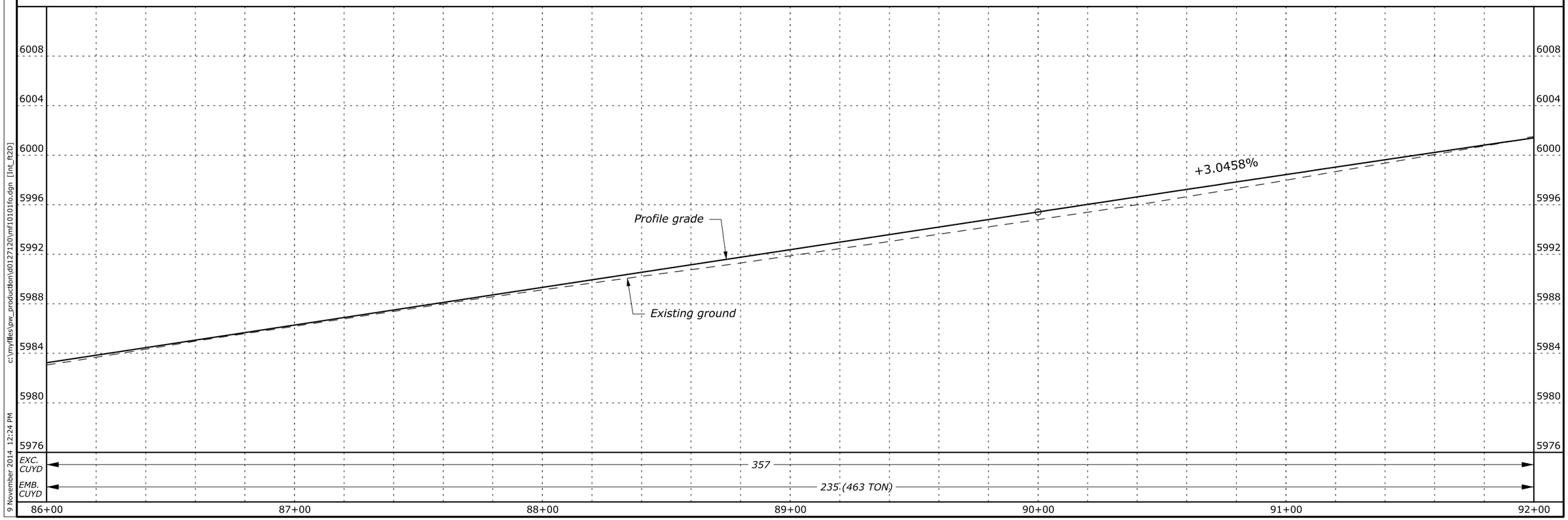
Designed by: T. Phan 11/2014 Checked by: M. Moen 11/2014

c:\myfiles\pw_production\d0127120\mf10101fn.dgn [Int_ft2D]

8 November 2014 6:21 PM

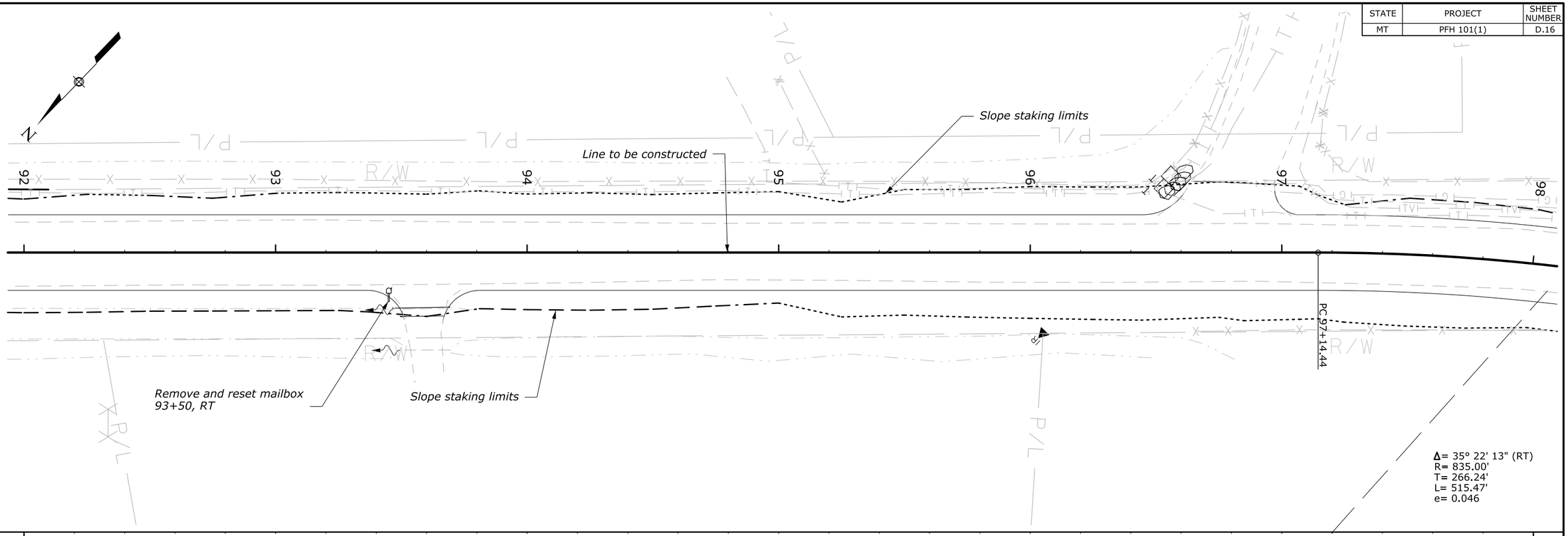
STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	D.15

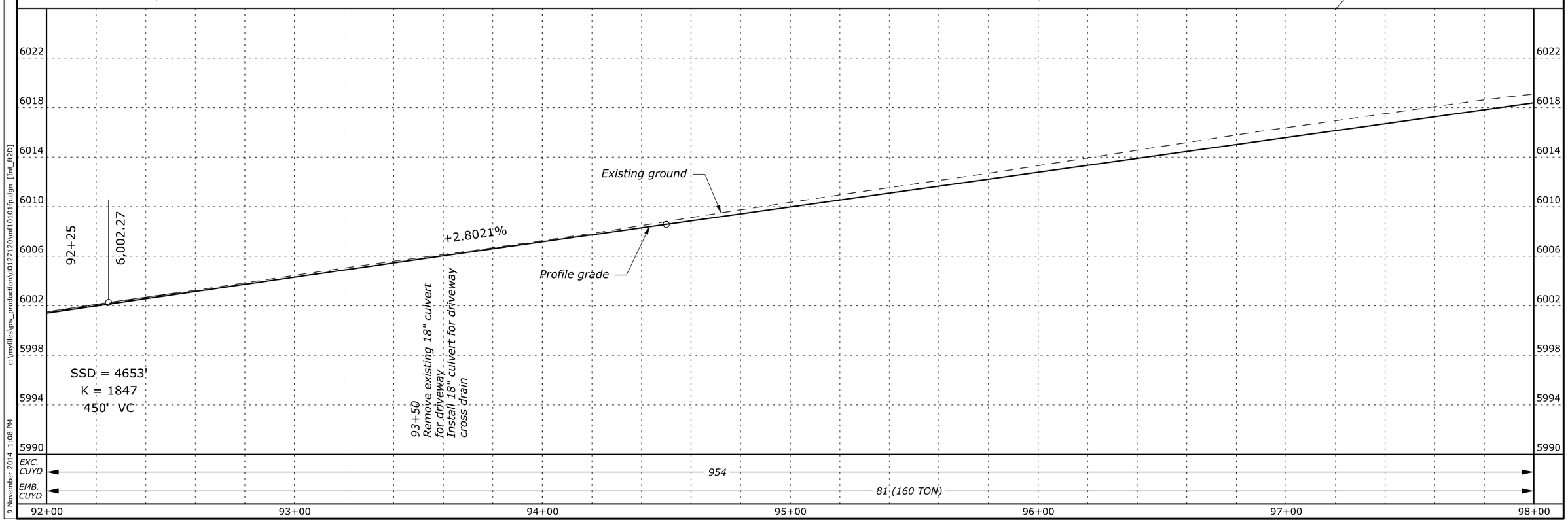




Designed by: T. Phan 11/2014
Checked by: M. Moen 11/2014
c:\myfiles\pw_production\d0127120\mf10101fo.dgn [Int_ft2D]
9 November 2014 12:24 PM

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	D.16





Designed by: T. Phan 11/2014 Checked by: M. Moen 11/2014

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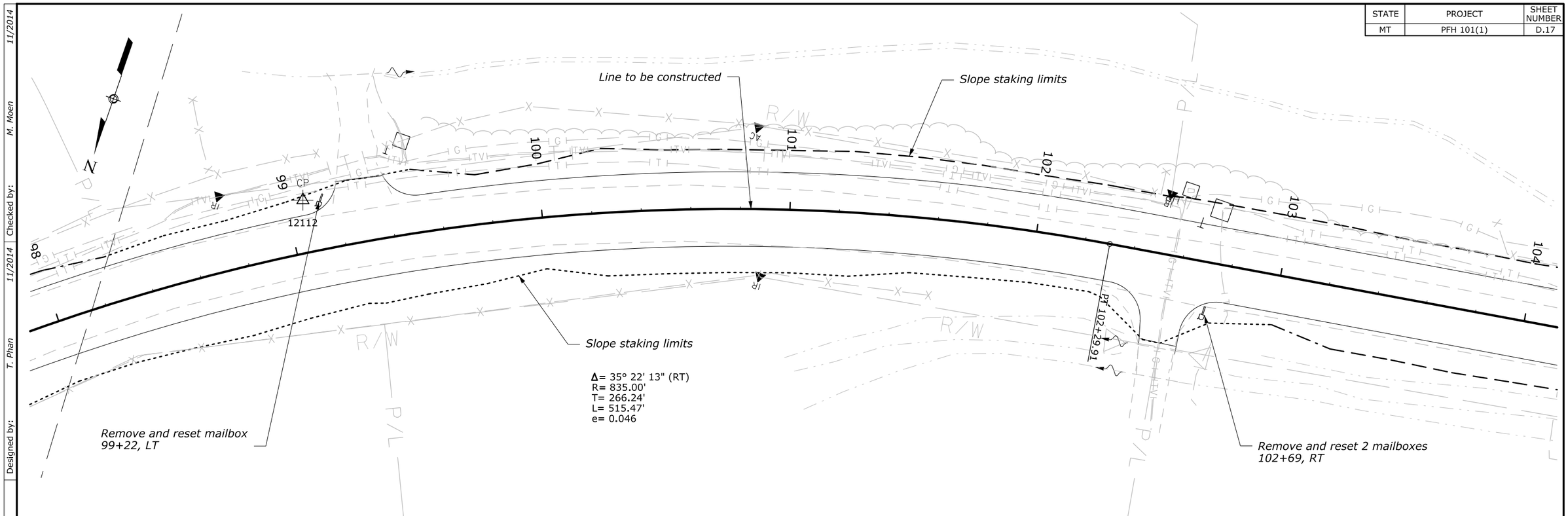
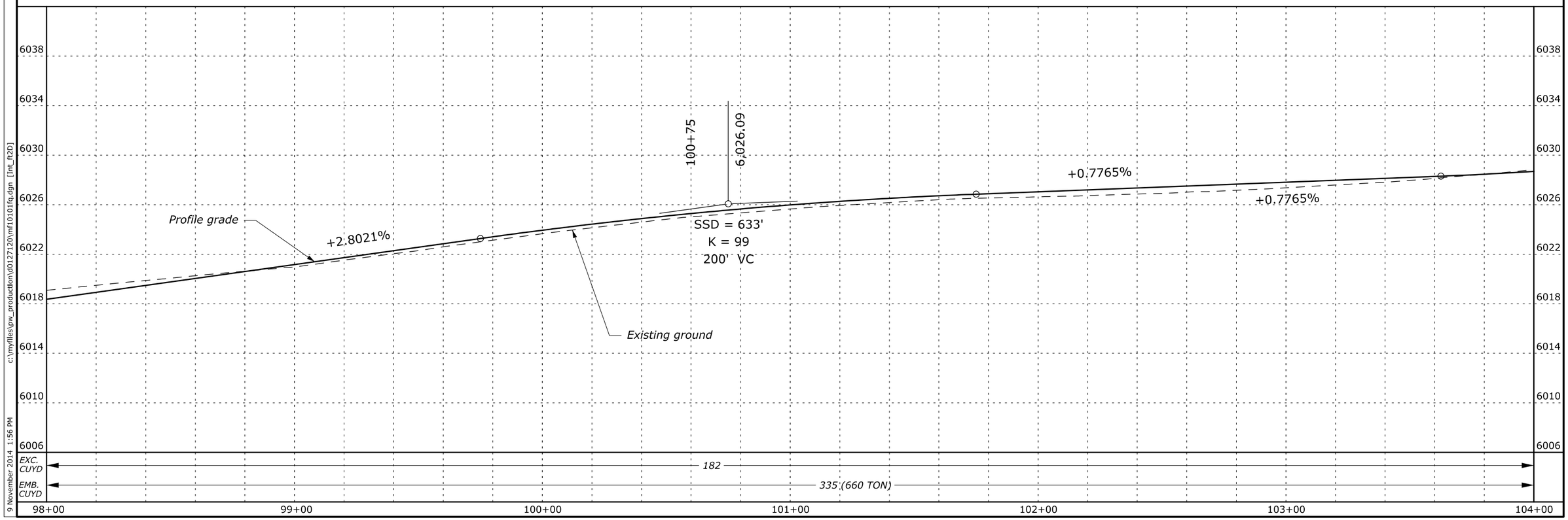
9 November 2014 1:08 PM

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	D.17





Designed by: T. Phan 11/2014 Checked by: M. Moen 11/2014

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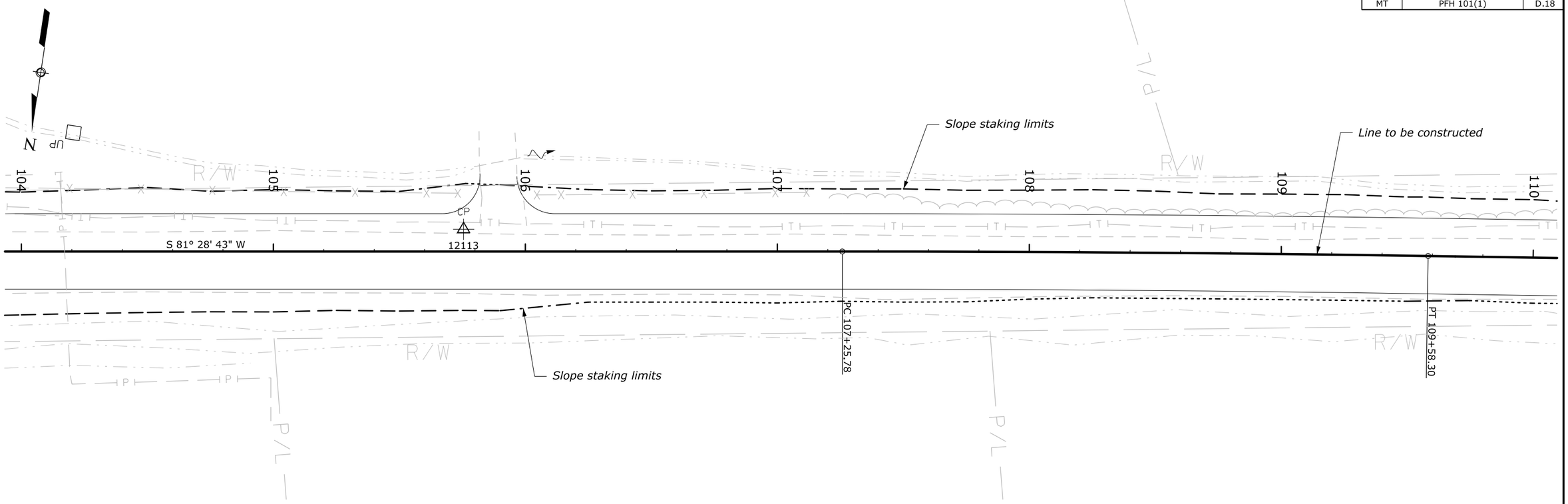
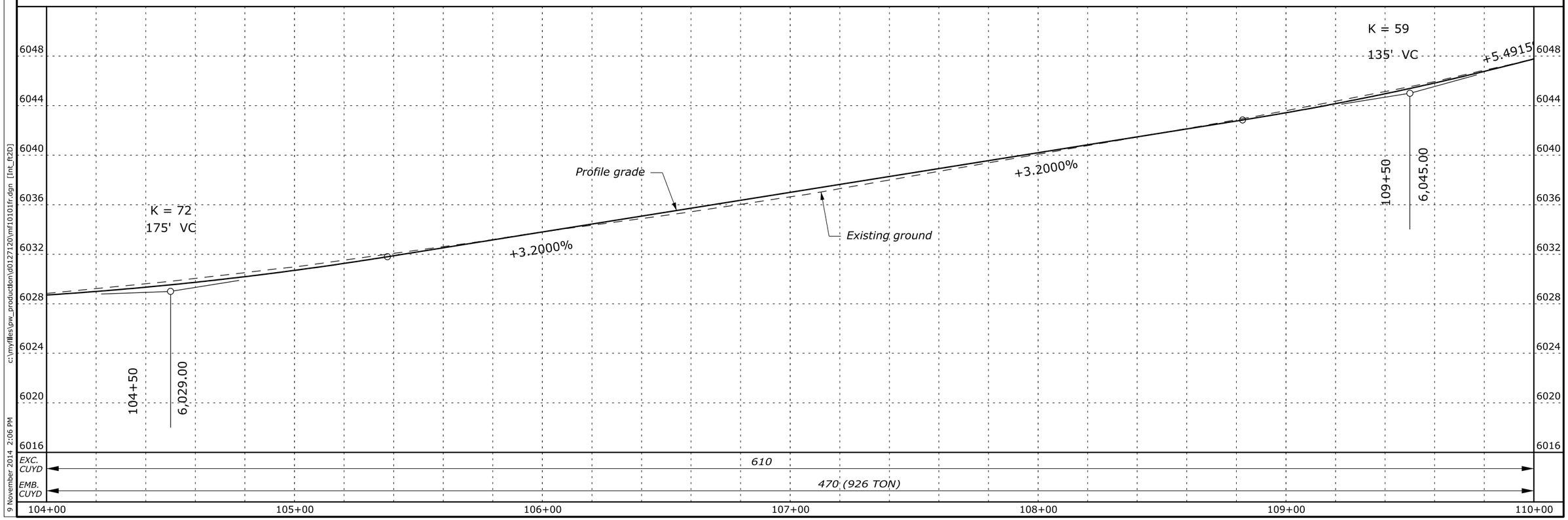
9 November 2014 1:56 PM

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	D.18



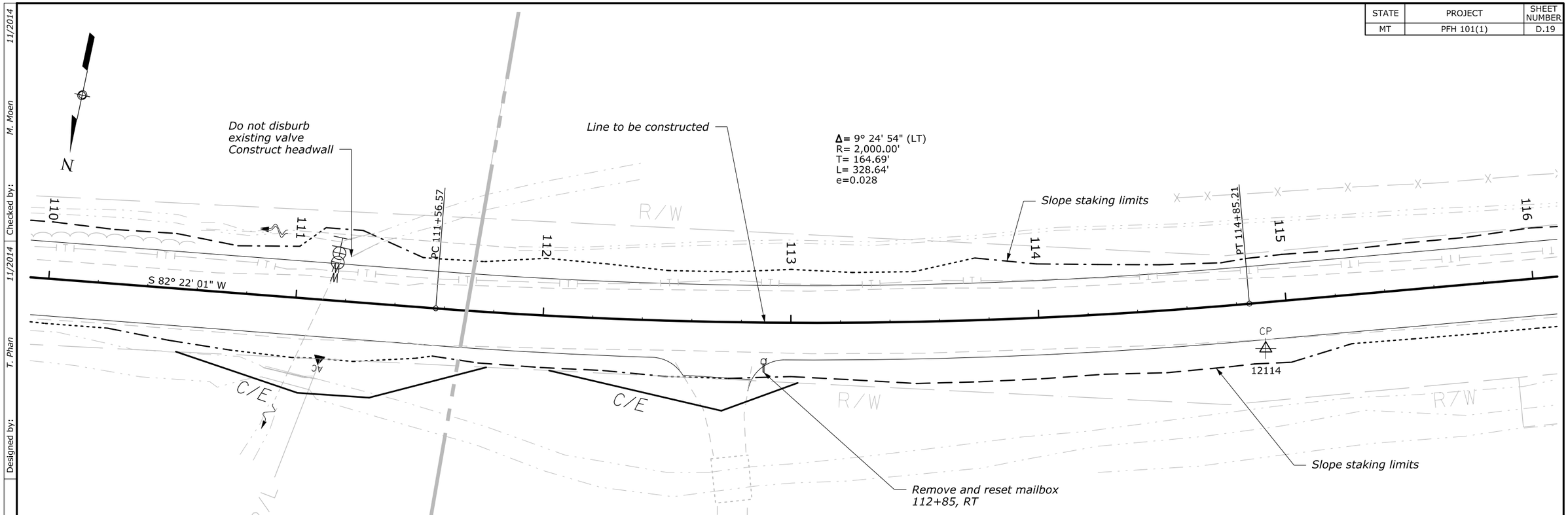


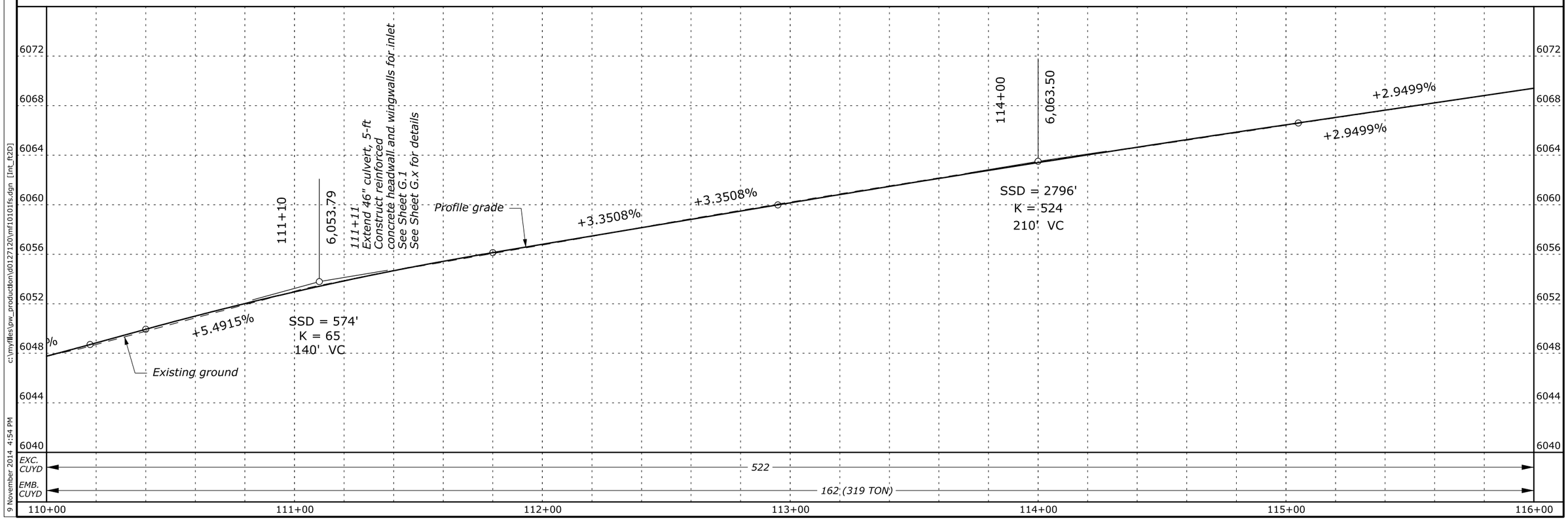
Designed by: T. Phan 11/2014 | Checked by: M. Moen 11/2014

c:\myfiles\pw_production\d0127120\mf10101fr.dgn [Int_ft2D]

9 November 2014 2:06 PM

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	D.19



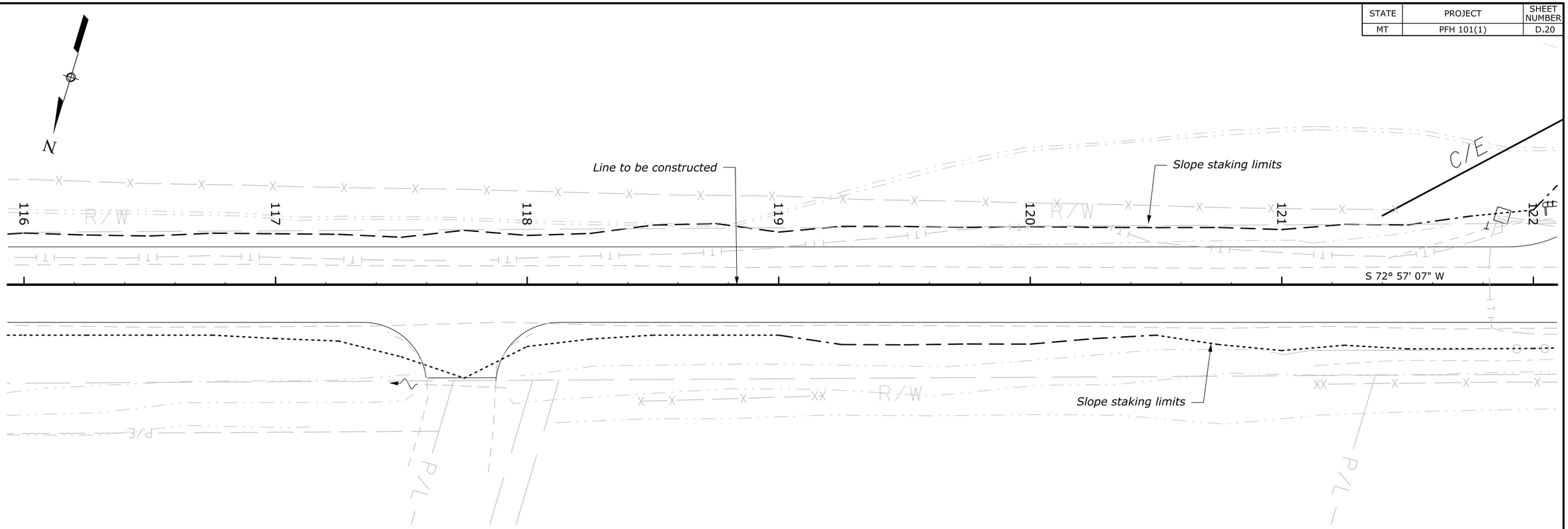


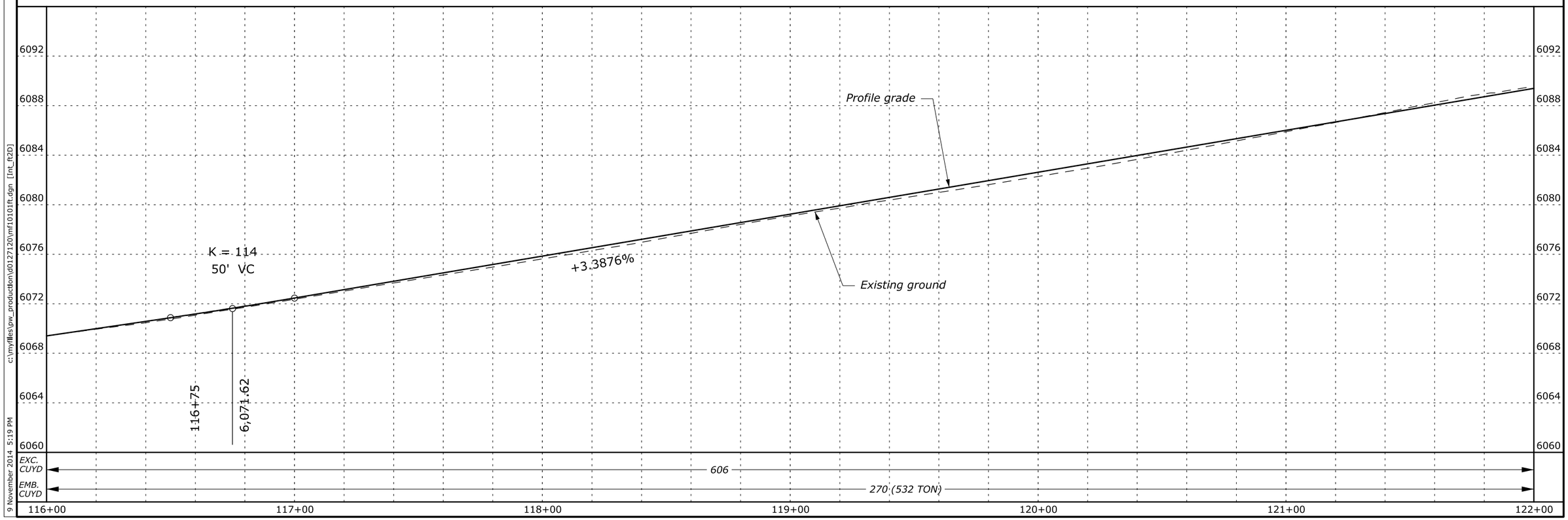
Designed by: T. Phan 11/2014 Checked by: 11/2014 M. Moen 11/2014

c:\myfiles\pw_production\d0127120\mf10101fs.dgn [Int_ft2D]

9 November 2014 4:54 PM

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	D.20





Designed by: T. Phan 11/2014
Checked by: M. Moen 11/2014
9 November 2014 5:19 PM c:\myfiles\pw_production\d0127120\mf10101ft.dgn [int_ft2D]

STATE	PROJECT	SHEET NUMBER
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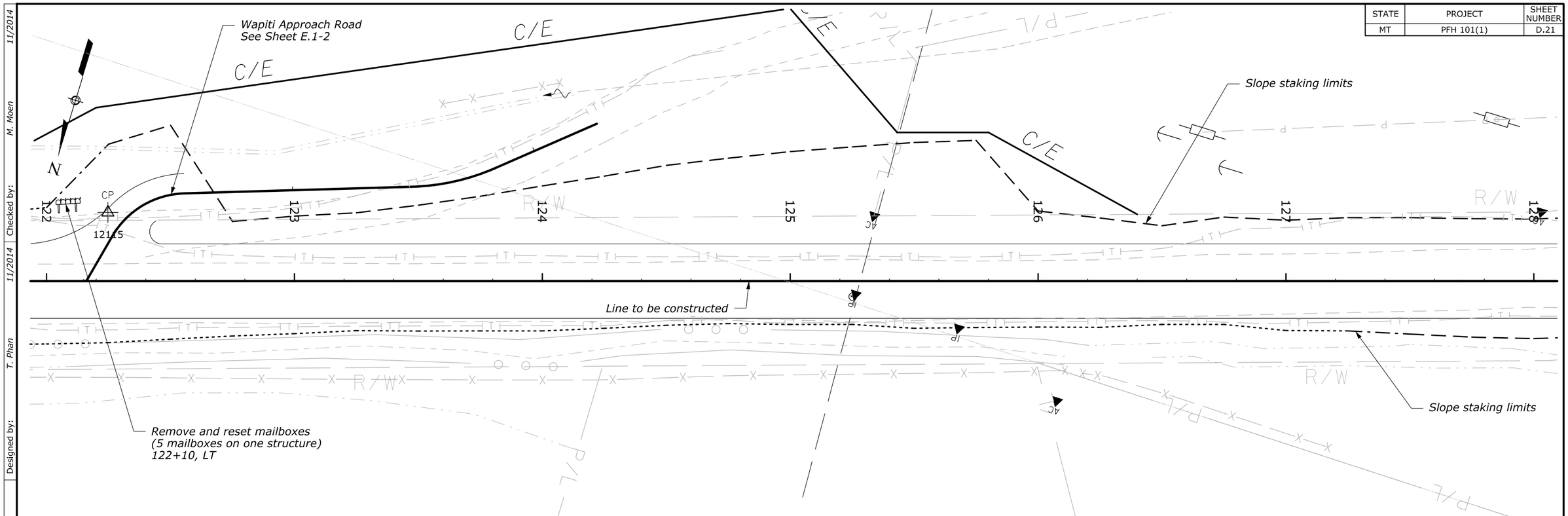

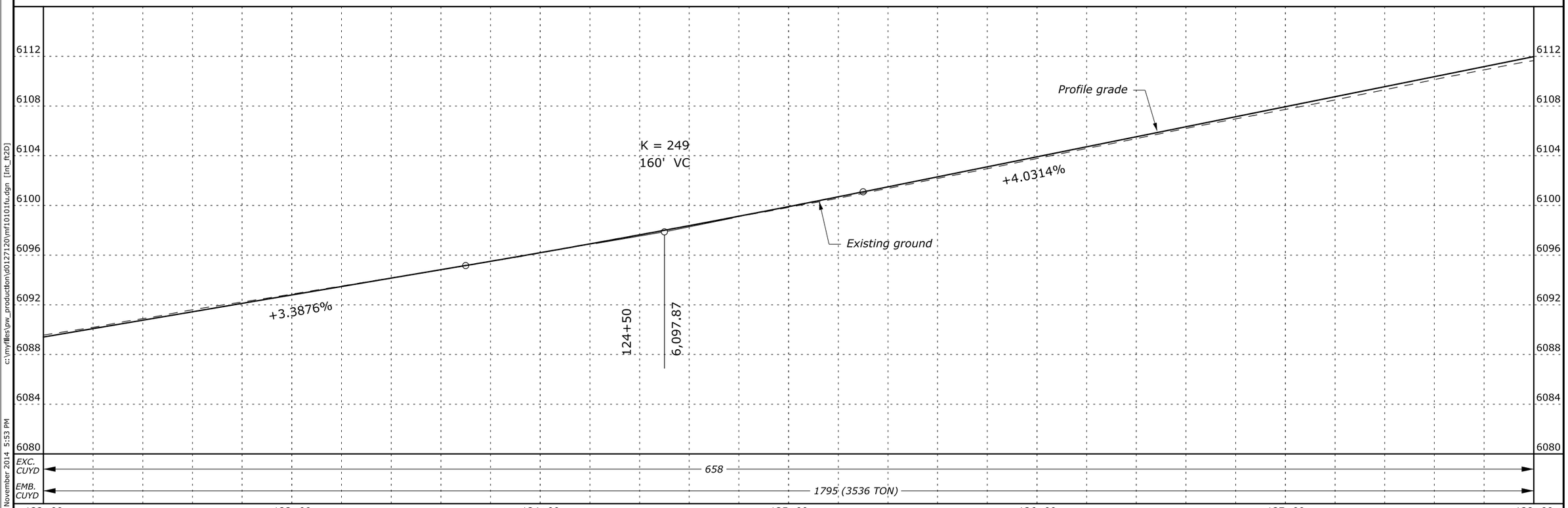

Designed by: T. Phan 11/2014 Checked by: M. Moen 11/2014

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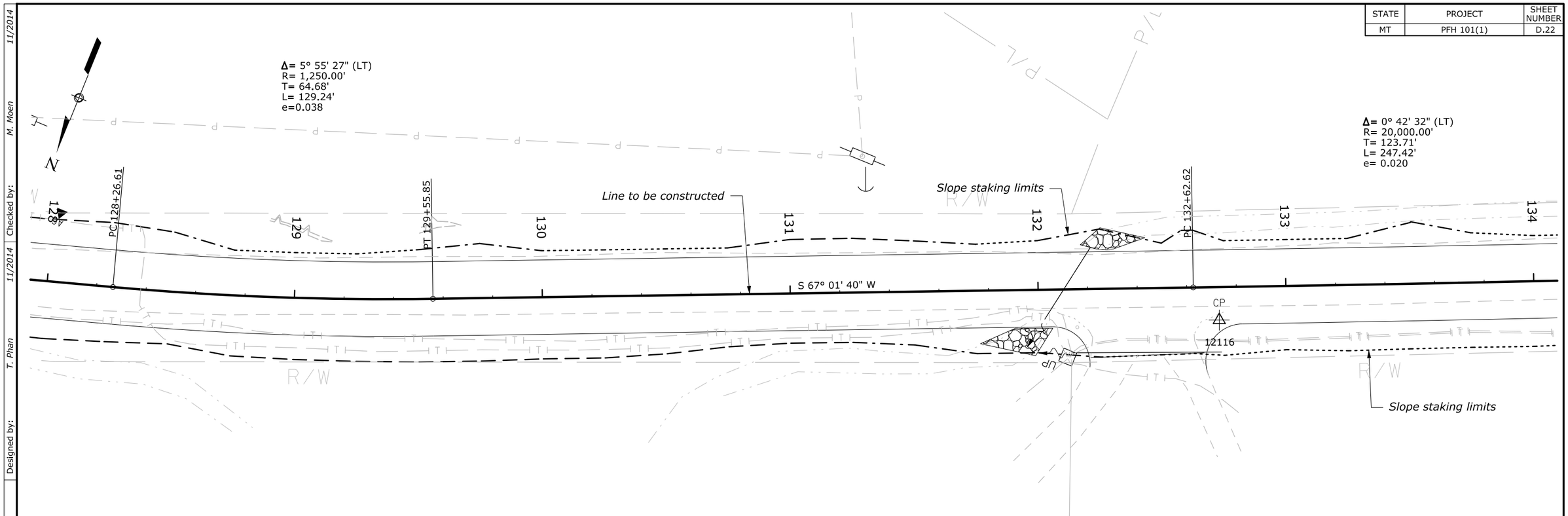
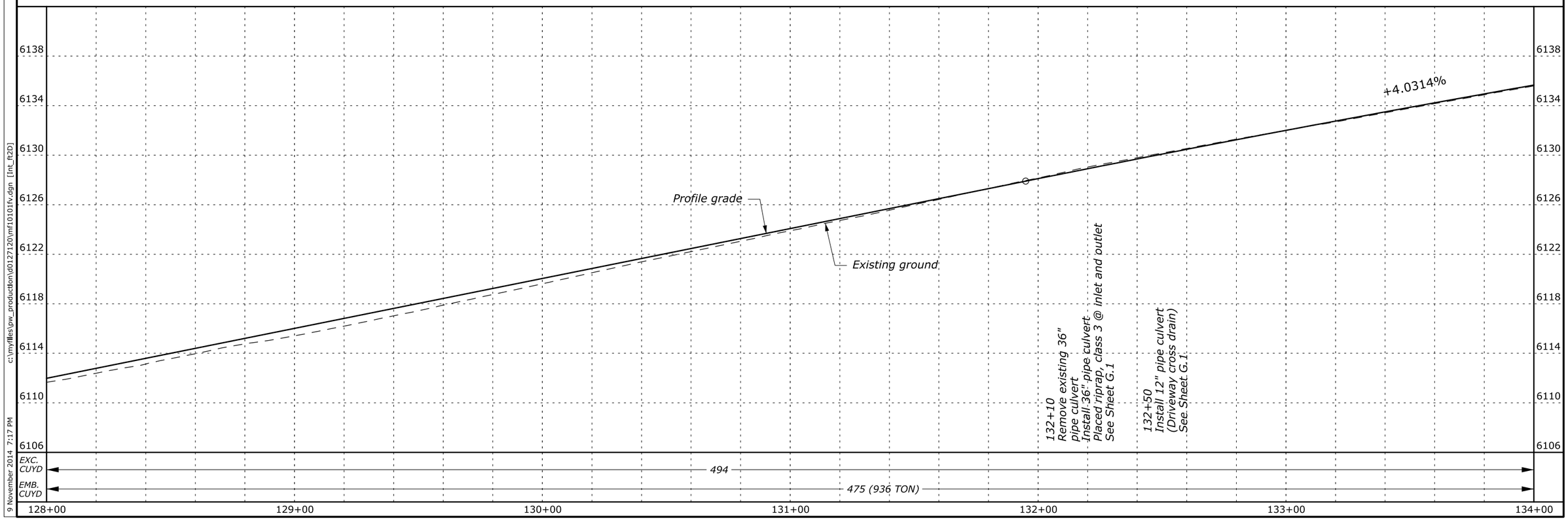
9 November 2014 5:53 PM

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	D.22



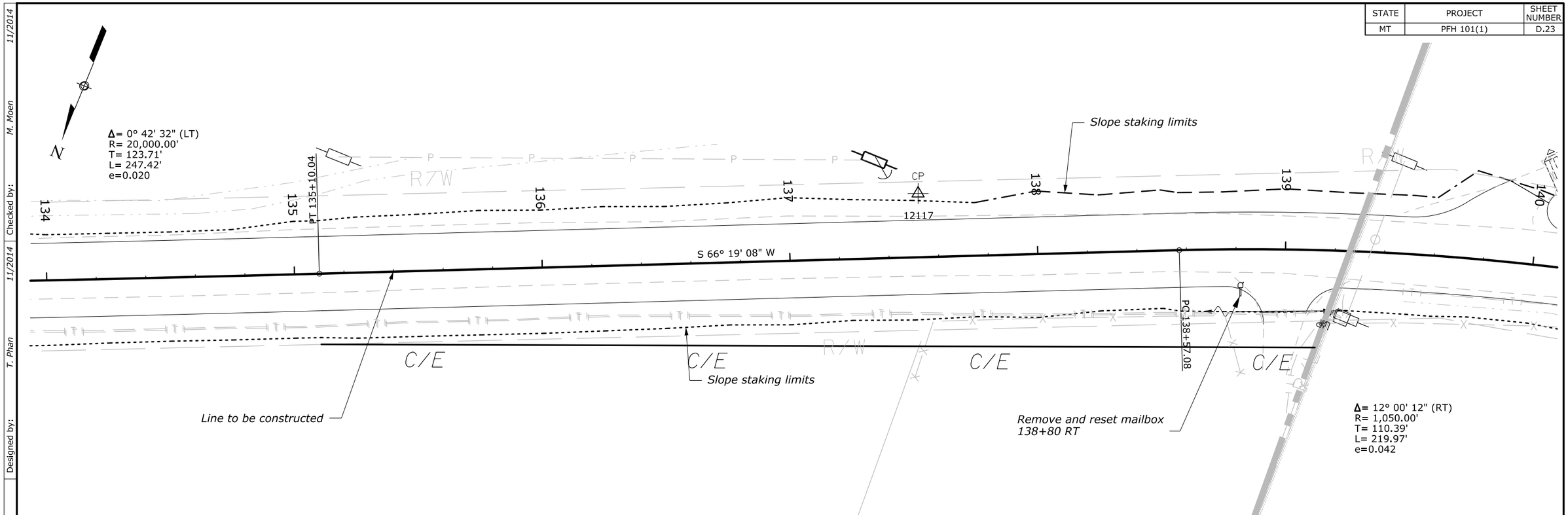


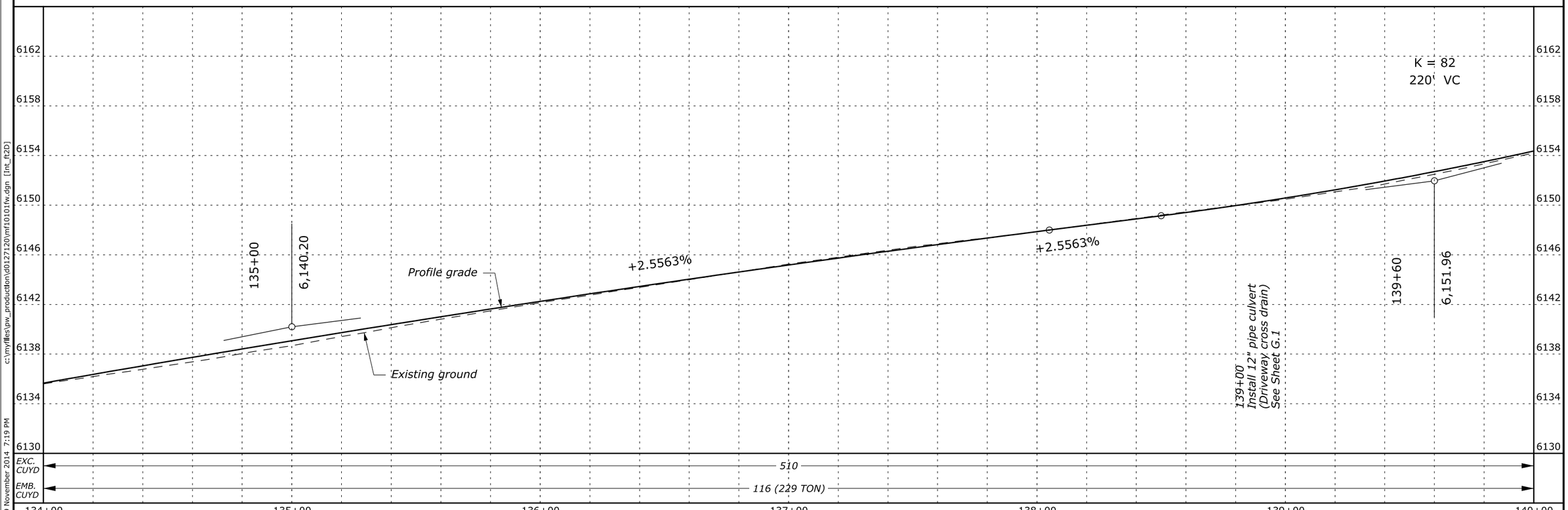
Designed by: T. Phan 11/2014 Checked by: M. Moen 11/2014

c:\myfiles\pw_production\d0127120\mf10101fv.dgn [Int_ft2D]

9 November 2014 7:17 PM

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	D.23





Designed by: T. Phan 11/2014 Checked by: M. Moen 11/2014

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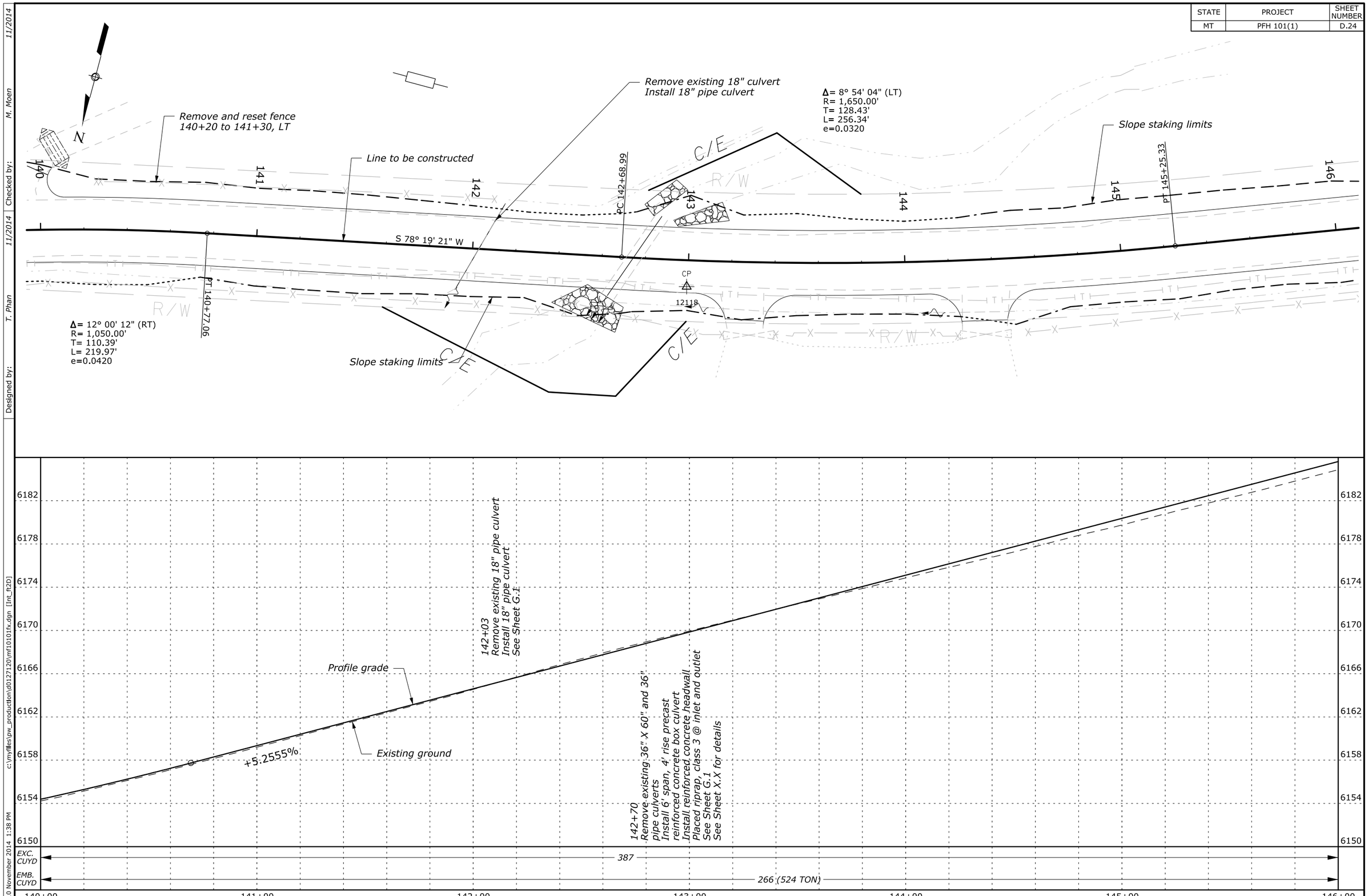
9 November 2014 7:19 PM

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	D.24



Designed by: T. Phan 11/2014 Checked by: M. Moen 11/2014

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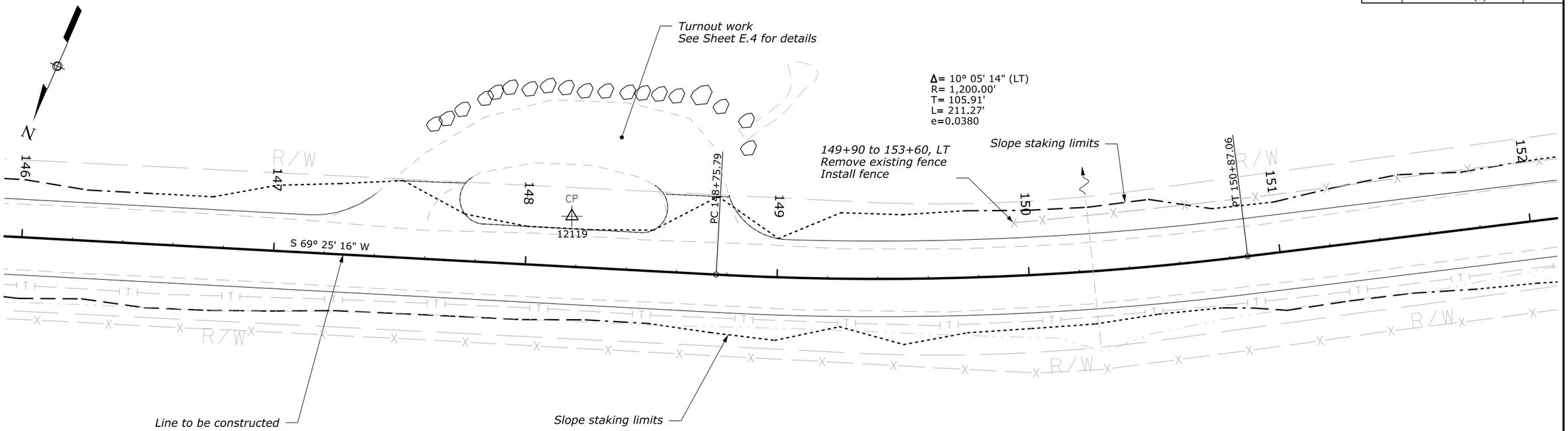
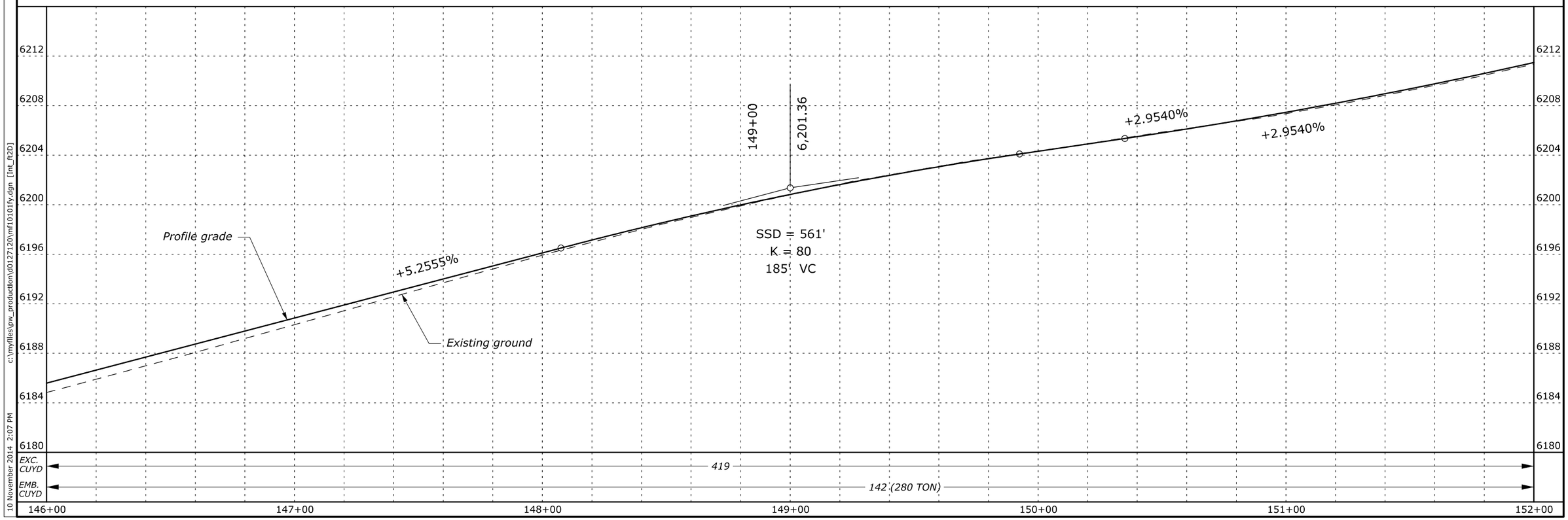
10 November 2014 1:38 PM

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	D.25





Designed by: T. Phan 11/2014 | Checked by: M. Moen 11/2014

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10 November 2014 2:07 PM

STATE	PROJECT	SHEET NUMBER
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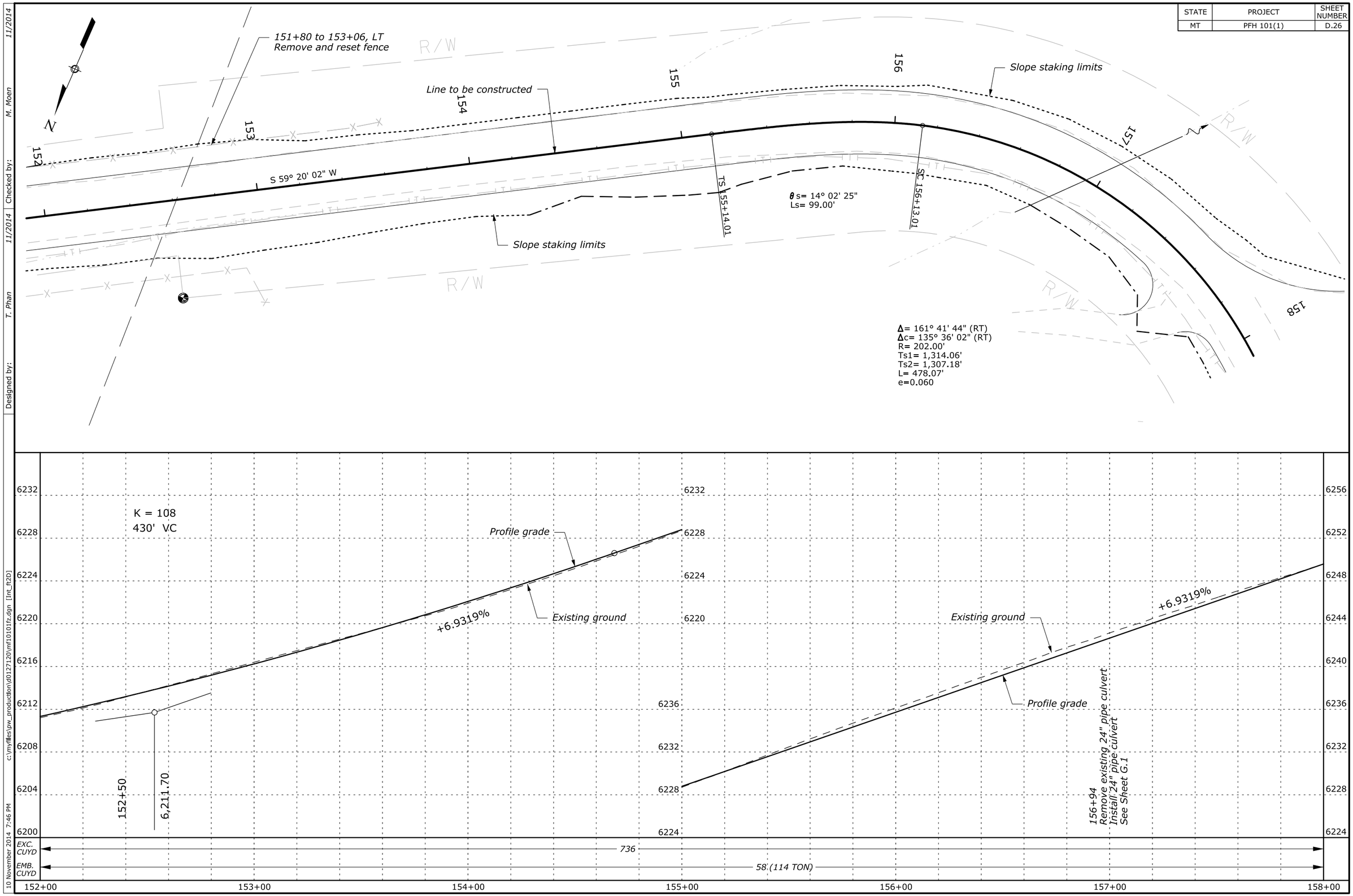

Designed by: T. Phan 11/2014 Checked by: M. Moen 11/2014

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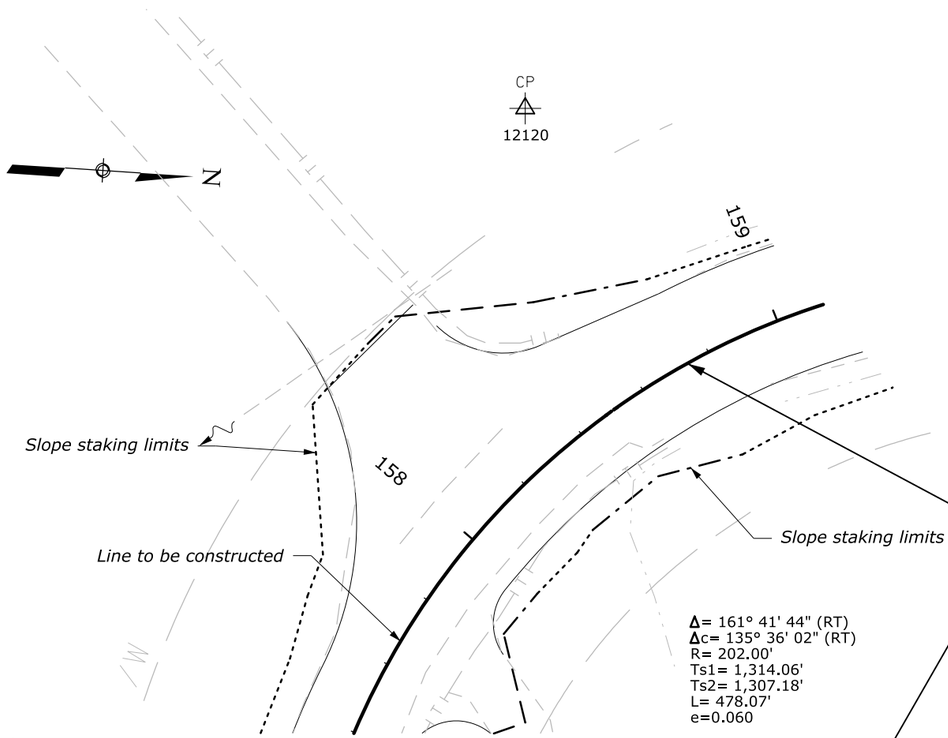
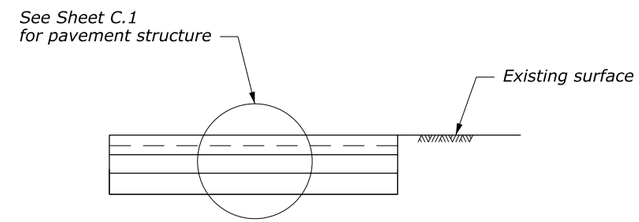
10 November 2014 7:46 PM

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	D.27



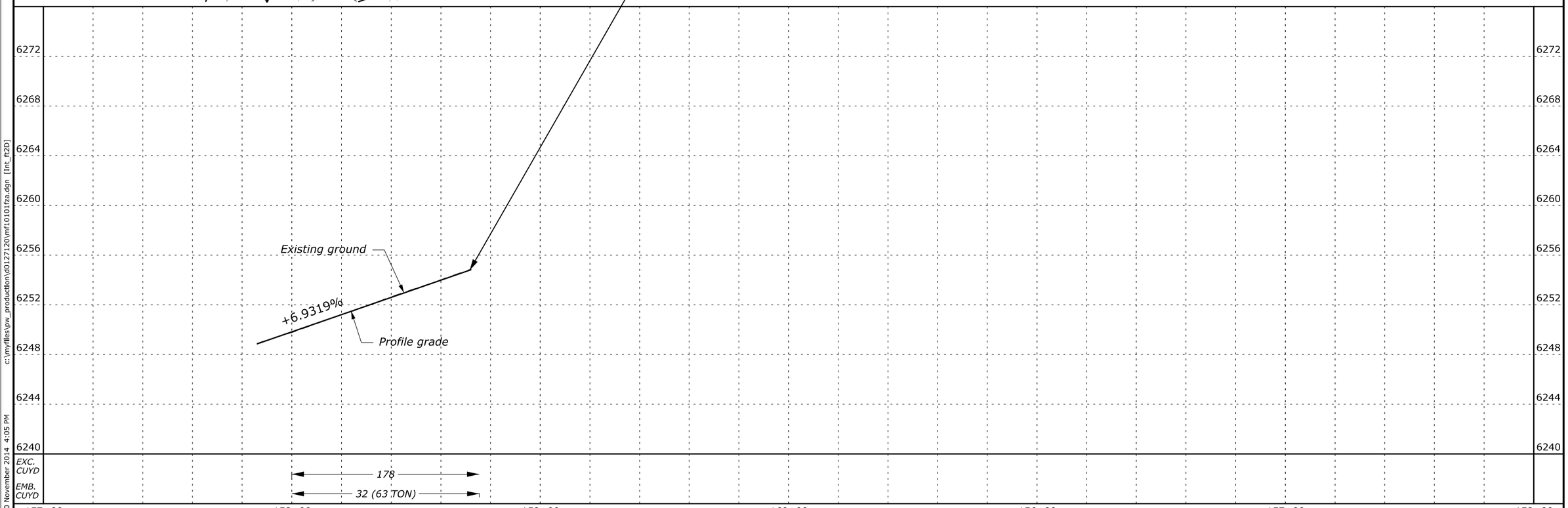


CONNECTION DETAIL

END PROJECT

MT PFH 101(1)
WEST FORK
ROCK CREEK ROAD
158+75.00

N= 330660.83
E= 2018146.12
El=6,255.071



Designed by: T. Phan 11/2014 Checked by: M. Moen 11/2014

c:\myfiles\pw_production\d0127120\mf10101fza.dgn [Int_ft2D]

10 November 2014 4:05 PM

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	D.28

PROJECT :West Fork Rock Creek
DATE OF FIELD WORK : Multiple Entries
DATE OF FINAL ADJUSTMENT : May 2012

GPK FILE DATED June 2012

PROJECT UNITS : International Foot
COORDINATE SYSTEM : Montana SPCS NAD83; CORS96
EPOCH DATE : 2002.0000
VERTICAL DATUM : NAVD88 based on Geoid 03

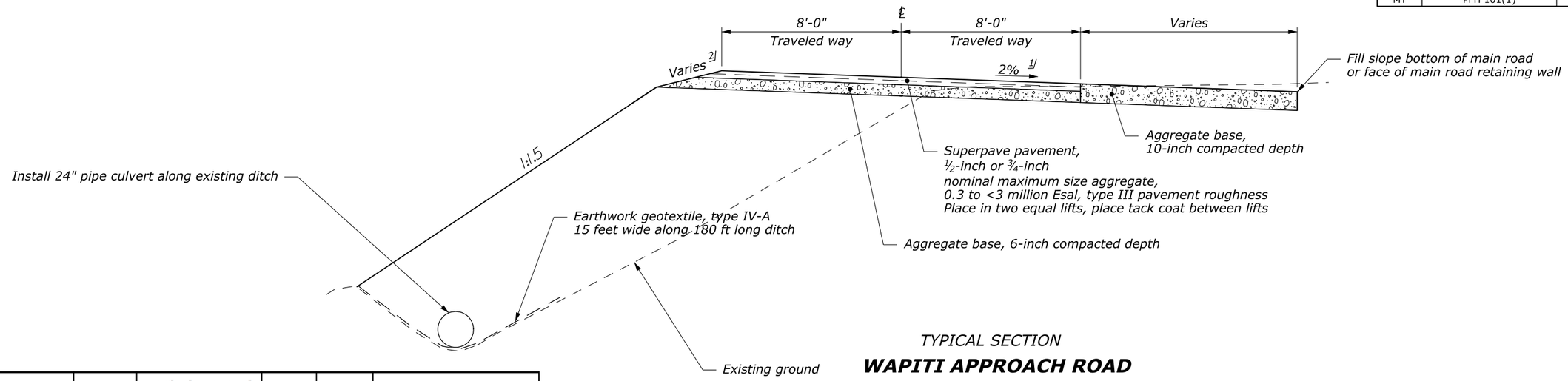
POINT NUMBER	PROJECT COORDINATES			GEO COORDINATES				DESCRIPTION
	NORTH	EAST	ELEVATION	LATITUDE	LONGITUDE	ELLIPSOID HEIGHT	COMBINED FACTOR	
12104	335743.425	2029571.782	5763.994	45°10'13.630526" N	109°15'47.527152" W	5728.6715	0.99962838	5/8" IR W/RPC
12110	333611.083	2025112.871	5965.697	45°09'52.703379" N	109°16'49.854120" W	5930.9011	0.99962193	5/8" IR W/RED PLASTIC CAP
12111	332942.637	2024408.055	5994.350	45°09'46.122328" N	109°16'59.717689" W	5959.6479	0.99962157	5/8" IR W/RED PLASTIC CAP
12112	332314.256	2023774.676	6020.951	45°09'39.934722" N	109°17'08.582033" W	5986.3349	0.99962124	5/8" IR W/RED PLASTIC CAP
12113	332164.652	2023120.786	6032.294	45°09'38.475049" N	109°17'17.714026" W	5997.7559	0.99962092	5/8" IR W/RED PLASTIC CAP
12114	332038.247	2022213.230	6065.303	45°09'37.250915" N	109°17'30.385392" W	6030.8709	0.99961953	5/8" IR W/RED PLASTIC CAP
12115	331778.618	2021524.576	6089.040	45°09'34.705227" N	109°17'40.006325" W	6054.6926	0.99961878	5/8" IR W/RED PLASTIC CAP
12116	331472.970	2020522.469	6130.161	45°09'31.712895" N	109°17'54.003362" W	6095.9359	0.99961728	5/8" IR W/RED PLASTIC CAP
12117	331245.836	2020098.369	6143.693	45°09'29.480849" N	109°17'59.930383" W	6109.5126	0.99961697	5/8" IR W/RED PLASTIC CAP
12118	331127.262	2019562.396	6169.493	45°09'28.323461" N	109°18'07.414756" W	6135.3792	0.99961591	5/8" IR W/RED PLASTIC CAP
12119	330929.320	2019082.541	6196.182	45°09'26.380845" N	109°18'14.118626" W	6162.1308	0.99961494	5/8" IR W/RED PLASTIC CAP
12120	330612.670	2018082.400	6253.618	45°09'23.278633" N	109°18'28.087507" W	6219.6981	0.99961267	5/8" IR W/RED PLASTIC CAP
12606	333056.285	2019132.483	6379.085	45°09'47.381872" N	109°18'13.347241" W	6344.9879	0.99960298	5/8" IR W/RED PLASTIC CAP
25101	336198.993	2031195.646	5672.994	45°10'18.079825" N	109°15'24.839328" W	5637.4904	0.99963206	1/2" IR W/YPC
25102	336060.322	2030484.577	5715.387	45°10'16.732213" N	109°15'34.771551" W	5679.9628	0.99963023	5/8" IR W/RPC
25103	336008.054	2030056.577	5743.351	45°10'16.229026" N	109°15'40.748471" W	5707.973	0.99962897	1/2" IR W/YPC
25105	335432.002	2028849.178	5805.145	45°10'10.576883" N	109°15'57.627225" W	5769.9052	0.99962688	5/8" IR W/RPC
25106	335248.610	2028269.402	5830.806	45°10'08.783034" N	109°16'05.727975" W	5795.6318	0.99962593	5/8" IR W/RPC
25107	335049.776	2027763.751	5854.398	45°10'06.834396" N	109°16'12.794509" W	5819.2822	0.9996251	1/2" IR W/YPC
25108	334997.990	2027195.531	5876.157	45°10'06.339427" N	109°16'20.728326" W	5841.1042	0.99962413	5/8" IR W/RPC
25109	334864.056	2026780.974	5895.187	45°10'05.028773" N	109°16'26.520458" W	5860.1821	0.99962342	5/8" IR W/RPC
25601	335589.047	2030895.666	5687.545	45°10'12.066201" N	109°15'29.053247" W	5652.0804	0.99963228	FND Brass CAP
25602	336160.381	2031483.874	5666.412	45°10'17.689705" N	109°15'20.817443" W	5630.8785	0.99963243	5/8" IR W/ORANGE PLASTIC CAP
25603	334431.892	2026285.599	5919.745	45°10'00.775506" N	109°16'33.452534" W	5884.8014	0.9996229	5/8" IR W/ORANGE PLASTIC CAP
25604	333907.990	2025720.202	5944.583	45°09'55.618231" N	109°16'41.365318" W	5909.7129	0.9996225	5/8" IR W/ORANGE PLASTIC CAP
25605	332003.617	2019095.945	6327.506	45°09'36.988424" N	109°18'13.894014" W	6293.4378	0.99960704	5/8" IR W/ORANGE PLASTIC CAP

Note: To precisely check distances between points as measured on the ground, inverse the state plane coordinates and divide the computed distance by a mean combined factor of the two points.

SURVEY CONTROL

--/---- Goble
--/---- Checked by:
--/---- Davies
Designed by:
19-Nov-2014 4:37 PM
c:\myfiles\pw_production\d0127120\[WestForkRockCreek_ControlSheet.xlsx]Sheet

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	E.1



TYPICAL SECTION

WAPITI APPROACH ROAD

500+15 to 502+20

MAINLINE STATION	SIDE		ROAD WIDTH (FT)	APROACH RADIUS (FT)		TYPE	L (FT)	NOTES
	LT	RT		R1	R2			
11+06		X	24	50	40	1	50	
13+25	X		18	15	15	1	10	
13+78		X	18	15	15	1	15	
15+26		X	12	15	15	1	10	
17+15		X	23	20	20	1	10	
53+56	X		12	10	20	1	25	Remove and reset gate
59+11	X		12	15	15	1	20	
61+20	X		18	15	15	1	12	
64+49	X		20	15	15	1	12	
66+25		X	22	100	10	1	50	
80+89		X	16	15	15	1	15	
86+27		X	15	15	15	1	15	
88+34		X	16	15	15	1	15	
93+57		X	13	15	15	1	15	
96+78	X		28	25	10	1	14	
99+27	X		18	15	15	1	15	
102+54		X	15	20	20	1	24	
105+89	X		15	15	15	1	15	
112+67		X	15	15	15	1	10	
117+73		X	26	20	20	1	15	
121+95	X		18	80	3	1	210	wapiti road
132+38		X	43	15	15	1	15	Two driveways merges
138+98		X	14	15	20	1	15	
139+82	X		14	35	10	1	25	Access gate to remain
147+42	X		17	50	8	1	10	Viewing area access
148+68	X		17	15	25	1	10	Viewing area access
157+70		X	15	15	25	1	35	
158+06	X		26	100	25	1	20	

ROAD APPROACH QUANTITIES

ITEM	DESCRIPTION	UNIT	QUANTITY	EST. VALUE
20103-0000	CLEARING AND GRUBBING	ACRE	0.5	
20401-0000	ROADWAY EXCAVATION	CUYD	160	
20411+0000	SELECT BORROW (ROADWAY EMBANKMENT) 3/	TON	1510	1.97 TON/CUYD
20701-1200	EARTHWORK GEOTEXTILE, TYPE IV-A 3/	SQYD	300	
30101-2000	AGGREGATE BASE GRADING D	TON	800	
40101-5600	SUPERPAVE PAVEMENT, 1/2-INCH OR 3/4-INCH NOMINAL MAXIMUM SIZE AGGREGATE, 0.3 TO <3 MILLION ESAL, TYPE III PAVEMENT	TON	317	1.94 TON/CUYD
40105-3000	ANTISTRIP ADDITIVE, TYPE 3	TON	3	1% of 40101-56000
41201-1000	TACK COAT GRADE CSS-1, CSS-1H, SS-1, OR SS-1H	TON	1	0.1 GAL/SQYD, 240 GAL/TON

FOOTNOTE:

1/ Superelevate roadway on curves at the rate "e" as indicated on the plan and profile curve data.

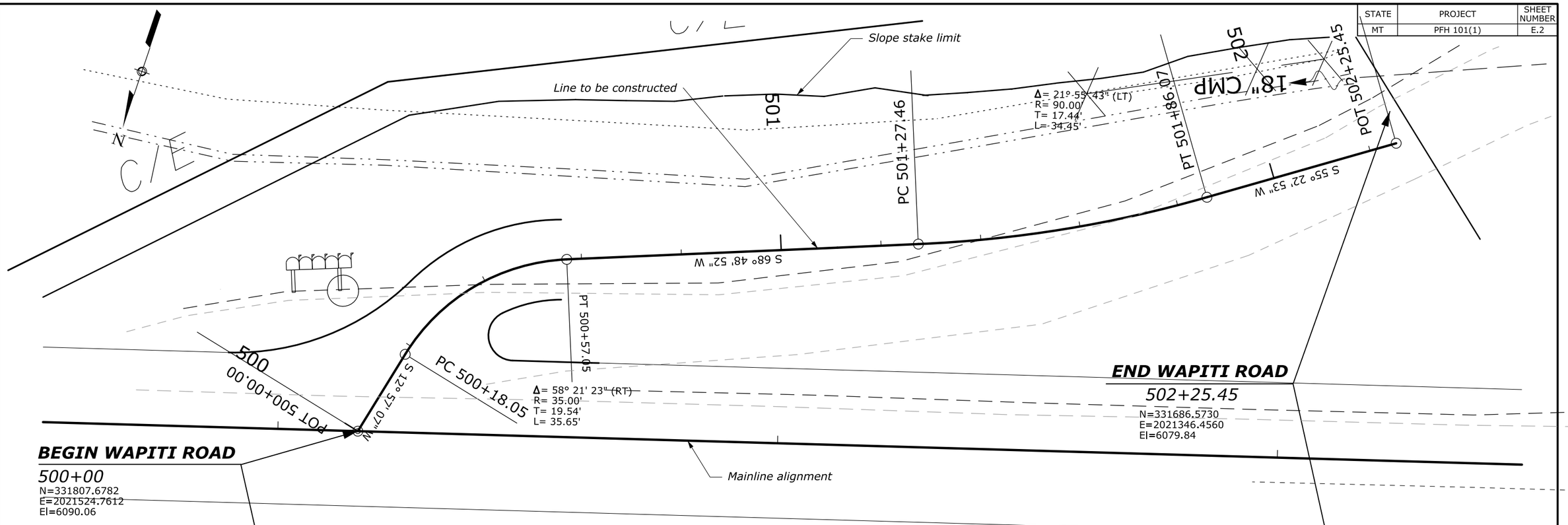
2/ Construct slope as shown in the Staking Report.

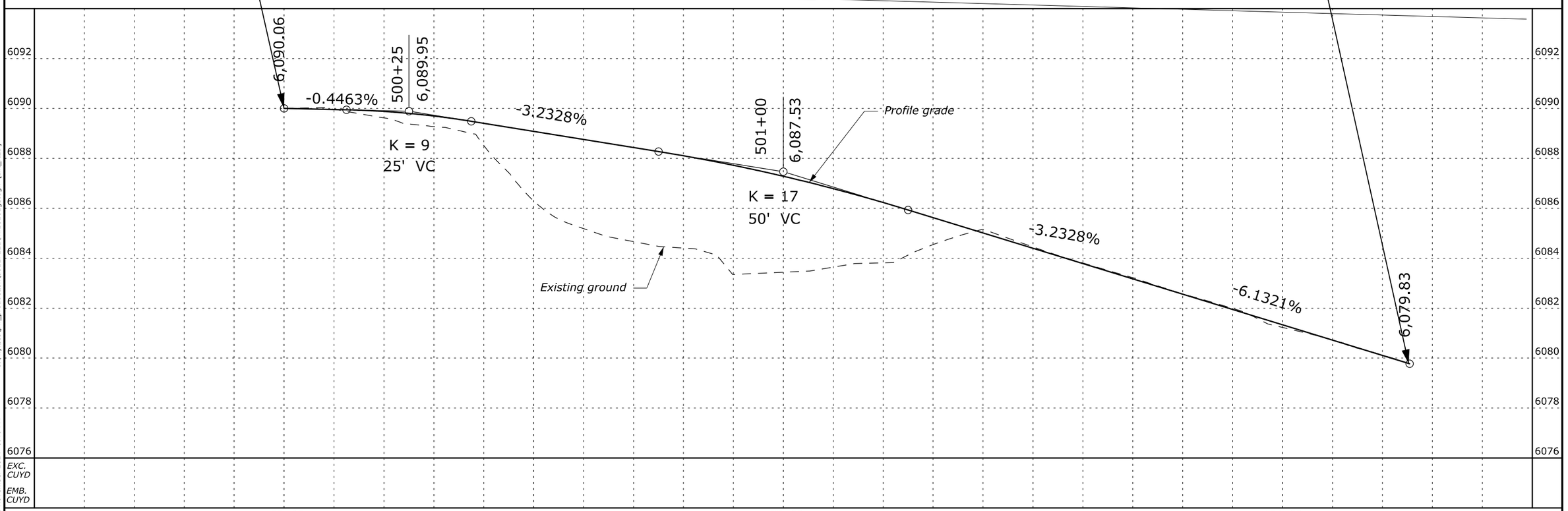
3/ These quantities are for Wapiti Approach only

APPROACH ROADS TYPICAL SECTION, LOCATIONS, AND TABULATION OF QUANTITIES

--/---
Checked by:
06/2013
Designed by:
11/19/2014
T. Phan
...\mf10101ga.dgn [US_Int2D]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	E.2

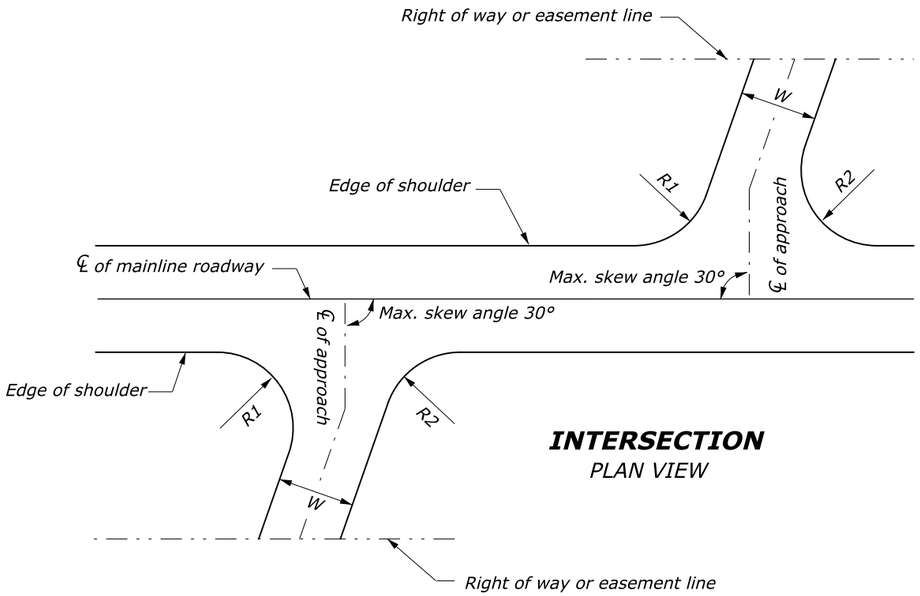




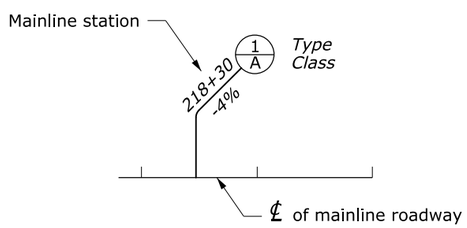
Designed by: T. Phan 11/2014 | Checked by: M. Moen 11/2014

c:\myfiles\pw_production\d0127121\mf10101gb.dgn [Int_ft2D] 16 November 2014 6:46 PM

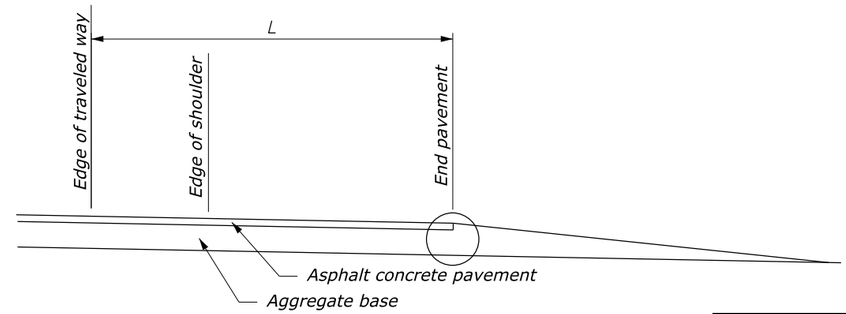
STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	E.3



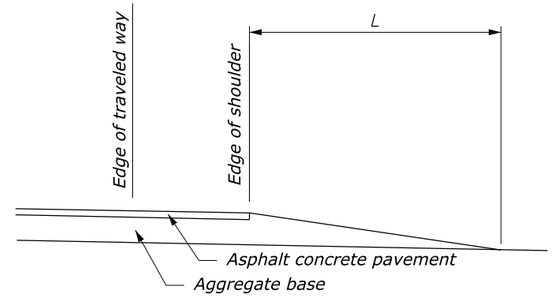
INTERSECTION
PLAN VIEW



ROAD APPROACH SYMBOL

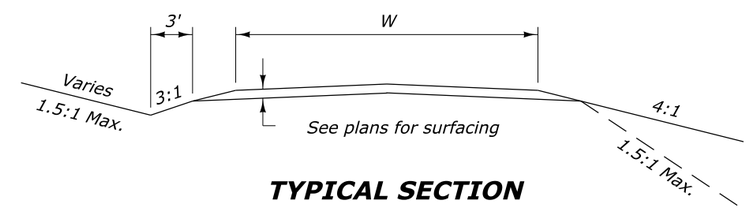


TYPE 1 APPROACH (PAVED)



TYPE 2 APPROACH (UNPAVED)

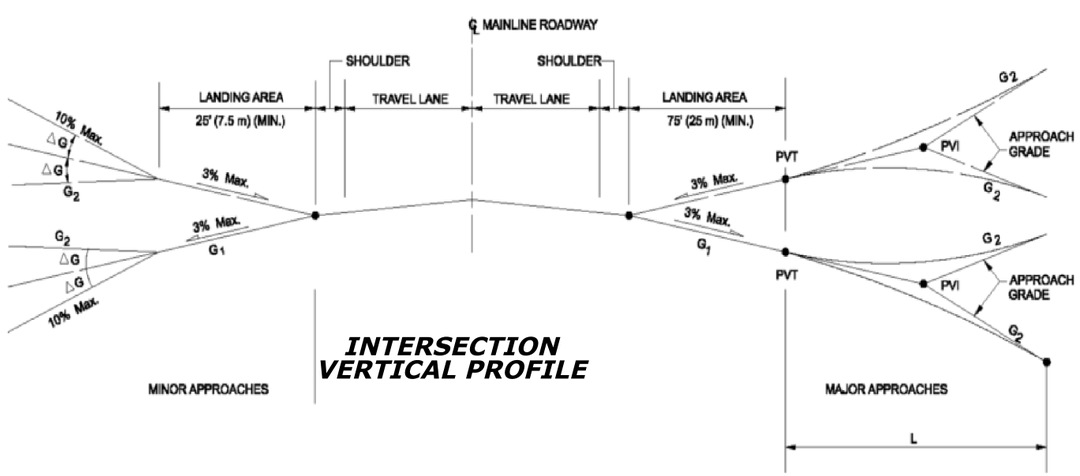
Design Speed	Crest Angular	Sag Angular
MPH	ΔG	ΔG
20	7.5%	4.8%
25	5.4%	2.7%
30	3.5%	1.7%
35	2.4%	1.2%
45	1.8%	0.9%
50	1.4%	0.7%
55	1.1%	0.5%
60	0.9%	0.4%



TYPICAL SECTION

BACK SLOPES	
0'-5'	4:1
5'-10'	2:1
OVER 10'	1.5:1

FILL SLOPES	
0'-10'	4:1
10'-20'	2:1
OVER 20'	1.5:1



INTERSECTION VERTICAL PROFILE

NOTE:

1. Construct approaches to fit local conditions, minimize traffic hazards, and afford entry and exit of traffic to and from the main road.
2. Secure written permission from landowner for work beyond the right of way or construction easement line.
3. Minor approach grade beyond landing is not to exceed 10% unless indicated on the plan. See table below for maximum change in grades without a vertical curve.
4. For dimension of L, see Sheet E.2.

ROAD APPROACH DETAILS

--/---- Checked by: --/---- 11/19/2014 Designed by: ...\mf10101gc.dgn [US_Int2D]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	F.1

ITEM 15705-1500 SOIL EROSION CONTROL, SEDIMENT WATTLE

BEGINNING STATION	ENDING STATION	LT/RT	LENGTH (LNFT)
10+31.00	10+77.00	RT	46
10+31.00	11+30.00	LT	99
11+42.00	13+63.00	RT	221
13+90.00	15+15.00	RT	125
15+35.00	16+03.00	RT	68
16+08.00	16+86.00	RT	78
16+95.00	19+52.00	LT	257
17+41.00	21+27.00	RT	386
27+29.00	40+98.00	RT	1,369
33+20.00	49+42.00	LT	1,622
45+08.00	49+91.00	RT	483
50+62.24	52+02.00	RT	140
58+59.00	58+90.00	RT	31
59+12.00	65+82.00	RT	670
67+41.00	80+77.00	RT	1,336
81+03.00	86+13.00	RT	510
86+49.00	88+22.00	RT	173
88+76.00	93+44.00	RT	468
93+73.00	96+90.00	RT	317
99+46.00	105+78.00	LT	632
101+24.00	102+30.00	RT	106
102+65.00	110+85.00	RT	820
106+00.00	111+13.00	LT	513
111+10.00	112+52.00	RT	142
111+27.00	132+14.00	LT	2,087
112+89.00	117+55.00	RT	466
117+94.00	129+05.00	RT	1,111
130+51.00	131+90.00	RT	139
132+70.00	137+07.00	LT	437
141+31.00	142+75.00	LT	144
141+54.00	142+57.00	RT	103
142+71.00	154+49.00	RT	1,178
142+96.00	145+95.00	LT	299
156+72.00	157+44.00	LT	72
		TOTAL	16,648

ITEM 15705-0100 SOIL EROSION CONTROL, SILT FENCE

BEGINNING STATION	ENDING STATION	LT/RT	LENGTH (LNFT)
21+51.00	29+10.00	LT	759
32+07.00	33+17.00	LT	110
		TOTAL	**869**

ITEM 15706-0300 SOIL EROSION CONTROI, SANDBAG

BEGINNING STATION	ENDING STATION	QUANTITY (EACH)
To be use as directed by the CO		250
		250

ITEM 62510-2000 SEEDING, HYDRAULIC METHOD

BEGINNING STATION	ENDING STATION	QUANTITY (ACRE)
TBD (All)	TBD (All)	3.6
		3.6

ITEM 62515-2000 MULCHING, HYDRAULIC METHOD

BEGINNING STATION	ENDING STATION	QUANTITY (ACRE)
TBD (All)	TBD (All)	3.6
		3.6

ITEM 62901-0000 ROLLED EROSION CONTROL PRODUCT

BEGINNING STATION	ENDING STATION	RT/LT	QUANTITY (SQYD)
20+50.00	25+75.00	RT	1200
122+50.00	126+00.00	LT	800
			2000

TABULATION OF EROSION CONTROL QUANTITIES

--/--- Designed by: T. Phan --/--- Checked by: R. Johnson
15 November 2014 4:32 PM c:\myfiles\pw_production\d0127117\mf10101da.dgn [int_f2D]

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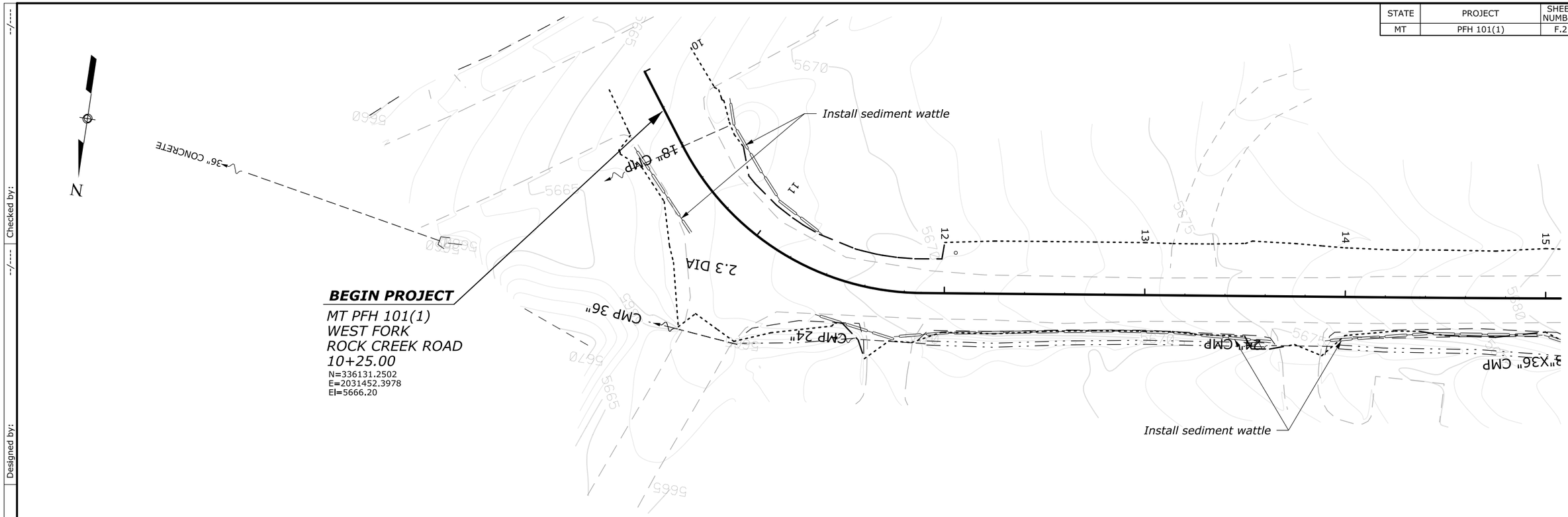

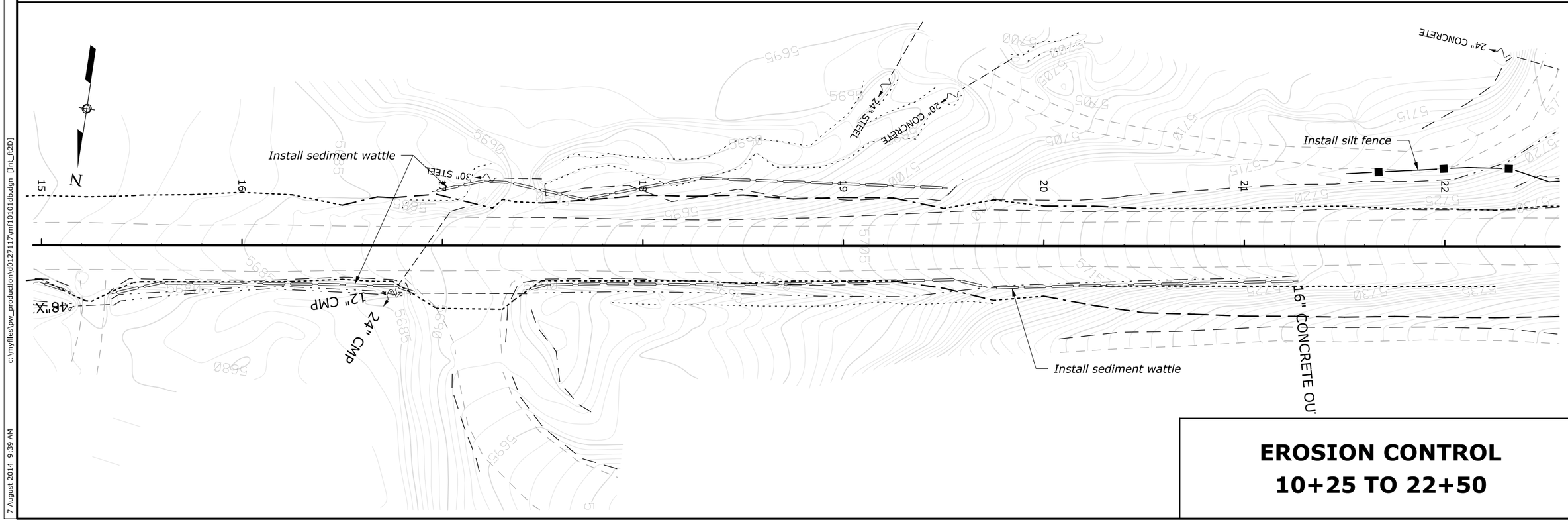

EROSION CONTROL
10+25 TO 22+50

Designed by: --/---- Checked by: --/----

7 August 2014 9:39 AM c:\myfiles\pw_production\d0127117\mf10101db.dgn [int_ft2D]

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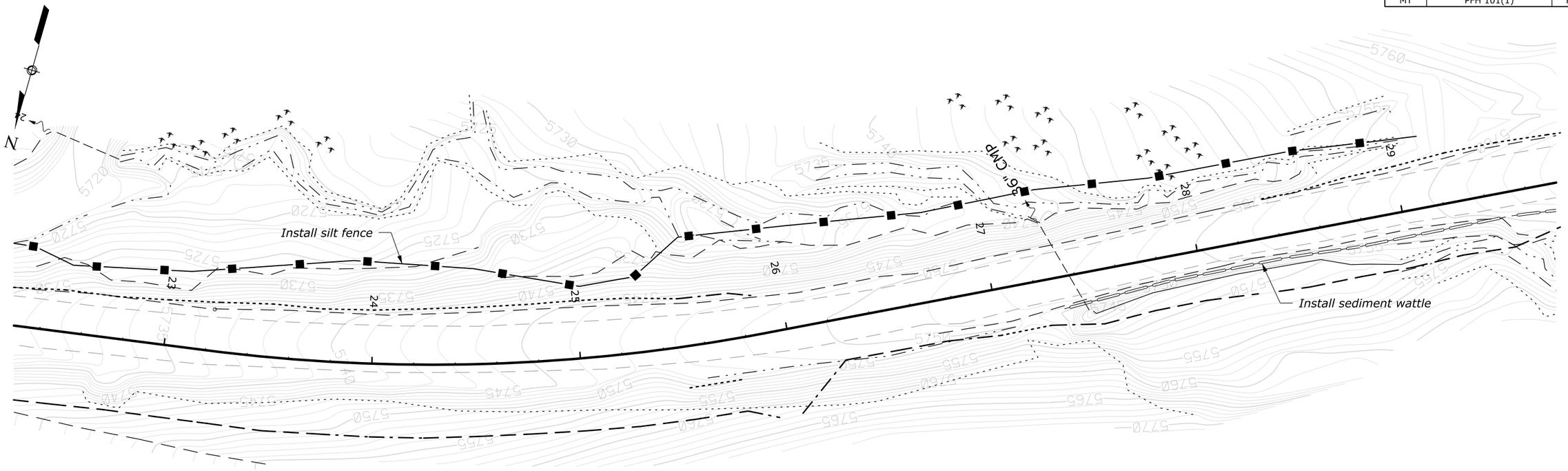

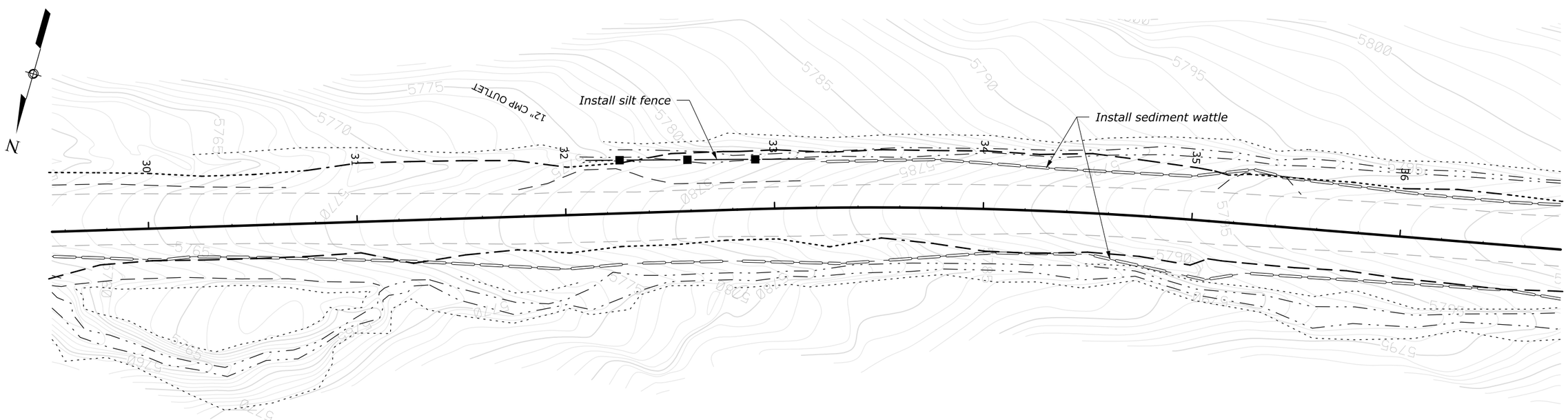

EROSION CONTROL
22+50 TO 36+30

Designed by: --/---
Checked by: --/---
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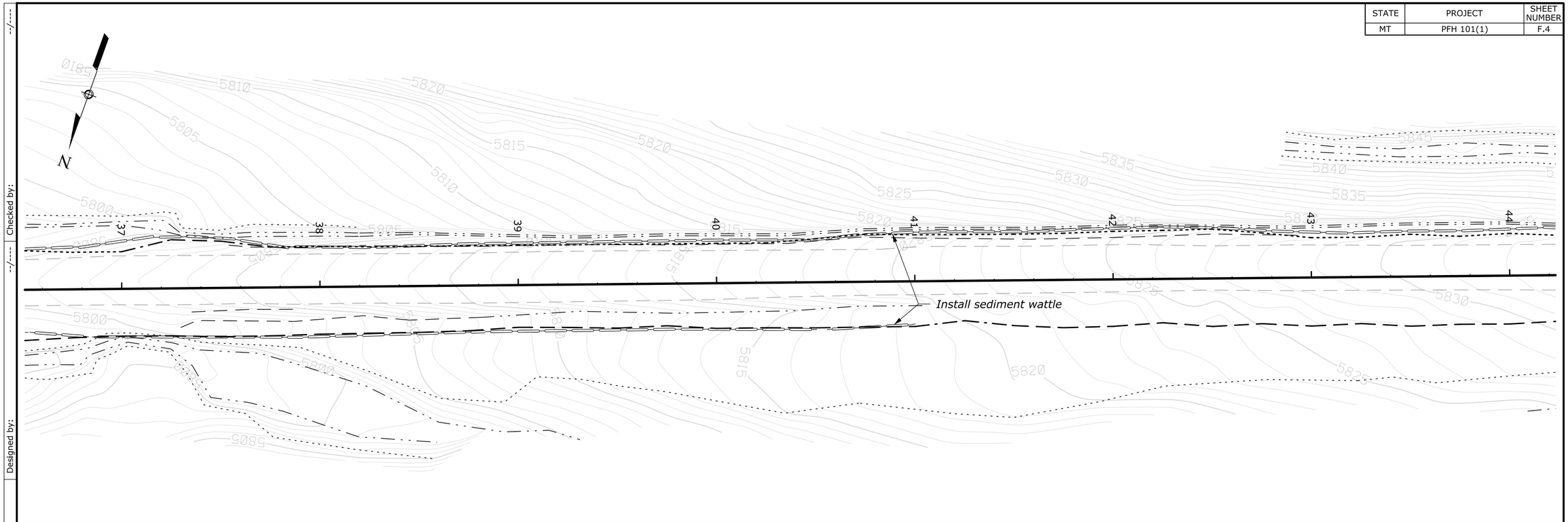

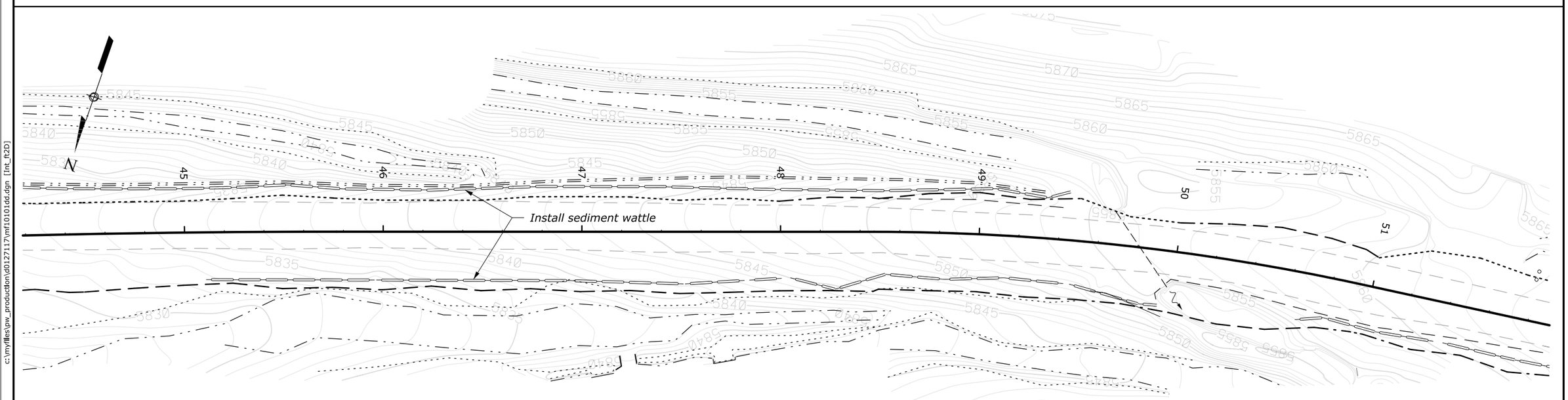

EROSION CONTROL
36+30 TO 51+50

Designed by: --/---
Checked by: --/---

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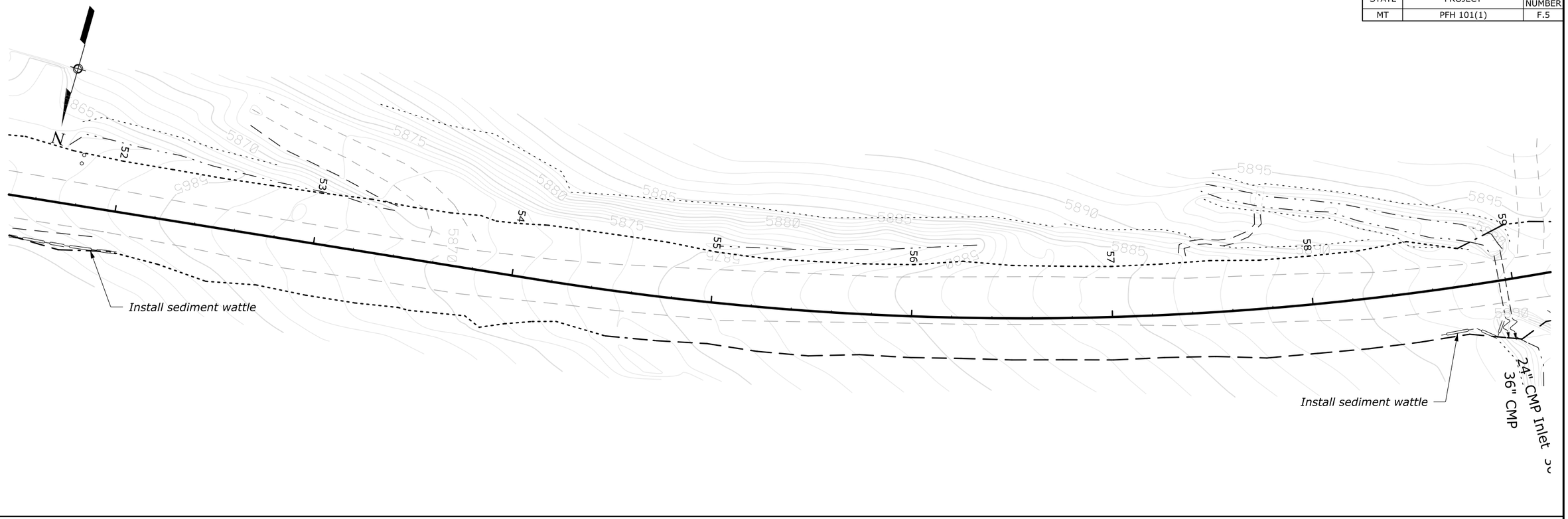

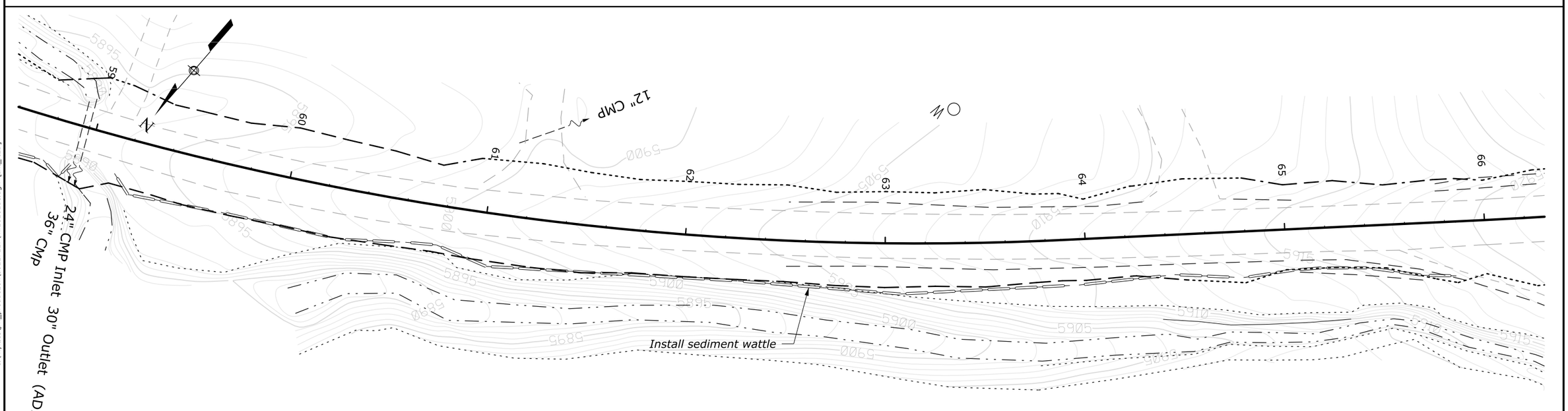

EROSION CONTROL
51+50 TO 66+20

Designed by: --/---
Checked by: --/---
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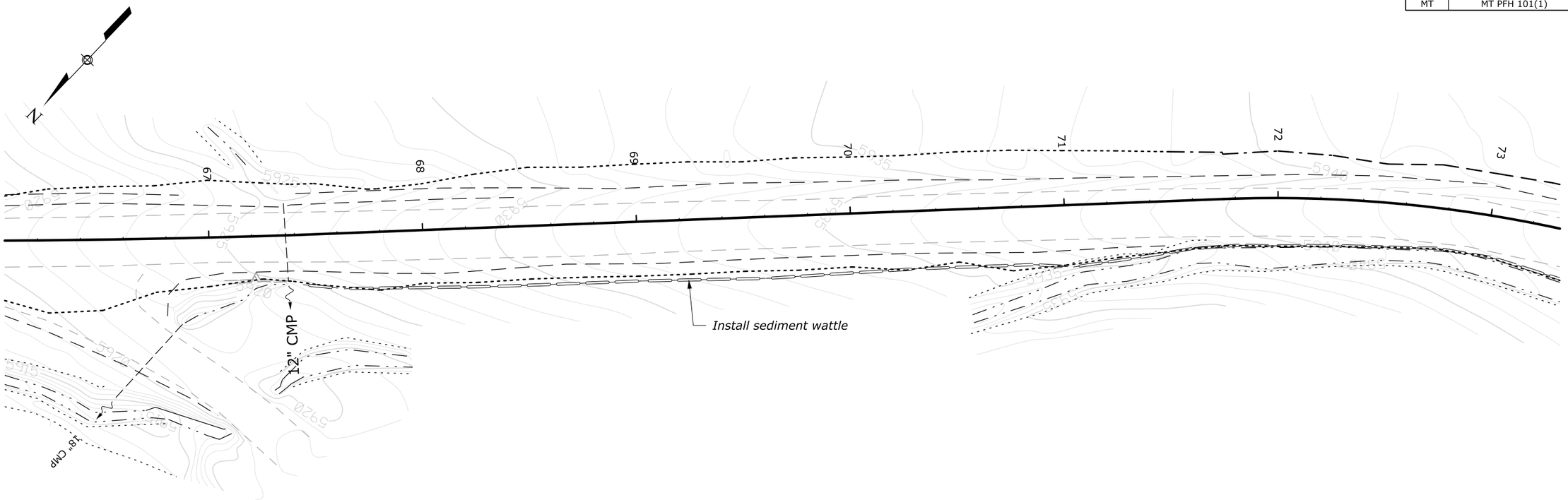

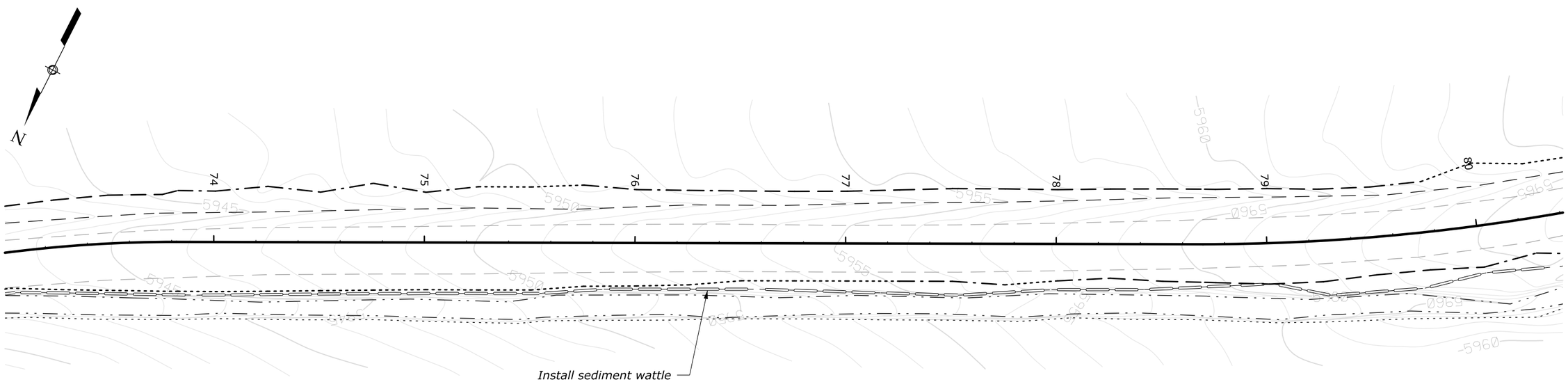

EROSION CONTROL
66+20 TO 80+40

Designed by: --/--- Checked by: --/---

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7 August 2014 9:07 AM

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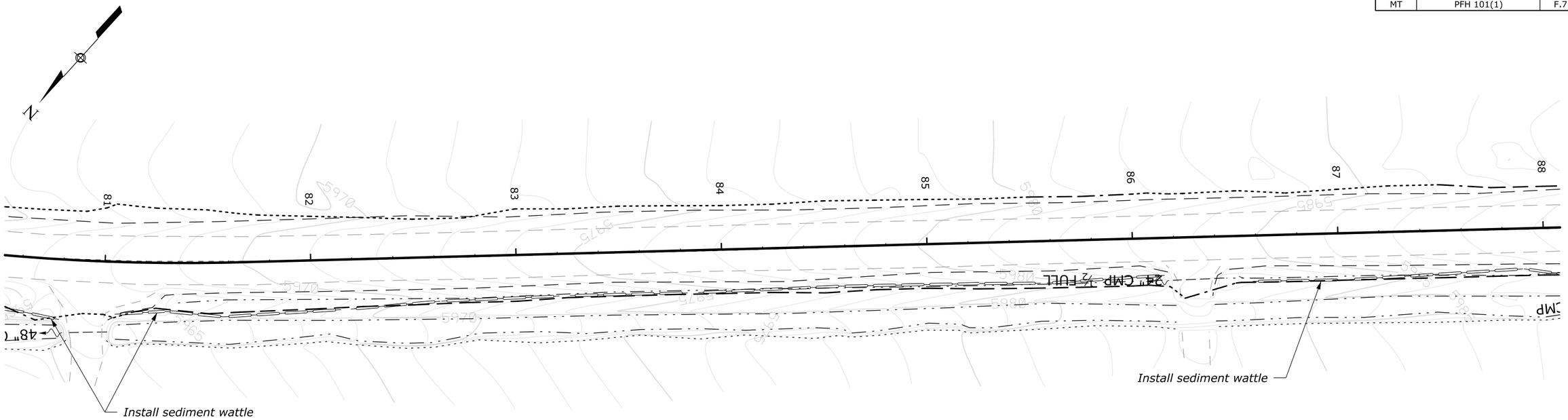

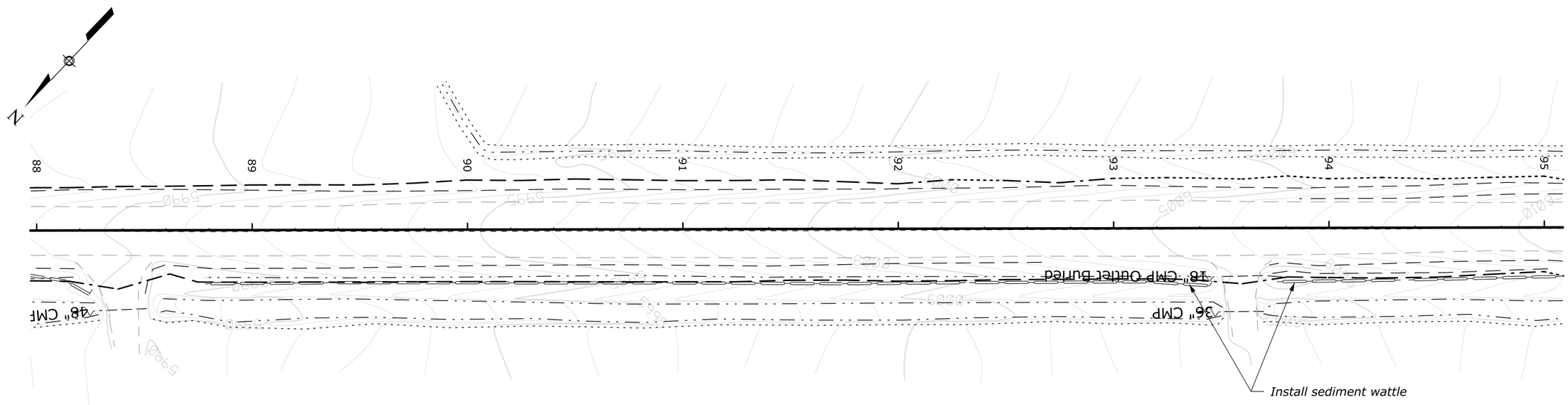

EROSION CONTROL
80+40 TO 95+00

Designed by: --/---
Checked by: --/---
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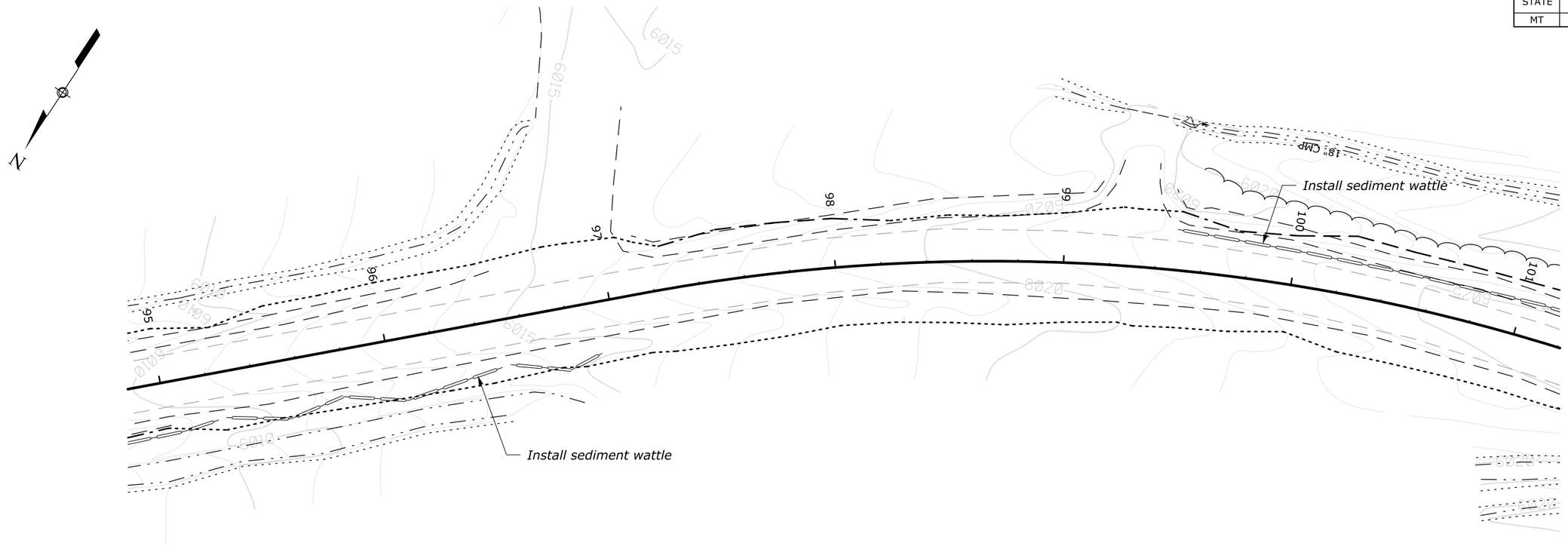

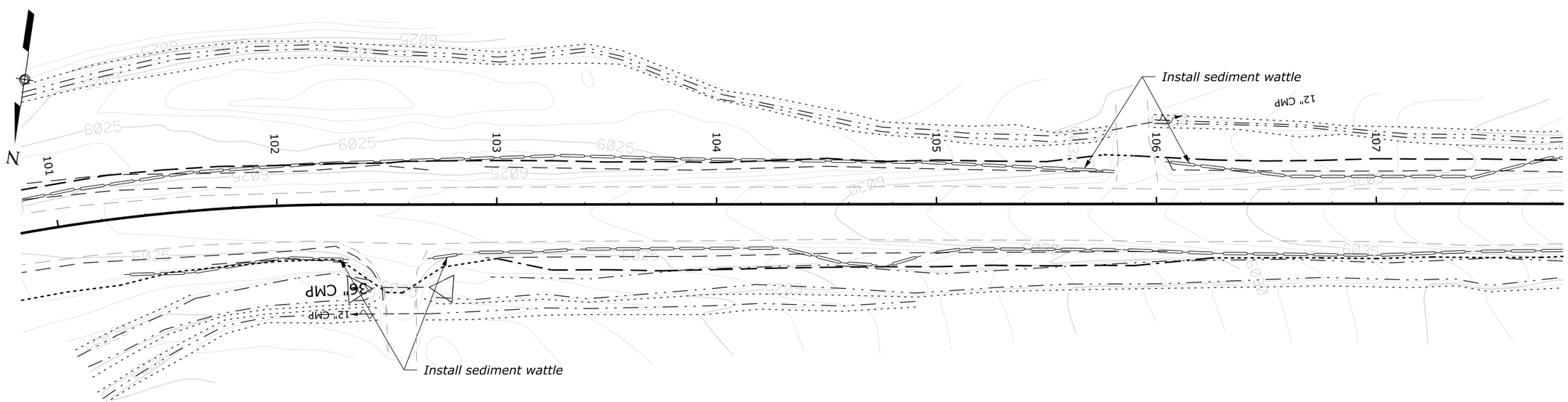

EROSION CONTROL
95+00 TO 107+50

Designed by: --/---- Checked by: --/----

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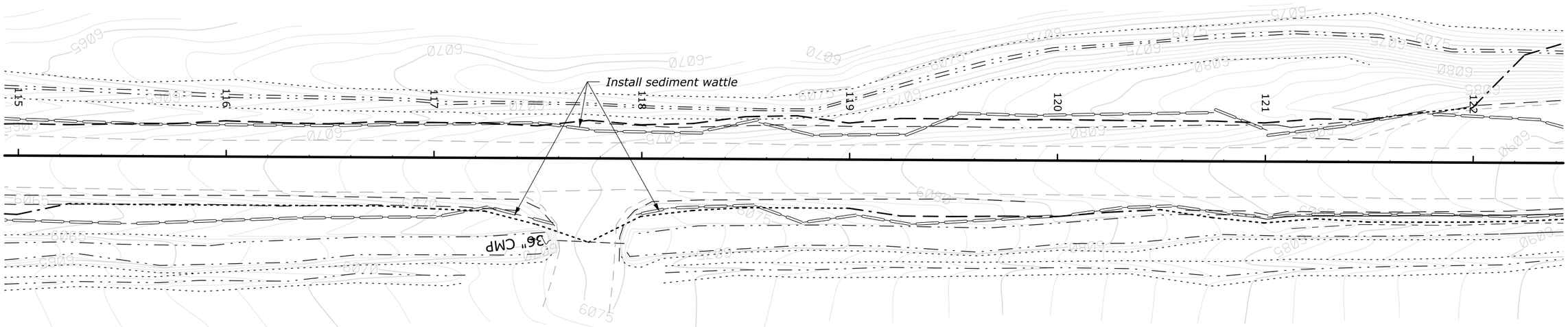

EROSION CONTROL
107+50 TO 122+20

Designed by: --/---
Checked by: --/---
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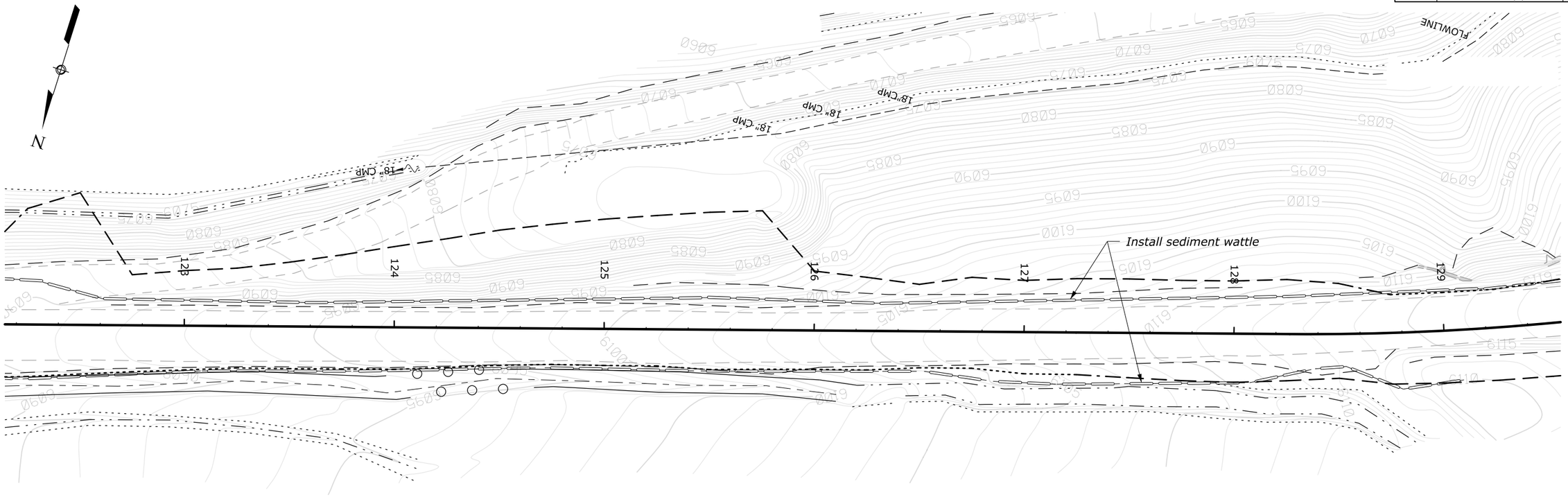

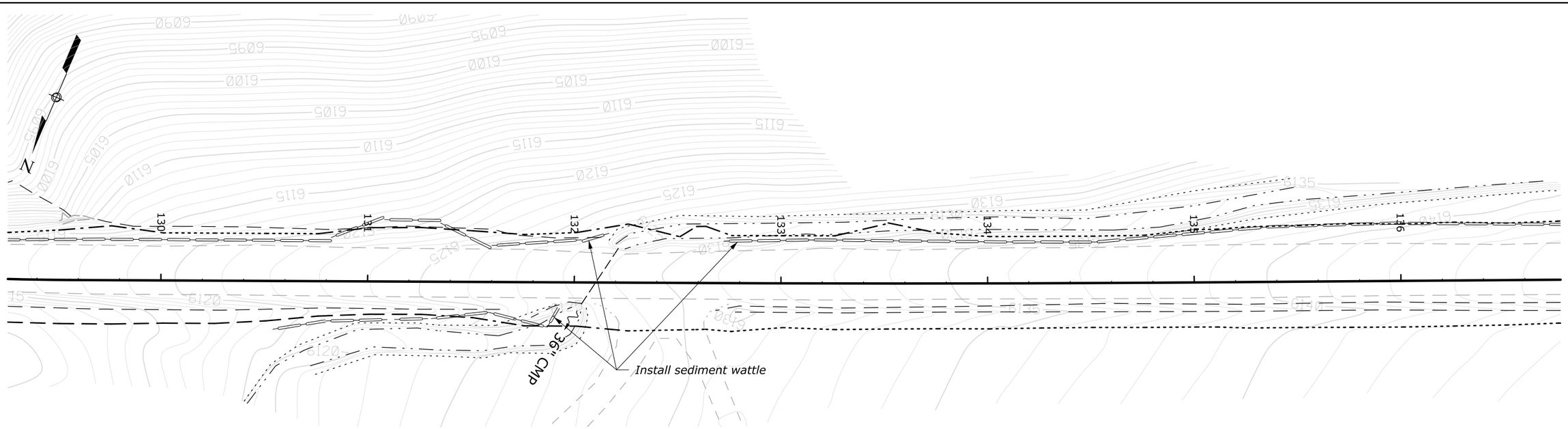

EROSION CONTROL
122+20 TO 136+60

Designed by: --/---
Checked by: --/---
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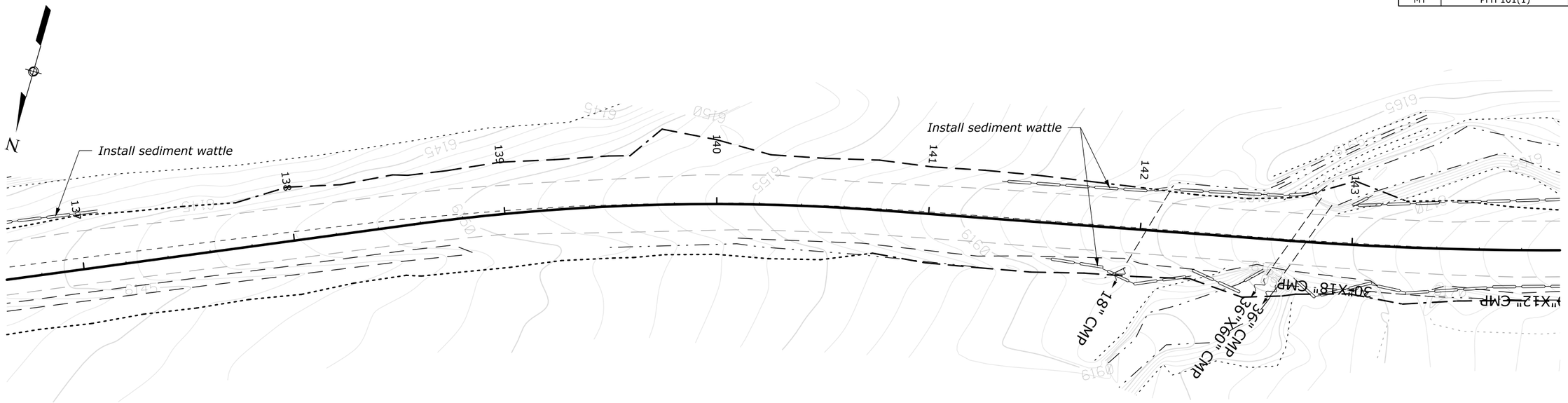

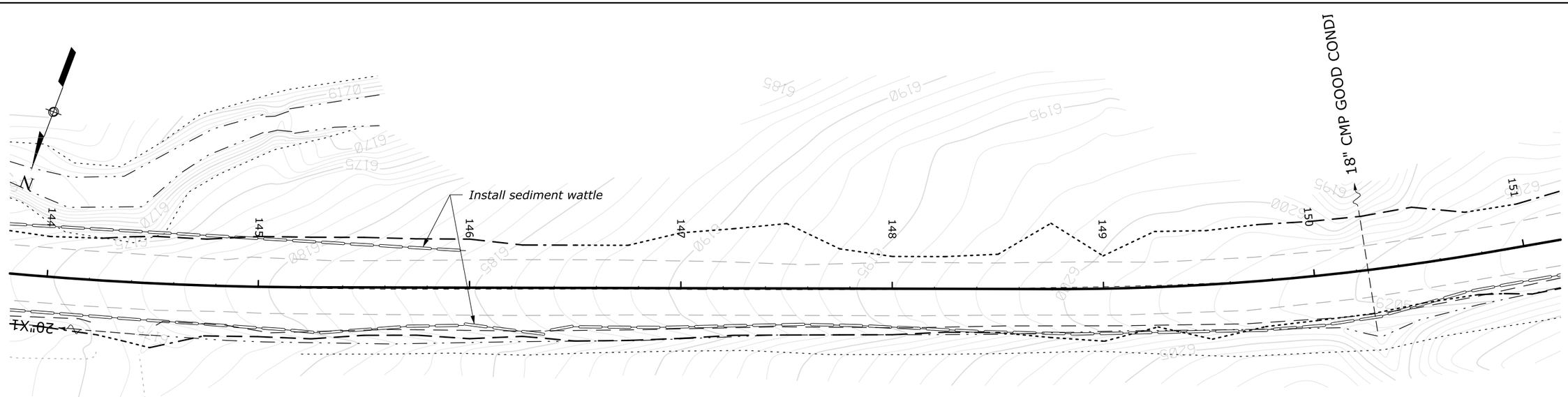

EROSION CONTROL
136+60 TO 151+10

Designed by: --/---
Checked by: --/---
7 August 2014 9:43 AM
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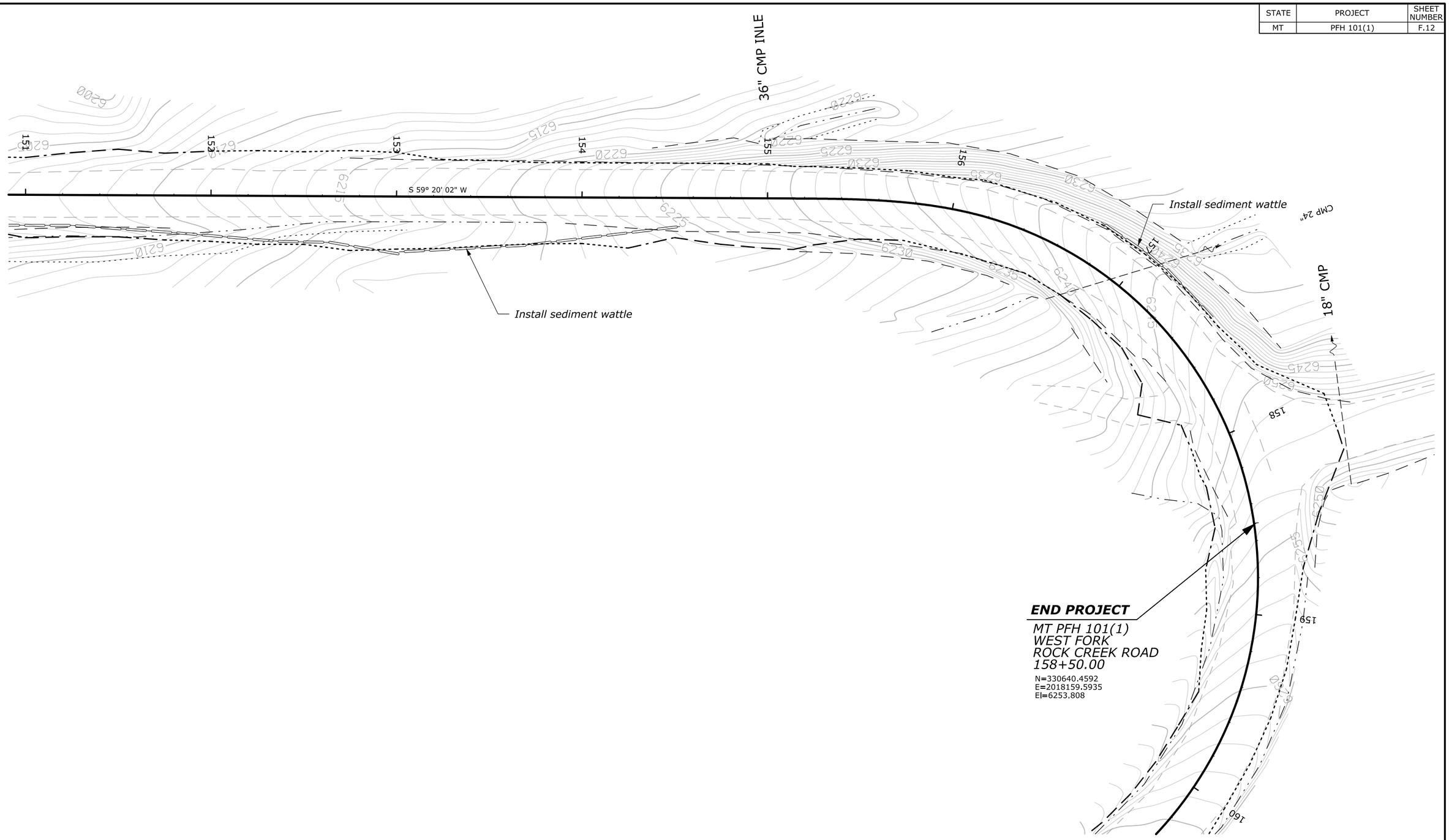

EROSION CONTROL
151+10 to 160+00

Designed by: --/---
Checked by: --/---
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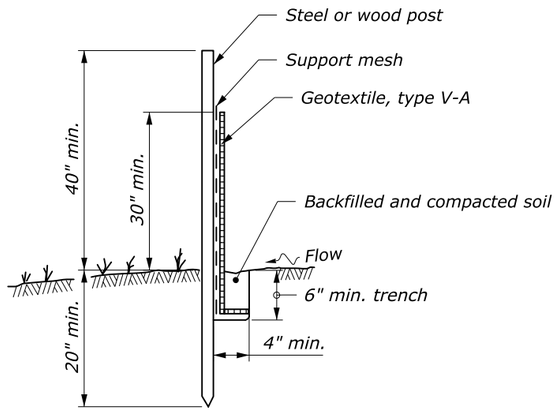
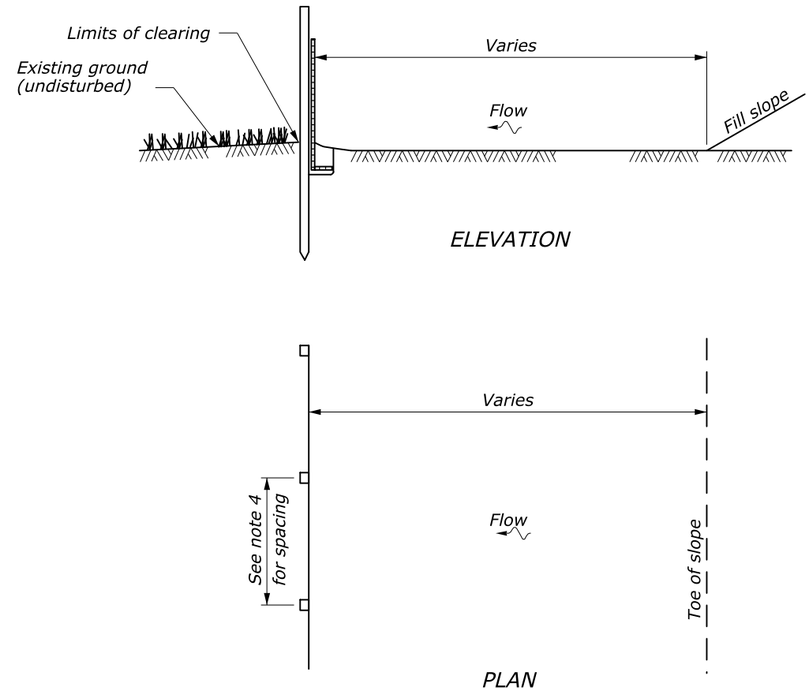
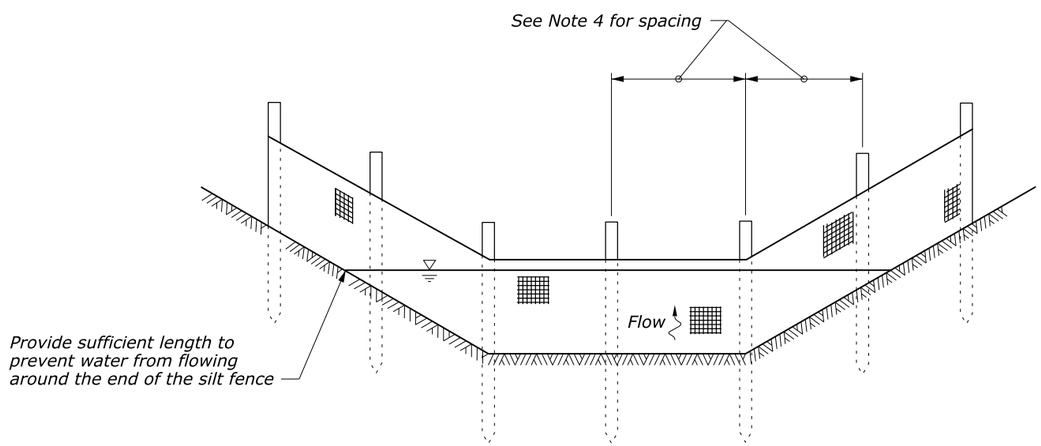


POST AND GEOTEXTILE INSTALLATION DETAIL



SILT FENCE INSTALLATION AT TOE OF FILL



SILT FENCE INSTALLATION IN A DRAINAGE DITCH

See Note 1

NOTE:

1. *Use drainage ditch installation for low flow conditions only when specified on Erosion Control Plan.*
2. *Alternate preassembled silt fence options (geotextile, type V-B) will be allowed as long as specified dimensions are satisfied. Follow manufacturer's recommendations for installation procedures. All types must ensure silt fence remains attached to, and does not slide down, supporting posts.*
3. *Install silt fence along ground contours. Curve ends of silt fence upgrade to prevent water from running around the ends.*
4. *10 ft. (max.) spacing with fence support.*
   6 ft. (max.) spacing without fence support.

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

SILT FENCE

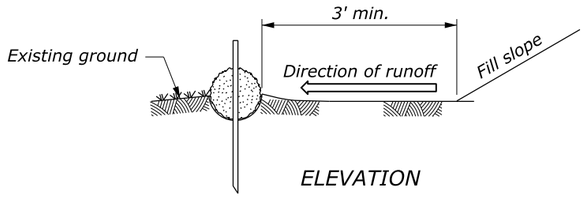
STANDARD APPROVED FOR USE 6/2005
REVISED: 6/2007

STANDARD 157-1

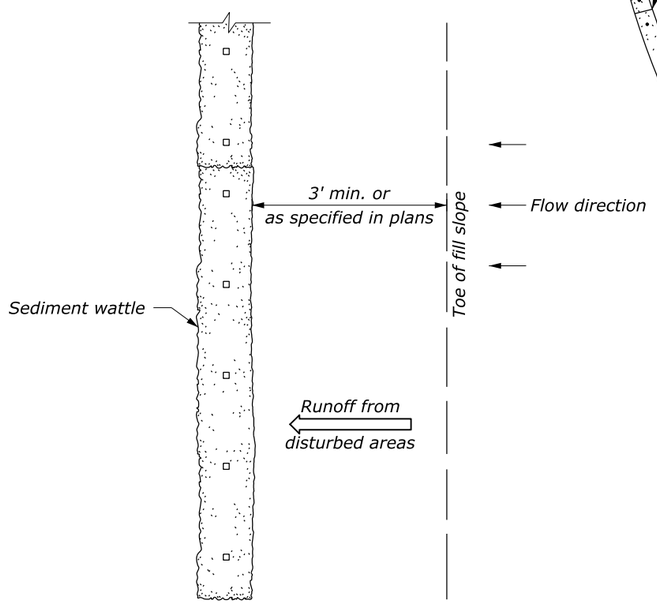
11/16/2014

...\mf101(1)dm.dgn [US Customary]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	F.14

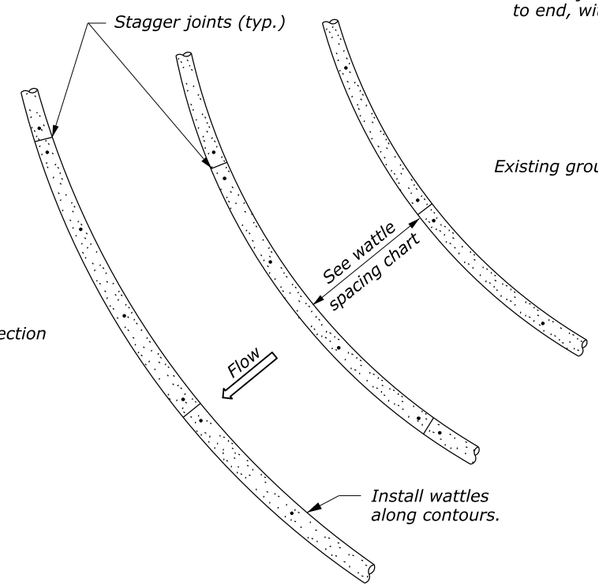


ELEVATION

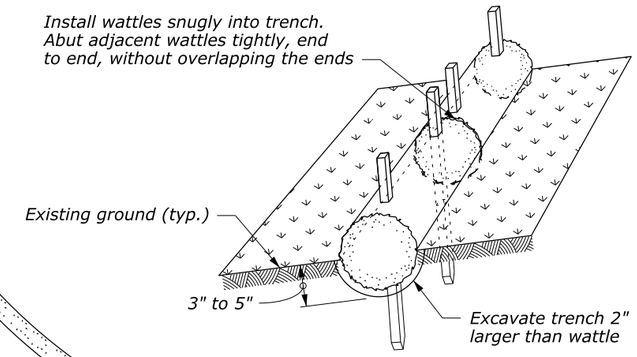


PLAN

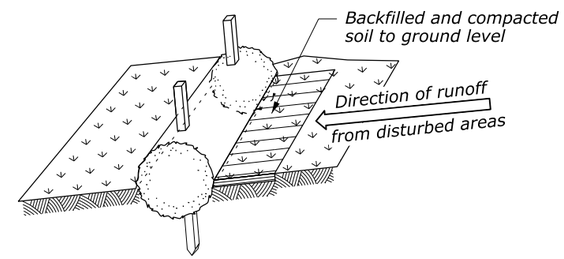
INSTALLATION BEYOND TOE OF SLOPE



INSTALLATION ALONG SLOPES



Step 1: Excavate trench and install wattles



Step 2: Backfill soil against wattles

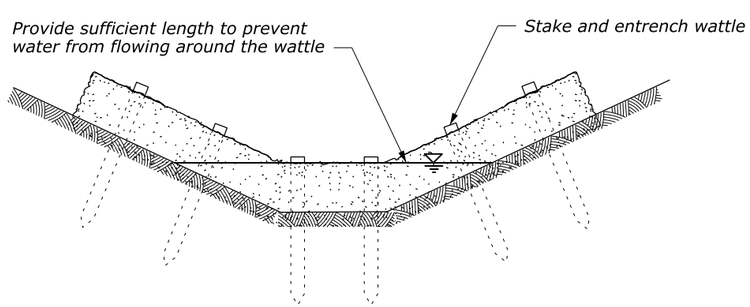
PROPERLY STAKED AND ENTRENCHED WATTLE

NOTE:

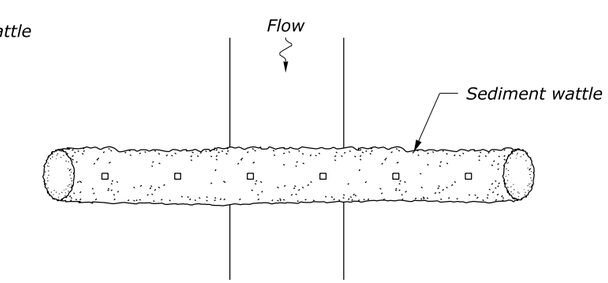
1. Drive stakes at each end and at 4' spacing until wattle is secure to slope. Do not crush wattle while staking. Live stakes may be used for permanent installations.
2. Use drainage ditch installation only in low flow conditions.

STAKES REQUIRED	
Wattle length (ft)	Stakes required for each wattle
25	8
20	6
12	4

WATTLE SPACING	
Slope	Spacing (ft)
1:4 or flatter	40
1:3	30
1:2	20
1:1	10

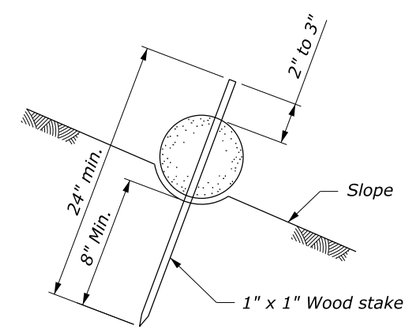


ELEVATION



PLAN

DRAINAGE DITCH INSTALLATION



WATTLE STAKING DETAIL

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY DETAIL

SEDIMENT WATTLE

DETAIL APPROVED FOR USE 9/2007

REVISED:

DETAIL W157-20

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Note: The quantities shown hereon are approximate and are subject to field

TABULATION OF DRAINAGE QUANTITIES

STATE	PROJECT	SHEET NUMBE
MT	PFH 101(1)	G.1

PAY ITEM NUMBER			20301		25101		60103		60201				60220	60401	60403	60701	60704	60707		Allow. Pipe Material (See key below)	BEVELS 1V:nH		FOOTNOTES See below for numbered footnotes
				1900	-1000	-3000	-0000	-0400	-0600	-0800	-1000	-1200	-1200	-0000	-1200	-1000	-0000	-0500	-0600				
STATION	EST MAX COVER (ft)	STR EXC (CUYD)	Removal (Each)		Placed riprap (CUYD)		Concrete, Headwall	Pipe Culvert (LNFT)					Precast Concrete Box culvert	Manhole (Each)	Inlet type 5A (Each)	Removing, cleaning, and stockpiling culvert (Each)	Cleaning culverts in place (Each)	Lining pipe culvert (LNFT)					
			Head-wall	Pipe Culverts	Class 1	Class 3															Lt	Rt	
DIAMETER or SPAN x RISE (inch)								12	18	24	36	48	6 X 4					24	30				
10+42	2.4	19		1					60														
13+52	2.5	22							43														
16+97	2.7	47		1		4				66													
27+38	7.2	101		1		8				57													
28+89	3.2	98				12					81												
49+81	1.5	80		1		15	2						50							C			
58+95	3.8	85		2		10	2						40							C			
67+36	2.5	24		1				45															
80+50	3.5	32						54															
93+50	2	20							22														1
111+06	4.5	5		1		10	1					5											2
132+10	5	43		1		6					55												
132+45	2	20						60															1
139+00	2	15						45															1
142+03	3.5	25		1					50														
142+70	4	129		2		15	2						55							C			
156+93	10.5	155		1						88													
PROJECT TOTAL		**920**	**0**	**13**	**0**	**80**	**7**	**204**	**175**	**211**	**136**	**5**	**145**	**0**	**0**	**0**	**0**	**0**	**0**				

NOTE:

1. Steel pipe culvert minimum wall thickness is the larger of 0.079" or the thickness required by the Std. 602-1 fill height table.
1. Aluminized steel pipe culvert minimum wall thickness is the larger of 0.79" or the thickness required by the Std. 602-1 fill height table (steel).
2. Aluminum pipe culvert minimum wall thickness is the larger of 0.75" or the thickness required by the Std. 602-1 fill height table.

FOOTNOTE:

1. For approach road cross drain.
2. Extend existing culvert. Verify culvert sizes to be intal
   Do not disturb existing valve box

Allowable pipe culvert material

A	Aluminum
AS	Aluminized steel
C	Concrete
GS	Galvanized steel
P	Plastic
(blank)	Any appropriate material
X/__	Any appropriate material except __

11/2014 M. Moen
11/2014 Checked by:
T. Phan
19-Nov-2014 3:30 Designed by:
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STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	G.2

METAL ROUND PIPE CULVERT

FILL HEIGHT AND METAL THICKNESS TABLE FOR HELICAL LOCKSEAM AND WELDED SEAM PIPE CULVERT

STEEL

PIPE SIZE DIAMETER INCHES	MINIMUM COVER INCHES	2⅔" x ½" CORRUGATIONS					3" x 1" CORRUGATIONS					5" x 1" CORRUGATIONS				
		METAL THICKNESS (INCH/GAGE)														
		0.064/16	0.079/14	0.109/12	0.138/10	0.168/8	0.064/16	0.079/14	0.109/12	0.138/10	0.168/8	0.064/16	0.079/14	0.109/12	0.138/10	0.168/8
		MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE (FEET)														
12	12	100	100	100	100	100										
15	12	100	100	100	100	100										
18	12	100	100	100	100	100										
21	12	100	100	100	100	100										
24	12	100	100	100	100	100										
30	12	85	100	100	100	100										
36	12	71	89	100	100	100	81	100	100	100	100					
42	12	61	76	100	100	100	70	87	100	100	100					
48	12	53	66	93	100	100	61	76	100	100	100	54	68	95	100	100
54	12		59	83	100	100	54	68	95	100	100	48	60	85	100	100
60	12			74	97	100	49	61	86	100	100	43	54	76	98	100
66	12				87	100	44	55	78	100	100	39	49	69	89	100
72	12				80	97	40	51	71	92	100	36	45	63	82	100
78	12					87	37	47	66	85	100	33	42	58	75	92
84	12					75	35	43	61	78	96	31	39	54	70	86
90	12						32	40	57	73	90	29	36	51	65	80
96	12							38	53	69	84		34	48	61	75
102	18							36	50	65	79		32	45	57	71
108	18								47	61	75			42	54	67
114	18								45	58	71			40	52	63
120	18								43	55	67			38	49	60
126	18									52	64				47	57
132	18									50	61				44	54
138	18									48	58				42	52
144	18										56					50

ALUMINUM

PIPE SIZE DIAMETER INCHES	MINIMUM COVER INCHES	2⅔" x ½" CORRUGATIONS					3" x 1" CORRUGATIONS				
		METAL THICKNESS (INCH/GAGE)									
		0.060/16	0.075/14	0.105/12	0.135/10	0.164/8	0.060/16	0.075/14	0.105/12	0.135/10	0.164/8
		MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE (FEET)									
12	12	100	100	100	100	100					
15	12	100	100	100	100	100					
18	12	100	100	100	100	100					
21	12	88	100	100	100	100					
24	12	77	97	100	100	100					
30	12	62	77	100	100	100	71	89	100	100	100
36	12	52	64	90	100	100	59	74	100	100	100
42	12	44	55	77	99	100	51	64	89	100	100
48	12			67	87	100	44	56	78	100	100
54	18			54	71	88	39	50	69	93	100
60	18				57	72	35	45	62	83	98
66	18					58	32	40	56	76	89
72	18					45	30	37	55	70	82
78	24							34	48	64	75
84	24								44	59	70
90	24								41	62	65
96	24								38	51	61
102	24									46	55
108	24									42	50
114	24										45
120	24										40

NOTE:

1. When directed, camber pipe culverts upward from a chord through the inlet and outlet inverts an ordinate amount equal to 1% of the pipe length. Develop camber on a parabolic curve. If the midpoint elevation on the parabolic curve as designed exceeds the elevation of the inlet invert, reduce the amount of camber or increase the pipe culvert gradient.
2. Fill heights exceeding 100 feet require special analysis by the CO.
3. The fill heights in the table are for helical lockseam and welded seam pipe only. Fill heights for culvert pipe with annular corrugations are more restrictive than those of helical lockseam and welded seam pipe. Obtain approval before furnishing annular corrugation pipe.
4. Measure minimum cover from the top of the pipe culvert to the subgrade for flexible pavements, and to the top of the pavement for rigid pavements. Measure maximum fill height from the top of the pipe to the top of the pavement for both flexible and rigid pavement.

METAL PIPE ARCH CULVERT

FILL HEIGHT AND METAL THICKNESS TABLE FOR HELICAL LOCKSEAM AND WELDED SEAM PIPE CULVERT

STEEL

PIPE ARCH SIZE SPAN x RISE INCHES	EQUI-VALENT DIAMETER INCHES	MINIMUM CORNER RADIUS INCHES	MINIMUM COVER INCHES	2⅔" x ½" CORRUGATIONS					3" x 1" CORRUGATIONS				5" x 1" CORRUGATIONS			
				METAL THICKNESS (INCH/GAGE)												
				0.064/16	0.079/14	0.109/12	0.138/10	0.168/8	0.079/14	0.109/12	0.138/10	0.168/8	0.079/14	0.109/12	0.138/10	0.168/8
				MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE (FEET)												
17 x 13	15	3	12	13												
21 x 15	18	3	12	12												
24 x 18	21	3	12	13												
28 x 20	24	3	12	13												
35 x 24	30	3	12	12												
42 x 29	36	3.5	12	12												
49 x 33	42	4	12		12											
57 x 38	48	5	12			12										
60 x 46	54	8	15							21				21		
64 x 43	54	6	12			12										
66 x 51	60	9	15							21				21		
71 x 47	60	7	12				12									
73 x 55	66	12	18							20				20		
77 x 52	66	8	12					12								
81 x 59	72	14	18						17				17			
83 x 57	72	9	12					12								
87 x 63	78	14	18						17				17			
95 x 67	84	16	18						17				17			
103 x 71	90	16	18							17			17			
112 x 75	96	18	21							16				16		
117 x 79	102	18	21							16				16		
128 x 83	108	18	24								16				16	
137 x 87	114	18	24								16				16	
142 x 91	120	18	24									16				16

ALUMINUM

PIPE ARCH SIZE SPAN x RISE INCHES	EQUI-VALENT DIAMETER INCHES	MINIMUM CORNER RADIUS INCHES	MINIMUM COVER INCHES	2⅔" x ½" CORRUGATIONS				3" x 1" CORRUGATIONS			
				METAL THICKNESS (INCH/GAGE)							
				0.060/16	0.075/14	0.105/12	0.135/10	0.060/16	0.075/14	0.105/12	0.135/10
				MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE (FEET)							
17 x 13	15	3	12	13							
21 x 15	18	3	12	12							
24 x 18	21	3	12	13							
28 x 20	24	3	12		13						
35 x 24	30	3	12		12						
42 x 29	36	3.5	15			12					
49 x 33	42	4	15			12					
57 x 38	48	5	15				12				
60 x 46	54	8	15					21			
64 x 43	54	6	18				12				
66 x 51	60	9	18					21			
73 x 55	66	12	18						20		
81 x 59	72	14	21							17	
87 x 63	78	14	21							17	
95 x 67	84	16	24							17	
103 x 71	90	16	24								17

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

METAL PIPE CULVERT

STANDARD APPROVED FOR USE 12/1993
REVISED: 4/1994 6/2005

STANDARD
602-1

...\mf101101eb.dgn [US Customary] 11/16/2014

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	G.3

COUPLING BANDS FOR METAL PIPE CULVERT 1/

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

1/ Fabricate annular, helical and semi-corrugated type coupling bands from the same metal as the connecting pipe. Provide coupling bands not more than 3 nominal sheet thicknesses thinner than the thickness of the pipe to be connected, and no thinner than 0.052 inch for steel or 0.048 inch for aluminum. Fasten coupling bands with the following diameter of bolt:
⅜" for 18" round culvert (21" x 15" pipe arch) or less
½" for 21" round culvert (24" x 18" pipe arch) or more

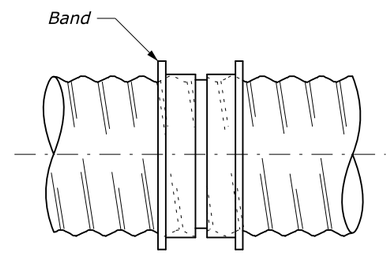
2/ For helically corrugated pipe with rerolled ends, the nominal corrugations size refers to the dimension of the end corrugation in the pipe.

3/ Use annular corrugated bands with pipes having annular corrugations or with helical pipe having rerolled end to form annular corrugations. A 10.5 inch band is acceptable on pipe ends rerolled with 2⅔" x ½" corrugations. A 12 inch band is acceptable on pipe ends rerolled with 3" x 1" pipe corrugations.

4/ Use helical corrugated bands with pipes having helically corrugated ends.

5/ The minimum band widths shown for 3" x 1" and 5" x 1" corrugated sizes apply to 2⅔" x ½" corrugations on rerolled pipe ends.

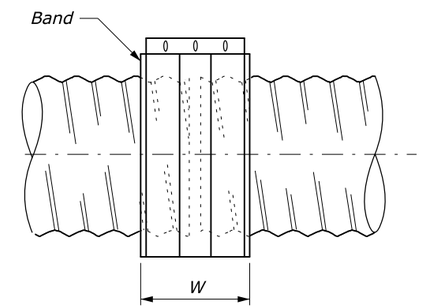
6/ Smooth sleeve-type couplers and flat bands may be used for pipe diameters of 12" or less. Use a matching metal having a nominal thickness of not less than 0.040 inch for steel, or 0.036 inch for aluminum, or a plastic with an equivalent strength to metal.



SLEEVE JOINT

Smoother sleeve with center stop.
Stab type joint

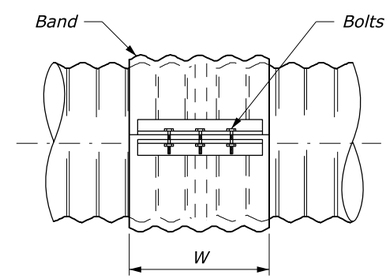
SMOOTH SLEEVE BAND



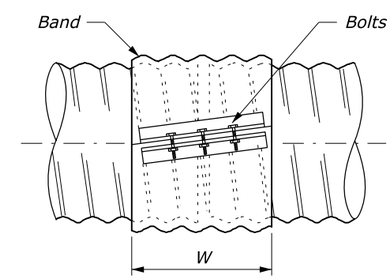
FLAT BAND

NOTE:

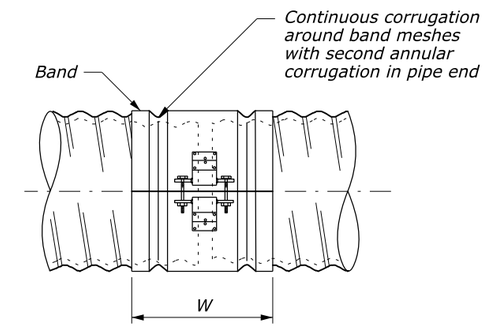
1. Watertight pipe joints are not required unless specified in the Special Contract Requirements.
2. Other types of coupling bands or fastening devices that comply with the joint performance criteria of AASHTO Standard specifications for Highway Bridges, Division II Section 26 may be used.



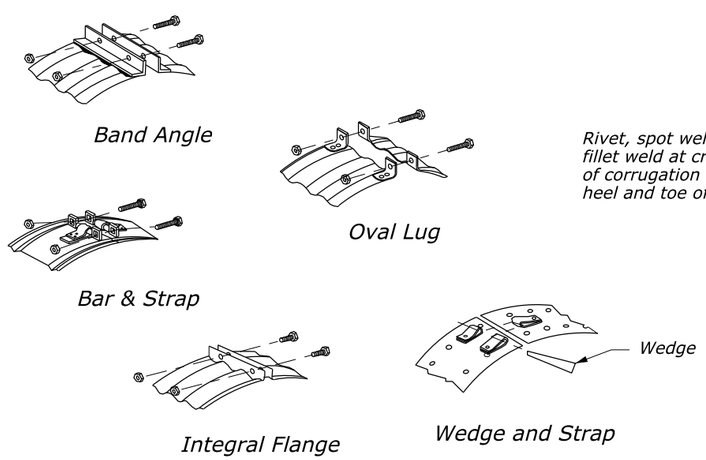
SIDE VIEW



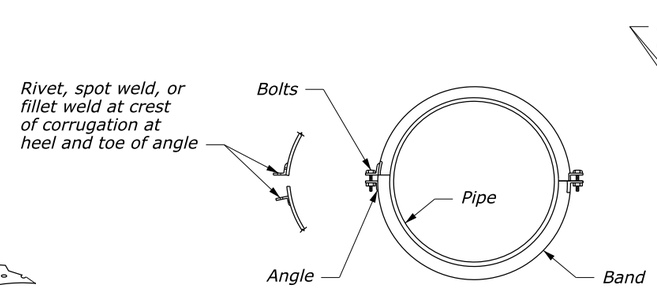
SIDE VIEW



SIDE VIEW



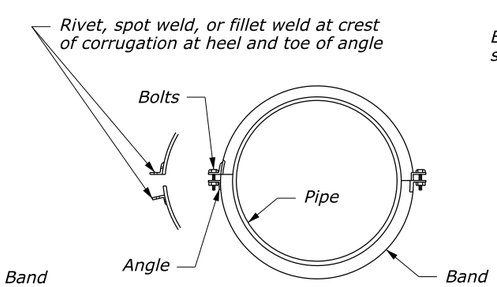
STANDARD BAND CONNECTIONS



END VIEW

Second angle connection optional to 42" diameter, required above 42" diameter

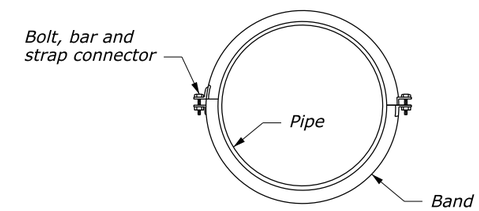
ANNULAR BAND



END VIEW

Second angle connection optional to 42" diameter, required above 42" diameter

HELICAL BAND



END VIEW

SEMI-CORRUGATED BAND

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

METAL PIPE CULVERT COUPLING BAND

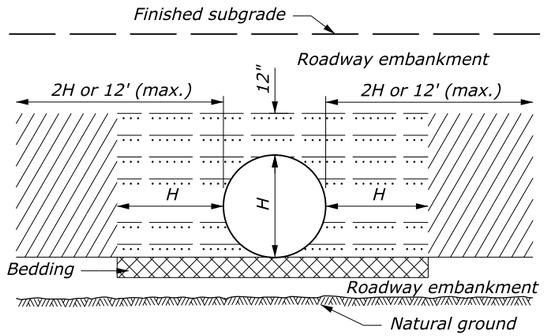
STANDARD APPROVED FOR USE 12/1993
REVISED: 4/1994 6/2005

STANDARD 602-2

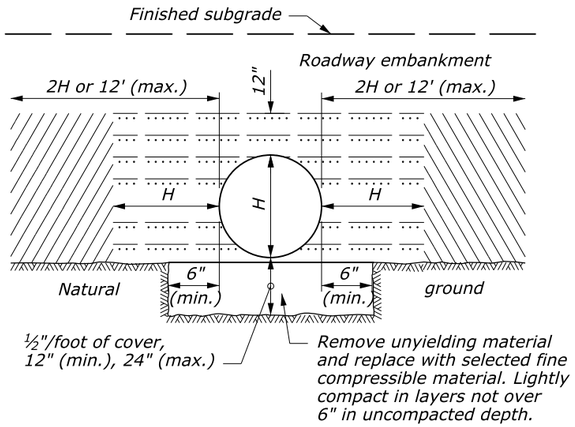
11/16/2014

...\mf1010ec.dgn [US Customary]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	G.4

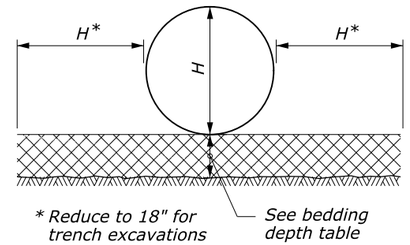


ABOVE NATURAL GROUND



ON UNYIELDING MATERIAL

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



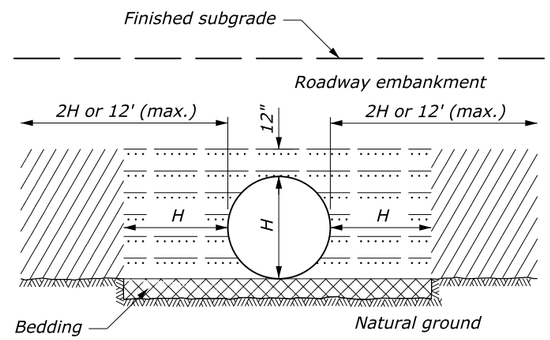
PIPE BEDDING

NOTE:

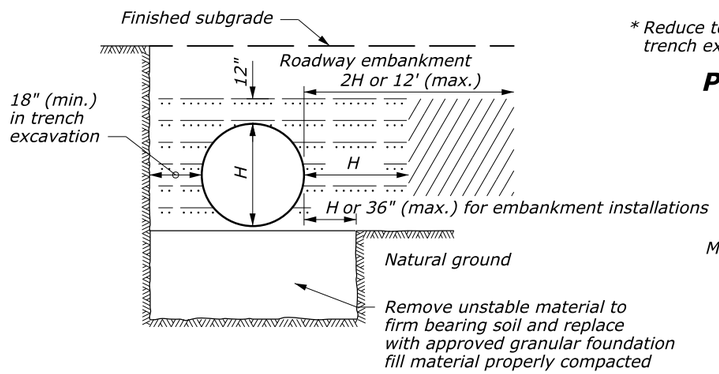
1. When directed, camber pipe culverts upward from a chord through the inlet and outlet inverts an ordinate amount equal to 1% of the pipe length. Develop camber on a parabolic curve. If the midpoint elevation on the parabolic curve as designed exceeds the elevation of the inlet invert, reduce the amount of camber or increase the pipe culvert gradient.

2. H equals the diameter of all round pipe culverts or the rise dimension of all pipe arch culverts.

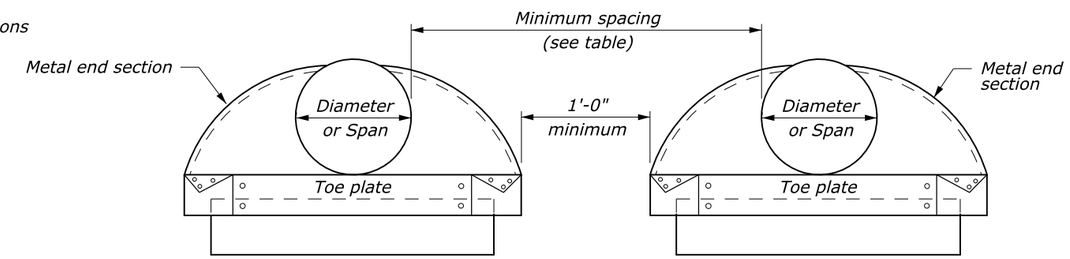
MINIMUM SPACING	
DIAMETER or SPAN	SPACING
UP to 48"	24"
48" and UP	Half diameter or span OR 36" whichever is less



ON NATURAL GROUND

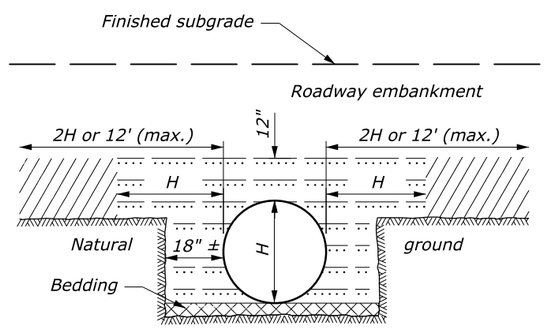


ON UNSTABLE MATERIAL

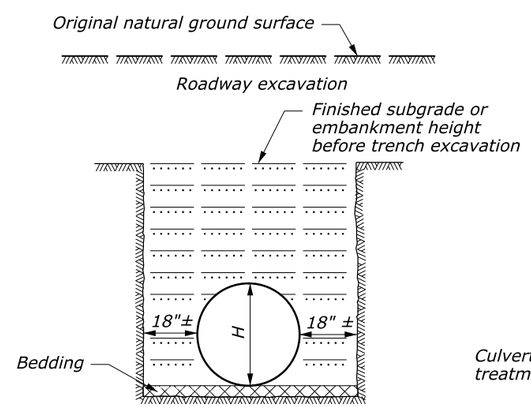


ELEVATION

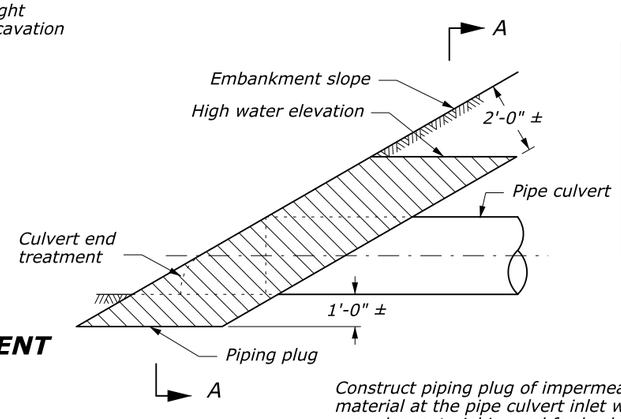
MULTIPLE PIPE INSTALLATION

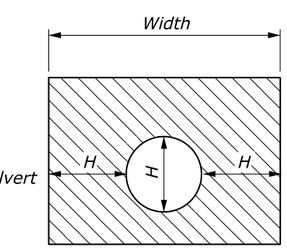


ABOVE AND BELOW NATURAL GROUND



BELOW NATURAL GROUND OR TRENCH EXCAVATION IN EMBANKMENT





SECTION A-A

Construct piping plug of impermeable backfill material at the pipe culvert inlet where granular material is used for backfill. Width may be adjusted to tie into impervious material.

PIPING PLUG NO SCALE

Bedding material (uncompacted)

Embankment material placed in layers not exceeding 6" compacted depth.

Compacted backfill material placed in layers not exceeding 6" compacted depth meeting the following:
Metal Pipe: Maximum particle size = 3"
Soil classification: A-1, A-2, or A-3
Plastic Pipe: Maximum particle size: 1½"
Soil classification: A-1, A-2-4, A-2-5, or A-3
Or lean concrete backfill in accordance with Section 614.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

METAL AND PLASTIC PIPE CULVERT BEDDING

STANDARD APPROVED FOR USE 12/1993
REVISED: 4/1994 6/2005

STANDARD 602-3

11/16/2014

...\mf10101ed.dgn [US Customary]

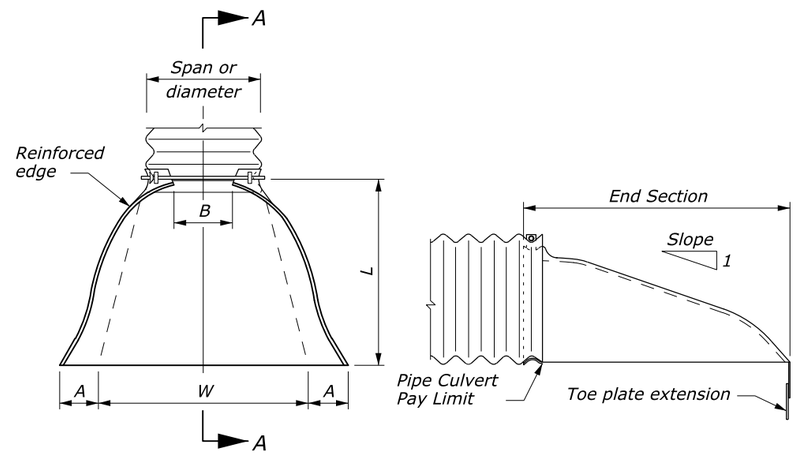
STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	G.5

END SECTIONS FOR ROUND PIPE CULVERT

PIPE SIZE DIAMETER INCHES	METAL THICKNESS STEEL INCHES	STEEL GAGE	ALUMINUM INCHES	ALUMINUM GAGE	DIMENSIONS INCHES A (min)	B (max)	H (min)	L (±2")	W (max)	SLOPE Approx.
12	0.064	16	0.060	16	5	7	6	21	44	2¼
15	0.064	16	0.060	16	6	8	6	26	52	2¼
18	0.064	16	0.060	16	7	10	6	31	58	2⅛
21	0.064	16	0.060	16	8	12	6	36	66	2⅛
24	0.064	16	0.060	16	9	13	6	41	72	2⅛
30	0.079	14	0.075	14	11	16	8	51	88	2⅛
36	0.079	14	0.075	14	13	19	9	60	105	2
42	0.109	12	0.105	12	15	25	10	69	122	2⅛
48	0.109	12	0.105	12	17	29	12	78	131	2
54	0.109	12	0.105	12	17	33	12	84	143	2
60	0.109	12	0.105	12	17	36	12	87	157	1⅞
66	0.109	12	0.105	12	17	39	12	87	162	1⅝
72	0.109	12	0.105	12	17	44	12	87	169	1½
78	0.109	12	0.105	12	17	48	12	87	178	1⅜
84	0.109	12	0.105	12	17	52	12	87	184	1⅓
90	0.109	12	0.105	12	17	58	12	87	188	1¼
96	0.109	12	0.105	12	17	58	12	87	197	1⅛

END SECTIONS FOR PIPE ARCH CULVERT

PIPE SIZE SPAN x RISE INCHES	METAL THICKNESS STEEL INCHES	STEEL GAGE	ALUMINUM INCHES	ALUMINUM GAGE	DIMENSIONS INCHES A (min)	B (max)	H (min)	L (±2")	W (max)	SLOPE Approx.
17 x 13	0.064	16	0.060	16	5	9	6	20	52	2⅛
21 x 15	0.064	16	0.060	16	6	11	6	24	58	2
24 x 18	0.064	16	0.060	16	7	12	6	28	58	2⅛
28 x 20	0.064	16	0.060	16	7	16	6	32	66	2
35 x 24	0.079	14	0.075	14	9	16	6	39	72	1⅞
42 x 29	0.079	14	0.075	14	11	18	7	46	88	1⅞
49 x 33	0.109	12	0.105	12	12	21	9	53	105	1¾
57 x 38	0.109	12	0.105	12	16	26	12	62	122	1⅞
60 x 46	0.109	12	0.105	12	17	36	12	70	142	1⅞
64 x 43	0.109	12	0.105	12	17	30	12	69	131	1⅞
66 x 51	0.109	12	0.105	12	17	36	12	77	156	1¾
71 x 47	0.109	12	0.105	12	17	36	12	77	143	1⅞
73 x 55	0.109	12	0.105	12	17	36	12	77	168	1½
77 x 52	0.109	12	0.105	12	17	36	12	77	157	1⅝
81 x 59	0.109	12	0.105	12	17	44	12	77	179	1⅝
83 x 57	0.109	12	0.105	12	17	44	12	77	162	1½
87 x 63	0.109	12	0.105	12	17	44	12	77	186	1½
95 x 67	0.109	12	0.105	12	17	44	12	87	210	1½
103 x 71	0.109	12	0.105	12	17	44	12	87	222	1⅓
112 x 75	0.109	12	0.105	12	17	44	12	87	226	1¼

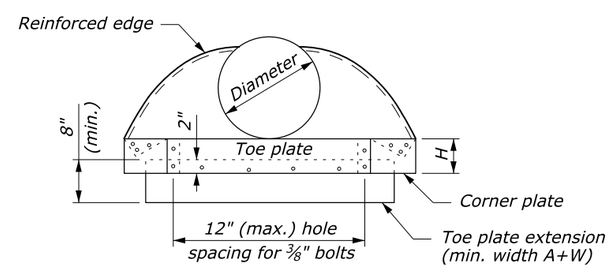


PLAN SECTION A-A

ROUND OR PIPE ARCH CULVERT

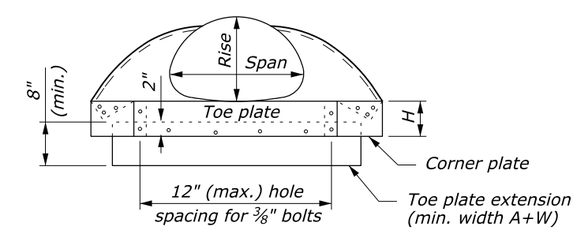
NOTE:

1. Variations in design and dimensions are permitted to allow for manufacturer's standards.
2. Fabricate the diameter of the end section of Design B to match the inside diameter of the concrete pipe culvert.
3. Design C may be used in lieu of design A for all metal pipe culvert sizes. Coupling bands may be any acceptable type for the pipe culvert specified.
4. Fabricate multiple piece bodies with lap seams tightly joined by ⅜" rivets or bolts. Fabricate end section center panels for 60" and larger diameter pipe and equivalent pipe arch from 0.138 inch steel or 0.135 inch aluminum.
5. On end section center panels for 66" and larger equivalent pipe arch provide 2½" x 2½" x ¼" angle reinforcement bolted or riveted under the center panel seam.
6. Supplement the reinforced edges of end sections for 60" and larger diameter pipe and 66" and larger equivalent pipe arch with 2½" x 2½" x ¼" stiffener angles attached with bolts or rivets.
7. Fabricate connector section, corner plate and toe plate extensions from the same metal thickness as the panel body. Use toe plate extension where shown on the plans.
8. Warp embankment slopes to match the slope of the flared end sections.



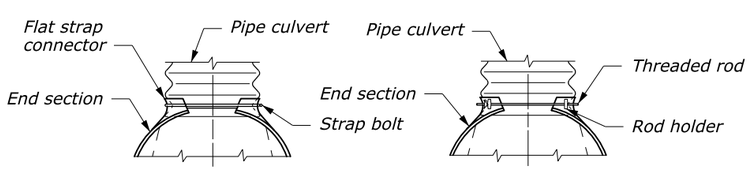
ELEVATION

ROUND PIPE CULVERT



ELEVATION

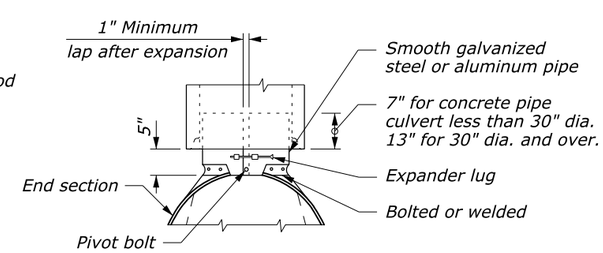
PIPE ARCH CULVERT



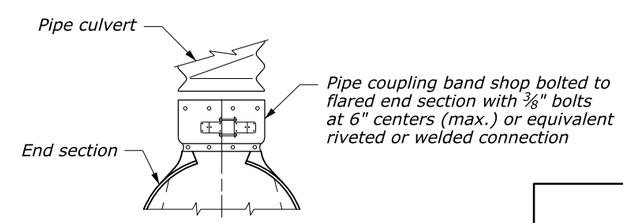
For 12" thru 24" round pipe and 17" x 13" thru 28" x 20" pipe arch

For 30" thru 60" round pipe and 35" x 24" thru 66" x 51" pipe arch

DESIGN A
CONNECTION TO ANNULAR CORRUGATED METAL PIPE



DESIGN B
CONNECTION TO CONCRETE PIPE INLET END



For all sizes of round pipe and pipe arch

DESIGN C
CONNECTION TO METAL PIPE OR OUTLET END OF CONCRETE PIPE

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

METAL END SECTIONS

STANDARD APPROVED FOR USE 12/1993
REVISED: 4/1994 6/2005
DRAFT: 10/2007

STANDARD 602-4

11/16/2014

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POLYETHYLENE (PE) PLASTIC ROUND PIPE CULVERT

FILL HEIGHT TABLE AND MINIMUM CELL CLASSIFICATION NUMBER PER ASTM D 3350

SMOOTH WALL (SOLID WALL)

PIPE SIZE DIAMETER INCHES	MINIMUM COVER INCHES	CELL CLASSIFICATION NUMBER 335434C — MINIMUM WALL THICKNESS (INCHES) 0.607	0.857	0.923	1.154	1.385	1.292	1.477
		MAXIMUM FILL HEIGHT (FEET)						
12	12	57						
18	12		52					
24	12			38				
30	12				38			
36	12					38		
42	12						27	
48	12							27

CORRUGATED

PIPE SIZE DIAMETER INCHES	MINIMUM COVER INCHES	CELL CLASS. NO. 435400C MAXIMUM FILL HEIGHT (FEET)
12	12	10
15	12	10
18	12	10
24	12	10
30	12	10
36	12	10

RIBBED

PIPE SIZE DIAMETER INCHES	MINIMUM COVER INCHES	CELL CLASS. NO. 334433C	CELL CLASS. NO. 335434C
		MAXIMUM FILL HEIGHT (FEET)	
18	12	18	24
24	12	22	28
30	12	22	28
36	12	25	31
42	12	21	27
48	12	21	26

NOTE:

1. When directed, camber pipe culverts upward from a chord through the inlet and outlet inverts an ordinate amount equal to 1% of the pipe length. Develop camber on a parabolic curve. If the midpoint elevation on the parabolic curve as designed exceeds the elevation of the inlet invert, reduce the amount of camber or increase the pipe culvert gradient.
2. Measure minimum cover from the top of the pipe culvert to the subgrade for flexible pavements, and to the top of the pavement for rigid pavements. Measure maximum fill height from the top of the pipe to the top of the pavement for both flexible and rigid pavement.

POLYVINYL CHLORIDE (PVC) PLASTIC ROUND PIPE CULVERT

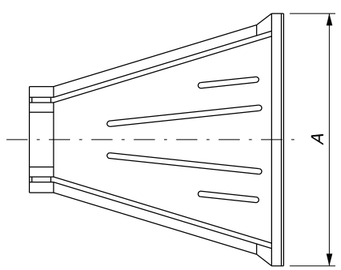
FILL HEIGHT TABLE AND MINIMUM CELL CLASSIFICATION NUMBER PER ASTM D 1784

SMOOTH WALL (SOLID WALL)

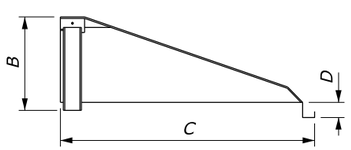
PIPE SIZE DIAMETER INCHES	MINIMUM COVER INCHES	CELL CLASS. NO. 12454 — MINIMUM WALL THICKNESS (INCHES) 0.358	0.438	CELL CLASS. NO. 12364 — 0.358	0.438
		MAXIMUM FILL HEIGHT (FEET)			
12	12	65		69	
15	12		62		66

RIBBED

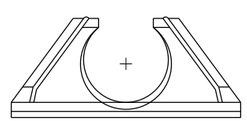
PIPE SIZE DIAMETER INCHES	MINIMUM COVER INCHES	CELL CLASS. NO. 12454C	CELL CLASS. NO. 12364C
		MAXIMUM FILL HEIGHT (FEET)	
12	12	37	26
15	12	32	22
18	12	33	23
24	12	29	21
30	12	28	20
36	12	27	19
42	12	26	18
48	12	24	17



TOP



SIDE



FRONT

END SECTION DIMENSIONS

PIPE SIZE DIAMETER INCHES	DIMENSIONS INCHES A	B	C	D
12	42	14.5	33	6
15	46	24.5	45.5	6
18	54	29	55	6
24	64	37	65	6
30	88	36	63.5	6
36	88	43	66.5	6

PLASTIC PIPE END SECTION

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

PLASTIC PIPE CULVERT

STANDARD APPROVED FOR USE 12/1993

REVISED: 4/1994 6/2005
DRAFT 12/2008

STANDARD 602-5

...\mf1010ef.dgn [US Customary] 11/16/2014

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	G.7

CONCRETE ROUND PIPE CULVERT

FILL HEIGHT AND PIPE CLASS TABLE

PIPE SIZE		EMBANKMENT				TRENCH			
DIAMETER INCHES	MINIMUM COVER INCHES	CLASS II	CLASS III	CLASS IV	CLASS V	CLASS II	CLASS III	CLASS IV	CLASS V
		MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE IN FEET							
12	12	10	10	15	23	18	18	26	13
18	12	10	10	25	39	13	13	31	45
24	12	10	10	15	30	15	15	22	40
30	12	9	13	15	35	13	16	20	46
36	12	9	9	20	41	10	13	26	56
48	12	12	13	26	44	15	16	30	49
60	12	15	17	28	44	15	20	32	49
72	12	13	17	30	41	15	20	35	49
84	12	13	19	30		15	23	37	
96	12	13	20			15	24		
108	14	15	20			18	26		

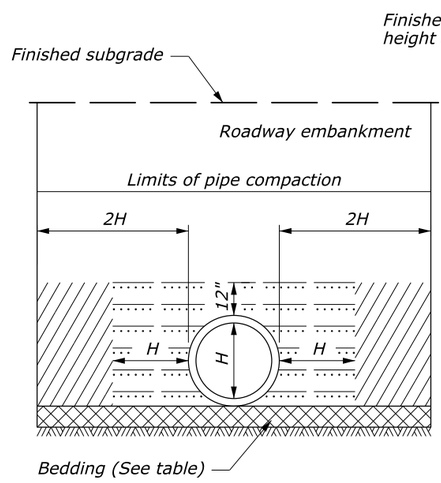
LEGEND:

- Bedding material (uncompacted).
- Embankment material placed in layers not exceeding 6" compacted depth.
- Compacted backfill material placed in layers not exceeding 6" compacted depth meeting the following:
  - Maximum particle size = 3"
  - Soil classification: A-1, A-2 or A-3
  - Or, lean concrete backfill in accordance with Section 614.
- Impermeable backfill material.

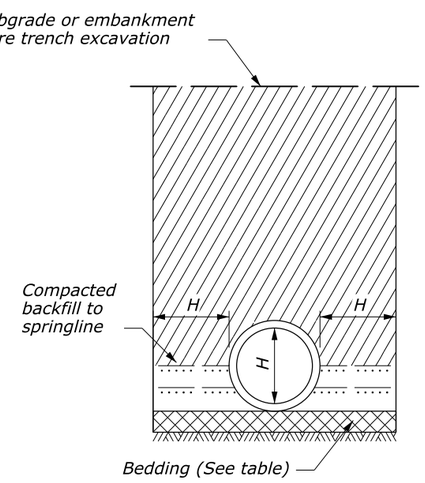
NOTE:

1. When directed, camber pipe culverts upwards from a chord through the inlet and outlet inverts an ordinate amount equal to 1% of the pipe length. Develop camber on a parabolic curve. If the midpoint elevation on the parabolic curve as designed exceeds the elevation of the inlet invert, reduce the amount of camber or increase the pipe culvert gradient.
2. Measure minimum cover from the top of the pipe culvert to the subgrade for flexible pavements, and to the top of the pavement for rigid pavements. Measure maximum fill height from the top of the pipe to the top of the pavement for both flexible and rigid pavements.
3. Pipe compaction limits shown are for pipe installation in an embankment. For pipe installation in a trench, the compaction limits shall be the walls of the trench.
4. Where unyielding or unstable material is encountered, install the pipe culvert according to the limits of pipe compaction shown on Standard 602-3.
5. Maximum fill heights for pipe culvert installations may be increased on approval of site-specific structural pipe designs meeting the criteria of AASHTO Standard Specifications for Highway bridges.
6. Use Supplemental Concrete Pipe Tie when specified in the contract documents.

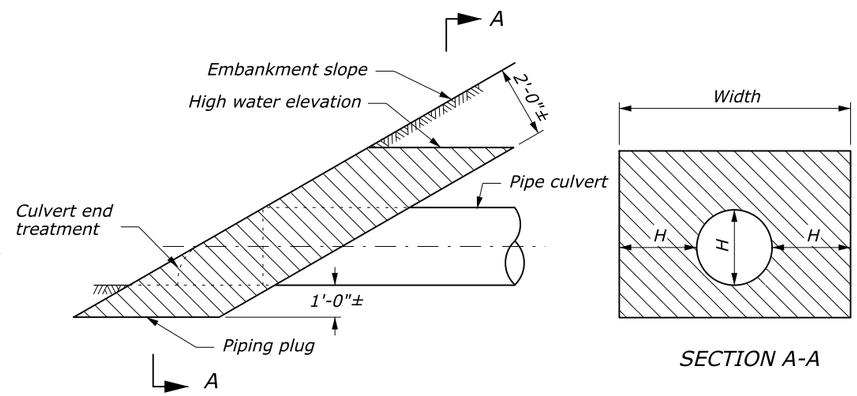
BEDDING DEPTH	
PIPE SIZE (H)	DEPTH
12" TO 54"	4"
> 54"	6"



EMBANKMENT INSTALLATION

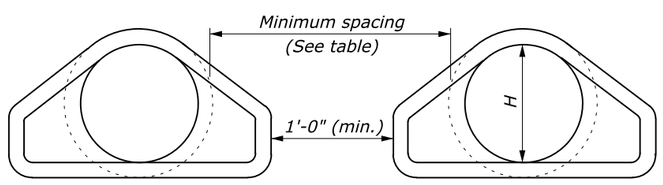


TRENCH INSTALLATION



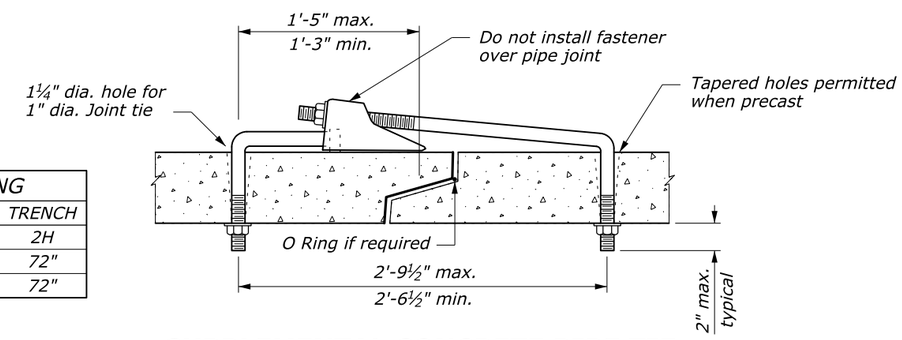
Construct a piping plug of impermeable backfill material at the pipe inlet where granular material is used for backfill. Width may be adjusted to tie into impervious material.

PIPING PLUG

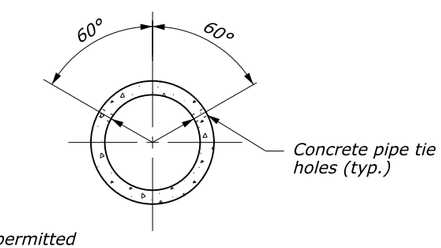


MULTIPLE ROUND PIPE INSTALLATION

MINIMUM SPACING		
DIAMETER	EMBANKMENT	TRENCH
12"-36"	15"	2H
36"-96"	0.5H	72"
OVER 96"	48"	72"



SUPPLEMENTAL CONCRETE PIPE TIE



NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

CONCRETE PIPE CULVERT INSTALLATION

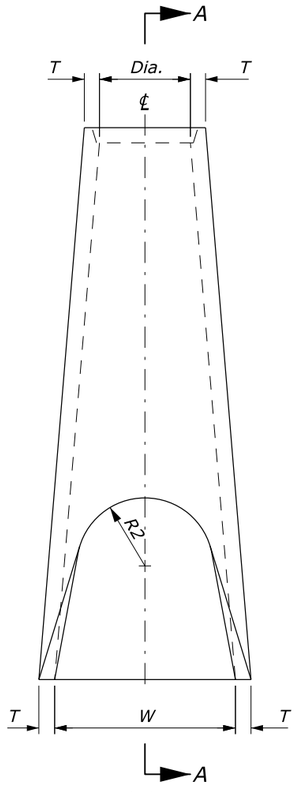
STANDARD APPROVED FOR USE 12/1993
REVISED: 4/1994 6/2005
DRAFT: 9/2005

STANDARD 602-7

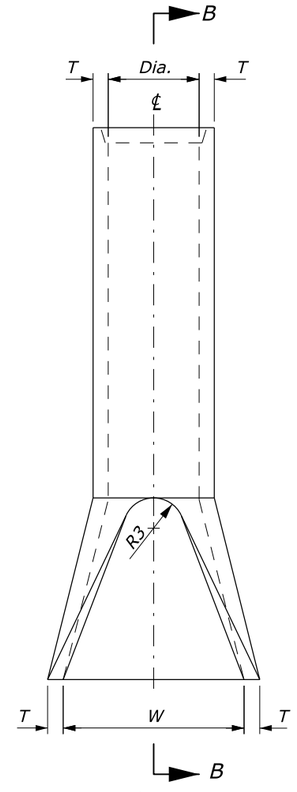
11/16/2014

...\mt10101eg.dgn [US Customary]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	G.8



PLAN



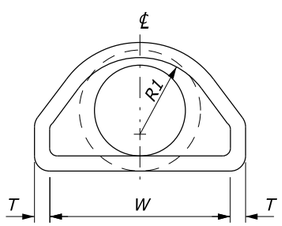
PLAN

NOTE:

1. Variations in design and dimensions are permitted to allow for manufacturer's standards.
2. Fabricate the outlet end section with a groove end and the inlet end section with a tongue end.
3. Warp embankment slopes to match the slope of the flared end section.

END SECTIONS FOR ROUND PIPE CULVERT

PIPE SIZE DIAMETER INCHES	DIMENSIONS INCHES									
	T	A	B	C	L	W	F	R1	R2	R3
12	2	4	24	48⅞	72⅞	24	13	10⅛	9	4
15	2¼	6	27	46	73	30	16	12½	11	6
18	2½	9	27	46	73	36	19	15½	12	7½
21	2¾	9	36	37	73	42	22	16½	13	5
24	3	9½	43½	30	73½	48	25	16¾	14	8
27	3¼	10½	48	25½	73½	54	28	--	14½	9
30	3½	12	54	19¾	73¾	60	31	18½	15	8
33	3¾	13½	59½	37½	96	66	34	23¾	17½	9
36	4	15	63	33	96	72	37	23¼	20	11
42	4½	21	63	33	96	78	43	--	22	11
48	5	24	72	24	96	84	49	--	22	12



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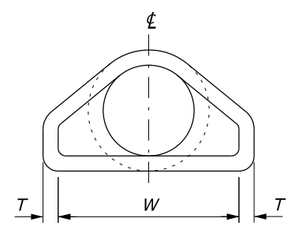
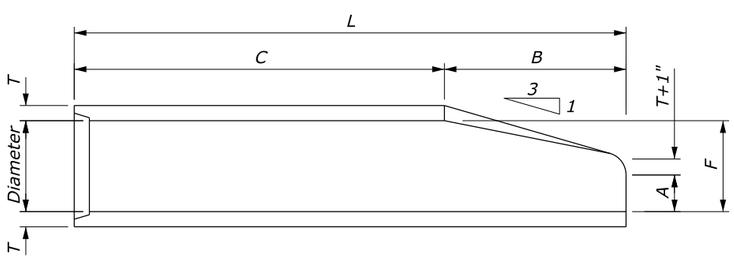
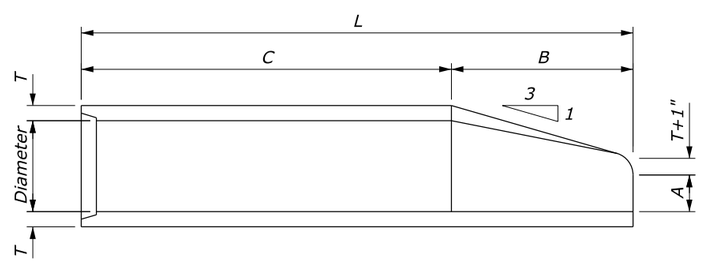


ELEVATION



SECTION A-A



SECTION B-B

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

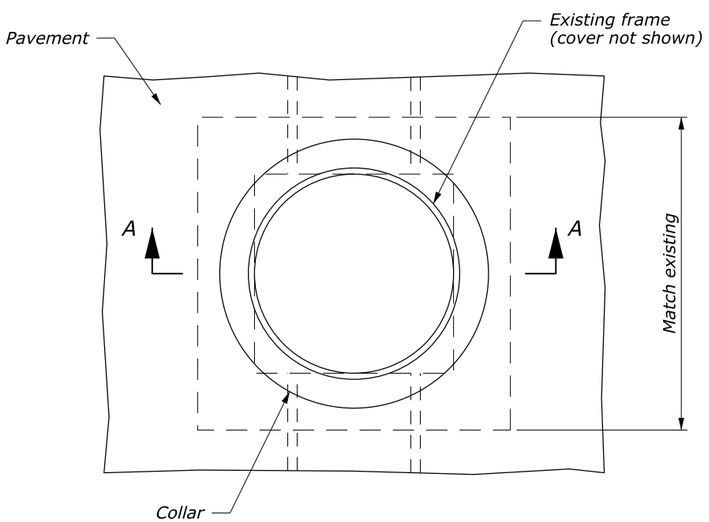
CONCRETE END SECTION FOR ROUND PIPE

STANDARD APPROVED FOR USE 12/1993
REVISED: 4/1994 6/2005

STANDARD 602-8

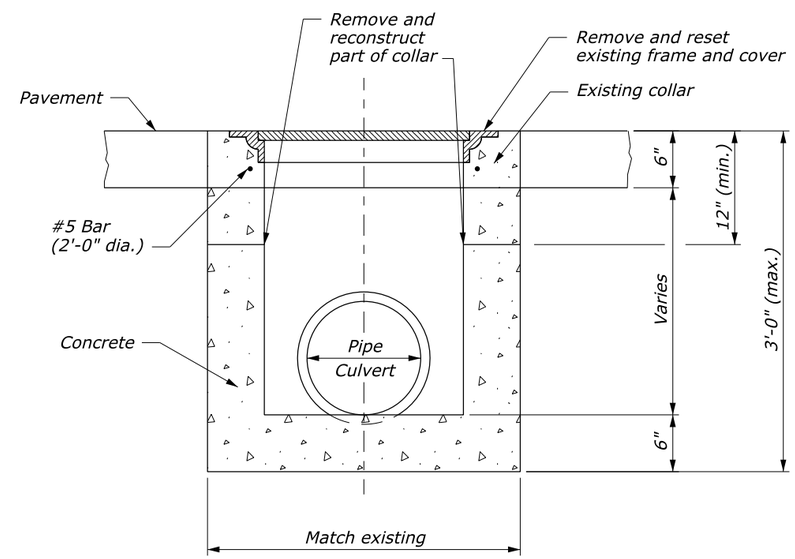
...\mf1010leh.dgn [US Customary] 11/16/2014

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	H.1



MANHOLE RETROFITING

PLAN



SECTION A-A

NO SCALE

ROADWAY DETAILS

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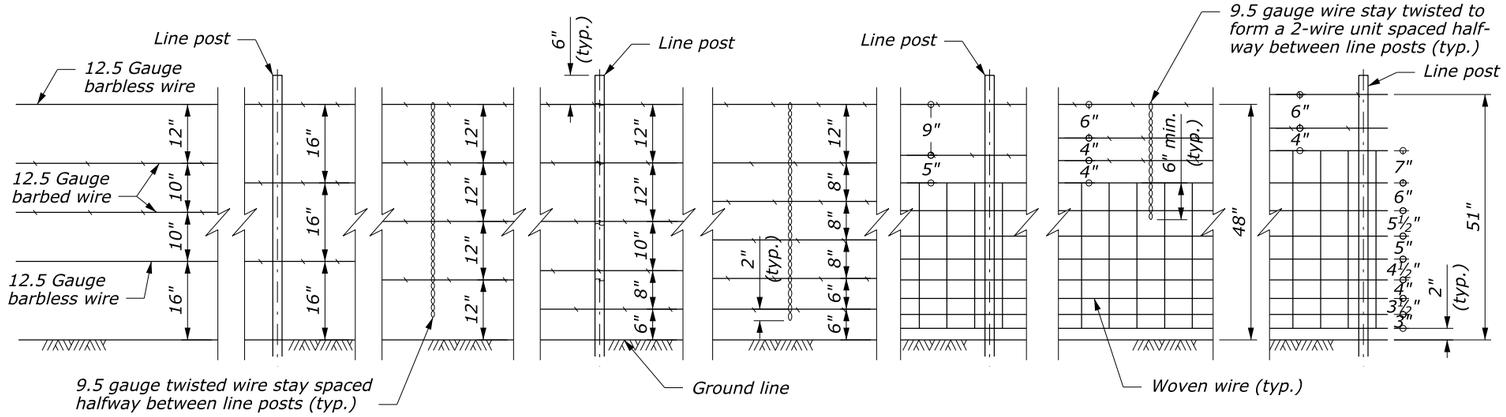
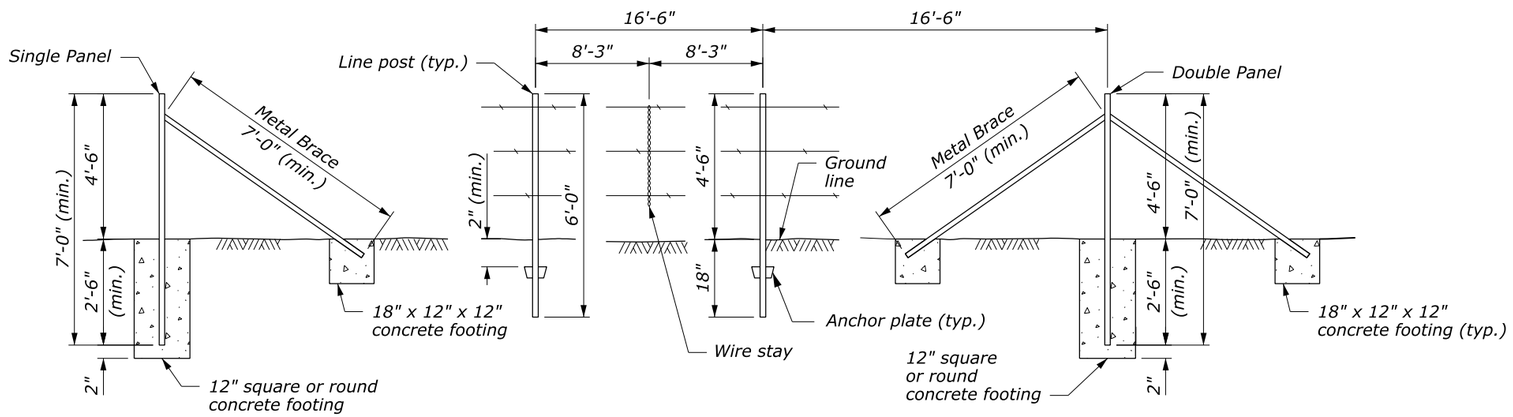
16 November 2014 8:22 PM

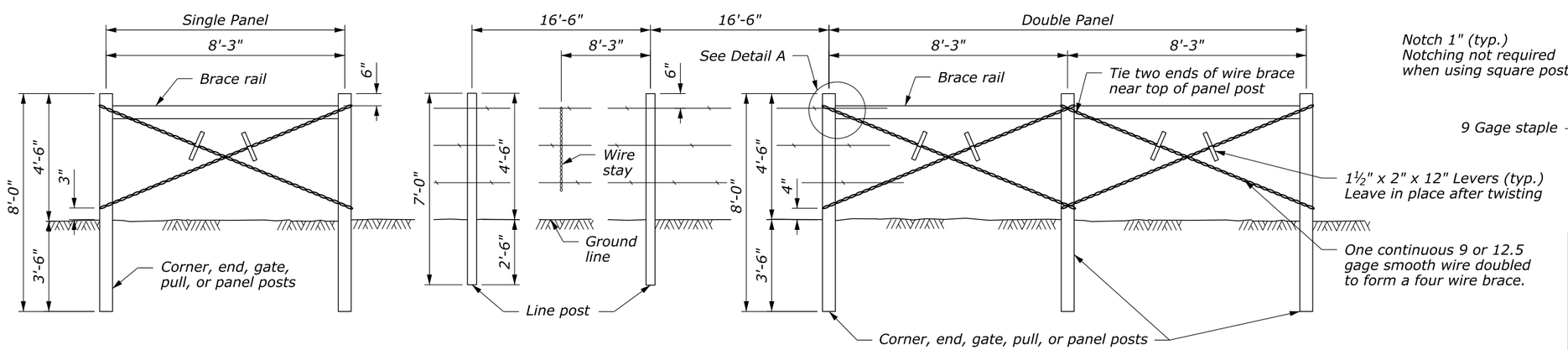
STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	H.2



FENCE WIRE DETAILS



FENCE WITH STEEL POSTS



FENCE WITH WOOD POSTS

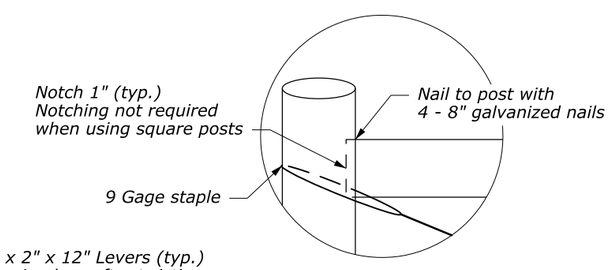
NO SCALE

NOTE:

1. Place all fence wire on pasture side of post, except on curves place the wire on the outside of the curve. In areas subject to high winds and moving debris wires may be placed on windward side of posts (except on curves).
2. Measure post spacing parallel to ground.
3. In each 500' run of wood post fence, place one metal post in place of a wood line post for lightning protection.
4. Use wood panels on all metal fences instead of the steel panels unless otherwise specified.
5. Attach all barbed wires to posts. Attach bottom, top, center, and alternate wires of woven wire to line posts. Attach all wires of woven wire to corner posts or post used to tie-off wire. Attach wires using staples for wood posts and using ties for steel posts.
6. Use wire stays on all fences unless wood stays are specified. When wood stays are specified, use either 2" round, a rough dimension 2" x 2", or a 1½" x 3½" (nominal 2" x 4"). Provide stay of sufficient length to be placed on the ground with the top of stay extending 2" above the top wire. Attach each wire to the wood stays using 1¾" x 9 gage staples. Wood stays do not need to be treated.

POST DIMENSIONS

MEMBER	WOOD		STEEL
	ROUND	SQUARE	
Line post	4"	4" x 4"	1.33 lb/ft
Brace	4"	4" x 4"	2" x 2" x ¼"
Other posts	5"	5" x 5"	2½" x 2½" x ¼"



DETAIL A

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY DETAIL

MONTANA FENCE

Sheet 1 of 2

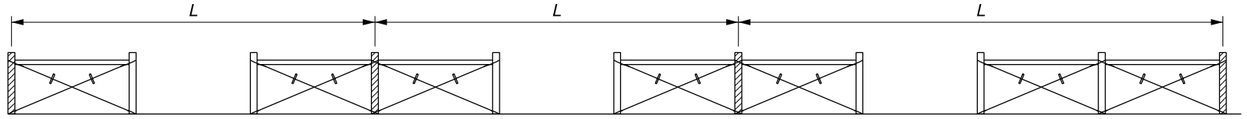
DETAIL APPROVED FOR USE 2/2010

REVISED:

DETAIL W619-60

16 November 2014 8:22 PM c:\myfiles\pw_production\d0142271\mf1010tb.dgn [USC]

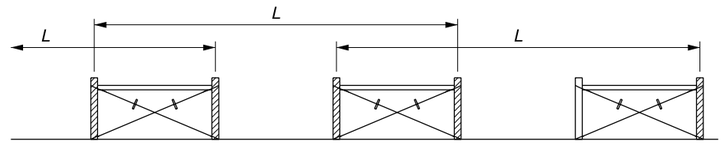
STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	H.3



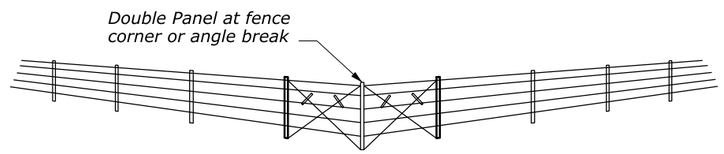
SINGLE PANEL (End of Run) | DOUBLE PANEL | DOUBLE PANEL | DOUBLE PANEL (End of Run)

FENCE TYPE	RUN = L	PANELS REQUIRED
Combination Woven Wire & Barbed Wire	< 33'	None
	33' to 330'	Single
	> 330' to 660' Max.	Double
Barbed Wire	< 66'	None
	66' to 660'	Single
	> 660' to 990' Max.	Double

NOTE: Tie off on all cross hatched posts.



SINGLE PANEL | SINGLE PANEL | SINGLE PANEL (End of Run)

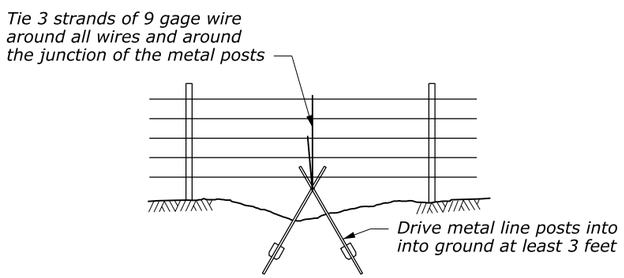


DOUBLE END PANEL

FENCE PANEL TYPES

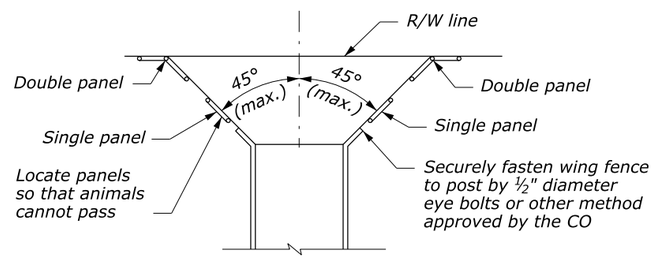
NOTE:

1. Attach barbed wires to tie-off posts by wrapping around the post at least two times, then wrapping the wires around itself five times.
2. To attach woven wire to end post, remove two or three vertical stay wires from the end of the fence. Place the first complete vertical stay wire against post. Start at the middle of the horizontal line wires, wrapping around the end post at least two times and then wrapping around itself five times.
3. A deadman may be a precast concrete block, a cast-in-place block or a rock or other approved object weighing at least 150 pounds. Bury the deadman in the ground with at least 24" cover. Attach the deadman to the fence with 3 strands of 9 gage wire or 6 strands of 12.5 gage wire. The Alternate Deadman shown on this sheet may be used when approved by the CO.
4. Offset "Interstate" fence 1 foot inside right-of-way. Increase length of metal "Interstate" posts and braces to 7'-8". Increase embedment depth to 3'-2". Increase length of metal "Interstate" line posts to 6'-6". Increase embedment depth to 2 feet.

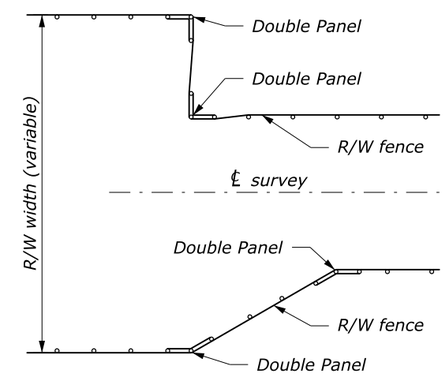


ALTERNATE DEADMAN

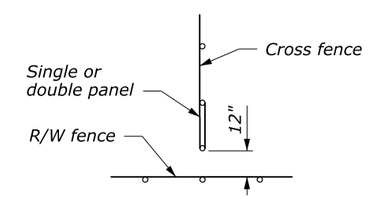
See Note 3 for normal deadman



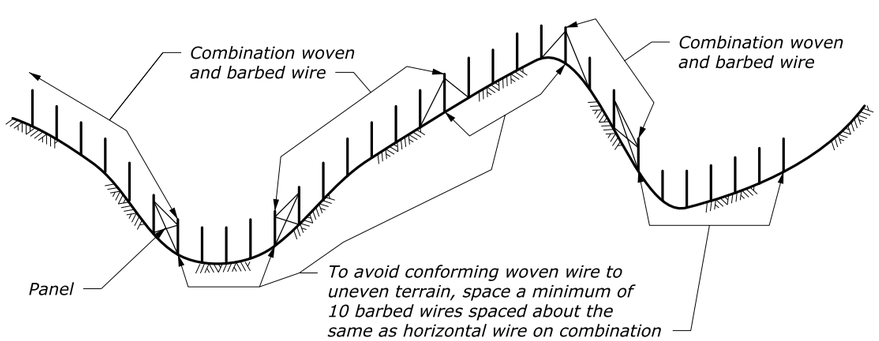
FENCE LAYOUT AT STOCKPASS



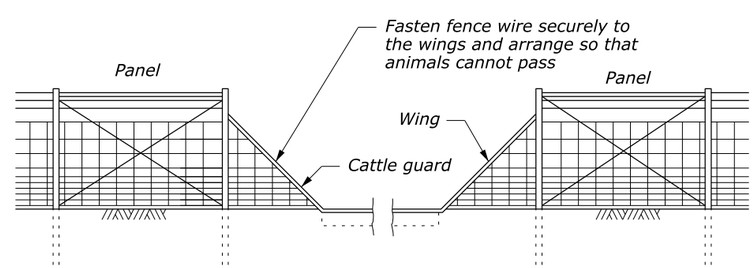
FENCE LAYOUT AT CHANGE IN R/W WIDTH



FENCE LAYOUT AT CROSS FENCE CONNECTION



FENCE LAYOUT ON SHARP VERTICAL CURVES



FENCE CONNECTION TO CATTLE GUARD

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY DETAIL

MONTANA FENCE

Sheet 2 of 2

DETAIL APPROVED FOR USE 2/2010

REVISED:

DETAIL W619-60

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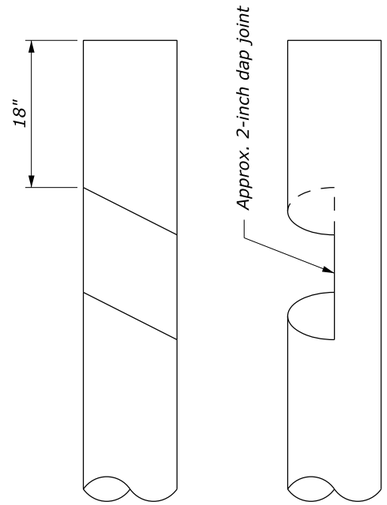
STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	H.4

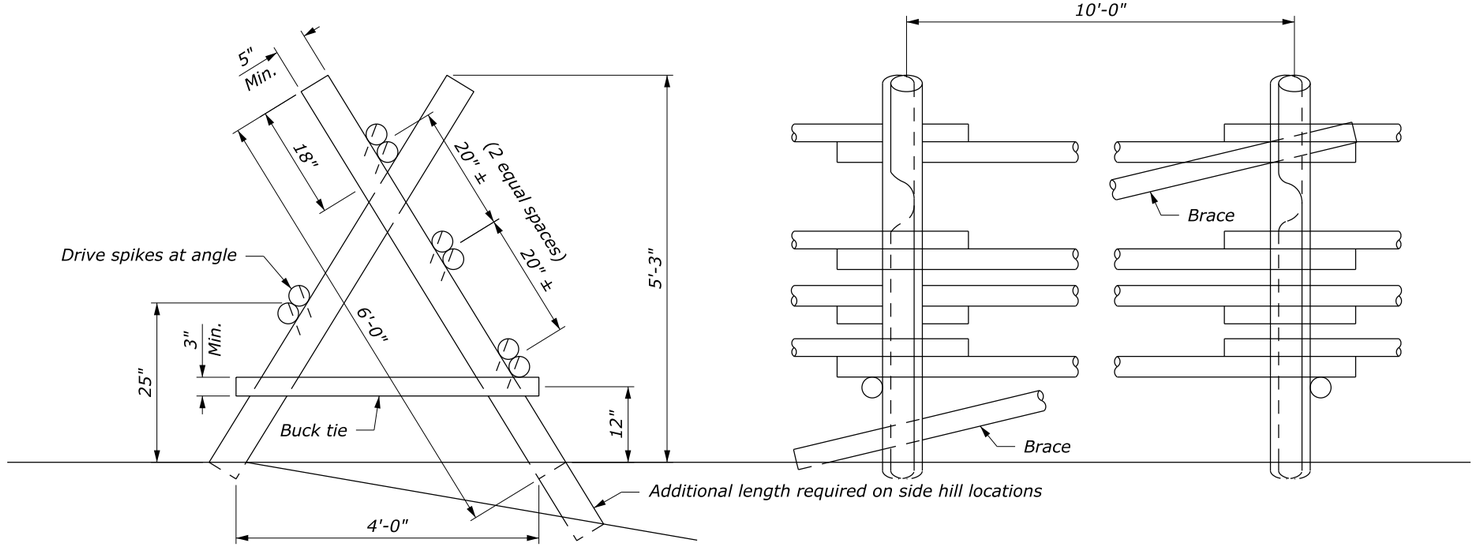


Both buck posts to be notched as shown

BUCK POST JOINT DETAIL

NOTE:

1. *Use either green or seasoned lodgepole pine of sound material free of knots and snags for poles, braces, buck ties, and buck posts .*
2. *Buck posts to be 6-foot long shall have an average diameter of 6" and a minimum diameter of 5-inch. Poles to be 12'-6" ± long shall have an average diameter of 4-inch and a minimum diameter of 3-inch. Buck ties shall have a minimum diameter of 3-inch. On hillside locations, the downhill buck post shall be of such length that the fence will be erect.*
3. *Two 8-inch spikes shall be used to fasten bucks together. One 8-inch spike shall be used to fasten poles, braces, and ties to buck posts.*



BUCK AND POLE FENCE

NO SCALE

JACKLEG (BUCK & POLE) FENCE

Checked by: --/---
Designed by: 11/19/2014
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STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	I.1

ITEM 25702-0000 ALTERNATE RETAINING WALL (Fill Side)		
LOCATION	**LT/RT**	**QUANTITY (SQFT)**
20+25 to 25+50	RT	3060
	TOTAL	**3060**

ITEM 25702-0000 ALTERNATE RETAINIG WALL		
LOCATION	**LT/RT**	**QUANTITY (SQFT)**
26+00 to 28+50	LT	1625
	TOTAL	**1,625**

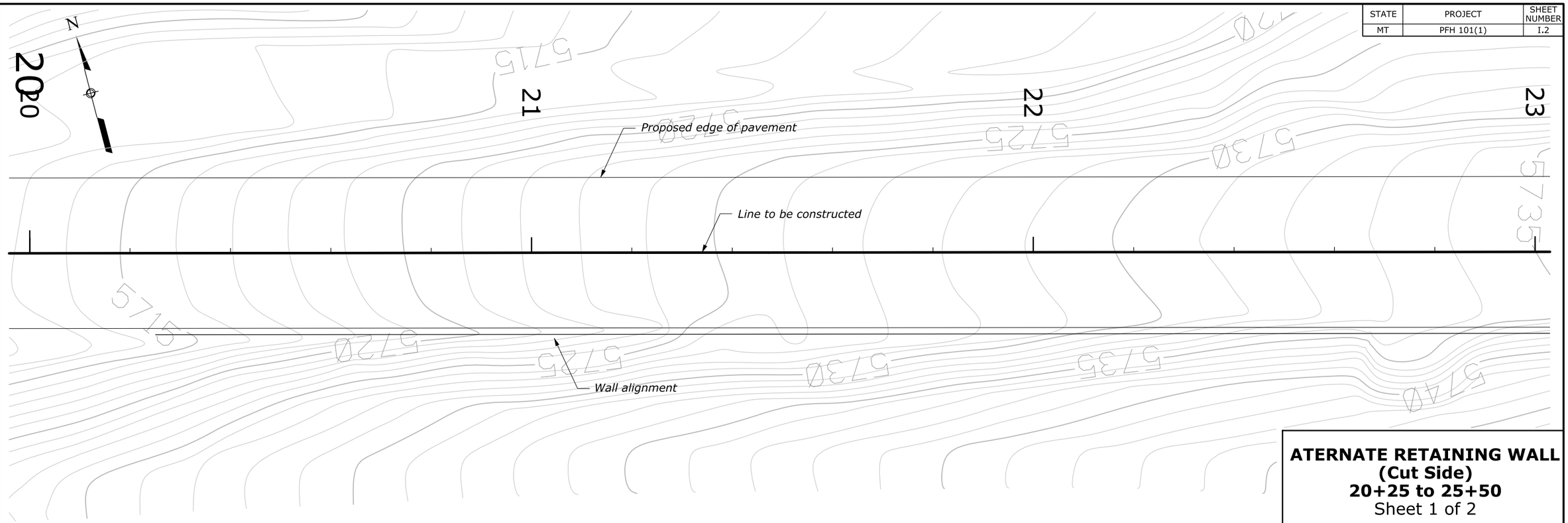
NOTE:

1. *Varify all information presented in this section per SCR Section 257*
2.

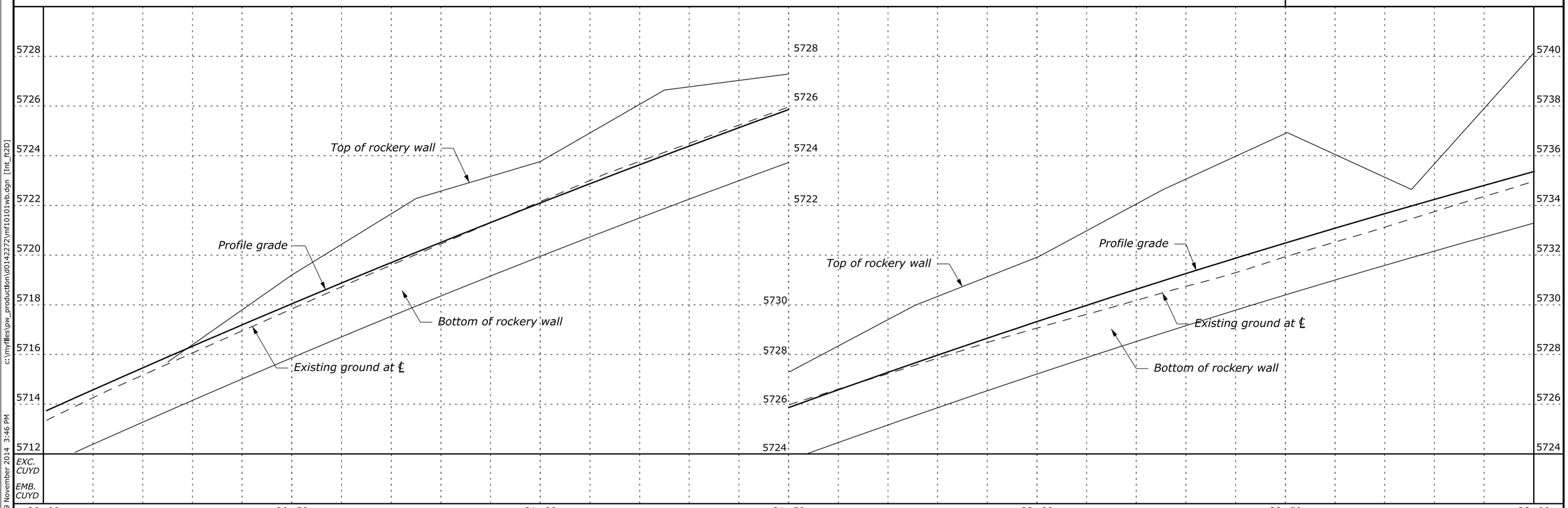
TABULATION OF RETAINING WALLS QUANTITIES

Designed by: T. Phan 05/2013 Checked by: R. Johnson 05/2013
19 November 2014 3:38 PM c:\myfiles\pw_production\d0142272\mf10101wa.dgn [Int_ft2D]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	I.2



ATERNATE RETAINING WALL
(Cut Side)
20+25 to 25+50
Sheet 1 of 2



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Checked by: --/---
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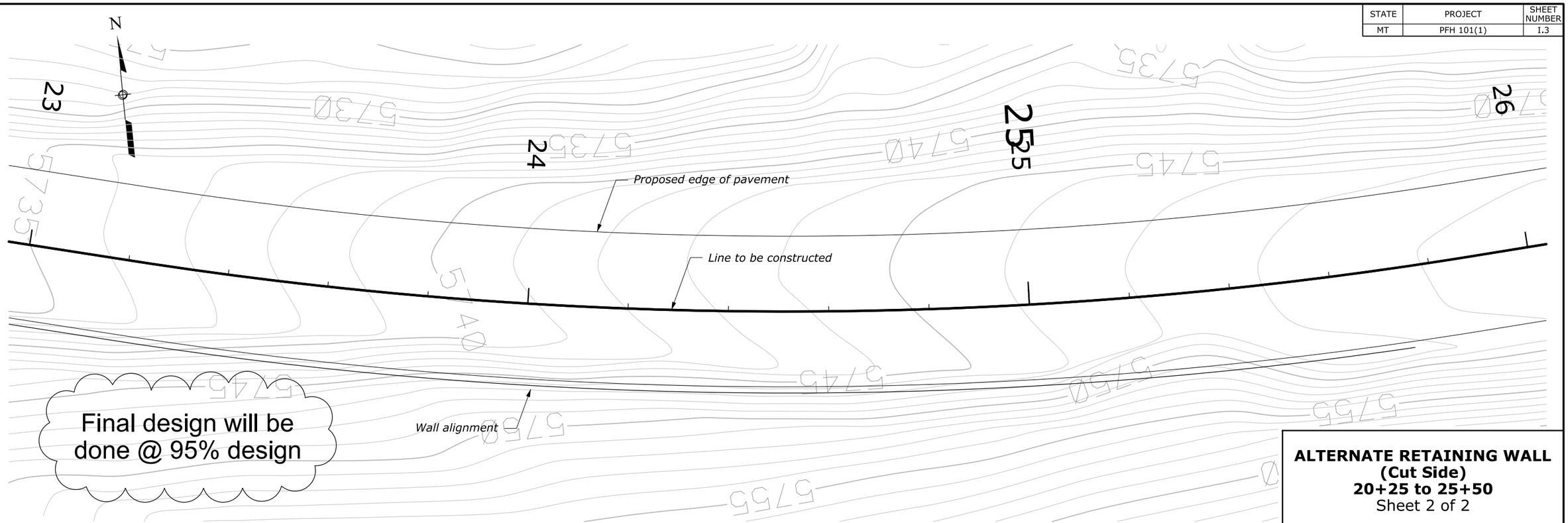
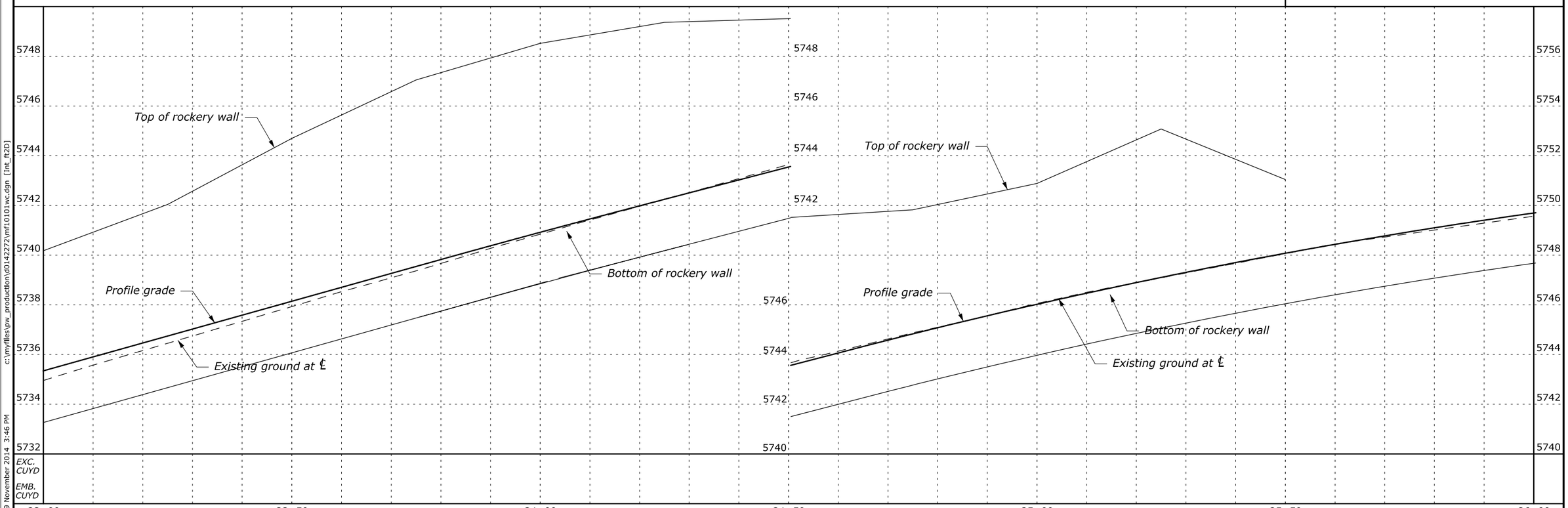
MT	PFH 101(1)	I.3



ALTERNATE RETAINING WALL
(Cut Side)
20+25 to 25+50
Sheet 2 of 2



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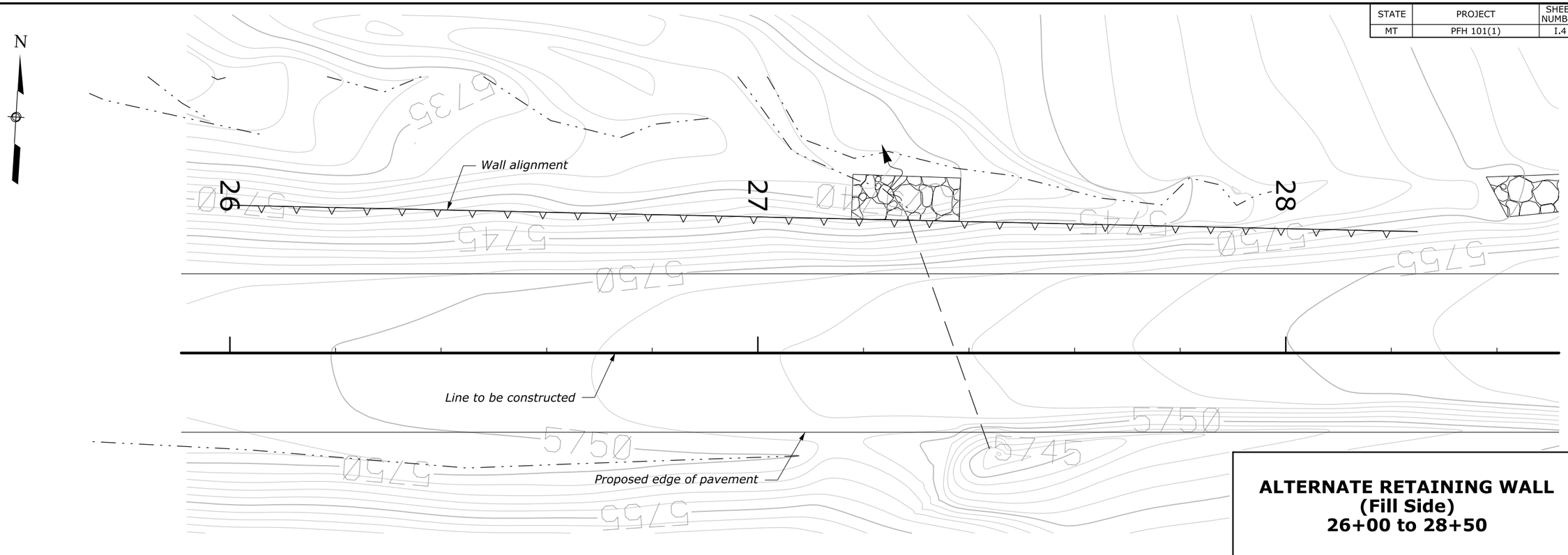
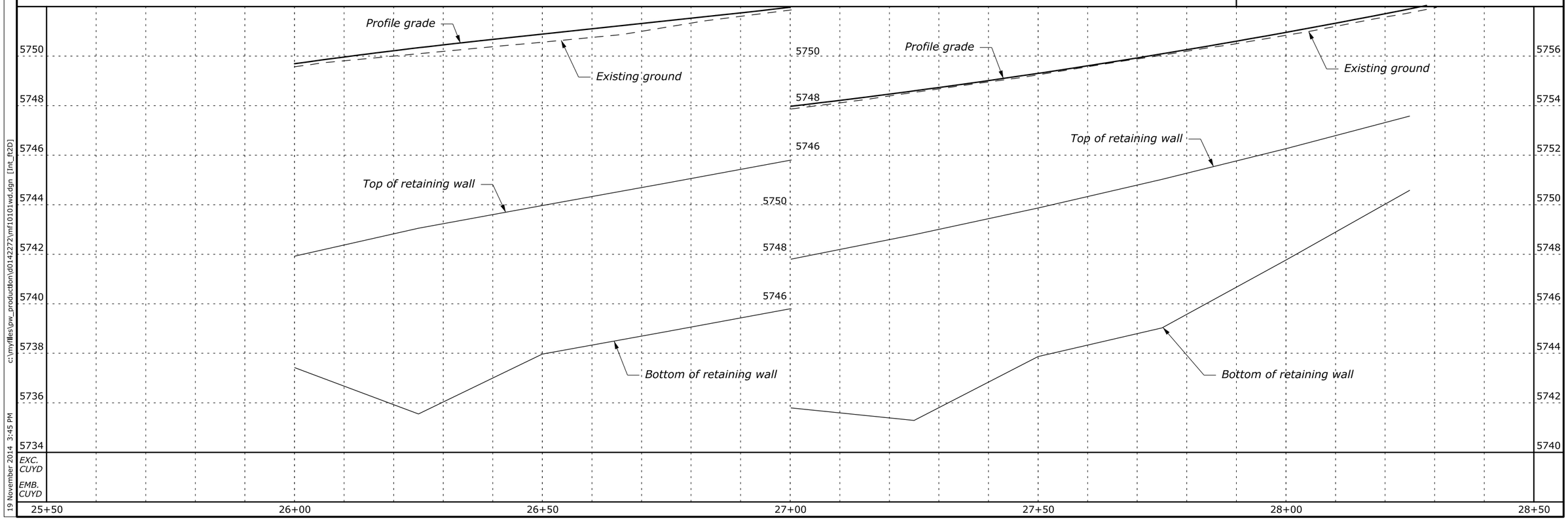
MT	PFH 101(1)	I.4



ALTERNATE RETAINING WALL (Fill Side) 26+00 to 28+50



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19 November 2014 3:45 PM

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	J.1

ITEM 63504-1000
TEMPORARY TRAFFIC CONTROL
CONSTRUCTION SIGN

SIGN NUMBER	MUTCD NUMBER OF REF	LEGEND	SIGN SIZE (IN X IN)	SQFT	QTY	SQFT
1	W16-8P	W FORK RD	30 X 8	1.67	4	6.7
2	W20-1	ROAD WORK AHEAD	36 X 36	9	12	108
3	G20-2	END ROAD WORK	36 X 18	4.5	12	54
4	R11-2	ROAD CLOSED	48 X 30	10	4	40
5	W20-3	ROAD CLOSED 1000 FT	36 X 36	9	6	54
6	W20-3	ROAD CLOSED 500 FT	36 X 36	9	6	54
7	W20-3	ROAD CLOSED 2 MILES	36 X 36	9	2	18
8	W20-4	ONE LANE ROAD AHEAD	36 X 36	9	4	36
9	W20-7a	FLAGGER	36 X 36	9	6	54
10	G20-4	PILOT CAR FOLLOW ME	36 X 18	4.5	1	4.5
					TOTAL	**429**

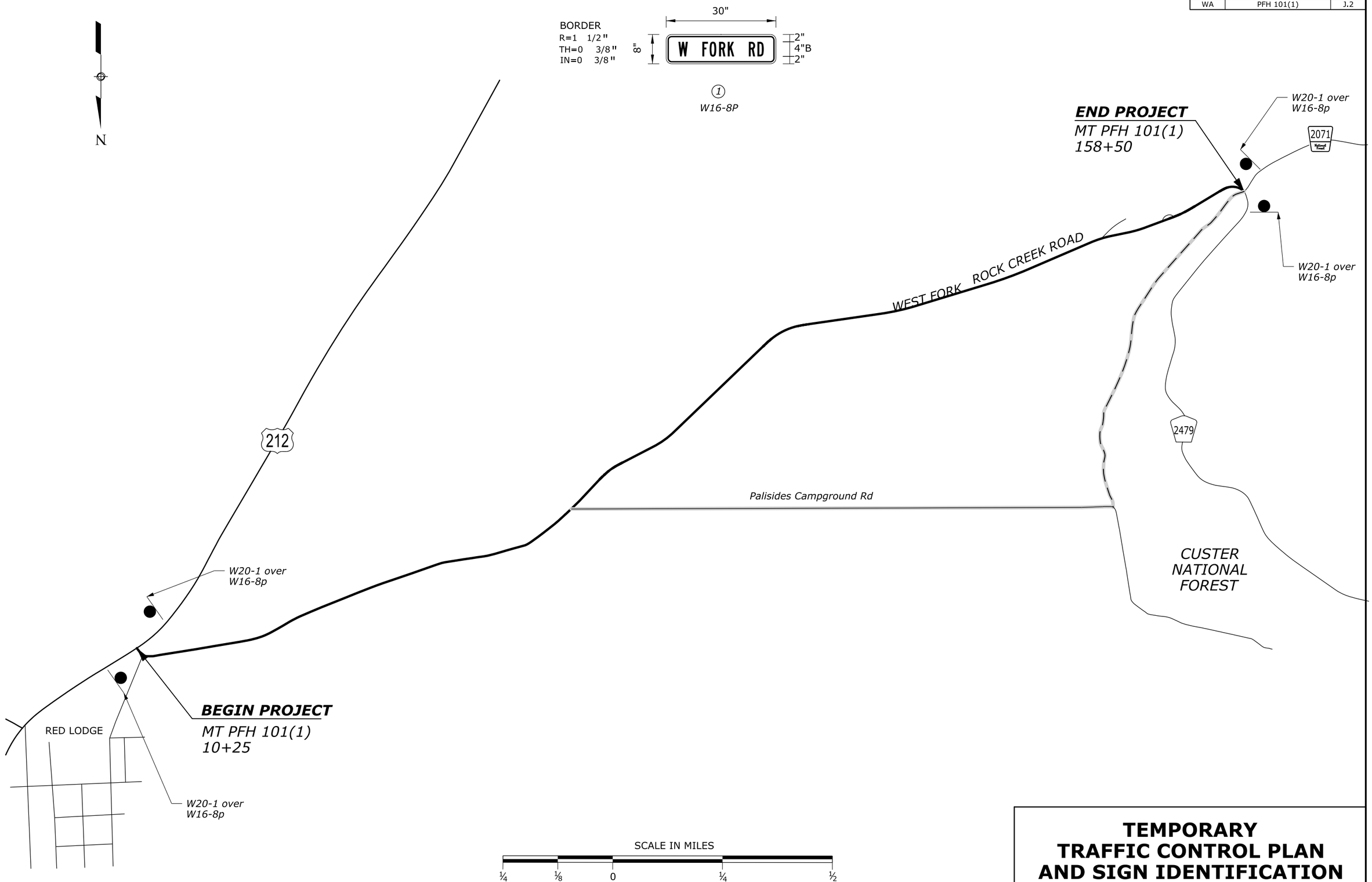
SECTION 635
TEMPORARY TRAFFIC CONTROL QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
63501-1000	TEMPORARY TRAFFIC CONTROL, TRAFFIC AND SAFETY SUPERVISOR	All	LPSM
63502-0600	TEMPORARY TRAFFIC CONTROL, BARRICADE TYPE 3	8	EACH
63502-1300	TEMPORARY TRAFFIC CONTROL, DRUM	400	EACH
63502-1500	TEMPORARY TRAFFIC CONTROL, WARNING LIGHT-TYPE A	120	EACH
63502-3100	TEMPORARY TRAFFIC CONTROL, TRAFFIC SIGNAL SYSTEM	2	LNFT
63503-0400	TEMPORARY TRAFFIC CONTROL, CONCRETE BARRIER	500	EACH
63506-0600	TEMPORARY TRAFFIC CONTROL, PILOT CAR	1,000	HOUR
63509-1000	TEMPORARY TRAFFIC CONTROL, FLAGGER	4,000	FIX HR RATE

TABULATION OF TEMPORARY TRAFFIC CONTROL QUANTITIES

Designed by: T. Phan 03/2013 Checked by: R. Johnson 03/2013
12 November 2014 3:41 PM c:\myfiles\pw_production\d0148455\mf10101na.dgn [Int_ft2D]

STATE	PROJECT	SHEET NUMBER
WA	PFH 101(1)	J.2



TEMPORARY TRAFFIC CONTROL PLAN AND SIGN IDENTIFICATION

--/--- Designed by: --/--- Checked by:
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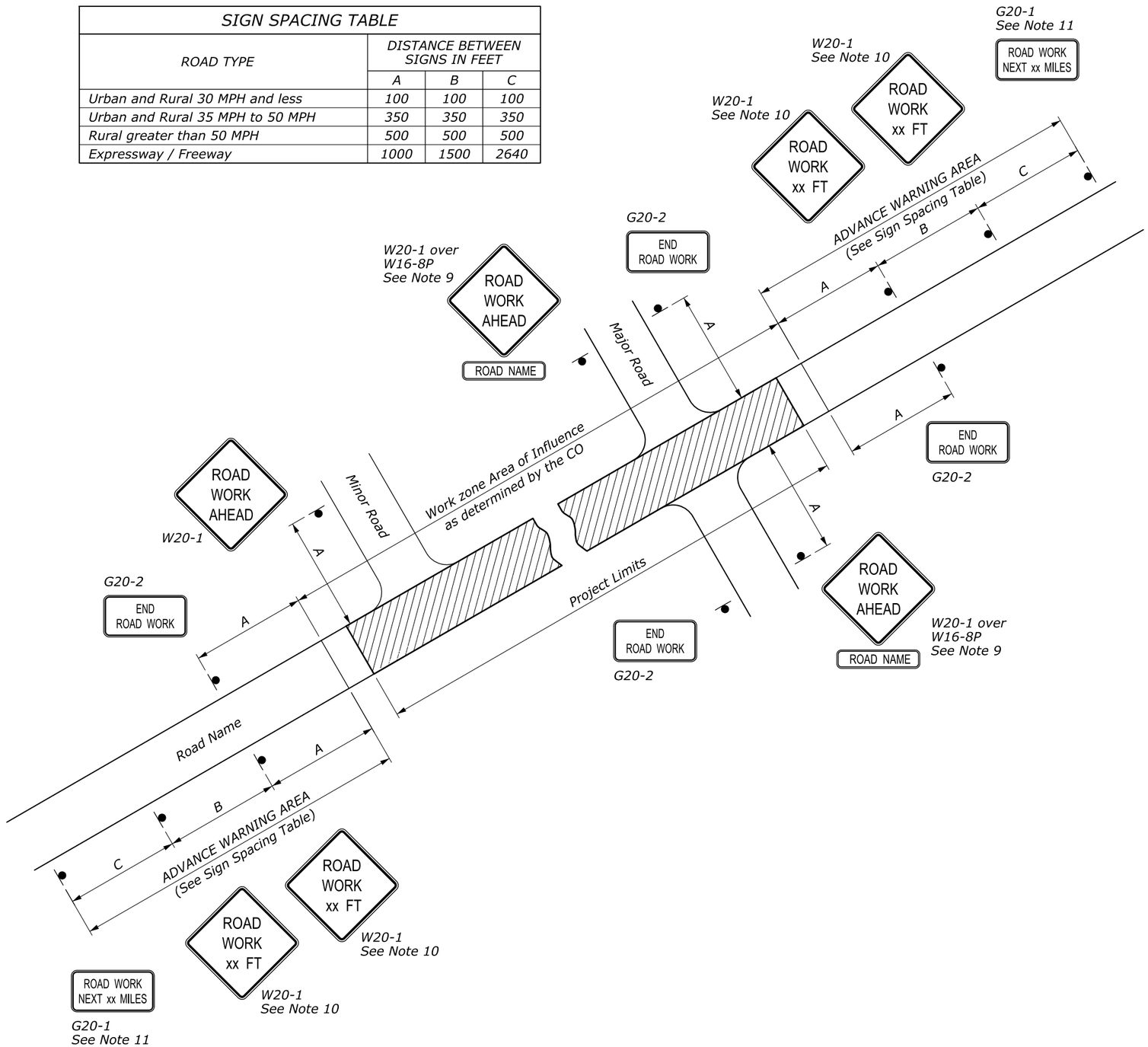
STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	J.3

SIGN SPACING TABLE			
ROAD TYPE	DISTANCE BETWEEN SIGNS IN FEET		
	A	B	C
Urban and Rural 30 MPH and less	100	100	100
Urban and Rural 35 MPH to 50 MPH	350	350	350
Rural greater than 50 MPH	500	500	500
Expressway / Freeway	1000	1500	2640



NOTE:

1. Erect all project advance warning signs before starting construction work.
2. Not all details shown on the temporary traffic control sheets may be applicable to this project. The Contractor may add or delete information and details in this traffic control plan as necessary to accommodate actual operations.
3. Where advance warning signs, placed as shown, interfere with permanent signs, locate the warning signs as determined by the CO for best results. Vary messages as required.
4. Additional or different message signs may be required to fit the actual construction conditions.
5. Install advisory speed plates under the W20 series warning signs as needed to indicate a maximum recommended speed through the construction area.
6. Ensure all sign supports exposed to impact by traffic meet the requirements of NCHRP-350 or MASH for crashworthiness.
7. Maintain two-way traffic during all non-work hours except as approved by the CO.
8. Do not store traffic control devices along the roadway when not in use. Cover post-mounted signs when not applicable.
9. If W20-1 is placed on a roadway other than that on which the actual construction work occurs, include a supplementary plaque indicating the name of the road on which the construction does occur (applies to major roads only).
10. The message on the W20-1 signs may be "ROAD WORK AHEAD" or may specify the distance to the work area in feet or in miles. Install an additional W20-1 sign when approach speeds exceed 50 MPH. When used place the two W20-1 signs "B" feet apart according to the Sign Spacing Table.
11. For work zones that are 2 miles or more in length, install G20-1 signs at each end of the project. Show the distance on the G20-1 sign to the nearest whole mile.
12. If signing on a roadway under a jurisdiction other than the client agency, verify that an encroachment permit has been obtained.
13. State standards may be used as an alternative if approved by the CO.
14. Refer to the Section 635 of the Special Contract Requirements for allowable retroreflective sheeting types.

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

TEMPORARY TRAFFIC CONTROL ADVANCE SIGNING

STANDARD APPROVED FOR USE 6/2005

REVISED:
DRAFT: 9/2010

STANDARD
635-1

12 August 2014 2:58 PM c:\myfiles\pw_production\d0148455\mf10101nc.dgn [USC]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	J.4

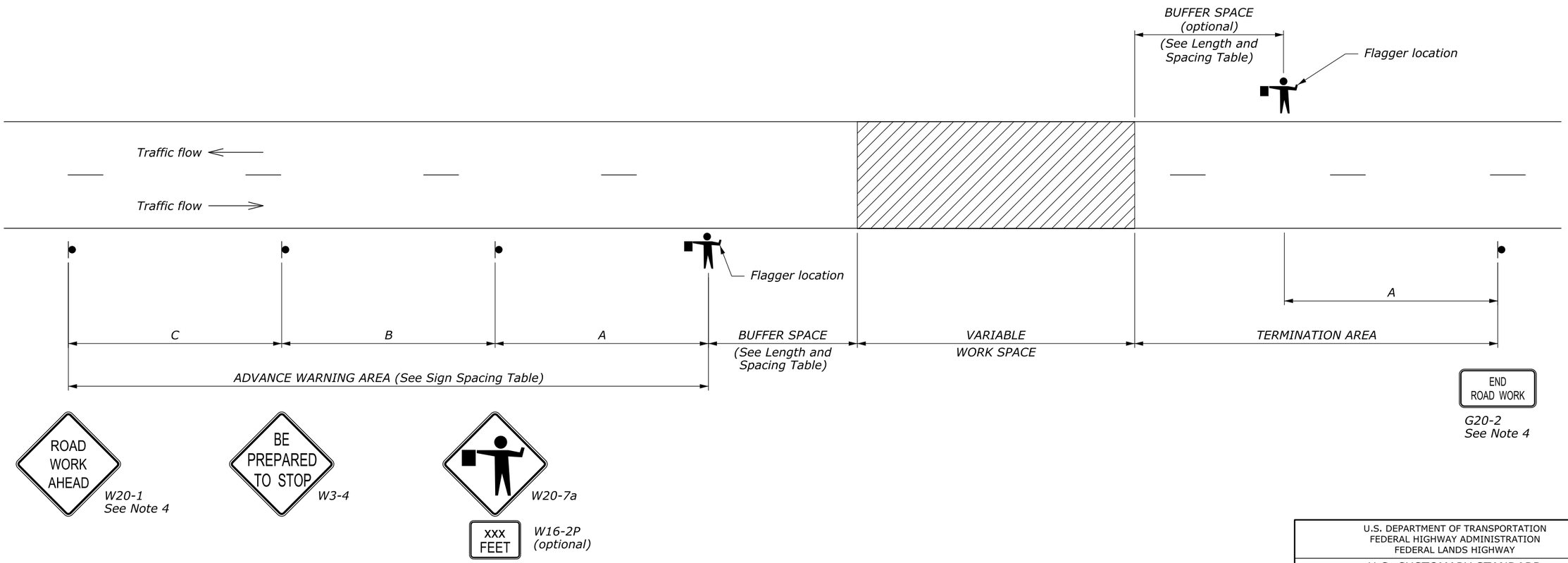
LENGTH AND SPACING TABLE	
APPROACH SPEED*	BUFFER SPACE LENGTH
MPH	FEET
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730

* Approach speed based on the regulatory posted speed, not the advisory speed.

SIGN SPACING TABLE			
ROAD TYPE	DISTANCE BETWEEN SIGNS IN FEET		
	A	B	C
Urban and Rural 30 MPH and less	100	100	100
Urban and Rural 35 MPH to 50 MPH	350	350	350
Rural greater than 50 MPH	500	500	500
Expressway / Freeway	1000	1500	2640

NOTE:

1. Signs are shown for one direction of travel only. Place devices similar to those depicted for the opposite direction of travel.
2. Final location and spacing of signs and devices may be changed to fit field conditions as approved by the CO.
3. For pilot car operation, mount the "PILOT CAR FOLLOW ME" (G20-4) sign at a conspicuous location on the rear of vehicle. Prominently display the name of the Contractor on the pilot car.
4. If closure is completely within the project limits, eliminate the "ROAD WORK AHEAD" (W20-1) and "END ROAD WORK" (G20-2) signs.
5. For night time flagging operation, provide floodlighting at flagger stations.
6. Do not allow equipment, materials, or vehicles to be parked or stored in the buffer space.



NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

TEMPORARY TRAFFIC CONTROL ROAD CLOSURE LAYOUT (WITH FLAGGERS)

STANDARD APPROVED FOR USE 6/2005

REVISED:
DRAFT: 9/2010

STANDARD
635-5

12 August 2014 2:59 PM c:\myfiles\pw_production\d0148455\mf10101nd.dgn [USC]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	J.5

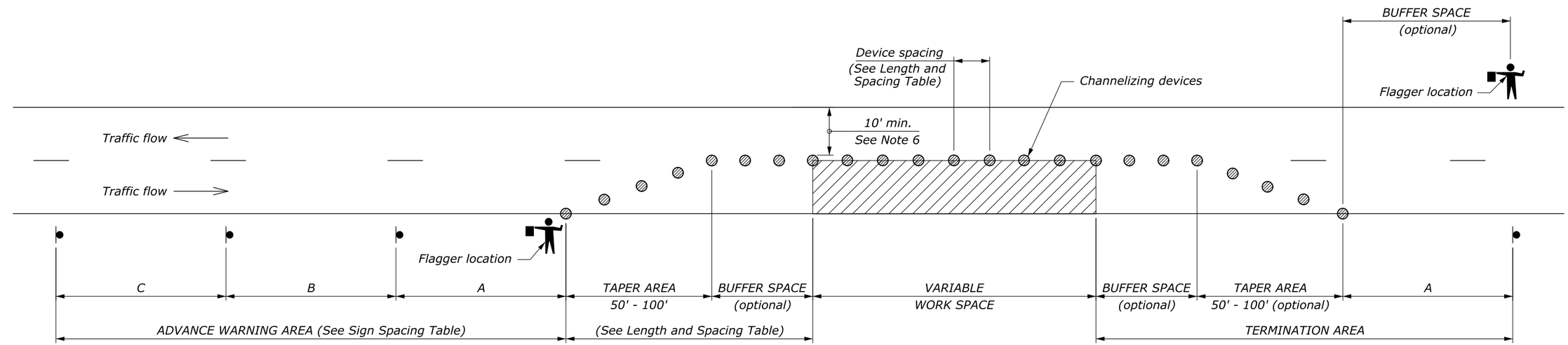
LENGTH AND SPACING TABLE				
APPROACH SPEED*	BUFFER SPACE LENGTH	CHANNELIZING DEVICE		
		TAPER AREA	BUFFER SPACE	WORK SPACE
MPH	FEET	SPACING IN FEET		
20	115	20	40	40
25	155	20	50	50
30	200	20	60	60
35	250	20	70	70
40	305	20	80	80
45	360	20	90	90
50	425	20	100	100
55	495	20	110	110
60	570	20	120	120
65	645	20	130	130
70	730	20	140	140

* Approach speed based on the regulatory posted speed, not the advisory speed.

SIGN SPACING TABLE			
ROAD TYPE	DISTANCE BETWEEN SIGNS IN FEET		
	A	B	C
Urban and Rural 30 MPH and less	100	100	100
Urban and Rural 35 MPH to 50 MPH	350	350	350
Rural greater than 50 MPH	500	500	500
Expressway / Freeway	1000	1500	2640

NOTE:

1. Signs are shown for one direction of travel only. Place devices similar to those depicted for the opposite direction of travel.
2. Final location and spacing of signs and devices may be changed to fit field conditions as approved by the CO.
3. For pilot car operation, mount the PILOT CAR FOLLOW ME (G20-4) sign at a conspicuous location on the rear of vehicle. Prominently display the name of the contractor on the pilot car.
4. If closure is completely within the project limits, eliminate the "ROAD WORK AHEAD" (W20-1) and "END ROAD WORK" (G20-2) signs.
5. For night time flagging operation, provide floodlighting at flagger stations.
6. For project specific minimum width, refer to the Special Contract Requirements, Section 156.
7. Do not allow equipment, materials, or vehicles to be parked or stored in the buffer space.



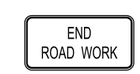
W20-1
See Note 4

W20-4

W20-7a

W13-1P
(optional)

W16-2P
(optional)



G20-2
See Note 4

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

TEMPORARY TRAFFIC CONTROL SINGLE LANE CLOSURE LAYOUT (WITH FLAGGERS)

STANDARD APPROVED FOR USE 6/2005

REVISED:
DRAFT: 9/2010

STANDARD
635-6

12 August 2014 3:00 PM c:\myfiles\pw_production\d0148455\mf10101ne.dgn [USC]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	J.6

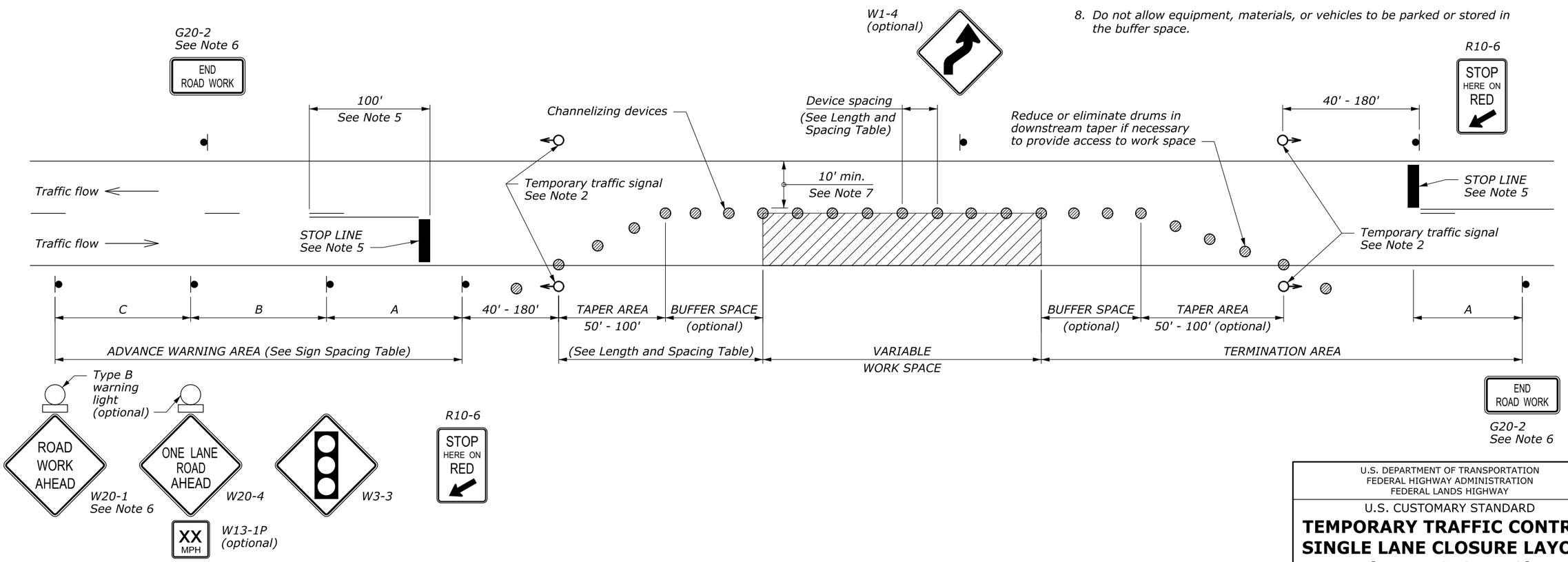
LENGTH AND SPACING TABLE				
APPROACH SPEED*	BUFFER SPACE LENGTH	CHANNELIZING DEVICE		
		TAPER AREA	BUFFER SPACE	WORK SPACE
MPH	FEET	SPACING IN FEET		
20	115	20	40	40
25	155	20	50	50
30	200	20	60	60
35	250	20	70	70
40	305	20	80	80
45	360	20	90	90
50	425	20	100	100
55	495	20	110	110
60	570	20	120	120
65	645	20	130	130
70	730	20	140	140

* Approach speed based on the regulatory posted speed, not the advisory speed.

SIGN SPACING TABLE			
ROAD TYPE	DISTANCE BETWEEN SIGNS IN FEET		
	A	B	C
Urban and Rural 30 MPH and less	100	100	100
Urban and Rural 35 MPH to 50 MPH	350	350	350
Rural greater than 50 MPH	500	500	500
Expressway / Freeway	1000	1500	2640

NOTE:

1. Advance Warning Area signs are shown for one direction of travel only. Place devices for opposite direction of travel.
2. A single signal installation is acceptable, on the right-hand side of the road, if it has two signal faces that are at least 8 feet apart and meets the other requirements of Part 4 of the MUTCD.
3. Install and operate temporary traffic control signals in accordance with the provisions of the MUTCD, Part 4. Signal timing shall be established by a qualified engineer. When the signal is changed to the flashing mode either manually or automatically, ensure red signal indications are flashed to both approaches.
4. Final location and spacing of signs and devices may be changed to fit field conditions as approved by the CO. If signals are moved, revised signal timing must be determined by a qualified engineer.
5. If the roadway surface is paved, install stop lines that comply with Section 3B.16 of the MUTCD. Remove existing conflicting pavement markings and raised markers between the work space and the stop line. Add no-passing lines in advance of the stop line. Removeable pavement markings may be used for stop lines and no-passing pavement markings.
6. If closure is completely within the project limits, eliminate the "ROAD WORK AHEAD" (W20-1) and "END ROAD WORK" (G20-2) signs.
7. For project specific minimum width, refer to Special Contract Requirements, Section 156.
8. Do not allow equipment, materials, or vehicles to be parked or stored in the buffer space.



NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

TEMPORARY TRAFFIC CONTROL SINGLE LANE CLOSURE LAYOUT (WITH SIGNALS)

STANDARD APPROVED FOR USE 6/2005

REVISED:
DRAFT: 9/2010

STANDARD
635-9

12 August 2014 3:01 PM c:\myfiles\pw_production\d0148455\mf10101nf.dgn [USC]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	J.7

LENGTH AND SPACING TABLE

APPROACH SPEED*	MINIMUM TAPER LENGTH**	BUFFER SPACE LENGTH	CHANNELIZING DEVICE		
			TAPER AREA	BUFFER SPACE	WORK SPACE
MPH	FEET	FEET	SPACING IN FEET		
20	Shoulder taper formula:	115	20	40	40
25	$L = \frac{WS^2}{180}$ for $S \leq 40$ MPH	155	25	50	50
30		200	30	60	60
35	$L = \frac{WS}{3}$ for $S \geq 45$ MPH	250	35	70	70
40		305	40	80	80
45	Where:	360	45	90	90
50	L = Minimum length of taper	425	50	100	100
55	W = Width of offset in feet	495	55	110	110
60	S = Numerical value of posted speed	570	60	120	120
65	limit or 85 percentile speed prior	645	65	130	130
70	to work in miles per hour	730	70	140	140

* Approach speed based on the regulatory posted speed, not the advisory speed.

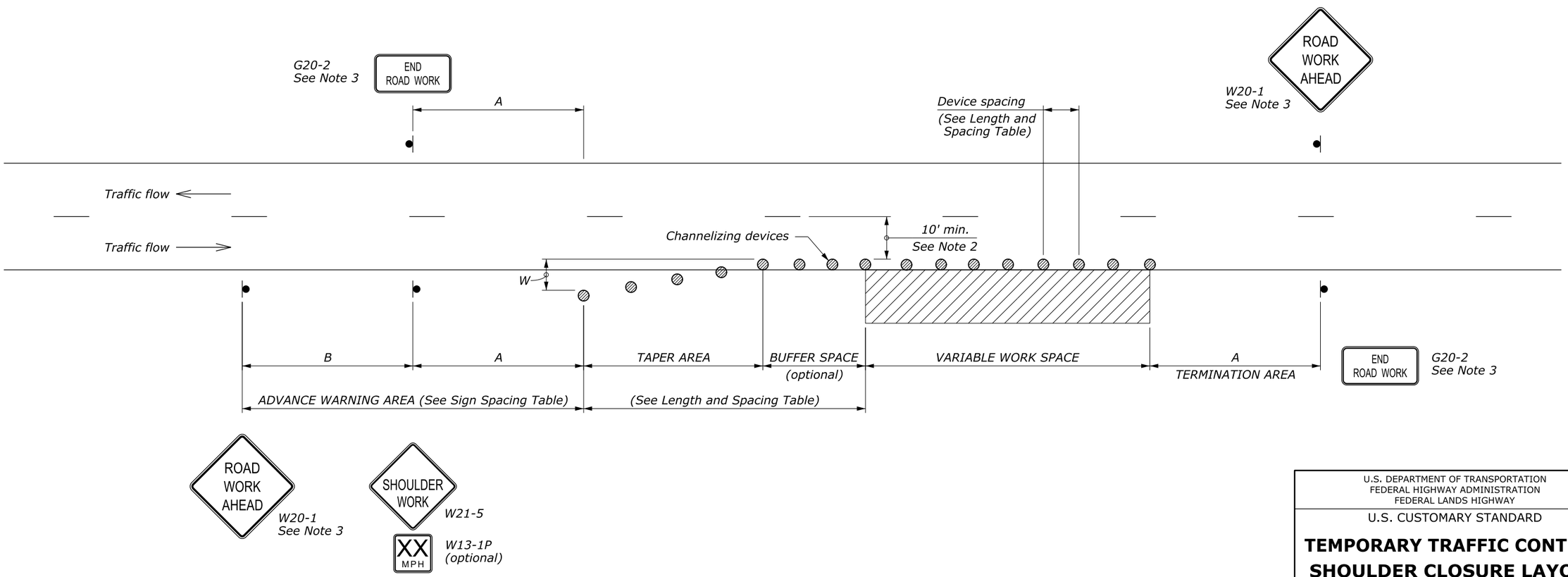
** Lengthen taper as needed to provide minimum of three channelizing devices in taper at required spacing.

SIGN SPACING TABLE

ROAD TYPE	DISTANCE BETWEEN SIGNS IN FEET		
	A	B	C
Urban and Rural 30 MPH and less	100	100	100
Urban and Rural 35 MPH to 50 MPH	350	350	350
Rural greater than 50 MPH	500	500	500
Expressway / Freeway	1000	1500	2640

NOTE:

1. Final location and spacing of signs and devices may be changed to fit field conditions as approved by the CO.
2. For project specific minimum width, refer to Special Contract Requirements, Section 156.
3. If shoulder closure is completely within the project limits, eliminate the "ROAD WORK AHEAD" (W20-1) and "END ROAD WORK" (G20-2) signs.
4. Do not allow equipment, materials, or vehicles to be parked or stored in the buffer space.



NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

TEMPORARY TRAFFIC CONTROL SHOULDER CLOSURE LAYOUT

STANDARD APPROVED FOR USE 6/2005

REVISED:
DRAFT: 9/2010

STANDARD
635-10

12 August 2014 3:02 PM c:\myfiles\pw_production\d0148455\mf10101ng.dgn [USC]

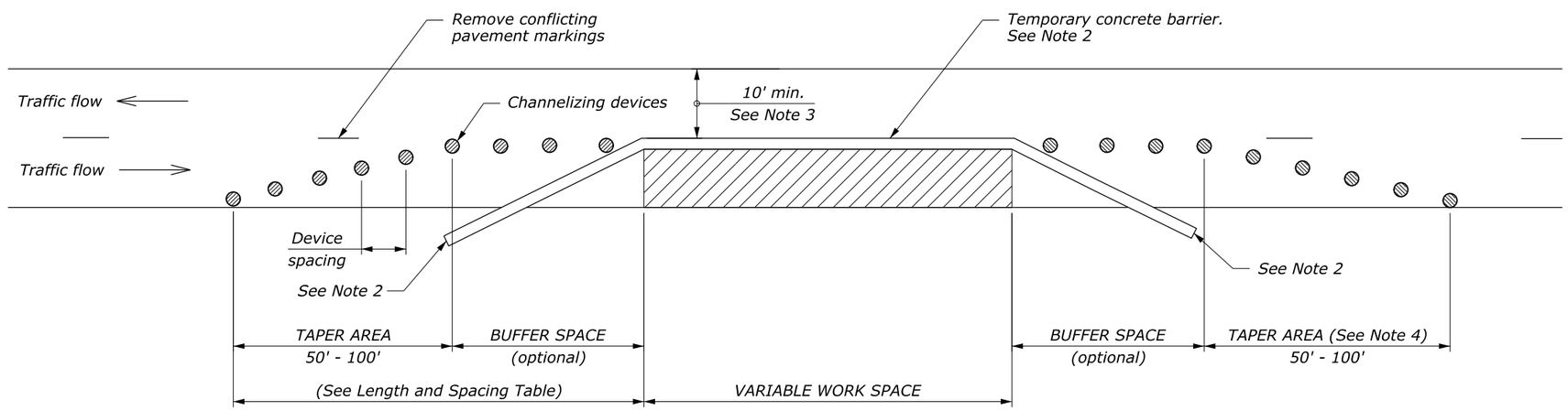
STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	J.8

LENGTH AND SPACING TABLE					
APPROACH SPEED* MPH	BUFFER SPACE LENGTH FEET	CHANNELIZING DEVICE			CONCRETE BARRIER FLARE RATE
		TAPER AREA	BUFFER SPACE	WORK SPACE	
		SPACING IN FEET			
20	115	20	40	40	1:8
25	155	20	50	50	1:8
30	200	20	60	60	1:8
35	250	20	70	70	1:9
40	305	20	80	80	1:10
45	360	20	90	90	1:12
50	425	20	100	100	1:14
55	495	20	110	110	1:16
60	570	20	120	120	1:16
65	645	20	130	130	1:16
70	730	20	140	140	1:16

* Approach speed based on the regulatory posted speed, not the advisory speed.

NOTE:

1. Install signs and other devices for single lane closure according to Standard 635-6, 7, 8, or 9. Final location and spacing of signs and devices may be changed to fit field conditions as approved by the CO.
2. Place barrier according to the AASHTO Roadside Design Guide. Terminate barrier ends outside the clear zone or protect the ends of the barrier with a crash cushion. Include reflectors on barrier at 25' intervals.
3. For project specific minimum width, refer to Special Contract Requirements, Section 156.
4. Place channelizing devices at downstream taper during non-work hours or when access is not needed.
5. Do not allow equipment, materials, or vehicles to be parked or stored in the buffer space.
6. Reduce or eliminate drums and barrier in downstream taper if necessary to provide access to work space.



NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

TEMPORARY TRAFFIC CONTROL SINGLE LANE CLOSURE LAYOUT (WITH TEMPORARY BARRIER)

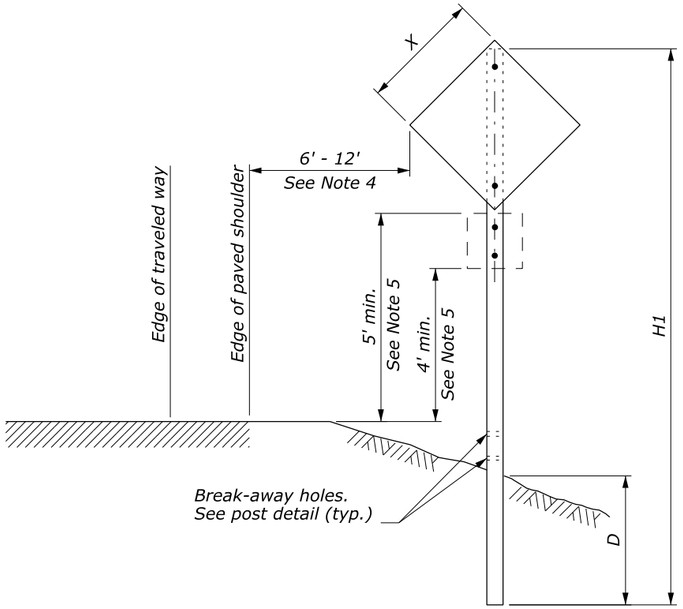
STANDARD APPROVED FOR USE 6/2005

REVISED:
DRAFT: 9/2010

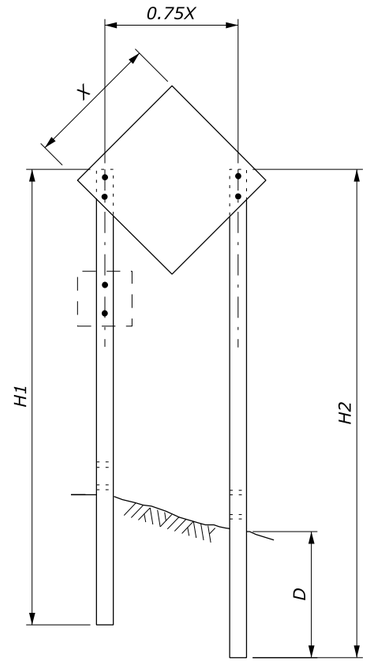
STANDARD 635-13

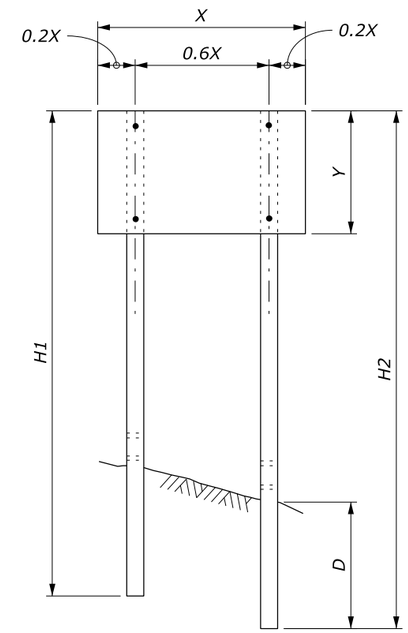
12 August 2014 3:03 PM c:\myfiles\pw_production\d0148455\mf10101nh.dgn [USC]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	J.9



SINGLE POST SIGN





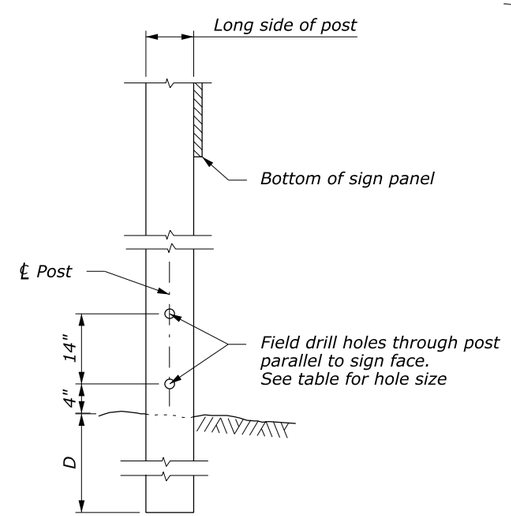
TWO POST SIGN

NOTE:

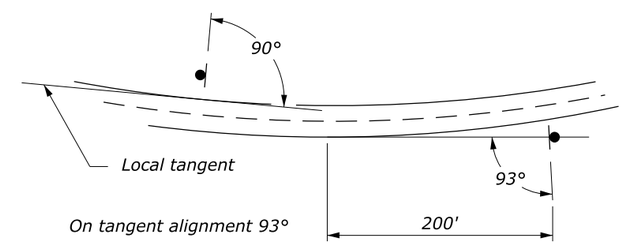
1. Attach sign panels with a minimum of 2 - ¼" dia. bolts per post.
2. H1 and H2 = Overall post length. Select post lengths to fit field conditions.
3. D = Post embedment depth for average soil conditions.
4. In rural areas where lateral distance is limited, a minimum lateral offset of 2' may be used. In urban areas, a minimum lateral offset of 1' behind the face of the curb may be used.
5. In pedestrian locations, or in areas where the view is obstructed, use 7' minimum mounting height for main sign and 6' minimum mounting height for secondary sign.
6. Use 7' minimum spacing between posts for sign posts 6" x 6" or larger.
7. State standards may be used as an alternative if approved by the CO.

WOOD POST SELECTION TABLE

WIDTH "X"	AREA (SQFT)	NUMBER OF POSTS	POST SIZE (INCH)	D (INCH)	HOLE SIZE (INCH)
Diamond ≤ 36" Other Shapes ≤ 48"	< 10	1	4 x 4	36	0
		1	4 x 6	48	1.5
Diamond ≤ 48"	10 - 20	1	6 x 6	48	2
Diamond ≤ 48" Other Shapes ≤ 12'	10 - 20	2	4 x 4	36	0
	20 - 50	2	4 x 6	48	1.5
> 13'	50 - 65	2	6 x 6	48	2
12' - 16'	50 - 65	3	4 x 6	48	1.5
> 17'	65 - 95	4	4 x 6	48	2
> 30'	65 - 95	3	6 x 6	48	2



POST DETAIL



SIGN INSTALLATION ANGLE

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

TEMPORARY TRAFFIC CONTROL SIGN INSTALLATION WOOD POSTS

STANDARD APPROVED FOR USE 6/2005

REVISED:
DRAFT: 9/2011

STANDARD 635-14

12 August 2014 3:15 PM c:\myfiles\pw_production\d0148455\mf10101ni.dgn [USC]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	K.1

ITEM 20301-2400
REMOVAL OF SIGN

STATION	LT/RT	SIGN LEGEND	QUANTITY (EACH)
10+37	LT	STOP	1
10+80	RT	CHEVRON	4
12+08	RT	CHAINS MAY BE REQUIRED	1
16+75	LT	STOP AHEAD	1
25+02	RT	30 MPH	1
26+65	RT	ROUGH ROAD	1
26+43	LT	CURVE RIGHT	1
45+26	LT	ROUGH ROAD	1
54+51	RT	BUS STOP AHEAD	1
59+01	LT	SKIVIEW LN	1
65+07	RT	1 3/4 MI PALISIDES CAMPGROUND RT	1
66+84	RT	PALISADES CAMPGROUND	1
69+13	RT	35 MPH	1
152+55	LT	35 MPH	1
153+00	RT	ENTERING/LEAVING CUSTER NATIONAL FOREST	1
158+37	LT	SKI RUN RD W. FORK RD	1
158+57	RT	WINDING ROAD	1
158+57	RT	25 MPH	1
	TOTAL		21

ITEM 63309-0000
DELINIATOR

LOCATION	LT/RT	QUANTITY (EACH)
10+60 TO 38+49	RT/LT	24
17+60 TO 50+25	RT/LT	20
28+40 TO 32+45	RT/LT	16
35+00 TO 67+60	RT/LT	20
39+50 TO 78+50	RT/LT	32
71+45 TO 84+62	RT/LT	22
63+49 TO 96+85	RT/LT	22
84+54 TO 114+90	RT/LT	28
96+37 TO 130+05	RT/LT	20
114+80 TO 143+06	RT/LT	18
125+07 TO 154+25	RT/LT	20
164+35 TO 164+35	RT/LT	20
155+14 TO 158+58	LT	32
	TOTAL	294

ITEM 63302-0000
SIGN SYSTEM

STATION	LT/RT	MUTCD NO.	SIGN LEGEND	SIGN SIZE (IN. X IN.)		QUANTITY (SQFT)
10+37	LT	R1-1	STOP	30	30	6
10+62	RT	W1-8	CHEVRON	18	24	3
10+70	RT	W1-8	CHEVRON	18	24	3
10+80	RT	W1-8	CHEVRON	18	24	3
10+87	RT	W1-8	CHEVRON	18	24	3
12+08	RT		REF-1 (CHAINS MAY BE REQUIRED)	24	36	6
12+77	RT		REF-2 (Mileage Distance)	48	60	20
16+75	LT	W3-1	STOP AHEAD	30	30	6
25+02	RT	R2-1	35 MPH	24	30	5
26+43	LT	W1-2R	CURVE RIGHT	30	30	6
45+26	LT	W8-8	ROUGH ROAD	18	18	2
54+51	RT	S3-1	BUS STOP AHEAD	36	36	9
65+07	RT		REF-3 (1 3/4 MI PALISIDES CAMPGROUND RT)	24	60	10
66+84	RT		REF-4 (PALISADES CAMPGROUND)	24	60	10
69+13	RT	R2-1	35 MPH	24	30	5
152+55	LT	R2-1	35 MPH	24	30	5
153+00	RT		REF-5 (CUSTER NATIONAL FOREST)	48	60	20
158+37	LT		REF-6 (SKI RUN RD W. FORK RD)	12	36	3
158+57	RT	W1-5	WINDING ROAD	30	30	6
158+57	RT	W13-1P	25 MPH	18	18	2
	TOTAL					135

SECTION 634
PERMANENT PAVEMENT MARKINGS

ITEM 63401-0300
Pavement Markings, Type B,
Solid (yellow)

LOCATION	SIDE	LENGTH (LNFT)	NUMBER OF LINES	NUMBER OF COATS	QUANTITY (LNFT)
10+25 to 158+50	CL	14,825	2	2	59,300
				TOTAL	59,300

SECTION 634
PERMANENT PAVEMENT MARKINGS

ITEM 63401-0300 1/
Pavement Markings, Type B,
Solid (white)

LOCATION	SIDE	LENGTH (LNFT)	NUMBER OF LINES	NUMBER OF COATS	QUANTITY (LNFT)
10+25 to 158+50	RT	14,825	1	2	14,825
10+25 to 158+50	LT	14,825	1	2	14,825
				TOTAL	59,300

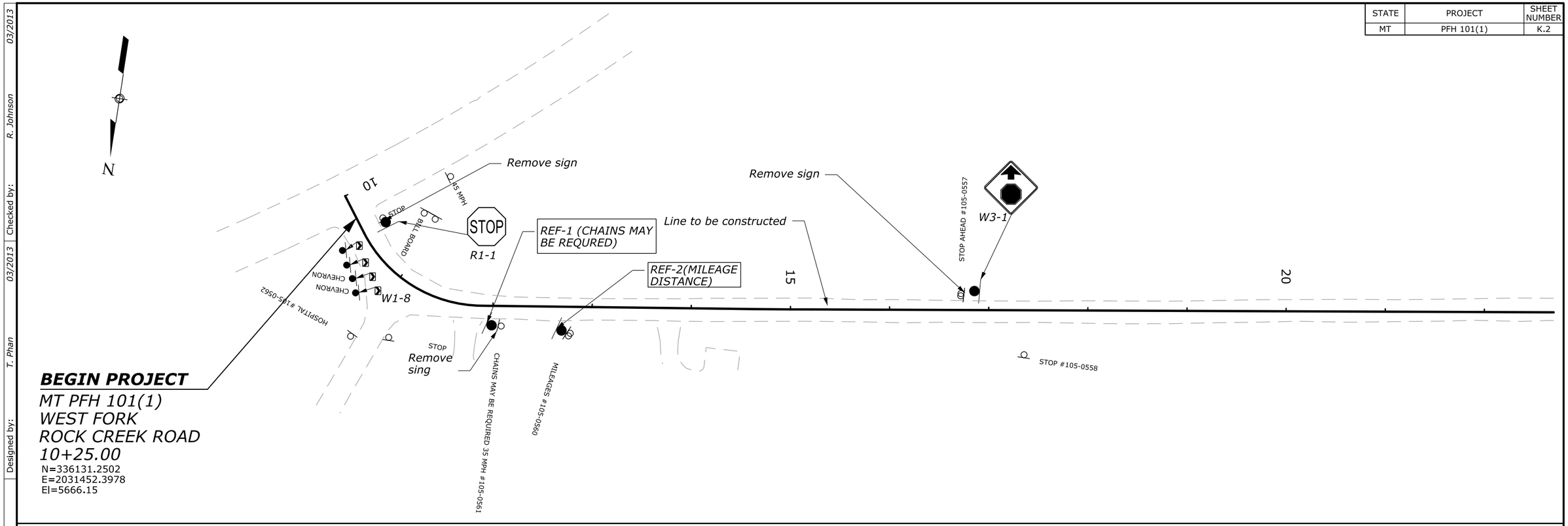
ITEM 63308-0000
OBJECT MARKERS

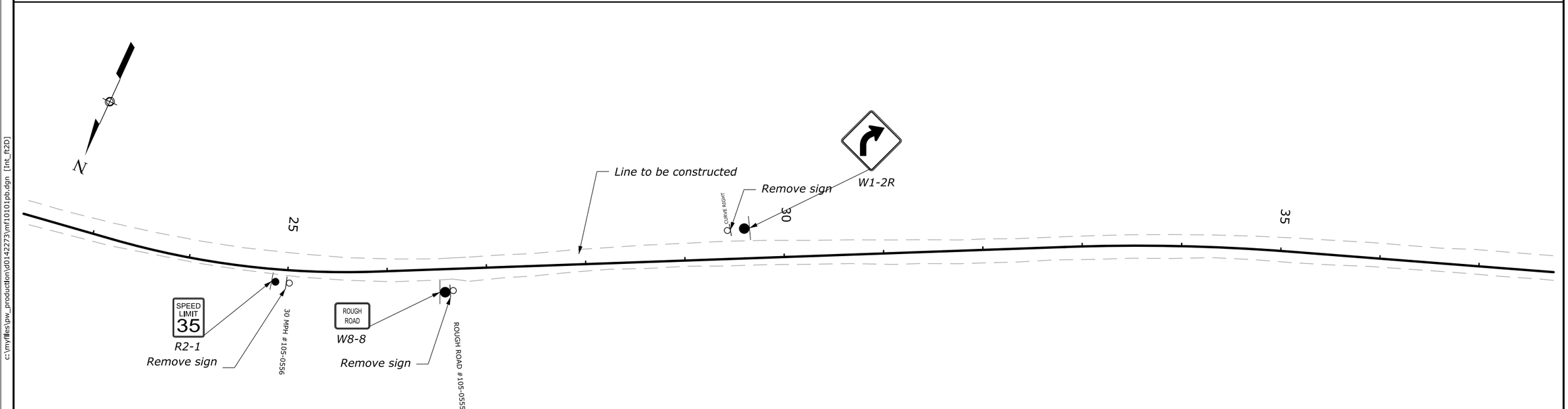
LOCATION	LT/RT	QUANTITY (EACH)
49+70	RT	1
49+85	LT	1
59+05	RT	1
59+20	LT	1
111+01	RT	1
111+15	LT	1
142+60	RT	1
142+75	LT	1
	TOTAL	8

TABULATION PERMANENT TRAFFIC CONTROL QUANTITIES

Designed by: T. Phan 11/2014 Checked by: M. Moen 11/2014
16 November 2014 9:04 PM c:\myfiles\pw_production\d0142273\mf1010 1pa.dgn [int_ft2D]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	K.2



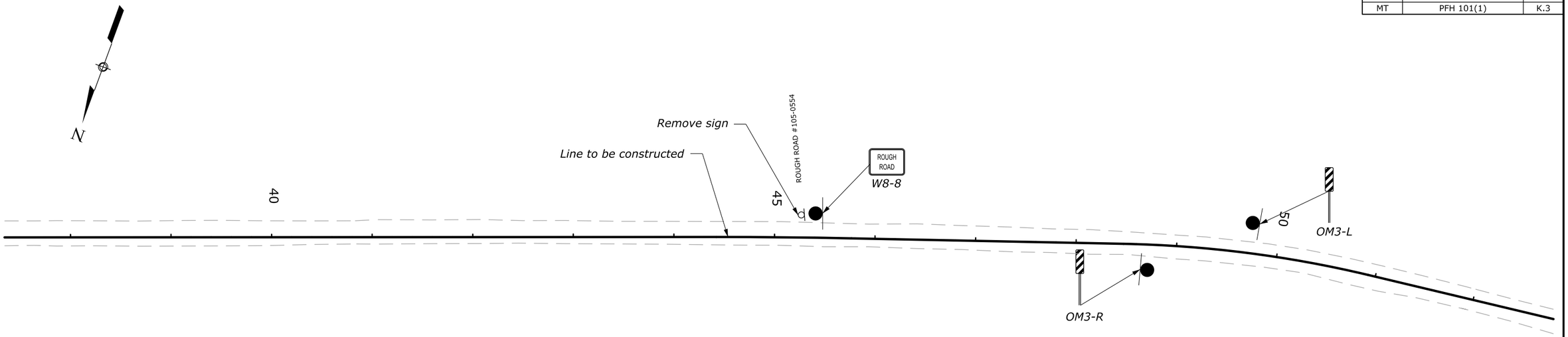


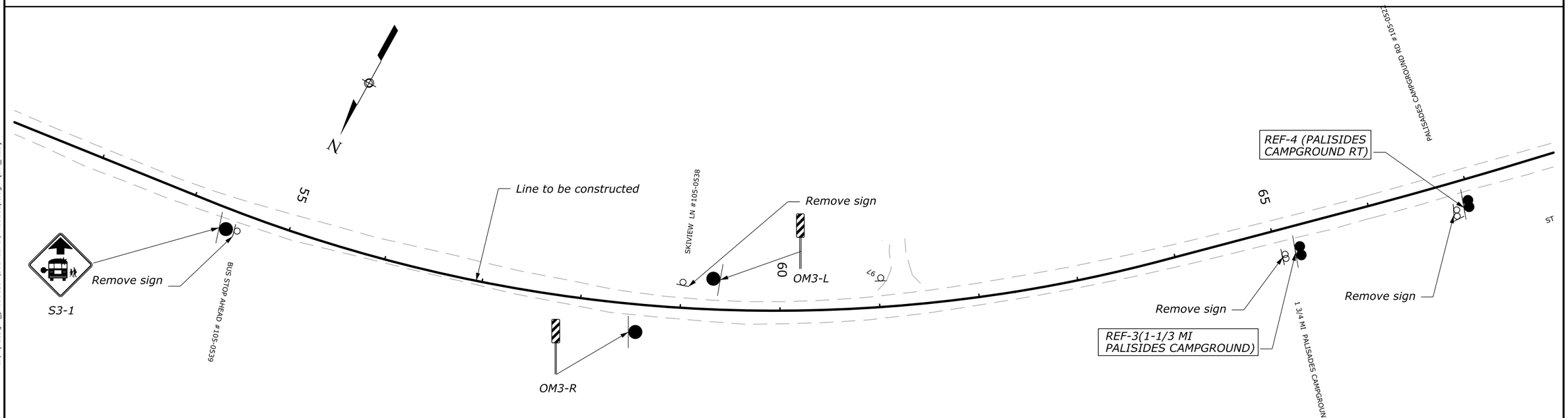
PERMANENT TRAFFIC CONTROL PLAN
10+25 to 37+50

Designed by: T. Phan | Checked by: R. Johnson | 03/2013 | 03/2013

16 November 2014 8:54 PM c:\myfiles\pw_production\d0142273\mf1010jpb.dgn [int_ft2D]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	K.3



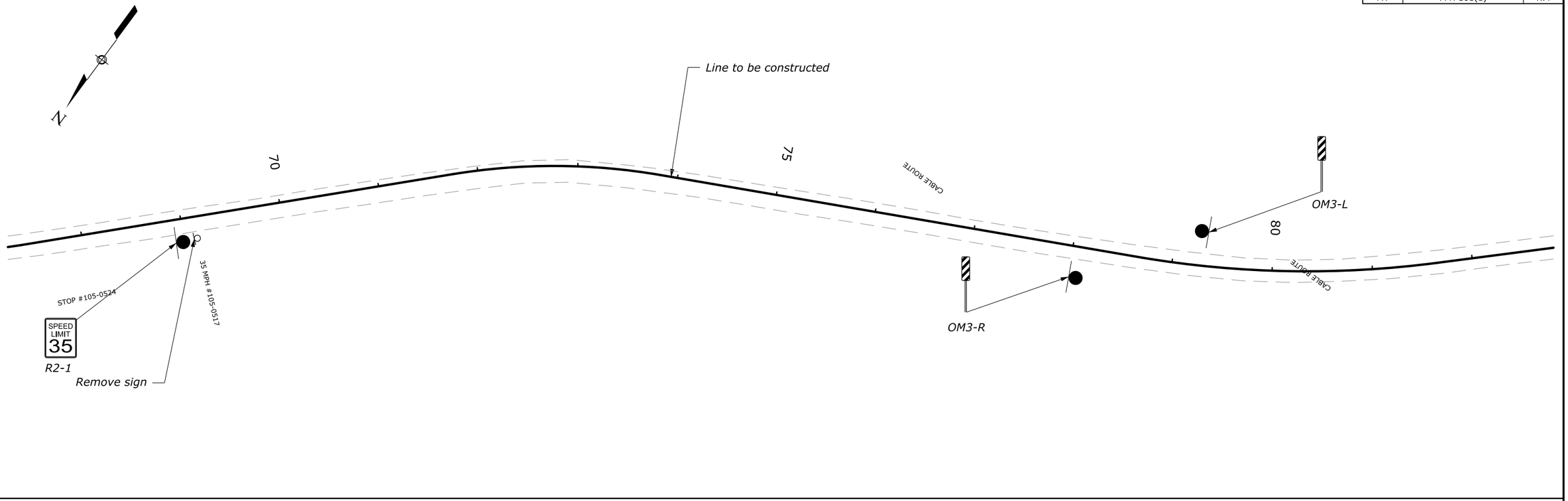


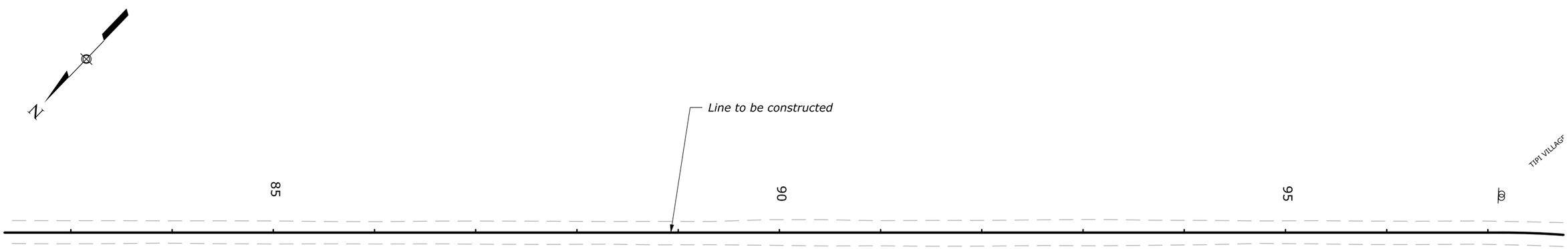
PERMANENT TRAFFIC CONTROL PLAN 37+50 to 67+50

Designed by: T. Phan 03/2013
Checked by: R. Johnson 03/2013

13 November 2014 2:46 PM c:\myfiles\pw_production\d0142273\mf10101pc.dgn [Int_ft2D]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	K.4





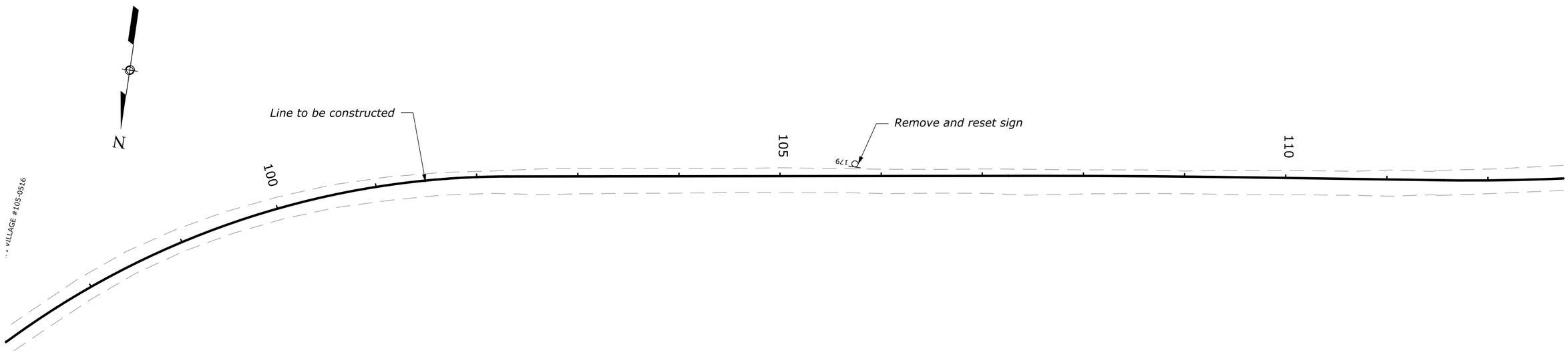
PERMANENT TRAFFIC CONTROL PLAN 67+50 to 97+50

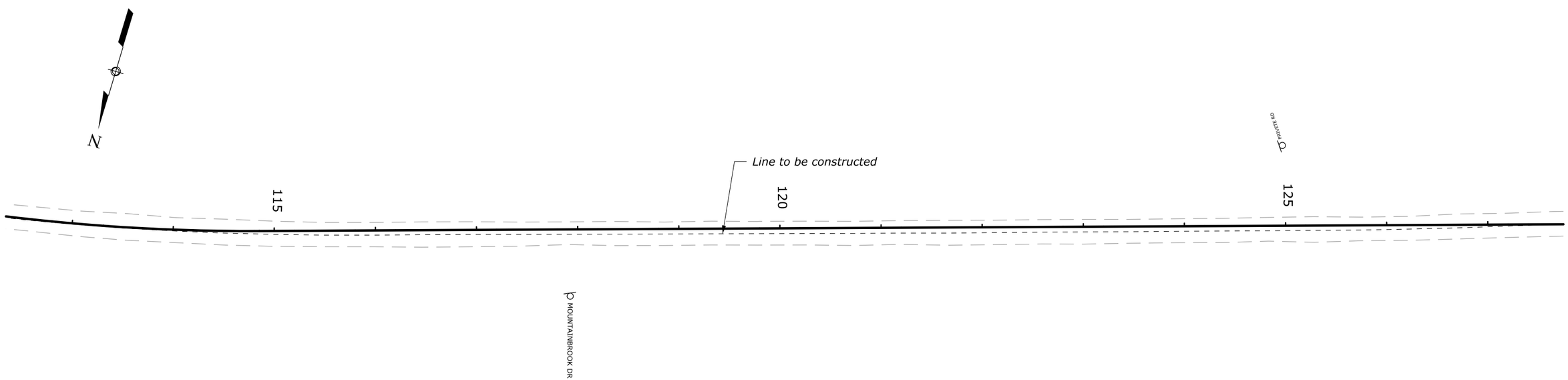
Designed by: T. Phan | Checked by: R. Johnson | 03/2013 | 03/2013

c:\myfiles\pw_production\d0142273\mf1010pd.dgn [int_ft2D]

13 November 2014 5:13 PM

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	K.5





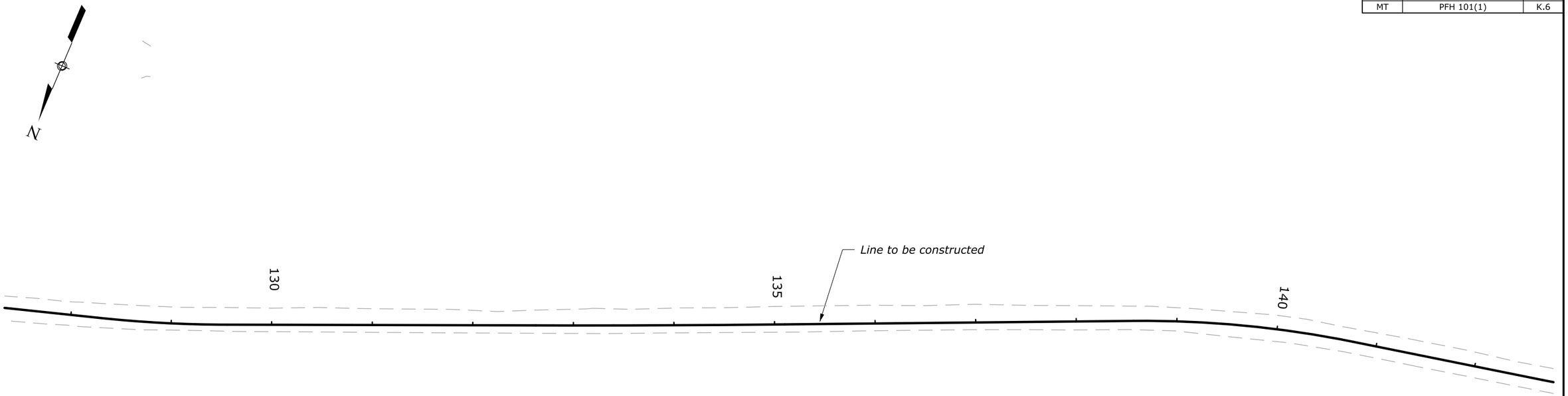
PERMANENT TRAFFIC CONTROL PLAN 97+50 to 127+50

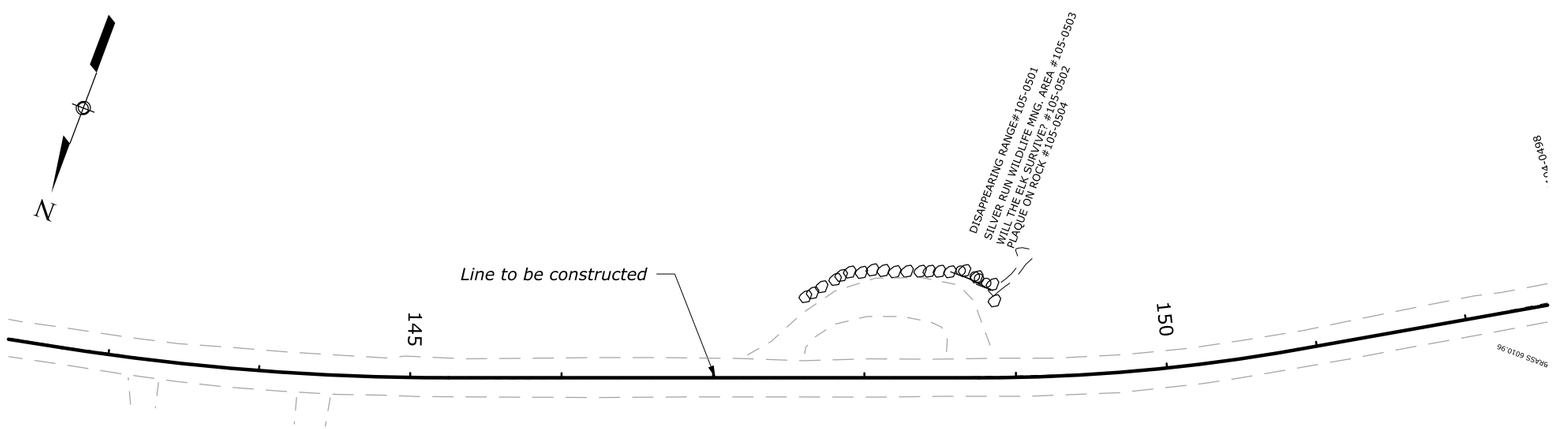
Designed by: T. Phan 03/2013 | Checked by: R. Johnson 03/2013

c:\myfiles\pw_production\d0142273\mf1010pe.dgn [int_ft2D]

13 August 2014 11:03 AM

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	K.6



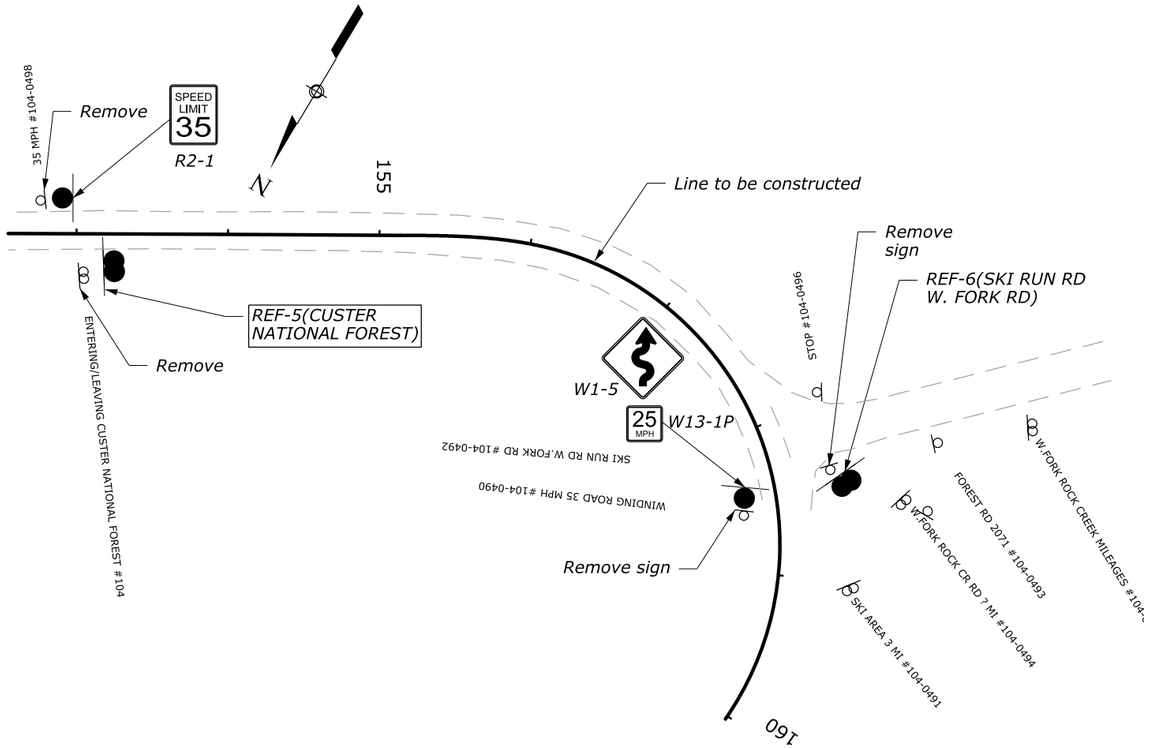


PERMANENT TRAFFIC CONTROL PLAN
127+50 to 152+50

Designed by: T. Phan 03/2013
Checked by: R. Johnson 03/2013

13 August 2014 11:04 AM c:\myfiles\pw_production\d0142273\mf1010pf.dgn [int_ft2D]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	K.7

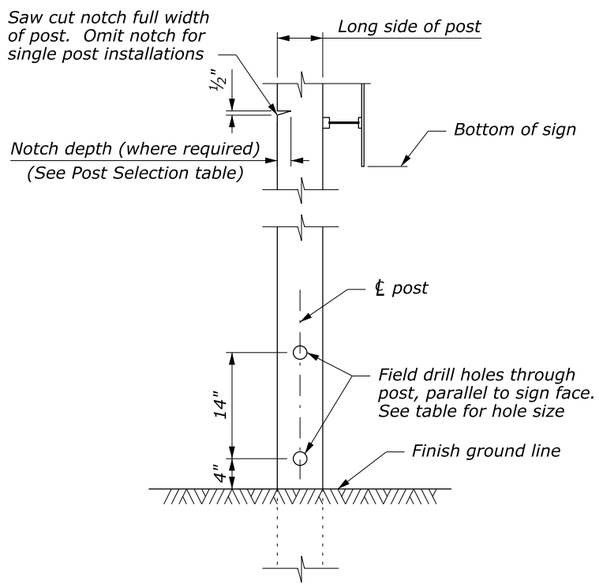


PERMANENT TRAFFIC CONTOL PLAN
152+50 to 160+00

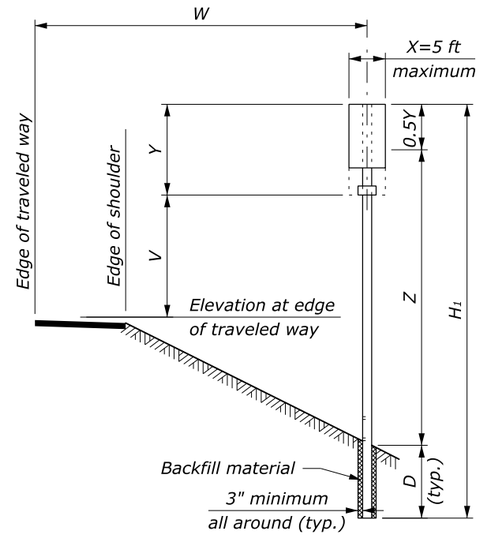
Designed by: T. Phan 03/2013 | Checked by: R. Johnson 03/2013

12 November 2014 5:27 PM c:\myfiles\pw_production\d0142273\mf1010pg.dgn [int_ft2D]

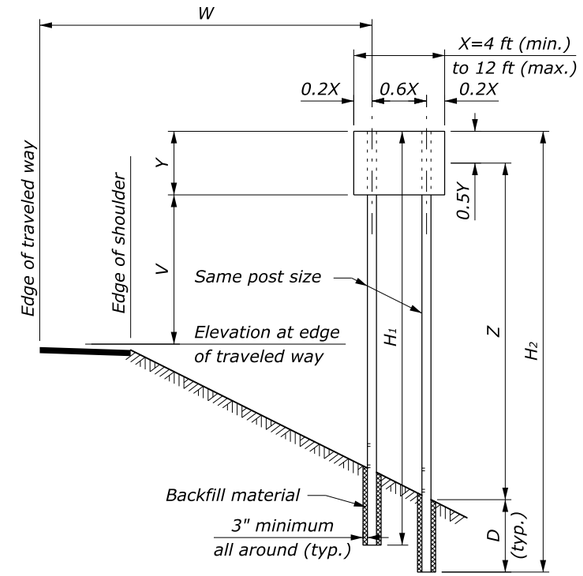
STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	K.8



POST DETAIL



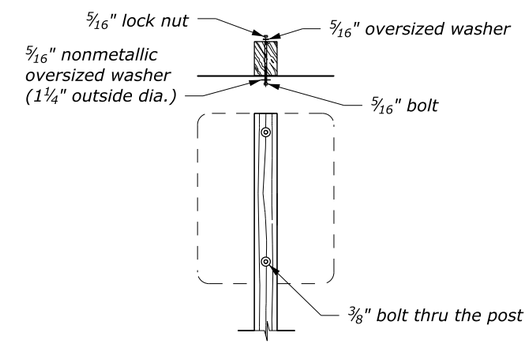
SINGLE POST SIGNS



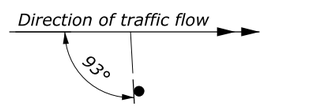
TWO POST SIGNS

NOTE:

1. Traffic barrier protection is required for all posts larger than 6" x 8" when located within the clear zone or if the post is vulnerable to being struck when placed outside the clear zone.
2. H_1 thru H_4 indicate overall post length. Select post lengths to fit field conditions.
3. D is the minimum post embedment depth for average soil conditions. See Wood Post Selection Table below.
4. Z is the height from ground line to mid-height of sign at the longest post.
5. For the purpose of post selection X and Y are as follows:
   - Single sign, or back to back signs: X and Y are the overall dimensions of the signs.
   - Multiple sign installations: X and Y are the dimensions of a rectangle enclosing all the signs.



TYPICAL MOUNTING FOR SIGNS WITHOUT ANGLES



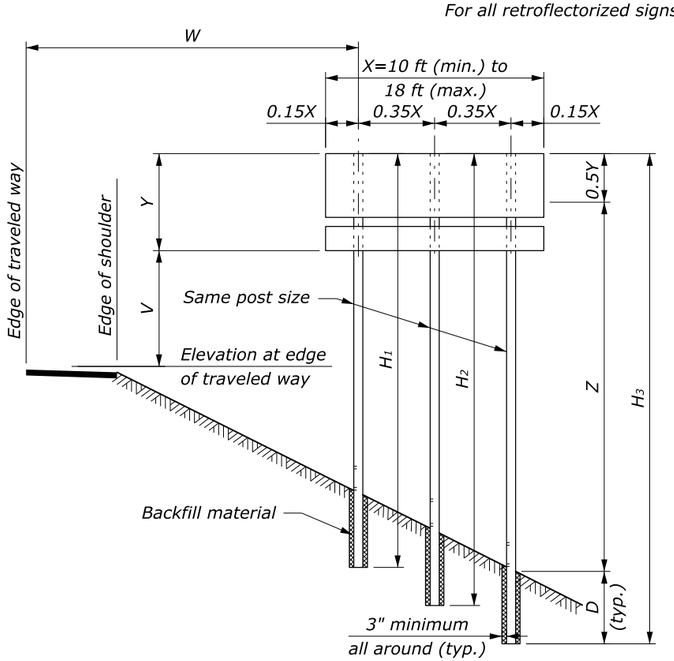
SIGN INSTALLATION ANGLE

For all retroflectorized signs where W > 25'

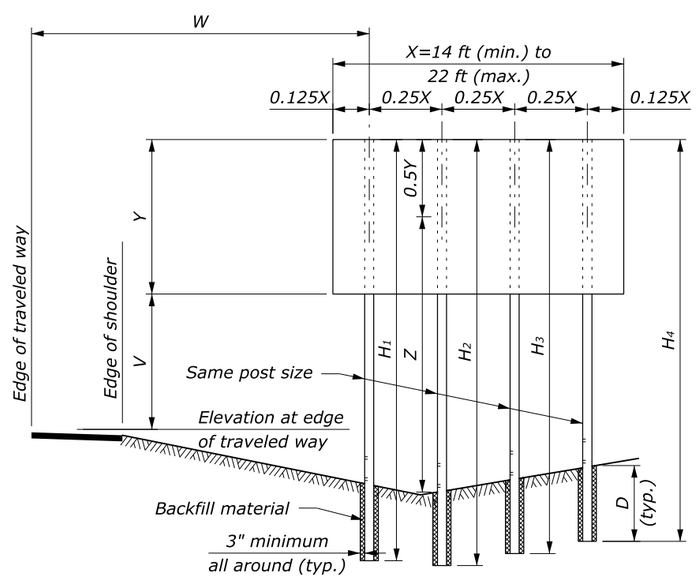
MINIMUM DISTANCE TO SIGN

Location	Lateral Offset (W)	Mounting Height (V)
Rural Districts	6 ft	5 ft
Business or Residence Districts	2 ft from curb	7 ft

V may be reduced by 1 foot in rural districts for a secondary sign mounted below another sign.



THREE POST SIGNS



FOUR POST SIGNS

WOOD POST SELECTION TABLE

POST SIZE (inch)	NUMBER OF POSTS 1	2	3	4	D	Notch depth and hole diameter
	Product of X-Y-Z in CUFT					
4 x 4	80	155	235	310	3'-0"	-
4 x 6	180	385	545	725	4'-0"	1¾"
6 x 6	235	475	710	950	4'-0"	1¾"
6 x 8	300	850	1280	1700	4'-0"	2½"
6 x 10	385	1180	1170	2360	5'-0"	-
8 x 10	575	1610	2410	3215	5'-0"	-
8 x 12	775	2310	3465	4620	6'-0"	-

Values shown are the maximum permitted. If the product of XYZ exceeds the limit for the largest post, use steel post installation.

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY DETAIL

PERMANENT SIGN INSTALLATION WOOD POSTS

DETAIL APPROVED FOR USE --/----

REVISED: 2/1998
DRAFT: 10/2009

DETAIL W633-7

12 November 2014 5:27 PM
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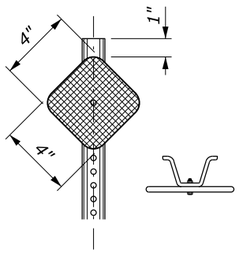
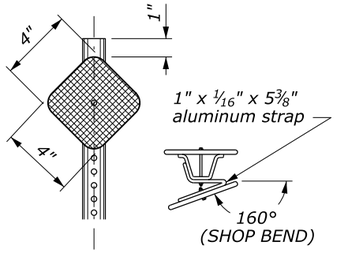
STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	K.9



DESIGN A

(WHITE)

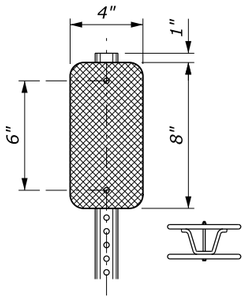
Use for delineation on tangents and on curves with R > 1500'.



DESIGN C

(WHITE)

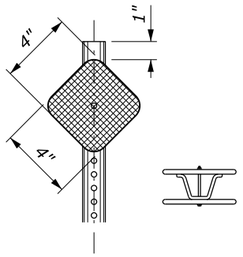
Use on curves with R ≤ 575'



DESIGN D

(YELLOW)

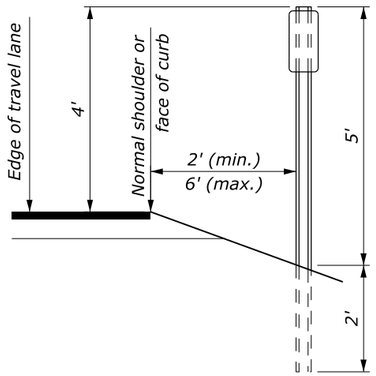
Use at approaches with Stop or Yield signs.



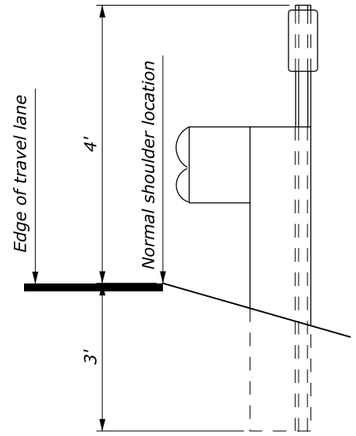
DESIGN F

(WHITE)

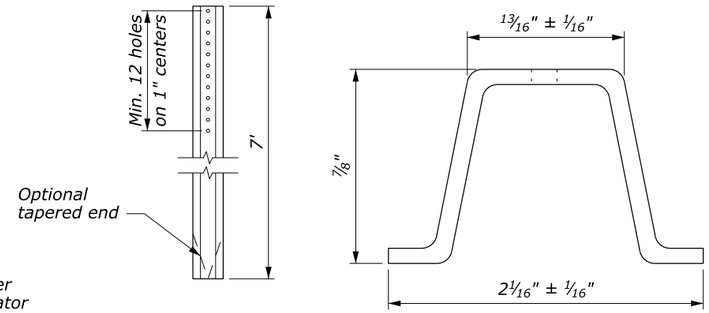
Use for curves with R > 575' and R ≤ 1500'.



TYPICAL INSTALLATION



TYPICAL INSTALLATION WITH BEAM TYPE GUARD RAIL

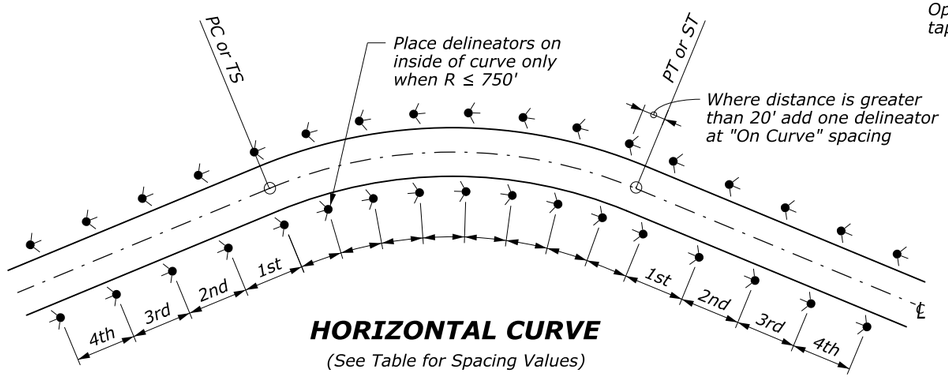


DELINEATOR POST DETAILS

Rigid Steel or Aluminum

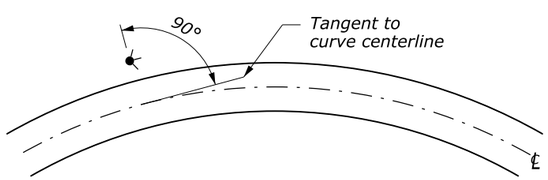
NOTE:

1. When the contract does not include the final surfacing, allow for the thickness of the final pavement structure when establishing the elevation of the traffic delineators.
2. Place delineators at a constant clearance distance from the edge of pavement except where guardrail or other obstructions interfere. Align delineators with the inside edge of obstruction. Install delineators located behind beam guardrail so that the delineator post is adjacent to the trailing edge of the nearest guardrail post. (See typical installation with beam type guardrail).
3. When a delineator falls within a cross road or approach, the delineator may be moved in either direction a distance not to exceed one quarter of the normal spacing. Eliminate the post if this allowance is exceeded.
4. Mount delineators on metal posts with 3/16" cadmium plated bolt(s). Drill or punch a minimum of twelve 3/8" diameter holes on 1-inch centers from the top of the post. 3/8" square holes may be used with large-headed bolt or an appropriate washer. Jam threads after tightening the nut to prevent removal.
5. All delineator reflectors have 3/4" corner radii.
6. Manufacture posts from flanged U-channel sections of steel meeting the requirements of ASTM A 36 and weighing not less than 1.25 pounds per foot or aluminum meeting the requirements of ASTM B 221, Alloy 6061-T6, with a minimum thickness of 0.125 inches. After fabrication galvanize steel posts in accordance with ASTM A 123.
7. When a route has a current ADT of 900 or greater, continuously delineate the roadway along the shoulder by means of post mounted reflectors. Spacing on tangent sections is 400 feet.



HORIZONTAL CURVE

(See Table for Spacing Values)



SIGN INSTALLATION ANGLE

HORIZONTAL CURVES

RADIUS (ft)	SPACING ON CURVE (ft)	SPACING IN ADVANCE OF & BEYOND CURVE (ft)			
		1st SPACE	2nd SPACE	3rd SPACE	4th SPACE
≥ 5700	300	400	400	400	400
3000 to < 5700	225	400	400	400	400
2000 to < 3000	160	320	400	400	400
1500 to < 2000	130	260	400	400	400
1000 to < 1500	110	220	330	400	400
700 to < 1000	90	185	275	400	400
500 to < 700	75	150	230	300	400
300 to < 500	60	125	185	300	400
< 300	45	90	140	275	400

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY DETAIL

MONTANA DELINEATORS

DETAIL APPROVED FOR USE 11/2006
REVISED: 1/2008

DETAIL
W633-60

13 August 2014 11:16 AM
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STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	L.1

POTENTIAL UTILITIES IMPACT GAS LINE

BEGINNING STATION	ENDING STATION	LT/RT	LENGTH (LNFT)	NOTES
10+75	10+97	RT		Crossing road at 10+92
10+97	10+91	RT		
97+05	97+14	LT		
101+14	102+55	LT		
102+55	102+59			
102+55	102+56	RT		Crossing road at 102+54

POTENTIAL UTILITIES IMPACT UNDERGROUND CABLE TV

BEGINNING STATION	ENDING STATION	LT/RT	LENGTH (LNFT)	NOTES
11+62	11+85	RT		Crossing at approach Rd
11+99	17+38	LT		
17+29	17+38	LT & RT		Crossing at 17+29
97+13	98+03	LT		
100+23	102+57	LT		Crossing at 102+57

POTENTIAL UTILITIES IMPACT UNDERGROUND POWER

BEGINNING STATION	ENDING STATION	LT/RT	LENGTH (LNFT)	NOTES
17+43	17+47	LT		
17+47	17+55	LT		
87+81	87+77	RT/LT		Crossing at 87+78
104+15	104+18	RT/LT		Crossing at 104+17

UTILITIES IMPACT UNDERGROUND TELEPHONE

BEGINNING STATION	ENDING STATION	LT/RT	LENGTH (LNFT)	NOTES
11+26	11+29	RT		Crossing at 11+28
11+99	17+37	LT		
17+37	17+34	RT		Crossing at 17+34
58+81	57+56	RT		Crossing at 56+94
57+96	58+75	LT		
59+42	67+17	LT		
61+59	62+49	LT		
64+38	64+87	LT		
67+07	75+99	LT		
77+50	78+00	LT		
79+75	81+75	LT		
87+85	87+87	LT/RT		Crosing Road
87+98	88+12	LT/RT		Crosing Road
89+90	90+15	LT		
93+60	93+90	LT		
95+35	98+20	LT		Shown double lines
99+05	128+37	LT		Crossing road at 102+75, 121+82, 128+37
121+80	158+75	RT		
158+30	158+75	LT		Crossing road just beyond 158+75

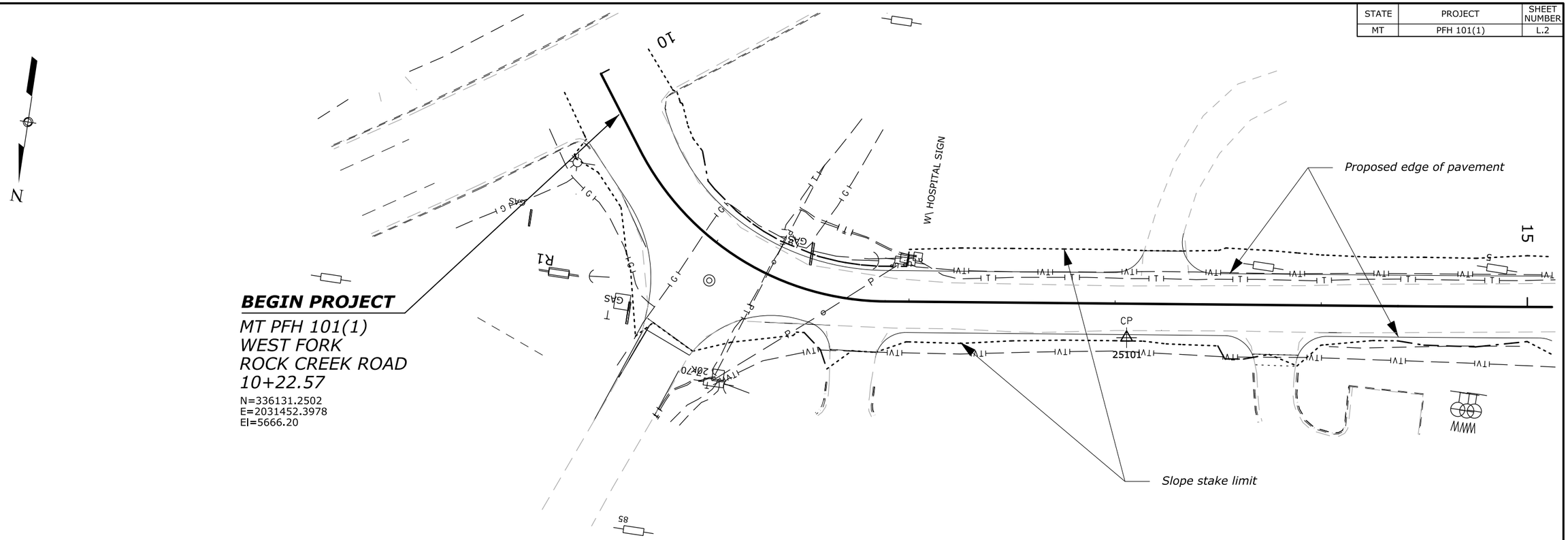
POTENTIAL UTILITIES IMPACT, POLES

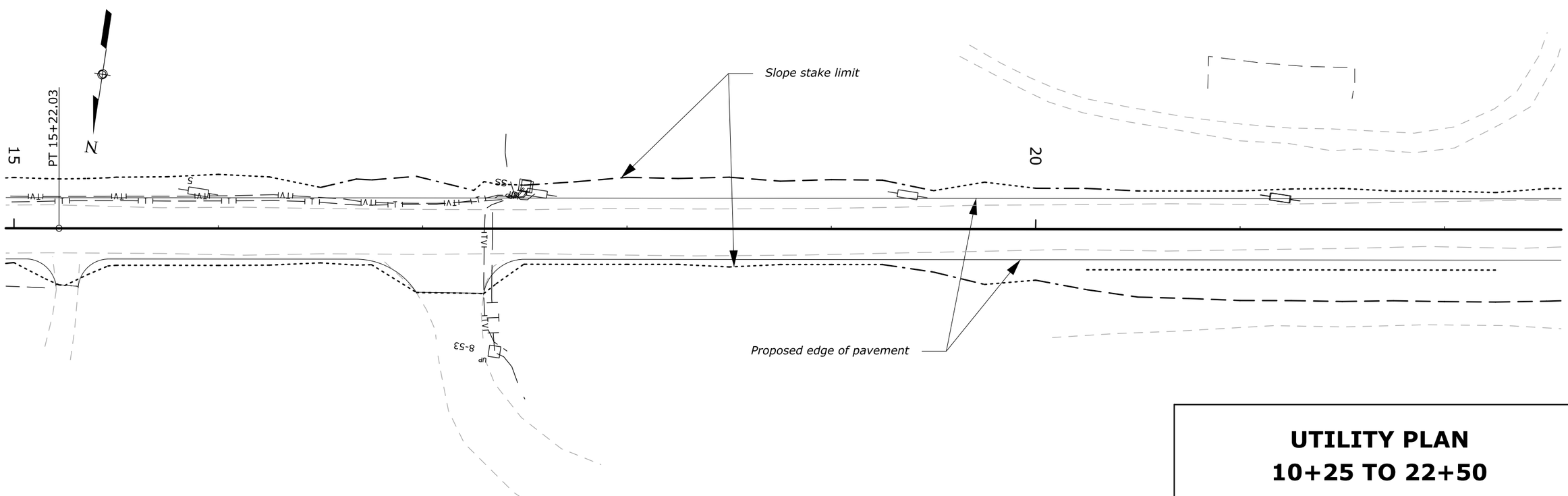
Station	LT/RT	Offset from Proposed Edge of Road
1372	LT	3.5
1485	LT	3
1590	LT	2.5
1756	LT	2
1937	LT	1.5
2509	RT	-3
5763	RT	-0.5

UTILITY IMPACT LOCATIONING

11/2014 Designed by: T. Phan 11/2014 Checked by: M. Moen
17 November 2014 4:14 PM c:\myfiles\pw_production\d0142274\mf1010ua.dgn [int_ft2D]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	L.2



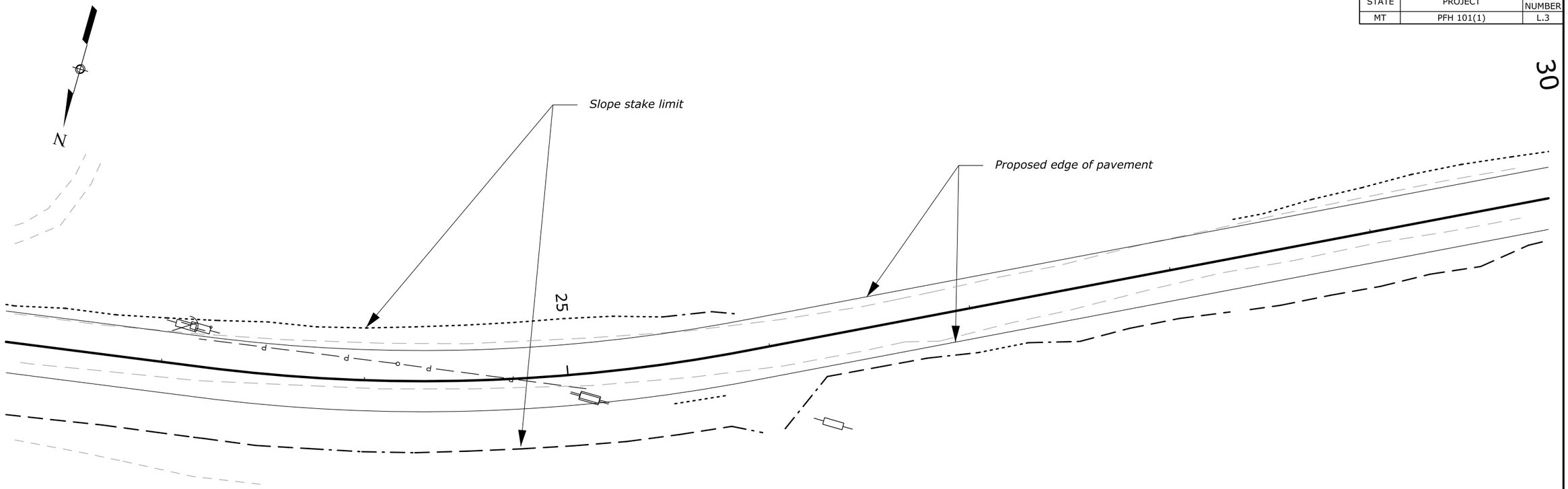


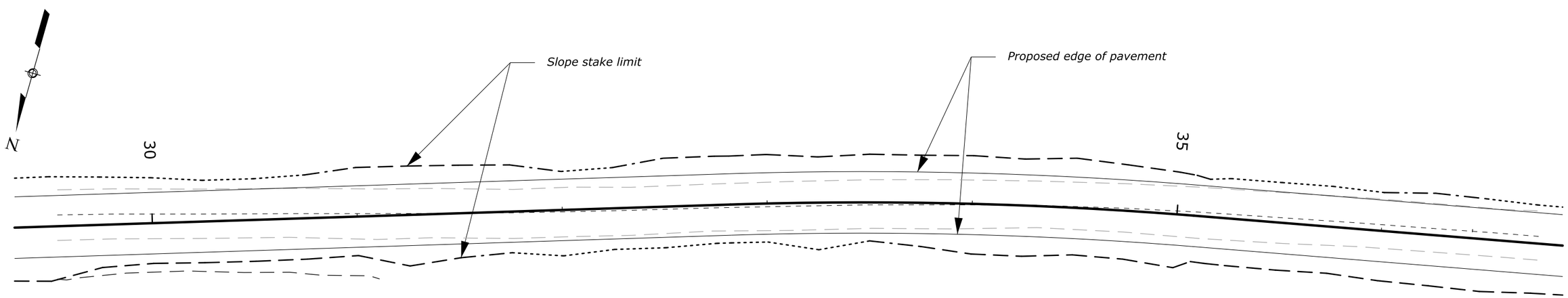
UTILITY PLAN
10+25 TO 22+50

Designed by: T. Phan 07/2014 | Checked by: R. Johnson 07/2014

17 November 2014 4:14 PM c:\myfiles\pw_production\d0142274\mf1010ub.dgn [int_ft2D]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	L.3



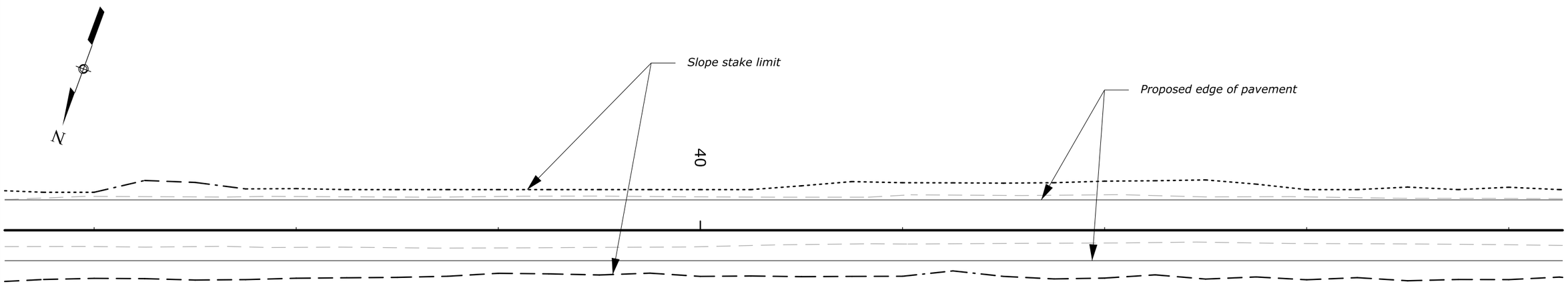


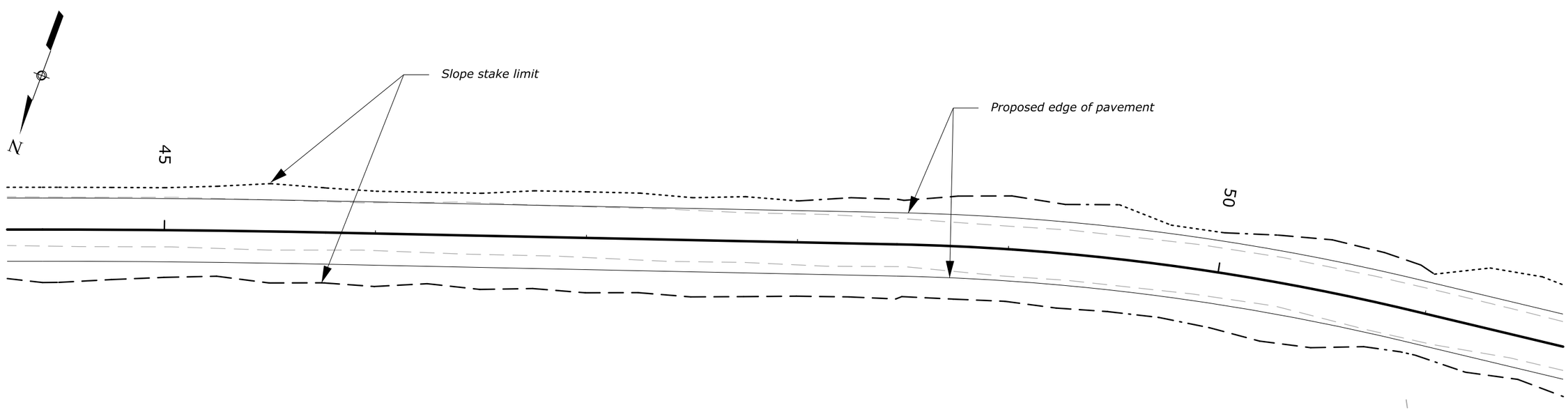
UTILITY PLAN
22+50 TO 36+30

Designed by: T. Phan 03/2013 | Checked by: R. Johnson 03/2013

17 November 2014 4:17 PM c:\myfiles\pw_production\d0142274\mf1010luc.dgn [Int_ft2D]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	L.4



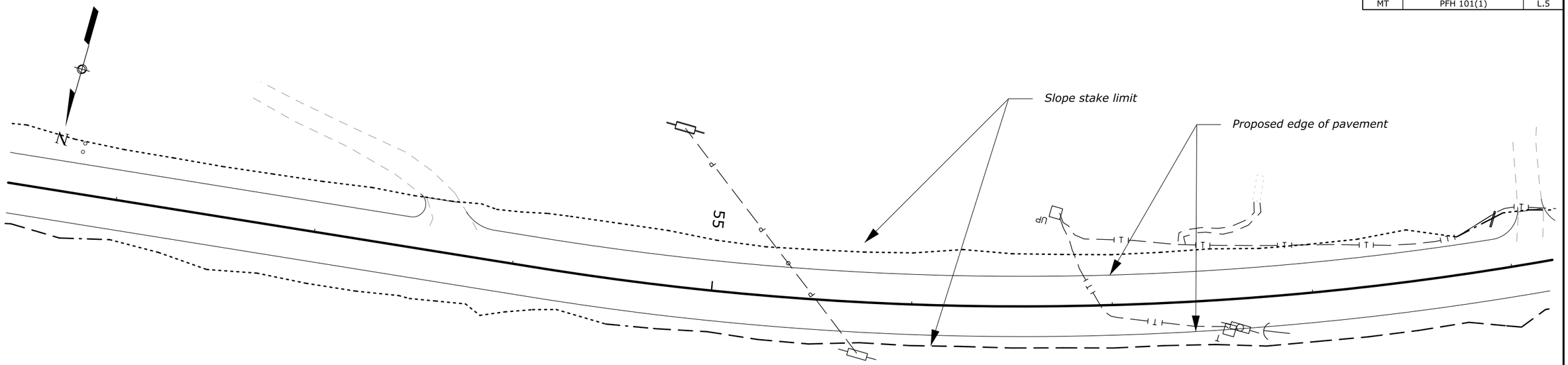


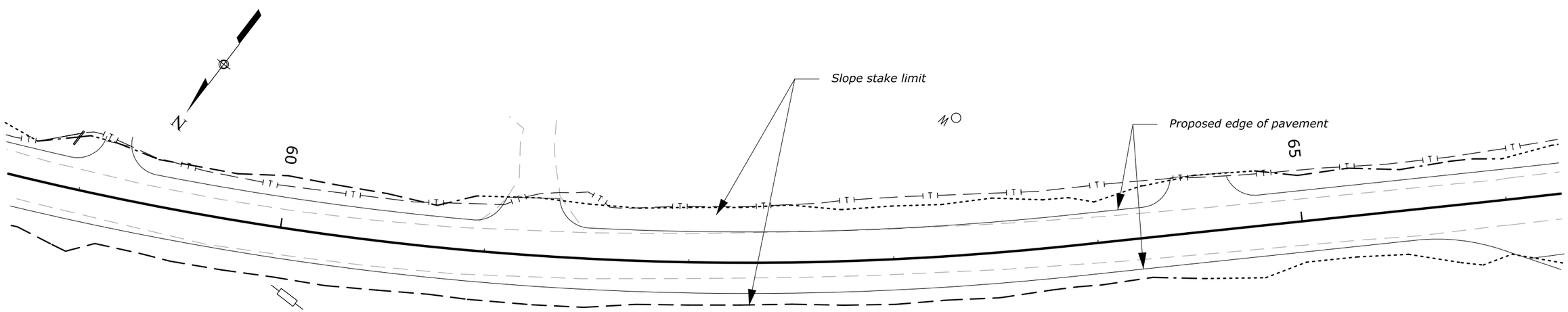
UTILITY PLAN
36+30 TO 51+50

Designed by: T. Phan 03/2013
Checked by: R. Johnson 03/2013

17 November 2014 4:17 PM c:\myfiles\pw_production\d0142274\mf1010ud.dgn [int_ft2D]

STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	L.5





UTILITY PLAN
51+50 TO 66+20

Designed by: T. Phan 03/2013 | Checked by: R. Johnson 03/2013

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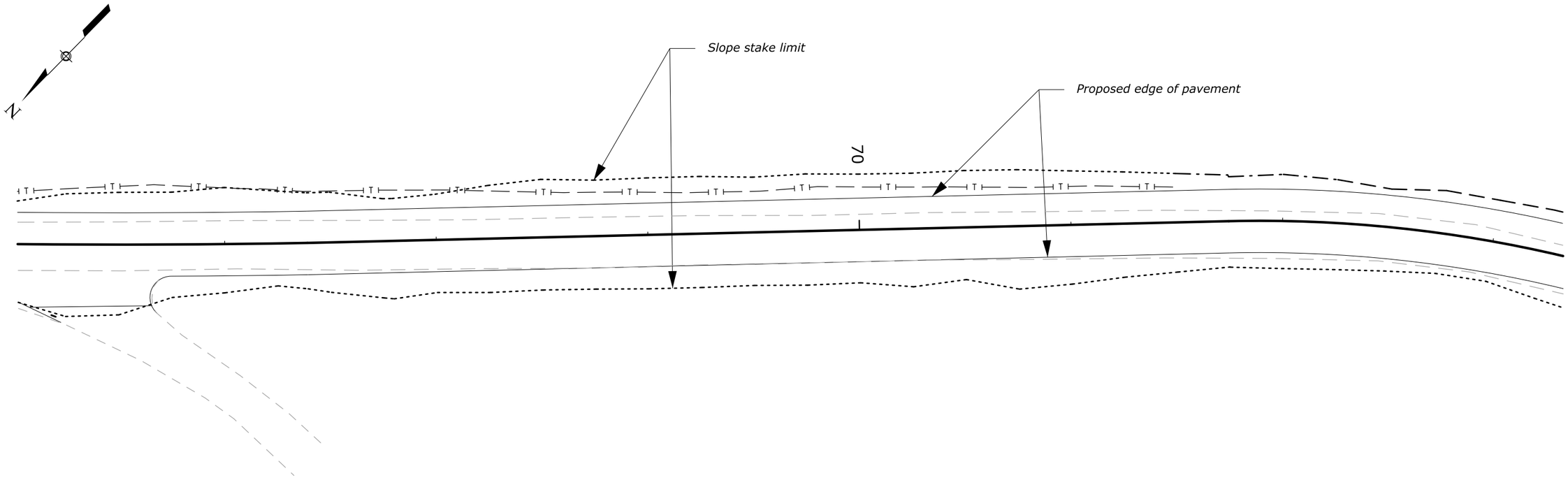
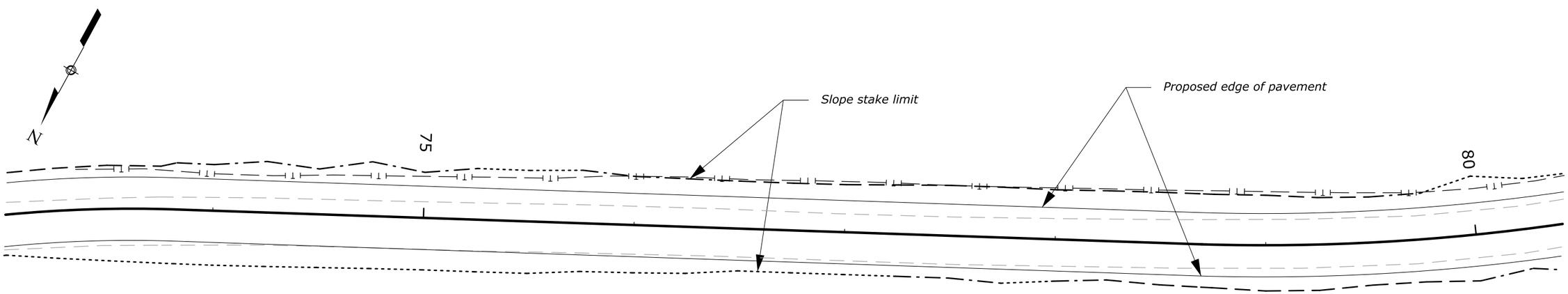
STATE	PROJECT	SHEET NUMBER
MT	MT PFH 101(1)	L.6





UTILITY PLAN
66+20 TO 80+40

Designed by: T. Phan 03/2013 | Checked by: R. Johnson 03/2013

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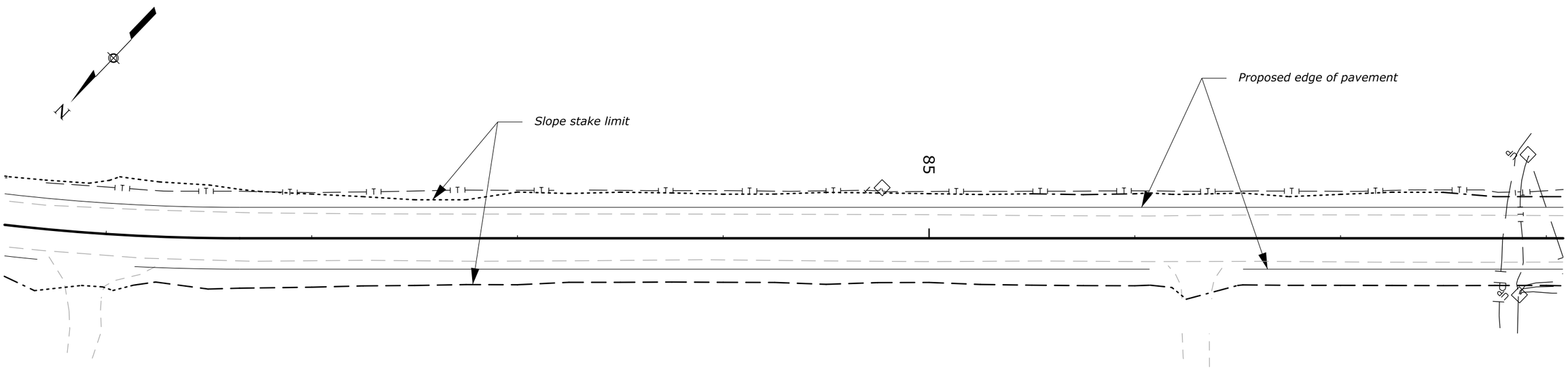
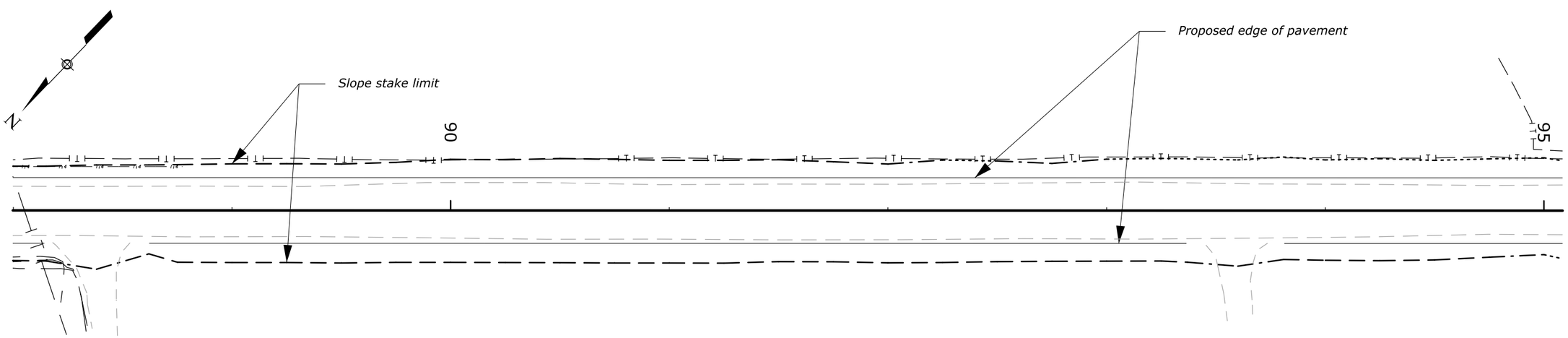
STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	L.7





UTILITY PLAN
80+40 TO 95+00

Designed by: T. Phan 03/2013 Checked by: R. Johnson 03/2013

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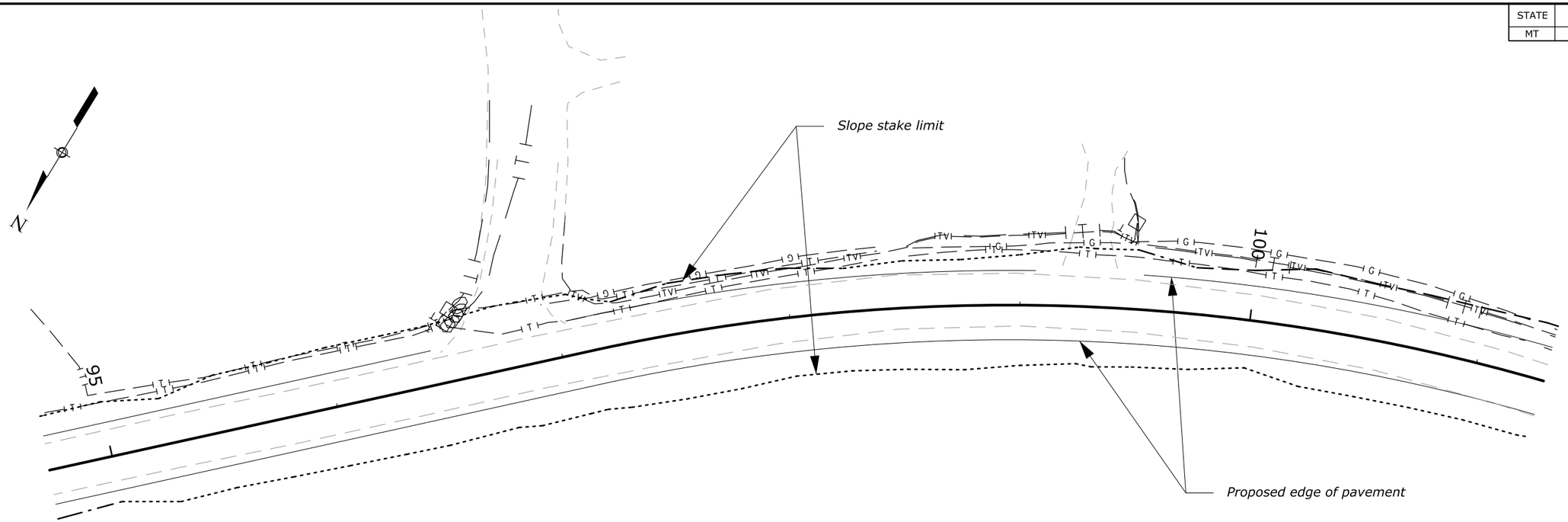
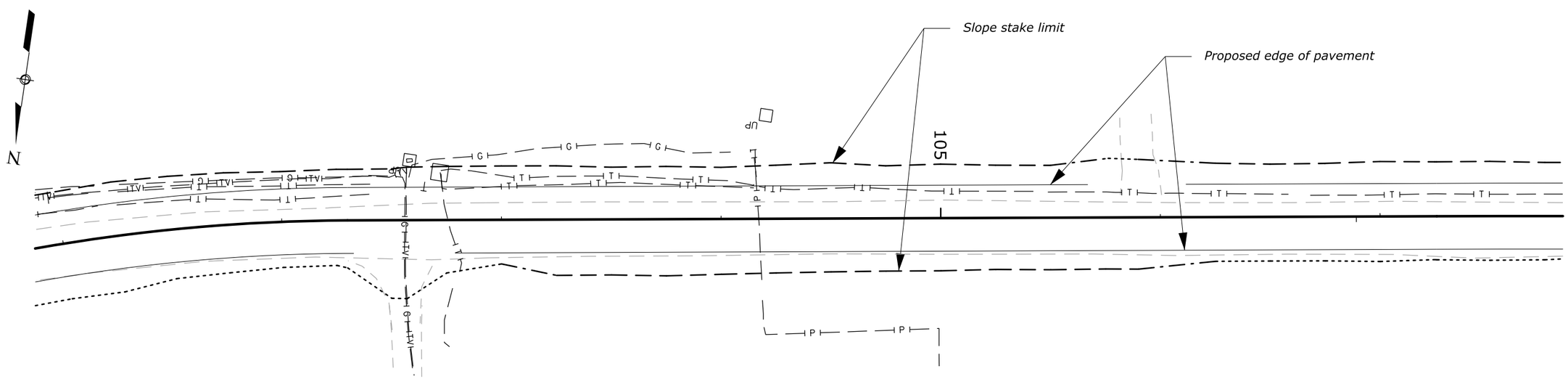
STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	L.8





UTILITY PLAN
95+00 TO 107+50

Designed by: T. Phan 03/2013 | Checked by: R. Johnson 03/2013

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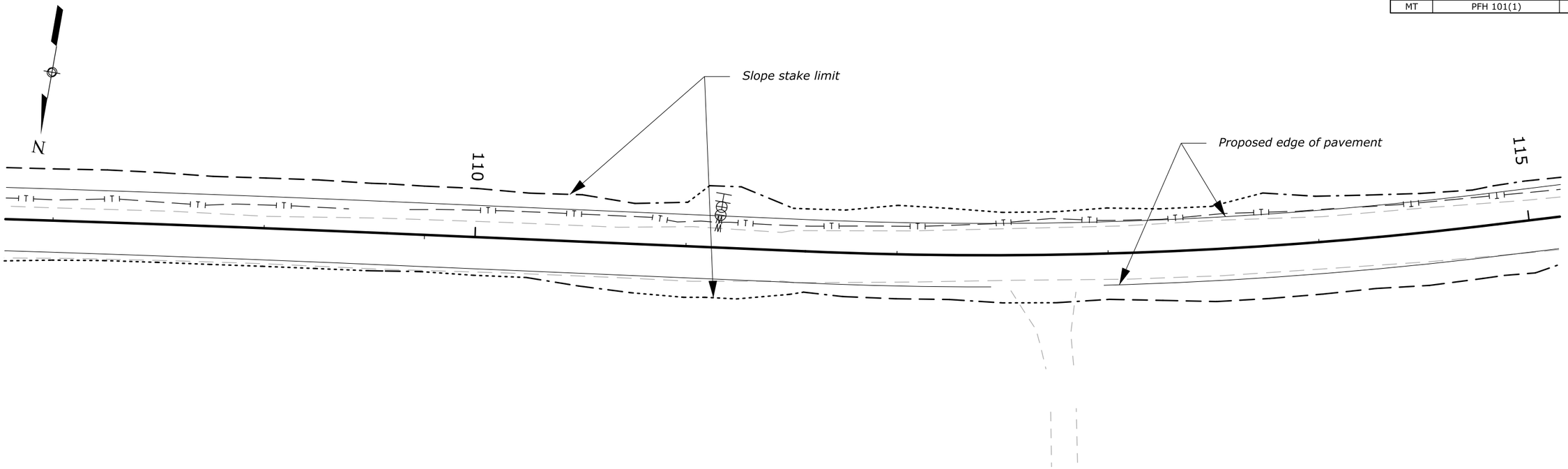
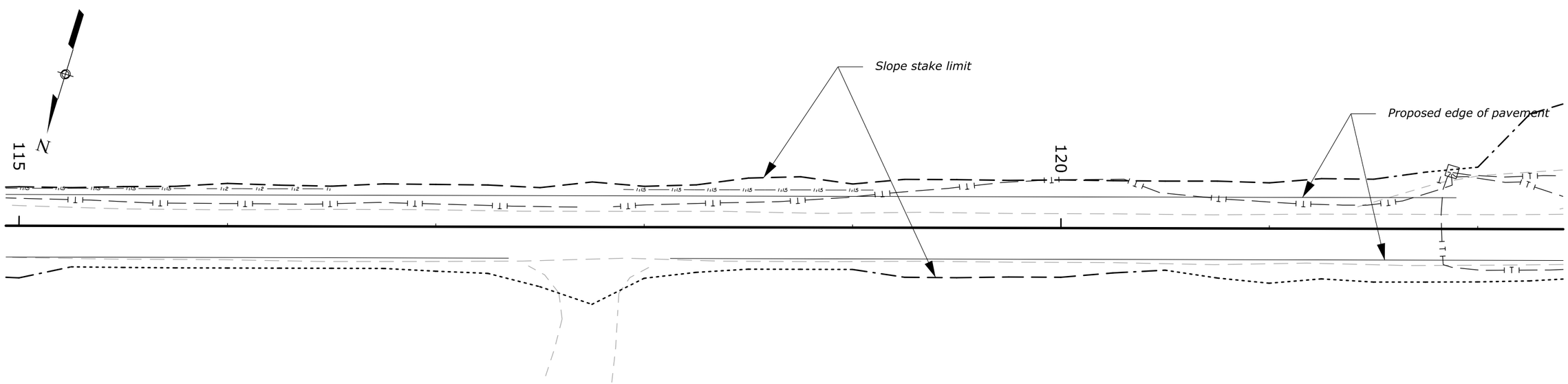
STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	L.9





UTILITY PLAN
107+50 TO 122+20

Designed by: T. Phan 03/2013
Checked by: R. Johnson 03/2013

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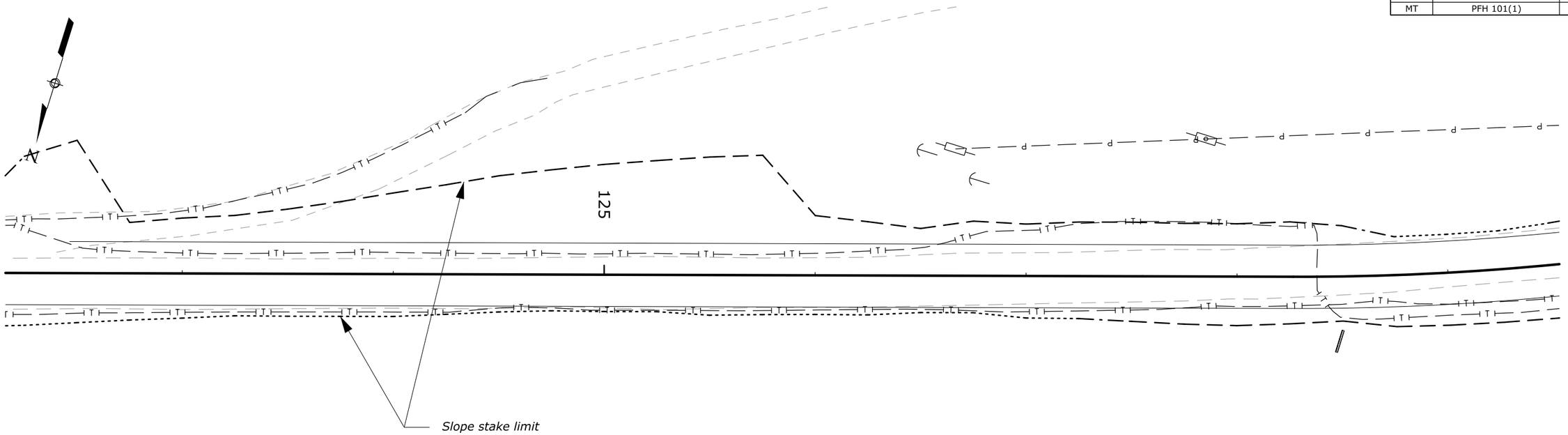
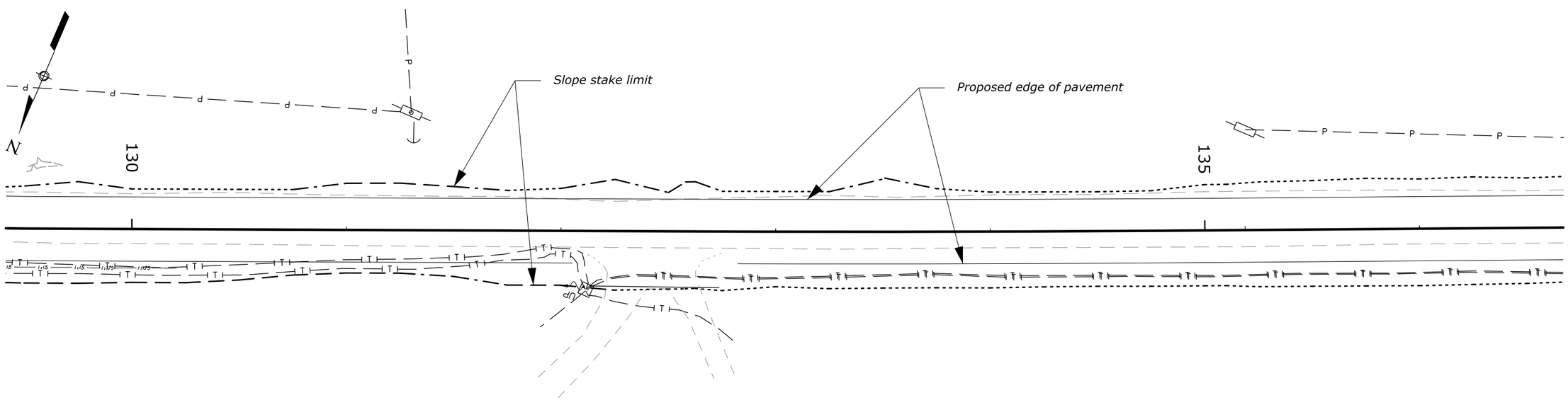
STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	L.10





UTILITY PLAN
122+20 TO 136+60

Designed by: T. Phan 03/2013 | Checked by: R. Johnson 03/2013

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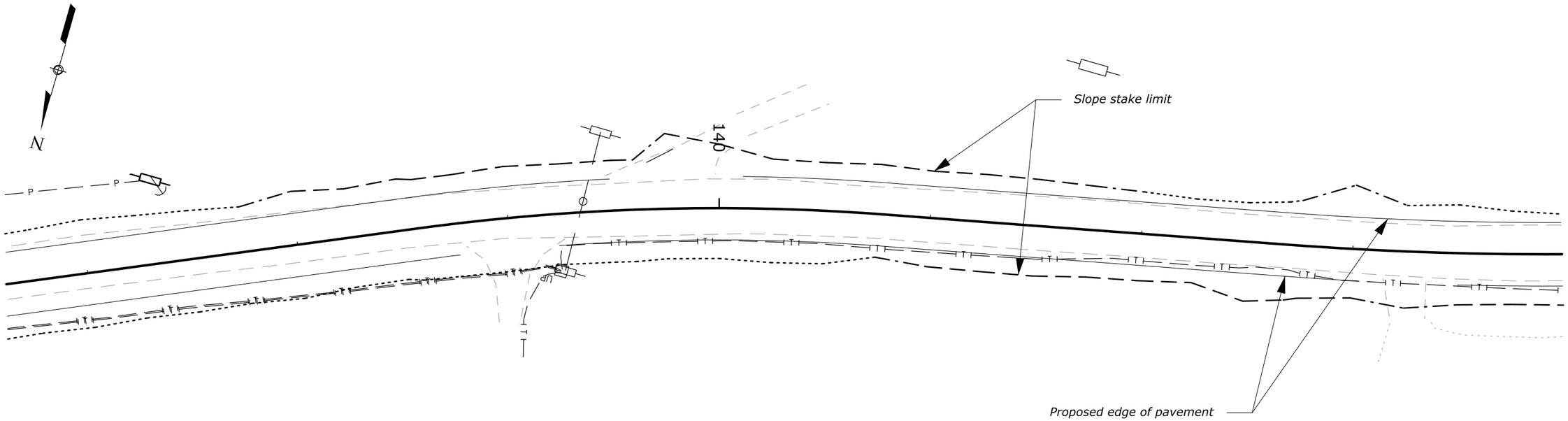
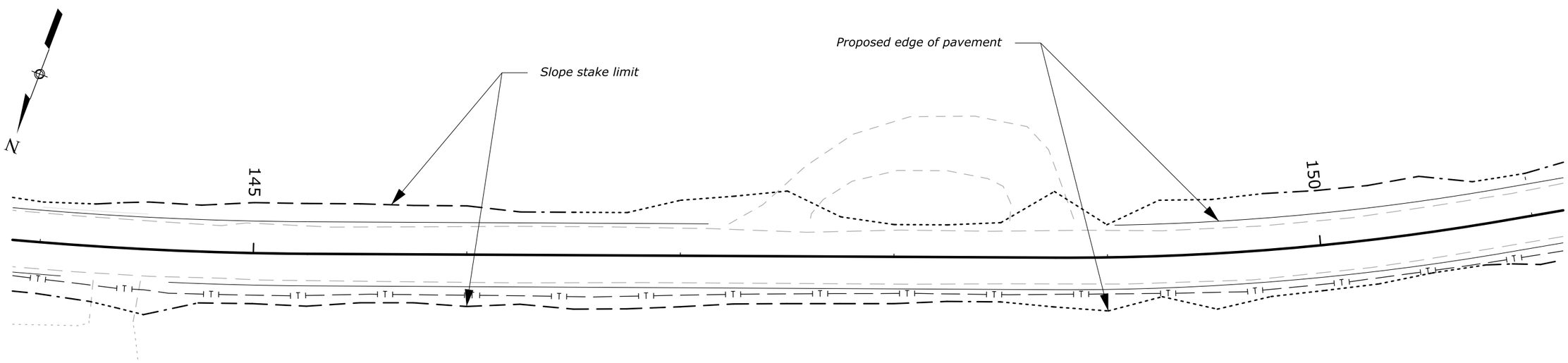
STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	L.11





UTILITY PLAN
136+60 TO 151+10

Designed by: T. Phan 03/2013 | Checked by: R. Johnson 03/2013

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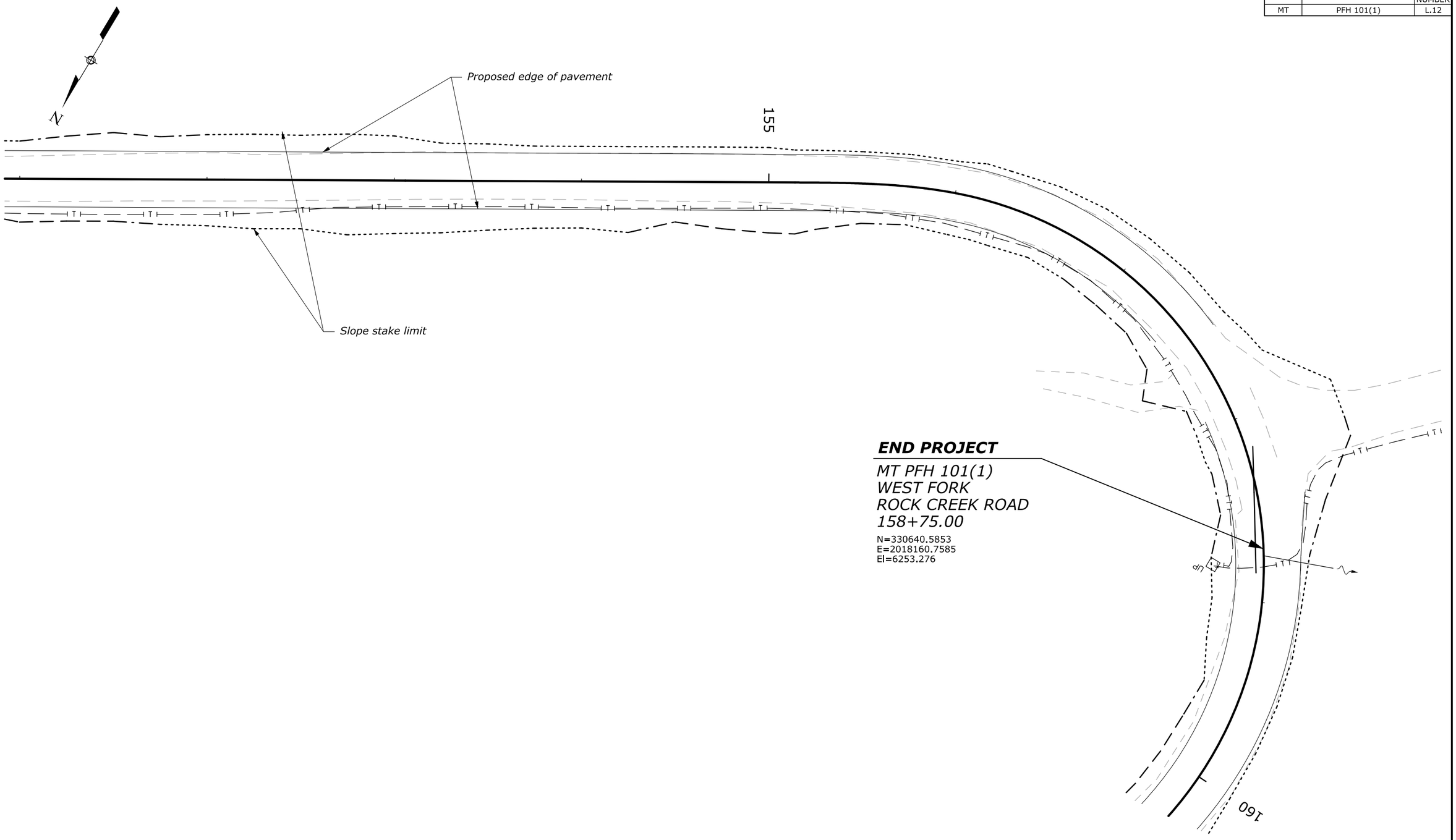
STATE	PROJECT	SHEET NUMBER
MT	PFH 101(1)	L.12



UTILITY PLAN
151+10 to 160+00

Designed by: T. Phan 03/2013 | Checked by: R. Johnson 03/2013

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