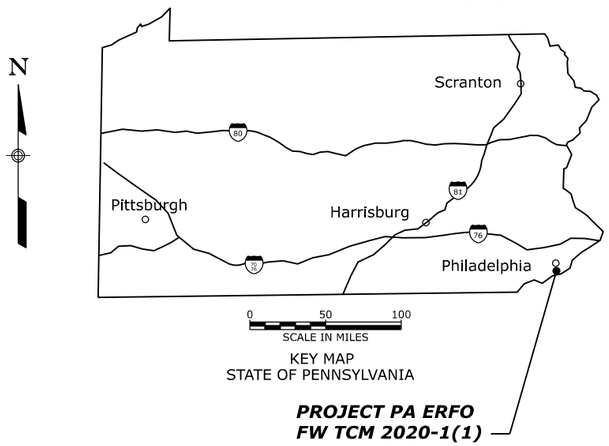
PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	A01
PWD TRACKING NUMBER: FY26-PAER-8386-01	

U.S. DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE
JOHN HEINZ NATIONAL WILDLIFE REFUGE AT TINICUM

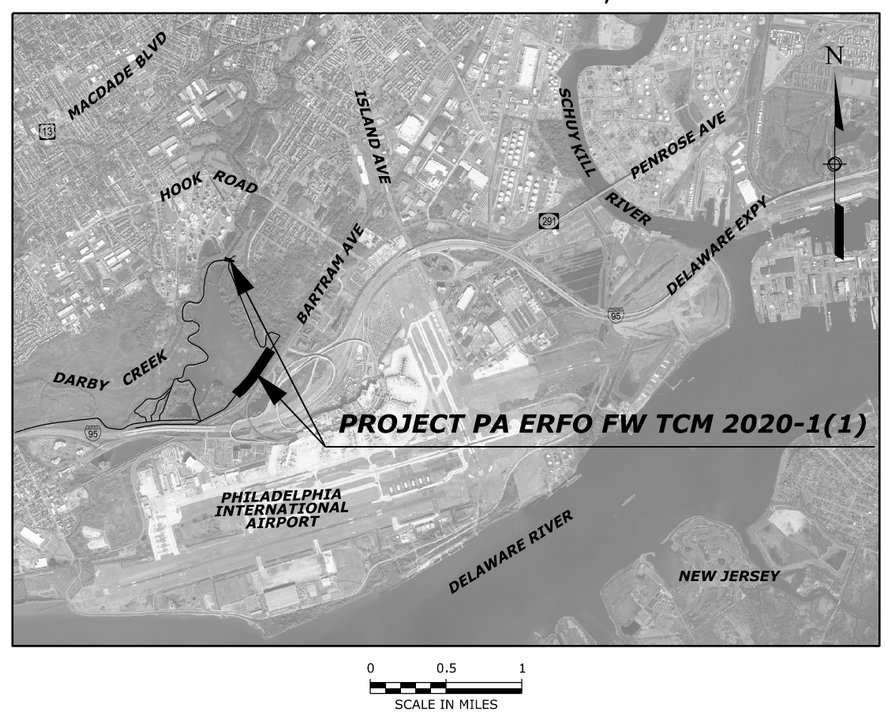


PLANS FOR PROPOSED PROJECT

PA ERFO FW TCM 2020-1(1)

REHABILITATION OF TROLLEY BED ROAD AND HAUL ROAD

PHILADELPHIA COUNTY, PA



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M12-M13	FEMA Floodplain Area
M14	Darby Creek Watershed
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S01-S18	Standards And Details
T01-T39	Cross Sections

DESCRIPTION OF PROJECT

IMPROVEMENT: Embankment construction, aggregate base, aggregate surface course, asphalt concrete pavement, remove and install pipe culverts, remove and install stone masonry headwalls, placed riprap, and other miscellaneous work.

PROJECT LENGTH: 0.38 Miles

LANE MILES: 0.38 Miles

ROAD:	WIDTH	SURFACE	BASE	SUBGRADE
Trolley Bed Road (Route 404)	15'	6" ASC	N/A	N/A
Haul Road (Route 405)	15'	4.5" ACP	6" AB	N/A

BRIDGE: N/A

DESIGN DESIGNATION:	TROLLEY BED ROAD
ADT (2023)	Less than 50
ADT (2033)	Less than 50
DHV	N/A
D	N/A
%Truck	N/A
V (MPH)	15
C/A	None
e(max)	None

SPECIFICATIONS:

"Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects", FP-14.

Schedule	Description	Station to Station	Length (miles)	RIP Milepost/ Cycle #
A	Trolley Bed Road	101+00 to 120+50	0.37	0.00-0.79 / Cycle 5
B	Haul Road	200+14 to 200+82	0.01	0.00-0.80 / Cycle 5

U.S. Department of Transportation
Federal Highway Administration

These design plans and specifications were performed by employees of the United States and is in accordance with accepted engineering practice, is true and correct, and is in conformance with Chapter 105 of the rules and regulations of the Pennsylvania Department of Environmental Protection. An engineer employed by the United States is exempt from the license requirements of Title 63, Chapter 5, Pennsylvania Statutes, which include signing and sealing the documents.

811 Know what's below. Call before you dig.

PLANS PREPARED BY
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
ASHBURN, VIRGINIA
APRIL 2026

Disaster No. PA2020-1-FWS

Project Manager	Highway Design Manager	Lead Designer
Sheila Foronda	Jeff Johnson	Brenda Duong

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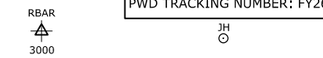
9 April 2026 8:31 AM

Δ	total central angle
Δc	curve central angle
Ø	diameter
θs	spiral central angle
abut.	abutment
ACP	asphalt concrete pavement
ADT	average daily traffic
Agg	aggregate
AH	ahead
AMD	amendment
appr.	approach
ASC	aggregate surface course
Asph	asphalt
BK	back
BL	baseline
bldg.	building
BM	bench mark
BP	balance point
br.	bridge
brg.	bearing
BW	broken white
cc or c. to c.	center to center
CL	centerline
CMP	corrugated metal pipe
col.	column
conc.	concrete
conn.	connection
constr. jt.	construction joint
cont.	continuous
CS	curve to spiral
ctrs.	centers
D	diameter
DHV	design hourly volume
dia.	diameter
diag.	diagonal
diaph.	diaphragm
dist.	distance
drwg(s).	drawing(s)
DSY	double solid yellow
DW or DTW	dotted white
DY or DTY	dotted yellow
E	east
e	superelevation rate
elec.	electric
elev.	elevation
emb.	embankment
EOP	edge of pavement
EOS	edge of shoulder
EOT	edge of travel way
EQ or eq.	equation
ER	edge of road
ESAL	equivalent single axle load
EW	edge of water
ex. or exist.	existing
exc.	excavation
exp. jt.	expansion joint
fin.	finish
flg.	flange
ftg.	footing
ga.	gage (gauge)
GAB	graded aggregate base
galv.	galvanized
gnd or grnd	ground
hdwl.	headwall
hex.	hexagon
HW	high water
ID	inside diameter
inv.	invert
jt.	joint
L	length of curve
lam.	lamination
lat.	latitude
LOD	Limits of Disturbance
long.	longitudinal
LPSM	lump sum
Ls	length of spiral
lt. or LT	left
LW	low water
ML	main line
MOD	modification
MP	mile post
max.	maximum
min.	minimum
mon.	monument
N	north
NC	normal crown
NMSA	nominal maximum size aggregate
No.	number
o. c.	on center
ohwm	ordinary high water mark
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
PGL	profile grade line
PI	point of intersection
pl.	plate
POB	point of beginning
POC	point on curve
POE	point of ending
POS	point on spiral
POT	point on tangent
prop.	proposed
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
RECP	rolled erosion control product
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
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)
SSD	stopping sight distance
ST	point of spiral to tangent
Sta.	station
std.	standard
stgr.	stringer
stiff.	stiffener
struc.	structural
STS	point of spiral to tangent spiral
SW or SDW	solid white
sym.	symmetrical
S/W	sidewalk
T	tangent distance
T.	township
TBM	temporary bench mark
thd.	thread
traf.	traffic
TS	point of tangent to spiral
Ts	tangent distance (spiraled curve)
typ.	typical
V	design speed
var.	varies
vph	vehicles per hour
VPI	vertical point of intersection
W	west

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	A02
PWD TRACKING NUMBER: FY26-PAER-8386-01	

Control Point (Terrestrial and GPS); Jump Hub



National Boundary

State Boundary

County Boundary

City Boundary

Township or Range Line

Section Line

Section Corner (Found, Projected)

¼ Section Line

¼ Section Corner (Found, Projected)

1/16 Section Line

1/16 Section Corner (Found, Projected)

Property Line w/Found Property Corner

Parcel Number

National Park Boundary

National Forest Boundary

National Wildlife Refuge Boundary

BLM Lands Boundary

Indian Reservation Boundary

Existing Roadway (Road, Paved, Gravel)

Railroad

Trail

Intermittent Drainage or Small Creek

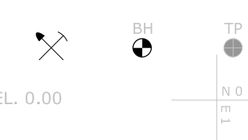
Large Creek or River

Lake, Pond or Reservoir

Spring or Seep

Treeline; Individual Trees

Material Source; Bore Hole; Test Pit



Spot Elevation; Coordinate Grid Tick

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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OFFICE OF FEDERAL LANDS HIGHWAY

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

SYMBOLS AND ABBREVIATIONS

Sheet 1 of 2

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26 March 2026 3:25 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	A03
PWD TRACKING NUMBER: FY26-PAER-8386-01	

North Arrow

	EXISTING	PROPOSED
Slope Stake Limits — Top of Cut		
Toe of Fill		
Transition		
Fence		
Gate with Fence		
Cattleguard		
Guardrail		
Concrete Barrier		
Retaining Wall		
Signs (single, double post; portable)		
Delineators		
Pipe Culvert (arrow shows flow)		
Pipe Culvert with End Section		
Pipe Culvert with Headwall		
Pipe Culvert with Drop Inlet		DI
Box Culvert		
Underdrain	UD	UD
Overhead/Above Ground Utilities	P	P
Underground Utilities	W	W

FM = force main, FO = fiber optic, G = gas, IRR = irrigation, O = oil,
P = power, SA = sanitary sewer, SD = storm drain, SS = storm sewer,
STEAM = steam, T = telephone, TV = CATV, W = water

Poles (Power, Telephone, Joint Use, Light, Support w/Anchor)

Miscellaneous Utility Features
EM = electric meter, T = telephone pedestal, TV = CATV pedestal,
UP = transformer or junction box, WF = water fountain

Building

Right-of-Way Line with Monument — r/w — R/W

Permanent Easement — P/E — P/E

Construction Easement — TCE

Riprap

AREA PATTERN

Pavement Removal / Roadway Obliteration

Full Depth Pavement

Sidewalk Asphalt/Concrete

Mill and Overlay

Overlay

Silt Fence — SF

Diversion Berm — DB

Drainage Divide

Check Dam

Limits of Disturbance — LOD LOD LOD

Fiber Roll or Wattle

PROJECT SPECIFIC SYMBOLS AND ABBREVIATIONS:

Aggregate base	AB
Aggregate surface course	ASC
Ductile iron pipe	DIP
Edge of gravel	EOG
Erosion and sediment	E&S
Not applicable	N/A
Reinforced concrete pipe	RCP

Aggregate surface course

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JOHN HEINZ WILDLIFE REFUGE AT TINICUM

SYMBOLS AND ABBREVIATIONS

Sheet 2 of 2

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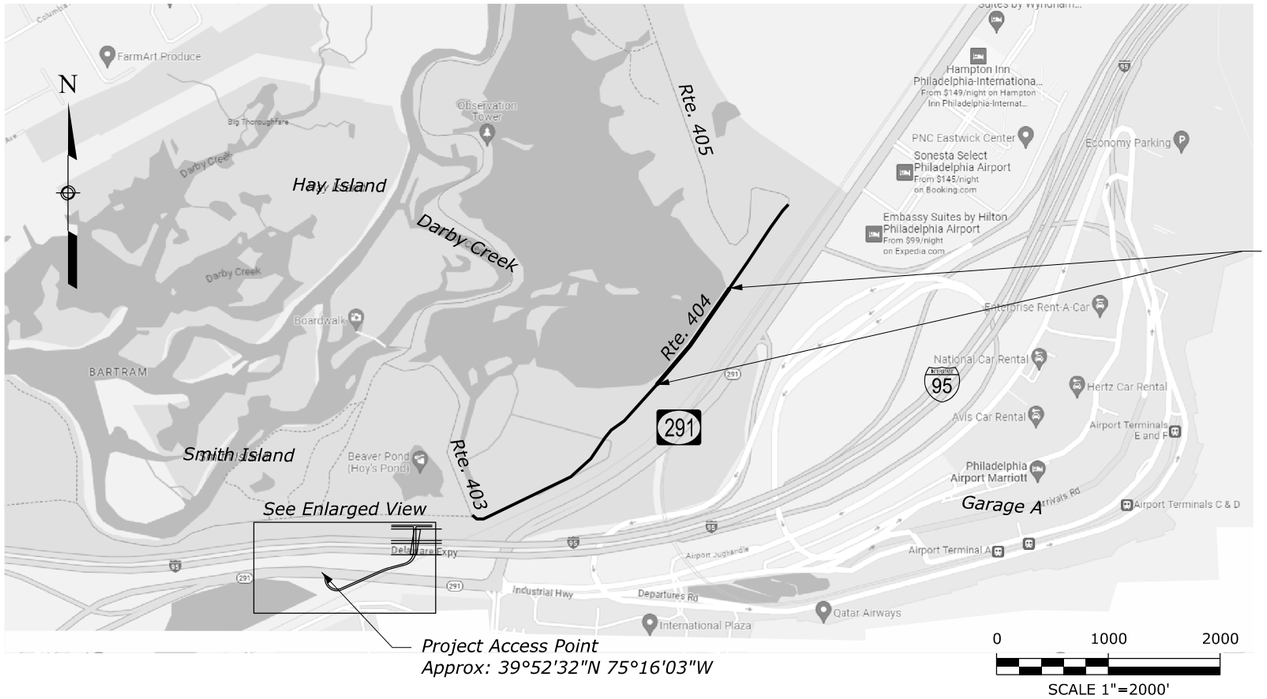
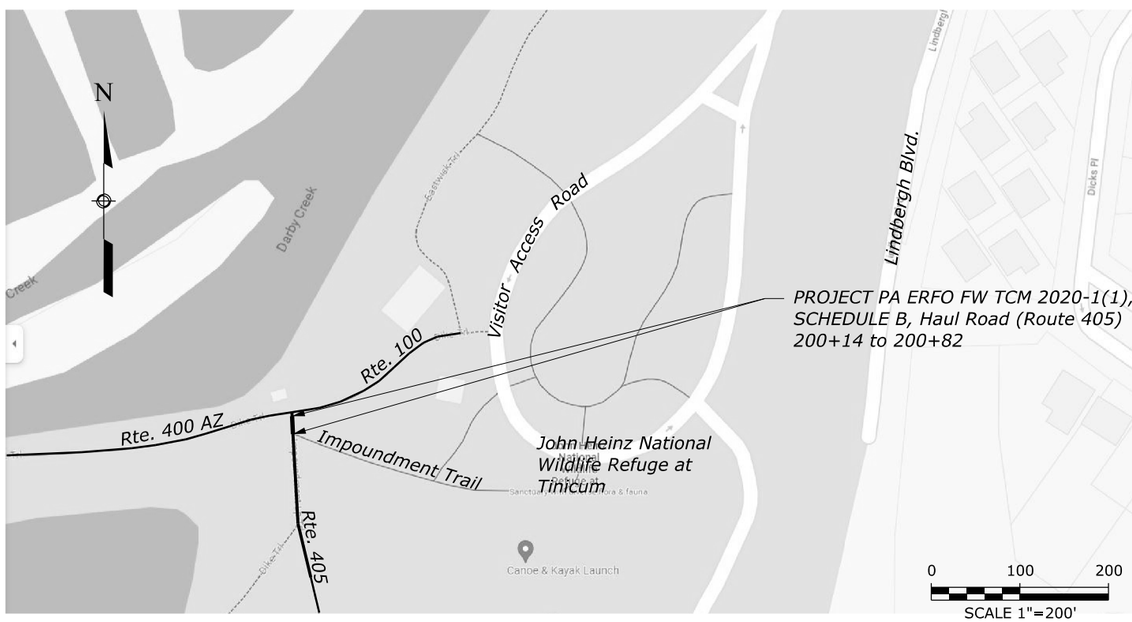
PWD TRACKING NUMBER: FY26-PAER-8386-01	



PROJECT PA ERFO FW TCM 2020-1(1),
SCHEDULE A, Trolley Bed Road (Route 404)
101+00 to 120+50

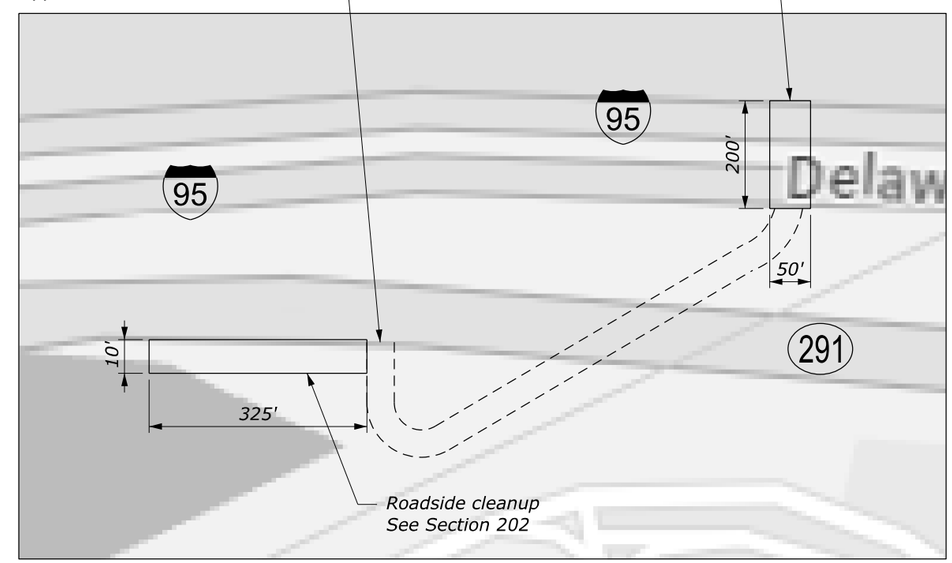
Project Access Point
Approx: 39°52'32"N 75°16'03"W



PROJECT PA ERFO FW TCM 2020-1(1),
SCHEDULE B, Haul Road (Route 405)
200+14 to 200+82

Project Stockpiling and Staging Area Under I-95 Bridges
Approx: 39°52'34"N 75°15'55"W

Project Access Point
Approx: 39°52'32"N 75°16'03"W



ENLARGED VIEW

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JOHN HEINZ WILDLIFE REFUGE AT TINICUM

LOCATION MAP

TROLLEY BED ROAD (ROUTE 404)
HAUL ROAD (ROUTE 405)

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PROJECT	SHEET NUMBER
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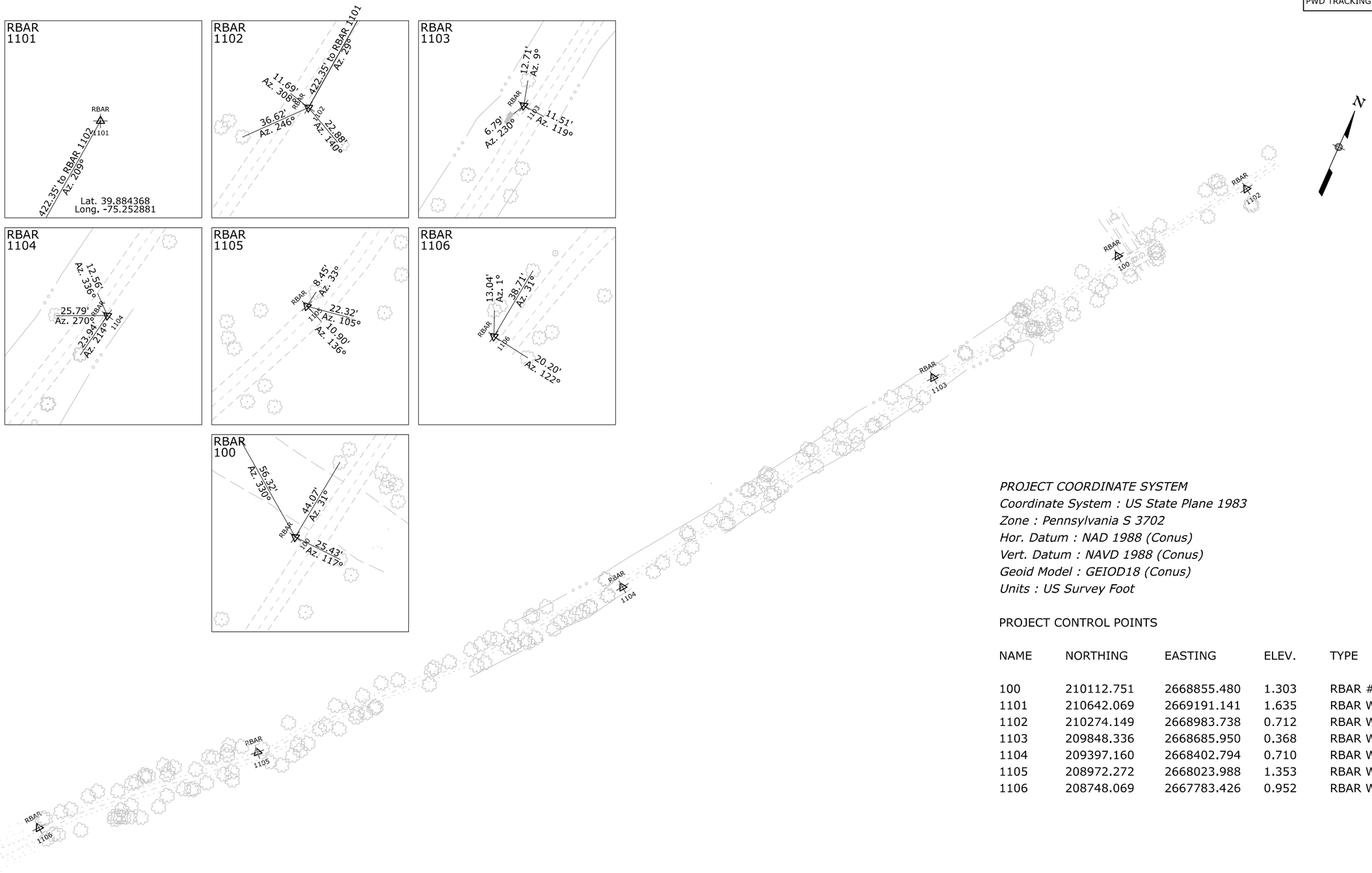
PWD TRACKING NUMBER: FY26-PAER-838604	



PROJECT COORDINATE SYSTEM
Coordinate System : US State Plane 1983
Zone : Pennsylvania S 3702
Hor. Datum : NAD 1988 (Conus)
Vert. Datum : NAVD 1988 (Conus)
Geoid Model : GEIOD18 (Conus)
Units : US Survey Foot

PROJECT CONTROL POINTS

NAME	NORTHING	EASTING	ELEV.	TYPE
100	210112.751	2668855.480	1.303	RBAR #IPF
1101	210642.069	2669191.141	1.635	RBAR W/CAP
1102	210274.149	2668983.738	0.712	RBAR W/CAP
1103	209848.336	2668685.950	0.368	RBAR W/CAP
1104	209397.160	2668402.794	0.710	RBAR W/CAP
1105	208972.272	2668023.988	1.353	RBAR W/CAP
1106	208748.069	2667783.426	0.952	RBAR W/CAP

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1	3/26/26	BD	PWD REVISION 1

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FEDERAL HIGHWAY ADMINISTRATION
OFFICE OF FEDERAL LANDS HIGHWAY

0 70 140
SCALE 1"=140'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

SURVEY INFORMATION

TROLLEY BED ROAD (ROUTE 404)
SCHEDULE A

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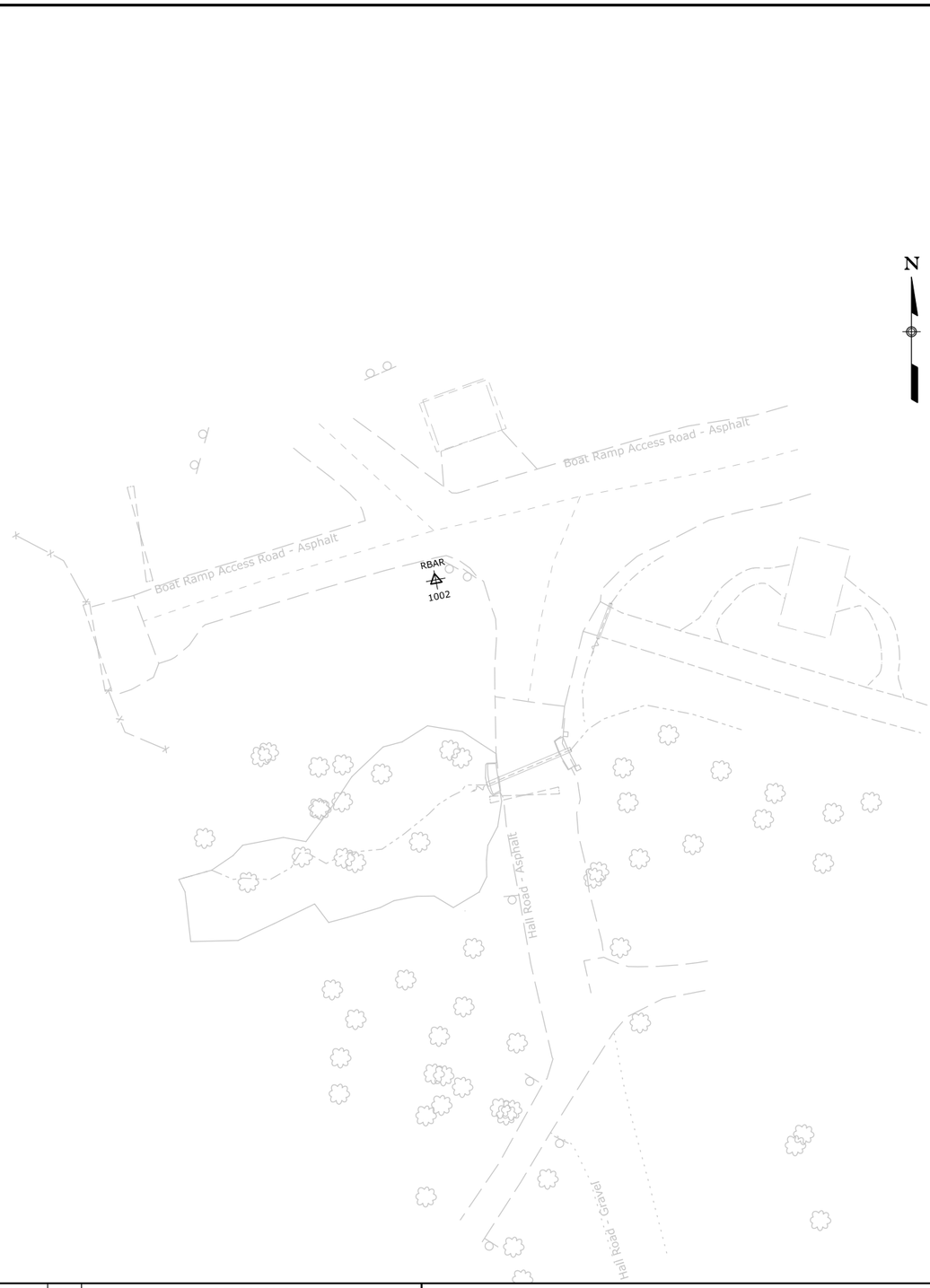
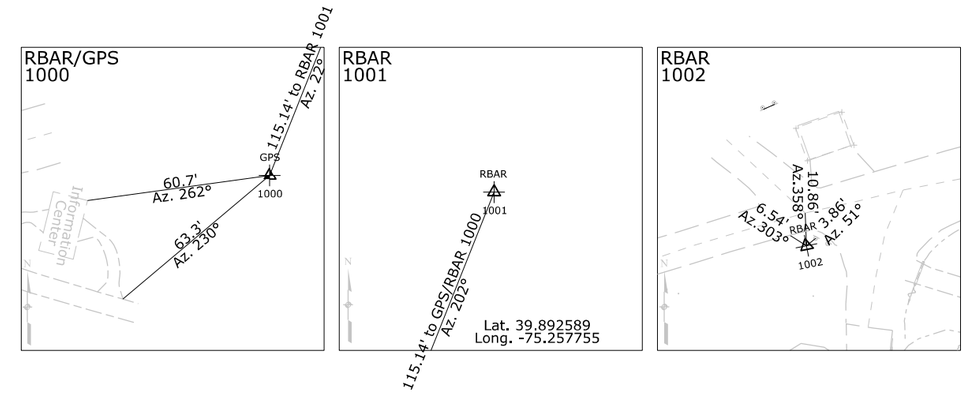
PWD TRACKING NUMBER: FY26-PAER-8386-01	





PROJECT COORDINATE SYSTEM
Coordinate System : US State Plane 1983
Zone : Pennsylvania S 3702
Hor. Datum : NAD 1988 (Conus)
Vert. Datum : NAVD 1988 (Conus)
Geoid Model : GEIOD18 (Conus)
Units : US Survey Foot

PROJECT CONTROL POINTS

NAME	NORTHING	EASTING	ELEV.	TYPE
1000	213489.833	2667696.781	10.237	RBAR W/CAP (GPS)
1001	213596.784	2667739.405	11.469	RBAR W/CAP
1002	213475.088	2667545.011	11.139	RBAR W/CAP

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1	3/26/26	BD	PWD REVISION 1

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FEDERAL HIGHWAY ADMINISTRATION
OFFICE OF FEDERAL LANDS HIGHWAY

0 25 50
SCALE 1"=50'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

SURVEY INFORMATION

HAUL ROAD (ROUTE 405)
SCHEDULE B

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27 March 2026 10:14 AM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	A07
PWD TRACKING NUMBER: FY26-PAER-8386-01	

CONTROL LINE DATA - TROLLEY BED ROAD BL (SCHEDULE A)

BEARING	DISTANCE (FEET)	NORTHING (Y)	EASTING (X)	PC	PI	PT	DELTA	R	L	T
N33.893°E	114.922 '	208451.87	2667592.7		100+00					
N30.118°E	104.214 '	208552.735	2667660.461	101+14.922	101+21.513	101+28.099	3.775°	-200.000 '	13.178 '	6.591 '
N38.542°E	160.258 '	208655.62	2667720.145	102+25.723	102+40.451	102+55.126	8.424°	200.000 '	29.404 '	14.728 '
N48.840°E	243.661 '	208795.063	2667831.229	104+00.656	104+18.679	104+36.604	10.298°	200.000 '	35.947 '	18.022 '
N34.980°E	49.549 '	208971.432	2668032.975	106+62.242	106+86.551	107+10.622	13.860°	-200.000 '	48.380 '	24.309 '
N44.299°E	154.500 '	209045.421	2668084.744	107+35.863	107+76.615	108+17.188	9.319°	500.000 '	81.325 '	40.752 '
N39.678°E	160.705 '	209199.313	2668234.916	109+30.936	109+91.457	110+51.913	4.621°	-1500.000 '	120.977 '	60.522 '
N34.155°E	153.094 '	209378.681	2668383.714	111+52.096	112+24.444	112+96.68	5.523°	-1500.000 '	144.584 '	72.348 '
N32.663°E	230.482 '	209521.533	2668480.634	113+77.427	113+96.96	114+16.491	1.492°	-1500.000 '	39.065 '	19.534 '
N34.609°E	55.001 '	209729.863	2668614.19	116+27.44	116+44.422	116+61.401	1.946°	1000.000 '	33.960 '	16.982 '
N33.314°E	446.546 '	209784.435	2668651.849	116+99.42	117+10.724	117+22.026	1.295°	-1000.000 '	22.606 '	11.303 '
N34.725°E	75.638 '	210193.638	2668920.786	121+57.268	122+00.39	122+43.507	1.412°	3500.000 '	86.239 '	43.121 '
N32.471°E	77.434 '	210259.04	2668966.115	122+76.024	122+79.96	122+83.894	2.255°	-200.000 '	7.871 '	3.936 '
		210324.368	2669007.687		123+57.393					

CONTROL LINE DATA - HAUL ROAD BL (SCHEDULE B)

BEARING	DISTANCE (FEET)	NORTHING (Y)	EASTING (X)	PC	PI	PT	DELTA	R	L	T
N11.356°W	53.780 '	213366.89	2667578.921		200+00					
N30.472°E		213464.493	2667559.386	200+53.78	200+99.539	201+41.213	41.746°	120.000 '	87.433 '	45.759 '

NO.	DATE	BY	REVISIONS
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FEDERAL HIGHWAY ADMINISTRATION
OFFICE OF FEDERAL LANDS HIGHWAY

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

ALIGNMENT DATA

TROLLEY BED ROAD (ROUTE 404) AND HAUL ROAD (ROUTE 405)
SCHEDULE A AND B

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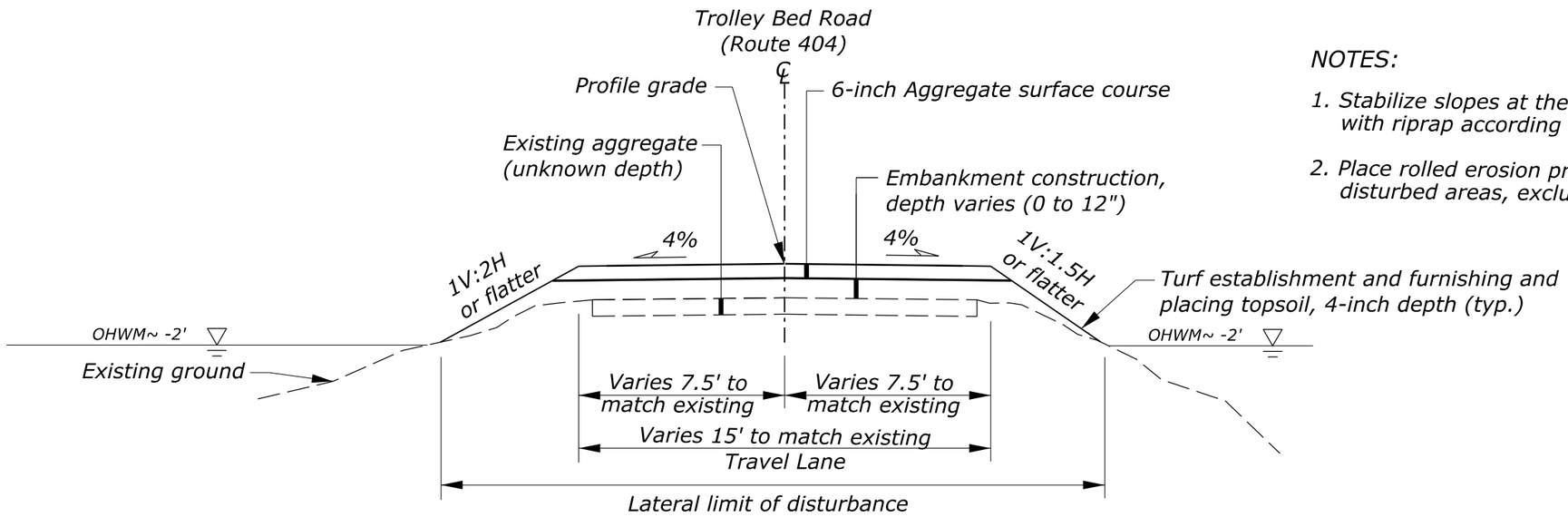
26 March 2026 3:26 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	B01
PWD TRACKING NUMBER: FY26-PAER-8386-01	

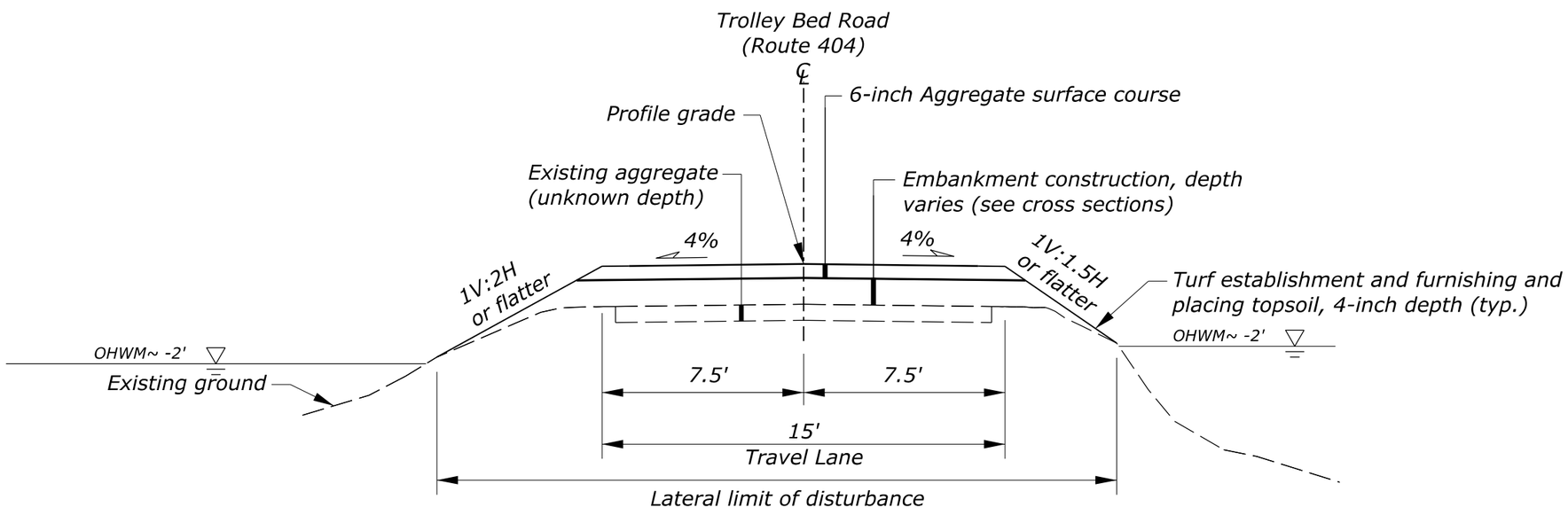


Aggregate Surface Course (Transition Sections)

101+00 to 102+00
119+50 to 120+50

NOTES:

1. *Stabilize slopes at the areas shown in the plans with riprap according to Detail E251-A.*
2. *Place rolled erosion product Type 3.B on all disturbed areas, excluding rock and paved areas.*



Aggregate Surface Course

102+00 to 119+50

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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NO SCALE

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

TYPICAL SECTIONS

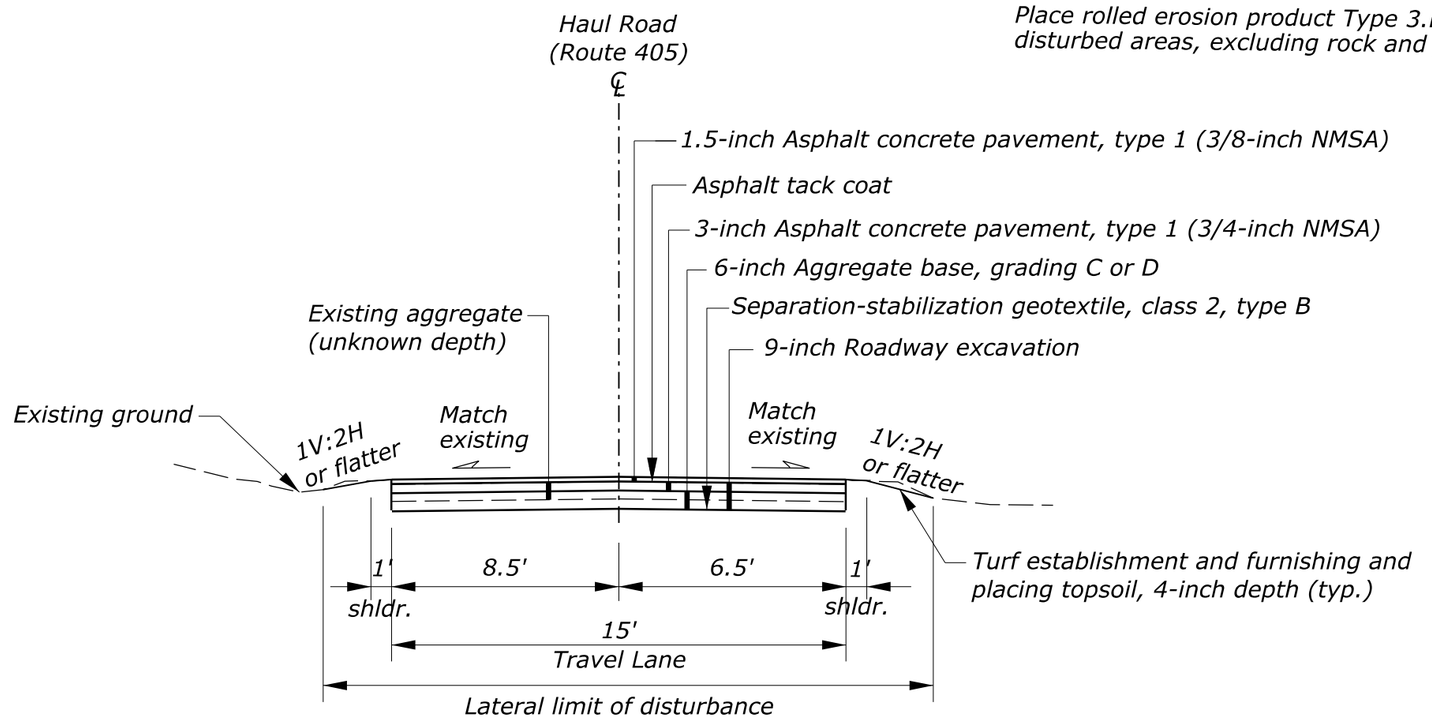
TROLLEY BED ROAD (ROUTE 404)
SCHEDULE A

\\fhflt15fileserve.fhwa.dot.gov\data\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\B01-B2_PA ERFO FW TCM 2020-1(1)_typ.dgn [TYP ER-1]
26 March 2026 3:23 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	B02
PWD TRACKING NUMBER: FY26-PAER-8386-01	

NOTE:

Place rolled erosion product Type 3.B on all disturbed areas, excluding rock and paved areas.



NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

NO SCALE

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

TYPICAL SECTIONS

HAUL ROAD (ROUTE 405)

SCHEDULE B

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26 March 2026 3:23 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	C01
PWD TRACKING NUMBER: FY26-PAER-8386-01	

SCHEDULE A

Line Item No.	Pay Item Number	Pay Item Description	Unit	Estimated Quantities Bid Schedule
A1000	15101-0000	MOBILIZATION	LPSM	ALL
A1010	15201-0000	CONSTRUCTION SURVEY AND STAKING	LPSM	ALL
A1020	15401-0000	CONTRACTOR TESTING	LPSM	ALL
A1030	15705-0100	SOIL EROSION CONTROL, SILT FENCE	LNFT	4,000
A1040	15705-1400	SOIL EROSION CONTROL, FIBER ROLL	LNFT	550
A1050	20120-1000	REMOVAL, INDIVIDUAL TREE	EACH	75
A1060	20214-0000	ROADSIDE CLEANUP	LPSM	ALL
A1070	20420-0000	EMBANKMENT CONSTRUCTION	CUYD	1,500
A1080	25102-0300	PLACED RIPRAP, METHOD A, CLASS 3	TON	110
A1090	30110-0000	AGGREGATE SURFACE COURSE	TON	1,200
A1100	62401-0300	FURNISHING AND PLACING TOPSOIL, 4-INCH DEPTH	SQYD	2,700
A1110	62502-0000	TURF ESTABLISHMENT	SQYD	2,700
A1120	62901-1000	ROLLED EROSION CONTROL PRODUCT, TYPE 3.B	SQYD	2,700
A1130	63501-0000	TEMPORARY TRAFFIC CONTROL	LPSM	ALL
A1140	63701-0000	FIELD OFFICE	EACH	1

SCHEDULE B

Line Item No.	Pay Item Number	Pay Item Description	Unit	Estimated Quantities Bid Schedule
B2000	15101-0000	MOBILIZATION	LPSM	ALL
B2010	15201-0000	CONSTRUCTION SURVEY AND STAKING	LPSM	ALL
B2020	15401-0000	CONTRACTOR TESTING	LPSM	ALL
B2030	15705-0100	SOIL EROSION CONTROL, SILT FENCE	LNFT	150
B2040	15705-1400	SOIL EROSION CONTROL, FIBER ROLL	LNFT	40
B2050	15706-0200	SOIL EROSION CONTROL, CHECK DAM	EACH	1
B2060	20120-1000	REMOVAL, INDIVIDUAL TREE	EACH	2
B2070	20301-1200	REMOVAL OF HEADWALL	EACH	2
B2080	20302-0700	REMOVAL OF FENCE,(WOOD)	LNFT	15
B2090	20302-2100	REMOVAL OF PIPE CULVERT	LNFT	32
B2100	20401-0000	ROADWAY EXCAVATION	CUYD	25
B2110	20425-1000	DITCH, EXCAVATION	LNFT	40
B2120	20701-0700	SEPARATION-STABILIZATION GEOTEXTILE, CLASS 2, TYPE B	SQYD	140
B2130	25102-0200	PLACED RIPRAP, METHOD A, CLASS 2	TON	8
B2140	30101-4000	AGGREGATE BASE GRADING C OR D	TON	45
B2150	40301-0100	ASPHALT CONCRETE PAVEMENT, TYPE 1,(3/4-INCH NMSA)	TON	23
B2160	40301-0100	ASPHALT CONCRETE PAVEMENT, TYPE 1,(3/8-INCH NMSA)	TON	12
B2170	60201-0800	24-INCH PIPE CULVERT,(CMP)	LNFT	22
B2180	60202-0200	18-INCH EQUIVALENT DIAMETER ARCH OR ELLIPTICAL PIPE CULVERT,(RCP)	LNFT	10
B2190	61901-0000	FENCE,(WOOD)	LNFT	15
B2200	62011-0500	STONE MASONRY HEADWALL FOR 24-INCH PIPE CULVERT	EACH	2
B2210	62401-0300	FURNISHING AND PLACING TOPSOIL, 4-INCH DEPTH	SQYD	70
B2220	62502-0000	TURF ESTABLISHMENT	SQYD	70
B2230	62901-1000	ROLLED EROSION CONTROL PRODUCT, TYPE 3.B	SQYD	70
B2240	63501-0000	TEMPORARY TRAFFIC CONTROL	LPSM	ALL

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

TABULATION OF QUANTITIES

TROLLEY BED ROAD (ROUTE 404) AND HAUL ROAD (ROUTE 405)
SCHEDULES A AND B

M:\PROJECTS_PWS\TCM\2020-1(1)\HWY_DES\CADD\C01_PA ERFO FW TCM 2020-1(1)_pln_tab.dgn [Tabulation of Quantities]
9 April 2026 12:35 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	C02
PWD TRACKING NUMBER: FY26-PAER-8386-01	

SOIL EROSION CONTROL SCHEDULE

Sheet	ROUTE NUMBER	ROUTE NAME	STATION TO STATION			SIDE	Schedule A Pay Item 15705-0100 SOIL EROSION CONTROL, SILT FENCE LNFT	Schedule A Pay Item 15705-1400 SOIL EROSION CONTROL, FIBER ROLL LNFT	REMARKS
A04	404	Trolley Bed Road						500	Under I-95 Bridges
M02	404	Trolley Bed Road	101+00	to	103+00	LT	201		
M02	404	Trolley Bed Road	101+00	to	103+00	RT	199		
M03	404	Trolley Bed Road	103+00	to	106+00	LT	302		
M03	404	Trolley Bed Road	103+00	to	106+00	RT	298		
M04	404	Trolley Bed Road	106+00	to	109+00	LT	300		
M04	404	Trolley Bed Road	106+00	to	109+00	RT	301		
M05	404	Trolley Bed Road	109+00	to	112+00	LT	299		
M05	404	Trolley Bed Road	109+00	to	112+00	RT	303		
M06	404	Trolley Bed Road	112+00	to	115+00	LT	300		
M06	404	Trolley Bed Road	112+00	to	115+00	RT	302		
M07	404	Trolley Bed Road	115+00	to	118+00	LT	300		
M07	404	Trolley Bed Road	115+00	to	118+00	RT	300		
M08	404	Trolley Bed Road	118+00	to	120+50	LT	251		
M08	404	Trolley Bed Road	118+00	to	120+50	RT	251		
						Subtotal this sheet	3,907	500	
						Rounded Total	4,000	550	

PAVEMENT / SURFACE SUMMARY

SHEET	ROUTE NUMBER	ROUTE NAME	STATION TO STATION	ROUTE LENGTH Ft	ROUTE WIDTH Ft	Schedule A Pay Item 30110-0000 AGGREGATE SURFACE COURSE TON
D01-07	404	Trolley Bed Road	101+00 to 120+50	1,930	15.0	1,126
					Subtotal this Sheet	1,126
					Rounded Total	1,200

DRAINAGE SCHEDULE

SHEET	ROUTE NUMBR	ROUTE NAME	STATION TO STATION	SIDE	Schedule A Pay Item 25102-0300 PLACED RIPRAP, METHOD A, CLASS 3 TON
D01	404	Trolley Bed Road	102+10 to 102+65	RT	20
D03	404	Trolley Bed Road	108+18 to 108+58	LT	16
D04	404	Trolley Bed Road	111+41 to 111+51	RT	4
D05	404	Trolley Bed Road	112+32 to 112+42	RT	4
D06	404	Trolley Bed Road	115+45 to 115+78	RT	13
D06	404	Trolley Bed Road	116+15 to 116+32	LT	7
D07	404	Trolley Bed Road	117+78 to 118+39	RT	25
D07	404	Trolley Bed Road	117+91 to 118+20	LT	12
				Subtotal this Sheet	101
				Rounded Total	110

EARTHWORK SUMMARY

SHEET	ROUTE NUMBER	ROUTE NAME	STATION TO STATION	Schedule A Pay Item 20420-0000 EMBANKMENT CONSTRUCTION CUYD	Schedule A Pay Item 62401-0300 FURNISHING AND PLACING TOPSOIL, 4-INCH DEPTH SQYD	Schedule A Pay Item 62502-0000 TURF ESTABLISHMENT SQYD	Schedule A Pay Item 62901-1000 ROLLED EROSION CONTROL PRODUCT, TYPE 3.B SQYD
D01-07	404	Trolley Bed Road	101+00 to 120+50	1,322	2,298	2,298	2,298
			Subtotal this Sheet	1,322	2,298	2,298	2,298
			Rounded Total	1,500	2,700	2,700	2,700

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

SUMMARIES AND SCHEDULES

TROLLEY BED ROAD (ROUTE 404)

SCHEDULE A

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9 April 2026 12:35 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	C03
PWD TRACKING NUMBER: FY26-PAER-8386-01	

CLEARING AND REMOVALS SCHEDULE

SHEET	ROUTE NUMBER	ROUTE NAME	STATION TO STATION			SIDE	Schedule A Pay Item 20120-1000 REMOVAL, INDIVIDUAL TREE EACH	REMARKS
F02	404	Trolley Bed Road	103+54			RT	1	10" Hawthorne
F02	404	Trolley Bed Road	103+66			RT	1	8" Hawthorne
F02	404	Trolley Bed Road	104+04			LT	1	24" Tree
F02	404	Trolley Bed Road	105+89			LT	1	8" Tree
F03	404	Trolley Bed Road	106+26			RT	1	14" Hawthorne
F03	404	Trolley Bed Road	106+38			RT	1	6" Maple
F03	404	Trolley Bed Road	106+90			LT	1	31" Tree
F03	404	Trolley Bed Road	107+75			RT	1	24" Oak
F03	404	Trolley Bed Road	107+86			RT	1	24" Oak
F03	404	Trolley Bed Road	108+09			LT	1	22" Hackberry
F03	404	Trolley Bed Road	108+34			RT	1	22" Oak
F03	404	Trolley Bed Road	108+50			LT	1	15" Ash
F03	404	Trolley Bed Road	108+59			RT	1	6" Hawthorne
F03	404	Trolley Bed Road	108+62			RT	1	8" Hawthorne
F04	404	Trolley Bed Road	109+44			RT	1	20" Hawthorne
F04	404	Trolley Bed Road	109+55			LT	1	8" Tree
F04	404	Trolley Bed Road	109+60			LT	1	12" Tree
F04	404	Trolley Bed Road	109+82			LT	1	14" Tree
F04	404	Trolley Bed Road	110+18			LT	1	12" Penta Birch
F04	404	Trolley Bed Road	110+16			RT	1	6" Hackberry
F04	404	Trolley Bed Road	110+28			RT	1	10" Sweet Gum
F04	404	Trolley Bed Road	110+59			LT	1	10" Tree
F04	404	Trolley Bed Road	110+66			RT	1	18" Sweet Gum
F04	404	Trolley Bed Road	110+76			RT	1	8" Sweet Gum
F04	404	Trolley Bed Road	110+77			RT	1	9" Sweet Gum
F04	404	Trolley Bed Road	110+93			RT	1	12" Sweet Gum
F04	404	Trolley Bed Road	111+50			RT	1	8" Tree
F04	404	Trolley Bed Road	111+63			RT	1	6" Maple
F04	404	Trolley Bed Road	111+74			RT	1	8" Maple
F04	404	Trolley Bed Road	111+85			RT	1	6" Tree
F04	404	Trolley Bed Road	111+96			RT	1	8" Tree
F04	404	Trolley Bed Road	111+97			RT	1	11" Ash
F05	404	Trolley Bed Road	112+26			RT	1	15" Sweet Gum
F05	404	Trolley Bed Road	112+27			RT	1	13" Sweet Gum
F05	404	Trolley Bed Road	112+99			RT	1	20" Ash
F05	404	Trolley Bed Road	113+17			RT	1	17" Oak
F05	404	Trolley Bed Road	113+64			RT	1	9" Tree
F05	404	Trolley Bed Road	113+69			LT	1	8" Tree
						Subtotal This sheet	38	

CLEARING AND REMOVALS SUMMARY

SHEET	ROUTE NUMBER	ROUTE NAME	STATION TO STATION			SIDE	Schedule A Pay Item 20120-1000 REMOVAL, INDIVIDUAL TREE EACH	REMARKS
F05	404	Trolley Bed Road	113+69			LT	1	14" Tree
F05	404	Trolley Bed Road	114+07			LT	1	11" Tree
F05	404	Trolley Bed Road	114+23			RT	1	14" Twin Ash
F05	404	Trolley Bed Road	114+24			RT	1	9" Ash
F05	404	Trolley Bed Road	114+36			LT	1	13" Ash
F05	404	Trolley Bed Road	114+61			RT	1	10" Ash
F05	404	Trolley Bed Road	114+84			LT	1	15" Twin
F05	404	Trolley Bed Road	115+00			LT	1	13" Ash
F05	404	Trolley Bed Road	114+99			RT	1	10" Ash
F06	404	Trolley Bed Road	115+04			RT	1	10" Tree
F06	404	Trolley Bed Road	115+17			RT	1	11" Ash?
F06	404	Trolley Bed Road	115+66			LT	1	10" Hawthorne Triple
F06	404	Trolley Bed Road	115+75			RT	1	6" Tree
F06	404	Trolley Bed Road	115+82			LT	1	13" Tree
F06	404	Trolley Bed Road	116+16			RT	1	13" Sideways
F06	404	Trolley Bed Road	116+21			RT	1	9" Sideways
F06	404	Trolley Bed Road	116+45			RT	1	16" Hawthorne
F06	404	Trolley Bed Road	116+73			RT	1	11" Ash
F06	404	Trolley Bed Road	116+76			RT	1	9" Oak
F06	404	Trolley Bed Road	116+88			RT	1	12" Oak
F06	404	Trolley Bed Road	117+38			LT	1	9" Ash
F06	404	Trolley Bed Road	117+41			RT	1	9" Ash
F06	404	Trolley Bed Road	117+56			RT	1	9" Twin
F06	404	Trolley Bed Road	117+94			LT	1	6" Tree
F07	404	Trolley Bed Road	118+40			LT	1	12" Tree
F07	404	Trolley Bed Road	118+40			LT	1	12" Tree
F07	404	Trolley Bed Road	118+79			RT	1	8" Tree
F07	404	Trolley Bed Road	118+96			RT	1	6" Tree
F07	404	Trolley Bed Road	118+97			RT	1	12" Tree
F07	404	Trolley Bed Road	119+12			RT	1	6" Tree
F07	404	Trolley Bed Road	119+35			LT	1	6" Tree
F07	404	Trolley Bed Road	119+35			RT	1	8" Tree
F07	404	Trolley Bed Road	119+41			RT	1	6" Tree
F07	404	Trolley Bed Road	119+40			RT	1	8" Tree
F07	404	Trolley Bed Road	119+39			RT	1	8" Tree
F07	404	Trolley Bed Road	119+42			RT	1	12" Tree
F07	404	Trolley Bed Road	120+47			RT	1	16" Tree
						Subtotal This Sheet	37	
						Subtotal Sheet 1	38	
						Total	75	
						Rounded Total	75	

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

SUMMARIES AND SCHEDULES

TROLLEY BED ROAD (ROUTE 404)

SCHEDULE A

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9 April 2026 12:35 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	C04
PWD TRACKING NUMBER: FY26-PAER-8386-01	

SOIL EROSION CONTROL SCHEDULE

Sheet	ROUTE NUMBER	ROUTE NAME	STATION TO STATION			SIDE	Schedule B Pay Item 15705-0100 SOIL EROSION CONTROL, SILT FENCE LNFT	Schedule B Pay Item 15705-1400 SOIL EROSION CONTROL, FIBER ROLL LNFT	Schedule B Pay Item 15706-0200 SOIL EROSION CONTROL, CHECK DAM EACH
M11	405	Haul Road	200+00	to	200+56	LT	58		
M11	405	Haul Road	200+74	to	200+82	LT	10		
M11	405	Haul Road	200+15	to	200+70	RT	51		
M11	405	Haul Road	20056	to	20074	LT		33	
M11	405	Haul Road	200+90			RT			1
						Subtotal this sheet	119	33	1
						Rounded Total	150	40	1

PAVEMENT / SURFACE SUMMARY

SHEET	ROUTE NUMBER	ROUTE NAME	STATION TO STATION	ROUTE LENGTH Ft	ROUTE WIDTH Ft	Schedule B Pay Item 30101-4000 AGGREGATE BASE GRADING C OR D TON	Schedule B Pay Item 40301-0100 ASPHALT CONCRETE PAVEMENT, TYPE 1 , (3/8-INCH NMSA) TON	Schedule B Pay Item 40301-0100 ASPHALT CONCRETE PAVEMENT, TYPE 1, (3/4-INCH NMSA)
D08	405	Haul Road	200+07 to 200+82	75	15	40	11	21
					Subtotal this Sheet	41	11	21
					Rounded Total	45	12	23

EARTHWORK SUMMARY

SHEET	ROUTE NUMBER	ROUTE NAME	STATION TO STATION	Schedule B Pay Item 20401-0000 ROADWAY EXCAVATION CUYD	Schedule B Pay Item 20701-0700 SEPARATION-STABILIZATION GEOTEXTILE, CLASS 2, TYPE B SQYD	Schedule B Pay Item 62401-0300 FURNISHING AND PLACING TOPSOIL, 4-INCH DEPTH SQYD	Schedule B Pay Item 62502-0000 TURF ESTABLISHMENT SQYD	Schedule B Pay Item 62901-1000 ROLLED EROSION CONTROL PRODUCT, TYPE 3.B SQYD
D08	405	Haul Road	200+07 to 200+82	23	125	48	48	48
			Subtotal this Sheet	23	125	48	48	48
			Rounded Total	25	140	70	70	70

DRAINAGE SCHEDULE

SHEET	ROUTE NUMBR	ROUTE NAME	STATION	SIDE	Schedule B Pay Item 20301-1200 REMOVAL OF HEADWALL EACH	Schedule B Pay Item 20302-2100 REMOVAL OF PIPE CULVERT LNFT	Schedule B Pay Item 20425-1000 DITCH, EXCAVATION LNFT	Schedule B Pay Item 25102-0200 PLACED RIPRAP, METHOD A, CLASS 2 TON	Schedule B Pay Item 62011-0500 STONE MASONRY HEADWALL FOR 24-INCH PIPE CULVERT EACH	Schedule B Pay Item 60201-0800 24-INCH PIPE CULVERT (CMP) LNFT	Schedule B Pay Item 60202-0200 18-INCH EQUIVALENT DIAMETER ARCH OR ELLIPTICAL PIPE CULVERT (RCP) LNFT
D08	405	Haul Road	200+70		2	20		7	2	20	
D08	405	Haul Road	200+70 to 200+82	RT			20				
D08	405	Haul Road	200+99 to 201+08	RT			17				
D08	405	Haul Road	201+00 to 201+08	RT		8					8
				Subtotal this Sheet	2	28	37	7	2	20	8
				Rounded Total	2	32	40	8	2	22	10

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

SUMMARIES AND SCHEDULES

HAUL ROAD (ROUTE 405)

SCHEDULE B

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PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	C05
PWD TRACKING NUMBER: FY26-PAER-8386-01	

CLEARING AND REMOVALS SCHEDULE

SHEET	ROUTE NUMBER	ROUTE NAME	STATION TO STATION			SIDE	Schedule B Pay Item 20120-1000 REMOVAL, INDIVIDUAL TREE EACH	Schedule B Pay Item 20302-0700 REMOVAL OF FENCE (WOOD) LNFT	Schedule B Pay Item 61901-0000 FENCE (WOOD) LNFT	REMARKS
F08	405	Haul Road	200+66	to	200+79	RT		13	13	
F08	405	Haul Road	200+71			LT	1			12" Tree
F08	405	Haul Road	200+73			LT	1			15" Tree
Subtotal This sheet							2	13	13	
Rounded Total							2	15	15	

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NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

SUMMARIES AND SCHEDULES

HAUL ROAD (ROUTE 405)

SCHEDULE B

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	C06
PWD TRACKING NUMBER: FY26-PAER-8386-01	

SCHEDULE A

CONSTRUCTION SIGN SUMMARY

SCHEDULE	ROUTE NUMBER	ROUTE NAME	MUTCD NO.	SIGN TEXT	PANEL SIZE WIDTH (in)	PANEL SIZE HEIGHT (in)	PANEL SIZE AREA (sqft)	COLOR COMBINATION	QUANTITY	Schedule A No Pay SECTION 635 TEMPORARY TRAFFIC CONTROL SQFT	REMARKS
A	404	Trolley Bed Road	W20-3	ROAD CLOSED AHEAD	36	36	9	Black on Orange	5	45	
A	404	Trolley Bed Road	SP-2	TROLLEY BED ROAD	42	12	4	Black on Orange	5	18	
A	404	Trolley Bed Road	R11-4	ROAD CLOSED TO ALL VISITORS	60	36	15	Black on White	3	45	Modified R11-4
A	404	Trolley Bed Road	W8-6	TRUCKS ENTERING AND LEAVING ROADWAY	36	36	9	Black on Orange	1	9	Modified W8-6
								Subtotal this Sheet		117	
								Rounded Total		*	

Note: Construct and erect all signs in accordance with the "Manual on Uniform Traffic Control Devices" (MUTCD), latest edition.

* For information only

SCHEDULE B

CONSTRUCTION SIGN SUMMARY

SCHEDULE	ROUTE NUMBER	ROUTE NAME	MUTCD NO.	SIGN TEXT	PANEL SIZE WIDTH (in)	PANEL SIZE HEIGHT (in)	PANEL SIZE AREA (sqft)	COLOR COMBINATION	QUANTITY	Schedule B No Pay SECTION 635 TEMPORARY TRAFFIC CONTROL SQFT	REMARKS
B	405	Haul Road	W20-3	ROAD CLOSED AHEAD	36	36	9	Black on Orange	4	36	
B	405	Haul Road	SP-4	HAUL ROAD	30	12	3	Black on Orange	4	10	
B	405	Haul Road	R11-4	ROAD CLOSED TO ALL VISITORS	60	36	15	Black on White	3	45	Modified R11-4
								Subtotal this Sheet		91	
								Rounded Total		*	

Note: Construct and erect all signs in accordance with the "Manual on Uniform Traffic Control Devices" (MUTCD), latest edition.

* For information only

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NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

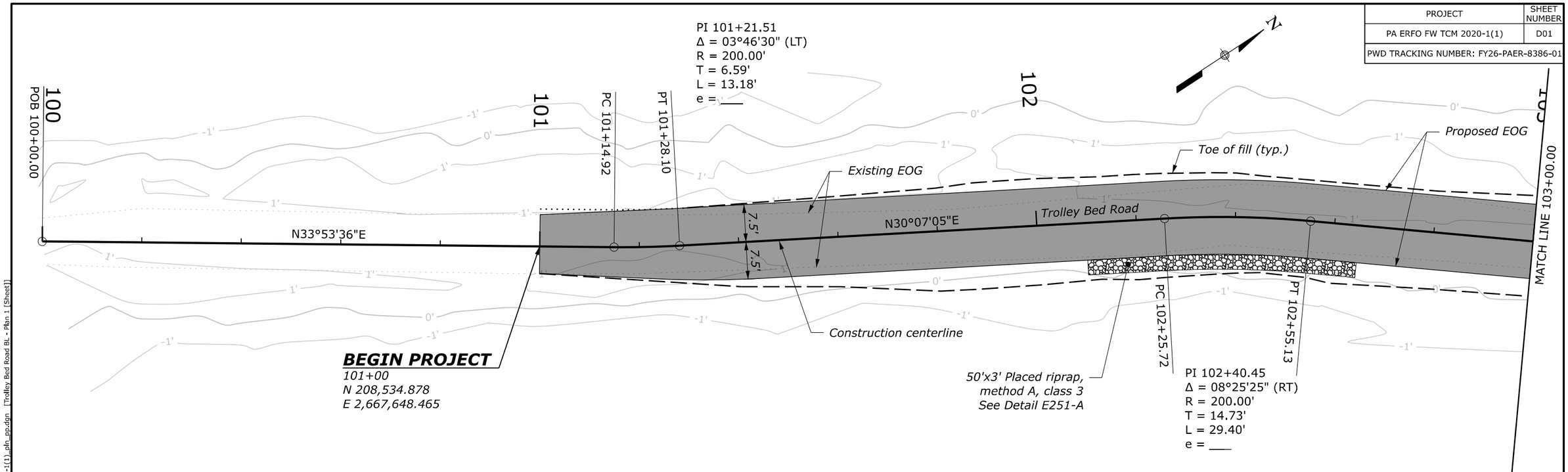
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
OFFICE OF FEDERAL LANDS HIGHWAY

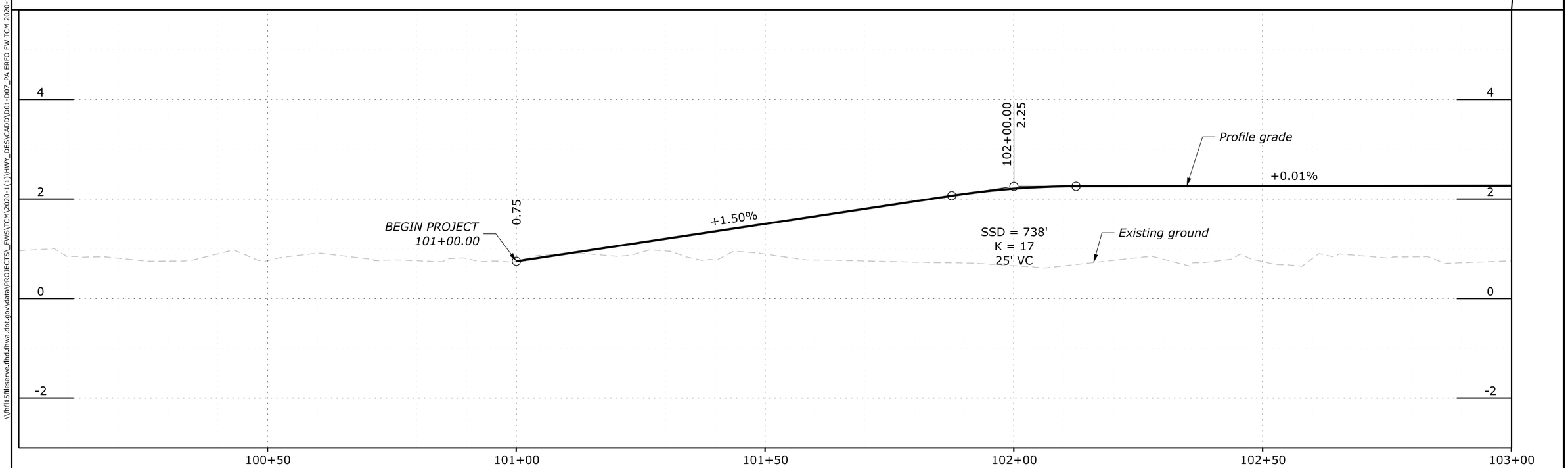
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

SUMMARIES AND SCHEDULES

TROLLEY BED ROAD (ROUTE 404) AND HAUL ROAD (ROUTE 405)
SCHEDULES A AND B

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	D01
PWD TRACKING NUMBER: FY26-PAER-8386-01	





NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

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SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

PLAN AND PROFILE

TROLLEY BED ROAD (ROUTE 404)
SCHEDULE A

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PROJECT	SHEET NUMBER
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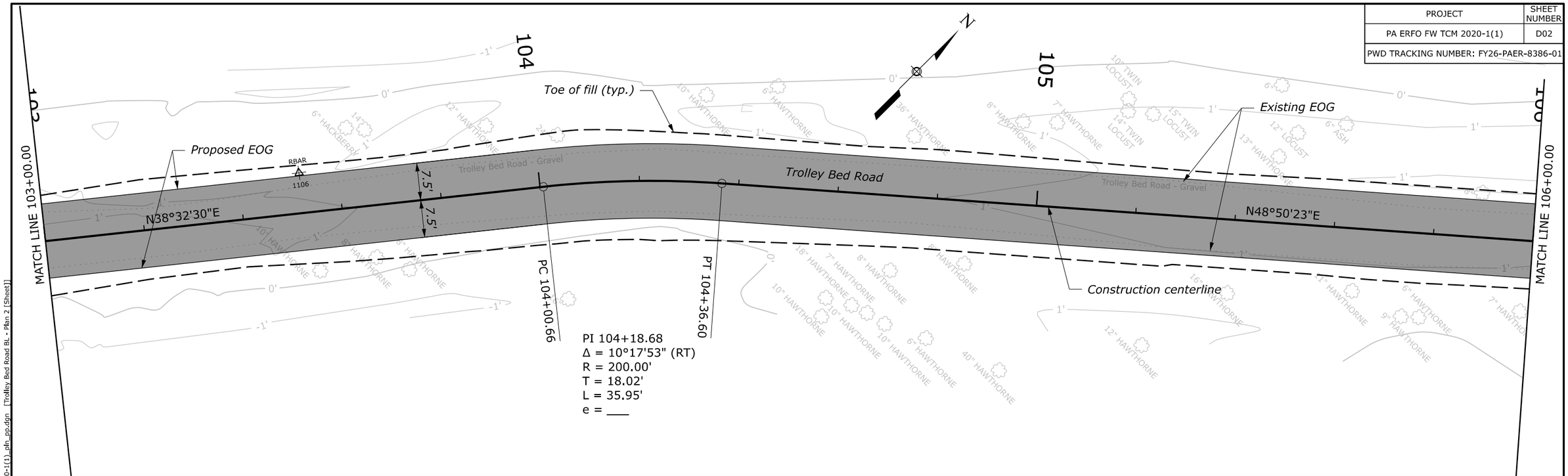
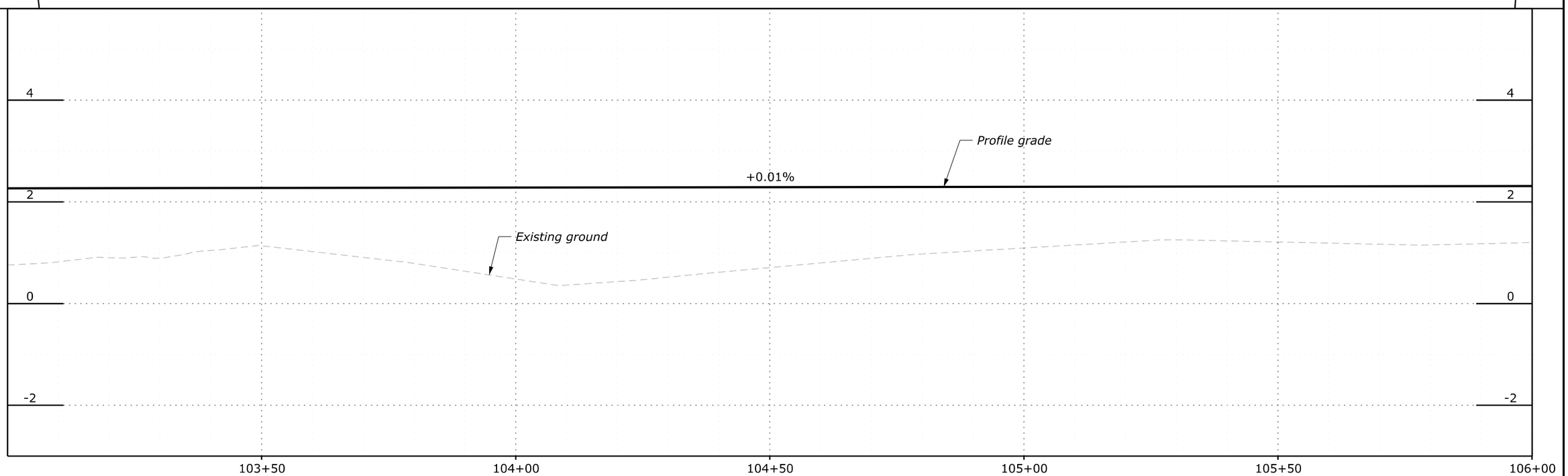
PWD TRACKING NUMBER: FY26-PAER-8386-01	





NO.	DATE	BY	REVISIONS
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U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
OFFICE OF FEDERAL LANDS HIGHWAY

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SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

PLAN AND PROFILE

TROLLEY BED ROAD (ROUTE 404)
SCHEDULE A

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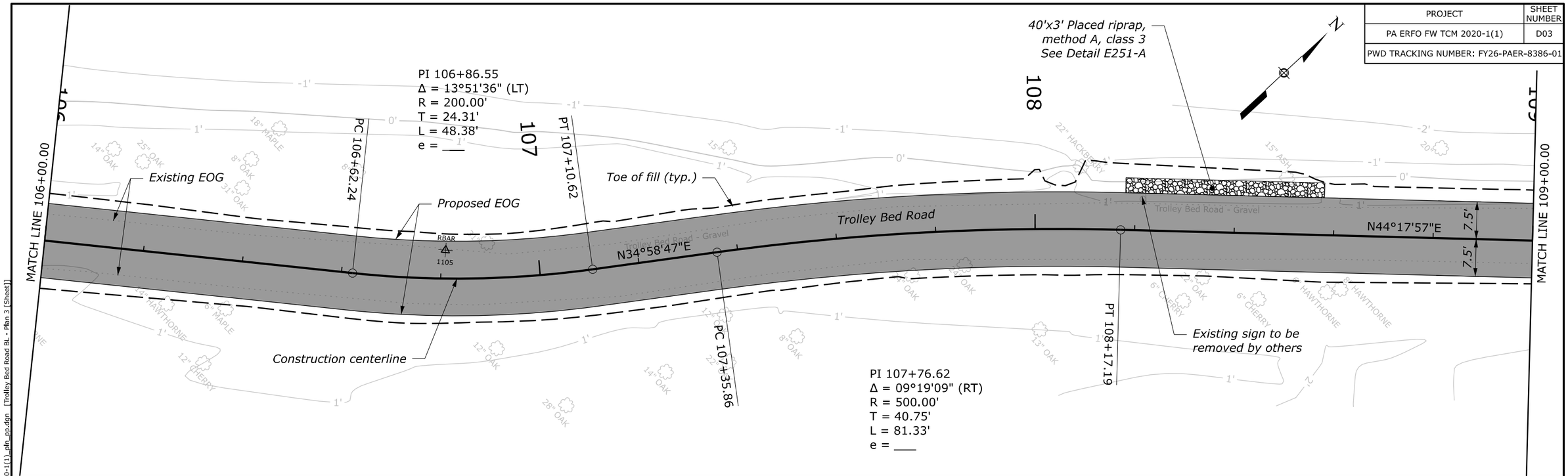
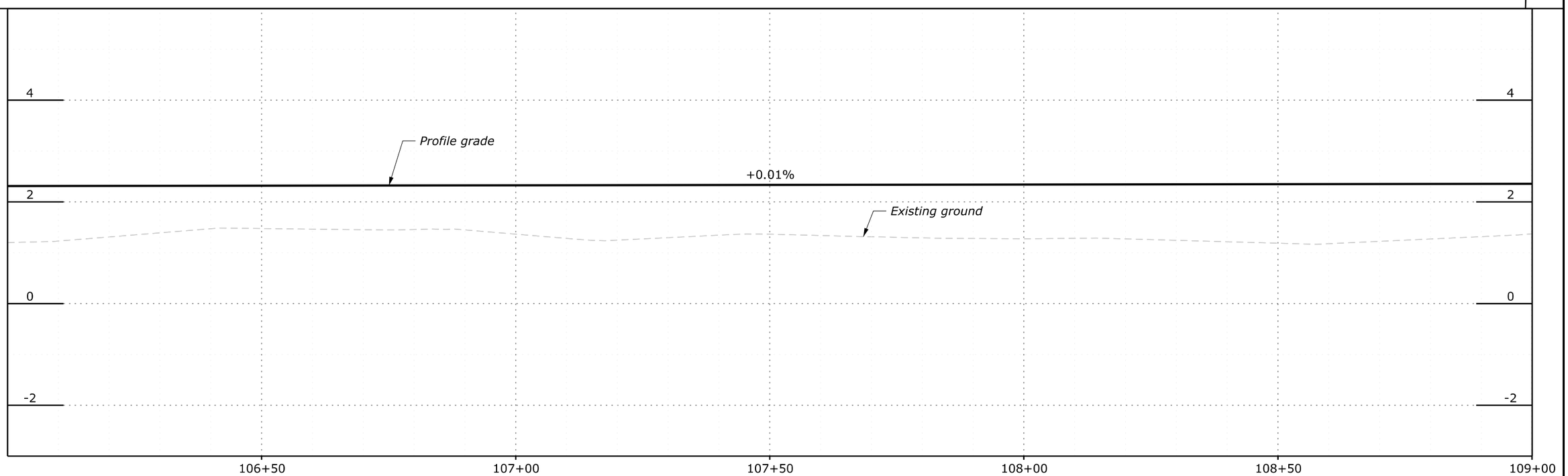
PWD TRACKING NUMBER: FY26-PAER-8386-01	





NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

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SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

PLAN AND PROFILE

TROLLEY BED ROAD (ROUTE 404)
SCHEDULE A

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PROJECT	SHEET NUMBER
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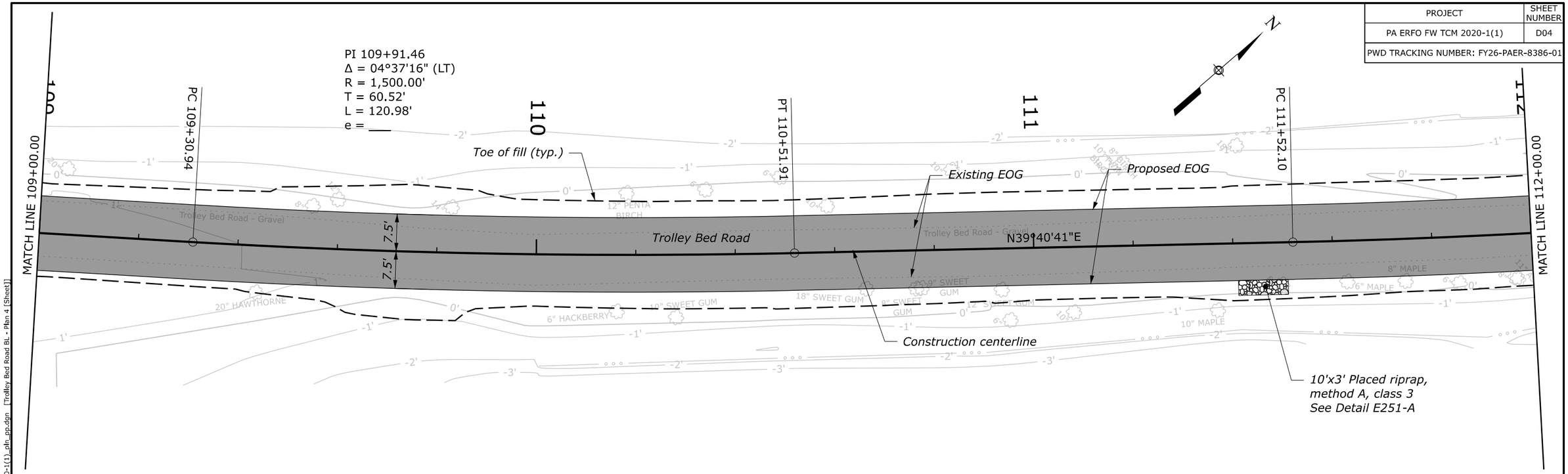
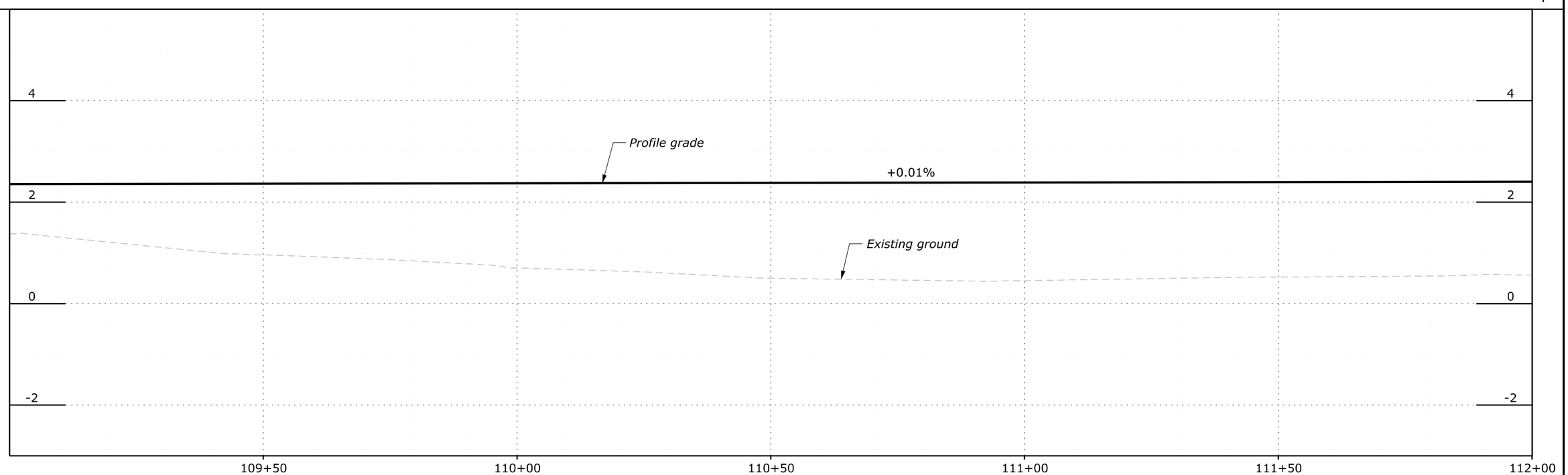
PWD TRACKING NUMBER: FY26-PAER-8386-01	





NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

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SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

PLAN AND PROFILE

TROLLEY BED ROAD (ROUTE 404)
SCHEDULE A

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PROJECT	SHEET NUMBER
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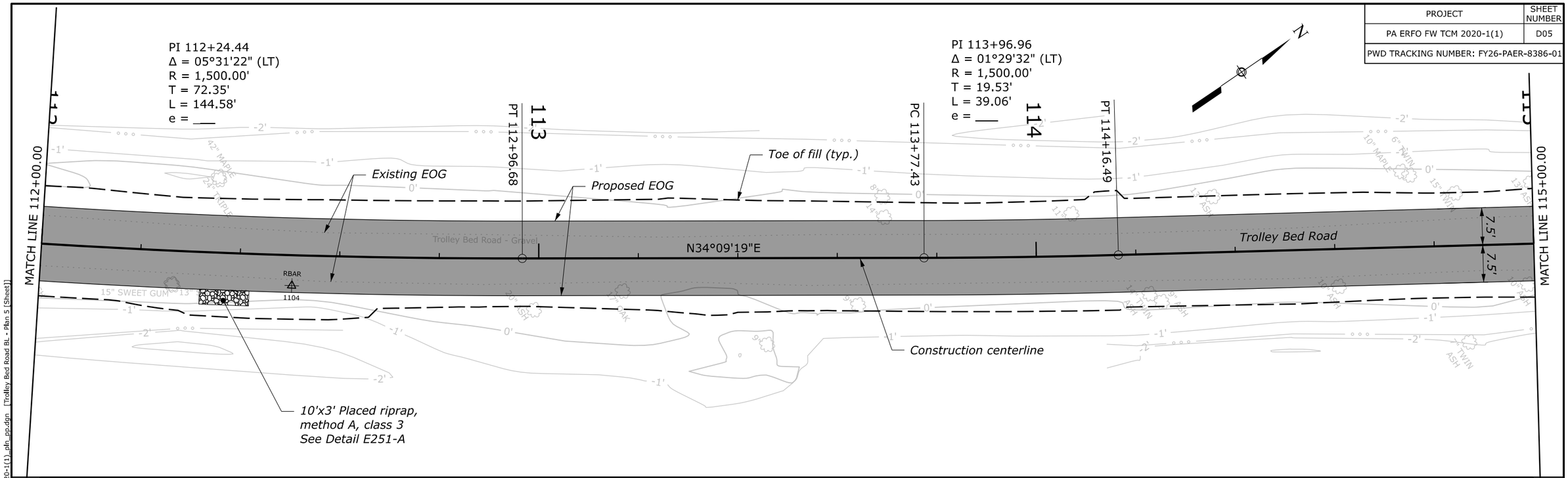
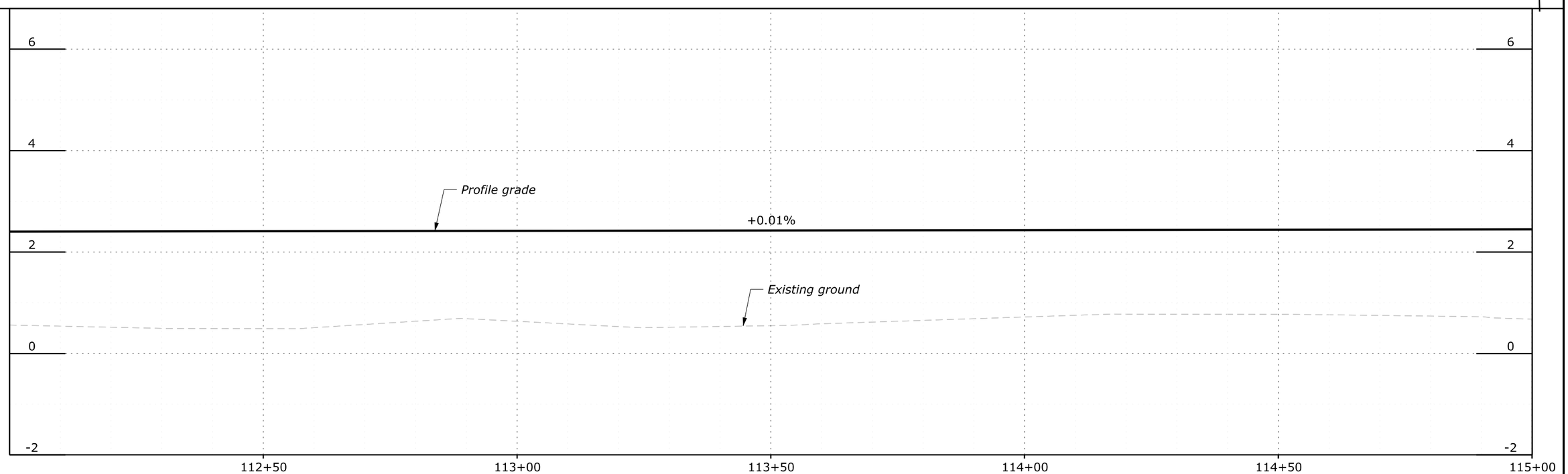
PWD TRACKING NUMBER: FY26-PAER-8386-01	





NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

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SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

PLAN AND PROFILE

TROLLEY BED ROAD (ROUTE 404)
SCHEDULE A

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PROJECT	SHEET NUMBER
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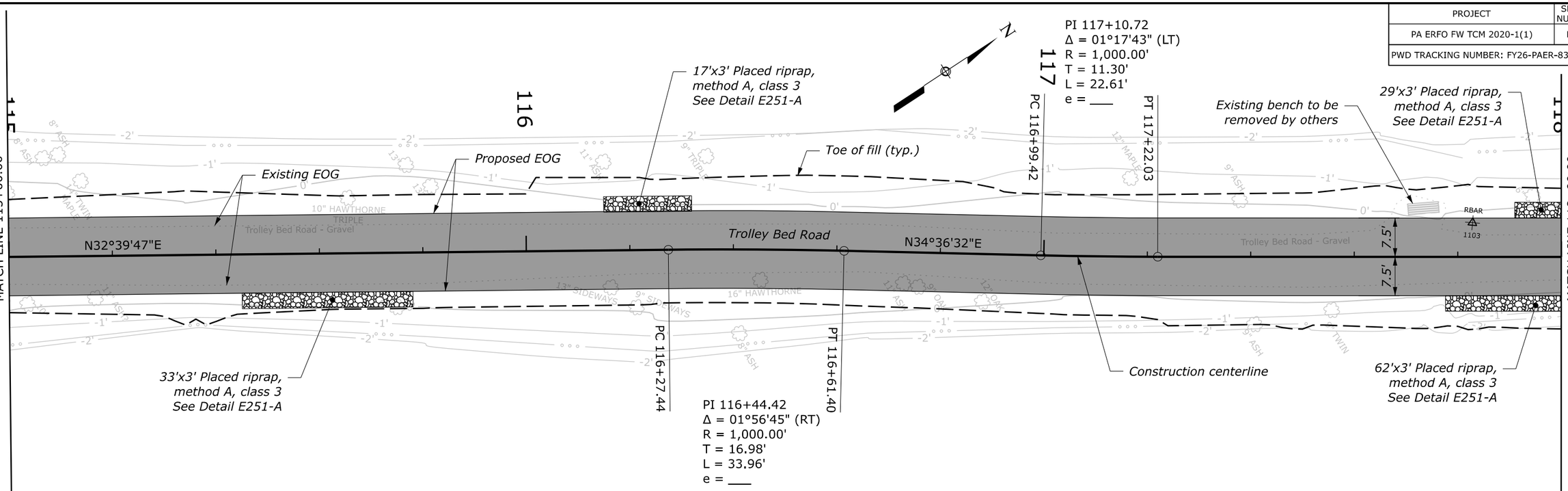
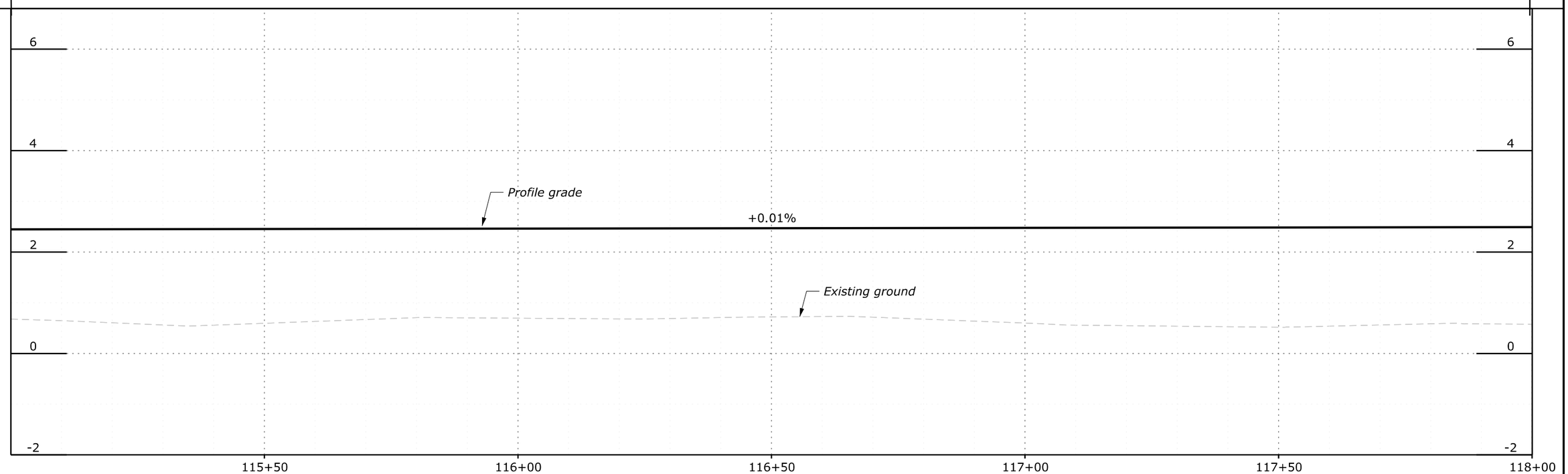
PWD TRACKING NUMBER: FY26-PAER-8386-01	





NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

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JOHN HEINZ WILDLIFE REFUGE AT TINICUM

PLAN AND PROFILE

TROLLEY BED ROAD (ROUTE 404)
SCHEDULE A

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PROJECT	SHEET NUMBER
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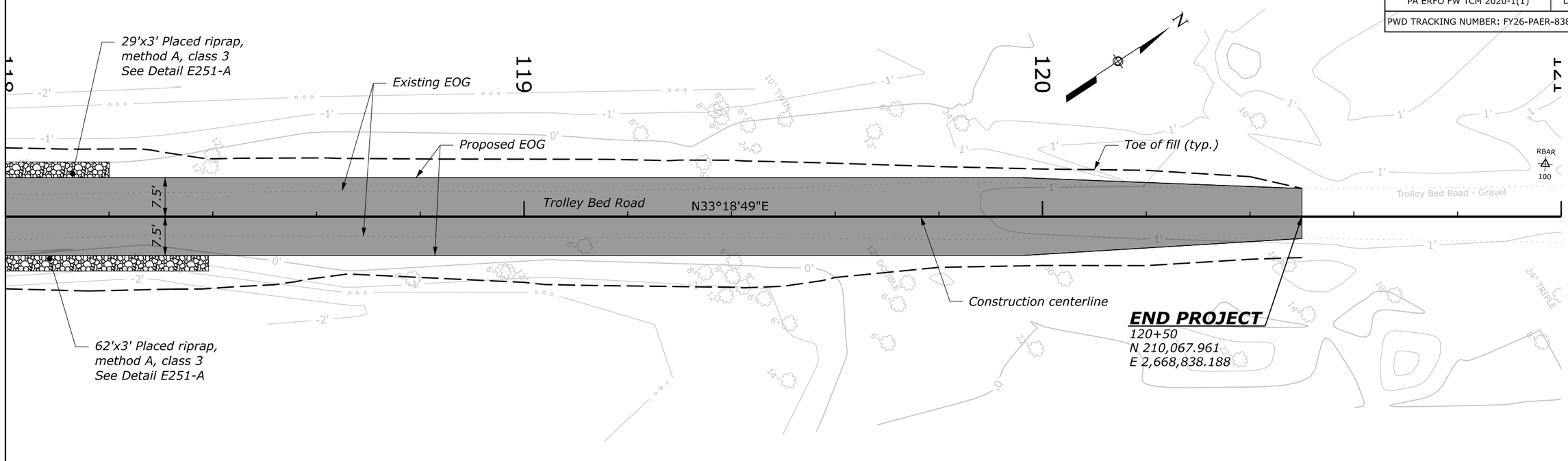
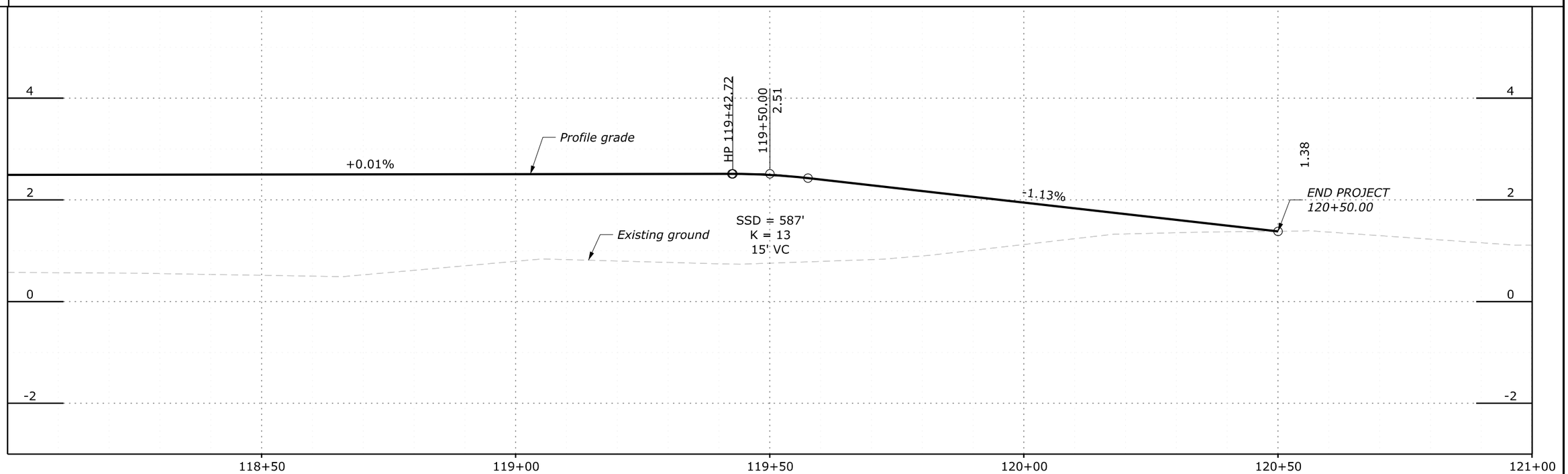
PWD TRACKING NUMBER: FY26-PAER-8386-01	





NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

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SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

PLAN AND PROFILE

TROLLEY BED ROAD (ROUTE 404)
SCHEDULE A

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PROJECT	SHEET NUMBER
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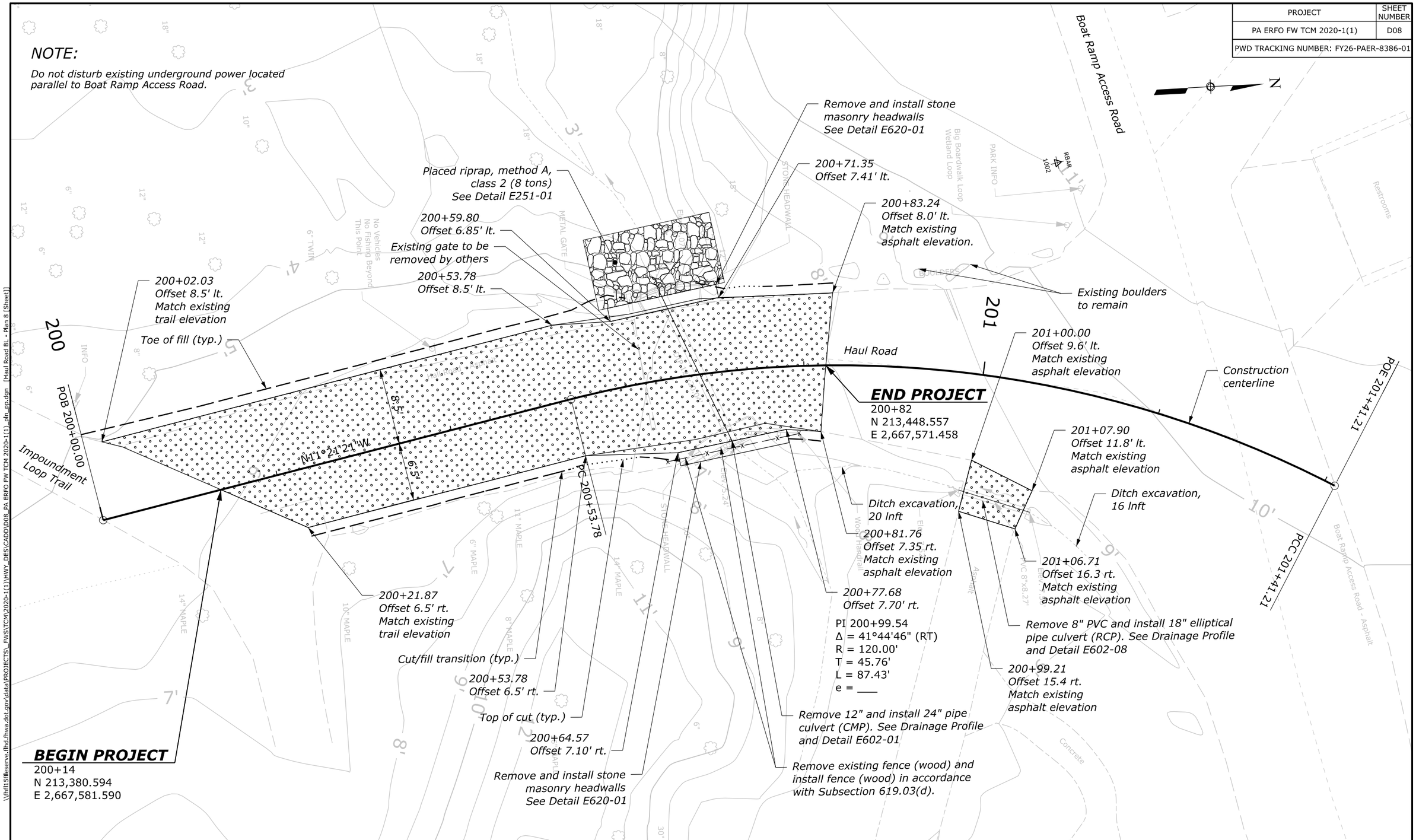
PWD TRACKING NUMBER: FY26-PAER-8386-01	



NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

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SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

PLAN

HAUL ROAD (ROUTE 405)
SCHEDULE B

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PROJECT	SHEET NUMBER
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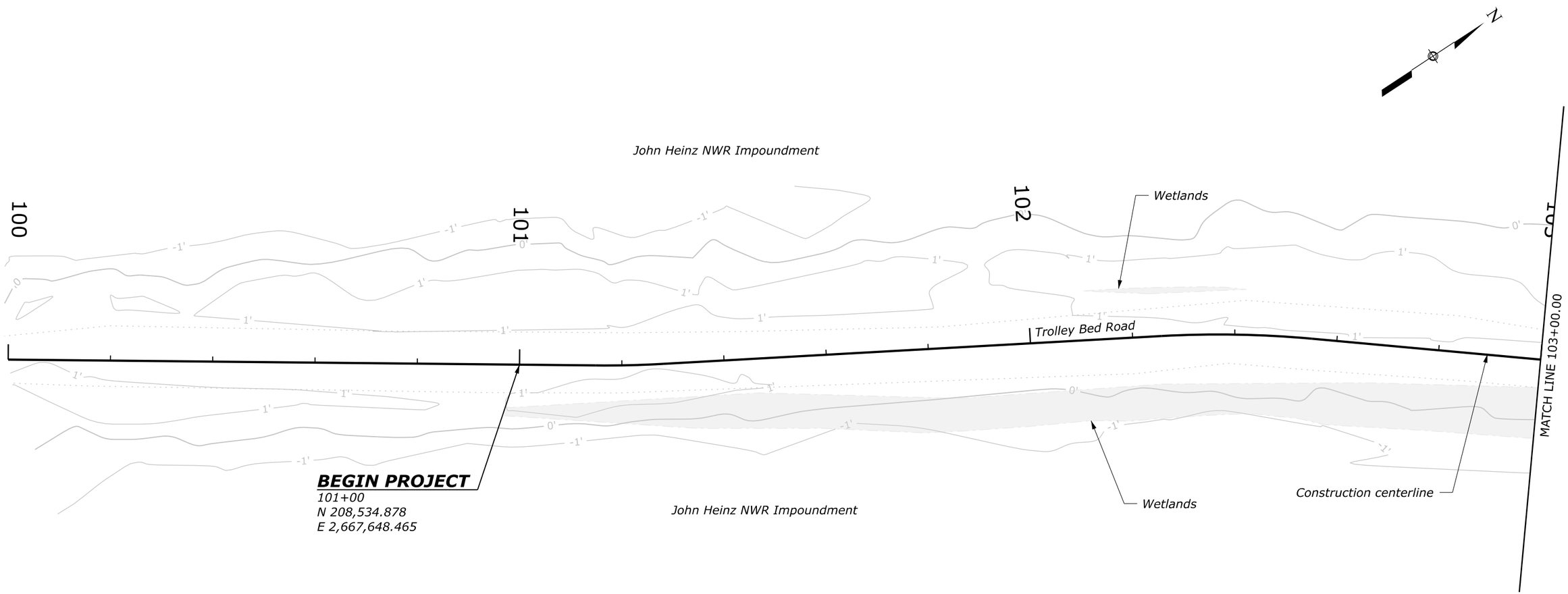

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NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

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SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

EXISTING CONDITIONS AND DEMOLITION PLAN

TROLLEY BED ROAD (ROUTE 404)

SCHEDULE A

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PROJECT	SHEET NUMBER
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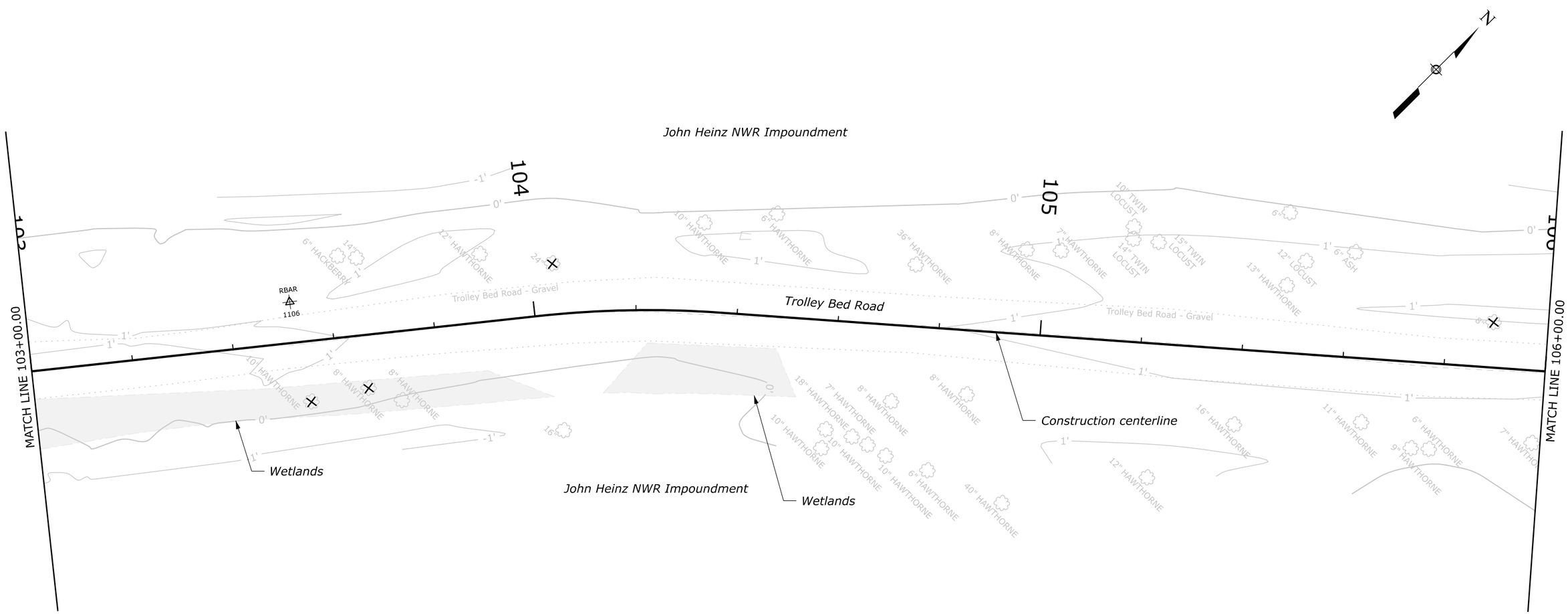

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NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 10 20
SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

EXISTING CONDITIONS AND DEMOLITION PLAN

TROLLEY BED ROAD (ROUTE 404)

SCHEDULE A

M:\PROJECTS_PWS\TCM\2020-1(1)\HWY_DES\CADD\F01-D07_PA ERFO FW TCM 2020-1(1)_demo.dgn [Trolley Bed Road BL - Plan 2 (Sheet)]

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PROJECT	SHEET NUMBER
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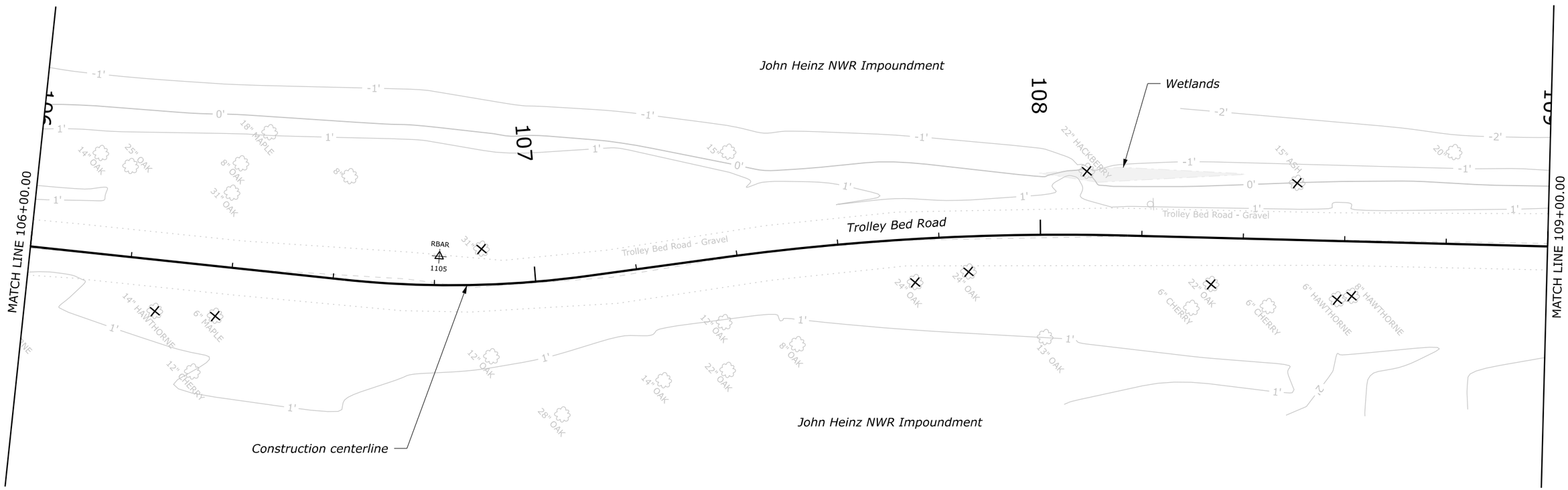

LEGEND:

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NO.	DATE	BY	REVISIONS
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U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
OFFICE OF FEDERAL LANDS HIGHWAY

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JOHN HEINZ WILDLIFE REFUGE AT TINICUM

EXISTING CONDITIONS AND DEMOLITION PLAN

TROLLEY BED ROAD (ROUTE 404)

SCHEDULE A

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PROJECT	SHEET NUMBER
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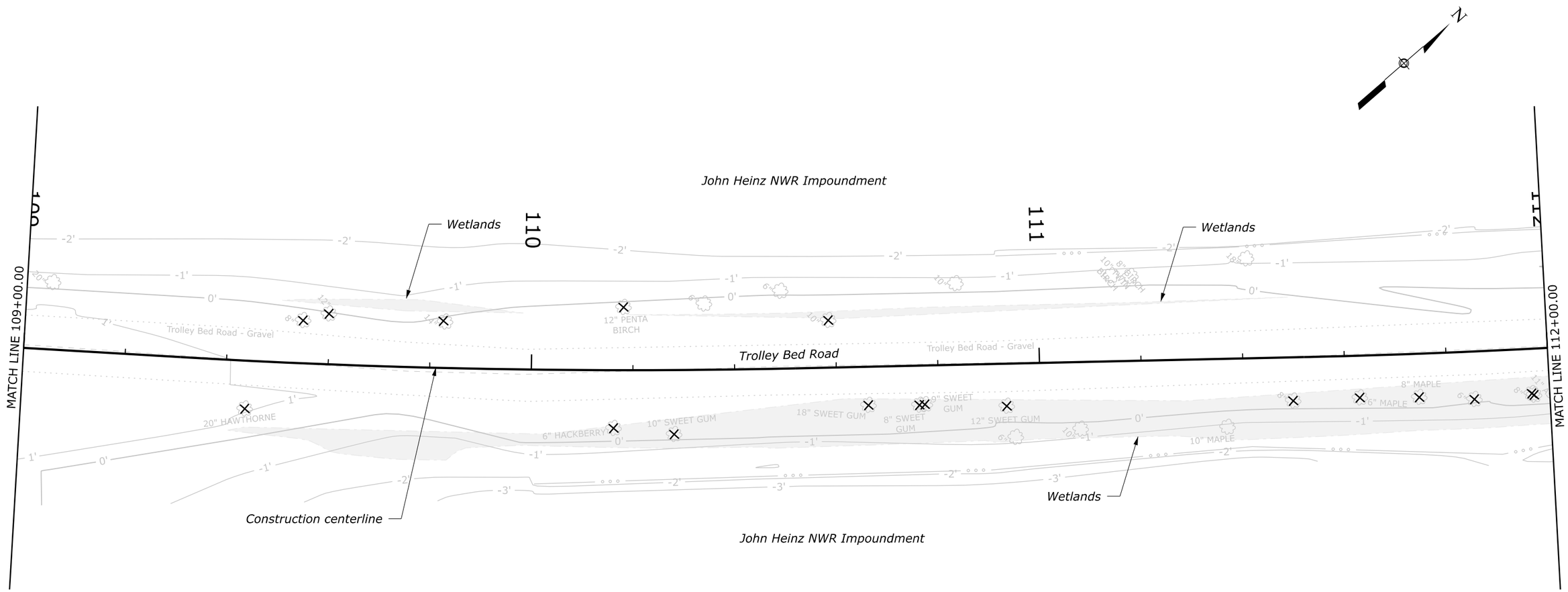

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NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

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SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

EXISTING CONDITIONS AND DEMOLITION PLAN

TROLLEY BED ROAD (ROUTE 404)

SCHEDULE A

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PROJECT	SHEET NUMBER
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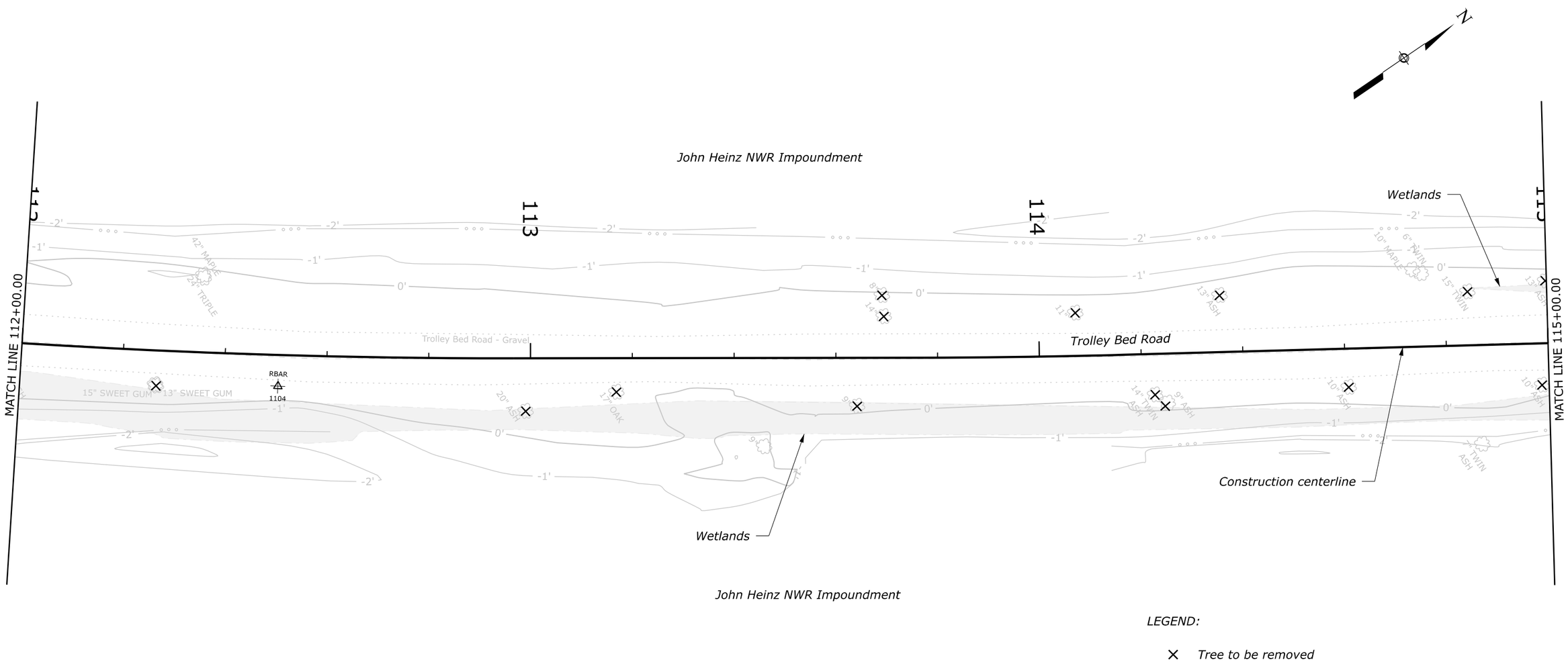

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NO.	DATE	BY	REVISIONS
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U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
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SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

EXISTING CONDITIONS AND DEMOLITION PLAN

TROLLEY BED ROAD (ROUTE 404)

SCHEDULE A

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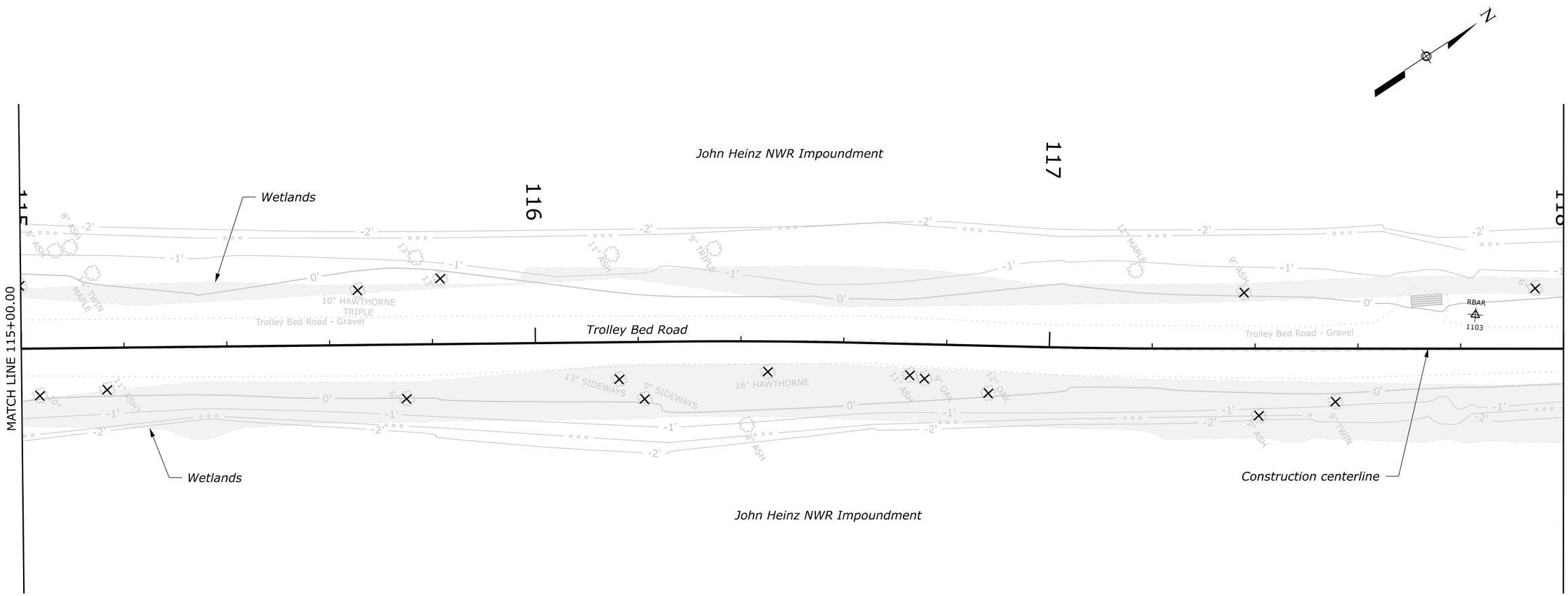

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U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
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0 10 20
SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

EXISTING CONDITIONS AND DEMOLITION PLAN

TROLLEY BED ROAD (ROUTE 404)

SCHEDULE A

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PROJECT	SHEET NUMBER
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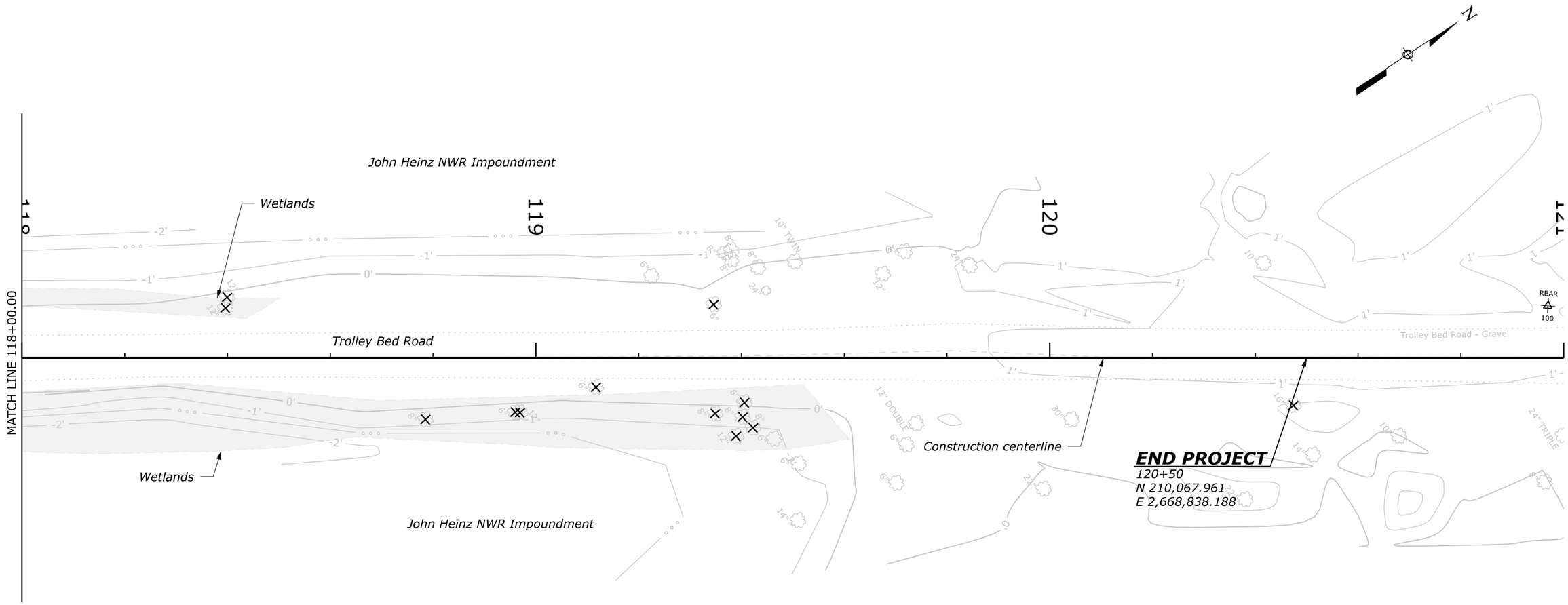

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U.S. DEPARTMENT OF TRANSPORTATION
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0 10 20
SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

EXISTING CONDITIONS AND DEMOLITION PLAN

TROLLEY BED ROAD (ROUTE 404)

SCHEDULE A

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PROJECT	SHEET NUMBER
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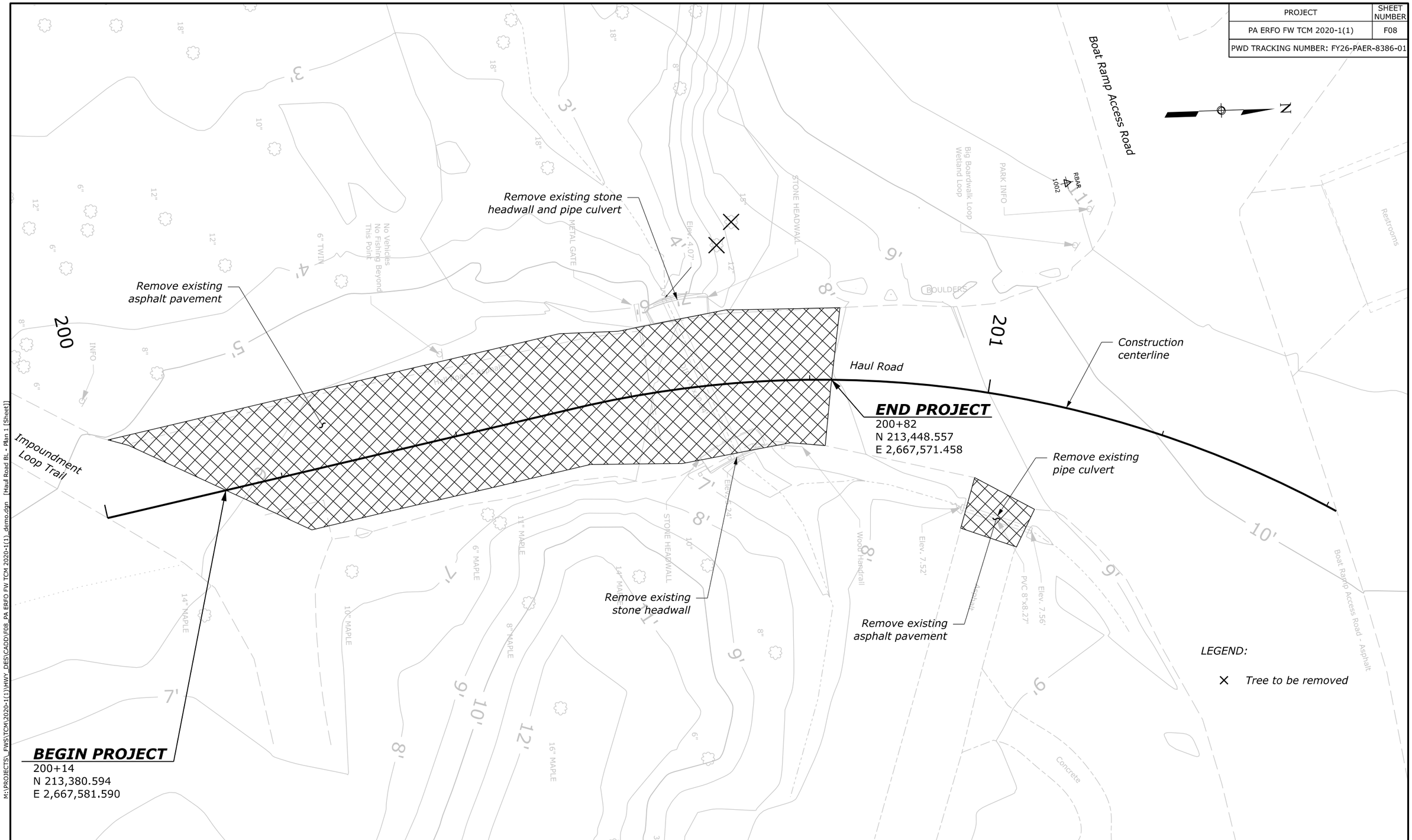
PWD TRACKING NUMBER: FY26-PAER-8386-01	



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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

EXISTING CONDITIONS AND DEMOLITION PLAN

HAUL ROAD (ROUTE 405)

SCHEDULE B

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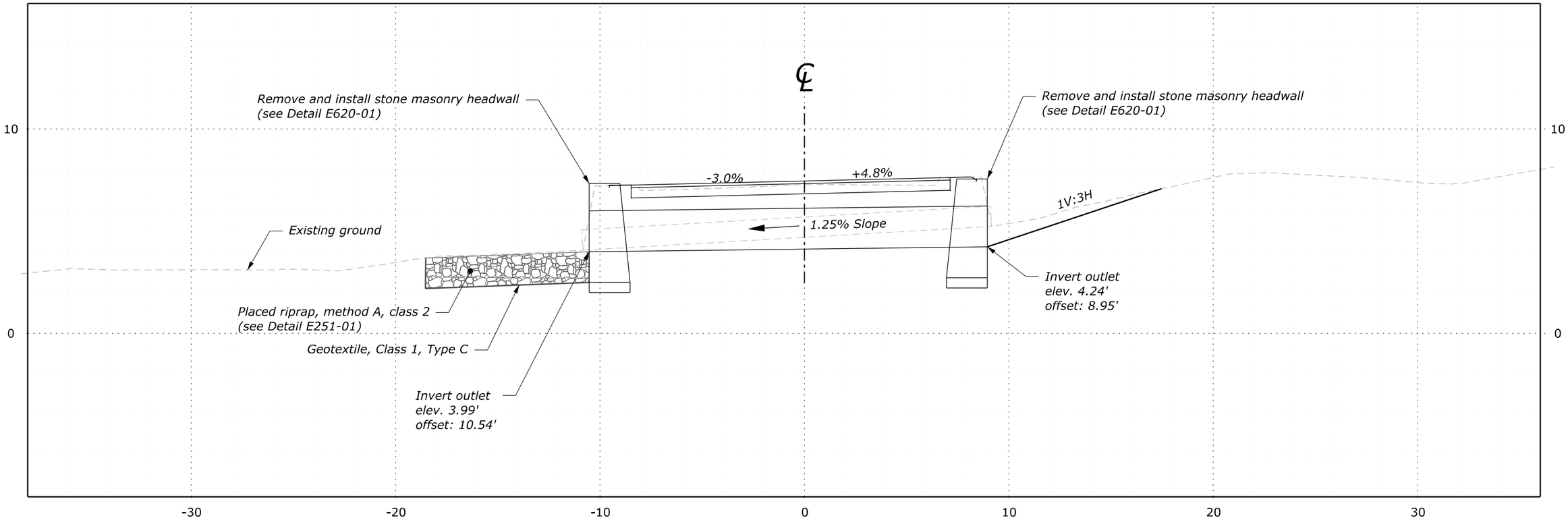
9 April 2026 8:32 AM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	K01
PWD TRACKING NUMBER: FY26-PAER-8386-01	

NOTE:

Maintain minimum 1-foot pipe cover during construction to prevent damage to pipe from equipment.



200+68.36
Des Grade = 7.28
Subgrade = 6.65
Original Grnd = 7.28

Remove existing 12" DIP culvert.
Install 24" corrugated metal pipe culvert.
Length = 20'
Skew = 18° Rt. ahead

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0 2.5 5
SCALE 1"=5'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

DRAINAGE PROFILE

HAUL ROAD (ROUTE 405)
SCHEDULE B

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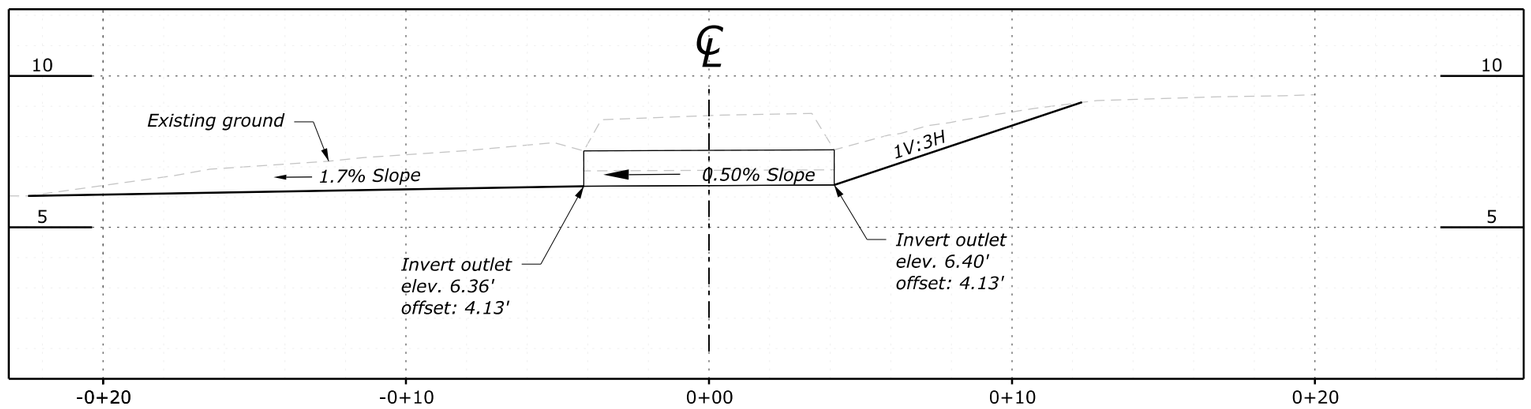
9 April 2026 8:32 AM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	K02
PWD TRACKING NUMBER: FY26-PAER-8386-01	

NOTE:

Maintain minimum 1-foot pipe cover during construction to prevent damage to pipe from equipment.



201+03.48

Original Grnd = 8.69

Remove existing 8" PVC culvert.
Install 18" equivalent ellipitical RCP culvert.
Length = 8'
No Skew

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 2.5 5
SCALE 1"=5'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

DRAINAGE PROFILE

HAUL ROAD (ROUTE 405)

SCHEDULE B

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\K01_PA ERFO FW TCM 2020-1(1)_pln_pp.dgn [culvert-1 - Profile 1 [Sheet]]
9 April 2026 8:32 AM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	M01
PWD TRACKING NUMBER: FY26-PAER-8386-01	

Project Description

This project consists of the reconstruction of a 0.37-mile segment of Mainline Trolley Bed Road and a 0.01-mile segment of Mainline Haul Road. This work includes embankment construction, aggregate base, aggregate surface course, asphalt concrete pavement, remove and install pipe culverts, remove and install stone masonry headwalls, place riprap, and other miscellaneous work.

Soil disturbing activities include embankment construction, placing riprap, and installing pipe culverts and stone masonry headwalls.

The total disturbed area for the project is approximately 0.52 acres (Schedule A = 0.50 acres and Schedule B = 0.02 acres). The receiving water is Darby Creek that is a Chapter 93 designated stream for warm water fishes.

Prohibited Discharges

The following discharges are prohibited:

- *Wash-water from concrete, paint, curing compounds, and other construction materials*
- *Fuels, oils, equipment-related compounds*
- *Soaps, solvents used for vehicle washing*
- *Waste, garbage, sanitary waste*

Inspect and maintain on a regular basis, all mechanized equipment used in or near surface water to prevent contamination from fuels, lubricants, hydraulic fluids, or other toxic materials.

Solid waste generated from the project will consist of construction debris, garbage, and empty containers. Collect and store all waste in dumpsters, or in metal or plastic drums, as appropriate.

Hazardous waste will not be generated from normal construction activities. Equipment fueling and maintenance could generate spills, leaks, and hazardous wastes like motor oil, diesel, gasoline, and battery fluid. If feasible, conduct these activities in a covered area to avoid contact with storm water. Store all hazardous waste materials in appropriate and clearly marked containers away from other non-waste materials. Do not dispose of hazardous waste materials into the on-site dumpsters. Dispose of material according to Federal, State, and local regulations.

Develop and implement a Spill Prevention Control and Countermeasures (SPCC) plan following the requirements under 40 CFR 112. Report spills large enough to discharge to surface waters to the National Response Center at 1-800-424-8802.

General Guidelines

The Erosion and Sediment Control Narrative is meant as a guideline for preventing erosion and controlling sediment. The work consists of applying measures throughout the life of the project to control erosion and to minimize the sedimentation of rivers, streams, and impoundments such as lakes, reservoirs, bays, and coastal waters. The measures consist of soil erosion control measures which are also defined and outlined in the Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-14, and the Special Contract Requirements.

At least 7 days prior to starting any earth disturbance activities, including clearing and grubbing, notify the CO to hold an on-site reconstruction meeting and invite the Refuge Manager, Contractor, the Erosion and Sediment Control Plan Preparer, and the Inspections Coordinator of the Philadelphia Water District (PWD). The Inspections Coordinator of the PWD can be reached at 215-685-6387. All earth disturbance activities will proceed in accordance with the sequence of construction.

Notify PWD of any changes to the approved plan prior to implementation of those changes. Submit a revised erosion and sediment control plan to PWD and Pennsylvania Department of Environmental Protection (PA DEP) for review and approval.

Limit clearing, grubbing, and topsoil removal to those areas described in each stage of the construction sequence. General site clearing, grubbing, and topsoil removal may not commence in any stage or phase of the project until the erosion and sediment control best management practices specified for that stage or phase have been installed and are functioning as described in the Erosion and Sediment Control Plan.

General Guidelines Continued

No construction access will be permitted through a wetland or waterway.

Do not allow construction vehicles to track sediment outside the project limits.

A copy of the approved drawings must be available at the project site at all times.

Do not allow any construction equipment to operate on or access the down-slope side of the perimeter control measures.

Direct storm water to vegetated buffer areas and do not discharge directly into surface waters.

An Industrial Waste Permit will be required should pumping to City-owned infrastructure become necessary during construction. All pumping of water from any work area shall be done according to the procedure described in this plan, over undisturbed vegetated areas.

Inlet protection should be provided for all inlets owned by PWD that are located within one block of the project site.

PWD is not responsible for any cleaning or repairs needed on City-owned infrastructure due to failure of any erosion and sediment control practices.

Inspection and maintenance of all erosion and sediment control best management practices shall occur on a weekly basis, before any anticipated precipitation events, and after all precipitation events.

The maximum height for stockpiles areas shall be 20 feet. The maximum side slope for stockpile areas shall not exceed 1V:2H.

The rock construction entrance thickness shall be constantly maintained on-site. A stockpile shall be maintained on-site for this purpose. At the end of each construction day, all sediment deposited on paved roadways shall be removed and returned to the construction site. In no case shall the sediment be washed, shoveled, or swept into any roadside ditch, storm sewer, or surface water.

Filter fabric fence should be installed at level grade. Both ends of each fence section should be extended at least 8 feet upslope at 45 degrees to the main barrier alignment. Support stakes shall be spaced at a maximum of 8 feet. Sediment must be removed when accumulations reach ½ the above ground height of the filter fence.

Any fence section which has been undermined or topped must be immediately replaced with a rock filter outlet. Sediment must be removed when accumulations reach 1/3 the height of the outlet.

Erosion control blanketing shall be installed on all slopes 3H:1V or steeper within 50 feet of a surface water and on all other disturbed areas specified on the plan maps and/or detail sheets. Immediately upon discovering unforeseen circumstances posing the potential for accelerated erosion and/or sediment pollution, the operator shall implement appropriate best management practices to minimize the potential for erosion and sediment pollution and notify PWD and PA DEP.

Until the site is stabilized, all E&S BMPs shall be maintained properly. Maintenance shall include inspections of all E&S BMPs prior to any anticipated storm event, after each runoff event and on a weekly basis. All preventative and remedial maintenance work, including clean out, repair, replacement, regrading, reseeding, remulching, and renetting, must be performed immediately. If the E&S BMPs fail to perform as expected, replacement BMPs, or modifications of those installed, will be required.

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

EROSION AND SEDIMENT CONTROL NARRATIVE

TROLLEY BED ROAD (ROUTE 404) AND HAUL ROAD (ROUTE 405)
SCHEDULES A AND B

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30 March 2026 2:35 PM

General Guidelines Continued

All earth disturbances, including clearing and grubbing, as well as cuts and fills, shall be done in accordance with the approved E&S Plan. A copy of the approved drawings must be available at the project site at all times. PWD shall be notified of any changes to the approved plan prior to implementation of those changes. PWD may require a written submittal of those changes for review and approval at its discretion.

At least three (3) days prior to starting any earth disturbance activities, or expanding into an area previously unmarked, the Pennsylvania One Call System Inc. shall be notified at 1-800-242-1776 for the location of existing underground utilities.

All earth disturbance activities shall proceed in accordance with the sequence provided on the plan drawings. Deviation from that sequence must be approved in writing by PWD and the PA DEP prior to implementation.

Areas to be filled are to be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots, and other objectionable material.

Clearing, grubbing, and topsoil stripping shall be limited to those areas described in each stage of the construction sequence. General site clearing, grubbing, and topsoil stripping may not commence in any stage of the project until the E&S BMPs specified by the BMP sequence for that stage have been installed and are functioning as described in this E&S Plan.

At no time shall construction vehicles be allowed to enter areas outside the limit of disturbance boundaries shown on the plan maps. These areas must be clearly marked and fenced off before clearing and grubbing operations begin.

A log showing dates that E&S BMPs were inspected as well as any deficiencies found and the date they were corrected shall be maintained on the site and be made available to PWD at the time of inspection.

All sediment removed from BMPs shall be disposed of according to Subsection 203.05.

Areas which are to be topsoiled shall be scarified to a minimum depth of three to five inches — six to 12 inches on compacted soils — prior to placement of topsoil. Areas to be vegetated shall have a minimum four inches of topsoil in place prior to seeding and mulching. Fill outslopes shall have a minimum of two inches of topsoil.

All fills shall be compacted as required to reduce erosion, slippage, settlement, subsidence, or other related problems. Fill intended to support buildings, structures, and conduits, etc. shall be compacted in accordance with local requirements or codes.

All earthen fills shall be placed in compacted layers not to exceed nine inches in thickness. Fill materials shall be free of frozen particles, brush, roots, sod, or other foreign or objectionable materials that would interfere with or prevent construction of satisfactory fills.

Frozen materials or soft, mucky, or highly compressible materials shall not be incorporated into fills.

Fill shall not be placed on saturated or frozen surfaces.

Seeps or springs encountered during construction shall be handled in accordance with the standard and specification for subsurface drain or other approved method.

All graded areas shall be permanently stabilized immediately upon reaching finished grade. Cut slopes in competent bedrock and rock fills need not be vegetated. Seeded areas within 50 feet of a surface water, or as otherwise shown on the plan drawings, shall be blanketed according to the standards of this plan.

General Guidelines Continued

Immediately after earth disturbance activities cease in any area or subarea of the project, the operator shall stabilize all disturbed areas. During non-germinating months, mulch or protective blanketing shall be applied as described in the plan. Areas not at finished grade, which will be reactivated within one year, may be stabilized in accordance with the temporary stabilization specifications. Those areas which will not be reactivated within one year shall be stabilized in accordance with the permanent stabilization specifications.

Permanent stabilization is defined as a minimum uniform, perennial 70% vegetative cover or other permanent non-vegetative cover with a density sufficient to resist accelerated erosion. Cut and fill slopes shall be capable of resisting failure due to slumping, sliding, or other movements.

E&S BMPs shall remain functional as such until all areas tributary to them are permanently stabilized or until they are replaced by another BMP approved by PWD and PA DEP.

After final site stabilization has been achieved, temporary E&S BMPs must be removed or converted to permanent post-construction stormwater management practices. Areas disturbed during removal or conversion of the E&S BMPs shall be stabilized immediately. In order to ensure rapid revegetation of disturbed areas, such removal/conversions are to be done only during the germinating season.

Sediment basins and/or traps shall be kept free of all construction waste, wash water, and other debris having potential to clog the basin/trap outlet structures and/or pollute the surface waters. (when applicable).

During construction, the selected contractor is expected to follow the post-construction stormwater management plan (PCSMP) approved by PWD. No change or deviation from the Approved PCSMP is permitted without prior approval from PWD.

All work associated with PWD water conveyance and sewer infrastructure shall be done in accordance with the City of Philadelphia Water Department "Water Main Standard Details and Corrosion Control Specifications", 1985 edition, and "Standard Details and Standard Specifications For Sewers", 2019 edition.

Contact PWD Water Transport Records (1101 Market Street, 2nd Floor, Phone: 215-685-6271) for additional approvals and permits required for all water services, meters, and connections to the existing and/or proposed PWD facilities.

All building materials and wastes shall be removed from the site and recycled or disposed of in accordance with the PA DEP's Solid Waste Management Regulations at 25 PA Code 260.1 et seq., 271.1, and 287.1 et seq. No building materials or wastes or unused building materials shall be burned, buried, dumped, or discharged at the site.

A Dust Control Permit will be required when completely demolishing a building or structure that is more than three (3) stories, greater than forty (40) feet tall, or encompasses more than ten thousand (10,000) square feet; completely or partially demolishing any building or structure by implosion; or engaging in earthworks, defined as "clearing, grubbing, or earth disturbance of any land in excess of 5,000 square feet."

Sequence of Construction

Phase I Establish Perimeter Controls

Prior to any excavation, construct perimeter controls to ensure that disturbed sediment does not leave the project site. Perimeter controls include silt fence and other specified measures outside the construction limits.

Phase II Intermediate Controls

Apply intermediate controls during rough grading operations. Install silt fence in areas called out in the Erosion and Sediment Control plans.

Immediately apply temporary turf establishment in disturbed areas that will remain exposed for longer than 4 days. Apply permanent turf establishment to the finished slopes according to Section 625.

Perform minor regrading work at the toe of the slope going upslope and install rolled erosion control product, topsoil, and turf establishment immediately after final grading is achieved. Work and phase regrading such that no area larger than that which can be stabilized immediately is disturbed for a period greater than 1 workday.

Provide silt fence around all stockpiled excavated roadway material. Apply temporary turf establishment to stockpiles remaining in place longer than 4 days.

Provide watering for dust control within the construction limits, on active haul roads, and in pits and staging areas.

Phase III Final Construction / Stabilization

After completion of roadway construction, do the following as directed by the CO:

> *Apply permanent turf establishment to any remaining disturbed areas. Once uniform vegetative cover is achieved (minimum uniform, perennial 70% vegetative cover) remove the sediment control. In order to ensure rapid revegetation of disturbed areas, removal of sediment controls is to be done only during the germinating season.*
>
> *Regrade and stabilize areas where sediment control was installed and immediately stabilize.*
>
> *Re-apply permanent turf establishment to disturbed areas where vegetation has not been established. Without use of equipment or in a manner in which causes minimal impact to stabilized areas, remove perimeter control once all areas have been permanently stabilized.*

Upon completion of all earth disturbance activities and permanent stabilization of all disturbed areas, notify the CO to contact the Inspections Coordinator of the PWD at 215-685-6387 to schedule final inspection.

Maintenance and Inspection Procedures

Unless stated otherwise, construct and maintain all vegetated and structural erosion control practices according to Section 157, the details shown in the plans, and the individual permitting requirements. Check and maintain erosion control measures once every 7 days and within 24 hours after a rain of 0.25 inches or more, and daily during wet weather. Repair or replace any damaged measures by the end of the day. All preventative and remedial maintenance work, including clean out, repair, replacement, regrading, reseeding, remulching, and renetting must be performed immediately. If the erosion and sediment best management practices fail to perform as expected, replacement best management practices, or modifications of those installed are required.

Silt fence - inspect for buildup of excess sediment, undercutting, sags, and other failures. If the fabric becomes damaged, repair or replace as necessary. Remove sediment from behind the silt fence when it becomes 0.5 feet deep at the fence. Dispose of all sediment in accordance with Section 203.05(a).

Check dam - inspect weekly and after each runoff event. Remove sediment deposits from the check dam when it reaches half the height of the device. Replace damaged check dam within 24 hours of inspection.

Fiber roll - inspect fiber roll weekly and after each runoff event. Remove sediment deposits from the fiber roll when it reaches half the height of the device. Replace damaged fiber roll within 24 hours of inspection

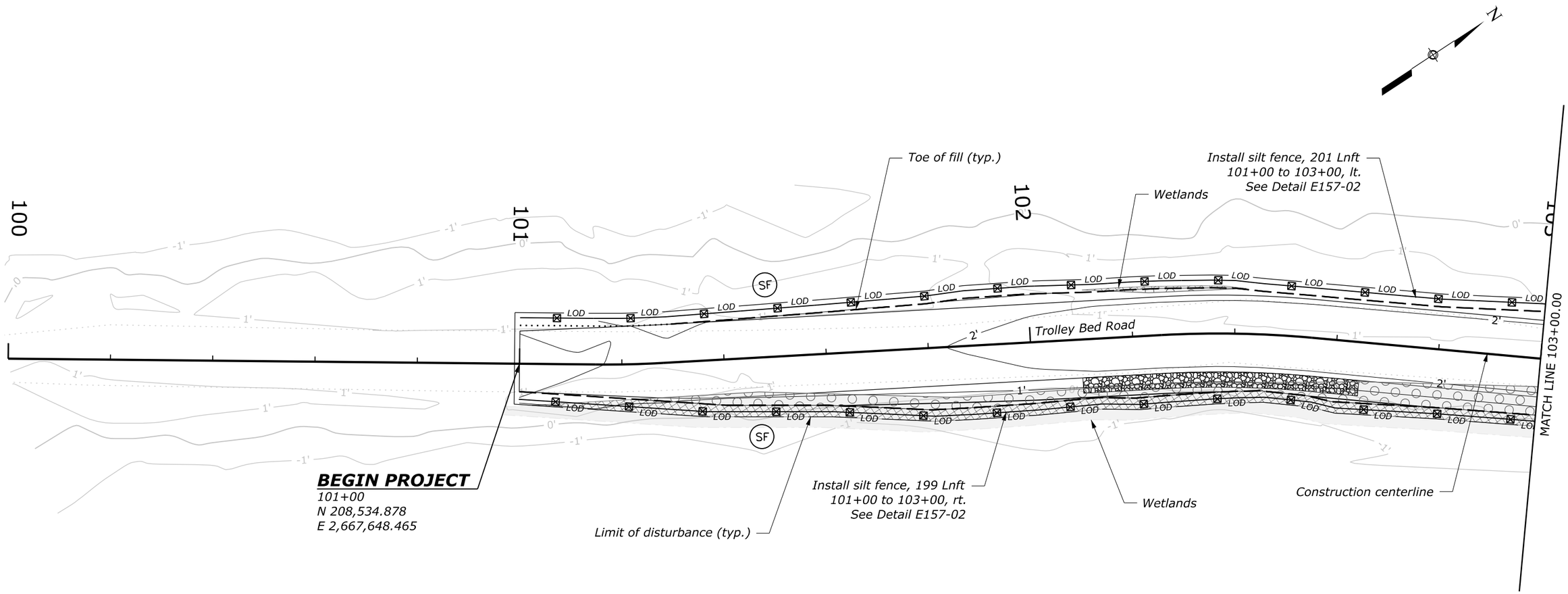
Rock filter outlet - install where failure of a silt fence has occurred due to concentrated flow. Remove sediment when accumulations reach 1/3 the height of the outlet.

Rolled erosion control product - inspect matting every significant rainfall (0.5 inches or greater) event for damage and erosion beneath the matting. Replace damaged matting as directed by the CO. Check staples and stakes to make sure they are securely in the ground.

Record the inspection date and summary of findings within 24 hours of completing a site inspection.

Immediately upon discovering unforeseen circumstances posing the potential for accelerated erosion and/or sediment pollution, implement appropriate best management practices to minimize the potential for erosion and sediment pollution, and notify PWD and PA DEP.

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	M04
PWD TRACKING NUMBER: FY26-PAER-8386-01	



LEGEND:

Permanent Impact

Temporary impact

Wetland Impact Summary Table

Temporary	Permanent
acre	acre
0.010	0.011

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 10 20
SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

EROSION AND SEDIMENT CONTROL PLAN

TROLLEY BED ROAD (ROUTE 404)

SCHEDULE A

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9 April 2026 8:30 AM

PROJECT	SHEET NUMBER
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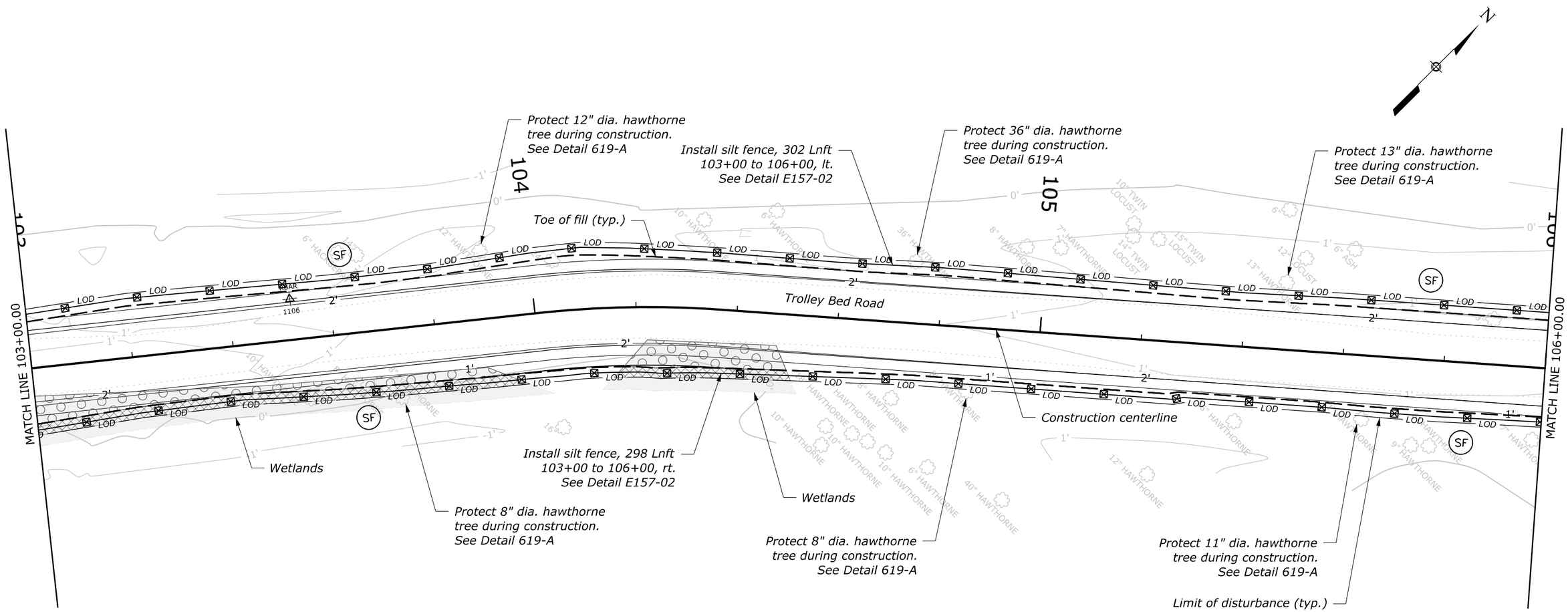
PWD TRACKING NUMBER: FY26-PAER-8386-01	



LEGEND:

Permanent Impact

Temporary impact

Wetland Impact Summary Table

Temporary	Permanent
acre	acre
0.006	0.009

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 10 20
SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

EROSION AND SEDIMENT CONTROL PLAN

TROLLEY BED ROAD (ROUTE 404)

SCHEDULE A

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PROJECT	SHEET NUMBER
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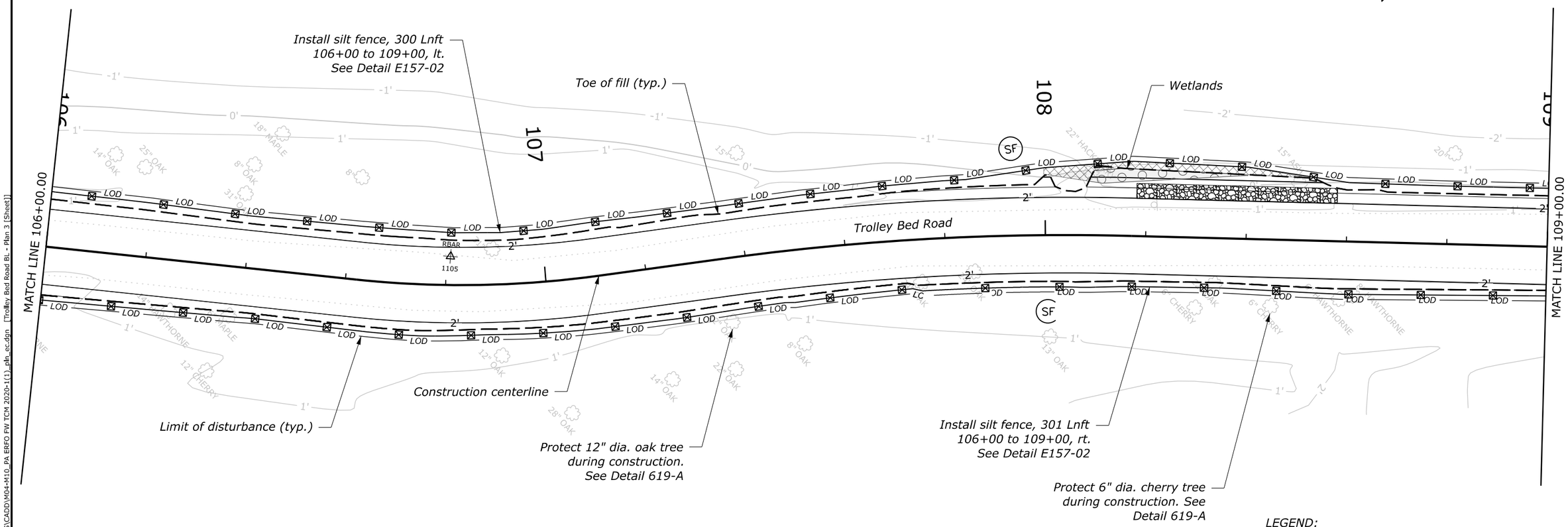

LEGEND:

Permanent Impact

Temporary impact

Wetland Impact Summary Table

Temporary	Permanent
acre	acre
0.002	0.001

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 10 20
SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

EROSION AND SEDIMENT CONTROL PLAN

TROLLEY BED ROAD (ROUTE 404)

SCHEDULE A

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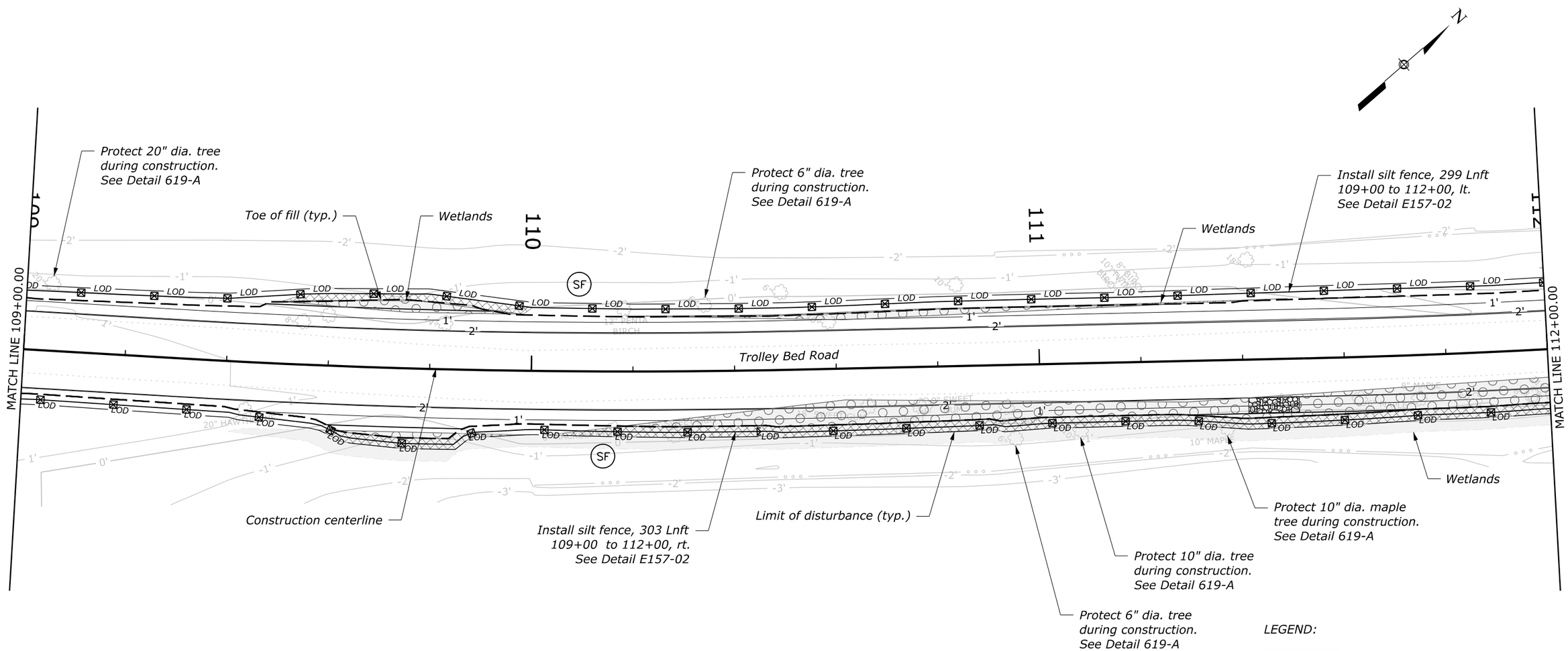

LEGEND:

Permanent Impact

Temporary impact

Wetland Impact Summary Table

Temporary	Permanent
acre	acre
0.012	0.019

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 10 20
SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

EROSION AND SEDIMENT CONTROL PLAN

TROLLEY BED ROAD (ROUTE 404)

SCHEDULE A

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PROJECT	SHEET NUMBER
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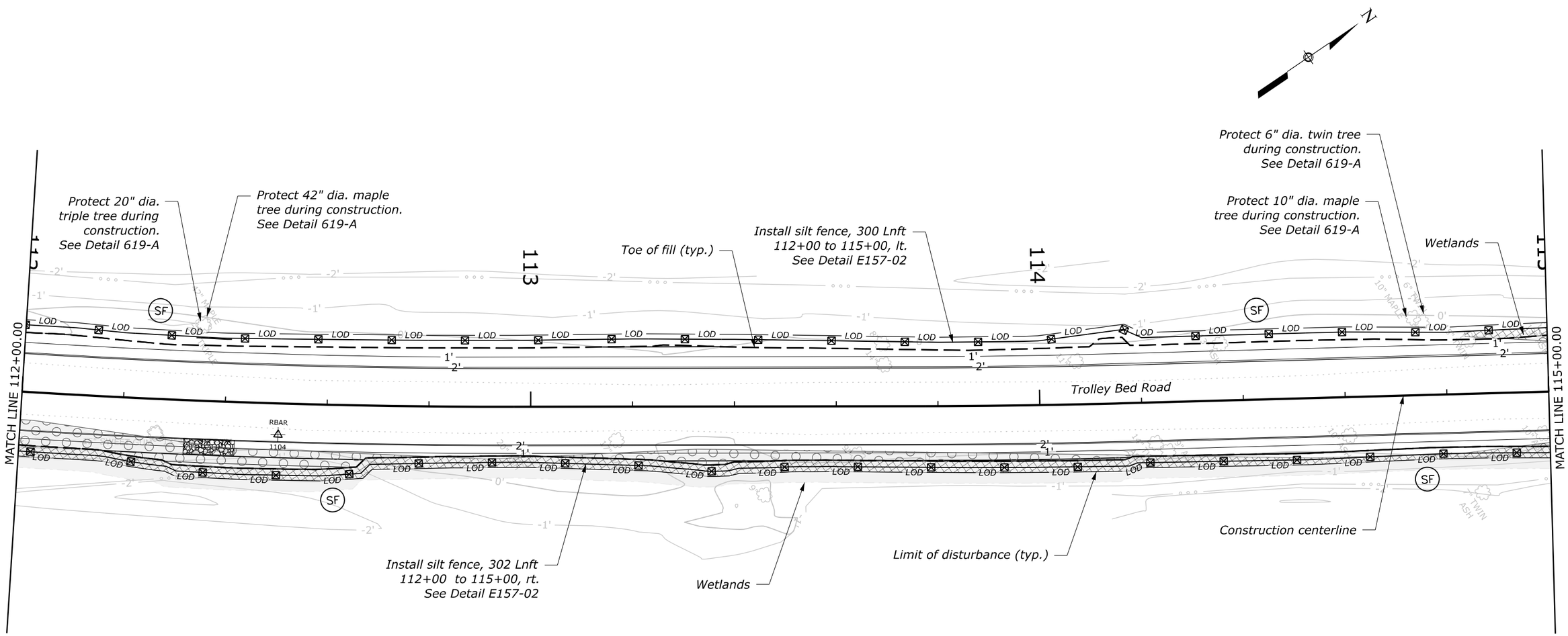

LEGEND:

Permanent Impact

Temporary impact

Wetland Impact Summary Table

Temporary	Permanent
acre	acre
0.014	0.011

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 10 20
SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

EROSION AND SEDIMENT CONTROL PLAN

TROLLEY BED ROAD (ROUTE 404)

SCHEDULE A

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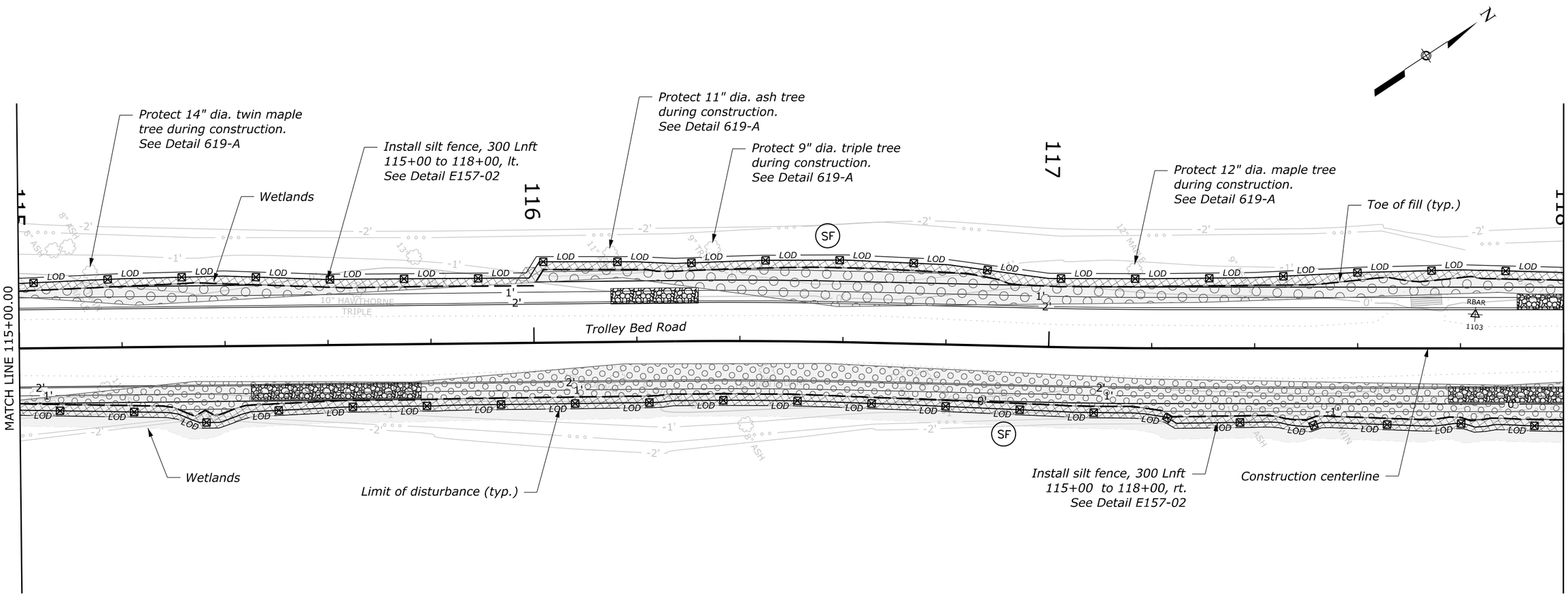
PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	M09
PWD TRACKING NUMBER: FY26-PAER-8386-01	



LEGEND:

Permanent Impact

Temporary impact

Wetland Impact Summary Table

Temporary	Permanent
acre	acre
0.026	0.060

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 10 20
SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

EROSION AND SEDIMENT CONTROL PLAN

TROLLEY BED ROAD (ROUTE 404)

SCHEDULE A

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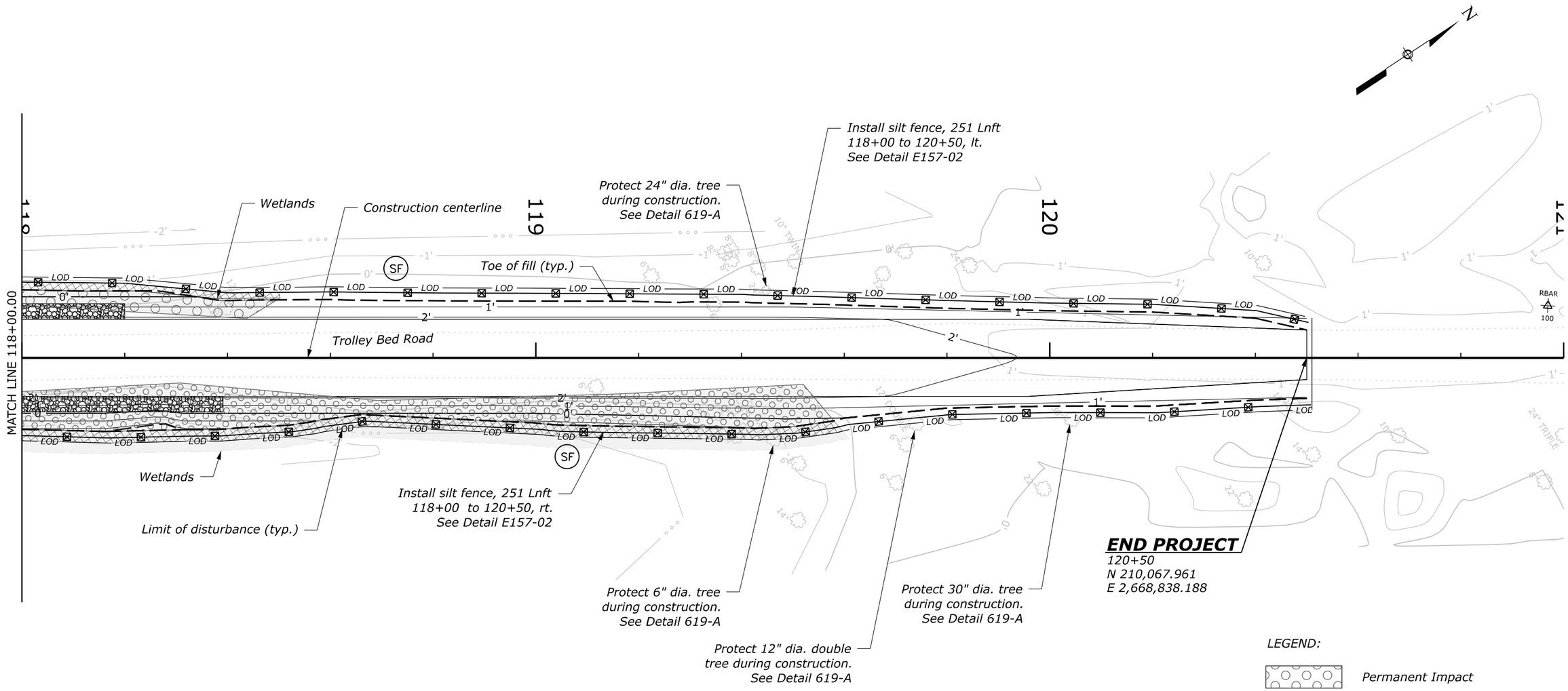
PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	M10
PWD TRACKING NUMBER: FY26-PAER-8386-01	



LEGEND:

Permanent Impact

Temporary impact

Wetland Impact Summary Table

Temporary	Permanent
acre	acre
0.011	0.027

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 10 20
SCALE 1"=20'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

EROSION AND SEDIMENT CONTROL PLAN

TROLLEY BED ROAD (ROUTE 404)

SCHEDULE A

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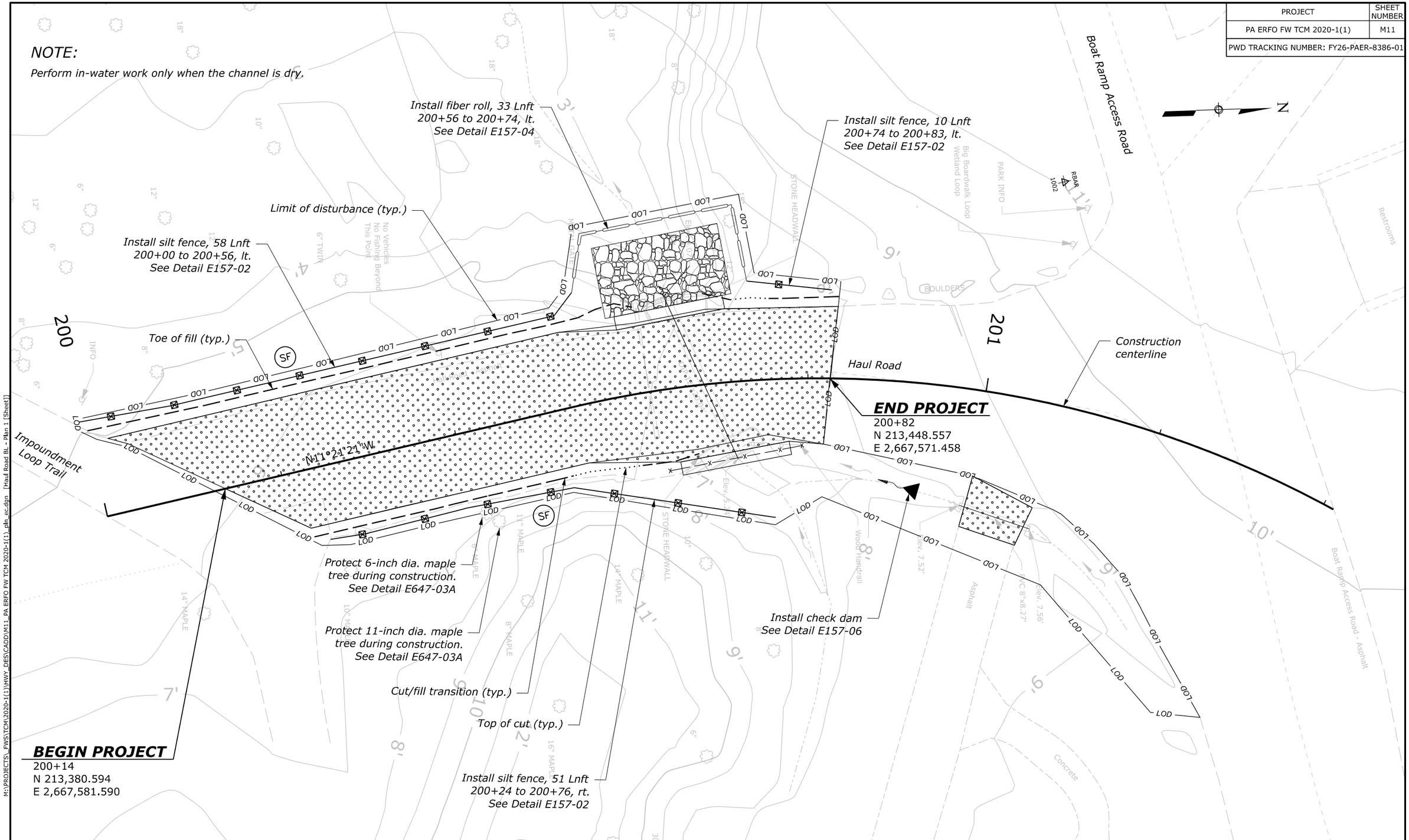
9 April 2026 8:30 AM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	M11
PWD TRACKING NUMBER: FY26-PAER-8386-01	

NOTE:

Perform in-water work only when the channel is dry.



NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

EROSION AND SEDIMENT CONTROL PLAN

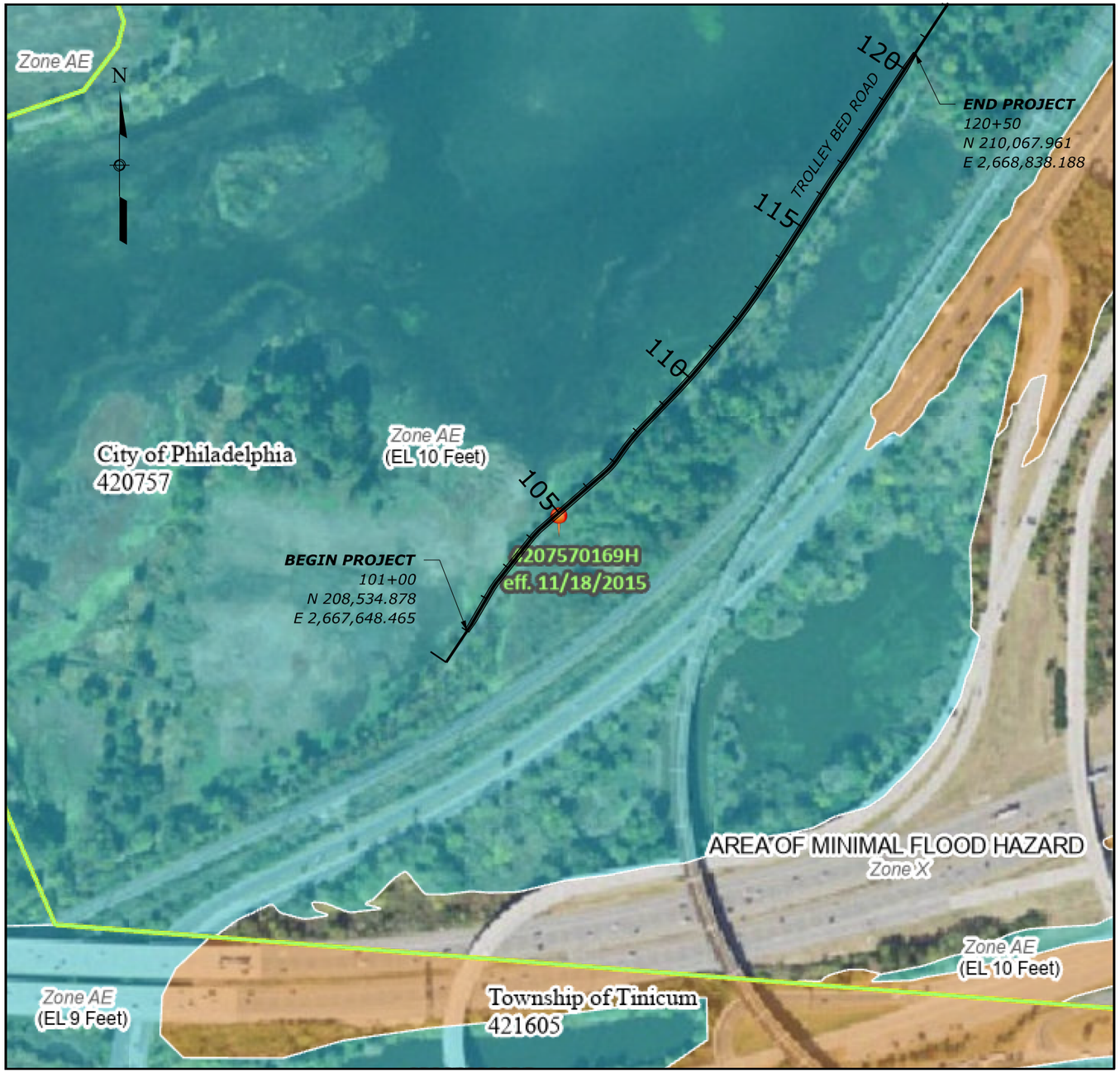
HAUL ROAD (ROUTE 405)

SCHEDULE B

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\M11_PA ERFO FW TCM 2020-1(1)_pln_ec.dgn [Haul Road BL - Plan 1 [Sheet]]

7 April 2026 1:18 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	M12
PWD TRACKING NUMBER: FY26-PAER-8386-01	



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- B 20.2 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/4/2025 at 7:13 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 250 500
SCALE IN FEET

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

FEMA FLOODPLAIN AREA

TROLLEY BED ROAD (ROUTE 404)
SCHEDULE A

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\M12_PA ERFO FW TCM 2020-1(1)_dh_ec.dgn (FEMA Location Map)
27 March 2026 8:08 AM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	M13
PWD TRACKING NUMBER: FY26-PAER-8386-01	

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
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OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- B 20.2 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/4/2025 at 7:13 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 125 250
SCALE IN FEET

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

FEMA FLOODPLAIN AREA

HAUL ROAD (ROUTE 405)
SCHEDULE B

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PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	M14
PWD TRACKING NUMBER: FY26-PAER-8386-01	

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

DARBY CREEK WATERSHED

TROLLEY BED ROAD (ROUTE 404)
HAUL ROAD (ROUTE 405)

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PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	N01
PWD TRACKING NUMBER: FY26-PAER-8386-01	

GENERAL NOTES

Adapt the Temporary Traffic Control Plan to meet field conditions and provide safe and efficient traffic movement, as approved by the Contracting Officer (CO). Changes may be required when physical dimensions in the plans are not attainable, or result in duplicate or undesired overlapping of devices. Modifications may include: moving, supplementing, covering, or removing devices.

The following general notes apply at all times for the duration of the construction of the project, except when otherwise noted in the plans, or directed by the CO.

1. *Obtain approval from the CO for final locations and spacing of all traffic control devices.*
2. *Install temporary traffic control devices for advance signing prior to beginning the project and maintain devices through the completion of all construction activities.*
3. *Cover or remove all conflicting signs and remove all conflicting striping for each phase, as approved by the CO.*

TRAFFIC CONTROL PHASE I

Close Trolley Bed Road from the intersections of Haul Road (Route 405) and Impoundment Loop Trail to the intersections of Trolley Bed Road (Route 404) and Cross Dike Road (Route 403) using type 3 barricades with "ROAD CLOSED TO ALL VISITORS" signs and chain link fence and gate. See Traffic Control Plan, Trolley Bed Road (Route 404), Phase I (Schedule A). Finish all the work in Phase I construction before moving to Phase II construction.

TRAFFIC CONTROL PHASE II

Close Haul Road from Visitor Parking to Impoundment Loop Trail using type 3 barricades with "ROAD CLOSED TO ALL VISITORS" signs and chain link fence and gate. See Traffic Control Plan, Haul Road (Route 405), Phase II (Schedule B).

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27 March 2026 8:10 AM

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

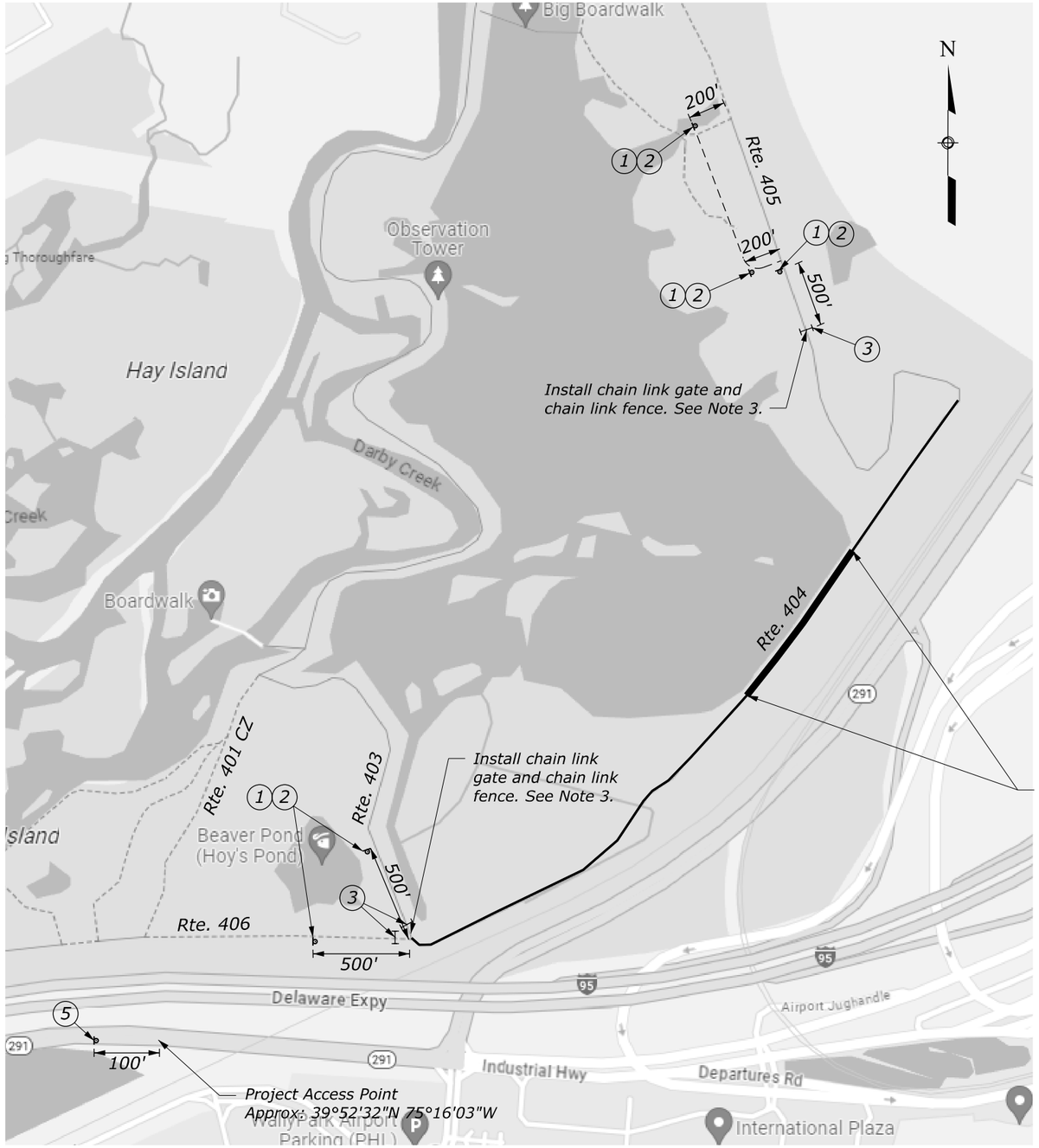
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
OFFICE OF FEDERAL LANDS HIGHWAY

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

TEMPORARY TRAFFIC CONTROL NARRATIVE

SCHEDULES A AND B

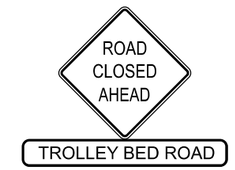
PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	N02
PWD TRACKING NUMBER: FY26-PAER-8386-01	



PROJECT PA ERFO FW TCM 2020-1(1), SCHEDULE A, Trolley Bed Road (Route 404)

NOTES:

1. Mount signs 1, 2, and 5 on posts in accordance with Detail E635-01.
2. Mount sign 3 on barricade, type 3 with Type B warning lights.
3. Install chain link gate and chain link fence. Extend chain link fence to tree line on each side. Lock gate at night or when no workers are present.



1 W20-3

2 SP-2

3 R11-4 (Mod.)

5 W8-6 (Mod.)

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

NO SCALE

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

TEMPORARY TRAFFIC CONTROL PLAN

TROLLEY BED ROAD (ROUTE 404) PHASE I (SCHEDULE A)

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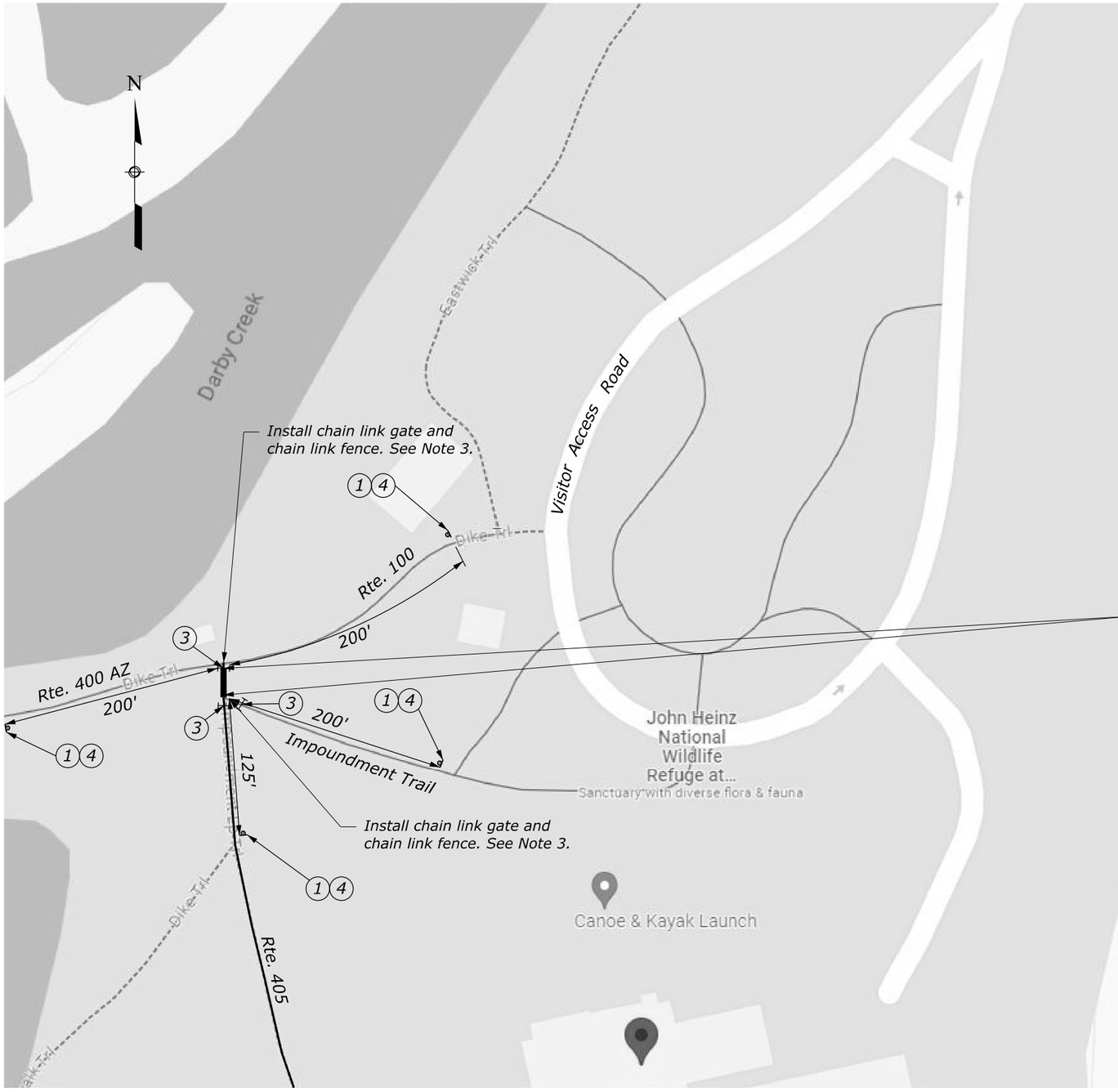
PWD TRACKING NUMBER: FY26-PAER-8386-01	



PROJECT PA ERFO FW TCM 2020-1(1), SCHEDULE B, Haul Road (Route 405)

NOTES:

1. Mount signs 1 and 4 on posts in accordance with Detail E635-01.
2. Mount sign 3 on barricade, type 3 with Type B warning lights.
3. Install chain link gate and chain link fence. Extend chain link fence to tree line on each side. Lock gate at night or when no workers are present.

3 R11-4 (Mod.)

1 W20-3

4 SP-4

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

NO SCALE

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

TEMPORARY TRAFFIC CONTROL PLAN

HAUL ROAD (ROUTE 405) PHASE II (SCHEDULE B)

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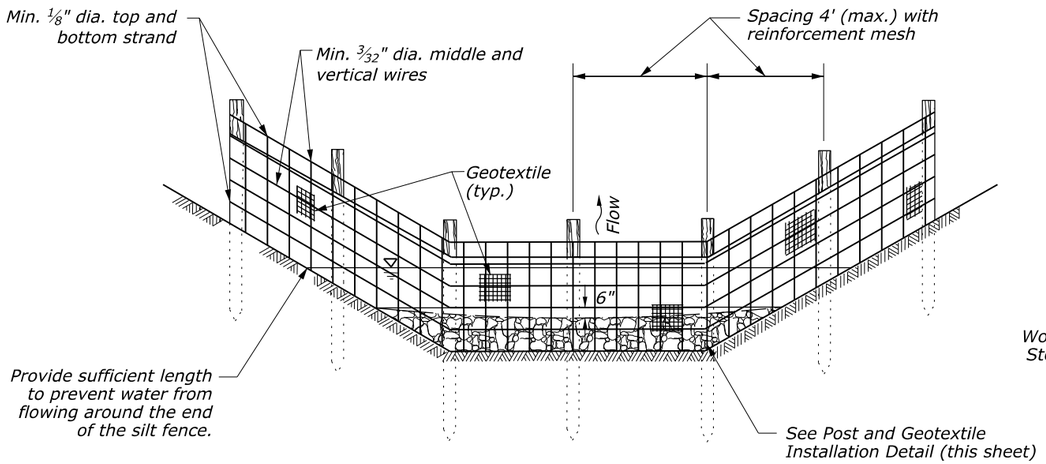
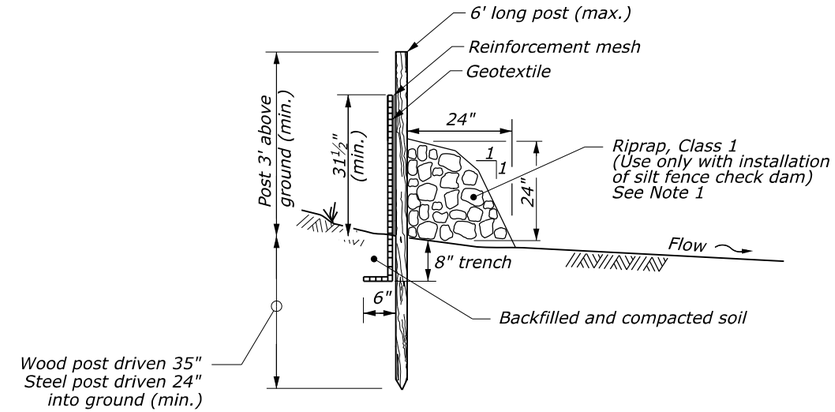


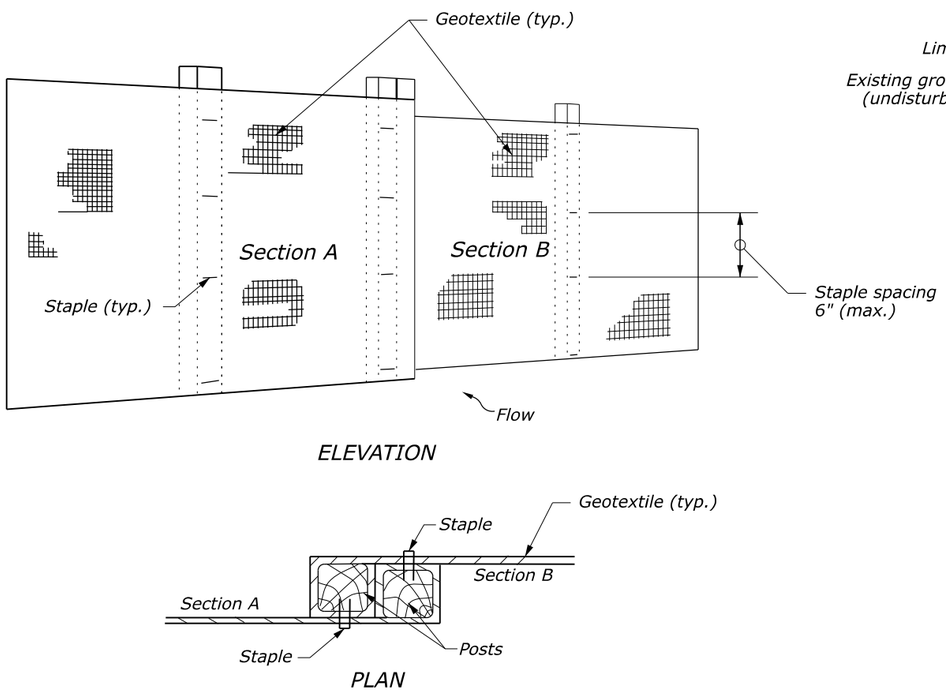
WIRE-BACKED SILT FENCE WITH CHECK DAM



POST AND GEOTEXTILE INSTALLATION

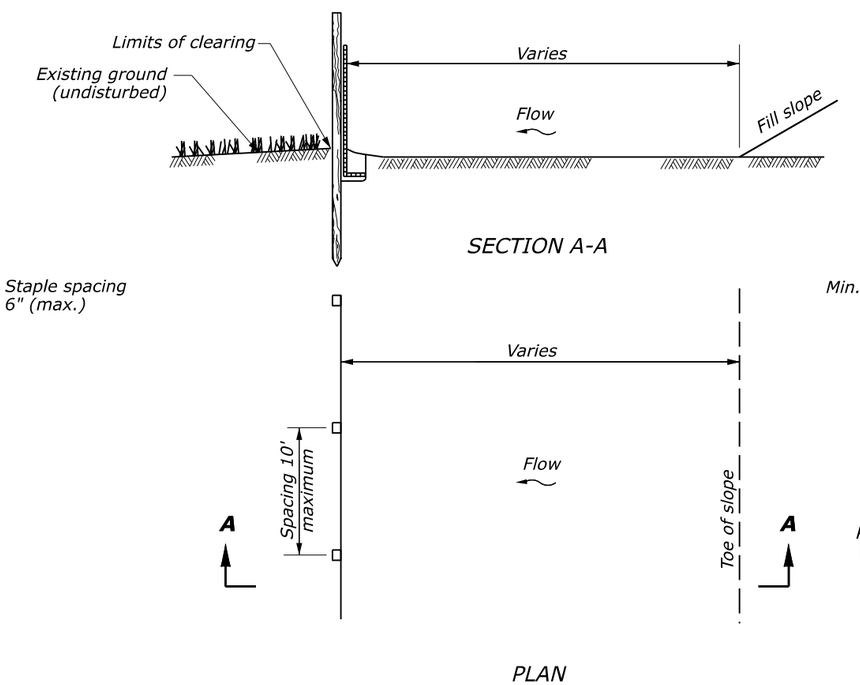
NOTES:

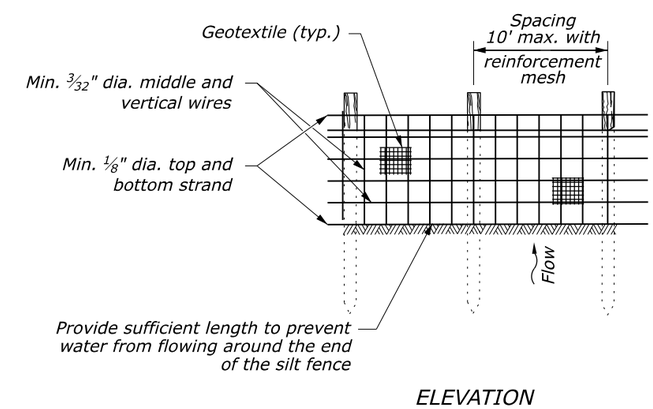
1. Install silt fence with Class 1 riprap only in low-flow drainage ditches where shown on the Erosion and Sediment Control Plan.
2. Install pre-assembled silt fence according to the manufacturer's recommendations.
3. Install silt fence along ground contours. Curve ends of silt fence upgrade to prevent water from running around the ends.
4. Attach geotextile and reinforcement mesh so they do not slide down posts. Provide detail for attaching to steel posts for approval.
5. Use reinforcement mesh that is a minimum of 32 inches in width and has a minimum of 6 line wires with 12-inch stay spacing.
6. Use geotextile that is a minimum of 45 inches in width and fasten adequately to the reinforcement mesh as directed.
7. Use 60-inch minimum height steel posts of the self-fastener angle steel type.
8. Use 70-inch minimum height by 3-inch diameter wood posts.
9. Extend reinforcement mesh and geotextile into trench.



JOINING TWO ADJACENT SILT FENCE SECTIONS

(See Note 4)





WIRE-BACKED SILT FENCE INSTALLATION AT TOE OF FILL

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA
OFFICE OF FEDERAL LANDS HIGHWAY

WIRE-BACKED SILT FENCE

EFLHD DETAIL
E157-02

SPECIFICATION
FP-24, FP-14

APPROVED FOR USE
05/2024

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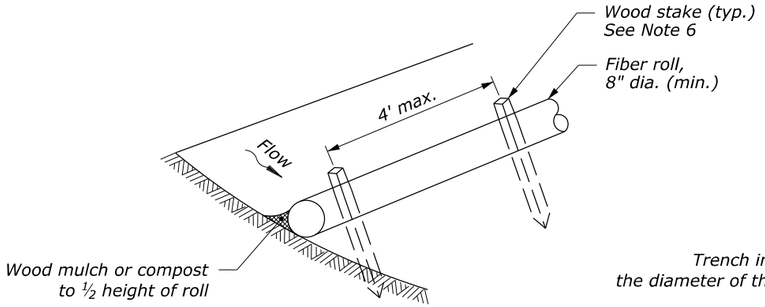
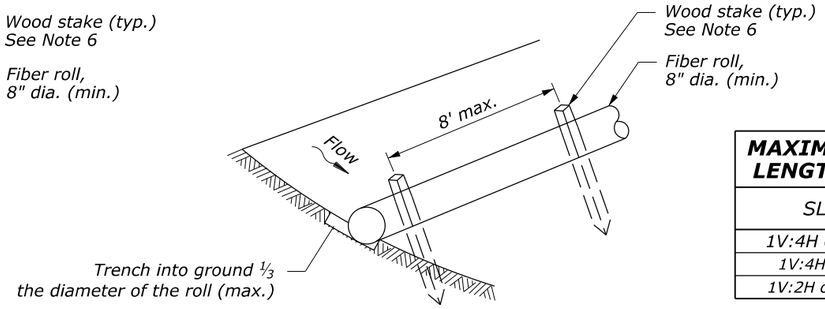
PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	S02
PWD TRACKING NUMBER: FY26-PAER-8386-01	



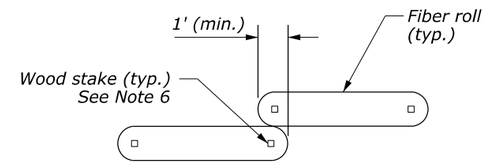
UNTRENCHED INSTALLATION



ENTRENCHED INSTALLATION

FIBER ROLL ISOMETRIC VIEW

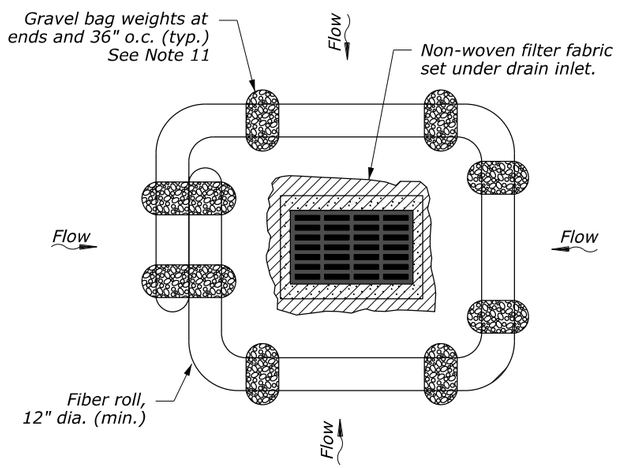
MAXIMUM ALLOWABLE SLOPE LENGTH ABOVE FIBER ROLLS	
SLOPE	MAX INTERVAL
1V:4H or Flatter	20 ft
1V:4H - 1V:2H	15 ft
1V:2H or Steeper	10 ft



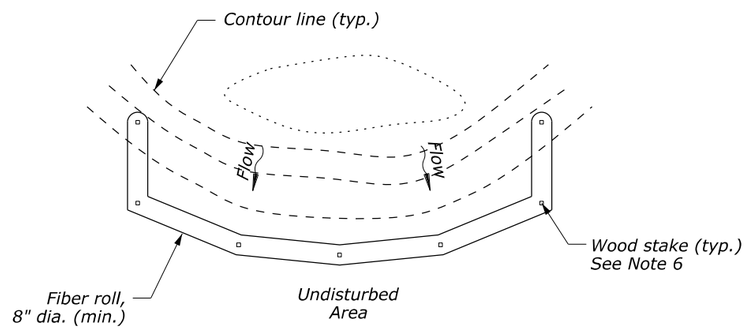
FIBER ROLL OVERLAP

NOTES:

1. Provide fiber rolls meeting the requirements of Subsection 713.12.
2. Use fiber rolls with a minimum 8-inch diameter. For drain inlet protection, use fiber rolls with a minimum 12-inch diameter.
3. Prior to installation, clear all obstructions including rocks, clods, and debris greater than 1-inch that may interfere with proper function of the fiber roll.
4. For untrenched installation, blow or hand place mulch or compost on uphill side of the slope along the fiber roll.
5. Place fiber rolls on level grade and parallel to contours. Extend both ends of the fiber roll at least 8 feet upslope at 45 degrees to the main alignment.
6. Use wood stakes with a minimum nominal cross section of 2- by 2-inch and of sufficient length to attain a minimum of 12 inches into the ground and 3 inches protruding above the roll. Provide wood stakes meeting the requirements of Subsection 713.08(a).
7. When more than one fiber roll is needed, overlap ends 12 inches minimum and stake.
8. Remove sediment deposits when accumulation is one-half the height of the exposed fiber roll.
9. Replace biodegradable fiber rolls 6 months after installation and photodegradable fiber rolls 12 months after installation.
10. When fiber rolls are required on paved surfaces, use gravel bags to support them as shown on the inlet protection view.
11. Provide gravel bag weights meeting the requirements of Subsection 713.13.



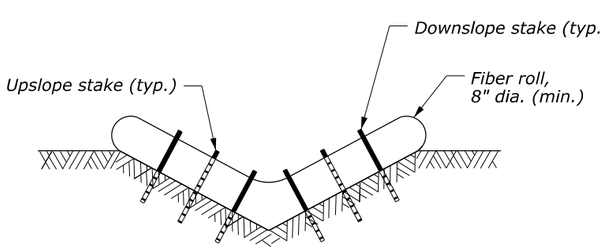
INLET PROTECTION



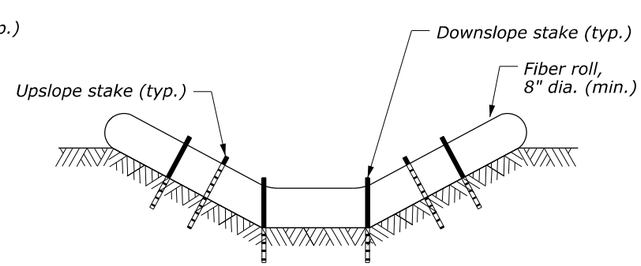
PLAN VIEW

FIBER ROLL CHECK DAM SPACING TABLE		
DITCH GRADE *	CHECK DAM SPACING (S)**	
	8" HIGH	12" HIGH
2%	33'	50'
3%	22'	33'
4%	16'	25'
5%	13'	20'

* Do not install check dams on grades below 2%
** Adjust spacing as approved based on site conditions

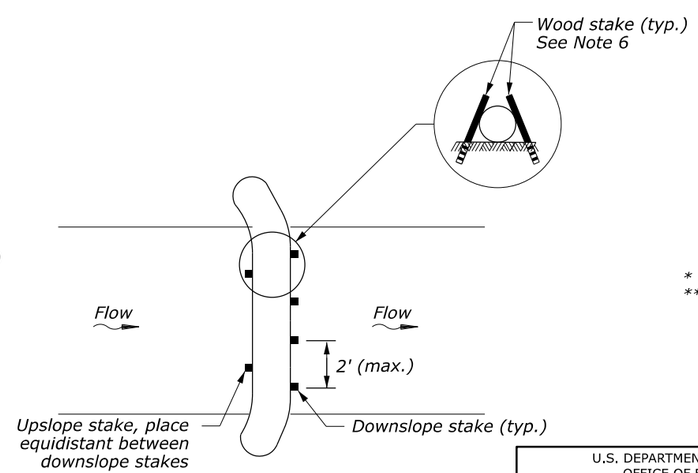


V-DITCH



TRAPEZOIDAL DITCH

FIBER ROLL CHECK DAM CROSS-SECTIONS



FIBER ROLL CHECK DAM PLAN VIEW

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA
OFFICE OF FEDERAL LANDS HIGHWAY

FIBER ROLL

EFLHD DETAIL
E157-04

SPECIFICATION
FP-24, FP-14

APPROVED FOR USE
05/2024

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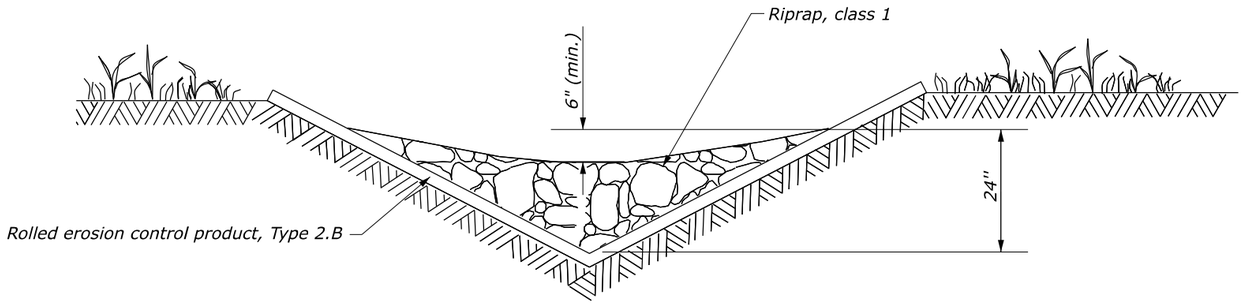
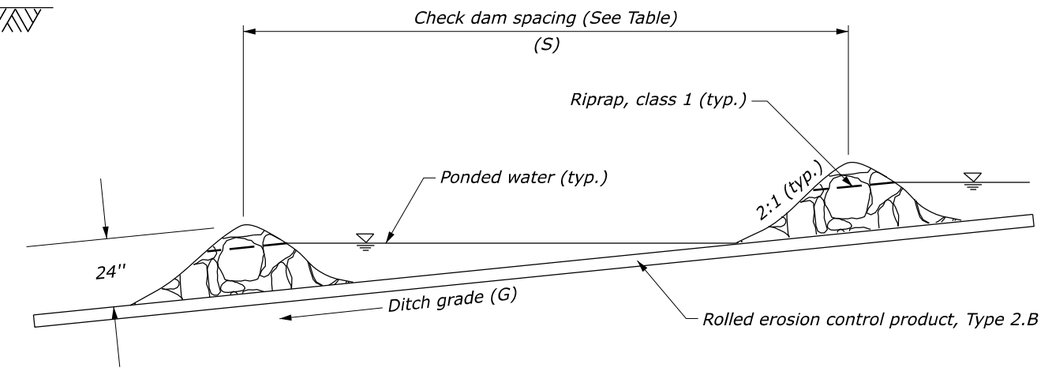
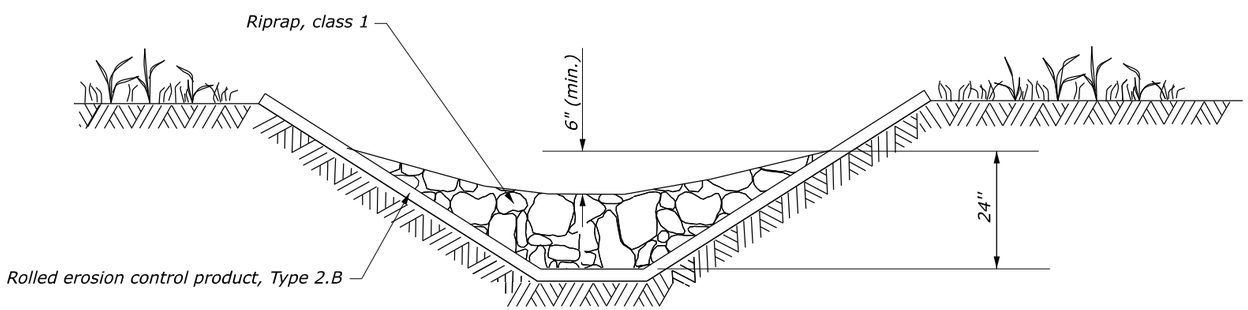
PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	S03
PWD TRACKING NUMBER: FY26-PAER-8386-01	



V-DITCH



DITCH PROFILE VIEW



TRAPEZOIDAL DITCH

DITCH CROSS-SECTION VIEW

CHECK DAM SPACING TABLE	
DITCH GRADE (G)*	SPACING (S) LNFT
2%	75
3%	50
4%	40
5%	30
6%	25

* Do not use Check Dams below 2% or above 6% ditch grades.

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA
OFFICE OF FEDERAL LANDS HIGHWAY

CHECK DAM WITH ROLLED EROSION CONTROL PRODUCT

EFLHD DETAIL
E157-06

SPECIFICATION
FP-24, FP-14

APPROVED FOR USE
05/2024

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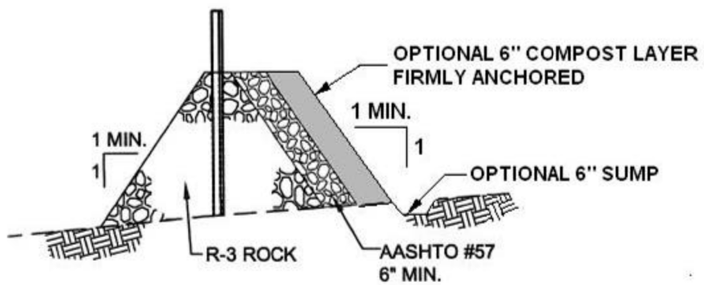
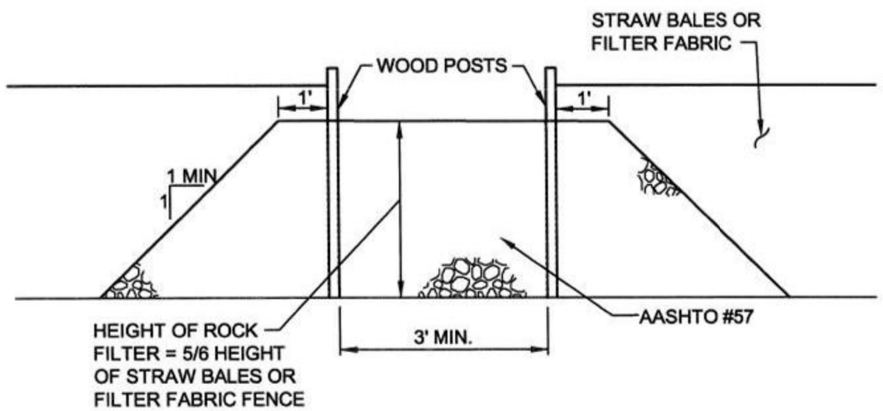
2 April 2026 9:05 AM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	S04
PWD TRACKING NUMBER: FY26-PAER-8386-01	

STANDARD CONSTRUCTION DETAIL # 4-6
Rock Filter Outlet



OUTLET CROSS-SECTION



UP-SLOPE FACE

PA DEP

A rock filter outlet shall be installed where failure of a silt fence or straw bale barrier has occurred due to concentrated flow. Anchored compost layer shall be used on upslope face in HQ and EV watersheds.

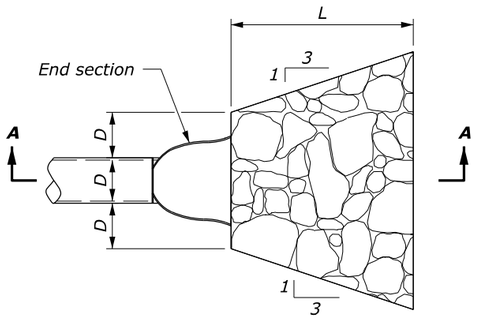
Sediment shall be removed when accumulations reach 1/3 the height of the outlet.

NO SCALE

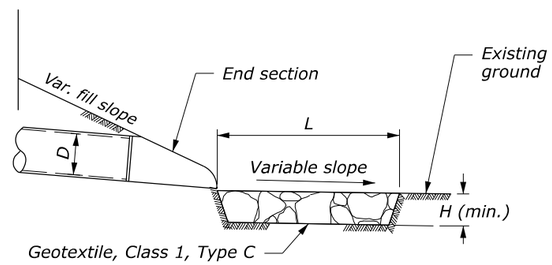
U.S. DEPARTMENT OF TRANSPORTATION, FHWA OFFICE OF FEDERAL LANDS HIGHWAY	EFLHD DETAIL E157-A
ROCK FILTER OUTLET	SPECIFICATION FP-14

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\Std-Det\S04_E157-A.dgn [PA Rock Filter Outlet]
2 April 2026 7:39 AM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	S05
PWD TRACKING NUMBER: FY26-PAER-8386-01	

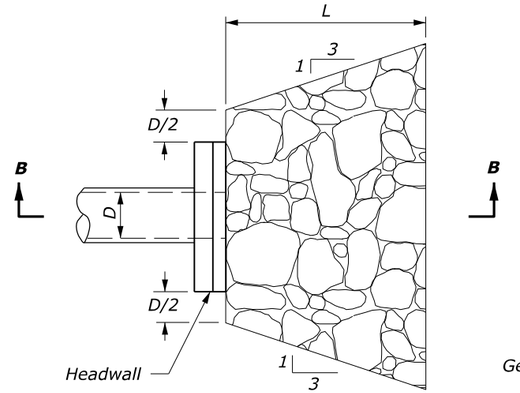


PLAN



SECTION A-A

CULVERT WITH END SECTION



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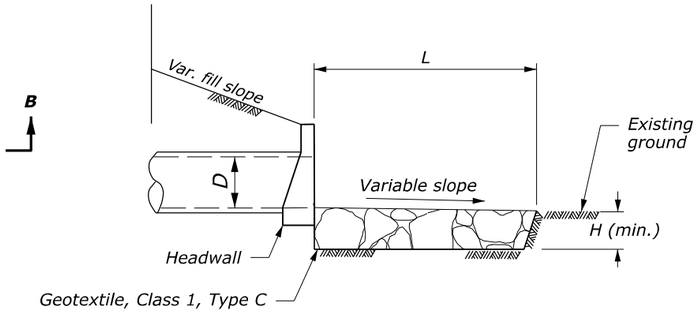
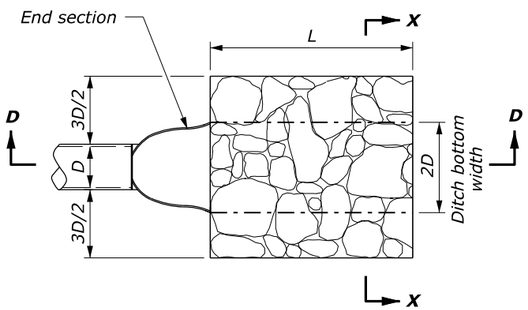


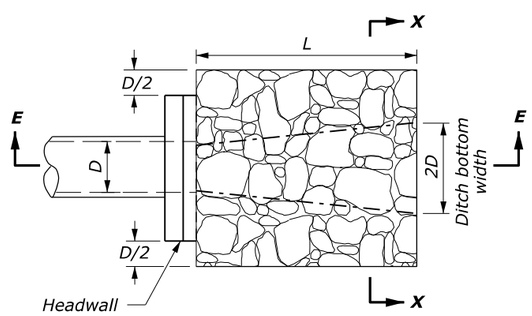
SECTION B-B

CULVERT WITH HEADWALL

PROTECTIVE APRON AT CULVERT OUTLET WITHOUT DITCH



PLAN



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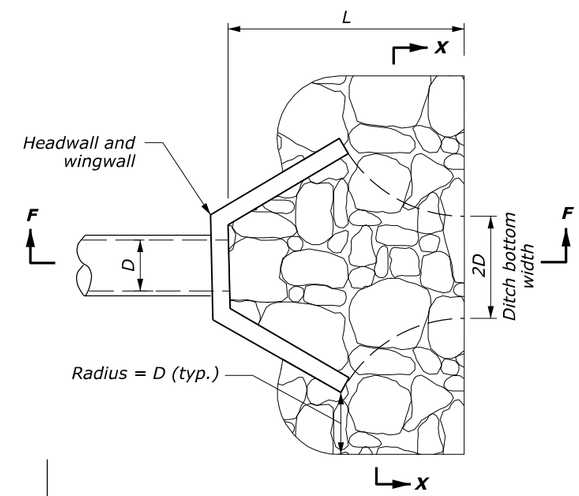

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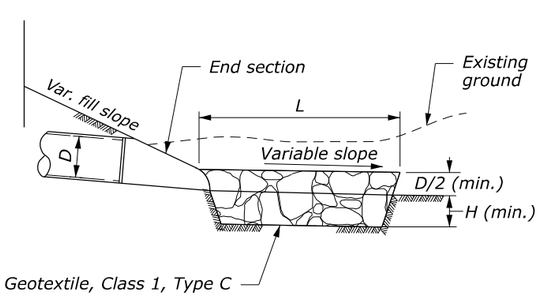
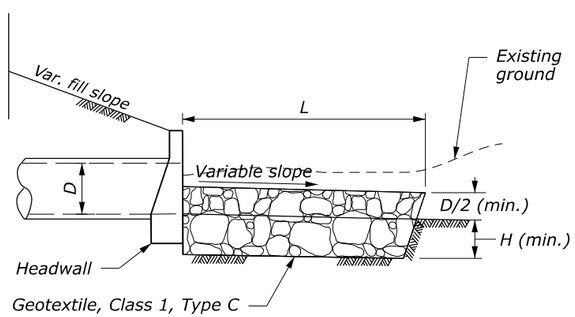


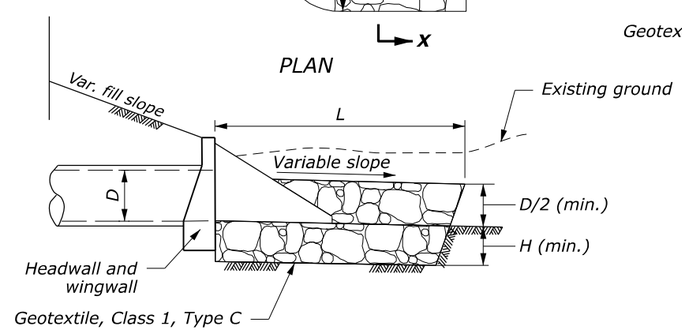
SECTION D-D

CULVERT WITH END SECTION



SECTION E-E

CULVERT WITH HEADWALL

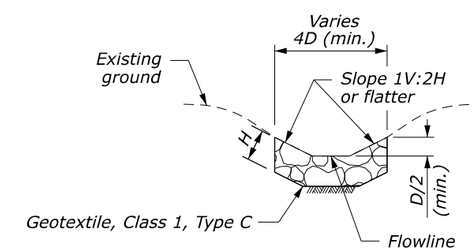


SECTION F-F

CULVERT WITH HEADWALL AND WINGWALL

NOTES:

1. Use for aprons serving culverts with slopes of less than 10%.
2. For arch or elliptical pipes, use equivalent diameter for (D) dimension.
3. See Sheet 2 of 2 for dimensions and estimated quantities.



SECTION X-X

PROTECTIVE APRON AT CULVERT OUTLET WITH DITCH

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA
OFFICE OF FEDERAL LANDS HIGHWAY

PLACED RIPRAP AT CULVERT OUTLETS
Sheet 1 of 2

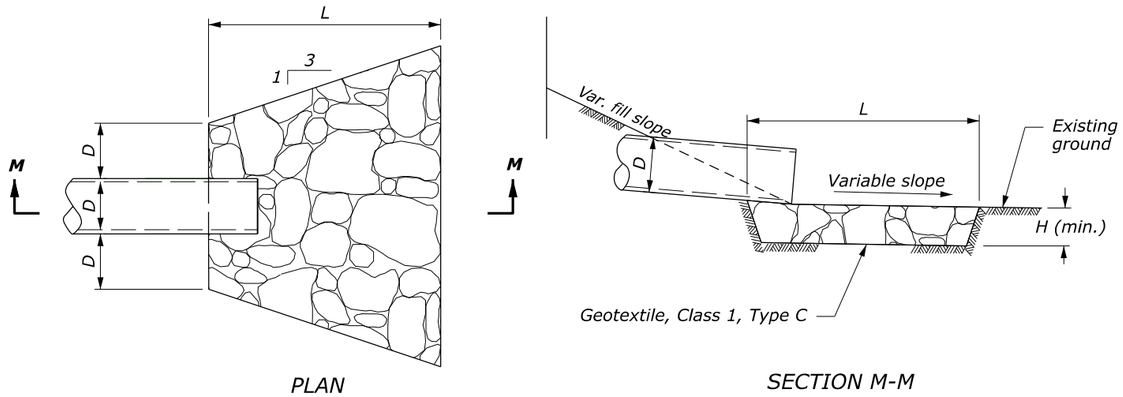
EFLHD DETAIL
E251-01

SPECIFICATION
FP-24, FP-14

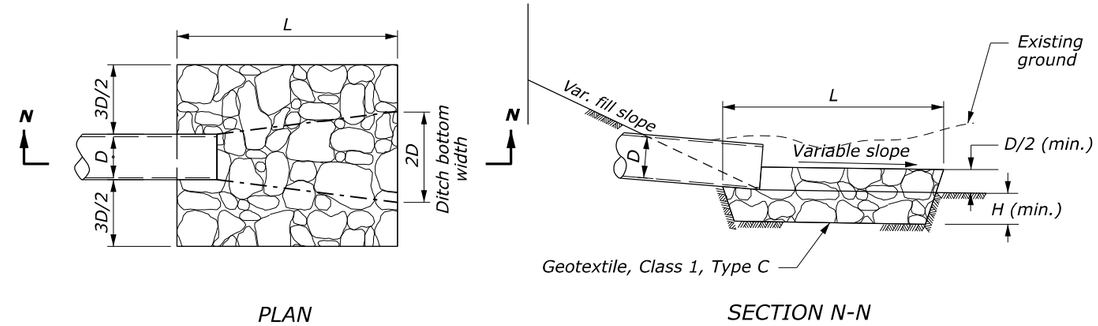
APPROVED FOR USE
05/2024

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\Std-Det\S05-06_E251-01.dgn [Sheet 1 of 2]
2 April 2026 7:39 AM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	S06
PWD TRACKING NUMBER: FY26-PAER-8386-01	



CULVERT OUTLET WITHOUT DITCH



CULVERT OUTLET WITH DITCH

PROTECTIVE APRON AT CULVERT OUTLET WITH NO END TREATMENT

PROTECTIVE APRON DIMENSIONS AND ESTIMATED QUANTITIES

					OUTLET WITHOUT DITCH		OUTLET WITH DITCH	
	CULVERT SIZE (D) INCH	RIPRAP CLASS	LENGTH OF APRON (L) FT	DEPTH OF APRON (H) FT	ESTIMATED RIPRAP QUANTITY CUYD	ESTIMATED GEOTEXTILE QUANTITY SQYD	ESTIMATED RIPRAP QUANTITY CUYD	ESTIMATED GEOTEXTILE QUANTITY SQYD
WITH END SECTION	12	2	4	1.5	1	5	0.9	4
	18	2	6	1.5	2.2	9	2	8
	24	2	8	1.5	3.9	13	3.6	12
	30	3	12.5	2	10.8	27	9.3	24
	36	3	15	2	15.6	37	13.3	32
	42	4	21	2.5	34	63	27.2	52
	48	4	24	2.5	44.4	78	35.6	65
WITH HEADWALL	12	2	4	1.5	1.6	6	1.1	5
	18	2	6	1.5	3	10	2	8
	24	2	8	1.5	5.3	16	3.6	12
	30	3	12.5	2	15	32	9.3	24
	36	3	15	2	21.7	43	13.3	32
	42	4	21	2.5	47.6	73	27.2	52
	48	4	24	2.5	62.2	91	35.6	65
WITH HEADWALL AND WINGWALL	12	2	4	1.5	1.6	6	1.1	6.3
	18	2	6	1.5	3	10	2.5	11.1
	24	2	8	1.5	5.3	16	4.5	17
	30	3	12.5	2	15	32	11.6	32
	36	3	15	2	21.7	43	16.7	42.6
	42	4	21	2.5	47.6	73	34.1	68.4
	48	4	24	2.5	62.2	91	44.5	84.9
WITH NO END TREATMENT	12	2	6	1.5	1.7	7	1.3	6
	18	2	8	1.5	3.2	12	2.7	10
	24	2	10	1.5	5.2	17	4.4	15
	30	3	14.5	2	13.2	32	10.7	27
	36	3	17	2	18.5	42	15.1	36
	42	4	23	2.5	38.7	70	29.8	56
	48	4	26	2.5	49.8	86	38.5	70

NOTES:

1. Use for aprons serving culverts with slopes of less than 10%.
2. For arch or elliptical pipes, use equivalent diameter for (D) dimension.

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA
OFFICE OF FEDERAL LANDS HIGHWAY

PLACED RIPRAP AT CULVERT OUTLETS
Sheet 2 of 2

EFLHD DETAIL
E251-01

SPECIFICATION
FP-24, FP-14

APPROVED FOR USE
05/2024

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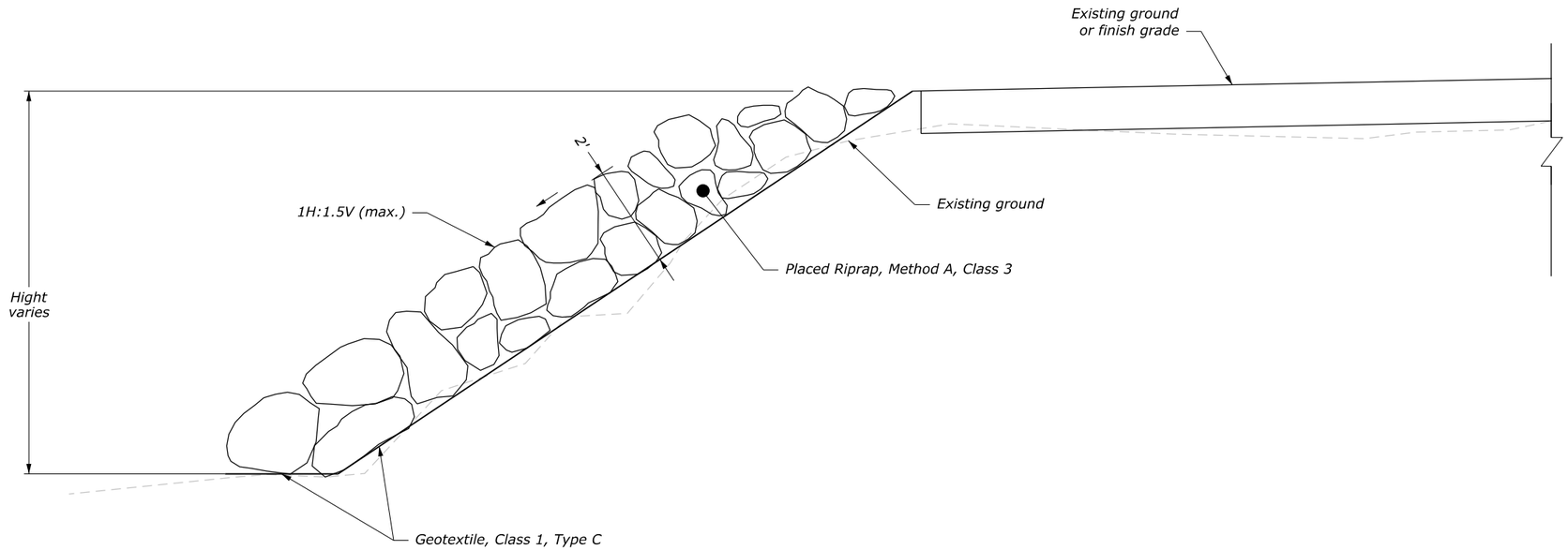
2 April 2026 7:39 AM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	S07
PWD TRACKING NUMBER: FY26-PAER-8386-01	

NOTES:

1. *Place riprap where shown in the plans and as directed by the CO. Blend with the channel rock in stream reconstruction.*
2. *Selectively place the largest riprap at the lower elevations.*
3. *When bedrock is encountered, place riprap above the bedrock only.*



RIPRAP SLOPE PROTECTION

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA OFFICE OF FEDERAL LANDS HIGHWAY	EFLHD DETAIL E251-A
LOOSE RIPRAP	SPECIFICATION FP-24, FP-14

9 April 2026 12:38 PM M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\Std-Det\S07-st251-A_detail.dgn [Sheet]

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	S08
PWD TRACKING NUMBER: FY26-PAER-8386-01	

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

NOTES:

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 providing annular corrugation pipe.
4. For flexible pavement and aggregate surface roadways, measure minimum cover from the top of the pipe culvert to the bottom of the roadway subgrade. For rigid pavement, measure minimum cover from the top of the pipe culvert to the top of the pavement. For all roadway surface types, measure maximum fill height from the top of the pipe culvert to the top of the 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, FHWA
OFFICE OF FEDERAL LANDS HIGHWAY

METAL PIPE CULVERT

EFLHD DETAIL
E602-01

SPECIFICATION
FP-24, FP-14

APPROVED FOR USE
05/2024

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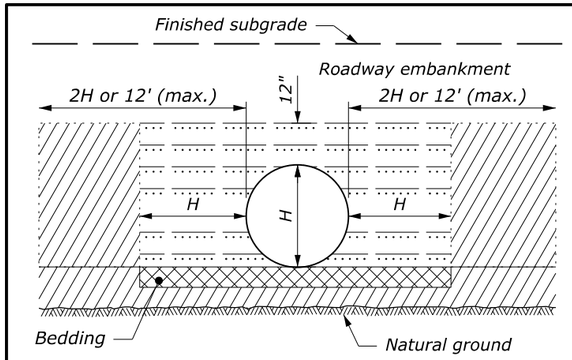
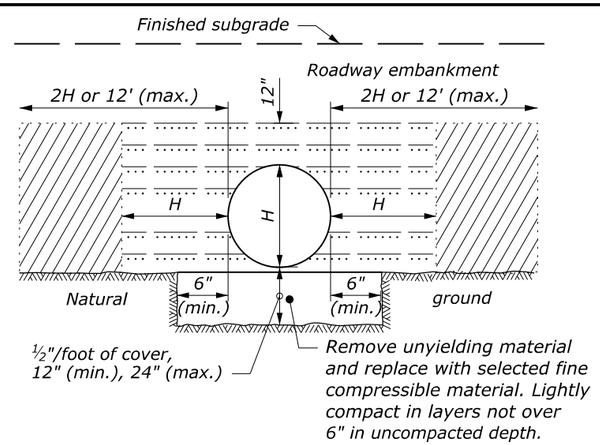
PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	S09
PWD TRACKING NUMBER: FY26-PAER-8386-01	

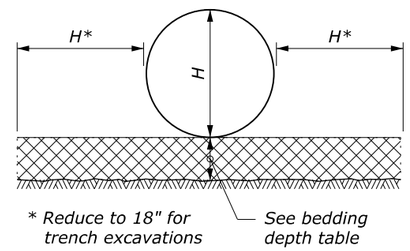


ABOVE NATURAL GROUND



ON UNYIELDING MATERIAL

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



PIPE BEDDING

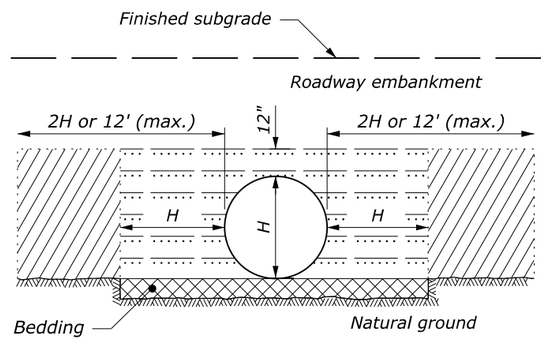
NOTE:

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.

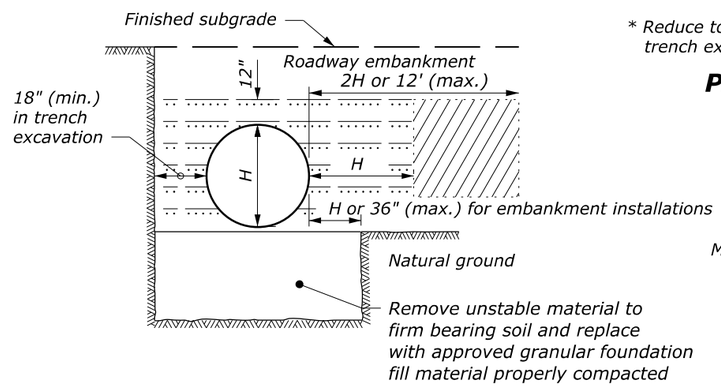
2. H equals the diameter of all round pipe culverts or the rise dimension of all pipe arch culverts.

3. See Section 704 for bedding and backfill requirements.

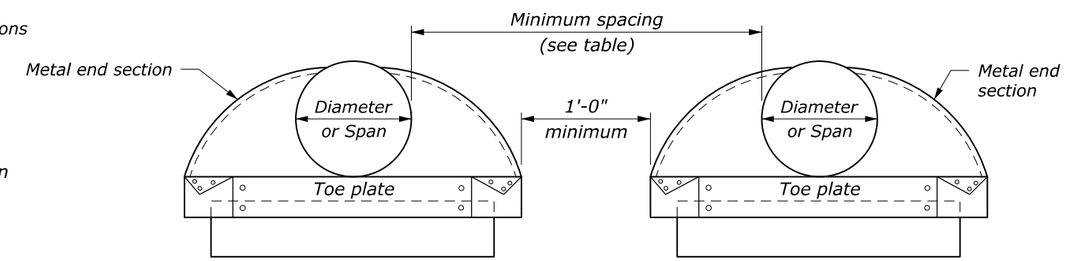
MINIMUM SPACING	
DIAMETER or SPAN	SPACING
UP to 48"	24"
48" and UP	Half diameter or span or 36", whichever is less



ON NATURAL GROUND

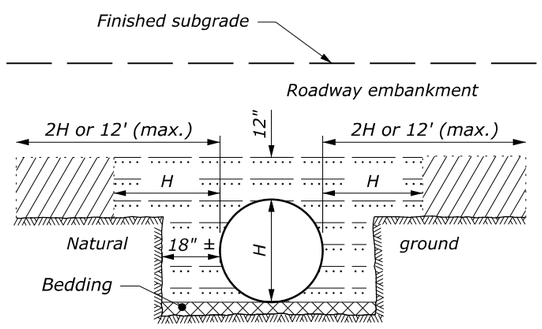


ON UNSTABLE MATERIAL

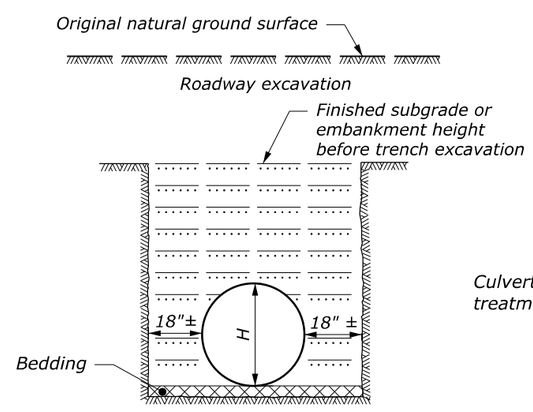


ELEVATION

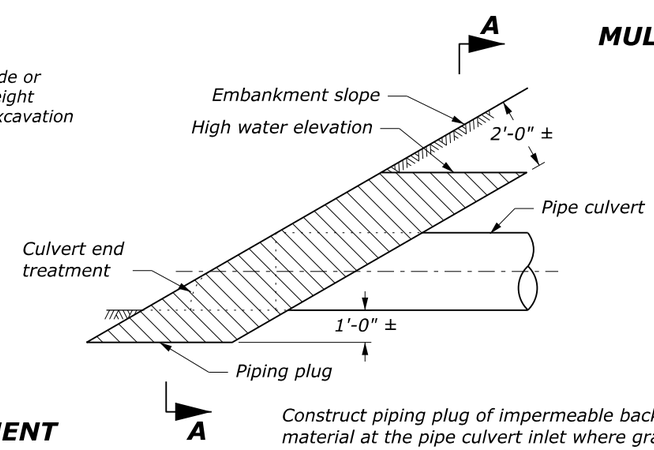
MULTIPLE PIPE INSTALLATION

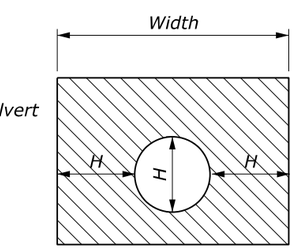


ABOVE AND BELOW NATURAL GROUND



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

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; or flowable backfill according to Section 614.
- Impermeable backfill material.

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA
OFFICE OF FEDERAL LANDS HIGHWAY

METAL AND PLASTIC PIPE CULVERT BEDDING

FLH STANDARD 602-3

SPECIFICATION FP-24

APPROVED FOR USE 1/2024

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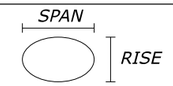
2 April 2026 7:40 AM

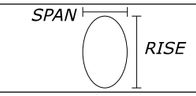
PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	S10
PWD TRACKING NUMBER: FY26-PAER-8386-01	

HORIZONTAL INSTALLATION



EQUIVALENT ROUND SIZE (INCH)	SPAN X RISE (INCH)	MAX. HEIGHT OF COVER IN FEET	
		1 - 13	14 - 21
		HE - III	HE - I V
18	23 x 14	METHOD "A" BEDDING	METHOD "A" BEDDING
24	30 x 19		
27	34 x 22		
30	38 x 24		
33	42 x 27		
36	45 x 29		
39	49 x 32		
42	53 x 34		
48	60 x 38		
54	68 x 43		
60	76 x 48		
66	83 x 53		
72	91 x 58		
78	98 x 63		
84	106 x 68		

VERTICAL INSTALLATION



SPAN X RISE (INCH)	MAX. HEIGHT OF COVER IN FEET		
	1 - 13	14 - 21	22 - 29
	VE - III	VE - I V	VE - V
	METHOD "A" BEDDING	METHOD "A" BEDDING	METHOD "A" BEDDING
29 x 45			
32 x 49			
34 x 53			
38 x 60			
43 x 68			
48 x 76			
53 x 83			
58 x 91			
63 x 98			
68 x 106			

ELLIPTICAL CONCRETE PIPE COVER TABLES FOR H-20 LIVE LOAD

NOTES:

1. Cover heights indicated in the Tables are for finished construction.
2. To protect pipe during construction, ensure the minimum heights of cover prior to allowing construction traffic to cross installation are ½ of the span or 3 feet, whichever is greater. Extend cover the full length of the pipe. Extend the approach fill ramp to a minimum of 10 times the span plus 3 feet on each side of the pipe or to the intersection with a cut.
3. Standard minimum finished height of cover for all pipes is ½ of the span or 2 feet, whichever is greater. In cases in which these cover heights cannot be achieved, an absolute minimum finished cover height of 12 inches will be allowed only if all possible means to obtain the standard height have been exhausted. Ensure minimum finished height of cover for pipes under entrances and median crossovers is 9 inches.
4. For flexible pavement and aggregate surface roadways, measure minimum cover from the top of the pipe culvert to the bottom of the roadway subgrade. For rigid pavement measure minimum cover from the top of the pipe culvert to the top of the pavement. For all roadway surface types, measure maximum fill height from the top of the pipe culvert to the top of the pavement.

ADOPTED FROM:
VIRGINIA DEPARTMENT OF TRANSPORTATION
STANDARD PC-1, PAGE 107.06

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA
OFFICE OF FEDERAL LANDS HIGHWAY

ELLIPTICAL CONCRETE PIPE

EFLHD DETAIL
E602-08

SPECIFICATION
FP-24, FP-14

APPROVED FOR USE
05/2024

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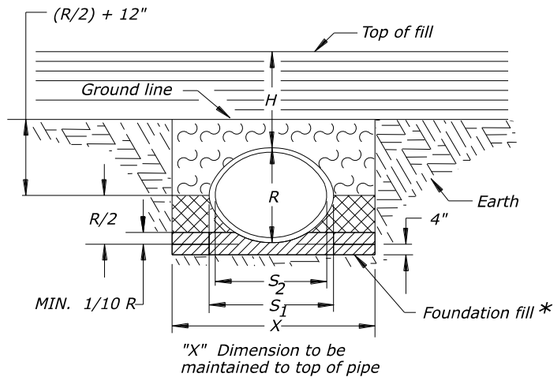
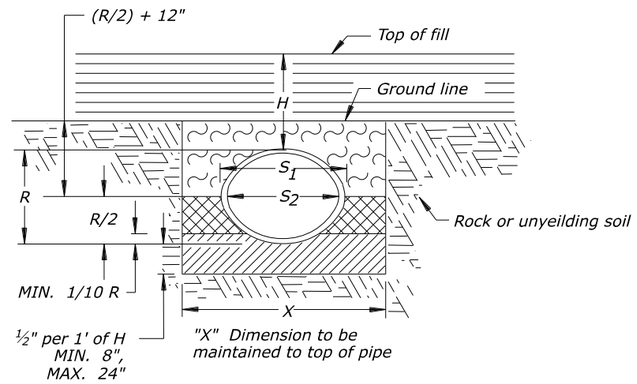
PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	S11
PWD TRACKING NUMBER: FY26-PAER-8386-01	

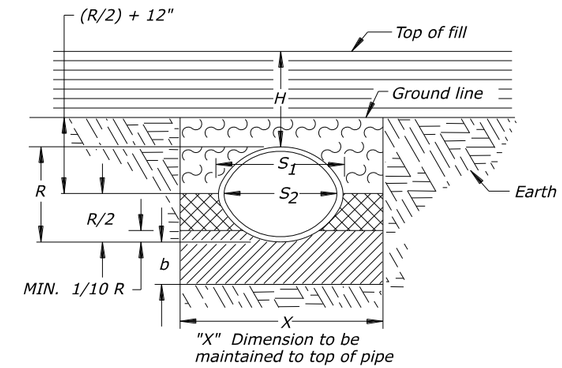
NO PROJECTION OF PIPE ABOVE GROUND LINE



NORMAL EARTH FOUNDATION

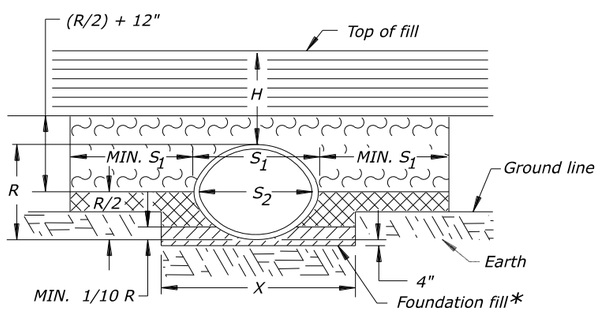


ROCK FOUNDATION

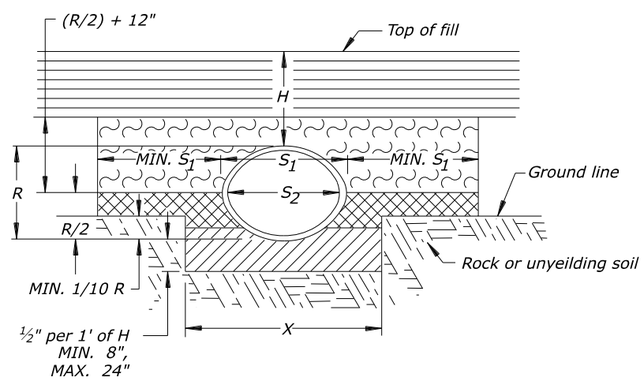


FOUNDATION SOFT, YIELDING, OR OTHERWISE UNSUITABLE MATERIAL

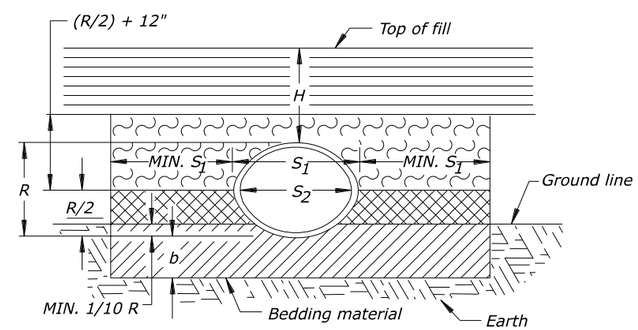
PIPE PROJECTION ABOVE GROUND LINE



NORMAL EARTH FOUNDATION



ROCK FOUNDATION



FOUNDATION SOFT, YIELDING, OR OTHERWISE UNSUITABLE MATERIAL

Culverts less than S_1 = 36"
$X = S_2 + 24"$

Culverts where S_1 = 36" and over
$X = S_2 + 36"$

Use Method "A" pipe bedding as follows unless otherwise noted in the plans:

Rigid Pipe
When H is less than or equal to 30'

Flexible Pipe
As shown on Tables.

* May be eliminated under entrance pipe where directed.

H = Height of cover measured from top of drainage structure to finished grade.

S_1 = Outside span of pipe.

S_2 = Inside span of pipe.

R = Outside rise of pipe.

b = Depth as shown in the plans or to firm bearing soil.

Foundation fill material placed according to Subsection 209.07.

Backfill material placed according to Subsection 209.09.

Suitable roadway excavation or unclassified borrow material placed according to Subsection 209.09.

Embankment.

NO SCALE

ADOPTED FROM:
VIRGINIA DEPARTMENT OF TRANSPORTATION
STANDARD PB-1, PAGE 107.02

U.S. DEPARTMENT OF TRANSPORTATION, FHWA
OFFICE OF FEDERAL LANDS HIGHWAY

ELLIPTICAL CONCRETE PIPE CULVERT INSTALLATION

EFLHD DETAIL
E602-09

SPECIFICATION
FP-24, FP-14

APPROVED FOR USE
05/2024

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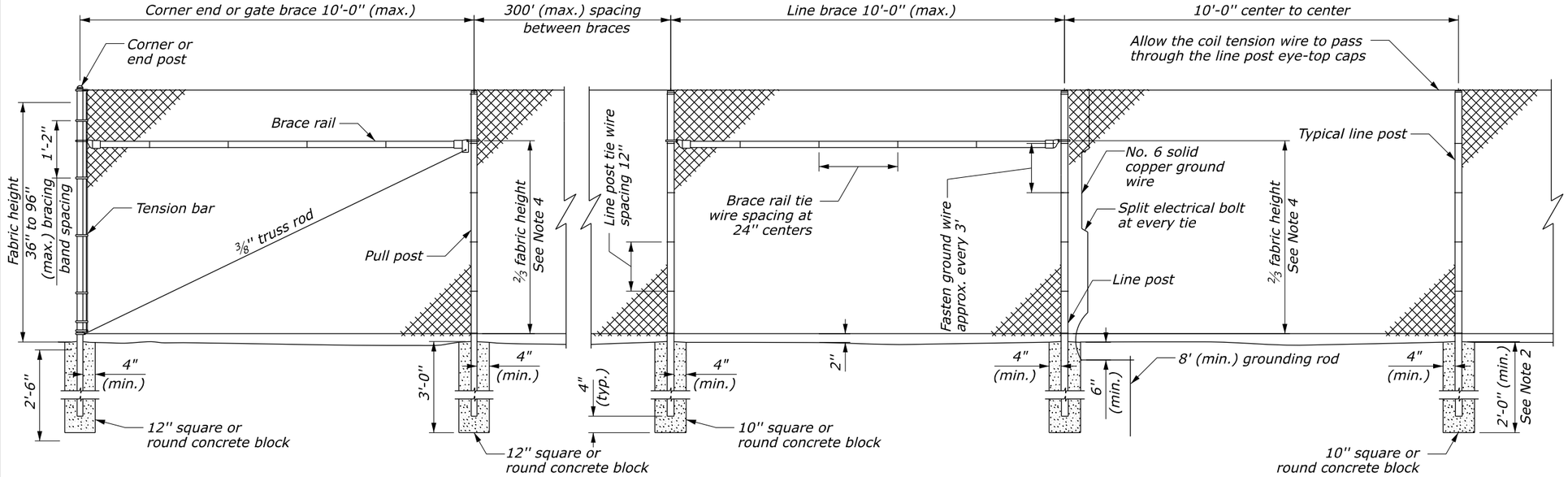
PWD TRACKING NUMBER: FY26-PAER-8386-01	



NOTES:

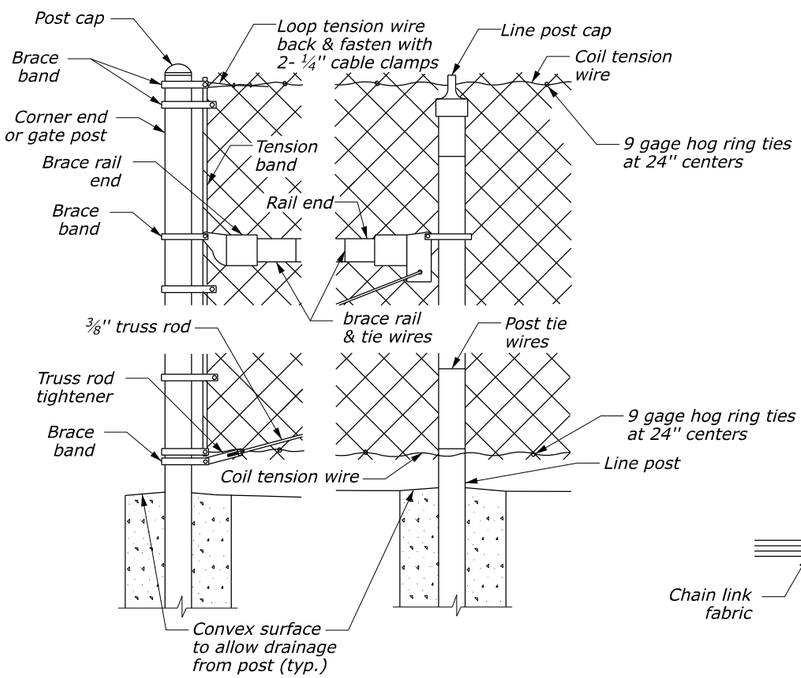
1. Use Type 1 requirements from chain link fence table unless otherwise specified.
2. Set all post in concrete. Set corner, end, and pull posts to the dimensions shown. Set line posts to a minimum depth of 24 inches in concrete. Increase depth by 3 inches for each addtional foot of fence height over 4 feet.
3. Install braces on all terminals on fences without a top rail. No braces are required on fabric 6 feet in height or less where a top rail is specified. Install braces where fabric is over 6 feet in height. Where a top rail is used, attach the brace at the halfway point of the terminal post above grade and, where the rail is omitted, at the two-thirds point above grade. Do not install top rail unless specified in the Special Contract Requirements.
4. Adjust the post top elevations to provide a smooth visual fence profile. Install corner posts at horizontal breaks in the fence at 15° or more.
5. If alternate steel posts are used, provide fastening bands, caps, brace rail, rail ends, and truss rod attaching hardware compatible with the post sizes ans styles selected.
6. Provide fence fabric with a 2-inch mesh. Use 11-gage wire in fabric heights of 48 inches or less and 9-gage wire in fabric heights greater than 48 inches. Provide Class D coating when zinc-coated steel fence frabric is provided. Knuckle both selvages on fabric less than 72 inches high. For fabric 72 inches or higher, knuckle one selvage and twist the other.
7. See Sheet 2 of 2 of hardware and gate requirements.

CHAIN LINK FENCE

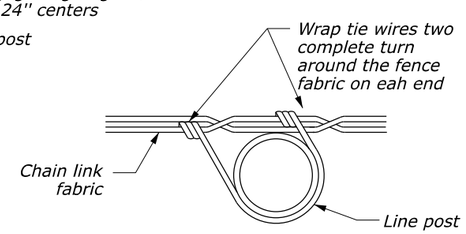
CHAIN LINK FENCE

POST SIZE AND WEIGHT TABLE

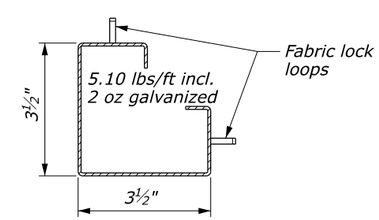
DESCRIPTION	FENCE TYPE	ROUND PIPE				HOT ROLLED SHAPE				ROLLED FORMED	
		Steel		Aluminum		Steel		Steel		Steel	
		Minimum yield strength Psi.									
		25,000		25,000		50,000		45,000		45,000	
		Size and mass									
		dia. inch	mass lbs/ft	dia. inch	mass lbs/ft	dia. inch	mass lbs/ft	dia. inch	mass lbs/ft	dia. inch	mass lbs/ft
Brace rail & top rail	Type 1	1.66	2.27	1.660	0.786	1.66	1.40	------	------	1¼ x 1⅝	1.40
	Type 2	1.66	1.82	------	------	1.66	1.40	------	------	1¼ x 1⅝	1.40
Line post	Type 1	2.375	3.65	2.375	1.264	2.375	3.12	2¼ x 1 45/64	3.26	2¼ x 1⅝	2.70
	Type 2	2.375	2.96	------	------	2.375	2.31	------	------	1⅞ x 1⅝	2.76
End, corner & pull post	Type 1	2.875	5.79	2.875	2.004	2.875	4.64	------	------	3½ x 3½	5.10
	Type 2	2.875	4.69	------	------	2.875	3.25	------	------	3½ x 3½	5.10



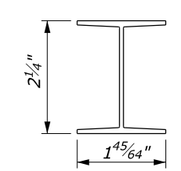
CHAIN LINK DETAIL



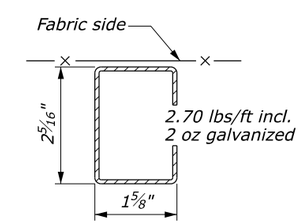
CHAIN LINK FENCE TIE DETAIL



END OR CORNER POST

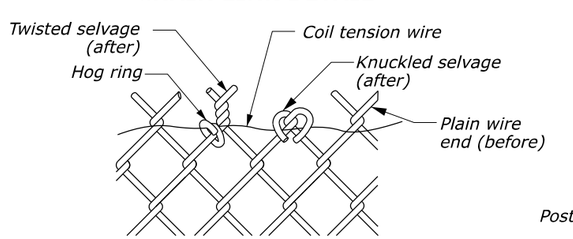


LINE POST

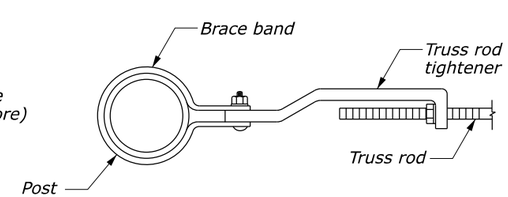


LINE POST

ALTERNATE STEEL POST & BRACE SECTIONS

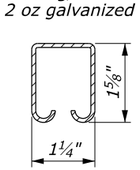


WIRE SELVAGE DETAIL



TRUSS ROD TIGHTENER DETAIL

2.08 kg/m incl.
2 oz galvanized



TOP & BRACE RAIL

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA
OFFICE OF FEDERAL LANDS HIGHWAY

CHAIN LINK FENCE AND GATE
Sheet 1 of 2

EFLHD DETAIL
E619-09

SPECIFICATION
FP-24

APPROVED FOR USE
06/2024

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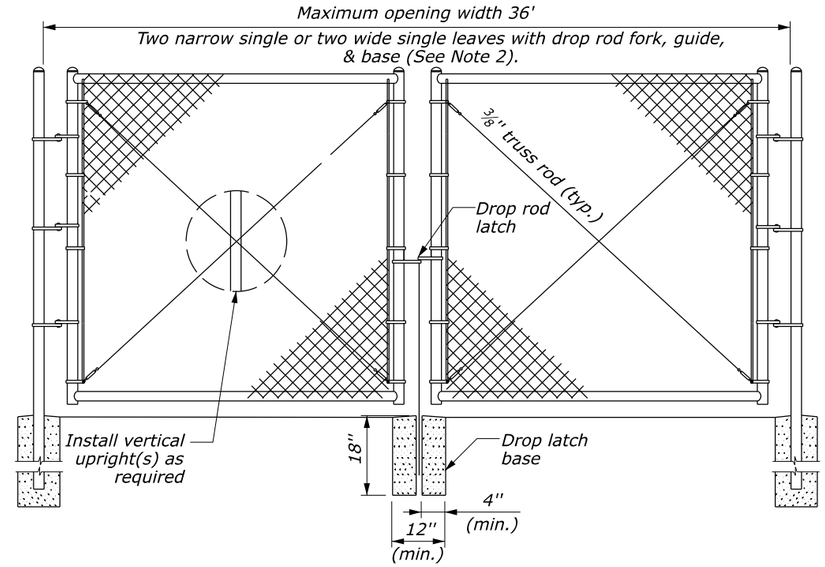
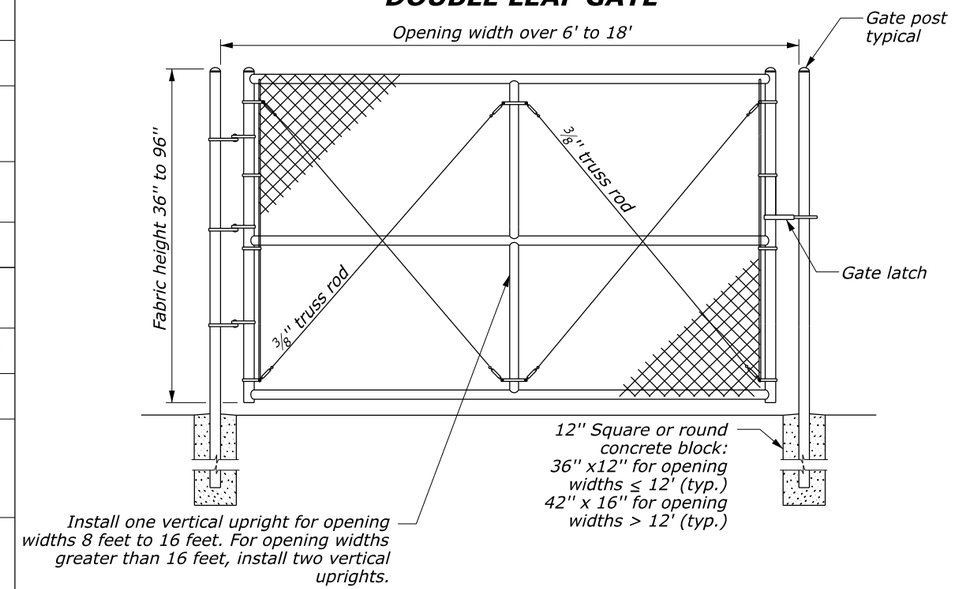
PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	S13
PWD TRACKING NUMBER: FY26-PAER-8386-01	

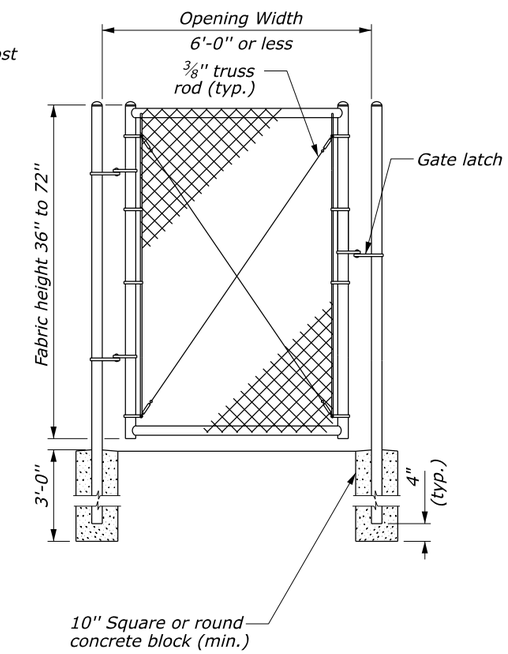
HARDWARE ITEM DESCRIPTION	STANDARD REQUIREMENTS
Brace rail and top rail	See Post Size and Weight Table on Sheet 1 of 2
Line post	See Post Size and Weight Table on Sheet 1 of 2
Corner; end and pull posts	See Post Size and Weight Table on Sheet 1 of 2
Post cap	Cast non-ferrous alloy or galvanized pressed steel cap must fit snugly on post and gate topa
Line post cap	Galvanized pressed steel minimum " 3/32" thickness or galvanized malleable ferrous alloy
Tension band	Minimum 3/32" x 5/16" galvanized steel
Brace band	Minimum 3/32" x 5/16" galvanized steel
Band bolt	Minimum 5/16" x 1¼" galvanized carriage bolt, (Lock washer & flat washer for each band)
Rail end	Galvanized pressed steel or galvanized malleable ferrous alloy minimum..." 3/8" thickness on back bolting appendage
Brace rail end	Galvanized pressed steel or galvanized malleable ferrous alloy minimum" 3/8" thickness on back bolting appendage
Truss rod tightener	Minimum ¼" formed galvanized steel
Truss rod	3/8" galvanized, NC threaded rod, lock washer, & flat washer with two 90° bends opposite of threaded end
Top rail sleeve	Galvanized steel 0.051" minimum thickness by 6" minimum length
Tension bar	Minimum 3/16" x ¾" galvanized steel
Fence fabric	2" diamond mesh fabric, See Note 6 on Sheet 1 of 2
Tie wires	Minimum 9 gage aluminum with one hooked end
Coil tension wire	0.177" minimum diameter metalic coated wire
Gate latch	Minimum ⅛" galvanized pressed steel or malleable ferrous alloy. 1 latch per each single gate with bent minimum 3/8" attachment bolt, washer & nut.
Frame hinge	Minimum ⅛" galvanized pressed steel with 2 - 3/8" U-bolts, lockwasher & nuts per hinge. Use 2 hinges per gate leaf up to 8' in width and 3 hinges per gate leaf widths greater than 8'.
Drop rod latch & guide	Minimum ⅛" galvanized presed steel. Drop rod guide includes 3/8" x 3" carriage bolt with lock washer & nut. Weld drop rod fork to rod & coat with an approved zinc rich coating.



DOUBLE LEAF GATE



WIDE SINGLE LEAF GATE



NARROW SINGLE LEAF GATE

NOTES:

1. Reinforce the gate frame corners with a malleable iron or pressed steel fitting designed for the purpose or shop weld the corners. Grind smooth all welds and coat each gate with the necessary hinges, latch, and drop rod locking device design for the type of gate posts and used on the project. Provide positive type latching devices with provisions for pad locking at all gates. Provide keepers to retain the gate in the open position.
2. Use alternate gate frames constructed of steel section, other than pipe, as approved.
3. The design of the chain link hardware may vary from the details shown. Ensure all hardware and materials used in a single installation are uniform and compatible.

CHAIN LINK GATE

POST AND FRAME SIZE AND MASS TABLE

GATE LEAF WIDTHS		ROUND PIPE					
		Steel		Aluminum		Steel	
		Minimum yield strength Psi.					
		25,000		25,000		50,000	
		Size and mass					
		dia. inch	lbs/ft (min.)	dia. inch	lbs/ft (min.)	dia. inch	lbs/ft (min.)
6 feet or less	Gate	2.875	4.64	2.875	1.94	2.875	4.64
Over 6 feet to 12 feet	post	4.000	8.65	4.000	2.99	4.000	6.56
Over 12 feet to 18 feet	size	6.625	18.02	-------	-------	-------	-------
Outside frame member	frame	1.900	2.28	1.900	1.900	1.900	2.28
Interior bracing member	size	1.660	1.83	1.900	1.900	1.660	1.84

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA
OFFICE OF FEDERAL LANDS HIGHWAY

CHAIN LINK FENCE AND GATE
Sheet 2 of 2

EFLHD DETAIL
E619-09

SPECIFICATION
FP-24

APPROVED FOR USE
06/2024

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PROJECT	SHEET NUMBER
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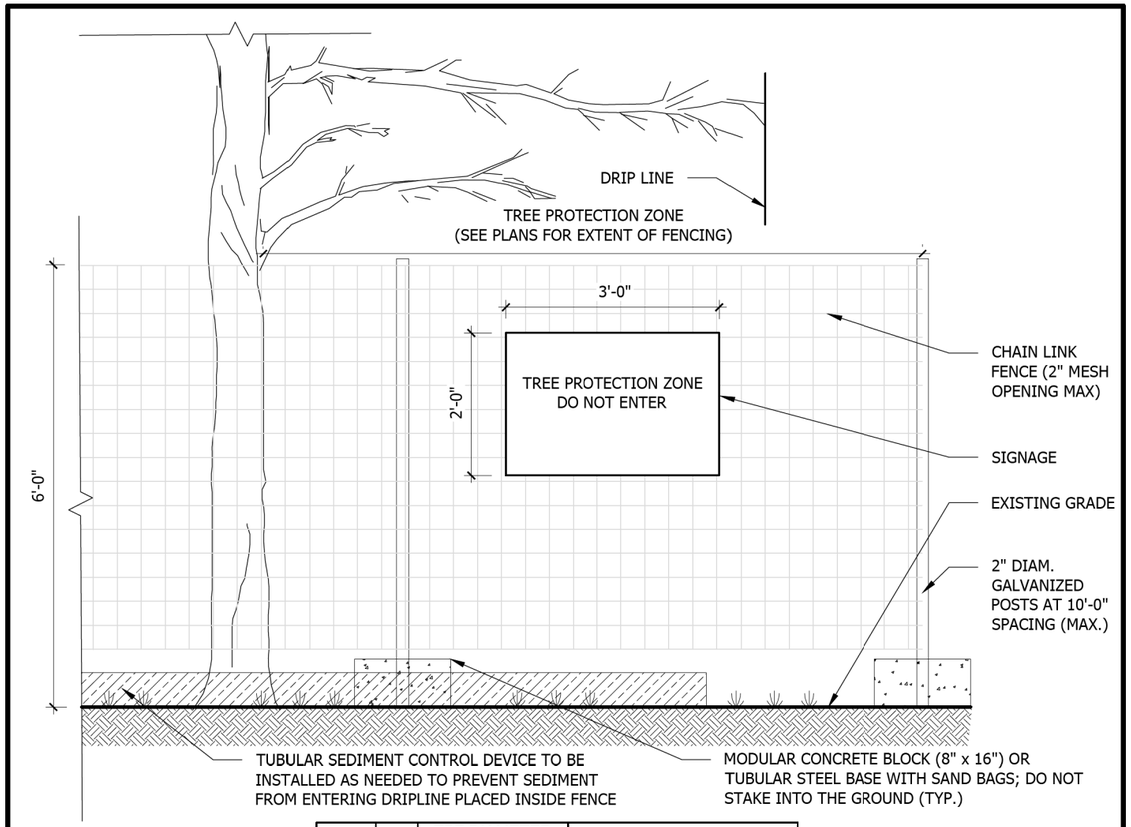
PWD TRACKING NUMBER: FY26-PAER-8386-01	



TREE NO.	DBH (IN.)	TPZ DIAMETER (FT.) SEE NOTE 6	FENCE PANELS REQUIRED

NOTES:

1. THE TREE PROTECTION FENCING IS TO BE INSTALLED AND REMAIN IN PLACE THROUGHOUT THE CONSTRUCTION PERIOD TO PROTECT THE CRITICAL ROOT ZONES (CRZs) AND PROHIBITIVE ROOT ZONES (PRZs), IN ACCORDANCE WITH SPECIFICATION SECTION 01535. REFER TO EROSION & SEDIMENT CONTROL SHEETS FOR TREE PROTECTION ZONE. ONE HEAVY DUTY WARNING SIGN SHALL BE PROMINENTLY DISPLAYED ON EACH TREE PROTECTION FENCE ENCLOSURE.
2. NO WORK IS TO OCCUR WITHIN THE TPZ, UNLESS OTHERWISE APPROVED BY THE PROJECT MANAGER. IF WORK IS TO OCCUR WITHIN THE TPZ, EXERCISE EXTREME CAUTION AND CARE UNDER THE SUPERVISION OF AN ISA CERTIFIED ARBORIST. HAND TOOLS SHOULD ONLY BE USED IF WORKING WITHIN THE TPZ. NOTIFY OWNER PRIOR TO COMMENCEMENT OF WORK WITHIN THE TPZ.
3. AVOID DAMAGING EXISTING TREES. DAMAGE INCLUDES BUT IS NOT LIMITED TO: CUTTING, BREAKING, SKINNING, OR COMPACTING SOIL AROUND ROOTS, SKINNING AND BRUISING OF BARK AND BREAKING OF BRANCHES AND LIMBS.
4. ACTIVITIES PROHIBITED WITHIN THE TPZ INCLUDE BUT ARE NOT LIMITED TO: EXCAVATION, DUMPING OF CONSTRUCTION WASTE, STORAGE OF MATERIALS, STORAGE OF VEHICLES AND EQUIPMENT, TRENCHING, CHANGING SOIL GRADE, COMPACTING SOIL WITH VEHICLE OR EQUIPMENT TRAFFIC, INSTALLING PAVEMENT OF ANY KIND, ATTACHING ANYTHING TO TREES USING NAILS, SCREWS, AND/OR SPIKES, OR CAUSING INJURY BY FIRE OR EXCESSIVE HEAT.
5. ANY REMOVAL OR PRUNING OF TREE BRANCHES, LIMBS, OR ROOTS MUST BE CONDUCTED BY AN ISA CERTIFIED ARBORIST. IF ANY TREE IS DAMAGED WITHIN THE TPZ, CONTACT THE PROJECT ARBORIST AND PROJECT MANAGER IMMEDIATELY.
6. THE TPZ SHALL BE DELINEATED BY ASSUMING 1 FOOT OF TPZ RADIUS FOR EACH INCH OF DIAMETER AT BREAST HEIGHT (DBH). THEREFORE A 10-INCH DBH TREE SHALL HAVE A TPZ DIAMETER OF 20 FEET.

PHILADELPHIA WATER DEPARTMENT
1101 MARKET ST, 4TH FLOOR
PHILADELPHIA, PA, 19107

CONSTRUCTION TREE PROTECTION - FENCING

VS.	DATE	INITIALS	REASON
1	09/01/2016		
2	06/01/2018	TJL	REVISED NOTATIONS & LANGUAGE

SCALE: N.T.S.

DRAWING NUMBER: C-46

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA
OFFICE OF FEDERAL LANDS HIGHWAY

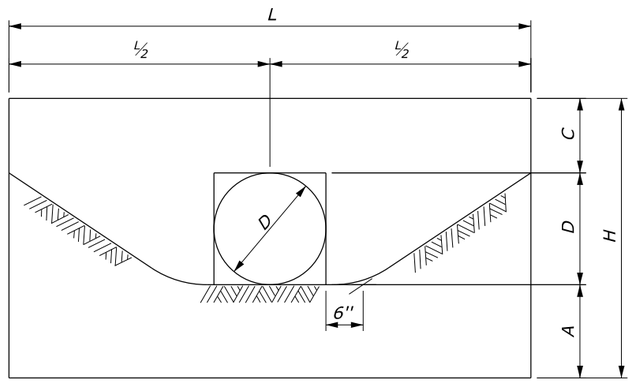
TREE PROTECTION FENCING

EFLHD DETAIL E619-A

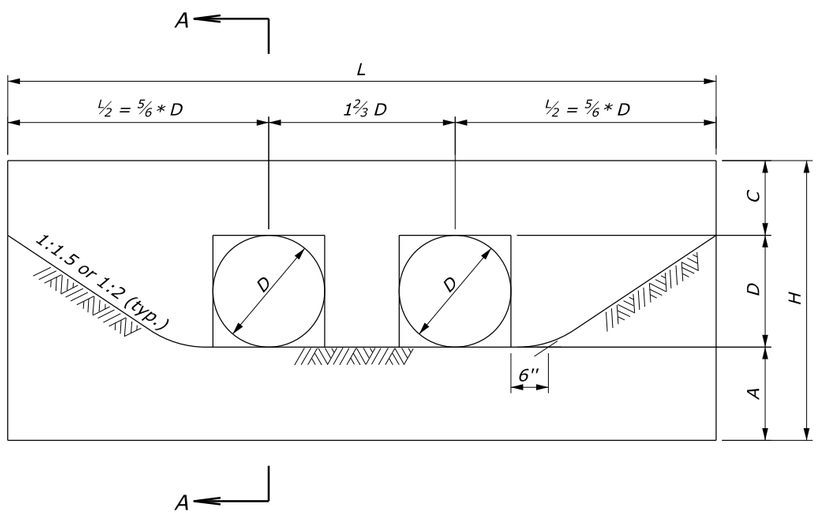
SPECIFICATION FP-14

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\Std-Det\S14_E619-A.dgn [PA Rock Filter Outlet]
2 April 2026 8:11 AM

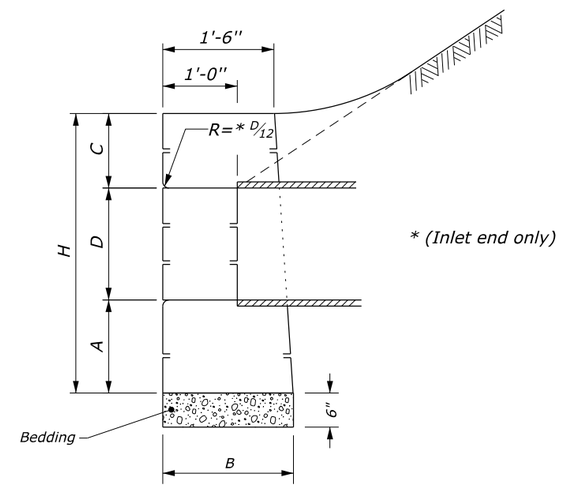
PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	S15
PWD TRACKING NUMBER: FY26-PAER-8386-01	



SINGLE



DOUBLE



SECTION A-A

NOTES:

1. All headwalls are oriented parallel to the roadway centerline unless otherwise indicated on the plans or by the CO.
2. When pipes are on skew, adapt and lengthen headwalls as directed.
3. Quantities shown in the Table are for one headwall with pipe at right angles.
4. Construct headwalls using dimensions shown under values for 1½ :1 slope, unless directed otherwise.

	VALUES FOR 1½:1 SLOPES								VALUES FOR 2:1 SLOPES							
	SINGLE				DOUBLE				SINGLE				DOUBLE			
D (in.)	18"	24"	30"	36"	18"	24"	30"	36"	18"	24"	30"	36"	18"	24"	30"	36"
L or L'	7'-0"	10'-0"	13'-0"	16'-0"	9'-6"	13'-4"	17'-2"	21'-0"	8'-6"	12'-4"	16'-2"	20'-0"	11'-0"	15'-8"	20'-4"	25'-0"
H	3'-9"	4'-10"	5'-11"	7'-0"	3'-9"	4'-10"	5'-11"	7'-0"	3'-9"	4'-10"	5'-11"	7'-0"	3'-9"	4'-10"	5'-11"	7'-0"
B	1'-9"	2'-0"	2'-5"	2'-10"	1'-9"	2'-0"	2'-5"	2'-10"	1'-9"	2'-0"	2'-5"	2'-10"	1'-9"	2'-0"	2'-5"	2'-10"
A (min.)	1'-3"	1'-6"	1'-9"	2'-0"	1'-3"	1'-6"	1'-9"	2'-0"	1'-3"	1'-6"	1'-9"	2'-0"	1'-3"	1'-6"	1'-9"	2'-0"
C	1'-0"	1'-4"	1'-8"	2'-0"	1'-0"	1'-4"	1'-8"	2'-0"	1'-0"	1'-4"	1'-8"	2'-0"	1'-0"	1'-4"	1'-8"	2'-0"
Stone (CY)	1.45	2.87	5.14	8.28	1.89	3.66	6.47	10.37	1.78	3.60	6.50	10.53	2.22	4.39	7.83	12.62

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA
OFFICE OF FEDERAL LANDS HIGHWAY

STONE MASONRY HEADWALLS FOR SMALL PIPE CULVERTS

EFLHD DETAIL
E620-01

SPECIFICATION
FP-24, FP-14

APPROVED FOR USE
06/2024

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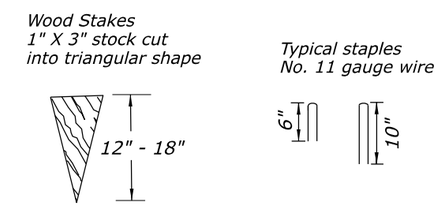
2 April 2026 8:11 AM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	S16
PWD TRACKING NUMBER: FY26-PAER-8386-01	

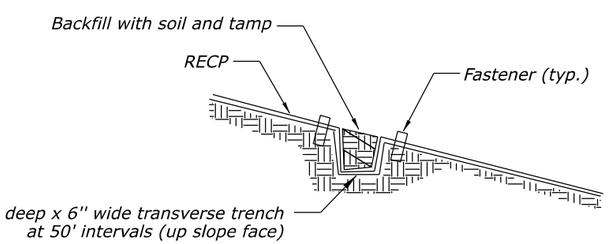
NOTES:

1. When required, place topsoil before installing RECP according to Section 624.
2. When required, apply turf establishment according to Section 625.
3. Apply seed and fertilizer as recommended by the manufacturer before placing RECP.

SLOPE STABILIZATION WITH RECP



DETAIL A
TYPICAL GROUND FASTENERS



SECTION A-A
EROSION STOP (CHECK SLOT)

INSTALLATION PROCEDURES:

Install Rolled Erosion Control Product (RECP) along the slopes as follows:

Step 1: Grade, smooth, and compact slope. Remove rocks, trash, and other material which will prevent the RECP from laying flush with the ground. Do not track slope face.

Step 2: Unroll and lay RECP out down slope face (in the direction of flow). Anchor at top of slope. Do not stretch RECP.

Step 3: Secure RECP with wood or metal fasteners. See Detail A.

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA OFFICE OF FEDERAL LANDS HIGHWAY	EFLHD DETAIL E629-01
SLOPE STABILIZATION WITH ROLLED EROSION CONTROL PRODUCT (RECP)	SPECIFICATION FP-24, FP-14
	APPROVED FOR USE 05/2024

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PROJECT	SHEET NUMBER
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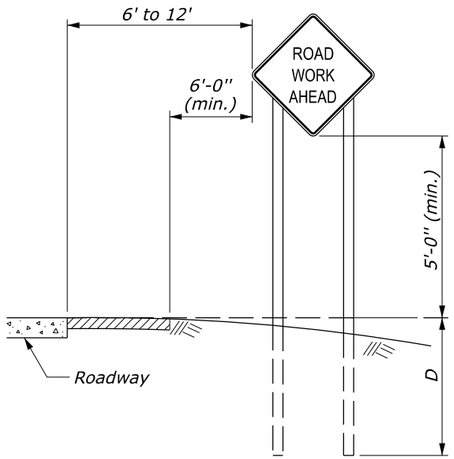
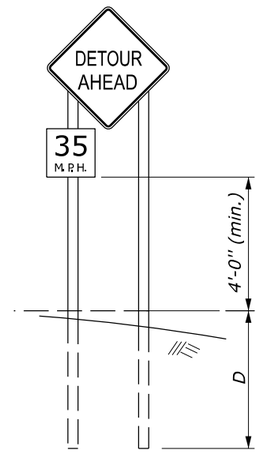
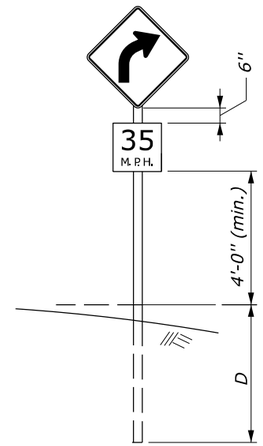
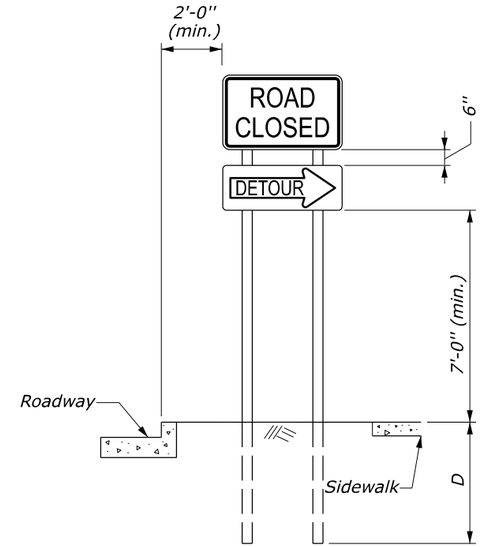
PWD TRACKING NUMBER: FY26-PAER-8386-01	







RURAL AREA

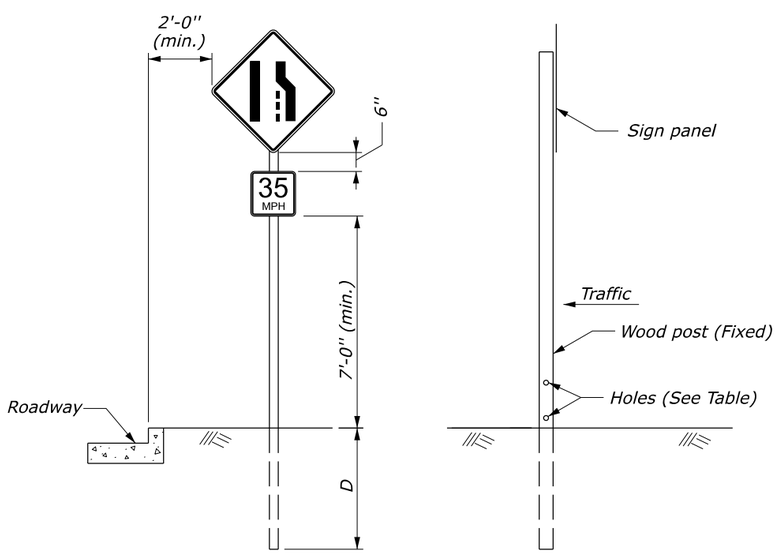


URBAN AREA

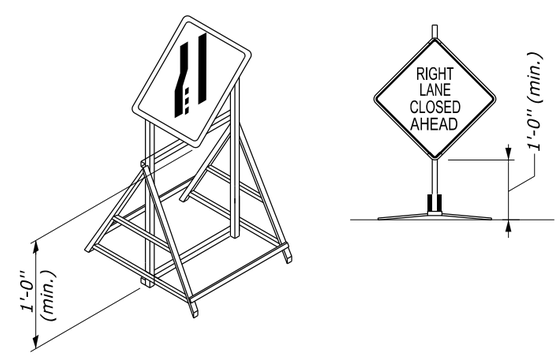
FIXED ROADWAY SIGNS

NOTES:

1. Mount signs that are wider than 3 feet or larger than 10 square feet on double posts.
2. All lumber dimensions are nominal.
3. Submit alternate details for portable signs. Ensure sign mounts hold the sign face in a vertical plane. Portable signs may be mounted lower than fixed signs when approved. Ensure all portable sign supports are crashworthy.
4. When parking is permitted within 200 feet of the sign, mount the sign a minimum of 7 feet above the pavement surface.
5. When approved by the CO and the Utility Company, utility poles may be used for sign mounting.
6. For 4- by 6-inch and greater posts, see the Breakaway Sign Support View. If breakaway design cannot be used due to post spacing, place the sign outside the clearzone or shield with a barrier. Do not place holes in posts of non-breakaway signs.
7. Signs requiring 6- by 6-inch and greater posts are considered non-breakaway if multiple posts are required and the posts cannot be spaced a minimum of 7 feet apart.



BREAKAWAY SIGN SUPPORT
(FIXED SIGNS 4'' X 6'' AND GREATER POSTS)
See Notes 6 and 7



PORTABLE SIGNS
See Notes 3 and 4

POST SIZE TABLE						
POST SIZE	D	HOLE DIAMETER	MAXIMUM SIGN AREA (SQFT)			
			1 Post	2 Post	3 Post	4 Post
4'' x 4''	4'	None Required	10	20		
4'' x 6''	4'	1.5''		35	50	70
6'' x 6''	5'	2''		50	75	100
6'' x 8''	5'	3''		85	125	165

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA
OFFICE OF FEDERAL LANDS HIGHWAY

TEMPORARY TRAFFIC CONTROL SIGN MOUNTING

EFLHD DETAIL
E635-01

SPECIFICATION
FP-24, FP-14

APPROVED FOR USE
06/2024

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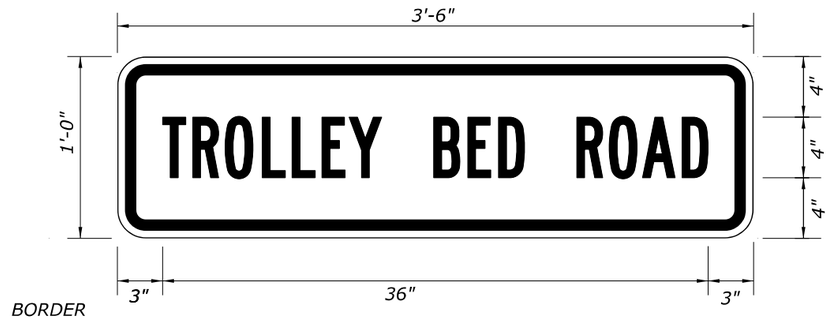
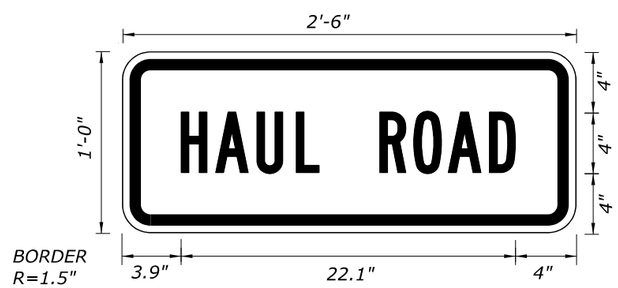
PWD TRACKING NUMBER: FY26-PAER-8386-01	



BORDER
R=1.5"
RH= 0.5"

SP-2

Panel Style: Street Name Sign
M.U.T.C.D: 2009 Edition



BORDER
R=1.5"
RH= 0.5"

SP-4

Panel Style: Street Name Sign
M.U.T.C.D: 2009 Edition

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA
OFFICE OF FEDERAL LANDS HIGHWAY

TEMPORARY TRAFFIC CONTROL SPECIAL SIGNS

EFLHD DETAIL
E635-A

SPECIFICATION
FP-24, FP-14

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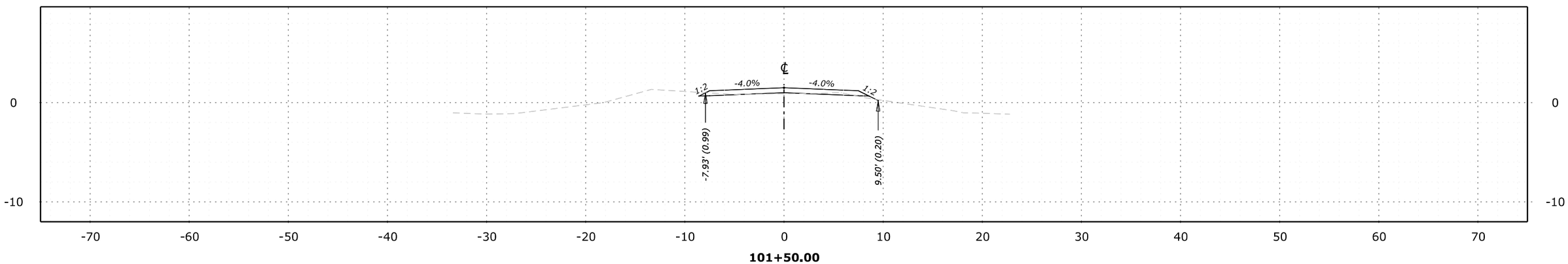
PWD TRACKING NUMBER: FY26-PAER-8386-01	



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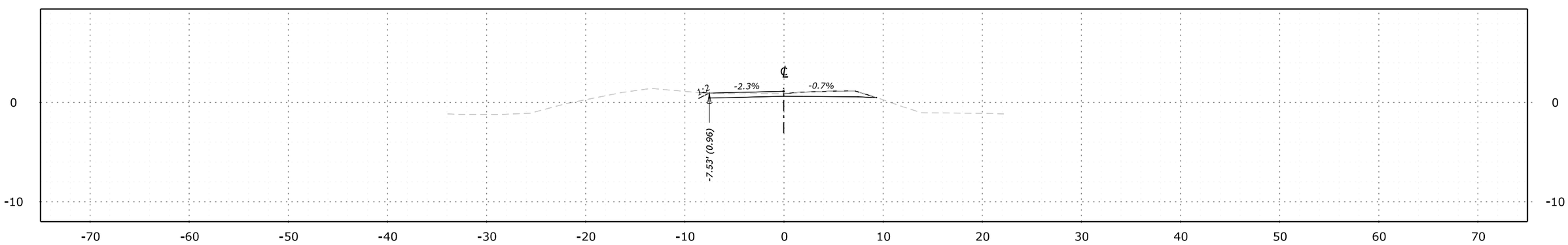
Subgrade = 1.00
Original Grnd = 0.77



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NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
101+25 TO 101+50

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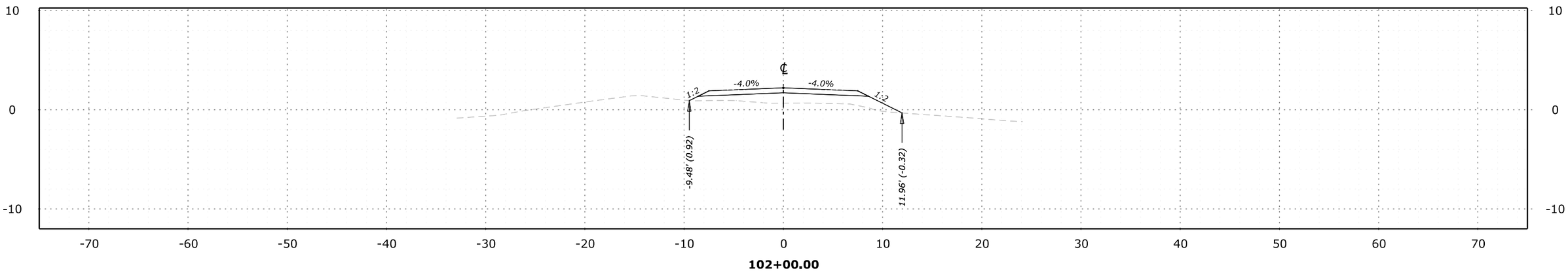
PWD TRACKING NUMBER: FY26-PAER-8386-01	



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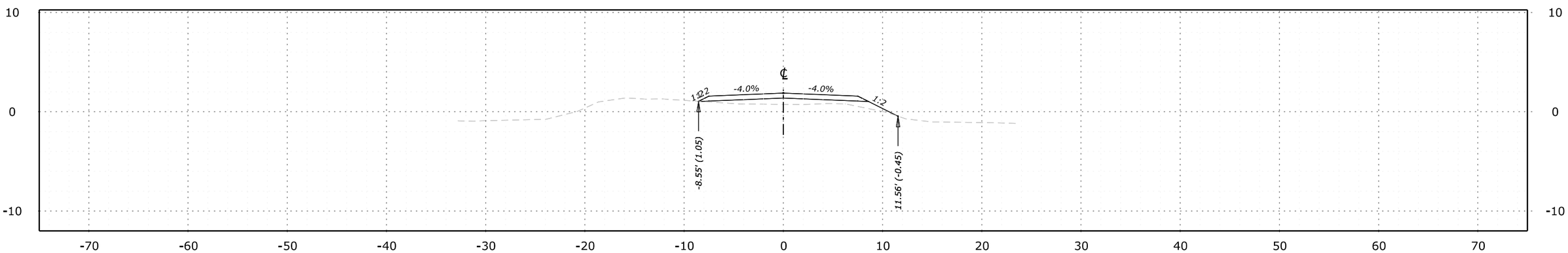

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NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
101+75 TO 102+00

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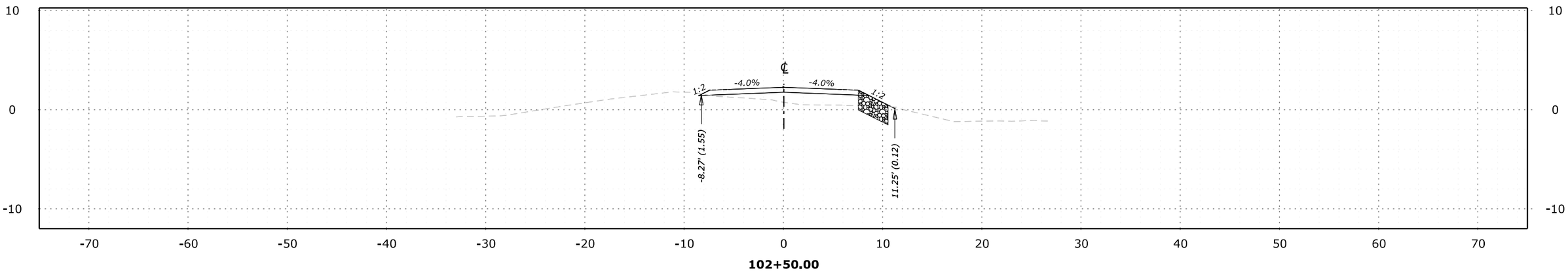
PWD TRACKING NUMBER: FY26-PAER-8386-01	



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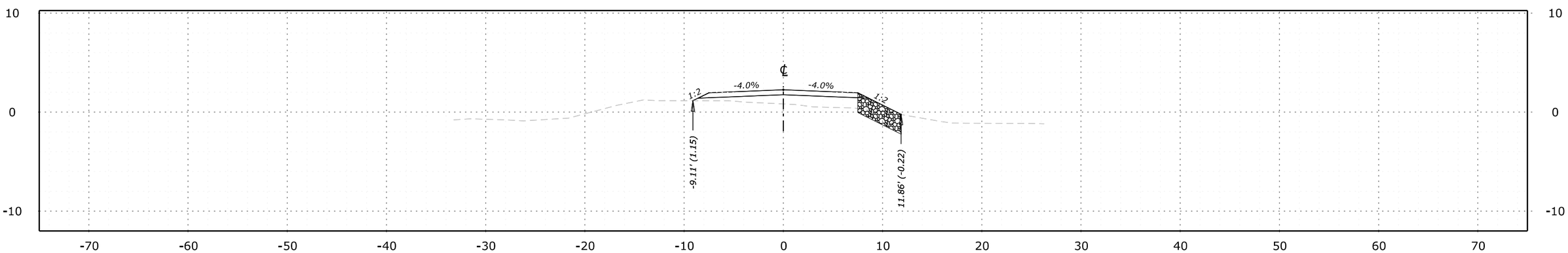

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NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
102+25 TO 102+50

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 102+25.00 [Sheet1]]

9 April 2026 12:39 PM

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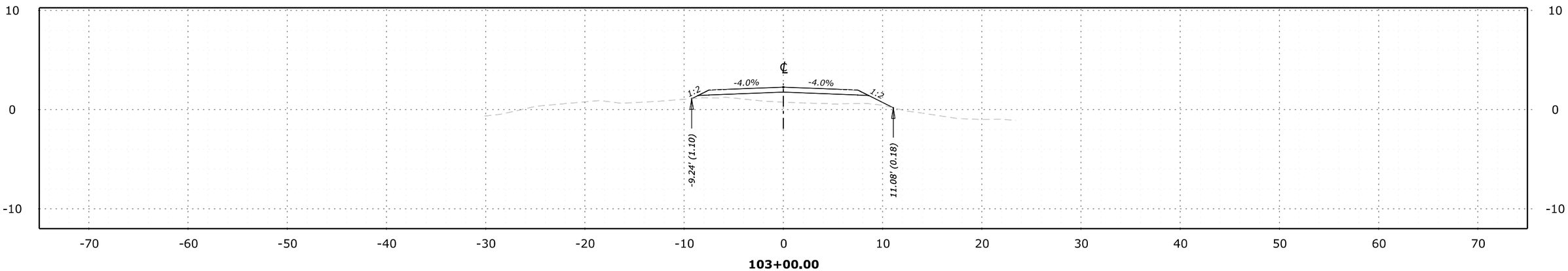
PWD TRACKING NUMBER: FY26-PAER-8386-01	



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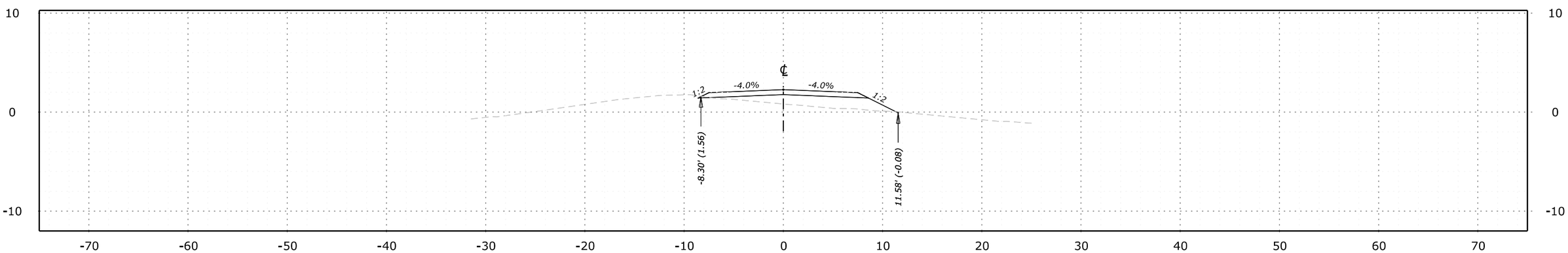
Original Grnd = 0.76



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Original Grnd = 0.83

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
102+75 TO 103+00

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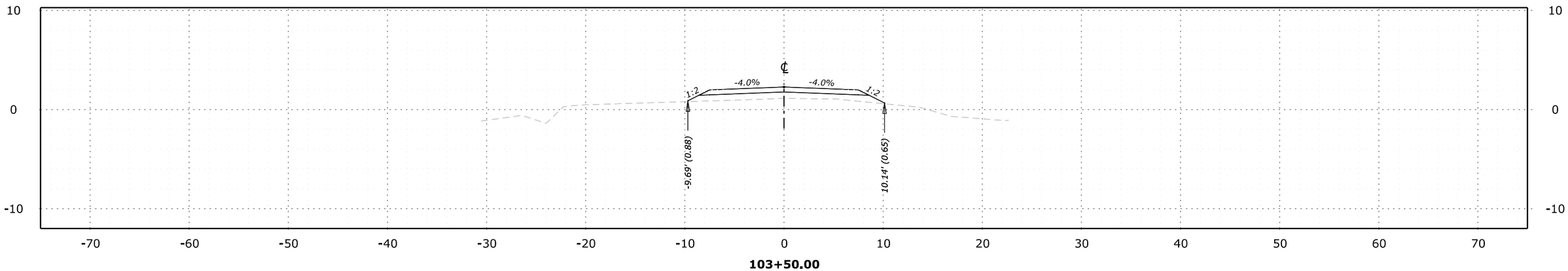

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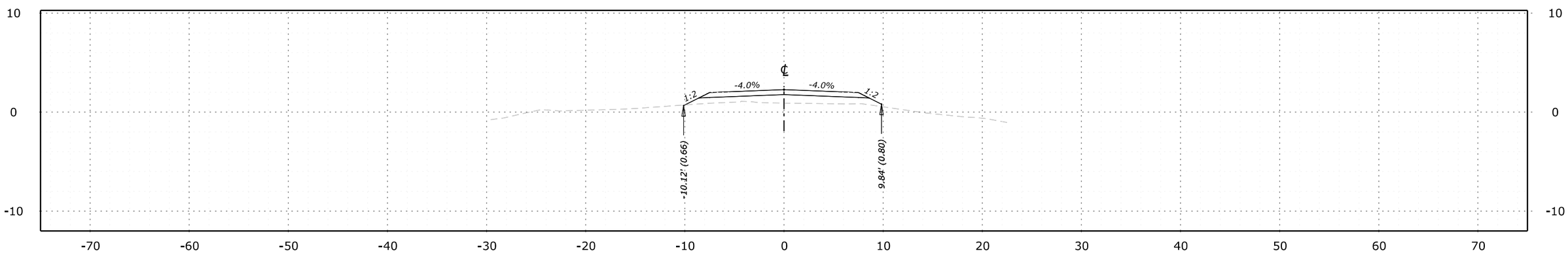

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NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
103+25 TO 103+50

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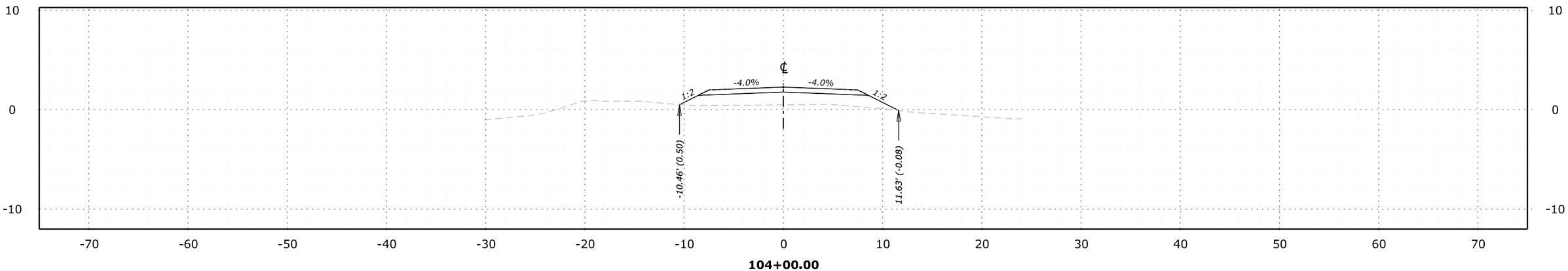
PWD TRACKING NUMBER: FY26-PAER-8386-01	



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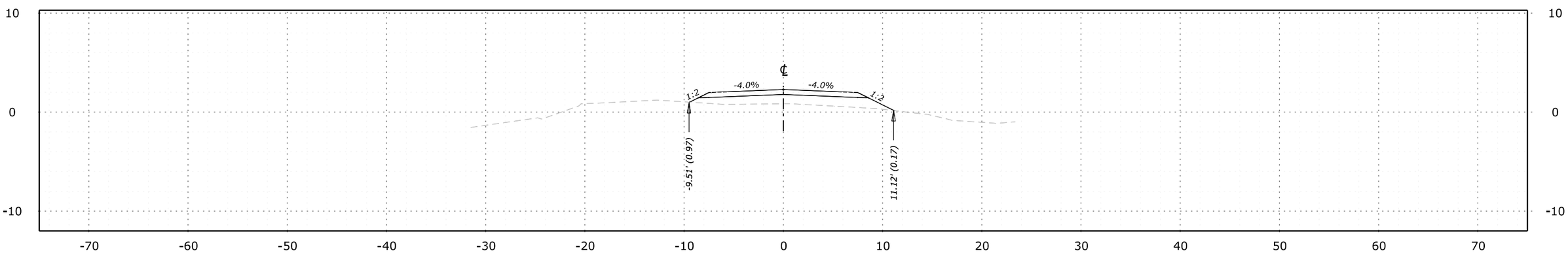

103+75.00
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Original Grnd = 0.85

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
103+75 TO 104+00

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PROJECT	SHEET NUMBER
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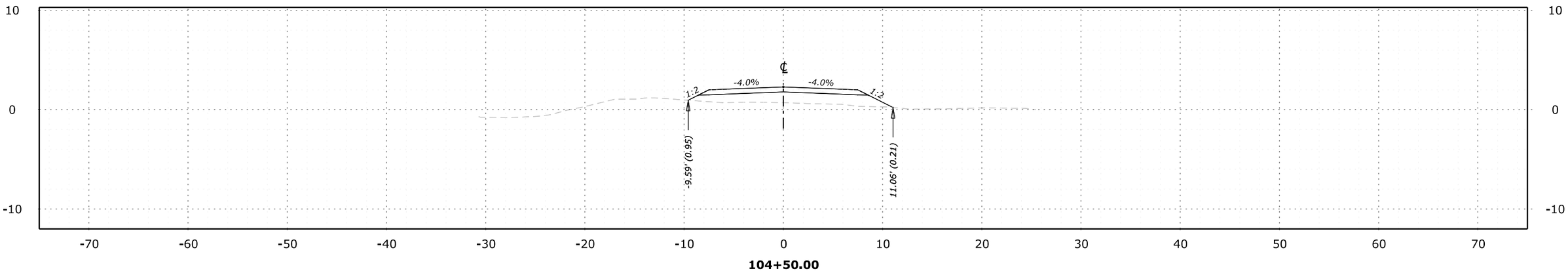
PWD TRACKING NUMBER: FY26-PAER-8386-01	



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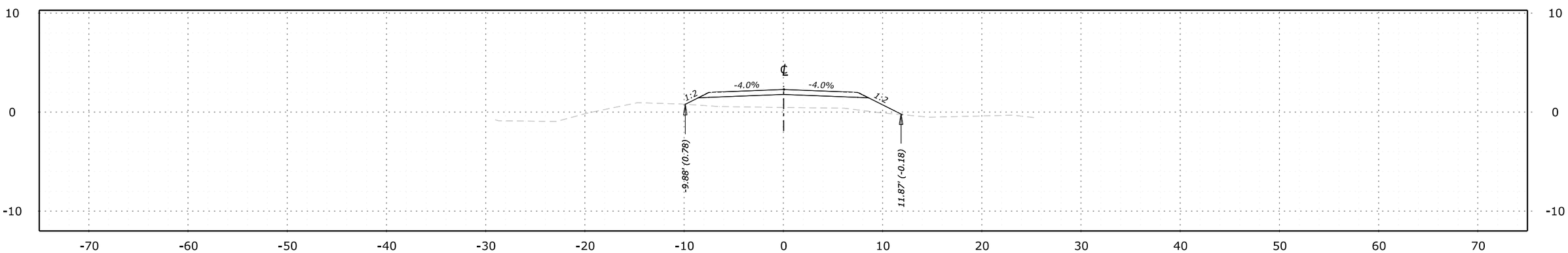
Subgrade = 1.79
Original Grnd = 0.71



104+25.00
Des Grade = 2.29
Subgrade = 1.79
Original Grnd = 0.48

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

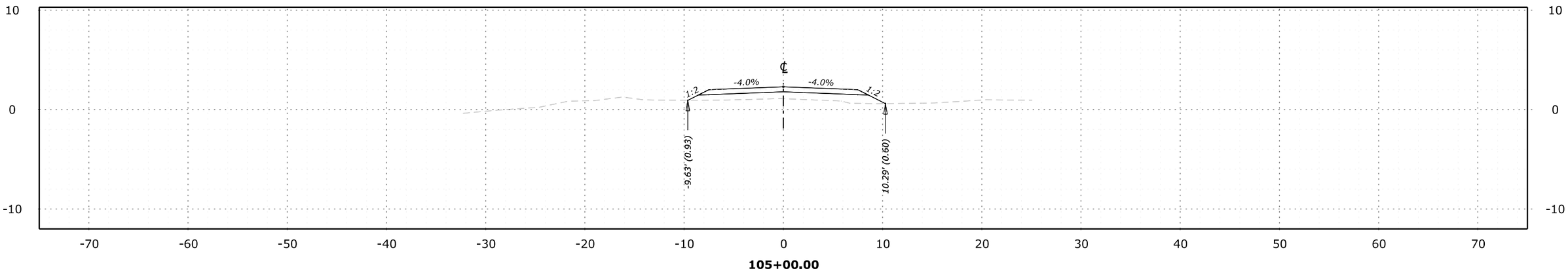
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

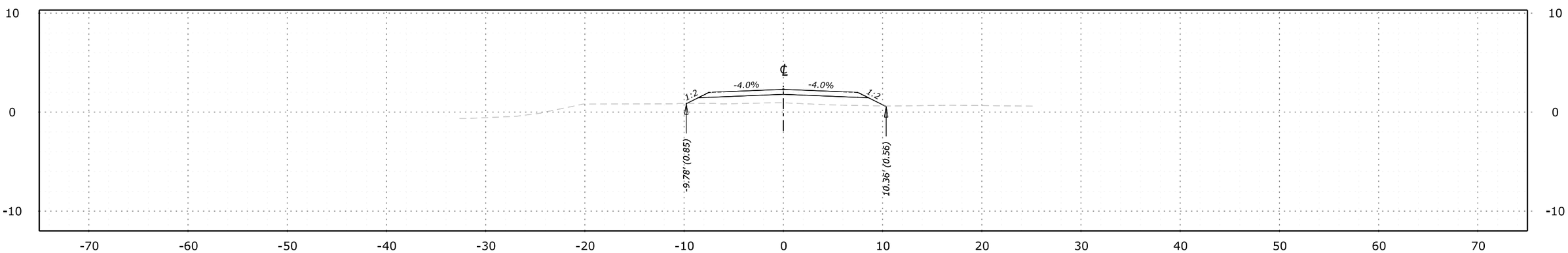
TROLLEY BED ROAD (ROUTE 404)
104+25 TO 104+50

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 104+25.00 [Sheet]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T08
PWD TRACKING NUMBER: FY26-PAER-8386-01	



105+00.00
Des Grade = 2.30
Subgrade = 1.80
Original Grnd = 1.10



104+75.00
Des Grade = 2.29
Subgrade = 1.79
Original Grnd = 0.93

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

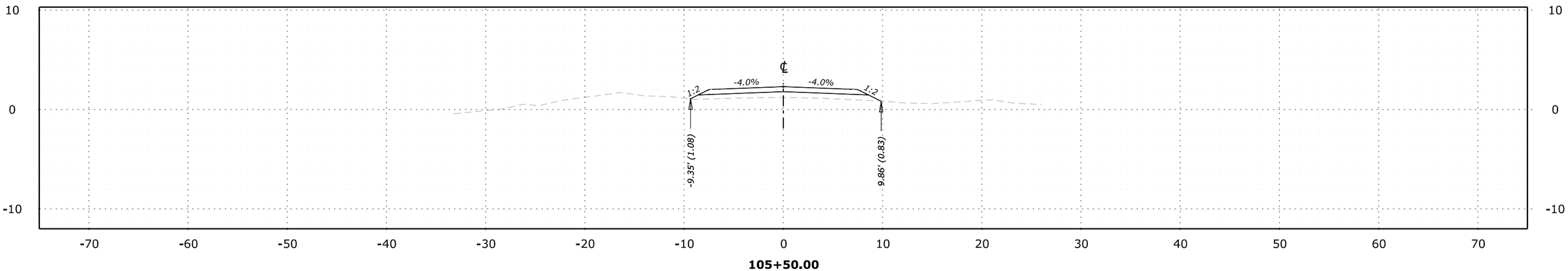
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

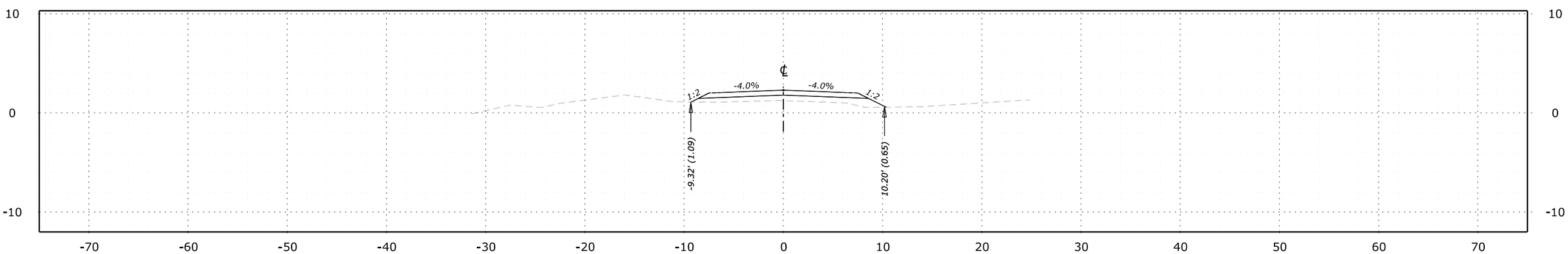
TROLLEY BED ROAD (ROUTE 404)
104+75 TO 105+00

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 104+75.00 [Sheet]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T09
PWD TRACKING NUMBER: FY26-PAER-8386-01	



105+50.00
Des Grade = 2.30
Subgrade = 1.80
Original Grnd = 1.21



105+25.00
Des Grade = 2.30
Subgrade = 1.80
Original Grnd = 1.22

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

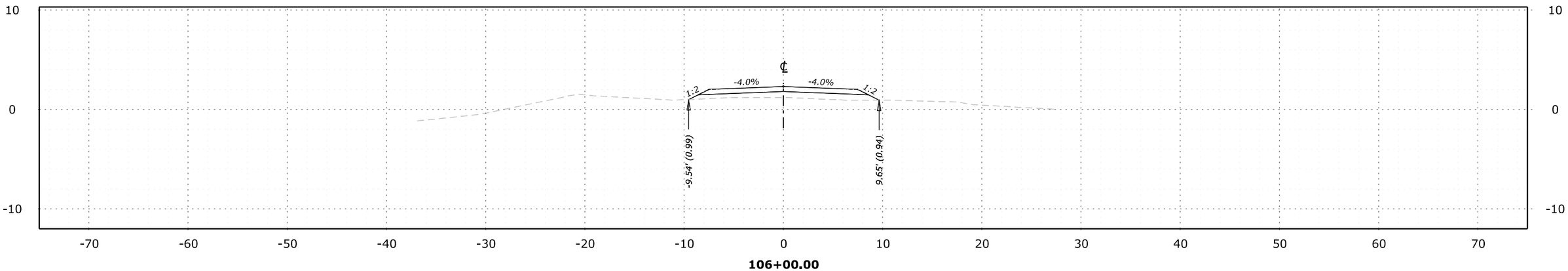
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

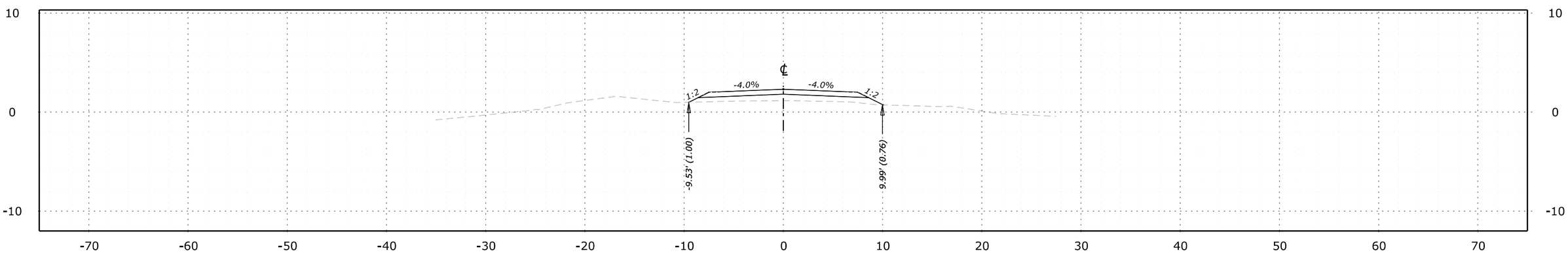
TROLLEY BED ROAD (ROUTE 404)
105+25 TO 105+50

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 105+25.00 [Sheet1]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T10
PWD TRACKING NUMBER: FY26-PAER-8386-01	



106+00.00
Des Grade = 2.31
Subgrade = 1.81
Original Grnd = 1.20



105+75.00
Des Grade = 2.31
Subgrade = 1.81
Original Grnd = 1.16

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

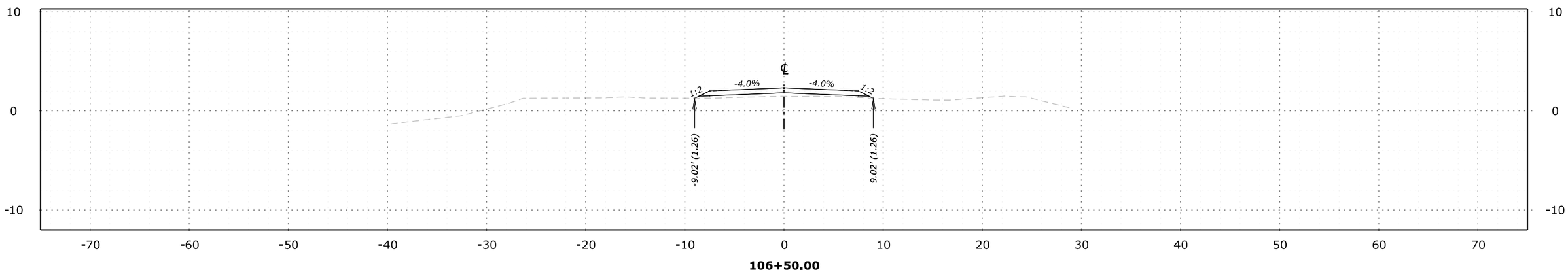
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

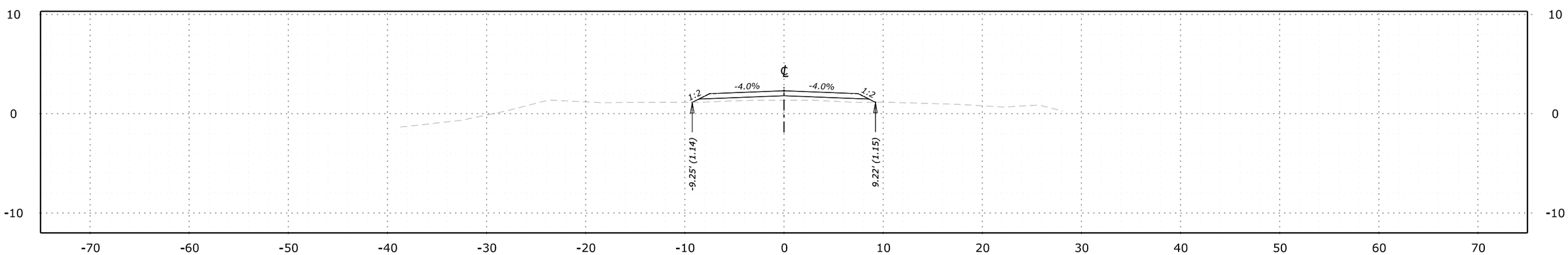
TROLLEY BED ROAD (ROUTE 404)
105+75 TO 106+00

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 105+75.00 [Sheet]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T11
PWD TRACKING NUMBER: FY26-PAER-8386-01	



106+50.00
Des Grade = 2.32
Subgrade = 1.82
Original Grnd = 1.47



106+25.00
Des Grade = 2.32
Subgrade = 1.82
Original Grnd = 1.35

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

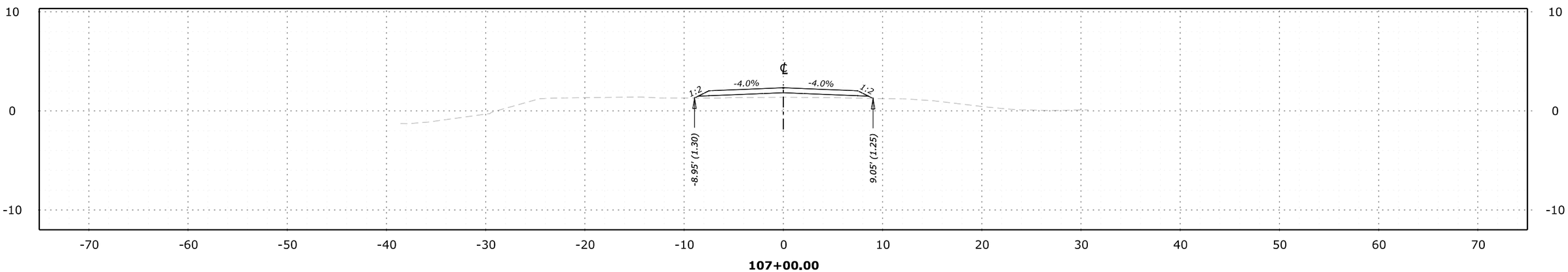
CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
106+25 TO 106+50

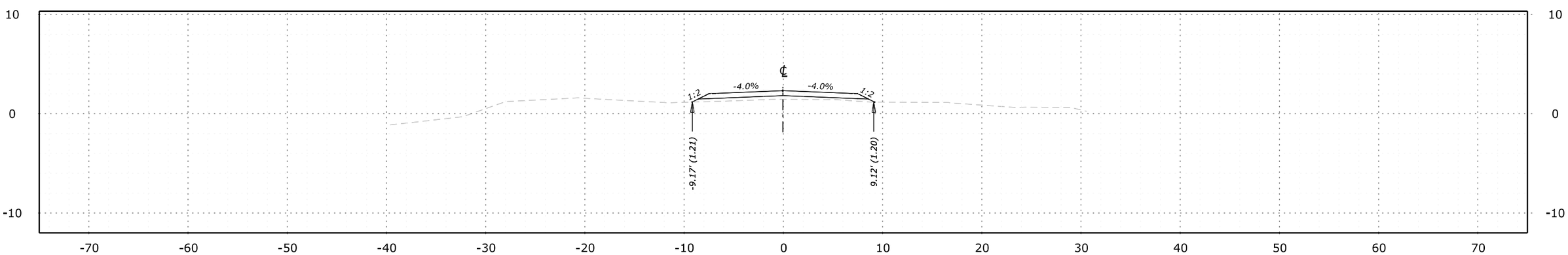
M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 106+25.00 [Sheet1]]

9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T12
PWD TRACKING NUMBER: FY26-PAER-8386-01	



107+00.00
Des Grade = 2.33
Subgrade = 1.83
Original Grnd = 1.37



106+75.00
Des Grade = 2.32
Subgrade = 1.82
Original Grnd = 1.45

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

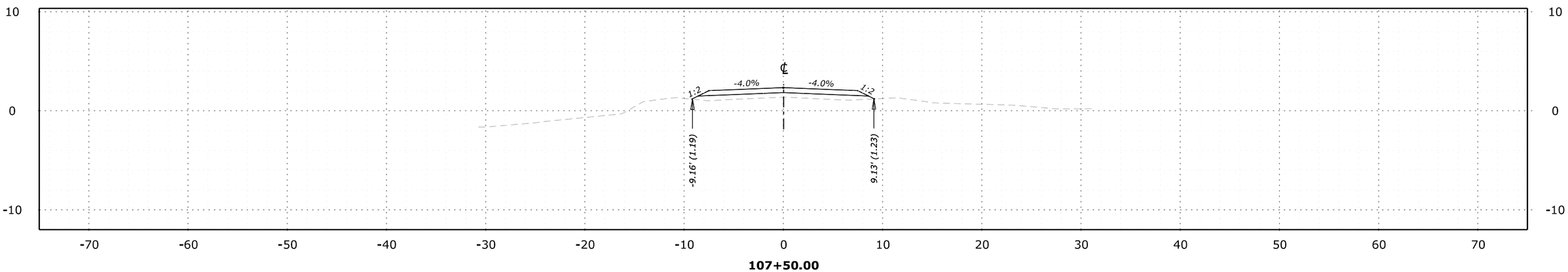
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

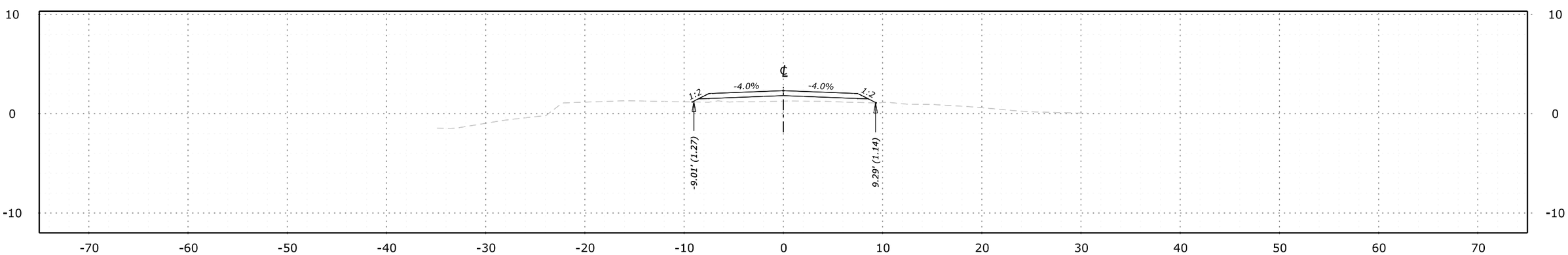
TROLLEY BED ROAD (ROUTE 404)
106+75 TO 107+00

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 106+75.00 [Sheet]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T13
PWD TRACKING NUMBER: FY26-PAER-8386-01	



107+50.00
Des Grade = 2.33
Subgrade = 1.83
Original Grnd = 1.36



107+25.00
Des Grade = 2.33
Subgrade = 1.83
Original Grnd = 1.27

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

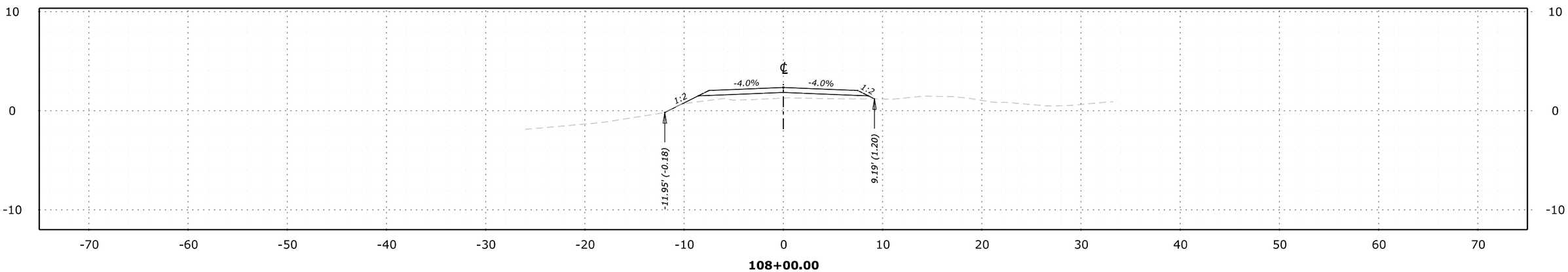
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

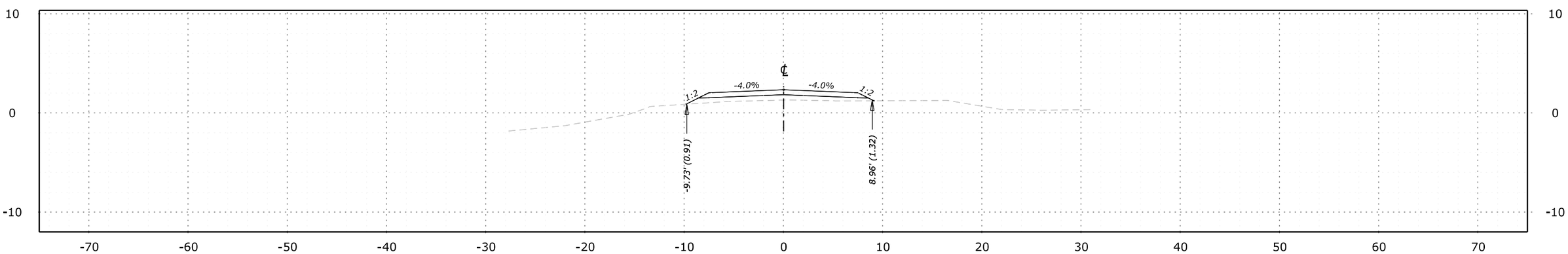
TROLLEY BED ROAD (ROUTE 404)
107+25 TO 107+50

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 107+25.00 [Sheet1]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T14
PWD TRACKING NUMBER: FY26-PAER-8386-01	



108+00.00
Des Grade = 2.34
Subgrade = 1.84
Original Grnd = 1.27



107+75.00
Des Grade = 2.34
Subgrade = 1.84
Original Grnd = 1.30

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

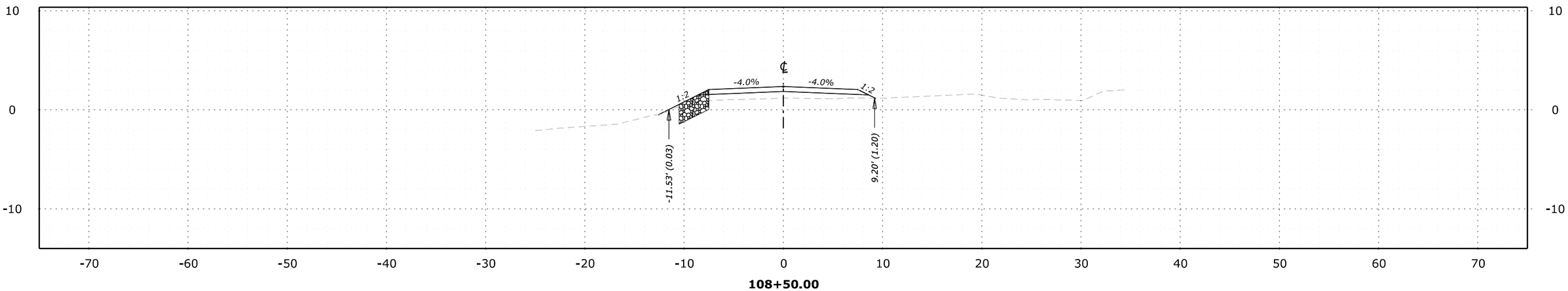
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

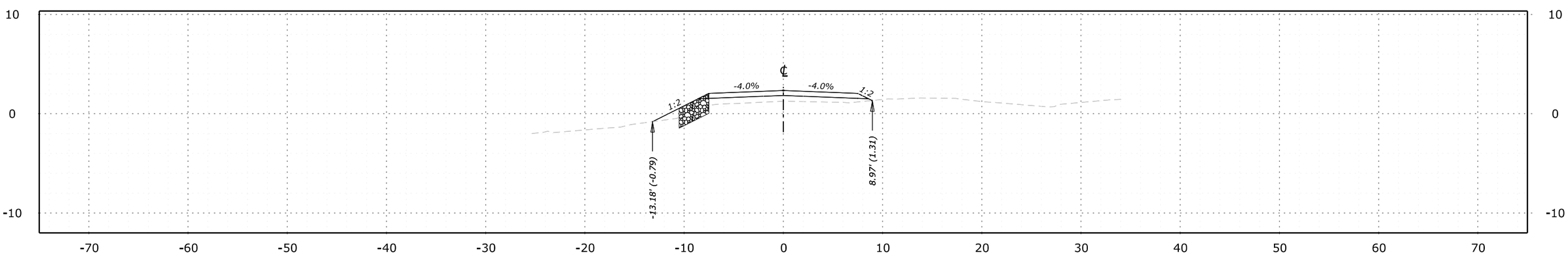
TROLLEY BED ROAD (ROUTE 404)
107+75 TO 108+00

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 107+75.00 [Sheet1]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T15
PWD TRACKING NUMBER: FY26-PAER-8386-01	



108+50.00
Des Grade = 2.35
Subgrade = 1.85
Original Grnd = 1.20



108+25.00
Des Grade = 2.35
Subgrade = 1.85
Original Grnd = 1.26

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

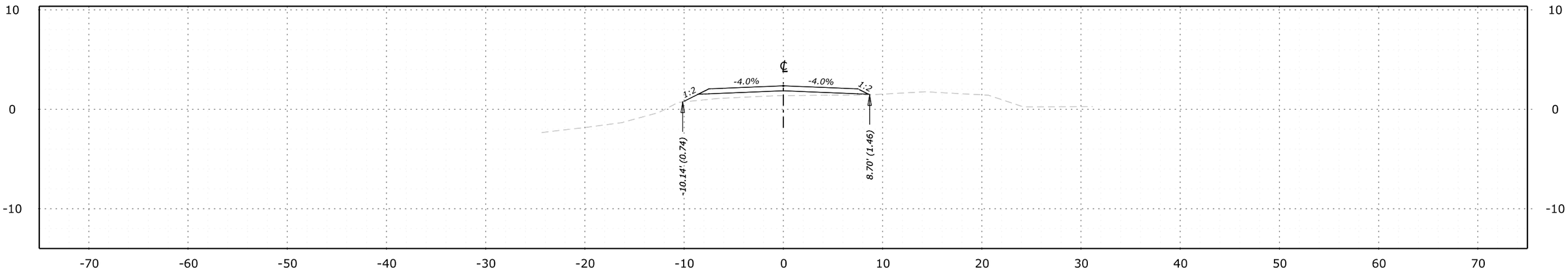
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

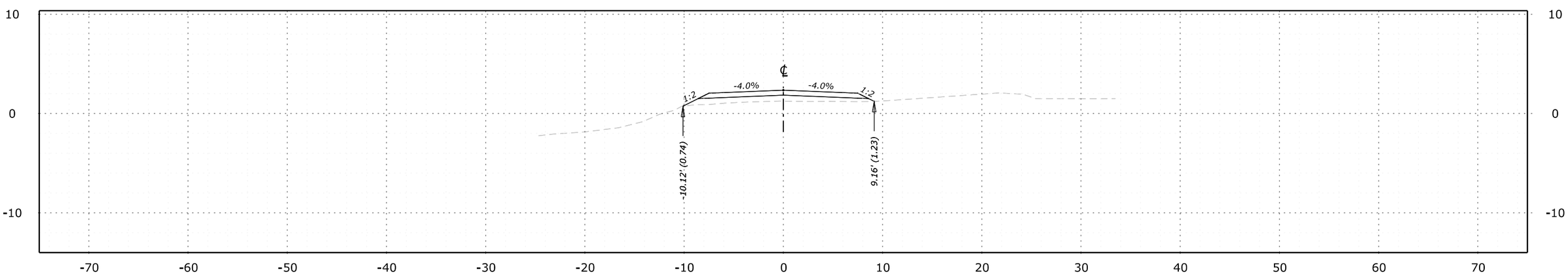
TROLLEY BED ROAD (ROUTE 404)
108+25 TO 108+50

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 108+25.00 [Sheet1]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T16
PWD TRACKING NUMBER: FY26-PAER-8386-01	



109+00.00
Des Grade = 2.36
Subgrade = 1.86
Original Grnd = 1.37



108+75.00
Des Grade = 2.35
Subgrade = 1.85
Original Grnd = 1.25

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

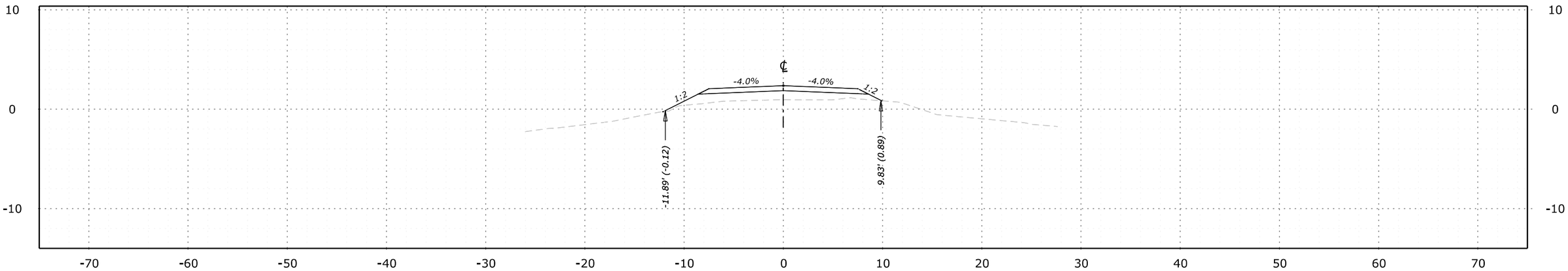
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

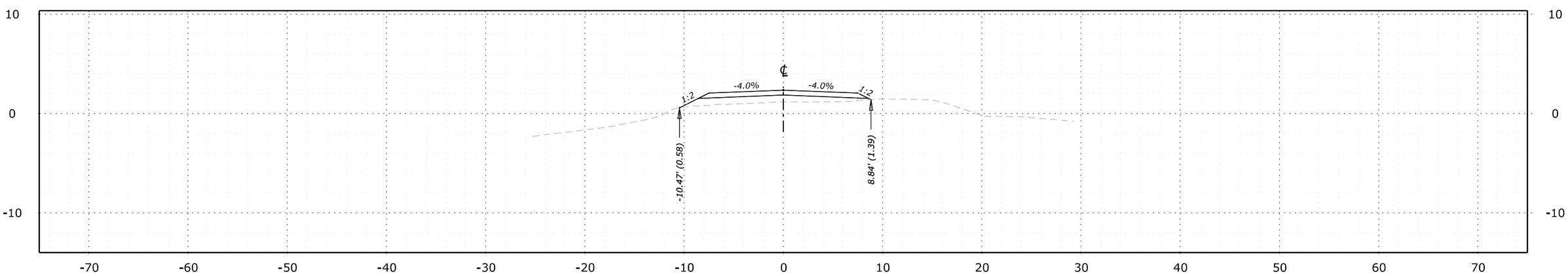
TROLLEY BED ROAD (ROUTE 404)
108+75 TO 109+00

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 108+75.00 [Sheet]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T17
PWD TRACKING NUMBER: FY26-PAER-8386-01	



109+50.00
Des Grade = 2.36
Subgrade = 1.86
Original Grnd = 0.97



109+25.00
Des Grade = 2.36
Subgrade = 1.86
Original Grnd = 1.16

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

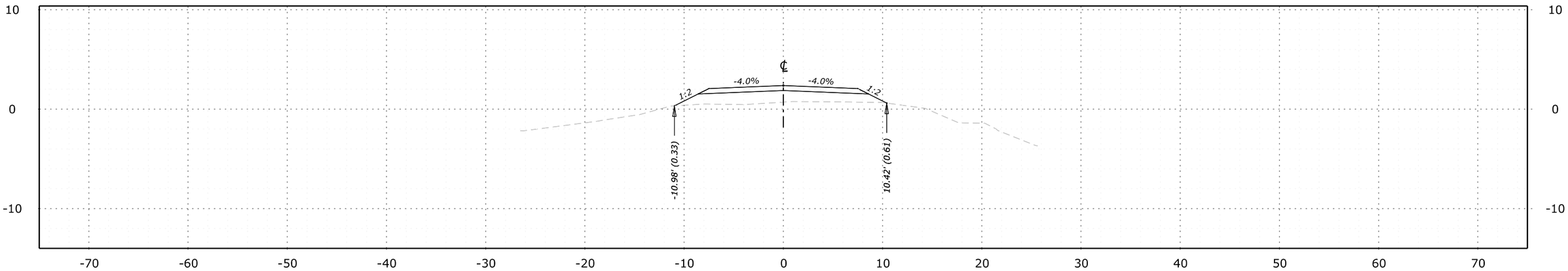
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

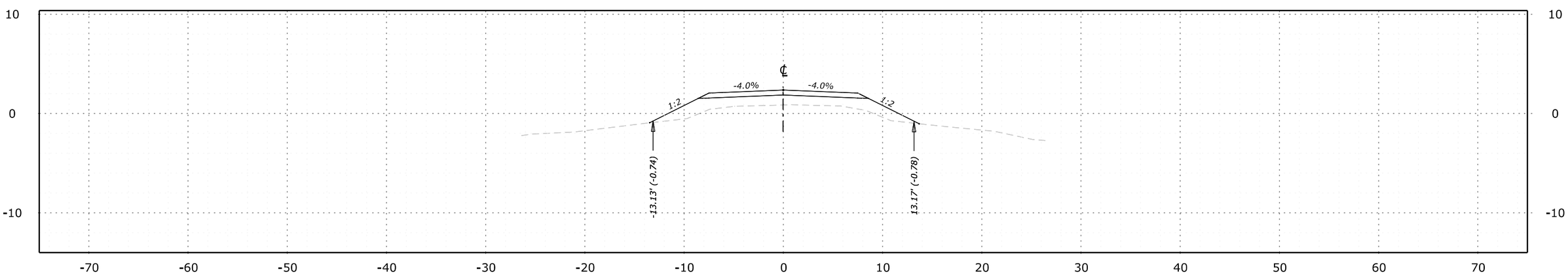
TROLLEY BED ROAD (ROUTE 404)
109+25 TO 109+50

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 109+25.00 [Sheet1]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T18
PWD TRACKING NUMBER: FY26-PAER-8386-01	



110+00.00
Des Grade = 2.37
Subgrade = 1.87
Original Grnd = 0.70



109+75.00
Des Grade = 2.37
Subgrade = 1.87
Original Grnd = 0.86

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

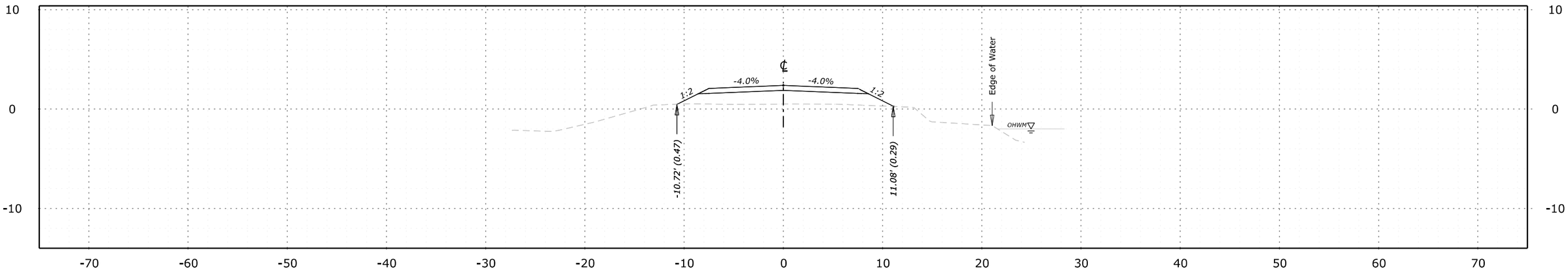
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

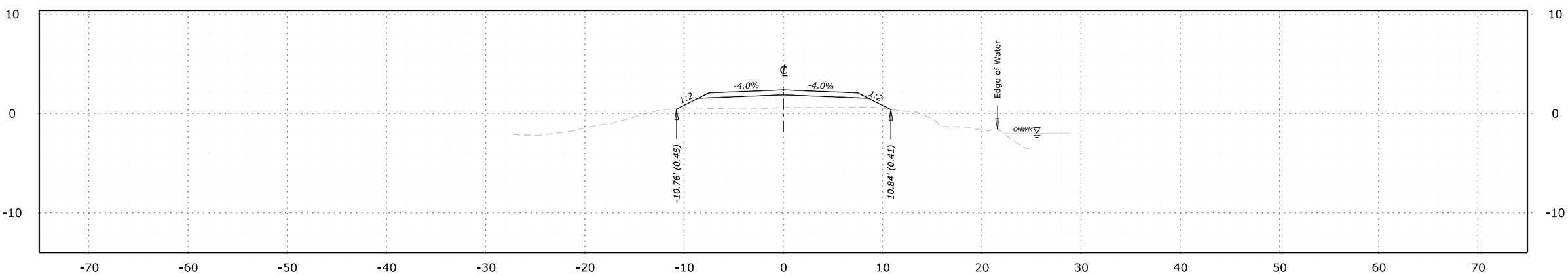
TROLLEY BED ROAD (ROUTE 404)
109+75 TO 110+00

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 109+75.00 [Sheet1]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T19
PWD TRACKING NUMBER: FY26-PAER-8386-01	



110+50.00
Des Grade = 2.38
Subgrade = 1.88
Original Grnd = 0.51



110+25.00
Des Grade = 2.38
Subgrade = 1.88
Original Grnd = 0.62

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

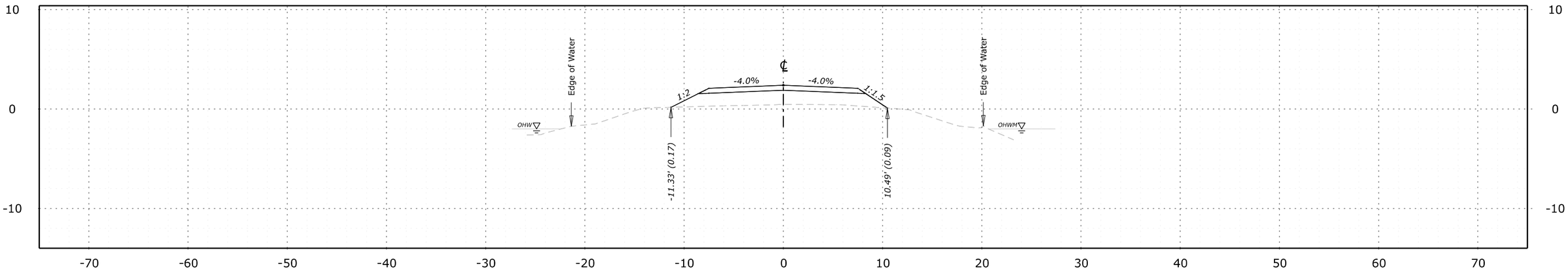
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

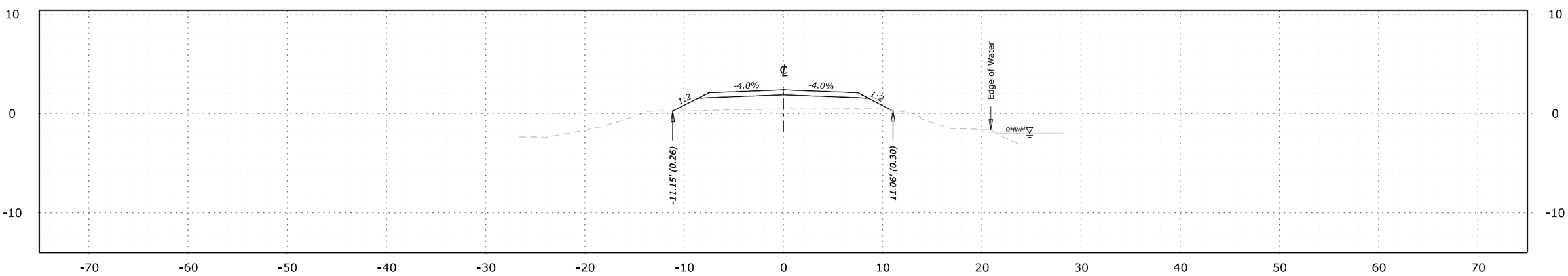
TROLLEY BED ROAD (ROUTE 404)
110+25 TO 110+50

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 110+25.00 [Sheet1]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T20
PWD TRACKING NUMBER: FY26-PAER-8386-01	



111+00.00
Des Grade = 2.39
Subgrade = 1.89
Original Grnd = 0.45



110+75.00
Des Grade = 2.38
Subgrade = 1.88
Original Grnd = 0.47

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
110+75 TO 111+00

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 110+75.00 [Sheet]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
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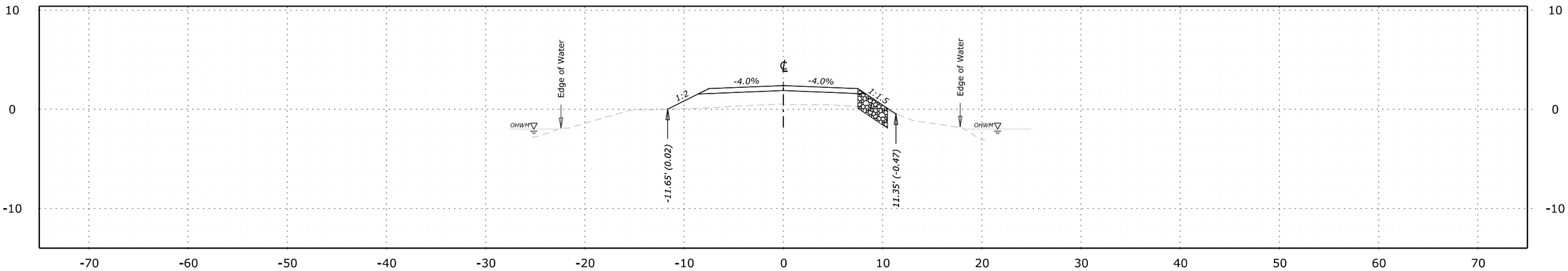
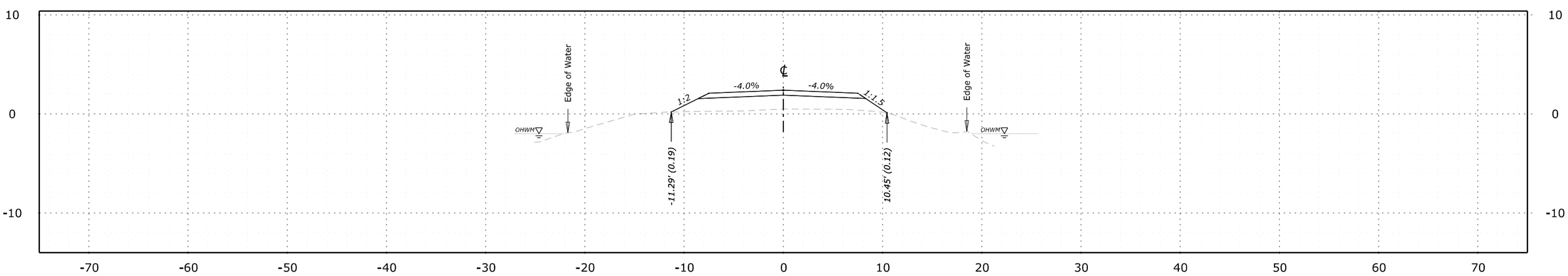
PWD TRACKING NUMBER: FY26-PAER-8386-01	



111+50.00
Des Grade = 2.39
Subgrade = 1.89
Original Grnd = 0.52



111+25.00
Des Grade = 2.39
Subgrade = 1.89
Original Grnd = 0.49

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

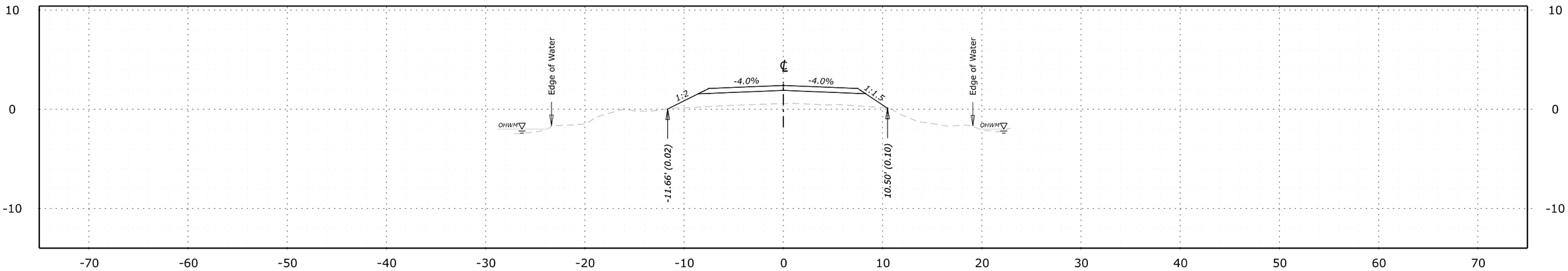
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

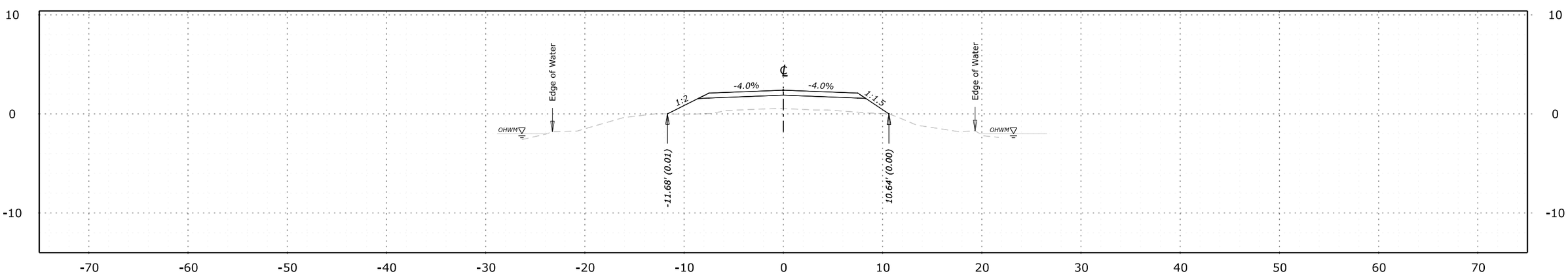
TROLLEY BED ROAD (ROUTE 404)
111+25 TO 111+50

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 111+25.00 [Sheet]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T22
PWD TRACKING NUMBER: FY26-PAER-8386-01	



112+00.00
Des Grade = 2.40
Subgrade = 1.90
Original Grnd = 0.56



111+75.00
Des Grade = 2.40
Subgrade = 1.90
Original Grnd = 0.54

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
111+75 TO 112+00

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 111+75.00 [Sheet]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
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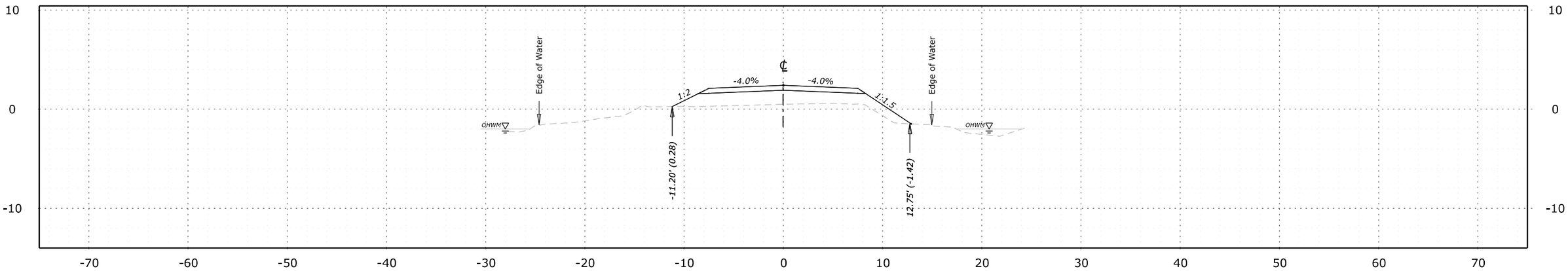
PWD TRACKING NUMBER: FY26-PAER-8386-01	



112+50.00
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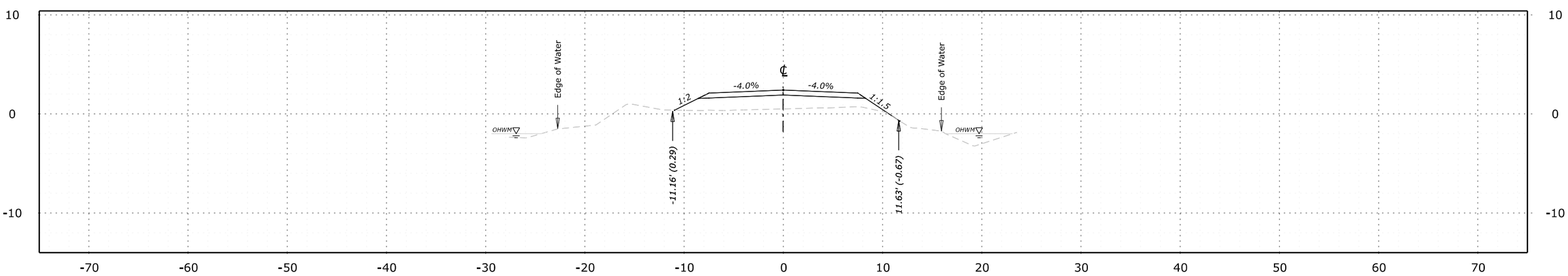
Original Grnd = 0.50



112+25.00
Des Grade = 2.40
Subgrade = 1.90
Original Grnd = 0.51

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
112+25 TO 112+50

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 112+25.00 [Sheet1]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
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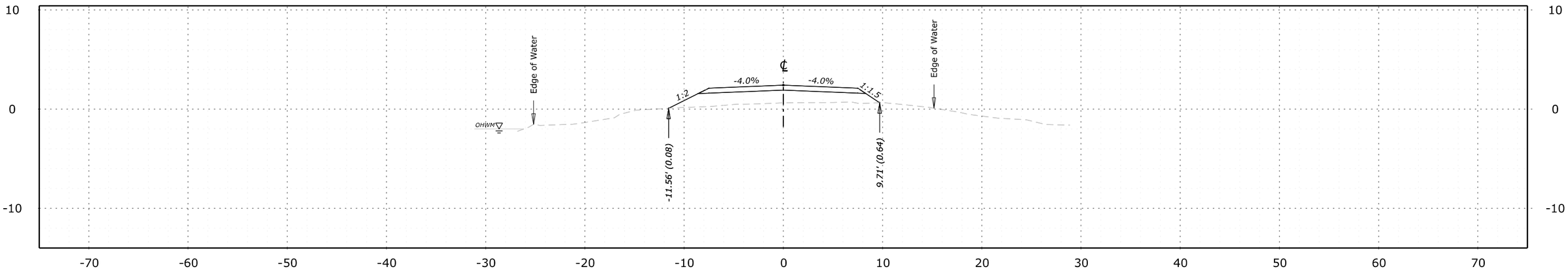
PWD TRACKING NUMBER: FY26-PAER-8386-01	



113+00.00
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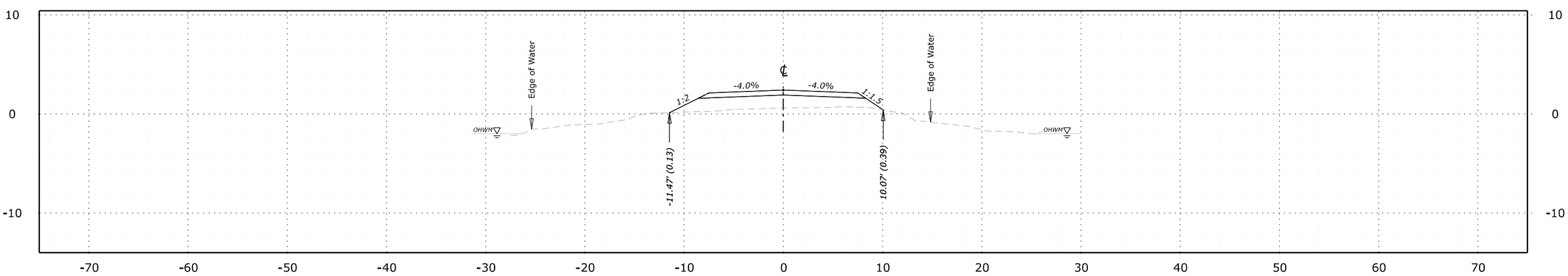
Subgrade = 1.92
Original Grnd = 0.64



112+75.00
Des Grade = 2.41
Subgrade = 1.91
Original Grnd = 0.61

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
112+75 TO 113+00

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 112+75.00 [Sheet1]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
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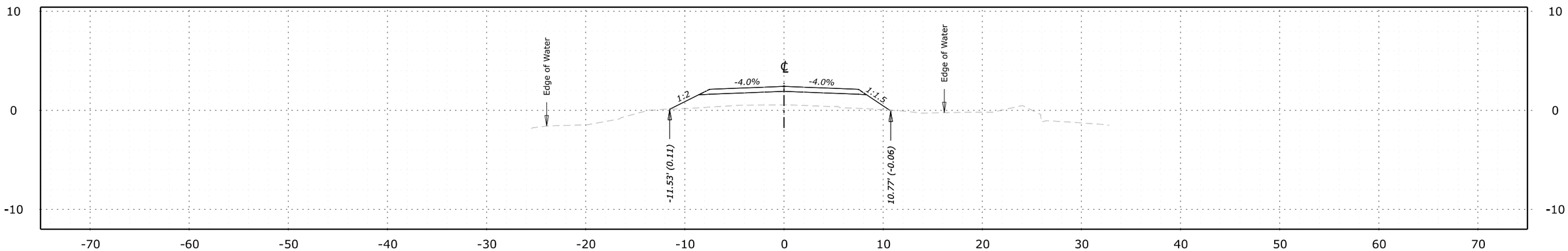
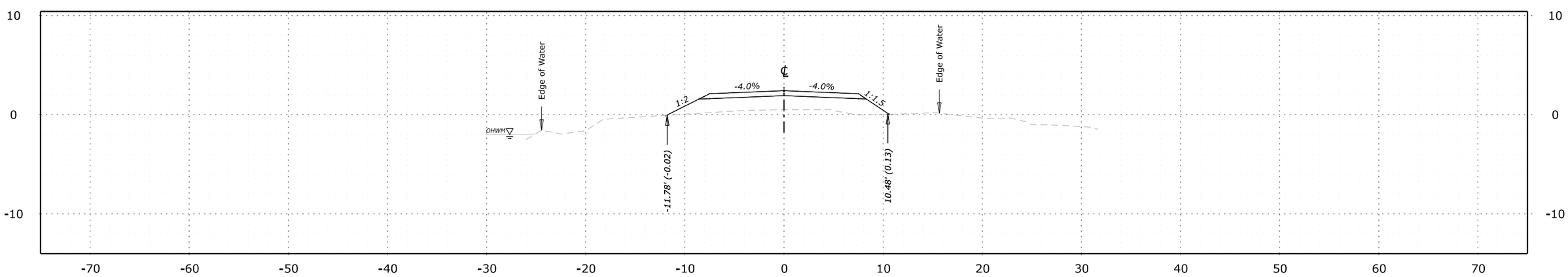
PWD TRACKING NUMBER: FY26-PAER-8386-01	



113+50.00
Des Grade = 2.42
Subgrade = 1.92
Original Grnd = 0.56



113+25.00
Des Grade = 2.42
Subgrade = 1.92
Original Grnd = 0.53

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
113+25 TO 113+50

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 113+25.00 [Sheet1]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
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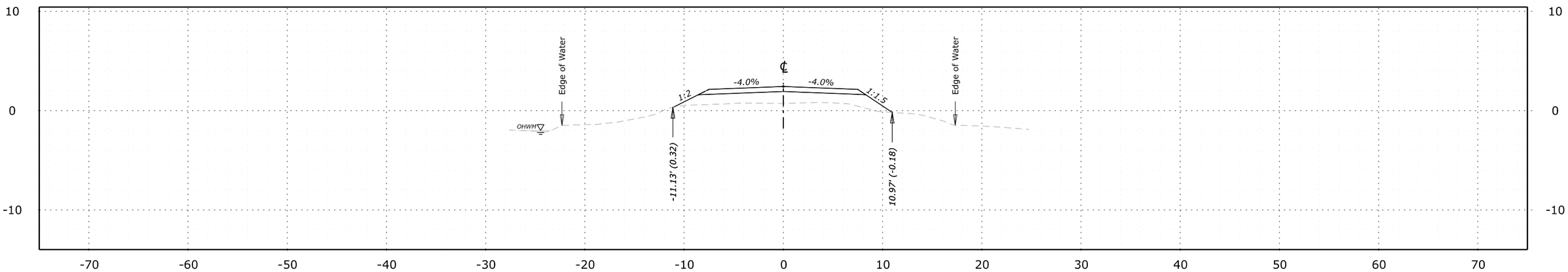
PWD TRACKING NUMBER: FY26-PAER-8386-01	



114+00.00
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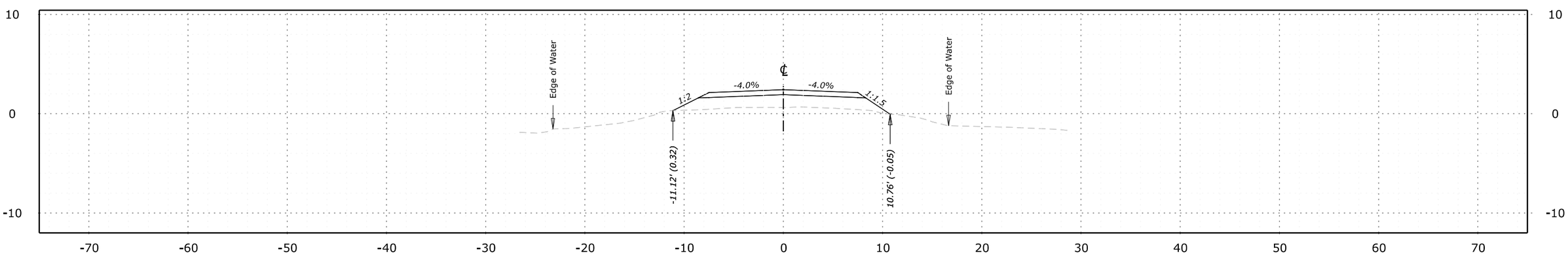
Subgrade = 1.93
Original Grnd = 0.72



113+75.00
Des Grade = 2.43
Subgrade = 1.93
Original Grnd = 0.63

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
113+75 TO 114+00

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 113+75.00 [Sheet1]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
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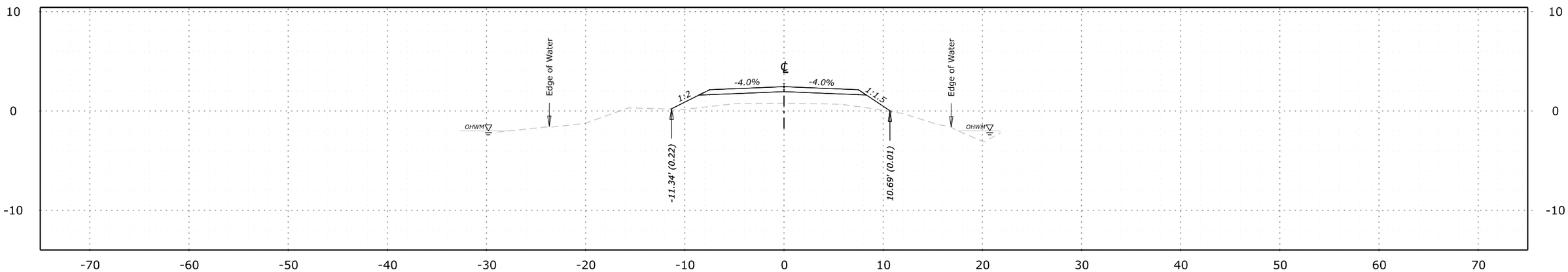
PWD TRACKING NUMBER: FY26-PAER-8386-01	



114+50.00
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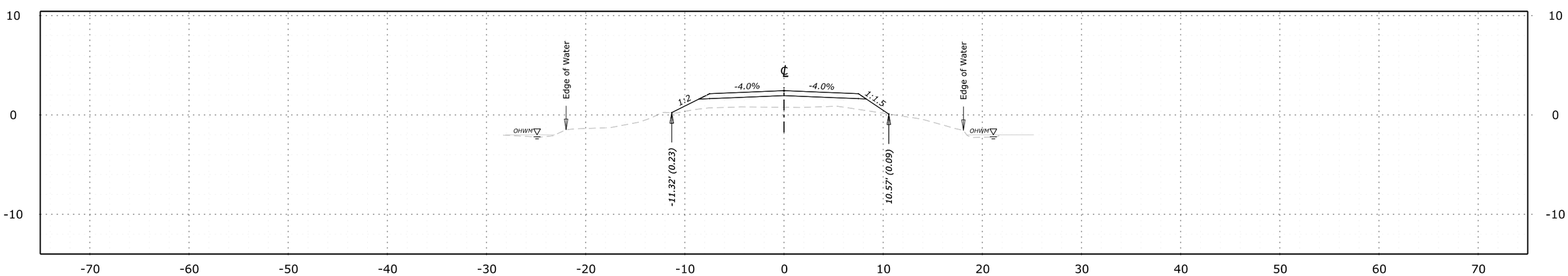
Subgrade = 1.94
Original Grnd = 0.77



114+25.00
Des Grade = 2.43
Subgrade = 1.93
Original Grnd = 0.77

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

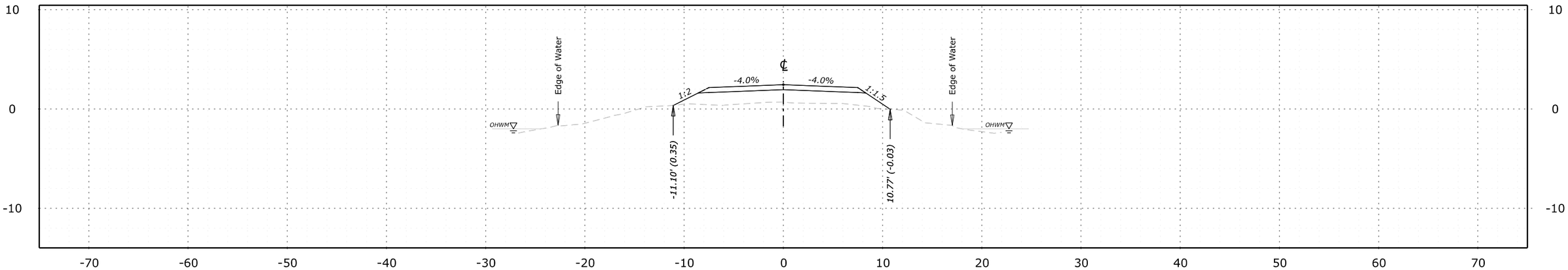
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

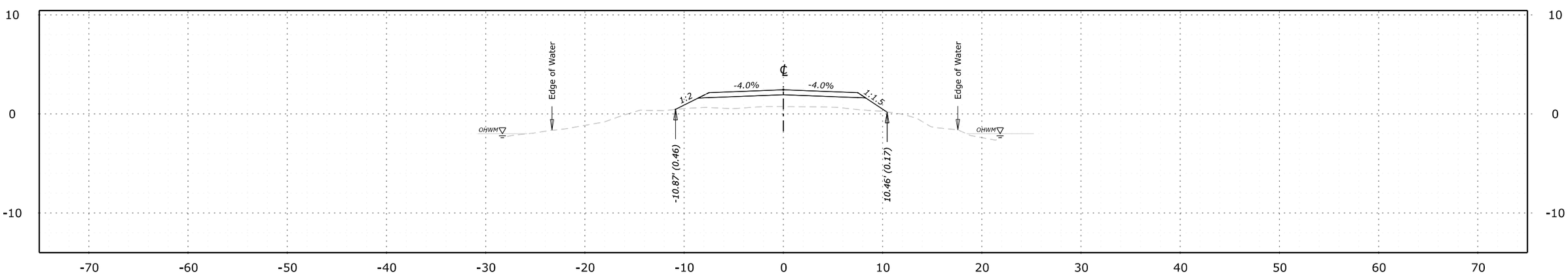
TROLLEY BED ROAD (ROUTE 404)
114+25 TO 114+50

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 114+25.00 [Sheet1]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T28
PWD TRACKING NUMBER: FY26-PAER-8386-01	



115+00.00
Des Grade = 2.45
Subgrade = 1.95
Original Grnd = 0.68



114+75.00
Des Grade = 2.44
Subgrade = 1.94
Original Grnd = 0.75

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

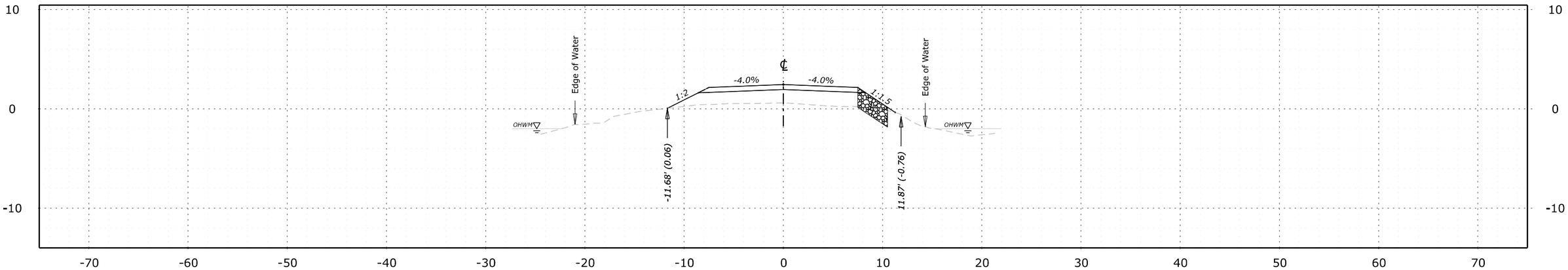
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
114+75 TO 115+00

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 114+75.00 [Sheet1]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T29
PWD TRACKING NUMBER: FY26-PAER-8386-01	



115+50.00
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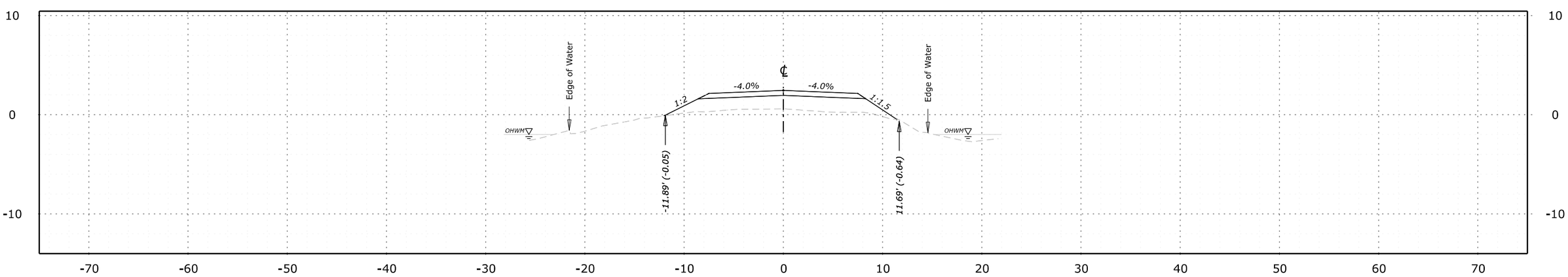
Subgrade = 1.95
Original Grnd = 0.60



115+25.00
Des Grade = 2.45
Subgrade = 1.95
Original Grnd = 0.59

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
115+25 TO 115+50

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 115+25.00 [Sheet1]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
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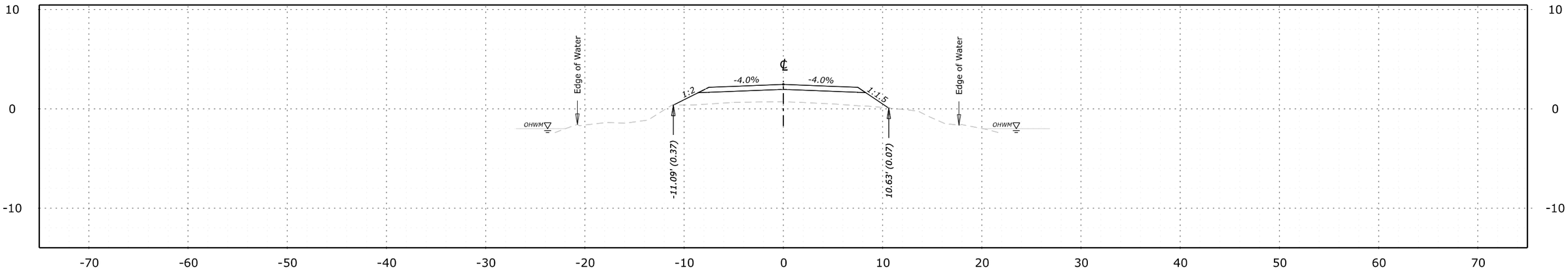
PWD TRACKING NUMBER: FY26-PAER-8386-01	



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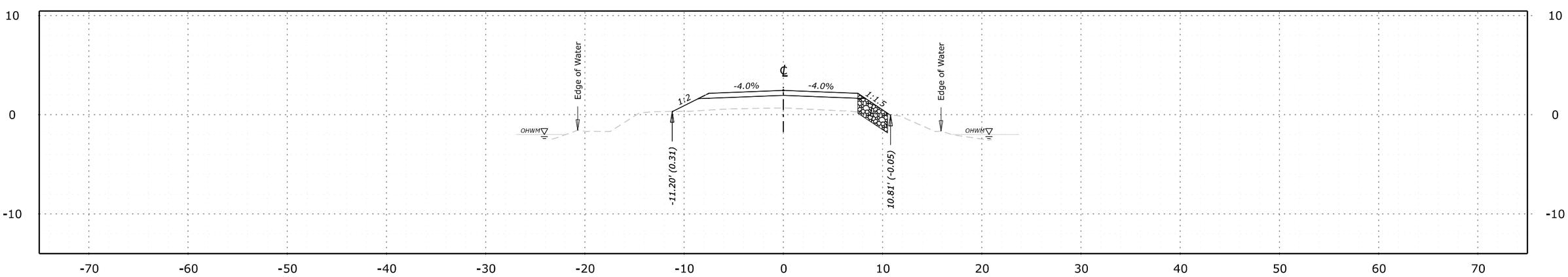
Subgrade = 1.96
Original Grnd = 0.70



115+75.00
Des Grade = 2.46
Subgrade = 1.96
Original Grnd = 0.69

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
115+75 TO 116+00

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 115+75.00 [Sheet1]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
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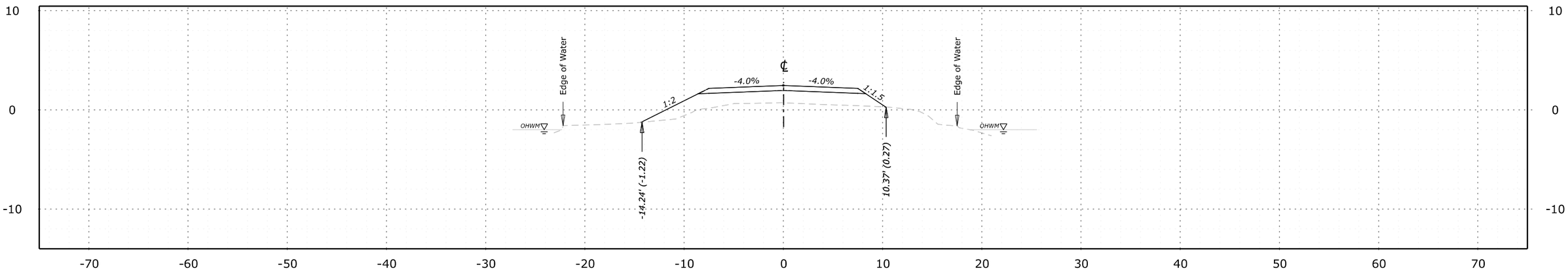
PWD TRACKING NUMBER: FY26-PAER-8386-01	



116+50.00
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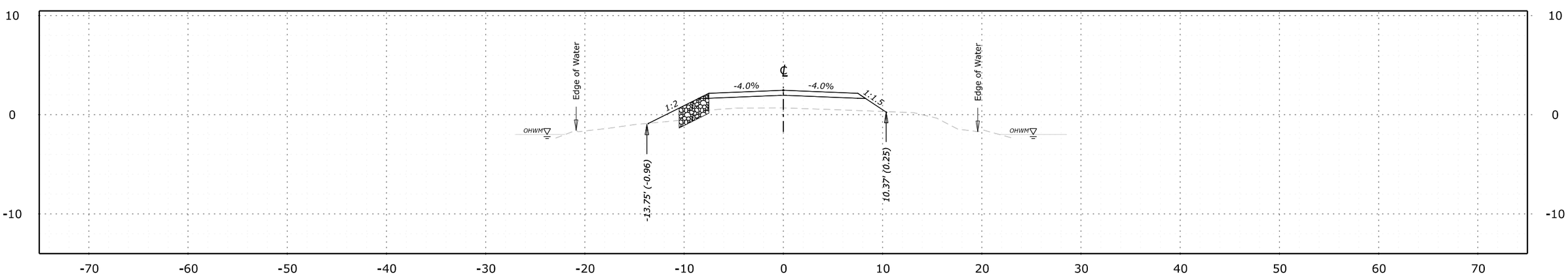
Subgrade = 1.97
Original Grnd = 0.72



116+25.00
Des Grade = 2.46
Subgrade = 1.96
Original Grnd = 0.68

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

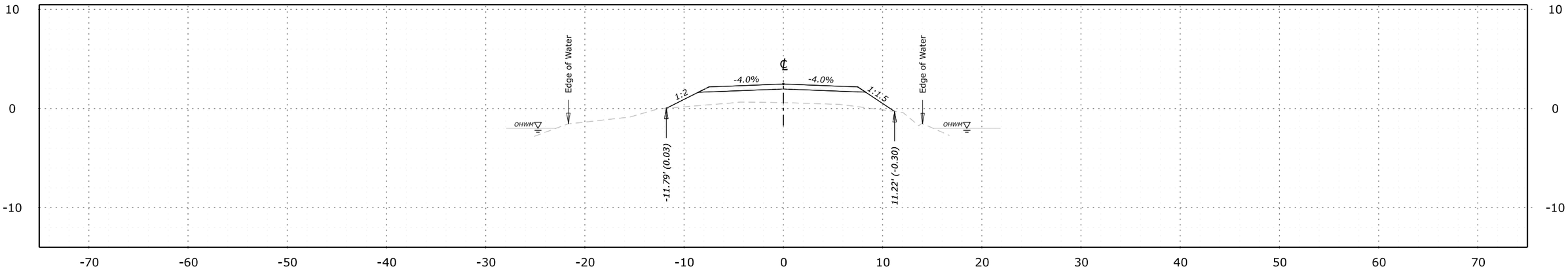
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

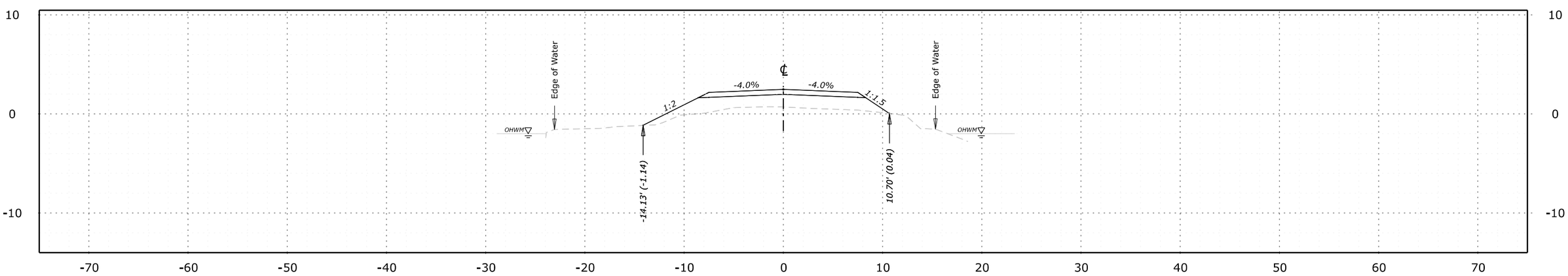
TROLLEY BED ROAD (ROUTE 404)
116+25 TO 116+50

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 116+25.00 [Sheet1]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T32
PWD TRACKING NUMBER: FY26-PAER-8386-01	



117+00.00
Des Grade = 2.48
Subgrade = 1.98
Original Grnd = 0.60



116+75.00
Des Grade = 2.47
Subgrade = 1.97
Original Grnd = 0.69

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

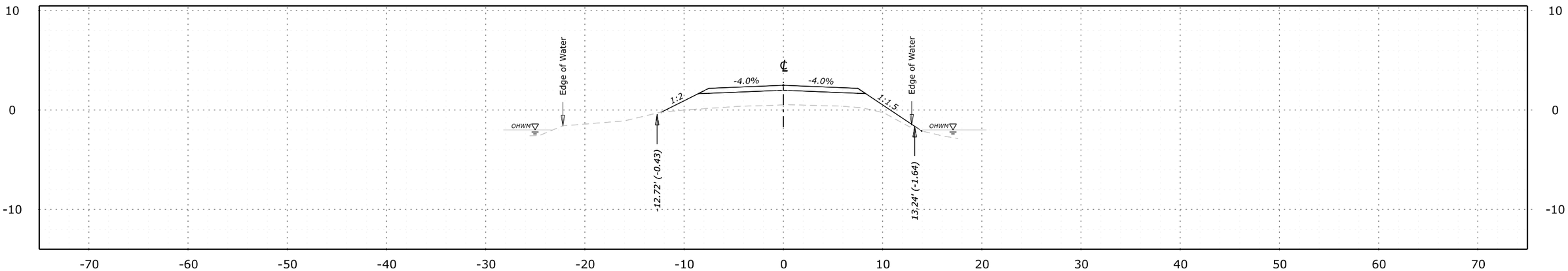
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

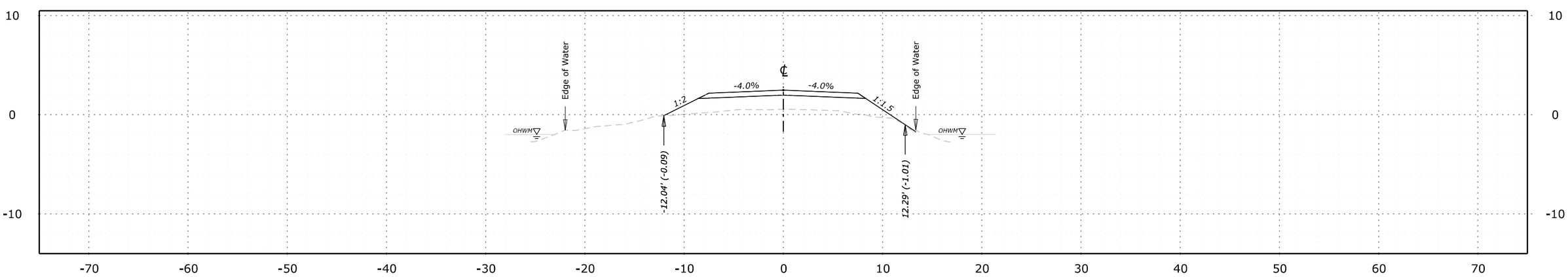
TROLLEY BED ROAD (ROUTE 404)
116+75 TO 117+00

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 116+75.00 [Sheet1]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T33
PWD TRACKING NUMBER: FY26-PAER-8386-01	



117+50.00
Des Grade = 2.48
Subgrade = 1.98
Original Grnd = 0.53



117+25.00
Des Grade = 2.48
Subgrade = 1.98
Original Grnd = 0.55

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
117+25 TO 117+50

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 117+25.00 [Sheet]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
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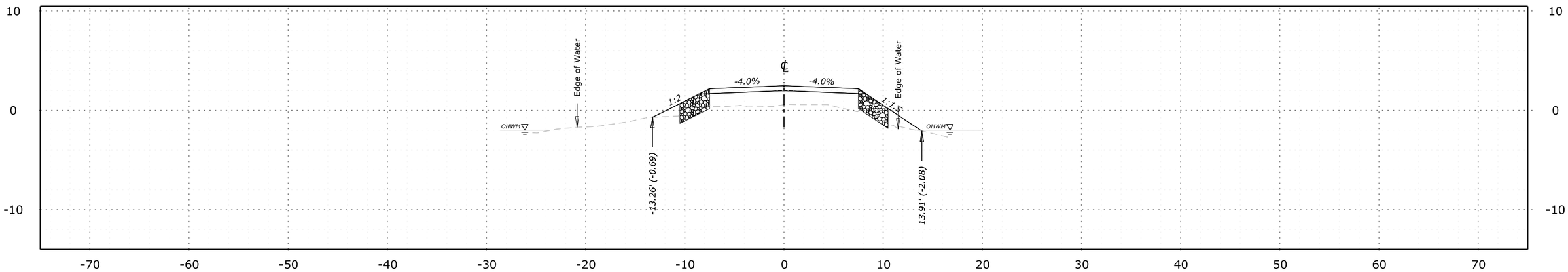
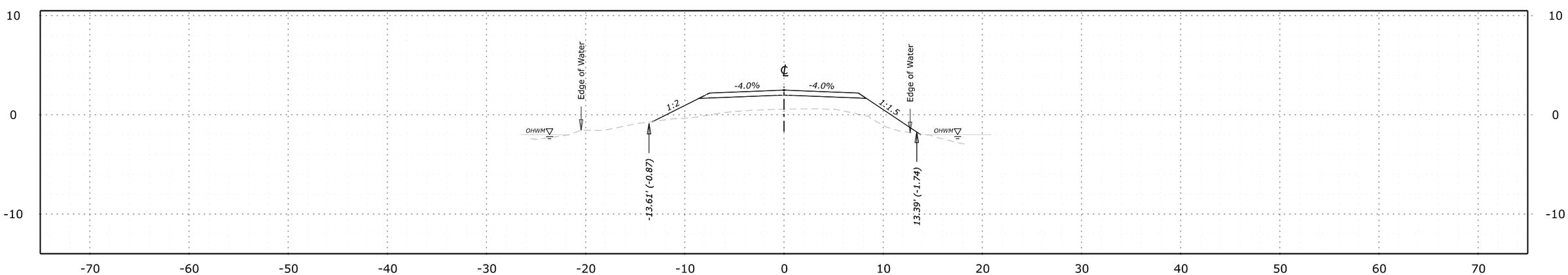
PWD TRACKING NUMBER: FY26-PAER-8386-01	



118+00.00
Des Grade = 2.49
Subgrade = 1.99
Original Grnd = 0.58



117+75.00
Des Grade = 2.49
Subgrade = 1.99
Original Grnd = 0.57

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
117+75 TO 118+00

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 117+75.00 [Sheet1]]
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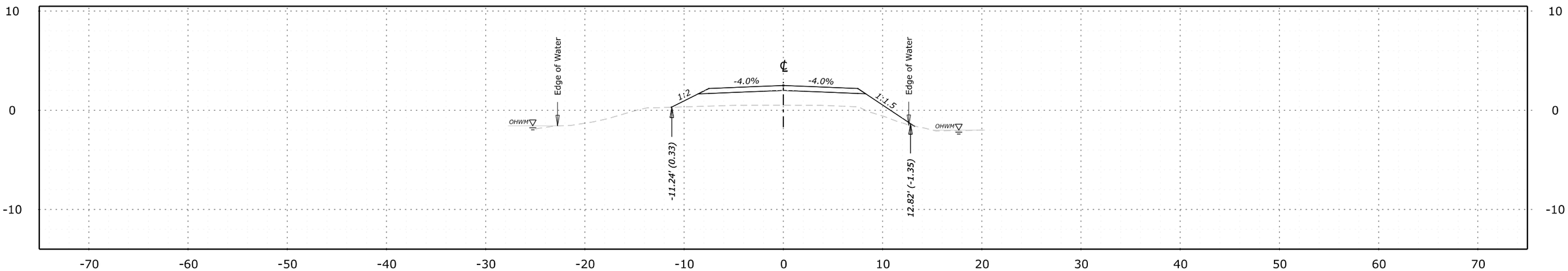
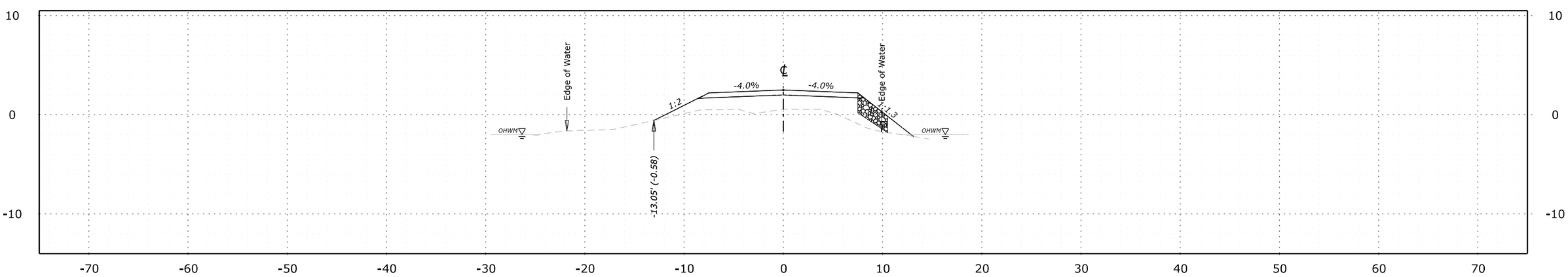
PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T35
PWD TRACKING NUMBER: FY26-PAER-8386-01	



118+50.00
Des Grade = 2.50
Subgrade = 2.00
Original Grnd = 0.52



118+25.00
Des Grade = 2.49
Subgrade = 1.99
Original Grnd = 0.56

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

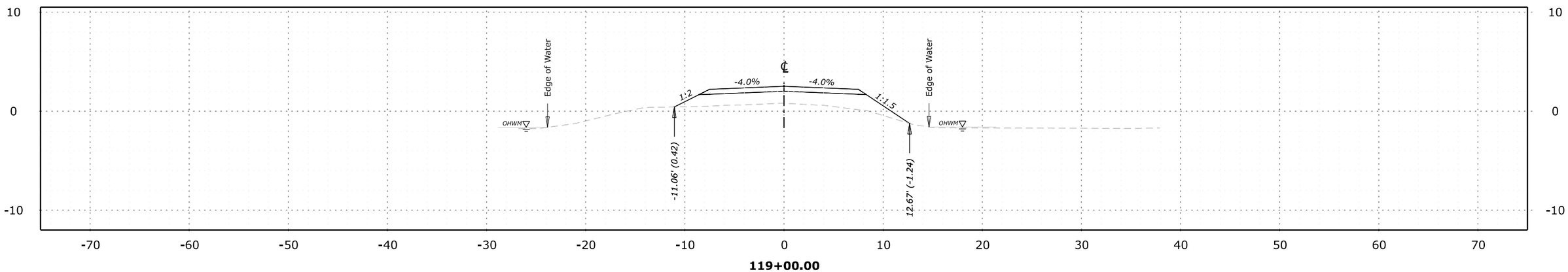
JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

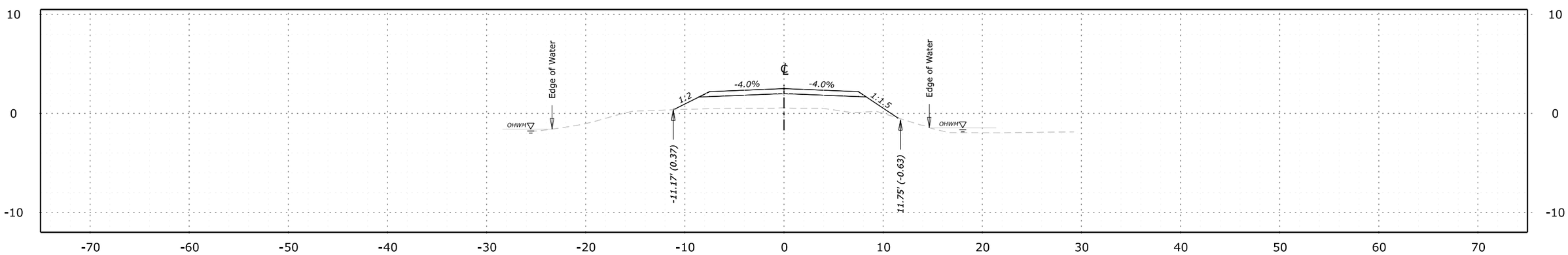
TROLLEY BED ROAD (ROUTE 404)
118+25 TO 118+50

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 118+25.00 [Sheet1]]
9 April 2026 12:39 PM

PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T36
PWD TRACKING NUMBER: FY26-PAER-8386-01	



119+00.00
Des Grade = 2.51
Subgrade = 2.01
Original Grnd = 0.79



118+75.00
Des Grade = 2.50
Subgrade = 2.00
Original Grnd = 0.59

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
118+75 TO 119+00

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 118+75.00 [Sheet1]]

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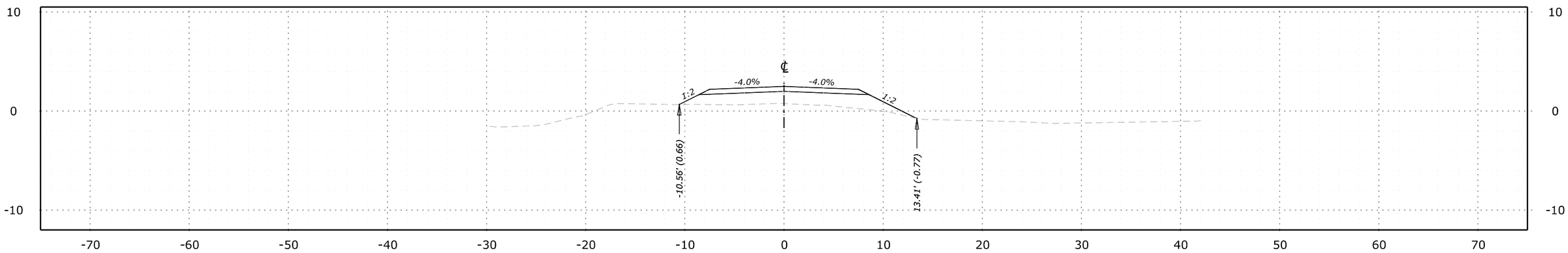
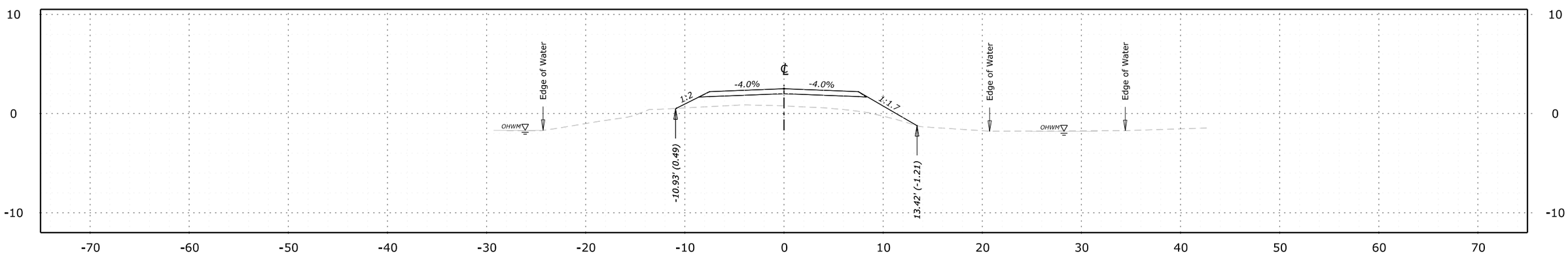
PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T37
PWD TRACKING NUMBER: FY26-PAER-8386-01	



119+50.00
Des Grade = 2.49
Subgrade = 1.99
Original Grnd = 0.75



119+25.00
Des Grade = 2.51
Subgrade = 2.01
Original Grnd = 0.78

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
119+25 TO 119+50

M:\PROJECTS_FWS\TCM\2020-1(1)\HWY_DES\CADD\T01-T040_PA ERFO FW TCM 2020-1(1)_xs.dgn [Trolley Bed Road BL - 119+25.00 [Sheet]]
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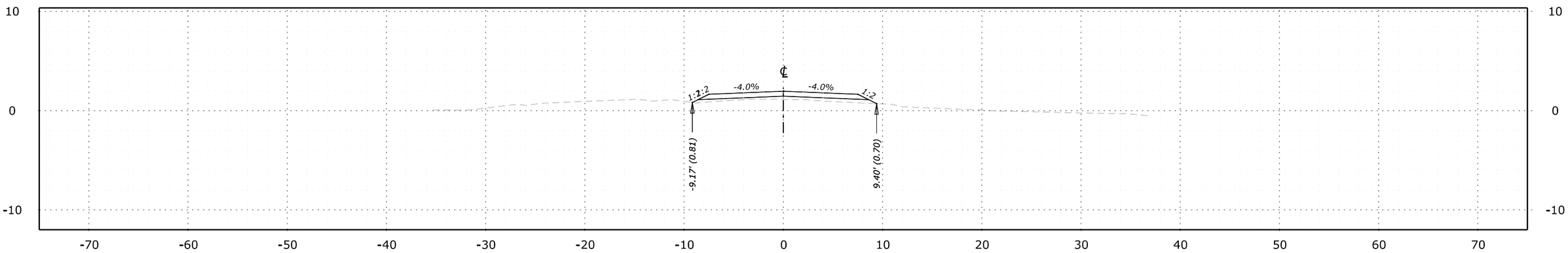
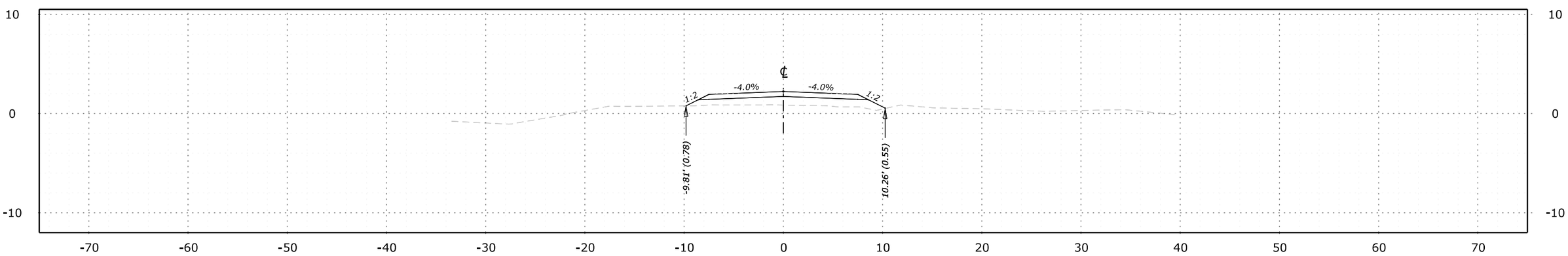
PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T38
PWD TRACKING NUMBER: FY26-PAER-8386-01	



120+00.00
Des Grade = 1.95
Subgrade = 1.45
Original Grnd = 1.12



119+75.00
Des Grade = 2.23
Subgrade = 1.73
Original Grnd = 0.87

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
119+75 TO 120+00

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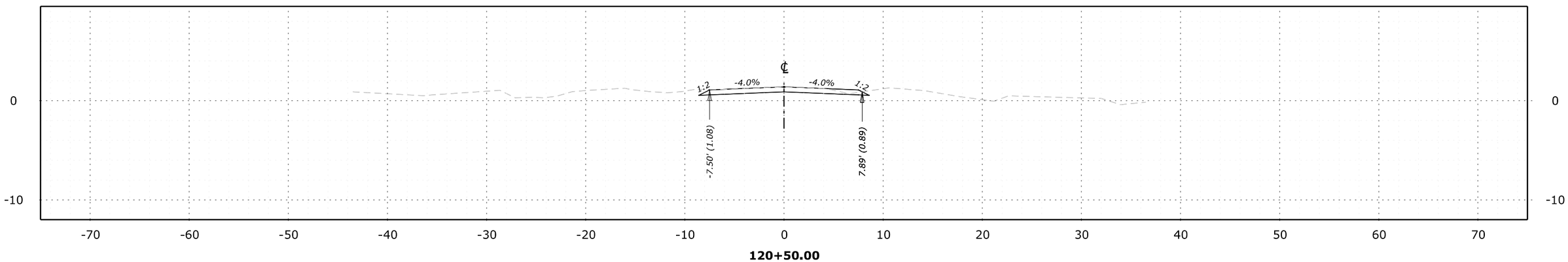
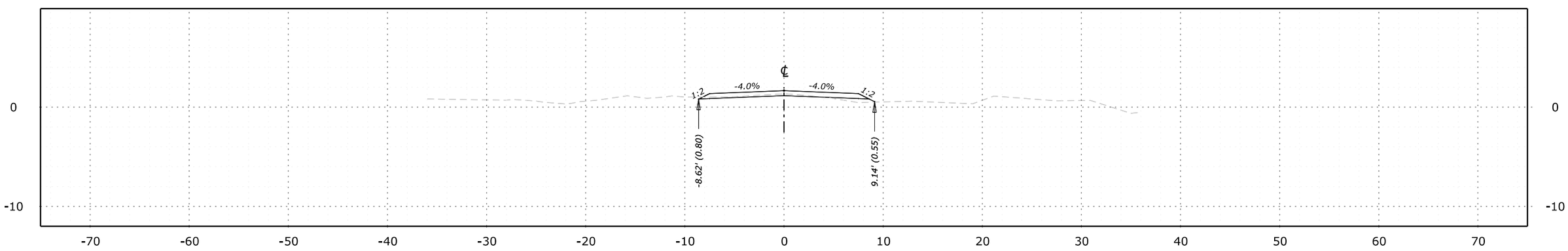
PROJECT	SHEET NUMBER
PA ERFO FW TCM 2020-1(1)	T39
PWD TRACKING NUMBER: FY26-PAER-8386-01	



120+50.00
Des Grade = 1.38
Subgrade = 0.88
Original Grnd = 1.38



120+25.00
Des Grade = 1.66
Subgrade = 1.16
Original Grnd = 1.34

NO.	DATE	BY	REVISIONS
1	3/26/26	BD	PWD REVISION 1

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

0 5 10
SCALE 1"=10'

JOHN HEINZ WILDLIFE REFUGE AT TINICUM

CROSS SECTIONS

TROLLEY BED ROAD (ROUTE 404)
120+25 TO 120+50

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