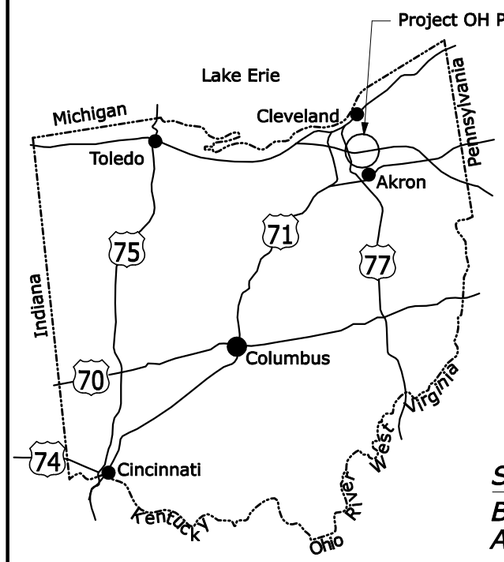
NPS NO.	REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
	MW	OH	CUVA 18(1)164(1) Acc Rd	A01	38



KEY MAP OF OHIO

U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

CUYAHOGA VALLEY NATIONAL PARK

PLANS FOR PROPOSED

CUYAHOGA MAINTENANCE ACCESS TO FITZWATER MAINTENANCE YARD - TEMPORARY ACCESS

PROJECT PRA CUVA 18(1), 164(1) Acc Rd

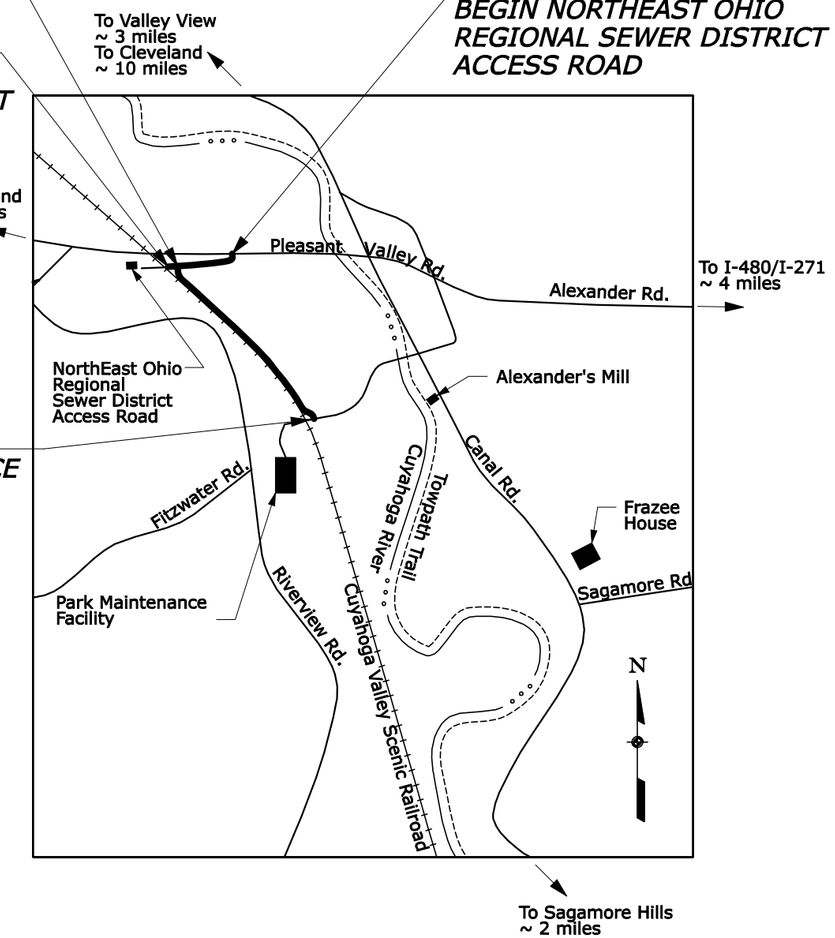
CUYAHOGA COUNTY, OHIO

STA. 200+05.00
BEGIN CUVA MAINTENANCE ACCESS ROAD

STA. 308+05.00
END NORTHEAST OHIO REGIONAL SEWER DISTRICT ACCESS ROAD

STA. 300+55.00
BEGIN NORTHEAST OHIO REGIONAL SEWER DISTRICT ACCESS ROAD

STA. 220+35.00
END CUVA MAINTENANCE ACCESS ROAD



INDEX TO SHEETS

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A01	TITLE SHEET
A02 - A03	CONVENTIONAL PLAN SYMBOLS & ABBREVIATIONS
A04 - A05	SITE PLAN
A06 - A09	SURVEY CONTROL
A10	STAKED CENTERLINE DATA
B01	TYPICAL SECTIONS
B02	MISCELLANEOUS DETAILS
C01	SUMMARY OF QUANTITIES
C02	TABULATION OF QUANTITIES
D01 - D02	NORTHEAST OHIO REGIONAL SEWER DISTRICT ACCESS ROAD PLAN & PROFILE SHEETS
D03 - D05	CUYAHOGA MAINTENANCE ACCESS ROAD PLAN & PROFILE SHEETS
D06	FITZWATER ROAD SELECTIVE CLEARING PLAN
M01	EROSION CONTROL NARRATIVE
S01	SILT FENCE DETAILS
S02	BENCHING DETAIL
S03 - S05	PIPE CULVERT STANDARDS
S06 - S07	U-CHANNEL POST SELECTION AND INSTALLATION DETAILS
S08	DELINEATOR DETAILS
S09	TEMPORARY TRAFFIC CONTROL ADVANCED SIGNING
S10	TEMPORARY TRAFFIC CONTROL SIGN INSTALLATION DETAILS
T01 - T06	CUYAHOGA MAINTENANCE ACCESS ROAD CROSS SECTION SHEETS
Z01	PIPE CULVERT CROSS SECTIONS

DESCRIPTION OF PROJECT

IMPROVEMENT: Rehabilitation of the Northeast Ohio Sewer District Access Road and New Construction of the CUVA Maintenance Yard Access Road - Temporary Access.

PROJECT LENGTH: 0.527 Miles

ROAD: Single Lane Road with a 10' Lane.

	WIDTH	TYPE
SURFACE:	10'-15'	Aggregate

DESIGN DESIGNATION:

ADT (2009)	<100
ADT (2029)	N/A
D	50/50
%Truck	No Data
V (MPH)	20 mph
C/A	None
e(max)	4%

SPECIFICATIONS:

"Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects", FP-03 U.S.Customary Units.

PLANS PREPARED BY

U.S. Department of Transportation
Federal Highway Administration

EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA
August, 2008

PROJECT MANAGER	LEAD DESIGNER
Arvind Patel	J. Michael Will

PMIS NO. 84320

9/3/2008 8:52:26 AM N:\OH\cuva18(1)164(1)\Roadway\sheets\A-Gen_sht\Temp Access\TTL_Template_Access Road.dgn

REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	A02

ABBREVIATIONS

	℄	centerline
	Δ	curve delta
A	abut.	abutment
	ADT	average daily traffic
	aggr.	aggregate
	AH	ahead
	alt.	alternate
	appr.	approach
	asph.	asphalt
B	b.f.	both faces
	beg.	beginning,begin
	BK	back
	BM	bench mark
	BP	balance point
	br.	bridge
	brg.	bearing
C	CBC	concrete box culvert
	c-c	center to center
	clr.	clear
	CMP	corrugated metal pipe
	Co.	county
	col.	column
	conc.	concrete
	constr.	construction
	constr. jt.	construction joint
	cont.	continuous
	corr.	corrugated
	cr.	creek
	CS	point of curve to spiral
	ctrs.	centers
	CTSM	contingent sum
	culv.	culvert
D	decr.	decrement
	DHV	design hour volume
	DI	drop inlet
	dia. or D	diameter
	diag.	diagonal
	diaph.	diaphragm
	dist.	distance
	Dist.	district
	DLC	donation land claim
	dwg(s).	drawing(s)
E	E	east
	e	superelevation rate
	El. 94.066	elevation with number
	elev.	elevation
	emb.	embankment
	engr(s).	Engineer(s)
	EOP	edge of pavement
	EQ or eq.	equation
	ER	edge of road
	et al	and others
	et ux	and wife
	EW	edge of water
	exc.	excavation
	exp. jt.	expansion joint
	ext.	exterior
F	f.f.	fill face
	Fed.	federal
	FES	flared end section
	fin.	finish
	ftg.	footing
G	ga.	gage (gauge)
	galv.	galvanized
	gdr.	girder
H	hdwl.	headwall
	HES	homestead entry survey
	hex.	hexagon
	horiz.	horizontal
	HW	high water
	hwy.	highway
I	ID	inside diameter
	incl.	inclusive,including
	incr.	increment
	int.	interior
J	jt.	joint
L	L	length of curve
	lam.	lamination
	lat.	latitude
	long.	longitudinal
	LPSM	lump sum
	Lt. or LT	left
	LW	low water
M	mag.	magnetic
	maint.	maintenance
	matl.	material
	max.	maximum
	min.	minimum
	mon.	monument
	mtn(s).	mountain(s)
N	N	north
	NC	normal crown
	neg.	negative
	no. or #	number
O	o.c.	on centers
	o.f.	other face
	OD	outside diameter
P	PC	point of curve
	PCC	point of compound curve
	perf.	perforate
	PI	point of intersection
	pl.	plate
	POC	point on curve
	POS	point on spiral
	POT	point on tangent
	proj.	project
	psi	pounds per square inch
	PT	point of tangent
	pvmt.	pavement
Q	quant., Qty	quantities
R	R	radius
	R.	range
	R/W	right-of-way
	rd.	road
	rdwy.	roadway
	reconst.	reconstruction
	reinf.	reinforcement
	reqd.	required
	res.	reservoir
	Res.	Reservation
	ret. wall	retaining wall
	RH	reference hub
	Rt. or RT	right
	rte.	route
S	S	south
	SADT	seasonal average daily traffic
	SC	point of spiral to curve
	sec.	section
	shldr.	shoulder
	spa.	spacing, Spaces or Spaced
	spec.	specification
	st.	street
	ST	point of spiral to tangent
	sta.	station
	std.	standard
	stiff.	stiffener
	str.	straight
	struc.	structural
	sym.	symmetrical
T	T	tangent length
	T.	township
	tan.	tangent
	TBM	temporary bench mark
	TCE	temporary construction easement
	transv.	transverse
	TS	point of tangent to spiral
	typ.	typical
V	V	design speed
	vert.	vertical
	vph	vehicles per hour
	VPI	vertical point of intersection
W	W	west

DRAINAGE SYMBOLS

Ditch (Existing, Proposed)

Flow Arrow

Drainage or Small Creek

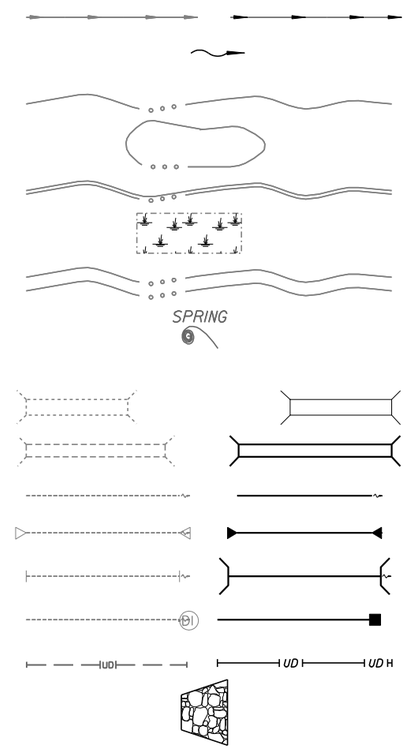
Lake, Pond or Reservoir

Large Creek

Wetland

River

Spring



Bridge (Existing, Proposed)

Box Culvert (Existing, Proposed)

Pipe Culvert (Existing, Proposed)

With End Sections (Existing, Proposed)

With Headwalls (Existing, Proposed)

With Drop Inlet (Existing, Proposed)

Underdrain (Existing, Proposed)

Riprap Apron (Proposed)

EROSION CONTROL SYMBOLS

Mulching, Bonded Fiber Matrix

Check Dam

Diversion Berm

Erosion Control Mat

Riprap

Sediment Log at:

Culvert Inlet With End Section

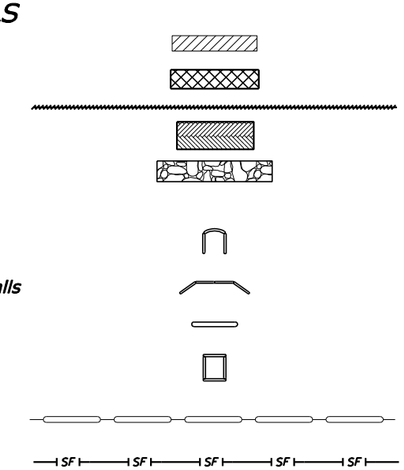
Culvert Inlet With Head and/or Wing Walls

Ditch and/or Cut Slope

Drop Inlet

Slope Protection (Wattle)

Silt Fence



FENCE & CATTLEGUARD SYMBOLS

Fence (Existing, Proposed)

Fence w/ Gate (Existing, Proposed)

Cattleguard (Existing, Proposed)

GEOLOGIC SYMBOLS

Boring Location (Existing, Proposed)

Material Source

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

U.S. CUSTOMARY

CONVENTIONAL PLAN SYMBOLS AND ABBREVIATIONS

Sheet 1 of 2

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REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	A03

LANDSCAPING & VEGETATION SYMBOLS

Tree

Treeline

MAPPING SYMBOLS

Building (Existing, Proposed)

Coordinate Grid Tick

North Arrow

Railroad
- Single Track
- Double Track

Spot Elevation — 999.9

Trail

Traverse Point (Horizontal & Vertical)

RIGHT-OF-WAY SYMBOLS

Boundaries
- National
- State
- County
- City
- Township or Range Line
- Section
- ¼ Section
- 1/16 Section
- Bureau of Indian Affairs
- Bureau of Land Management
- National Forest
- National Park
- National Wildlife Refuge

Easements
- Construction & Maintenance — CME
- Permanent (Existing) — P/E
- Permanent (Proposed) — P/E
- Temporary (Proposed) — TCE

Monument (As described)

Parcel Number — 400

Property Line — P/L
Right-of-Way Line (Existing) — r/w
Right-of-Way Line (Proposed) — R/W

Section Corner (Found, Projected) — 36 31 1 6

¼ Section Corner (Found, Projected) — 15 22

1/16 Section Corner (Found) — 1/16

GUARDRAIL, BARRIER & WALL SYMBOLS

Guardrail (Existing, Proposed)

Guardwall (Existing, Proposed)

Median & Side Barrier (Existing, Proposed)

Retaining Wall (Existing, Proposed)

ROADWAY SYMBOLS

Clearing/Construction Limits

Slope Stake Limits
- Top of Cut
- Transition
- Toe of Fill

Edge of Roadway
- Existing
- Proposed

Roadway Centerline (With Station ticks)

Roadway Obliteration

SIGN SYMBOLS

Signs
- Commercial (Existing, Proposed)
- Delineator (Existing, Proposed)
- Portable (Proposed)
- Post Mounted (Existing, Proposed)

UTILITY SYMBOLS

Irrigation Ditch
- Underground (Existing, Proposed) — IRR
- Surface (Existing, Proposed) — IRR

Support Pole (Existing, Proposed)

Support Pole Anchor (Existing, Proposed)

Street Light (Existing, Proposed)

Telephone Booth (Existing, Proposed) — TB

Telephone Pedestal (Existing, Proposed) — TP

Underground Utility (Existing, Proposed)
- CATV — TV
- Fiber Optic — FO
- Gas — G
- Oil — O
- Power — P
- Sanitary Sewer — SS
- Telephone — T
- Water — W

Overhead Utility Line (Existing, Proposed)
- CATV — TV
- Fiber Optic — FO
- Power — P
- Telephone — T

MISCELLANEOUS SYMBOLS

See Note 4 — 4

PROJECT SPECIFIC SYMBOLS

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

U.S. CUSTOMARY

CONVENTIONAL PLAN SYMBOLS AND ABBREVIATIONS

Sheet 2 of 2

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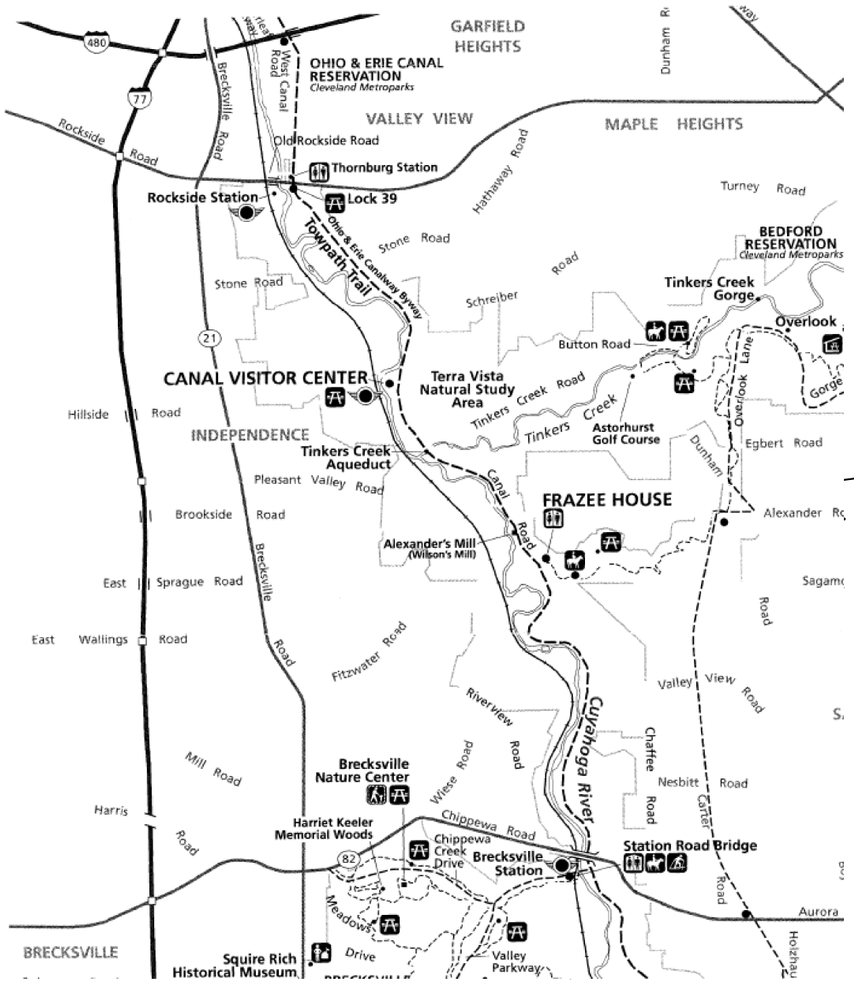
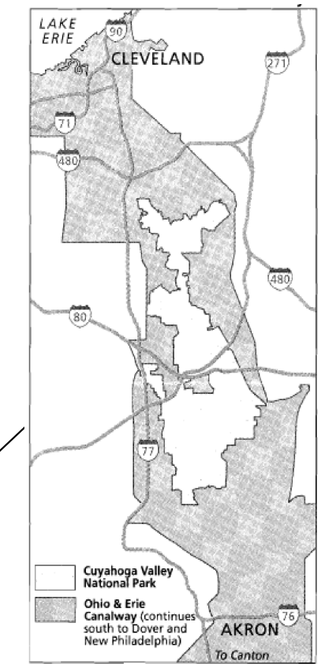
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	A04



0 5,000 10,000
SCALE IN FEET

N

Project CUVA MAINTENANCE ACCESS



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

SITE PLAN
(SHEET 1 OF 2)

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REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Fitzwater Bridges	A05

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

SITE PLAN

(SHEET 2 OF 2)

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NPS PMIS NO.: 84320

REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	A06

Point	Northing	Easting	Elevation	Description
100	613704.6866	2216481.5937	618.7649	Photo Point
101	614604.0360	2216230.1210	616.1976	Photo Point
102	614439.1300	2215557.6122	727.5935	Photo Point
103	615288.1061	2215853.2618	621.4602	Photo Point
104	616018.5804	2215570.0130	622.9305	Photo Point
105	615933.6480	2214975.0536	719.7410	Photo Point
106	616943.1228	2215257.4071	627.6613	Photo Point
107	617688.4189	2214542.9286	617.1954	Photo Point
108	617380.4572	2213876.0210	619.4181	Photo Point
109	618033.9846	2214123.2020	615.8193	Photo Point
110	618052.1607	2215087.6196	617.7463	Photo Point
111	618563.1096	2213645.9784	614.0402	Photo Point
112	619102.7375	2213125.6289	612.6892	Photo Point
113	620642.1838	2212869.3086	617.0891	Photo Point
114	620696.2538	2213237.9999	612.9598	Photo Point
115	620659.3734	2213577.8946	612.0983	Photo Point
116	620680.8212	2214065.5036	615.0236	Photo Point
117	620845.3077	2214692.8283	616.3091	Photo Point
118	620007.3956	2215491.7443	615.8960	Photo Point
119	619820.4531	2213487.4845	614.5530	Photo Point
120	619665.8949	2215936.3199	630.5702	Photo Point
121	619299.8219	2214536.0866	622.2195	Photo Point
122	619128.2832	2215113.6087	620.6390	Photo Point
123	618597.4542	2216920.4543	732.1678	Photo Point
124	618660.4686	2216764.7420	729.8738	Photo Point
125	618342.2912	2215970.2214	619.9305	Photo Point
126	618131.3339	2215706.5894	628.1694	Photo Point
128	617723.1275	2217524.0952	734.6698	Photo Point
129	617755.2105	2217771.8334	740.5944	Photo Point
130	616817.2859	2218352.0937	746.0829	Photo Point
131	617101.4646	2216795.3382	628.6642	Photo Point
132	616917.2332	2216119.6936	615.4223	Photo Point
133	616286.8620	2217067.2503	628.9432	Photo Point
134	615520.6429	2217711.1540	626.4770	Photo Point
135	614749.4565	2218003.1684	628.0585	Photo Point
136	615080.4371	2218878.0651	636.8950	Photo Point
137	615141.3165	2219291.4936	651.5138	Photo Point
138	621344.0725	2215866.4848	621.1494	Photo Point
3000	617652.4186	2216434.4388	641.3356	Monument
3001	617239.9306	2216722.1670	626.0749	Monument

Notes:

1) Horizontal Datum is NAD83 (1995) SPC Ohio North expressed in U.S. Survey Feet (3.28083333333 Feet=1 Meter) with a combined scale factor of 0.99991884635 PID #MB1812 (NGS Monument) was held for horizontal and vertical datum.

2) Vertical Datum is NAVD 88.

3) Note: Reference Sketchs are not to scale.

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

SURVEY CONTROL

SHEET 1 OF 4

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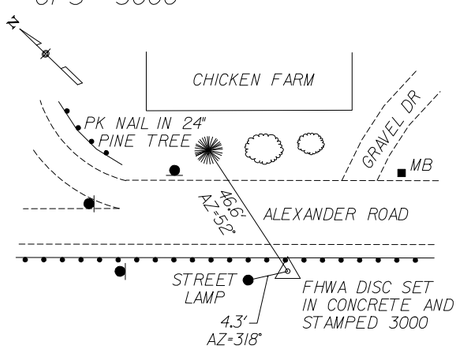
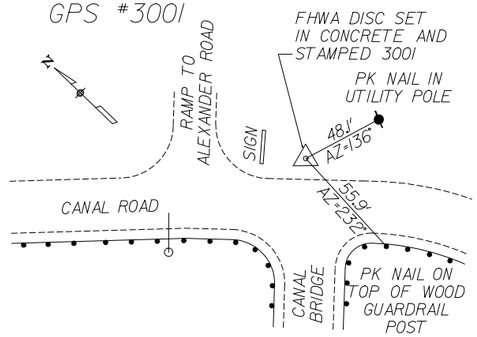
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	A07

GPS #3000



GPS #3001



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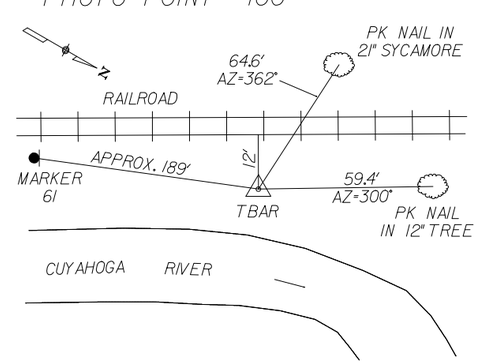

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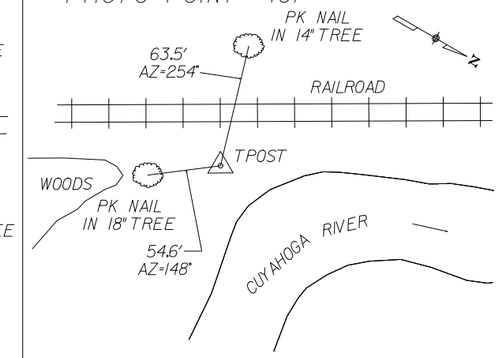

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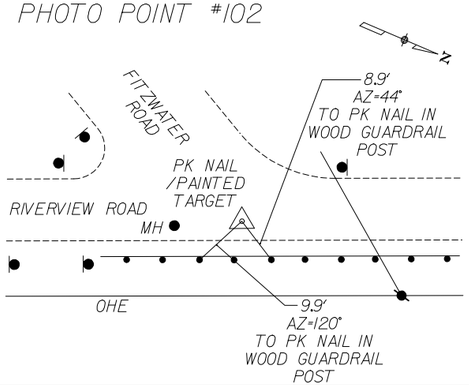

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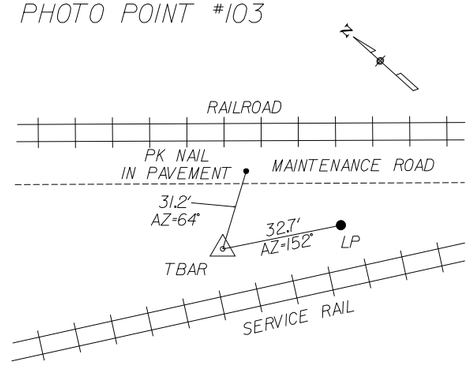

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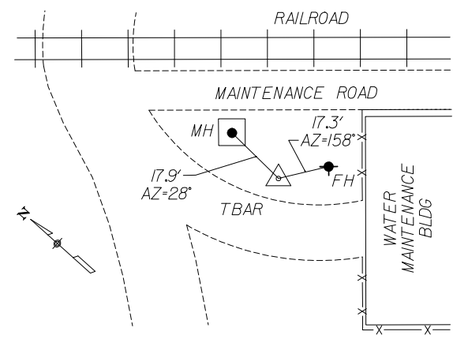

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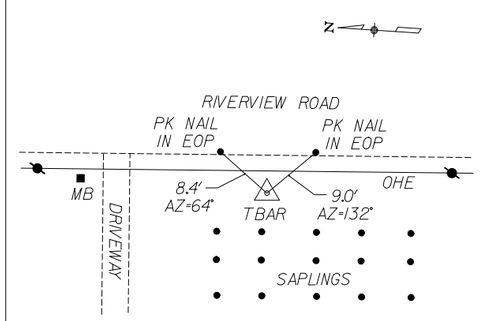

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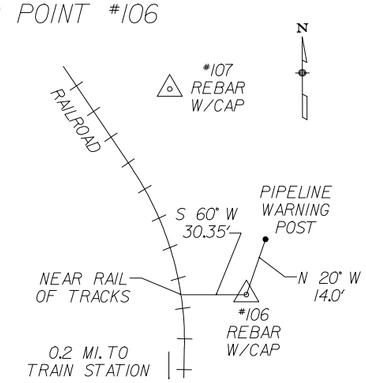

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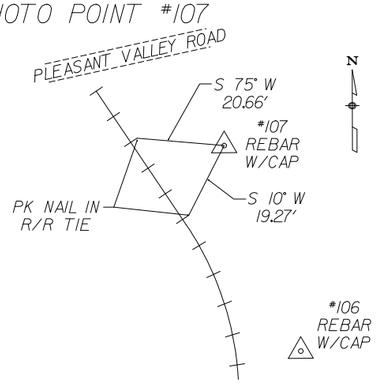

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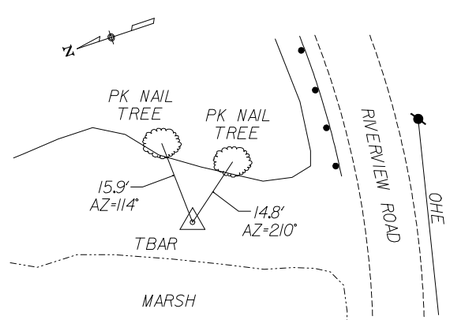

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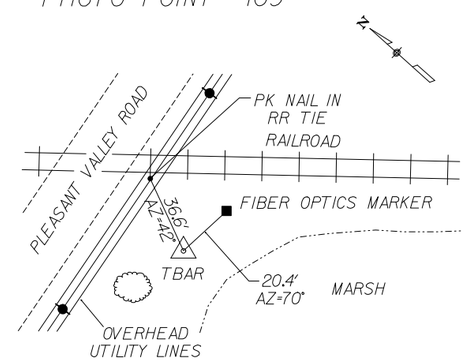

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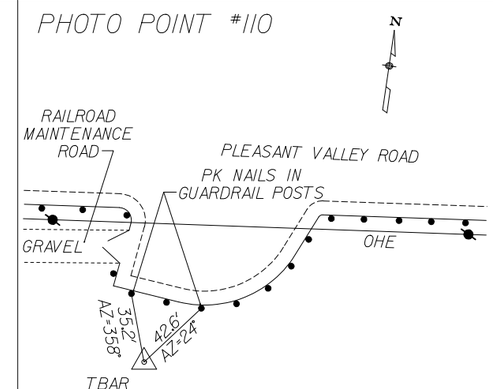

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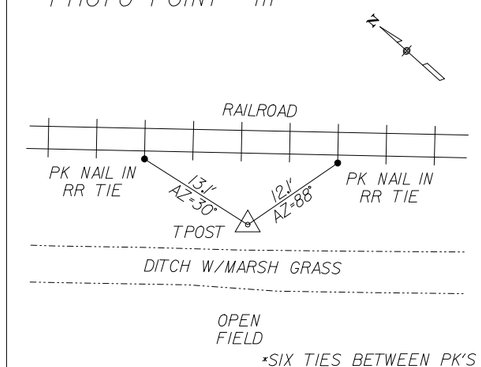

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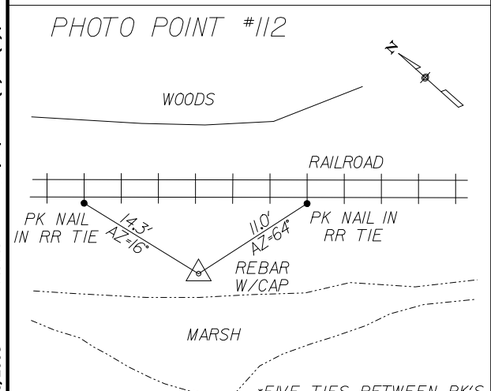

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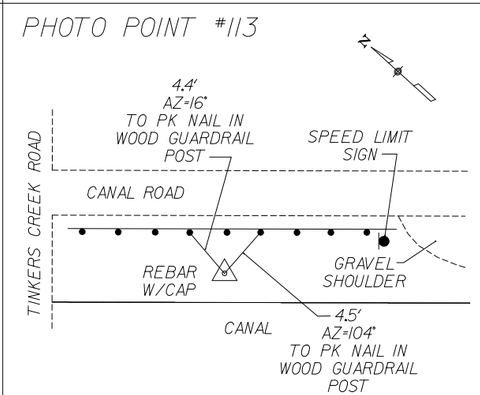

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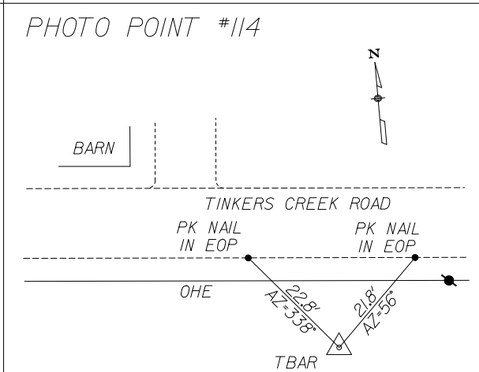

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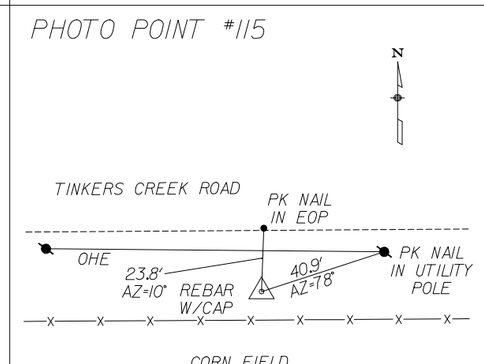


REFERENCES NOT DRAWN TO SCALE

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

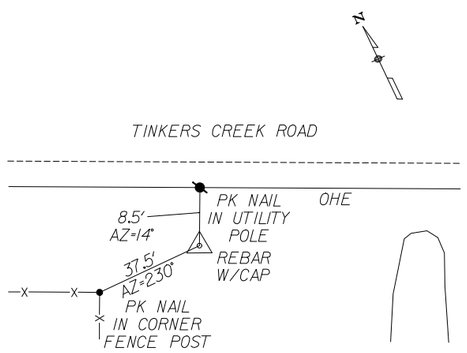
SURVEY CONTROL

SHEET 2 OF 4

8/20/2008 1:23:26 PM n:\oh\cuva18(1)164(1)\roadway\sheets\a-gen_sht\temp access\SURVEY CONTROL_Cuva18(1)2dv8.dgn

REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	A08

PHOTO POINT #116



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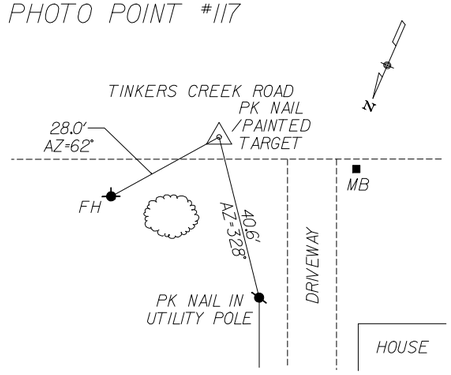

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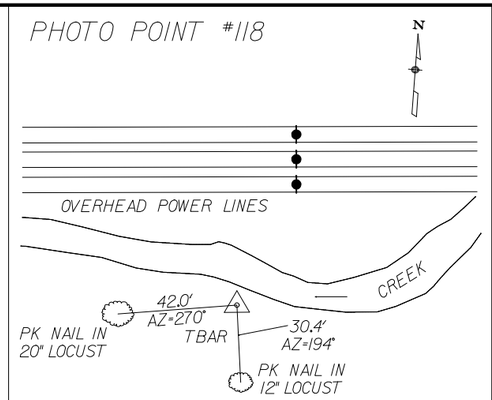

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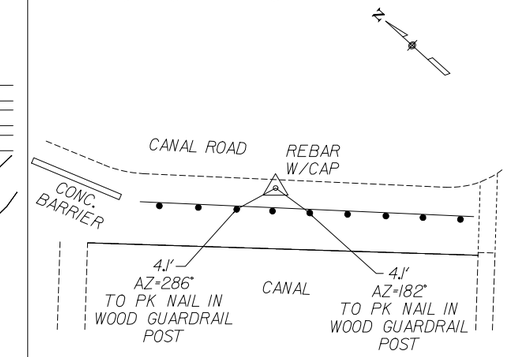

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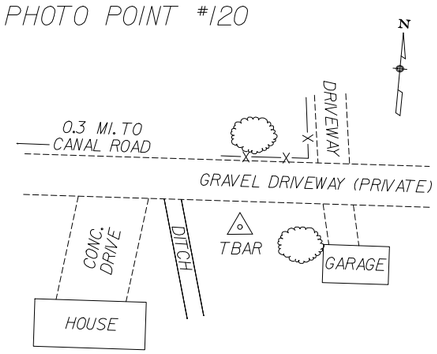

* NO REFERENCES - PRIVATE PROPERTY

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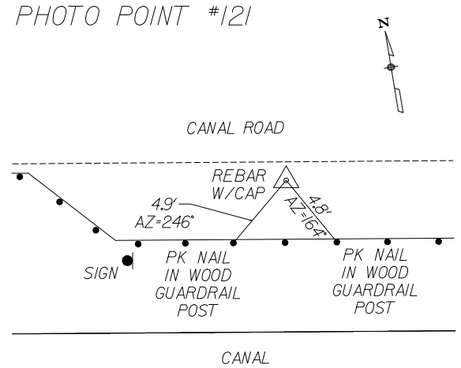

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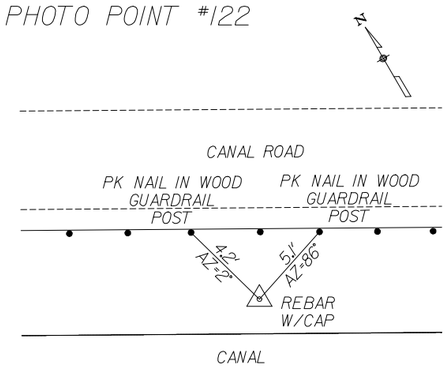

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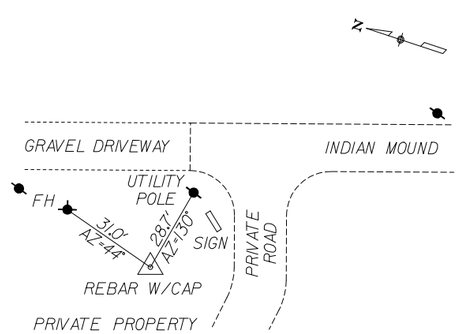

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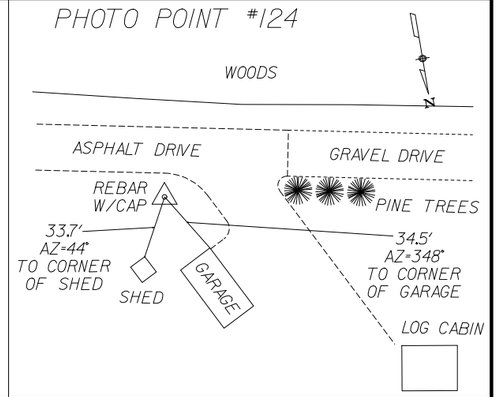

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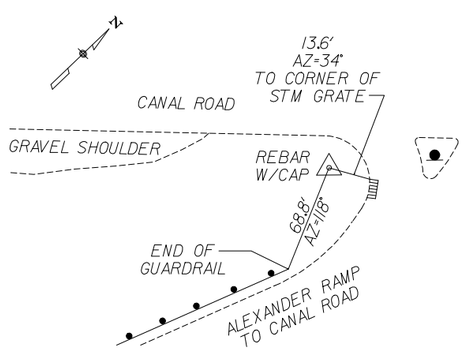

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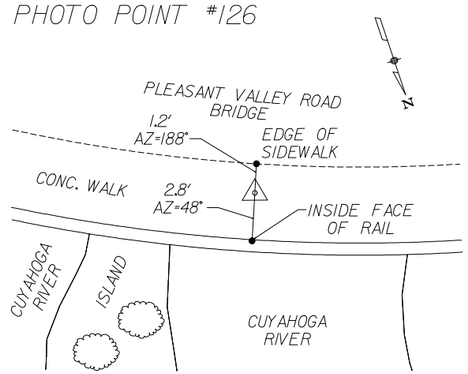

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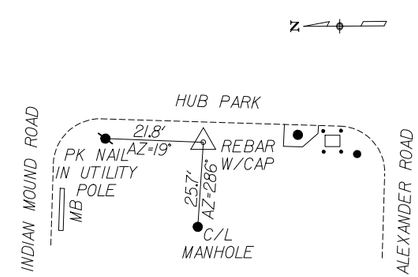

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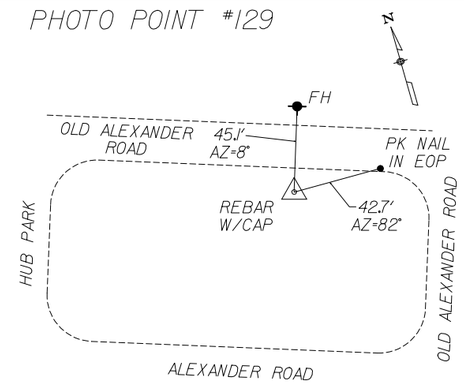

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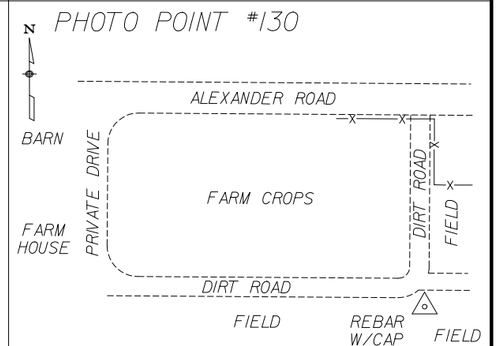
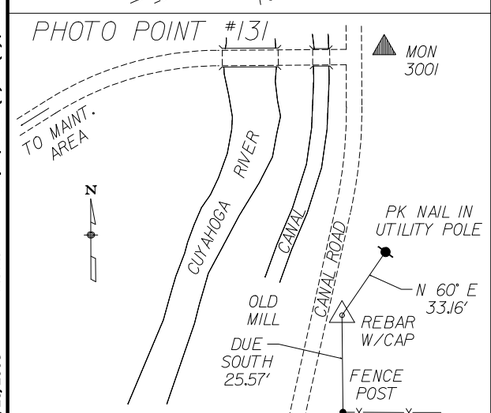


* NO REFERENCES - PRIVATE PROPERTY
STOP AT FARM HOUSE BEFORE ENTERING

PHOTO POINT #131



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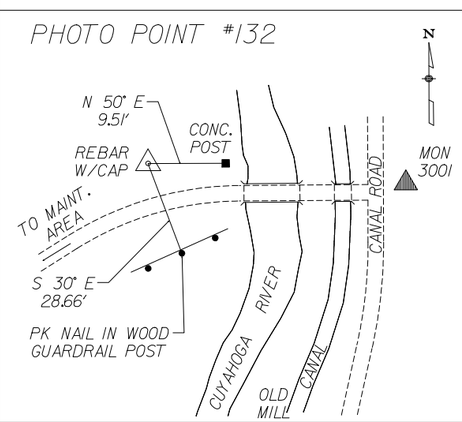

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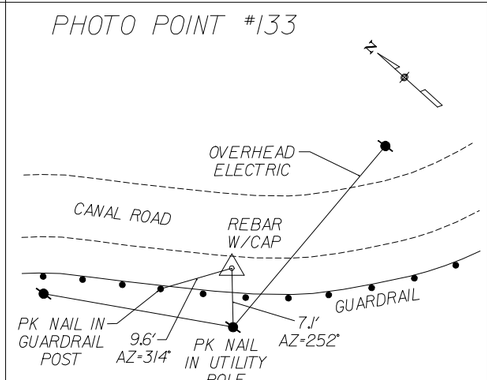

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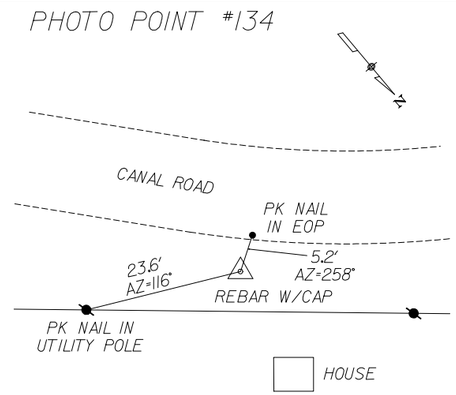

REFERENCES NOT DRAWN TO SCALE

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

SURVEY CONTROL

SHEET 3 OF 4

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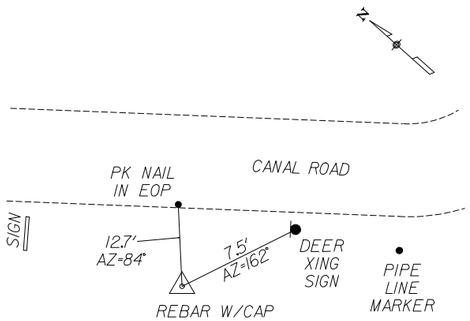
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	A09

PHOTO POINT #135



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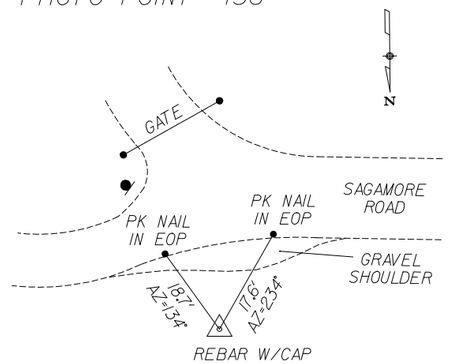

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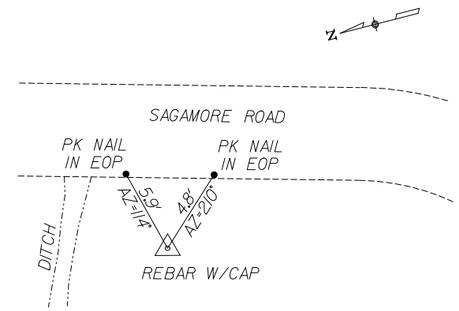

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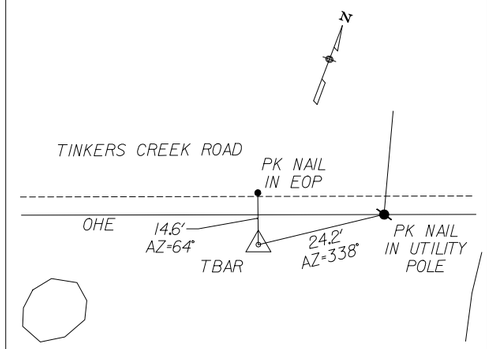

REFERENCES NOT DRAWN TO SCALE

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

SURVEY CONTROL

SHEET 4 OF 4

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REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	A10

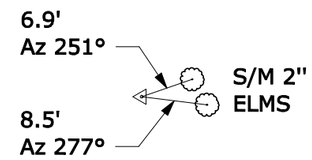
Maintenance Access Rd.

STATION	ELEV.	TYPE
200+50.000	608.440	NAIL
200+87.124	608.305	T-BAR
201+00.000	609.849	NAIL
201+50.000	617.026	NAIL
201+50.000	616.947	NAIL
201+60.190	617.126	T-BAR
202+00.000	617.479	NAIL
202+50.000	617.175	NAIL
203+00.000	617.201	NAIL
203+50.000	617.696	NAIL
204+00.000	617.773	NAIL
204+50.000	617.543	NAIL
205+00.000	617.422	NAIL
205+50.000	617.585	NAIL
206+00.000	616.711	NAIL
206+50.000	616.558	NAIL
207+00.000	617.822	NAIL
207+50.000	618.298	NAIL
208+00.000	619.068	NAIL
208+50.000	618.874	NAIL
209+00.000	618.833	NAIL
209+23.719	618.738	T-BAR
209+50.000	618.299	NAIL
210+00.000	618.157	NAIL
210+50.000	617.760	NAIL
210+85.434	618.862	T-BAR
211+00.000	619.001	NAIL
211+50.000	619.316	NAIL
212+00.000	623.278	NAIL
212+50.000	625.754	NAIL
213+00.000	625.498	NAIL
213+50.000	621.695	NAIL
214+00.000	625.275	NAIL
214+50.000	623.837	NAIL
215+00.000	620.273	NAIL
215+45.134	616.337	T-BAR
215+50.000	616.810	NAIL
216+00.000	616.402	NAIL
216+50.000	616.073	NAIL
216+86.516	617.212	T-BAR
217+00.000	617.362	NAIL
217+50.000	618.001	NAIL
218+00.000	617.978	NAIL
218+50.000	617.774	NAIL
219+00.000	617.623	NAIL
219+29.876	617.597	T-BAR
219+50.000	616.720	NAIL
220+00.000	616.354	NAIL
220+15.501	612.630	T-BAR
220+43.266	616.484	PK

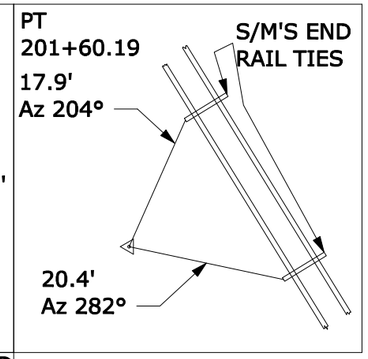
POT
200+00=
307+26.56

T-BAR ℄ ◁ NO REF. NEEDED
ACCESS RD.

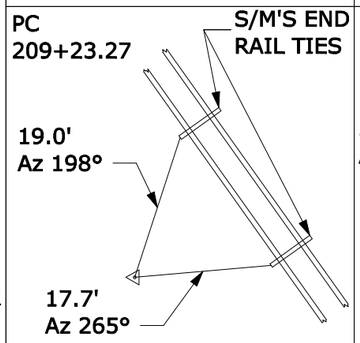
POT
200+87.12



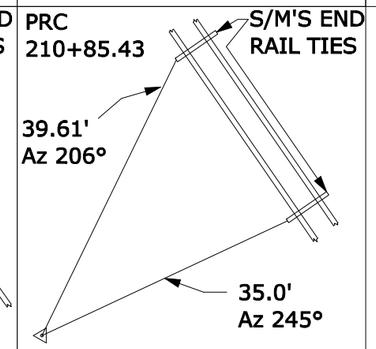
PT
201+60.19



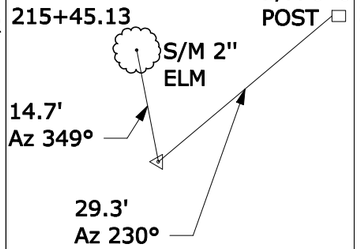
PC
209+23.27



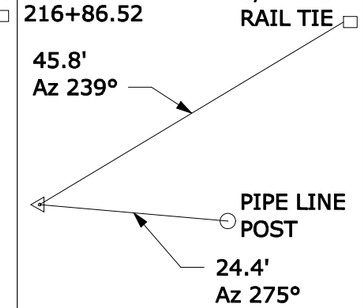
PRC
210+85.43



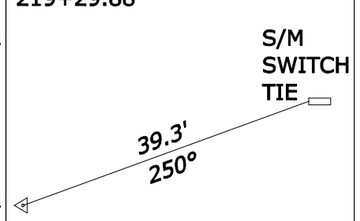
PRC
215+45.13



PRC
216+86.52



PRC
219+29.88



POT
220+43.27

PAINTED ON
PAVEMENT

Northeast Ohio Regional Sewer District Access Rd.

STATION	ELEV.	TYPE
300+00.000	623.326	PK
300+15.676	622.848	PK
300+25.000	622.332	PK
300+48.852	621.286	PK
300+50.000	621.197	PK
301+00.000	618.585	NAIL
301+50.000	616.178	NAIL
302+00.000	614.499	NAIL
302+50.000	613.402	NAIL
303+00.000	611.439	NAIL
303+50.000	610.683	NAIL
304+00.000	610.319	NAIL
304+50.000	610.014	NAIL
305+00.000	610.732	NAIL
305+50.000	610.966	NAIL
306+00.000	610.579	NAIL
306+50.000	610.564	NAIL
307+00.000	610.781	NAIL
307+26.560	611.825	T-BAR
307+50.000	612.908	NAIL
308+00.000	617.282	NAIL
308+08.447	618.312	T-BAR

POT
300+00

⌖ Painted
in Road

PC
300+15.68

⌖ Painted
On Paved
Shoulder

PT
300+48.05

⌖ Painted
and Under
Gate

POT
308+08.45

◁ Sta. Painted
on ties

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

STAKED CENTERLINE DATA

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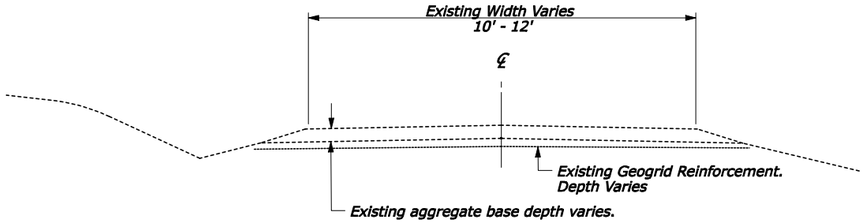
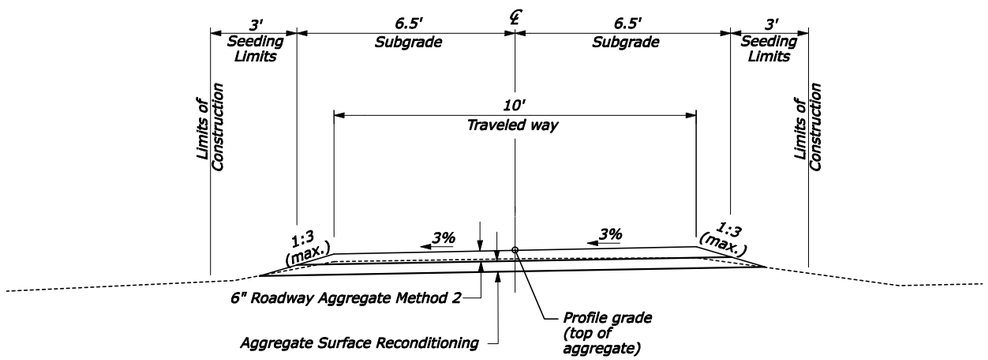
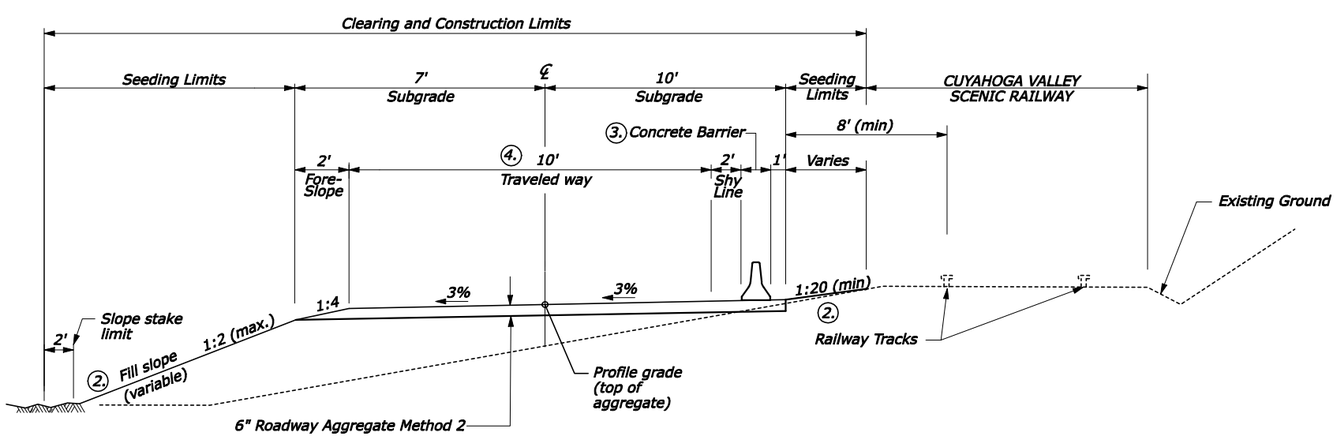
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	B01



EXISTING TYPICAL SECTION
NORTHEAST OHIO REGIONAL SEWER DISTRICT ACCESS ROAD
Station 300+55.00 to 308+05.00



TYPICAL SECTION
NORTHEAST OHIO REGIONAL SEWER DISTRICT ACCESS ROAD
Station 300+55.00 to 308+05.00



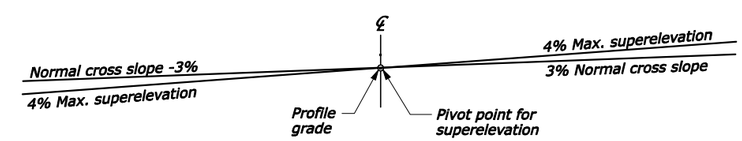
TYPICAL SECTION
CUVA MAINTENANCE ACCESS ROAD
Station 200+05.00 to 220+35.00

NOTE:

1. The gradient and width of roadway ditches and the excavation and embankment slope ratios may be adjusted by the contracting officer to assure adequate drainage and stability.
2. See the cross sections for cut and fill slope ratios.
3. Concrete Barrier will not be fabricated by the Contractor. 32" Precast Concrete Barrier may be used for this project. See Section 618 of the Special Contract Requirements.
4. Construct curve widening as shown in the plans. Apply the widening on the inside of curves throughout the superelevated sections. Transition the curve widening to coincide with the superelevation transitions.

LENGTH OF PROJECT

Station to Station	Length (ft)
CUVA MAINT. ACCESS ROAD 200+05 TO 220+35	2,030
NEORSD ACCESS ROAD 300+55 to 308+05	750
TOTAL (ft)	2,780
TOTALS (mile)	0.527



METHOD OF SUPERELEVATION ON CURVES
See plans for locations of curves and superelevations

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

TYPICAL SECTIONS
MAINLINE

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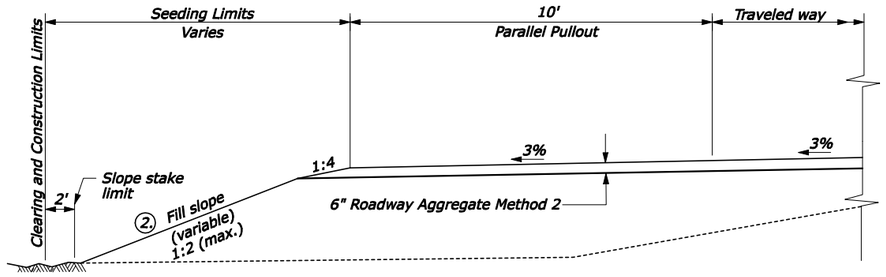
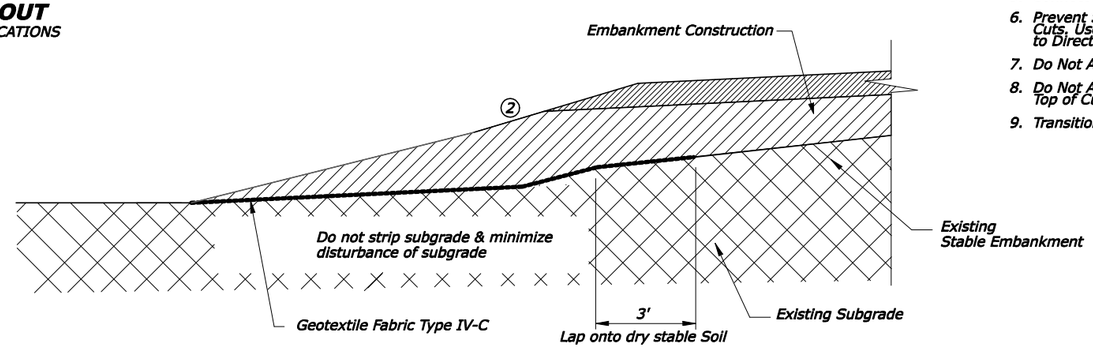
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Fitzwater Bridges	B02



TYPICAL PULLOUT
SEE PLAN SHEETS FOR LOCATIONS

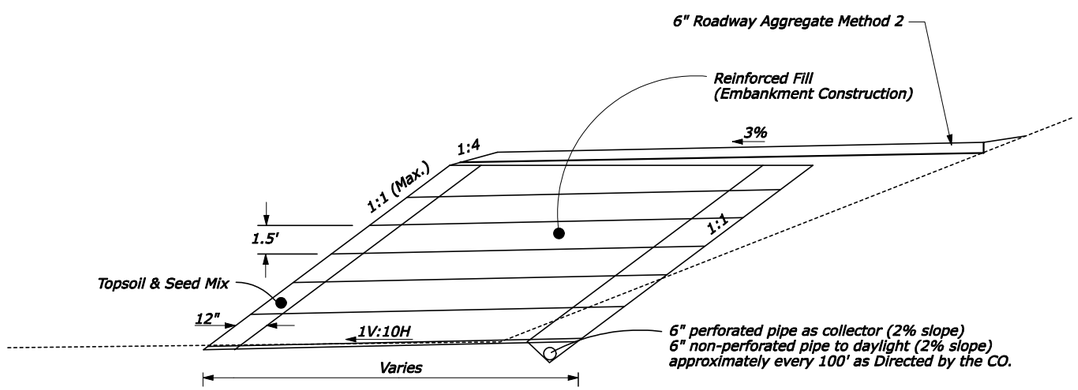
NOTE:

1. The gradient and width of roadway ditches and the excavation and embankment slope ratios may be adjusted by the contracting officer to assure adequate drainage and stability.
2. See the cross sections for cut and fill slope ratios.
3. The geogrid Reinforcement Length Varies in Length for each Reinforced Soil SLope (RSS) Structure.
4. Place a minimum of 6" embankment material over the upper geogrid. With the CO's Approval, Reduce the Vertical Spacing for the Upper Geogrid Within the Reinforced Fill to Attain this Minimum 6" Cover.
5. Connect the Geogrid Reinforcement with Spiral Binders.
6. Prevent Surface Water from Flowing Over the Face of the Excavation Cuts. Use Drainage Channels, Berms, or Other Appropriate Methods to Direct Surface Water Away From the Construction Area.
7. Do Not Allow Water to Collect Against the Base of the Cut.
8. Do Not Allow Water to Collect or Saturate the Soils Above the Top of Cut Face.
9. Transition the Reinforced Fills as Directed and Approved by the CO.

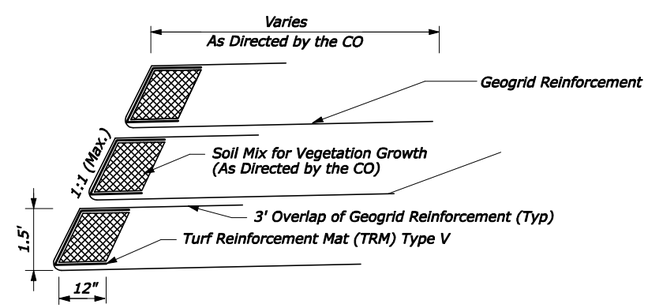


EMBANKMENT STABILIZATION

For embankment over soft saturated subgrade. See plan and profile sheets for locations



TYPICAL SECTION
REINFORCED FILL
(TO BE USED AT THE DISCRETION OF THE CO)



TYPICAL SECTION
WRAPPED FACE DETAIL
(TO BE USED AT THE DISCRETION OF THE CO)

NO SCALE

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

MISCELLANEOUS DETAILS

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NPS PMIS NO.: 84320

ITEM NO.	ITEM DESCRIPTION	UNIT	Sheet Number and Description: C02 TABULATION OF QUANTITIES					ESTIMATED QUANTITIES: PLAN	BID	REMARKS AND/OR DETERMINATION OF ESTIMATED QUANTITY
15101-0000	MOBILIZATION	LPSM						ALL	ALL	
15201-0000	CONSTRUCTION SURVEY AND STAKING	LPSM						ALL	ALL	
15401-0000	CONTRACTOR TESTING	LPSM						ALL	ALL	
15705-0100	SOIL EROSION CONTROL, SILT FENCE	LNFT							3,530	
20101-0000	CLEARING AND GRUBBING	ACRE	1.569					1.569	1.7	
20201-0000	SELECTIVE CLEARING	ACRE	0.503					0.503	0.6	
20420-0000	EMBANKMENT CONSTRUCTION	CUYD	3,681					3,681	3,850	
20701-1400	EARTHWORK GEOTEXTILE, TYPE IV-C	SQYD							400	
20703-2000	GEOGRID, BIAXIAL	SQYD							100	At the Discretion of the CO.
30301-5000	AGGREGATE SURFACE RECONDITIONING	STA	7.5					7.5	8	
30802-2000	ROADWAY AGGREGATE, METHOD 2	TON	1,253					1,253	1,300	Based on 138.9 lb/CF
60201-0600	18-INCH PIPE CULVERT	LNFT	40					40	42	
60210-0600	END SECTION FOR 18-INCH PIPE CULVERT	EACH	4					4	4	
61801-0000	CONCRETE BARRIER	LNFT	1,158					1,158	1,200	Prefabricated Units. See the Special Contract Requirements.
62501-0000	TURF ESTABLISHMENT	ACRE	0.814					0.814	0.900	
63301-0000	SIGN SYSTEM	EACH	10					10	10	
63309-0900	DELINEATOR, TYPE FLEXIBLE	EACH	53					53	55	
63501-0000	TEMPORARY TRAFFIC CONTROL	LPSM						ALL	ALL	
63701-0000	FIELD OFFICE	EACH							1	
64805-0000	UTILITY PROTECTION STRUCTURE (CUVA MAINT. ROAD CROSSING STA. 201+15 to STA. 201+90)	LPSM						ALL	ALL	
64805-0000	UTILITY PROTECTION STRUCTURE (CUVA MAINT. ROAD CROSSING STA. 209+80 to STA. 210+80)	LPSM						ALL	ALL	

REG	STATE	PROJECT	SHEET NO.
MW	OH	PRA CUVA 18(1) & 164(1) MAINTENANCE ROAD	C01

The following quantities are approximate unless noted as a contract quantity. Payment will be made for the actual quantities of work performed and accepted or for materials furnished according to the contract.

SUMMARY OF QUANTITIES

N:\OH\cuva18(1)164(1)\Roadway\sheets\B-Summ\Temp Access\sum_shts_FP03

REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1) 164(1) MAINTENANCE ROAD	C02

SUMMARY OF SURFACING QUANTITIES

ITEM NUMBER	30301-5000	30802-2000
Location	AGGREGATE SURFACE RECONDITIONING	ROADWAY AGGREGATE, METHOD 2
Unit	STA	TON
NEOSD Access Road Sta. 300+55 to Sta. 308+05	7.5	313
CUVA Maintenance Access Road Sta. 200+05 to Sta. 220+35		940
Project Totals	**7.5**	**1,253**

CONSTRUCTION SURVEY AND STAKING QUANTITIES

Item Number	15201-0000		
Location	SLOPE, REFERENCE, AND CLEARING AND GRUBBING STAKES	CENTERLINE VERIFICATION AND STAKING	SURVEY AND STAKING GRADE FINISH STAKES
Unit	**STA.**	**STA.**	**STA.**
NEOSD Access Road Sta. 300+55 to Sta. 308+05		7.5	
CUVA Maintenance Access Road Sta. 200+05 to Sta. 220+35	20.3	20.3	20.3
Project Totals	**20.3**	**27.8**	**20.3**

Note: Survey and staking items are considered subsidiary to pay item 15201-0000, Construction Survey and Staking-LPSM

SUMMARY OF PERMANENT SIGNS

Item Number	63301-0000	MUTCD Reference	Panel Dimensions	Number of Posts (F.I.O.)
Location	SIGN SYSTEM			
Unit	EACH		in x in	EACH
NEOSD Access Road				
Sta. 305+75 Rt	1	W2-2L	30" x 30"	1
Sta. 300+20 Lt	1	Remove & Reset From Fitzwater Road-See Plans		2
300+55 Lt	1	Special-1	12" x 18"	1
CUVA Maintenance Access Road				
Sta. 200+50 Lt	1	R1-1	30" x 30"	1
Sta. 201+80 Lt	1	W2-4	30" x 30"	1
Sta. 219+55 Rt	1	W2-4	30" x 30"	1
Sta. 220+05 Rt	1	R1-1	30" x 30"	1
Pleasant Valley Rd	2	W2-2 (L&R)	36" x 36"	1
Fitzwater Road	1	W2-2R	30" x 30"	1
Project Totals	**10**			**10**

Note: See Detail 633A for Special-1 Details. The removal of the existing Fitzwater Road Entrance Sign and Resetting to the NEOSD Access Road (Sta. 300+20) is considered subsidiary to pay item 63301-0000, Sign System-Each.

SUMMARY OF CONSTRUCTION SIGNS

Item Number							F.I.O
MUTCD Reference	Description	Panel Dimensions (in X in)			Area (sqft)	Number of Signs	Temporary Traffic Control, Construction Sign
							SQFT
G20-2	End Road Work	36	X	18	4.5	4	18
R11-2	Road Closed	48	X	30	10.0	2	20
W20-1	Road Work Ahead	36	X	36	9.0	4	36
As Directed by CO	As Directed by the CO						36
Project Totals						**10**	**110**

Note: Construction sign items considered subsidiary to pay item 63501-0000, Temporary Traffic Control-LPSM

SUMMARY OF CONCRETE BARRIER

Item Number	61801-0000
Location	Concrete Barrier
Unit	Lnft
Sta. 200+42 to 212+00 Rt.	1,158
Project Totals	**1,158**

CLEARING AND GRUBBING TURF ESTABLISHMENT QUANTITIES

Item Number	20101-0000	20201-0000	62501-0000
Location	CLEARING AND GRUBBING	SELECTIVE CLEARING	TURF ESTABLISHMENT
Unit	ACRE	ACRE	ACRE
NEOSD Access Road Sta. 300+55 to Sta. 308+05	N/A	N/A	N/A
CUVA Maintenance Access Road Sta. 200+05 to Sta. 220+35	1.569	N/A	0.814
Fitzwater Road	N/A	0.503	N/A
Project Totals	**1.569**	**0.503**	**0.814**

DELINEATOR SUMMARY

Item Number	63309-0900
Location	DELINEATOR - FLEXIBLE TYPE
Unit	EACH
NEOSD Access Road	
Sta. 300+55 to Sta. 308+05 L	7
Sta. 300+55 to Sta. 308+05 R	6
CUVA Maintenance Access Road	
Sta. 200+05 to Sta. 220+35 L	29
Sta. 212+00 to 220+35 Rt	11
Project Totals	**53**

TEMPORARY TRAFFIC CONTROL QUANTITIES

Item Number	Description	Unit	Project Totals
63501-0000	TEMPORARY TRAFFIC CONTROL, BARRICADE TYPE 3	Each	**4**
	TEMPORARY TRAFFIC CONTROL, DRUM	Each	**20**
	TEMPORARY TRAFFIC CONTROL, CONSTRUCTION SIGN	SqFt	**110**
	TEMPORARY TRAFFIC CONTROL, FLAGGER	Hour	**400**
	TEMPORARY TRAFFIC CONTROL, WARNING LIGHTS TYPE A	Each	**6**

Note: Temporary traffic control items considered subsidiary to pay item 63501-0000, Temporary Traffic Control-LPSM

GRADING SUMMARY

Pay Item			Roadway Excavation		Adjustments To Excavation		Roadway Embankment	Adjustments	20420-0000	Mass Ordinate	
Station to Station			Roadway Prism	Roadway Excavation	Average Shrink/Swell Factor(4)	Total Excavation Available for Fills	Roadway Prism	(+) Topsoil Replacement under fill	**Embankment Construction**	Excavation - Embankment	Placing Conserved Topsoil
Definition			(BCY)	(BCY)		(CCY)	(CCY)	(CCY)	**(CCY)**	(CCY)	(CCY)
CUVA Maintenance Access Road											
200+07.26	-	220+35.00	163	163	1	147	3,316	365	**3,681**	-3,499	365

NOTES:

1. BCY = Bank Cubic Yard = One cubic yard of material as it lies in natural bank state.
2. CCY = Compacted Cubic Yard = One cubic yard of material after it has been compacted to specification density.
3. The quantities shown herein are approximations. Payment will be made for the actual quantities of work performed and accepted.
4. The average shrink/swell factor shown is computed by taking an average of values over the specified station range. Recommended shrink/swell factors are used in the calculations.

DRAINAGE SUMMARY

Item Number	60201-0600	60210-0600
Location	18-INCH PIPE CULVERT	END SECTION FOR 18-INCH PIPE CULVERT
Unit	Lnft	Lnft
NEOSD Access Road		
Sta. 306+55	20	2
CUVA Maintenance Access Rd		
Sta. 216+22	20	2
Project Totals	**40**	**4**

TABULATION OF QUANTITIES

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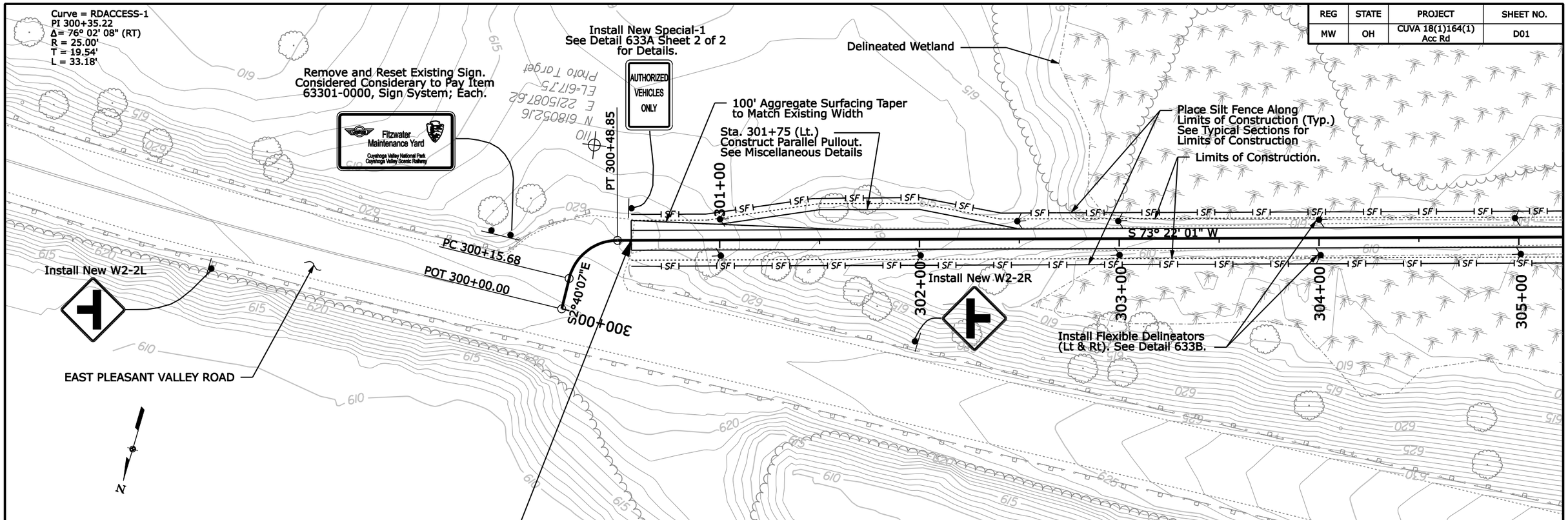
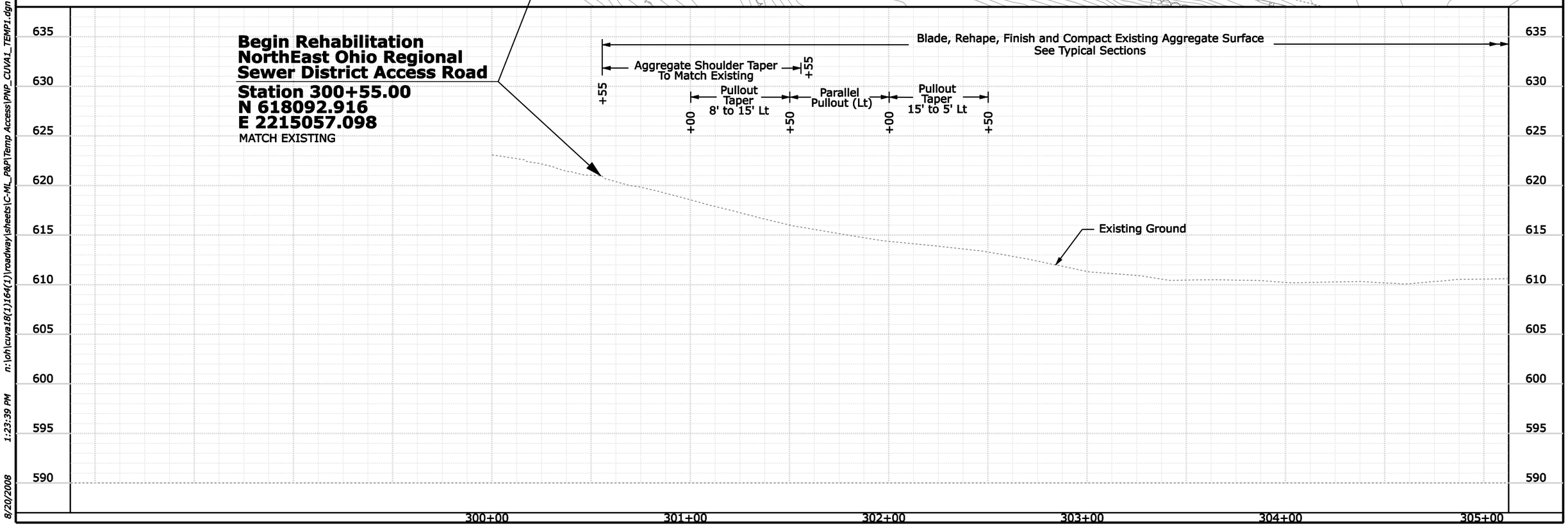
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	D01





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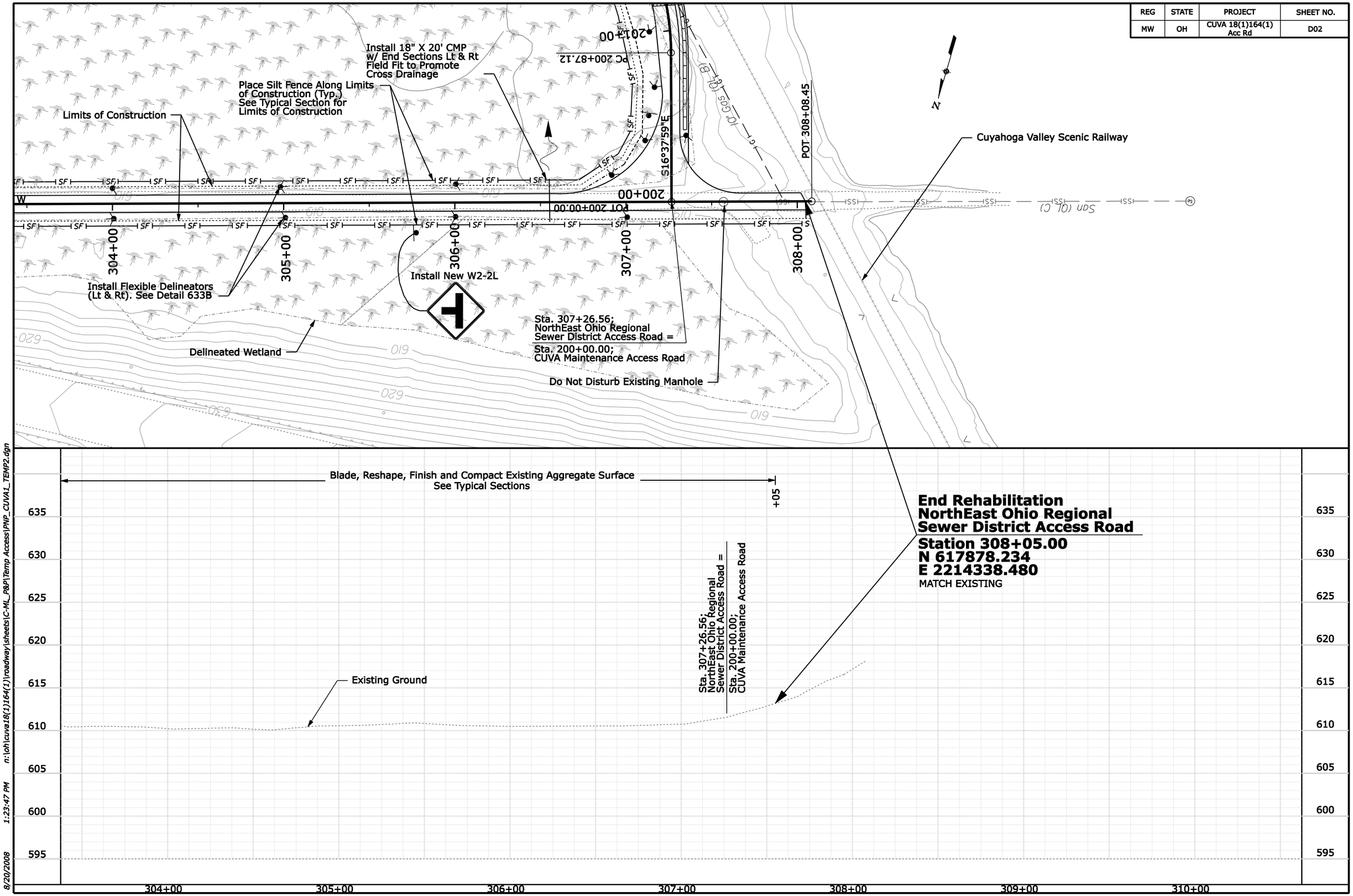
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	D02



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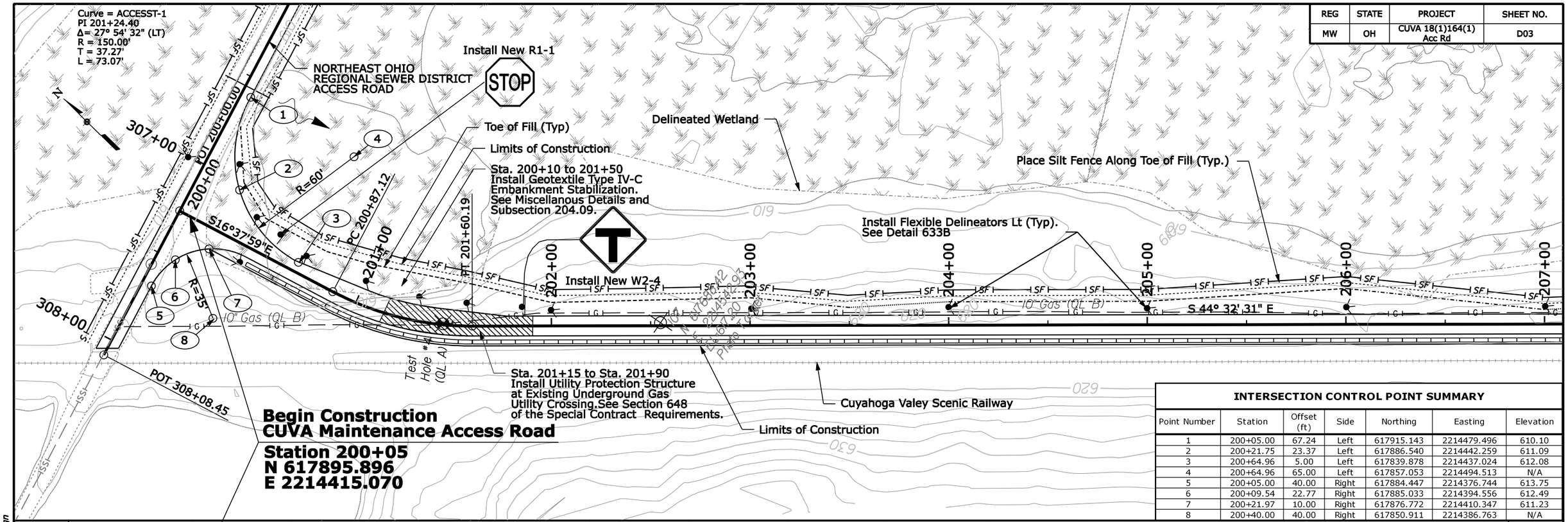
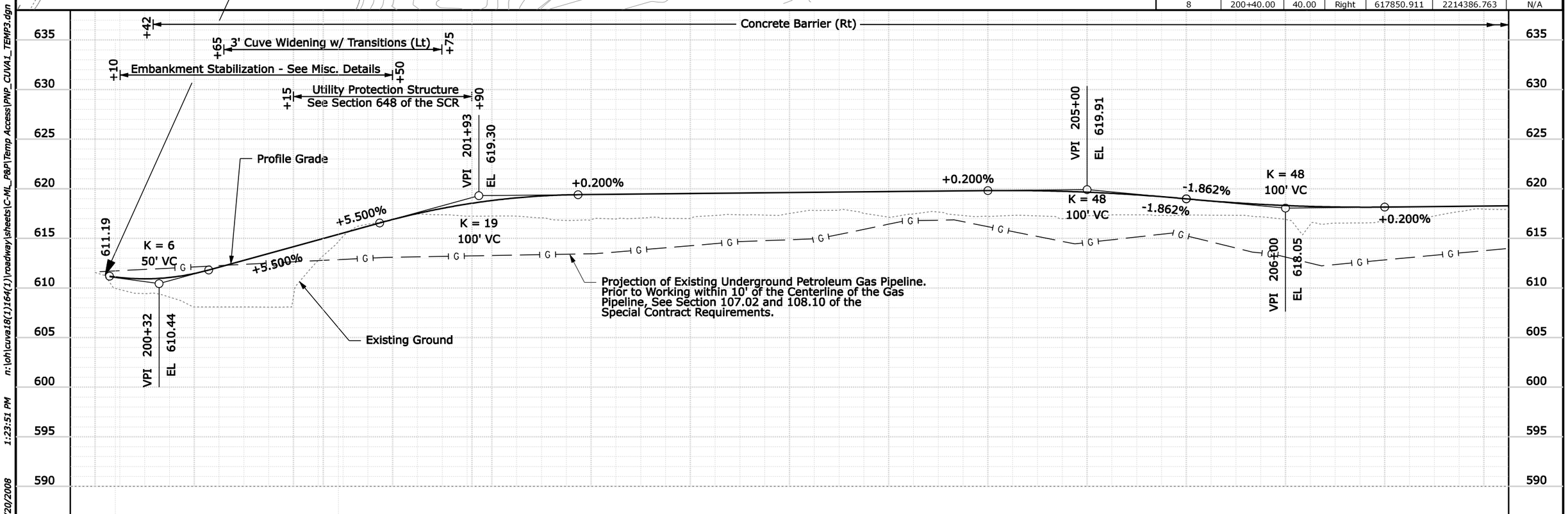
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	D03



INTERSECTION CONTROL POINT SUMMARY

Point Number	Station	Offset (ft)	Side	Northing	Easting	Elevation
1	200+05.00	67.24	Left	617915.143	2214479.496	610.10
2	200+21.75	23.37	Left	617886.540	2214442.259	611.09
3	200+64.96	5.00	Left	617839.878	2214437.024	612.08
4	200+64.96	65.00	Left	617857.053	2214494.513	N/A
5	200+05.00	40.00	Right	617884.447	2214376.744	613.75
6	200+09.54	22.77	Right	617885.033	2214394.556	612.49
7	200+21.97	10.00	Right	617876.772	2214410.347	611.23
8	200+40.00	40.00	Right	617850.911	2214386.763	N/A



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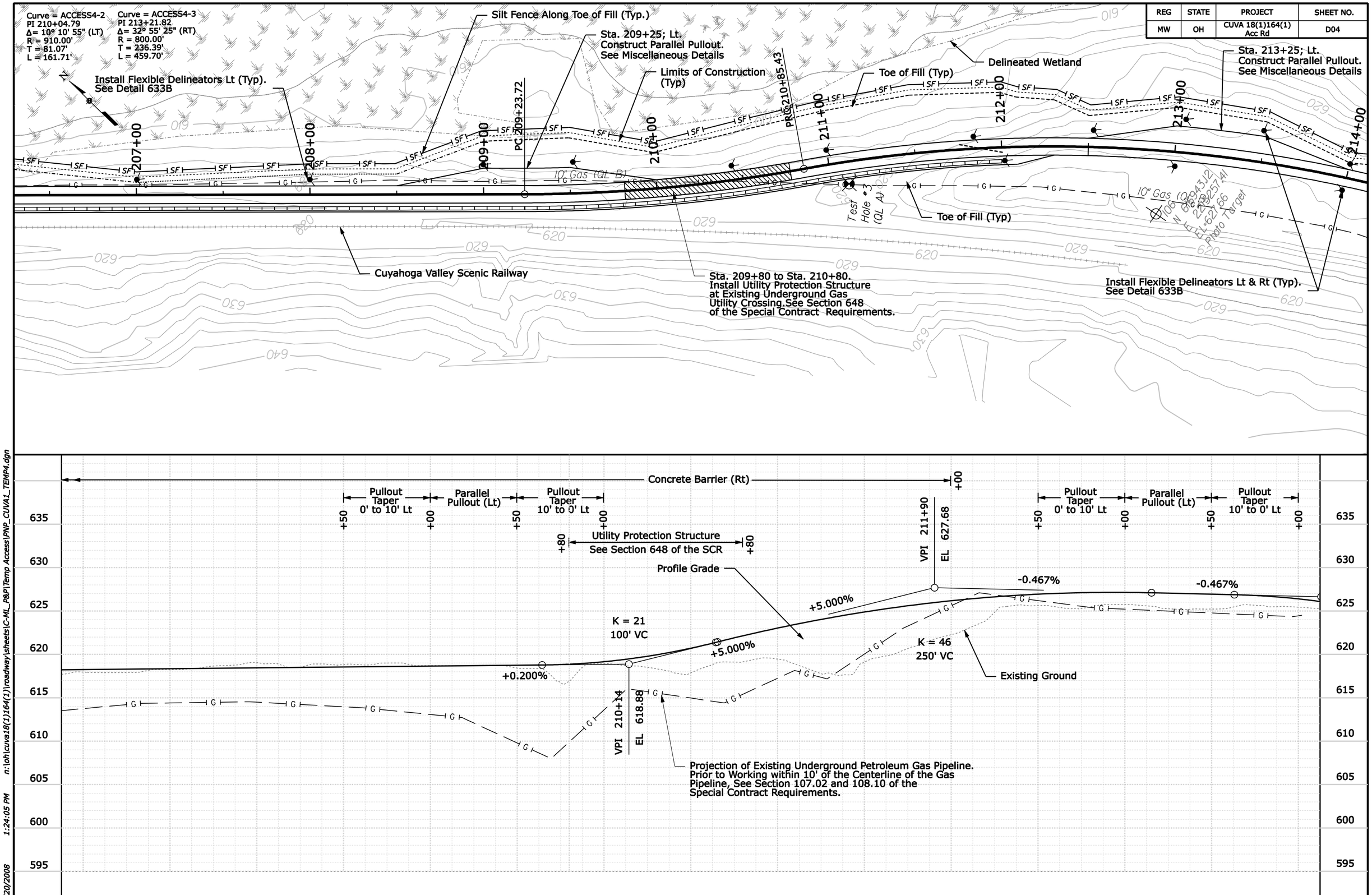
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	D04



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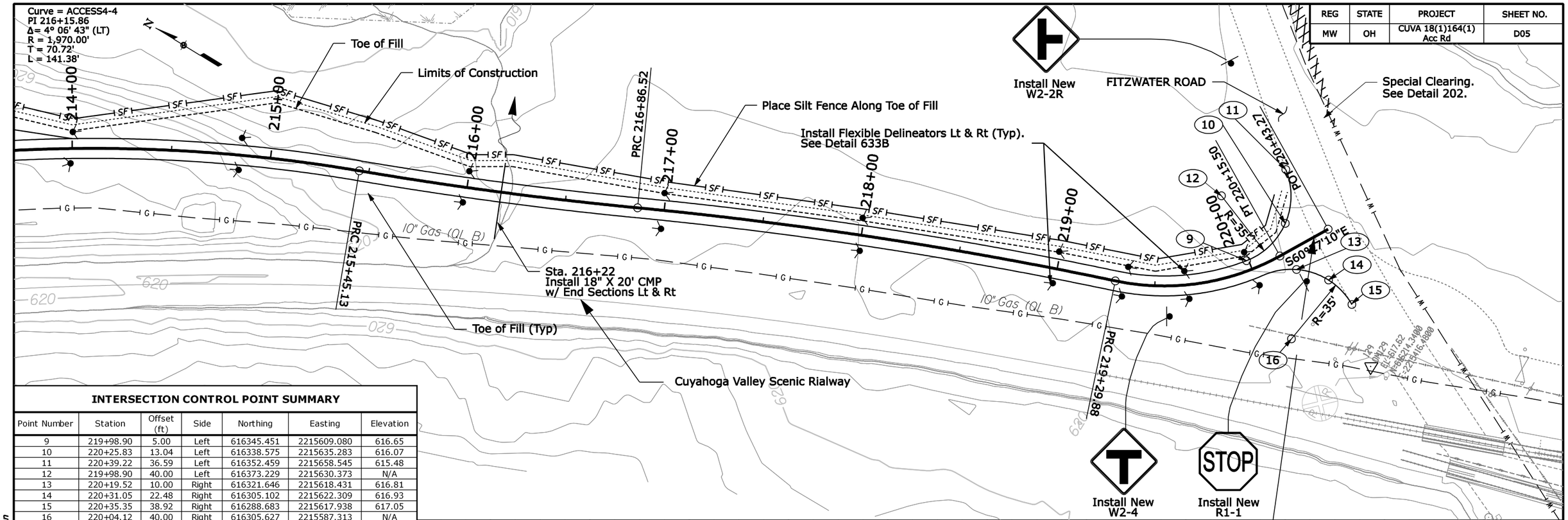
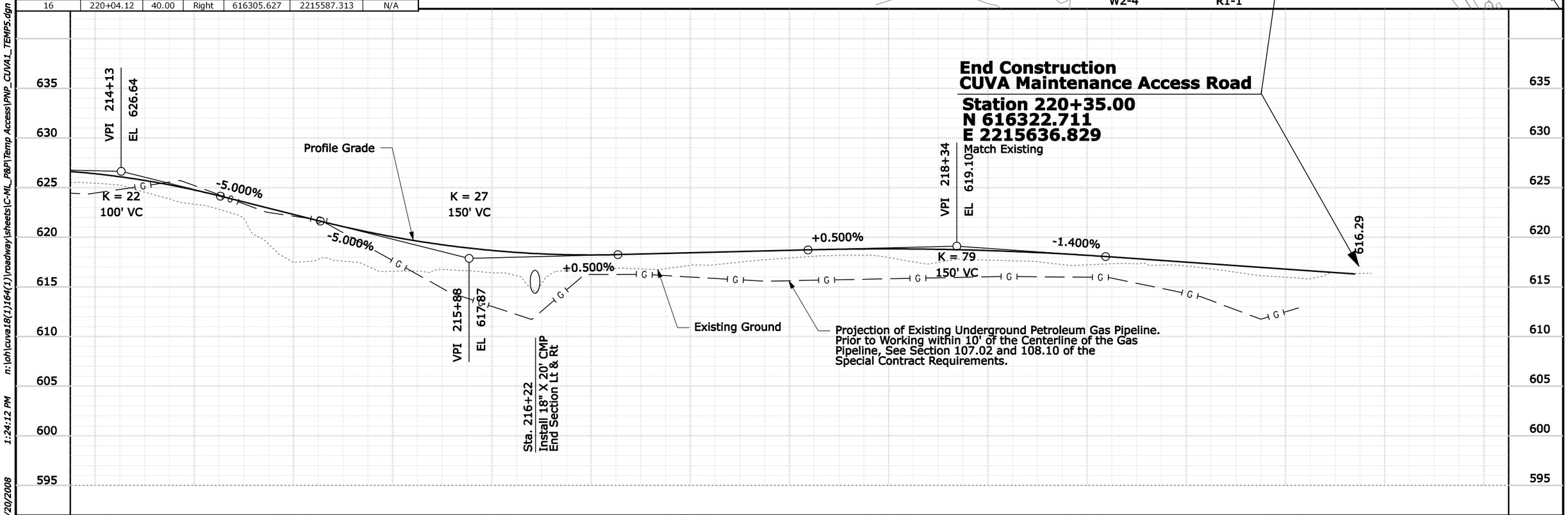
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	D05



INTERSECTION CONTROL POINT SUMMARY

Point Number	Station	Offset (ft)	Side	Northing	Easting	Elevation
9	219+98.90	5.00	Left	616345.451	2215609.080	616.65
10	220+25.83	13.04	Left	616338.575	2215635.283	616.07
11	220+39.22	36.59	Left	616352.459	2215658.545	615.48
12	219+98.90	40.00	Left	616373.229	2215630.373	N/A
13	220+19.52	10.00	Right	616321.646	2215618.431	616.81
14	220+31.05	22.48	Right	616305.102	2215622.309	616.93
15	220+35.35	38.92	Right	616288.683	2215617.938	617.05
16	220+04.12	40.00	Right	616305.627	2215587.313	N/A



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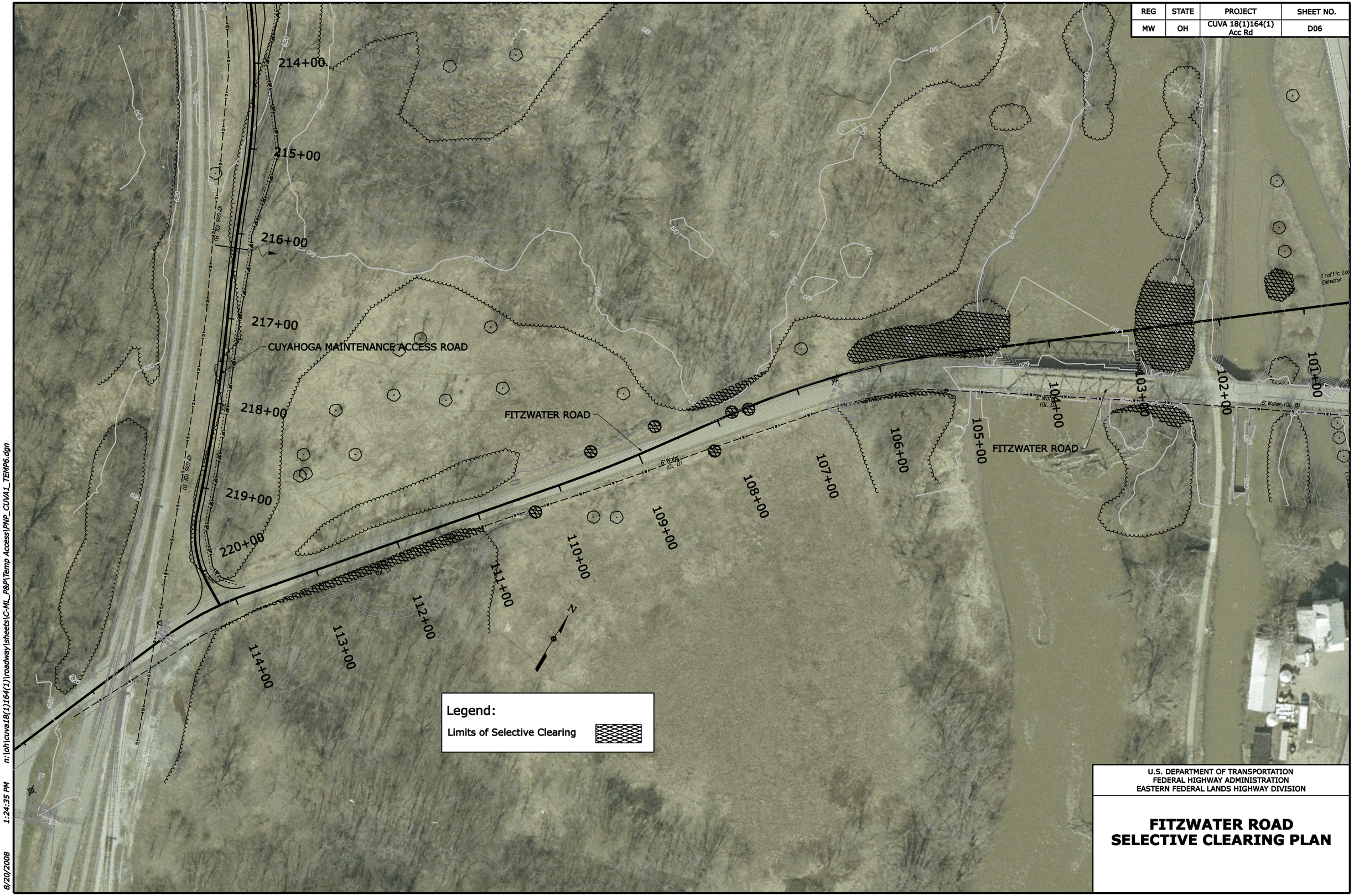
MW	OH	CUVA 18(1)164(1) Acc Rd	D06



U.S. DEPARTMENT OF TRANSPORTATION
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EASTERN FEDERAL LANDS HIGHWAY DIVISION

FITZWATER ROAD SELECTIVE CLEARING PLAN

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EROSION CONTROL NARRATIVE

GENERAL GUIDELINES

The Erosion Control Plans (ECP) are meant as a guideline for preventing and controlling sediment. Install all erosion and sediment control devices as shown in the ECP or as directed by the Contracting Officer (CO). Do not modify the type, size or location of any control or practice without approval from the CO.

Inspect all erosion and sediment control devices every seven calendar days and within 24 hours after any storm event of more than ½ inch in precipitation. Repair as needed or as directed by CO. Clean all sediment control devices (silt fence, inlet protectors and sediment traps) when they become half full of sediment or as directed by the CO. Dispose of the sediment by spreading it on site or disposing of it legally outside park boundaries.

Preventing initial soil erosion is much more effective than trying to control eroded sediment. Therefore, stabilize all disturbed areas as soon as practical, but not more than 14 days after construction activity has temporarily or permanently ceased. Stabilization may be in the form of paved waterways, rock riprap and/or turf establishment. Construct temporary erosion controls in incremental stages as construction proceeds.

Attempt to control only the sediment-laden runoff generated by the project site. Separate and route clean, offsite runoff through the project using earth diversion berms, diversion channels and culverts.

Do not drive construction equipment across flowing waterways.

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

Inspection of erosion control devices must continue for a period of 8 weeks following completion of the project.

TEMPORARY EROSION AND SEDIMENT CONTROL

PHASE I (ESTABLISH PERIMETER CONTROLS)

During clearing and grubbing operations, construct perimeter controls to ensure that sediment does not leave the project site. Perimeter controls may include silt fence, earth diversion berms, furrow ditches and offsite temporary sediment traps. Outlet sediment traps to nearby undisturbed streams or swales, or tie traps to diversion channels. Use diversion channels to route clean offsite drainage through the project site. Where possible, install permanent culverts and channels before beginning rough grading and divert offsite drainage through completed culverts as soon as practical. Where not practical, use temporary culverts for crossing of active streams or temporary diversion channels until permanent culverts can be installed. Do not line with plastic those portions of the diversion channels that run along natural stream beds.

PHASE II (INTERMEDIATE CONTROLS)

Apply intermediate controls during rough grading and culvert installation operations. Obtain the CO's approval before installing any controls not specified in the ECP. The CO may direct the Contractor to install certain controls in order to forestall or mitigate potential or existing erosion problems.

Upon completion of culverts or other structures, ensure that entrances, outlets and outlet channels and slopes are to final grade and are stabilized (with vegetation, riprap or pavement) before routing drainage through or on completed areas. Remove diversion channels and reroute offsite drainage through completed culverts as soon as practical.

Provide silt fence at the toe of all embankment slopes and around all stockpiled excavated roadway material. Apply mulch and turf establishment to stockpiles remaining in place longer than 14 calendar days or when directed by the CO.

PERMANENT EROSION AND SEDIMENT CONTROL

PHASE III (FINAL CONTROLS/STABILIZATION)

Complete remaining channels by paving, riprapping or applying permanent turf establishment. Where necessary, replace eroded topsoil and reapply permanent turf establishment to disturbed areas where vegetation has not been established.

Inspect, clean and repair all culvert outlet protection, riprap basins and stabilized channels and slopes.

Remove all fill slope perimeter earth berms and silt fence only after the embankment slopes and toe of fill have been stabilized.

Remove all perimeter controls when directed by the CO.

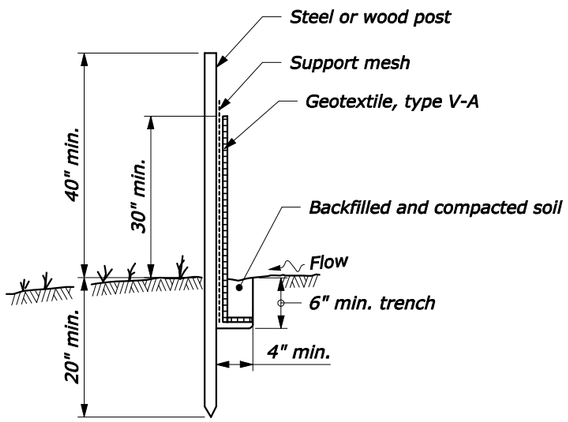
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

EROSION CONTROL NARRATIVE

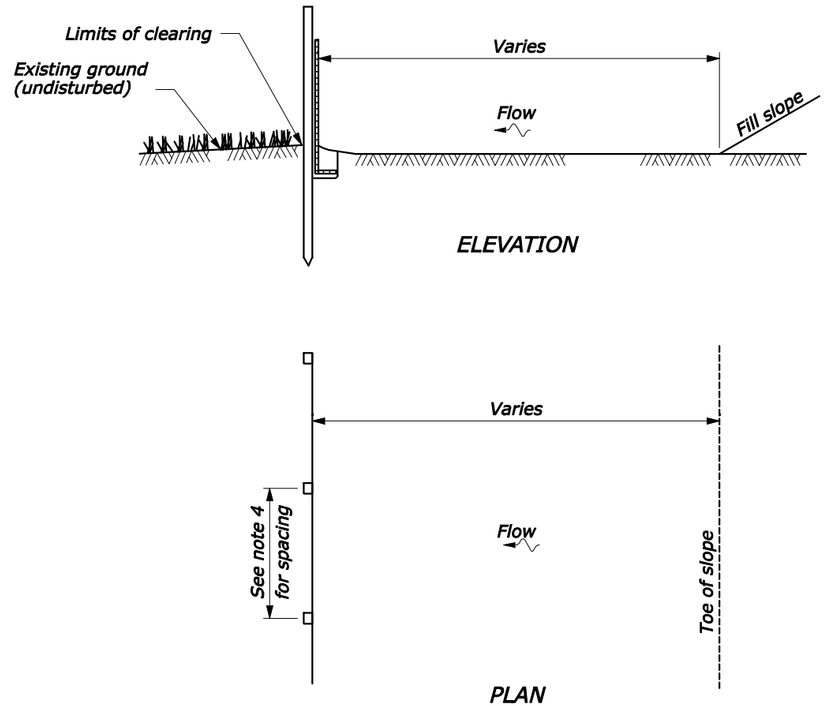
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	S01

NOTE:

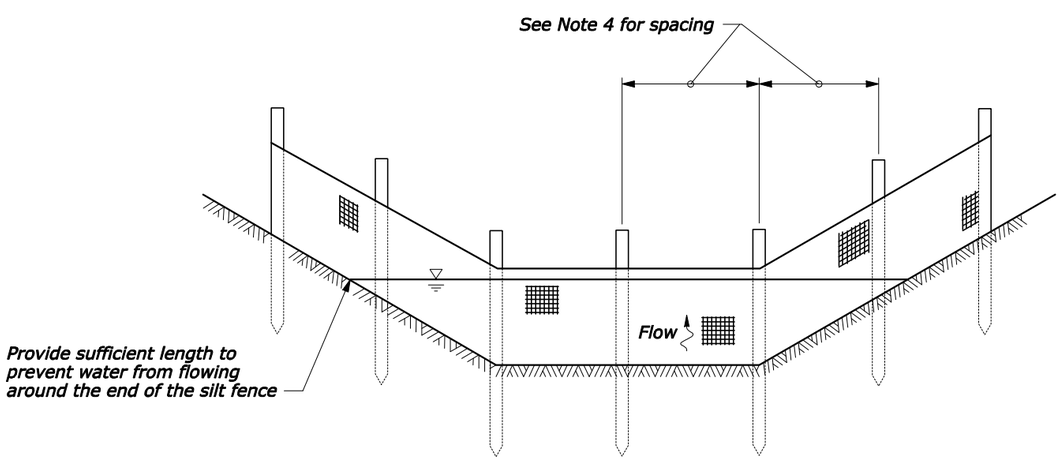
1. Use drainage ditch installation for low flow conditions only when specified on Erosion Control Plan.
2. Alternate preassembled silt fence options (geotextile, type V-B) will be allowed as long as specified dimensions are satisfied. Follow manufacturer's recommendations for installation procedures.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



POST AND GEOTEXTILE INSTALLATION DETAIL



SILT FENCE INSTALLATION AT TOE OF FILL



SILT FENCE INSTALLATION IN A DRAINAGE DITCH

See Note 1

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

U.S. CUSTOMARY DETAIL

SILT FENCE

DETAIL 157-1

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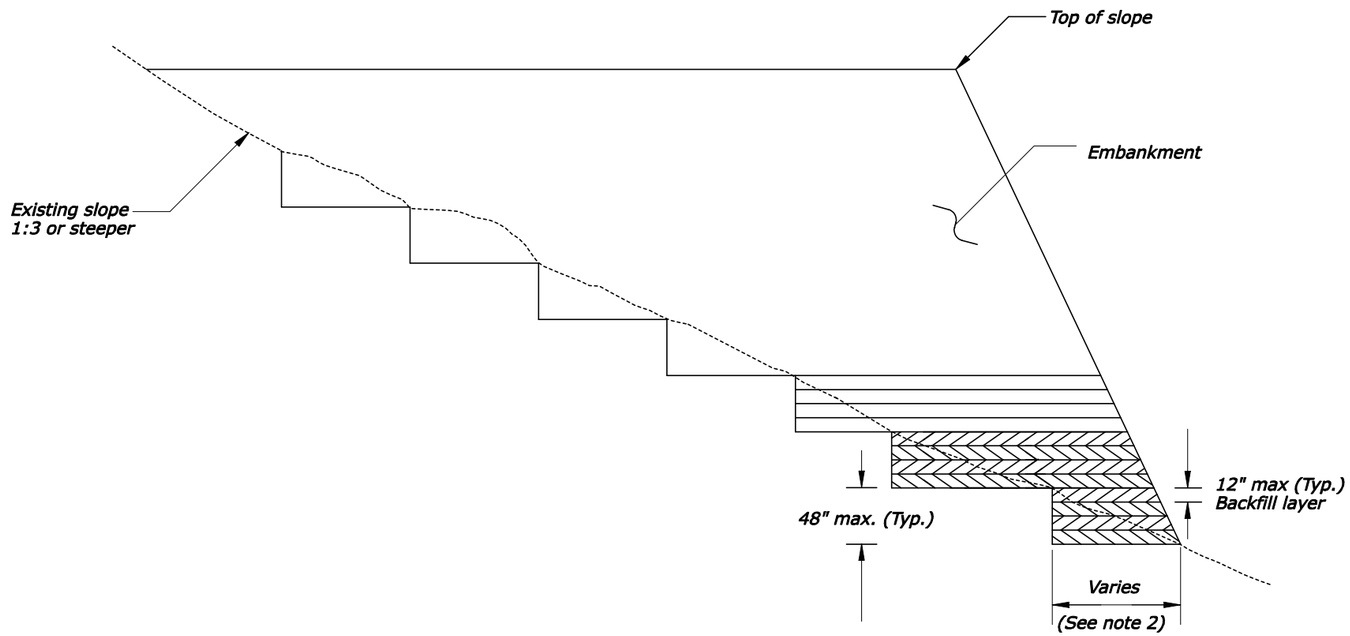
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	S02

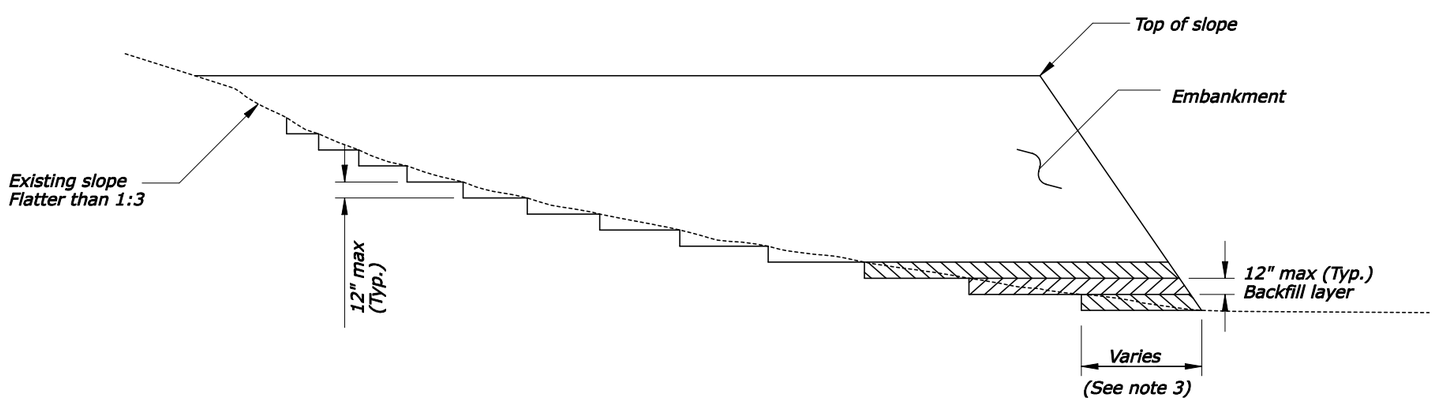


BENCHING DETAIL A

SLOPES STEEPER THAN 1:3

NOTES:

1. Where the embankment foundation is a hillside or another existing embankment, the foundation must be benched while the embankment is being constructed.
2. For slopes 1:3 or steeper, refer to Benching Detail A. Cut 8 ft wide horizontal benches in the existing slope. Bench the slope as the embankment is placed and compacted in 1 ft thick layers until a backfill height of 4 ft is reached. Excavate and backfill in a similar manner until the top of slope is reached.
3. For slopes flatter than 1:3, refer to Benching Detail B. Cut into the existing slope until a maximum height of 1 ft is reached, allowing the horizontal distance to vary. Place embankment material. Excavate and backfill in a similar manner until the top of slope is reached.
4. Benching is considered incidental to the item of roadway excavation and no additional measurement of quantity or payment will be made for benching.
5. Refer to Section 204 for benching specifications.



BENCHING DETAIL B

SLOPES FLATTER THAN 1:3

NO SCALE

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

BENCHING DETAIL

DETAIL APPROVED FOR USE

REVISED: 06/07

DETAIL E204-02

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REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	S03

METAL ROUND PIPE CULVERT

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

STEEL

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

ALUMINUM

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

NOTE:

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

METAL PIPE ARCH CULVERT

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

STEEL

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

ALUMINUM

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

NO SCALE

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

U.S. CUSTOMARY STANDARD

METAL PIPE CULVERT

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

STANDARD 602-1

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REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	S04

COUPLING BANDS FOR METAL PIPE CULVERT 1/

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

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

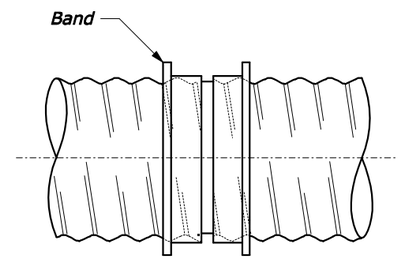
2/ For helically corrugated pipe with rerolled ends, the nominal corrugations size refers to the dimension of the end corrugation in the pipe.

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

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

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

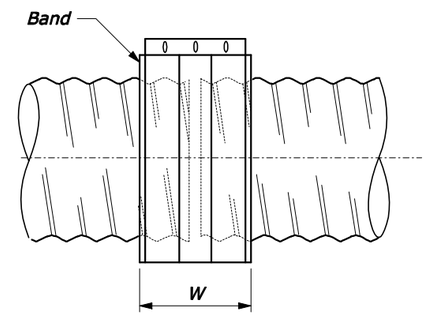
6/ Smooth sleeve-type couplers and flat bands may be used for pipe diameters of 12" or less. Use a matching metal having a nominal thickness of not less than 0.040 inch for steel, or 0.036 inch for aluminum, or a plastic with an equivalent strength to metal.



SLEEVE JOINT

Smoother sleeve with center stop.
Stab type joint

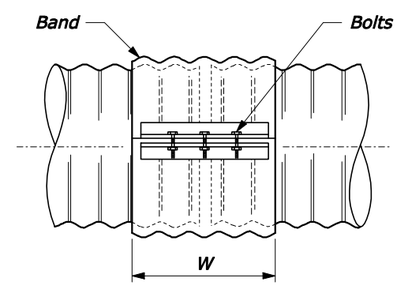
SMOOTH SLEEVE BAND



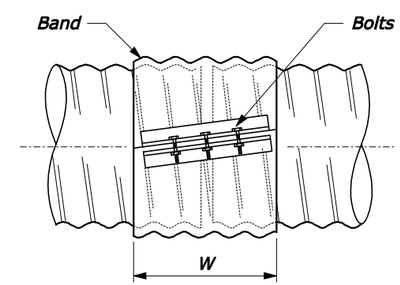
FLAT BAND

NOTE:

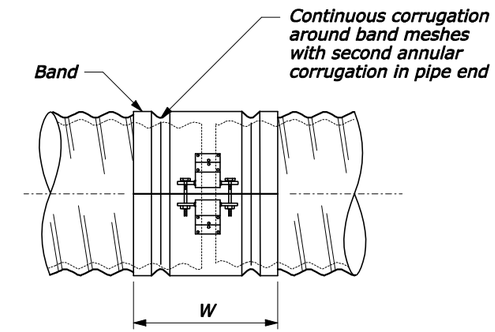
1. Watertight pipe joints are not required unless specified in the Special Contract Requirements.
2. Other types of coupling bands or fastening devices that comply with the joint performance criteria of AASHTO Standard specifications for Highway Bridges, Division II Section 26 may be used.



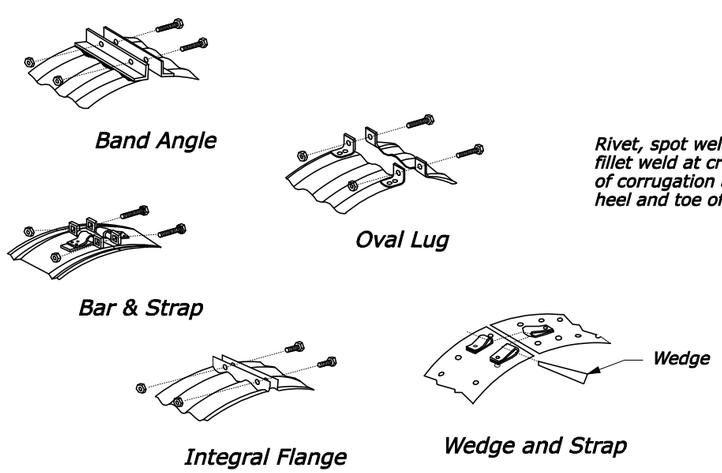
SIDE VIEW



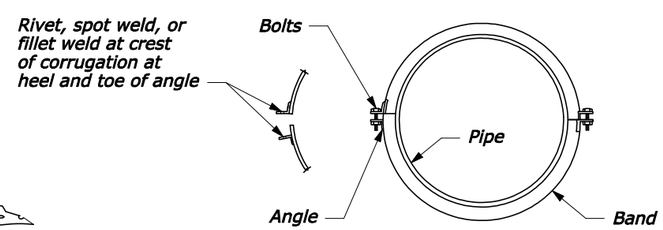
SIDE VIEW



SIDE VIEW



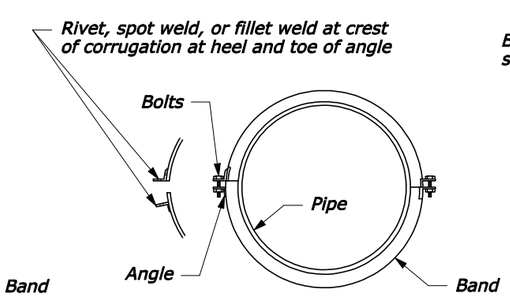
STANDARD BAND CONNECTIONS



END VIEW

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

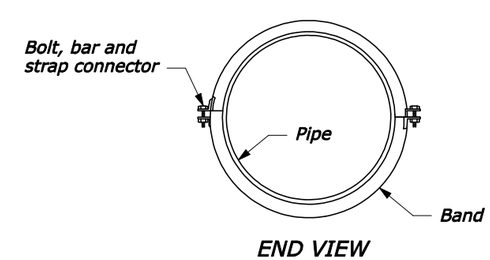
ANNULAR BAND



END VIEW

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

HELICAL BAND



END VIEW

SEMI-CORRUGATED BAND

NO SCALE

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

U.S. CUSTOMARY STANDARD

METAL PIPE CULVERT COUPLING BAND

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

STANDARD 602-2

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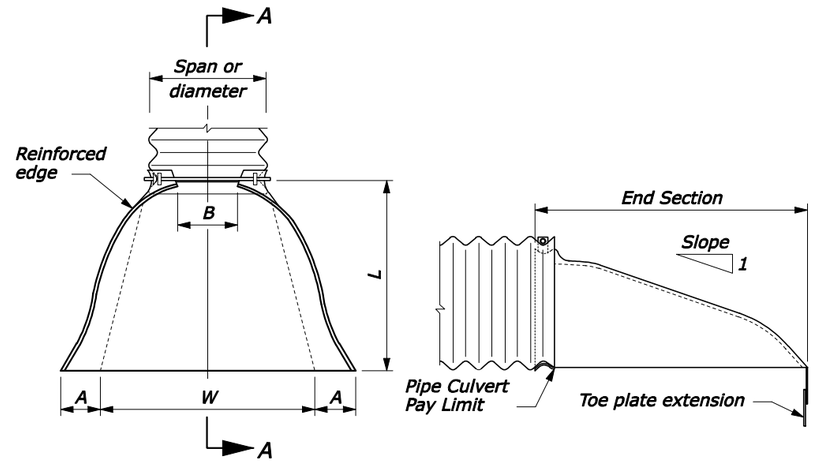
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	S05

END SECTIONS FOR ROUND PIPE CULVERT

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

END SECTIONS FOR PIPE ARCH CULVERT

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



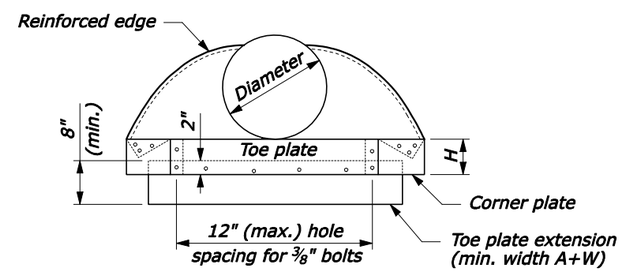
PLAN

SECTION A-A

ROUND OR PIPE ARCH CULVERT

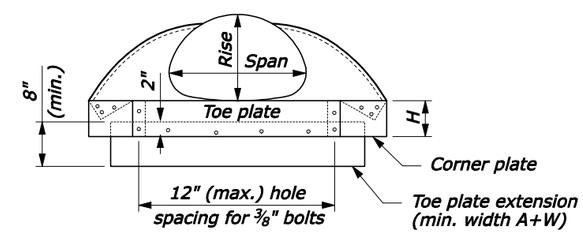
NOTE:

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



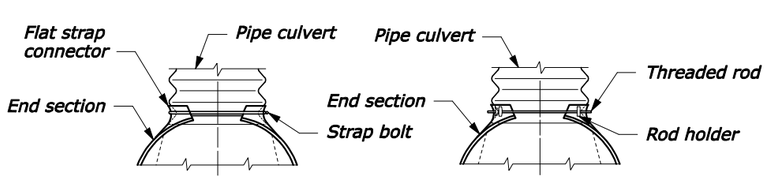
ELEVATION

ROUND PIPE CULVERT



ELEVATION

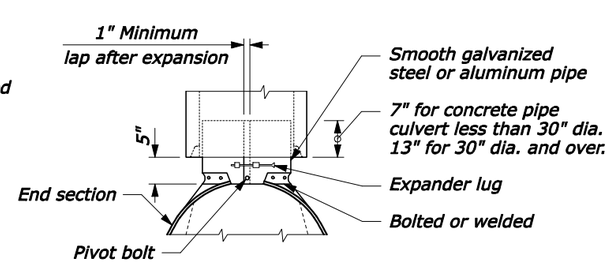
PIPE ARCH CULVERT



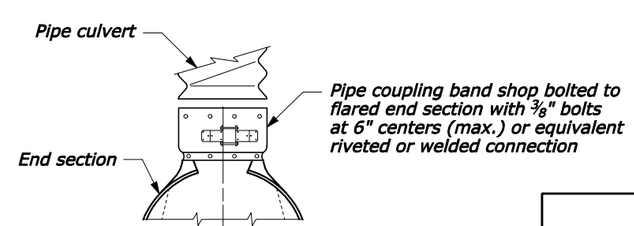
For 12" thru 24" round pipe and 17" x 13" thru 28" x 20" pipe arch

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

DESIGN A
CONNECTION TO ANNULAR CORRUGATED METAL PIPE



DESIGN B
CONNECTION TO CONCRETE PIPE INLET END



For all sizes of round pipe and pipe arch

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

NO SCALE

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

U.S. CUSTOMARY STANDARD

METAL END SECTIONS

STANDARD APPROVED FOR USE 12/1993

REVISED: 4/1994 6/2005
DRAFT: 10/2007

STANDARD 602-4

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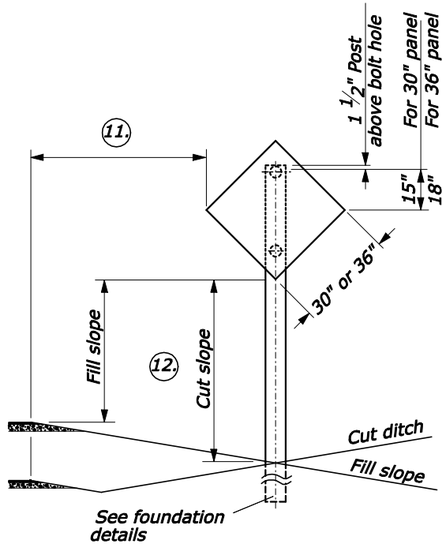
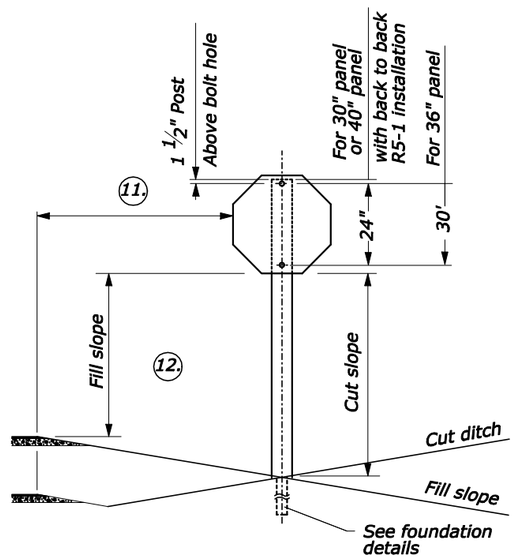
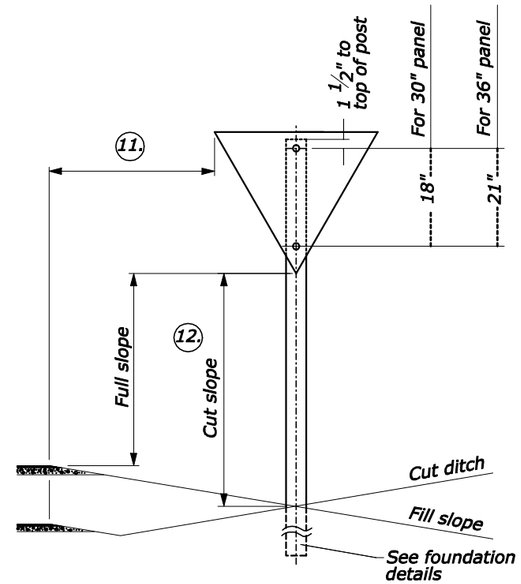
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	S06



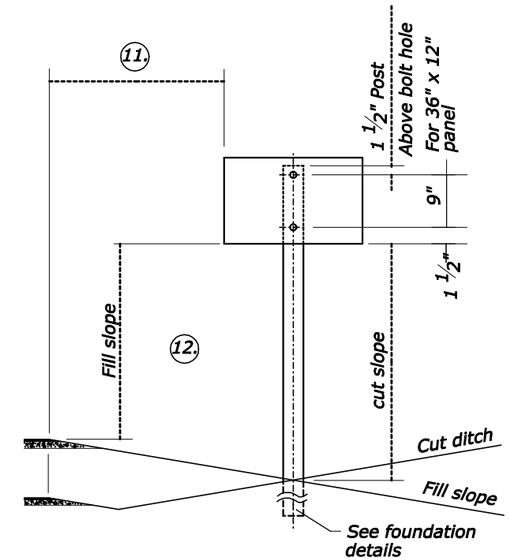
WARNING SIGN



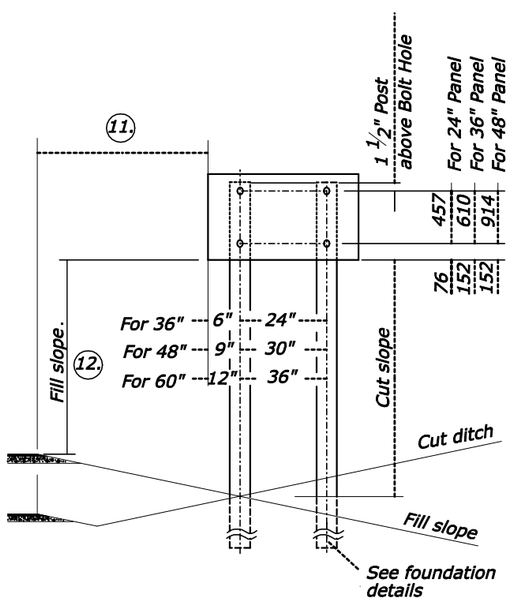
REGULATORY (STOP) SIGN



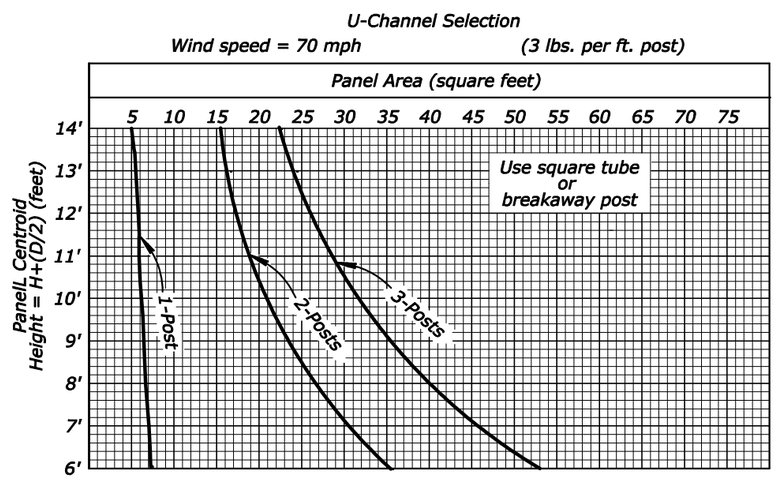
YIELD SIGN



REGULATORY SIGN SINGLE POST



REGULATORY SIGN TWO POST



Limit signs on one post to 36 inches or less in width.

NO SCALE

Notes:

1. See FHWA standard highway signs booklet for panel bolt hole. Spacing not shown.
2. Determine post sizes from U-Channel selection chart.
3. All sign panels shall be either single sheet steel, or single sheet aluminum.
4. Reflective sheeting shall be of the smooth type.
5. Sign symbol and letter size shall conform to the Manual of Uniform Traffic Control Devices, U.S. Department Transportation, Federal Highway Adminstration.
6. Paint or reflectorize exposed lockbolt fastner heads, bolt heads, and fiber washers on the faces of the sign to match the surrounding background or legend color.
7. Bolts, nuts, and metal washers shall be galvanized or cadmium plated.
8. Normal angular placement is zero degrees (0°). For all signs closer than 30' from the shoulder line turn the sign panel 3 degrees away from the roadway to reduce specular reflection.
9. Take special care in locating signs to ensure an unobstructed view of each sign.
10. Paint the back of sign panels and fastening hardware brown per the Speical Contract Requirements.
11. Lateral clearance measured from edge of pavement to near edge of sign. See MUTCD for lateral clearance requirements.
12. See MUTCD for mounting height requirements of each sign.

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

U.S. CUSTOMARY DETAIL

U-CHANNEL POST SELECTION AND INSTALLATION DETAILS

Sheet 1 of 2

DETAIL 633A

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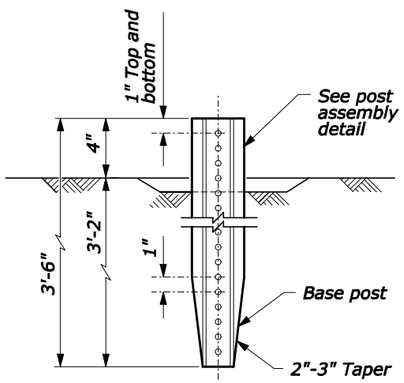
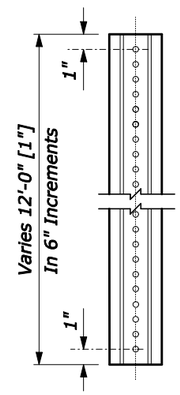
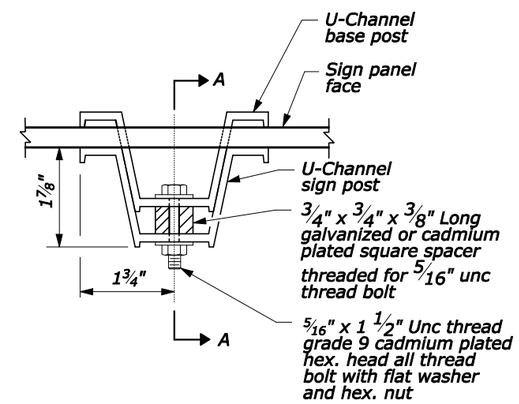
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	S07



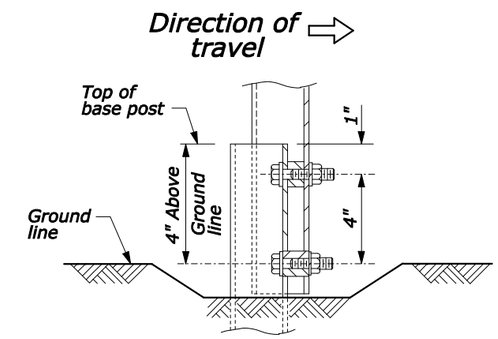
BASE POST AND INSTALLATION



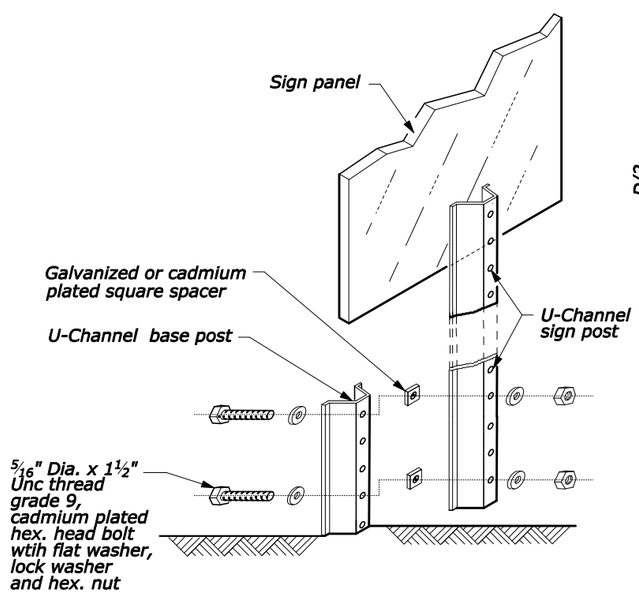
SIGN POST



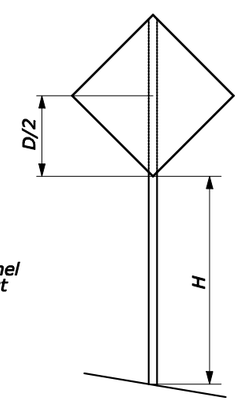
TOP VIEW

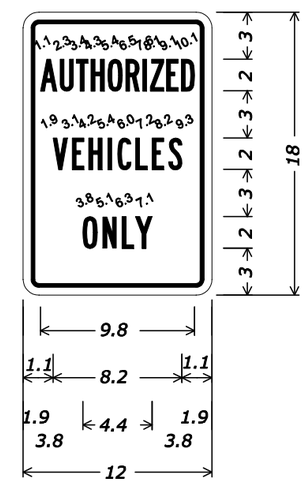


SECTION A-A POST ASSEMBLY



INSTALLATION PICTORIAL





1.0" Radius, 0.3" Border, 0.5" Indent, Black on White;
[AUTHORIZED] B specified length;
[VEHICLES] B specified length;
[ONLY] B;

SPECIAL-1

NO SCALE

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

U.S. CUSTOMARY DETAIL

U-CHANNEL POST SELECTION AND INSTALLATION DETAILS

Sheet 2 of 2

DETAIL 633A

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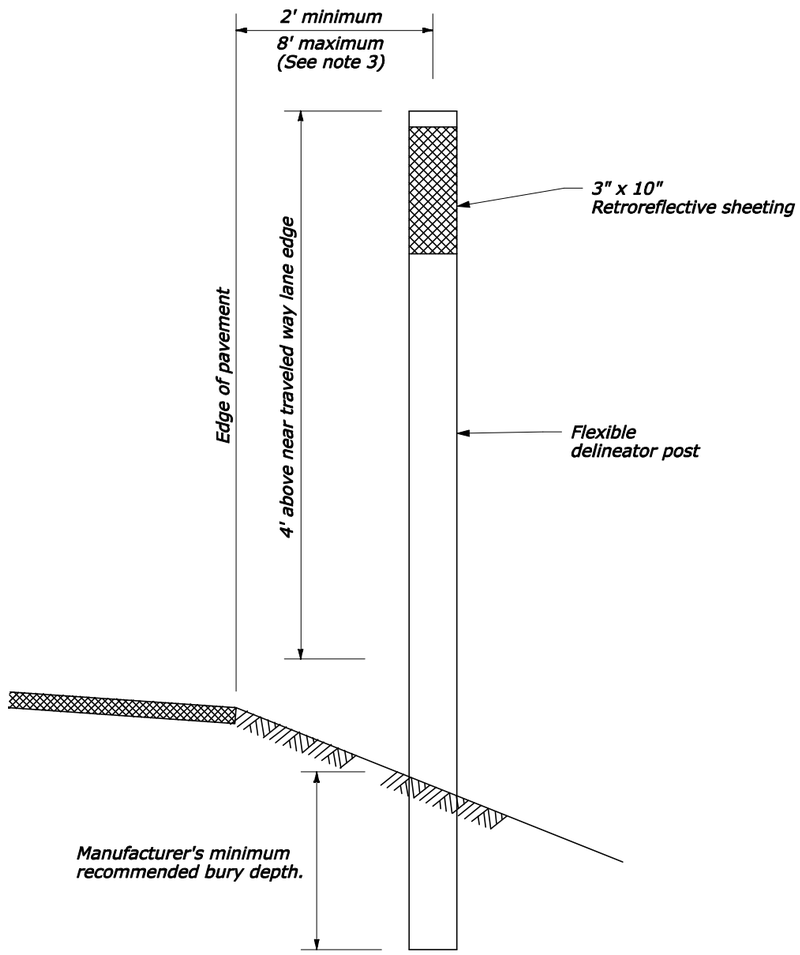
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	S08



FLEXIBLE DELINEATOR TYPICAL INSTALLATION

DELINEATOR SPACING				
HORIZONTAL CURVES				
RADIUS OF CURVE IN FEET	SPACING ON OUTSIDE OF CURVE IN FEET			
	ON CURVE	IN ADVANCE OF & BEYOND CURVE		
		1st SPACE	2nd SPACE	3rd SPACE
50	20	40	60	120
115	25	50	75	150
180	35	70	105	210
250	40	80	120	240
300	50	100	150	300
400	55	110	165	300
500	65	130	195	300
600	70	140	210	300
700	75	150	225	300
800	80	160	240	300
900	85	170	255	300
1,000	90	180	270	300

Spacing for specific radii not shown may be interpolated from the formula: Spacing = $3\sqrt{R-50}$.
The minimum spacing should be 20' and not exceed 300'.

NOTE

1. Vary the post spacing up to 1/8 of the spacing shown to clear driveways, cross roads, intersections or ramps or as approved by the CO. Eliminate the post if the variation is exceeded.
2. Install all delineators with reflectors facing adjacent to on-coming traffic or as approved by the CO.
3. Place delineators 2' from the edge of design shoulder or as approved by the CO.
4. Use the latest edition of the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) as a guide for delineation layout.
5. The color of the retroreflective sheeting, in all cases, conforms to the color of edgelines stipulated in the MUTCD.
6. Furnish flexible delineator post in a dark brown color Install delineators at locations shown on the plans and as directed by the CO.
7. Where fill slopes are steeper than 1V:3H, delineator spacing in advance of and beyond curves will be 100'.

NOT TO SCALE

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

U.S. CUSTOMARY DETAIL

DELINEATOR DETAILS

DETAIL
633B

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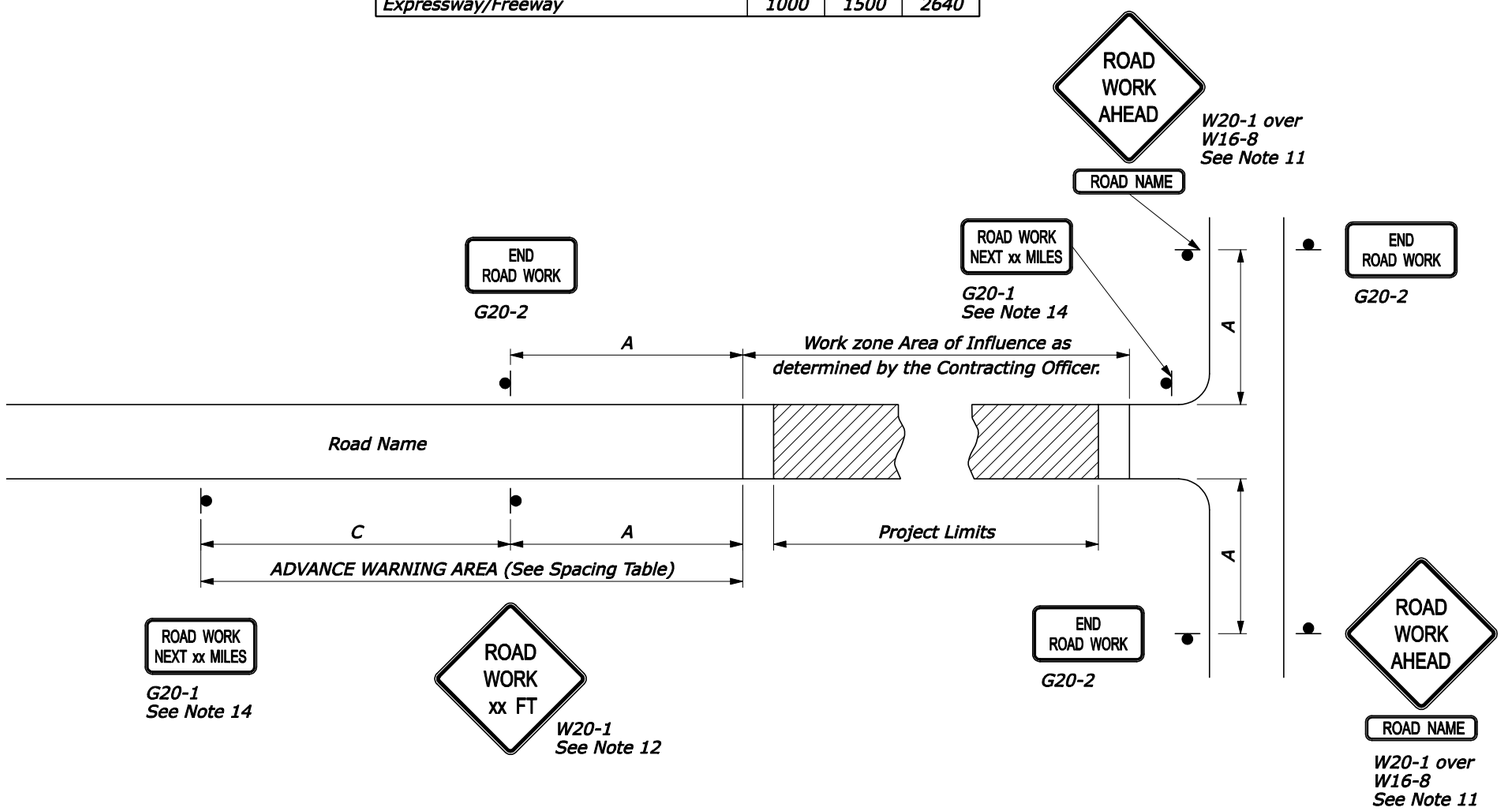
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	S09

SIGN SPACING TABLE			
ROAD TYPE	DISTANCE BETWEEN SIGNS IN FEET		
	A	B	C
Urban 40 MPH and less	100	100	100
Urban 45 MPH and greater	350	350	350
Rural	500	500	500
Expressway/Freeway	1000	1500	2640



NOTE:

1. Erect all advance warning signs before starting construction work.
2. Not all details shown on the temporary traffic control sheets may be applicable to this project. The Contractor may add or delete information and details in this traffic control plan as necessary to accommodate actual operations.
3. Where advance warning signs, placed as shown, interfere with permanent signs, locate the warning signs as determined by the CO for best results. Vary messages as required.
4. Use Type III or higher type sheeting on all signs and channelizing devices. Warning lights are not normally needed on devices with Type III or higher type sheeting, but may be beneficial to attract the drivers attention in fog or other special conditions. When used, apply the appropriate type of warning light (Type A, B, C, or D) per the MUTCD Chapter 6F.
5. When established in the contract, furnish beacons with the appropriate lens color as specified in the MUTCD Chapter 4K.
6. Additional or different message signs may be required to fit the actual construction conditions.
7. Install advisory speed plates under the W-20 series warning signs as needed to indicate a maximum recommended speed through the construction area.
8. Ensure all sign supports exposed to impact by traffic meet the requirements of NCHRP-350 for crash worthiness.
9. Maintain two-way traffic during all non-work hours except as approved by the CO.
10. Do not store traffic control devices along the roadway when not in use. Cover post-mounted signs when not applicable.
11. If W20-1 is on a roadway other than that on which the actual construction work occurs, include a supplementary plaque indicating the name of the road the work is on.
12. The message on the W20-1 signs may be "ROAD WORK AHEAD" or may specify the distance to the work area in feet or in miles. Install an additional W20-1 sign when approach speeds exceed 50 MPH. When used place the two W20-1 signs "B" feet apart.
13. When flagger warning sign series extend into project advance warning area, the second and third signs in the flagger series may be placed over the W20-1 sign(s) in project advance warning series.
14. For work zones that are more than 2 miles in length, install G20-1 sign. Show the distance on the G20-1 sign to the nearest whole mile.
15. If signs will be in place more than 72 consecutive hours, use ground-mounted post.
16. If signing on a roadway under a jurisdiction other than the partner agency, verify that an encroachment permit has been obtained.
17. State standards may be used as an alternative if approved by the CO.

NO SCALE

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

U.S. CUSTOMARY DETAIL

TEMPORARY TRAFFIC CONTROL ADVANCE SIGNING

STANDARD APPROVED FOR USE

REVISED:
DRAFT:

DETAIL 635-1

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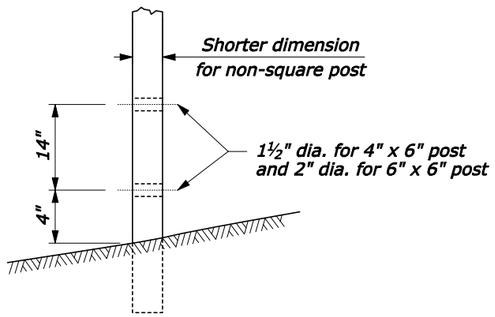
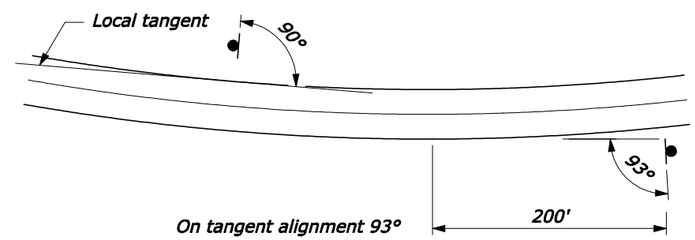
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	S10

NOTE:

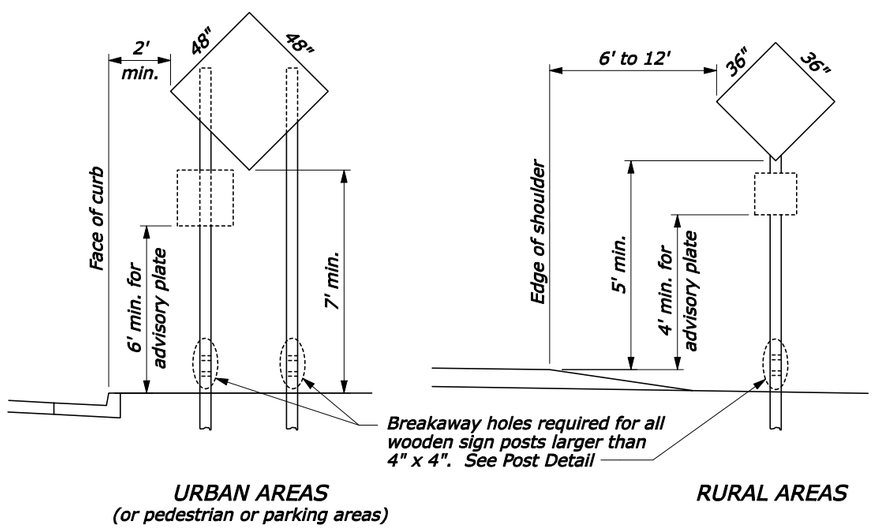
1. Use Type III or higher type sheeting on all signs and channelizing devices. Warning lights are not normally needed on devices with Type III or higher type sheeting, but may be beneficial to attract the drivers attention in fog or other special conditions. When used, apply the appropriate type of warning light (Type A, B, C, or D) per the MUTCD Chapter 6F.
2. Ensure all sign supports exposed to impact by traffic meet the requirements of NCHRP-350 for crash worthiness.
3. Do not store traffic control devices along the roadway when not in use. Cover post-mounted signs when not applicable.
4. State standards may be used as an alternative if approved by the CO.



POST DETAIL



SIGN INSTALLATION ANGLE



NOTE: Mount signs with area 9 sqft and under on a single 4" x 4" wood post. Use double wood posts for signs wider than 36" or signs with an area over 9 sqft. Steel may be used in lieu of wood posts (See Note 2)

SIGN PLACEMENT

NO SCALE

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

U.S. CUSTOMARY STANDARD

TEMPORARY TRAFFIC CONTROL SIGN INSTALLATION

STANDARD APPROVED FOR USE 6/2005

REVISED:
DRAFT: 11/2007

STANDARD
635-14

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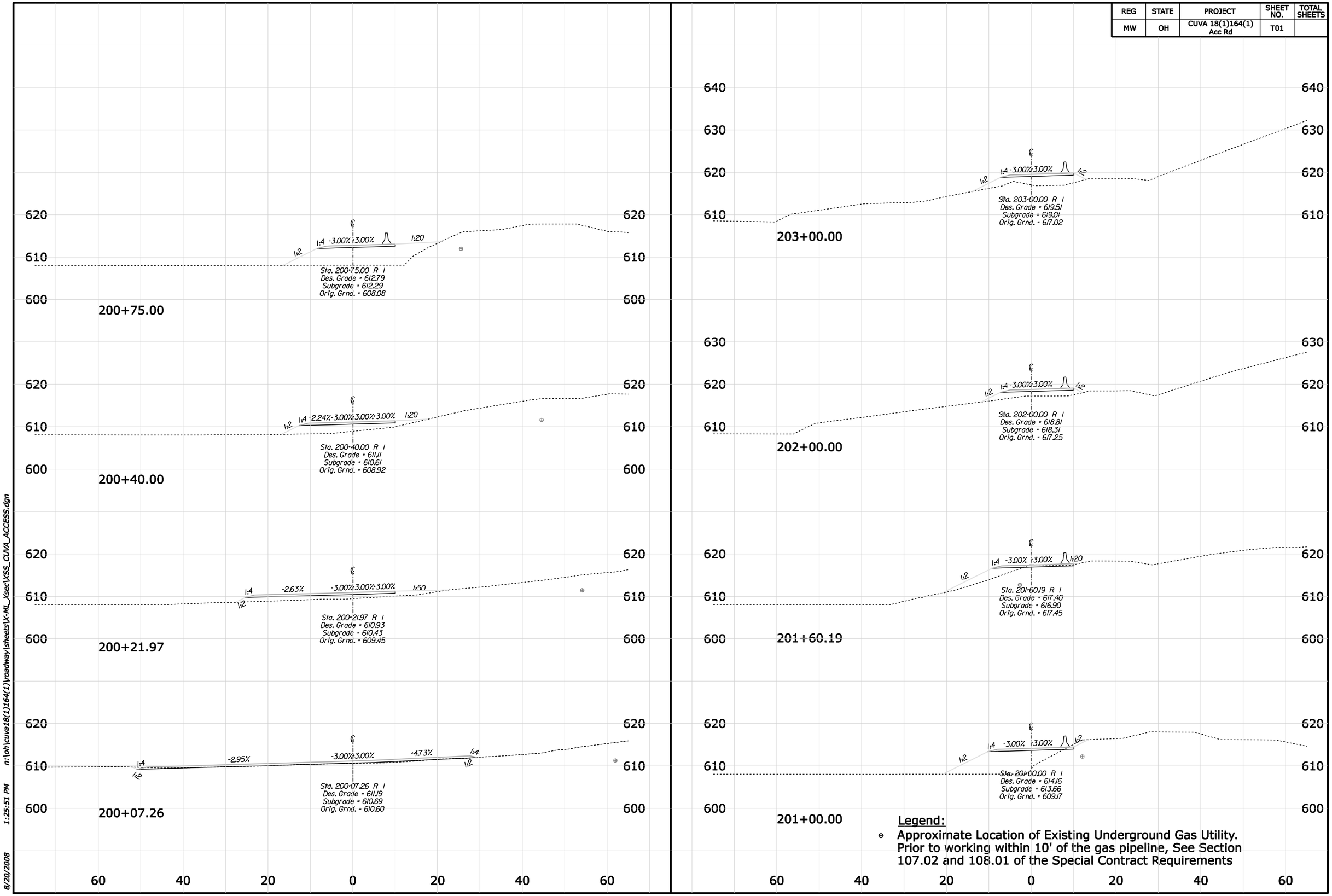
REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
MW	OH	CUVA 18(1)164(1) Acc Rd	T01	



Legend:

⊕ Approximate Location of Existing Underground Gas Utility. Prior to working within 10' of the gas pipeline, See Section 107.02 and 108.01 of the Special Contract Requirements

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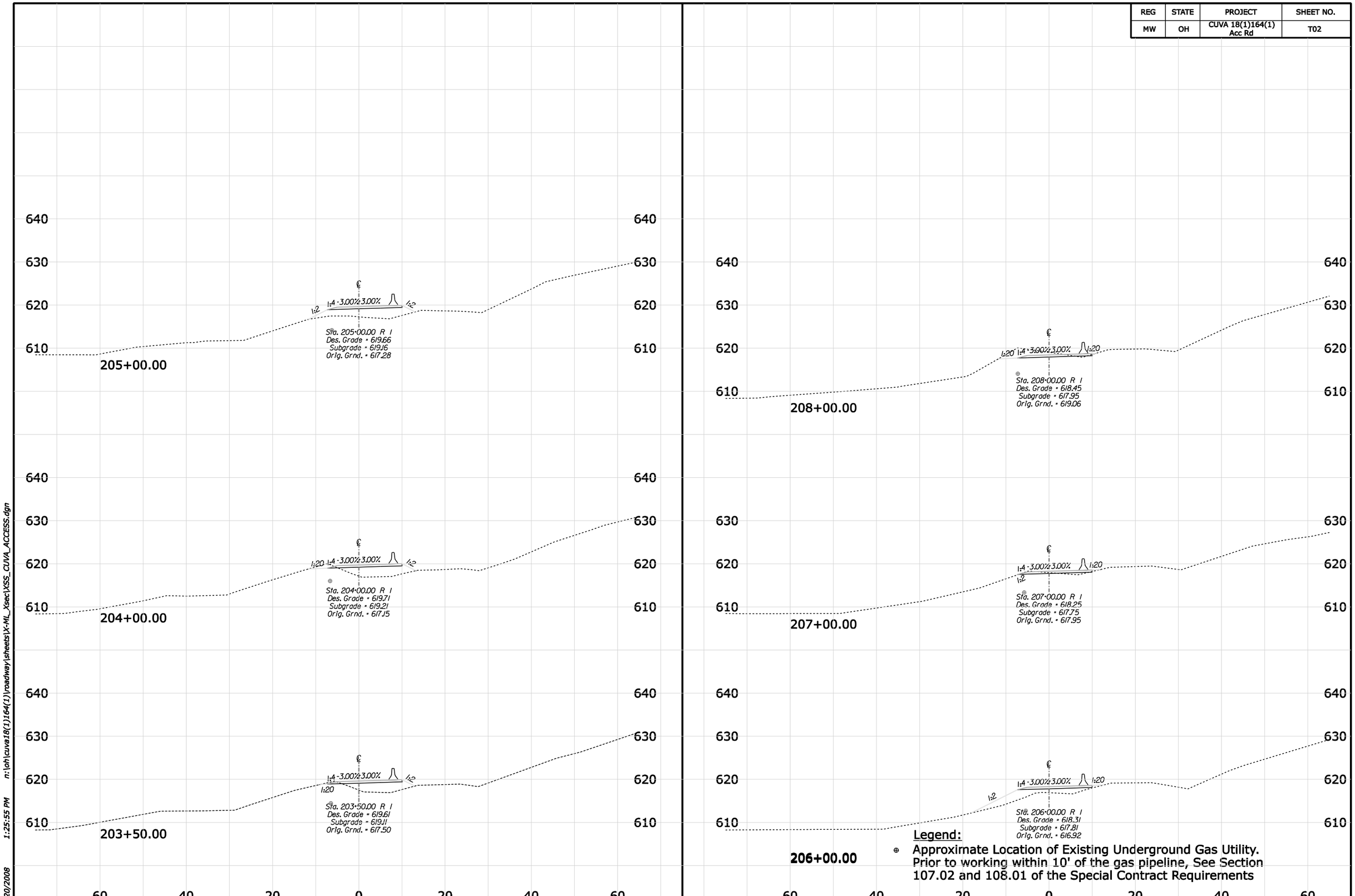
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	T02



Legend:

⊕ Approximate Location of Existing Underground Gas Utility. Prior to working within 10' of the gas pipeline, See Section 107.02 and 108.01 of the Special Contract Requirements

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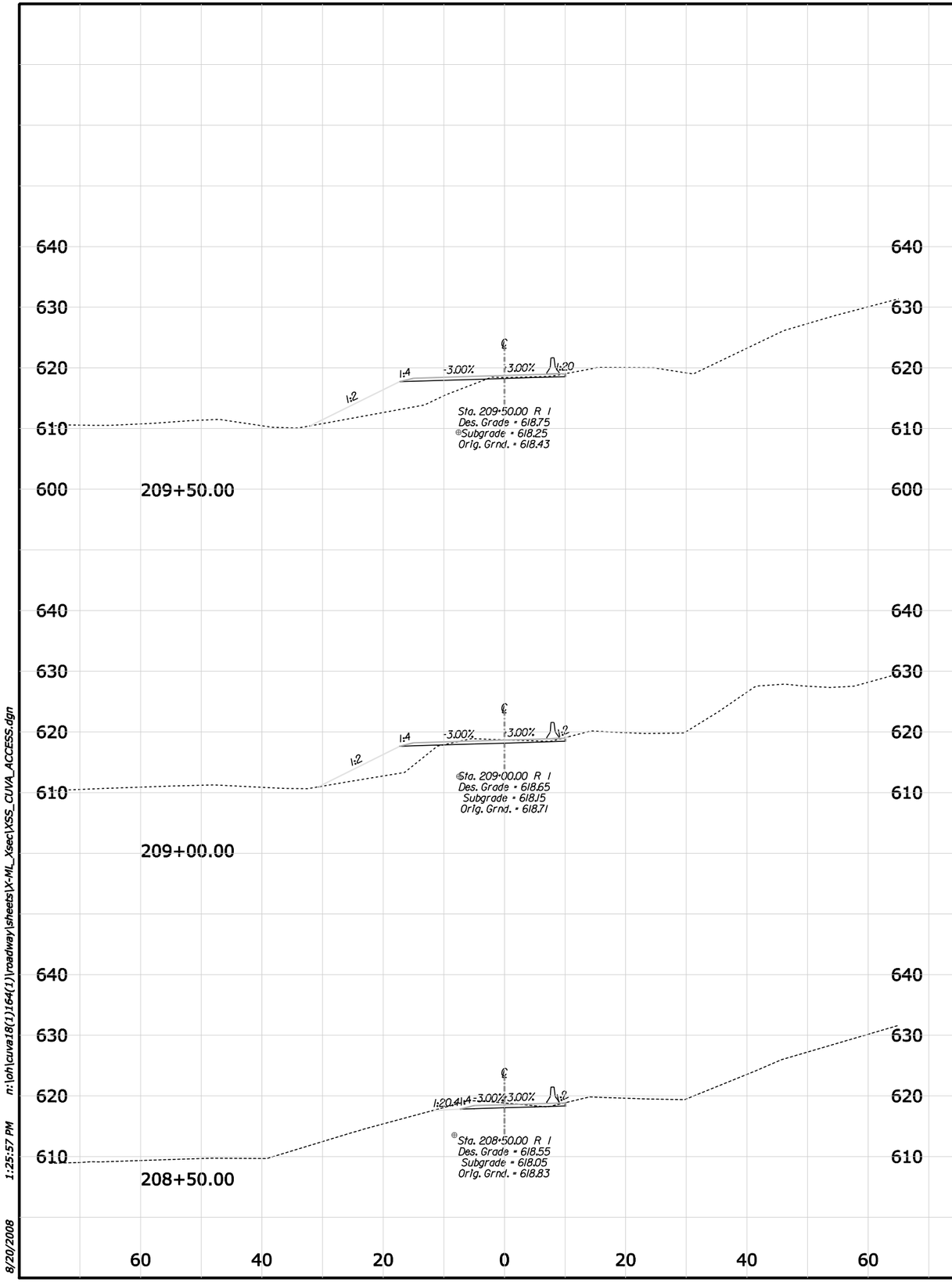
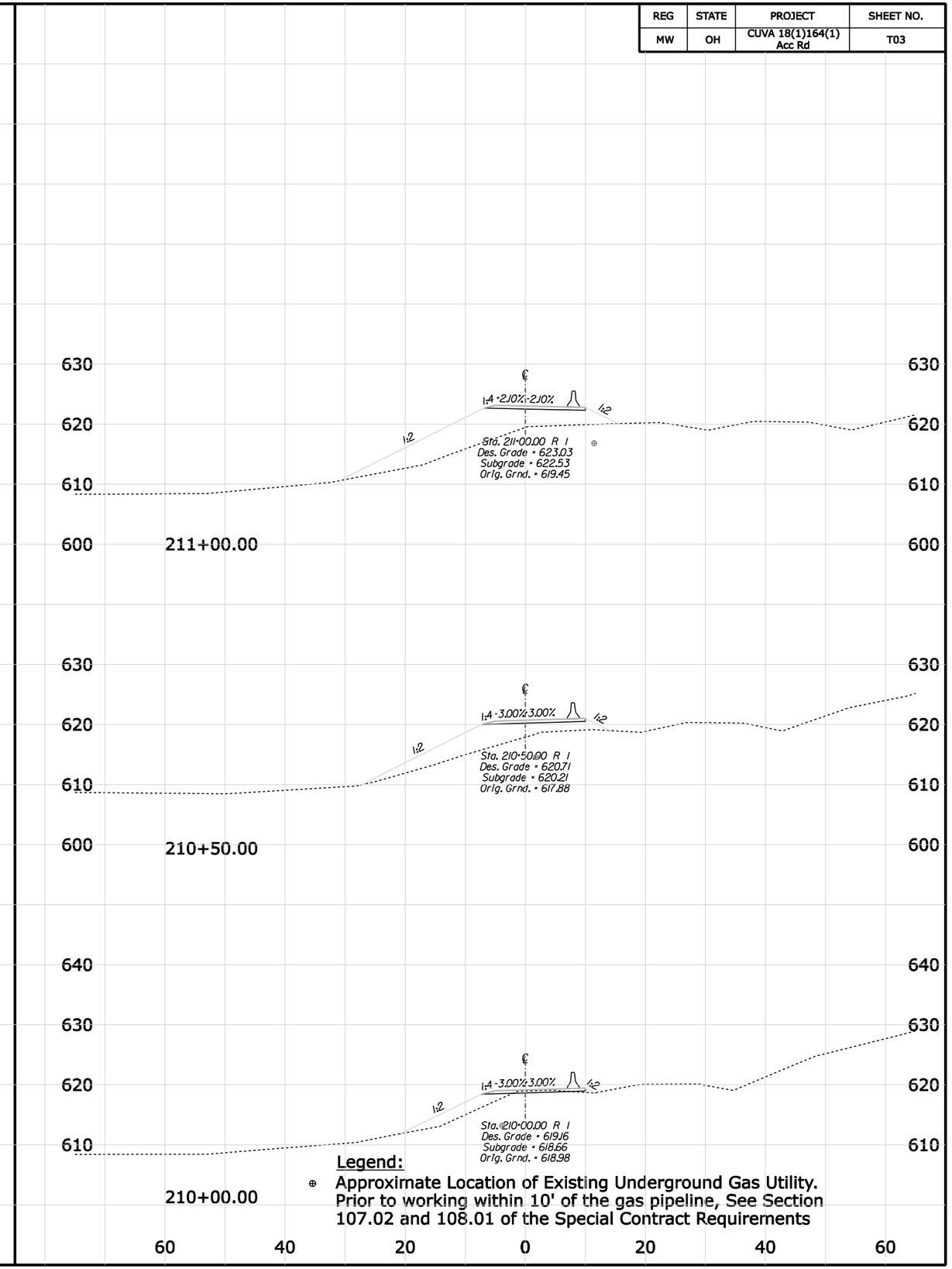
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	T03





Legend:

⊕ Approximate Location of Existing Underground Gas Utility. Prior to working within 10' of the gas pipeline, See Section 107.02 and 108.01 of the Special Contract Requirements

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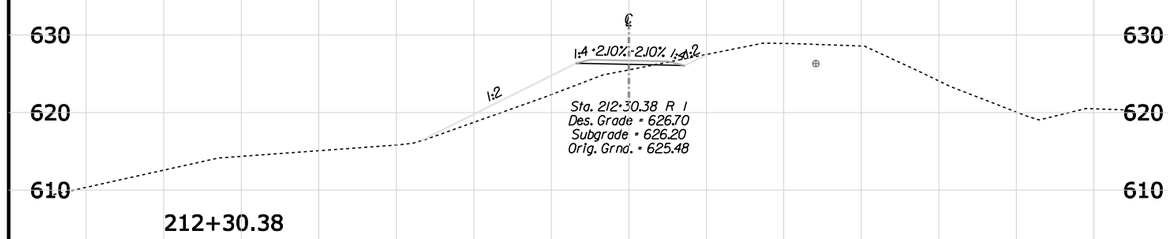
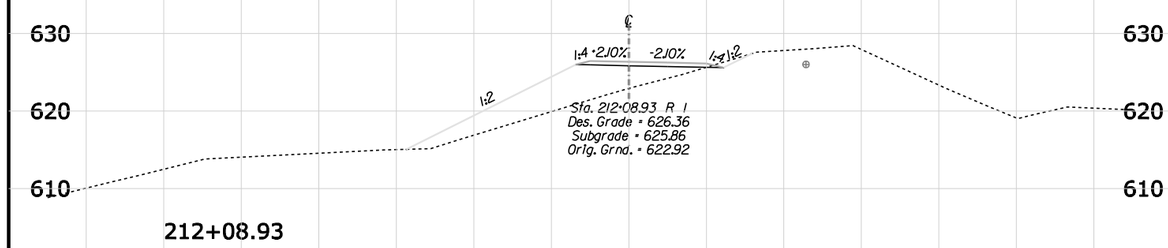
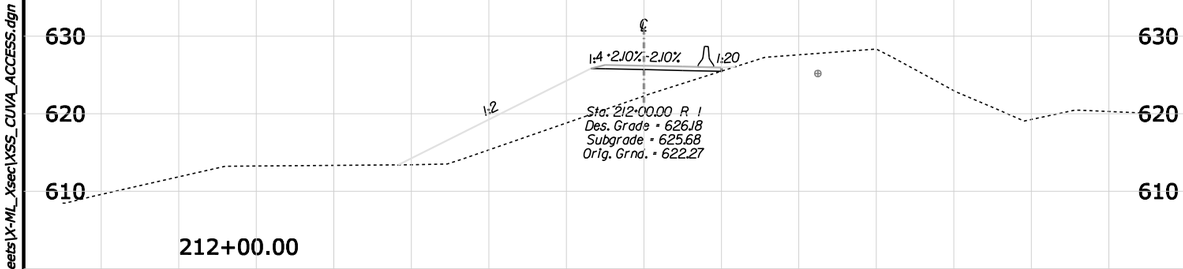
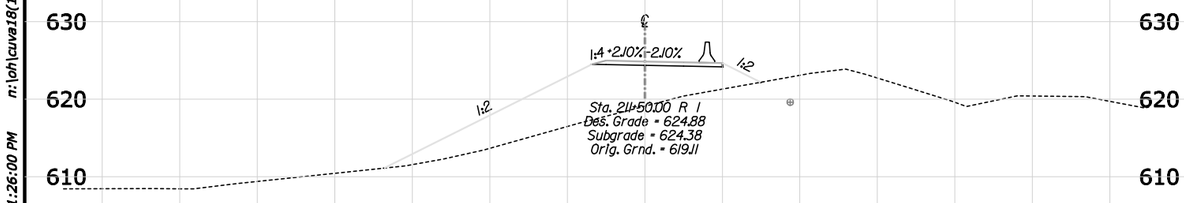
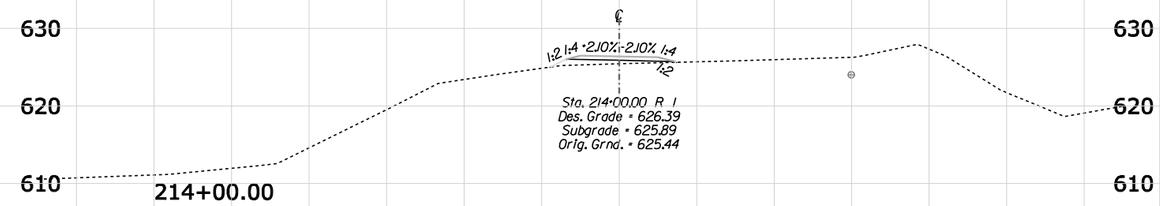
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	T04

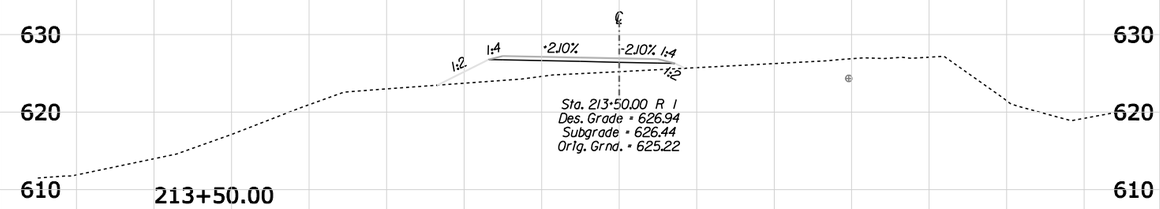


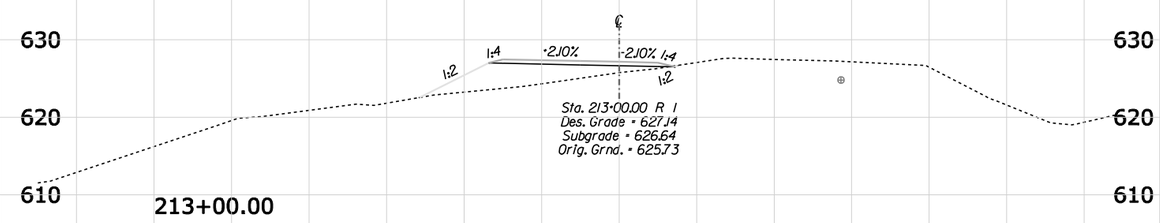


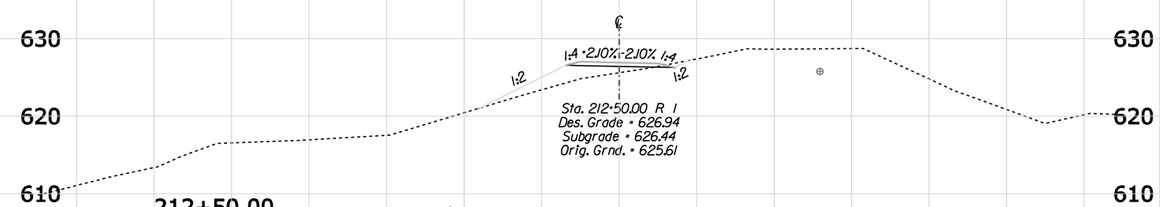












Legend:

⊕ Approximate Location of Existing Underground Gas Utility. Prior to working within 10' of the gas pipeline, See Section 107.02 and 108.01 of the Special Contract Requirements

60 40 20 0 20 40 60

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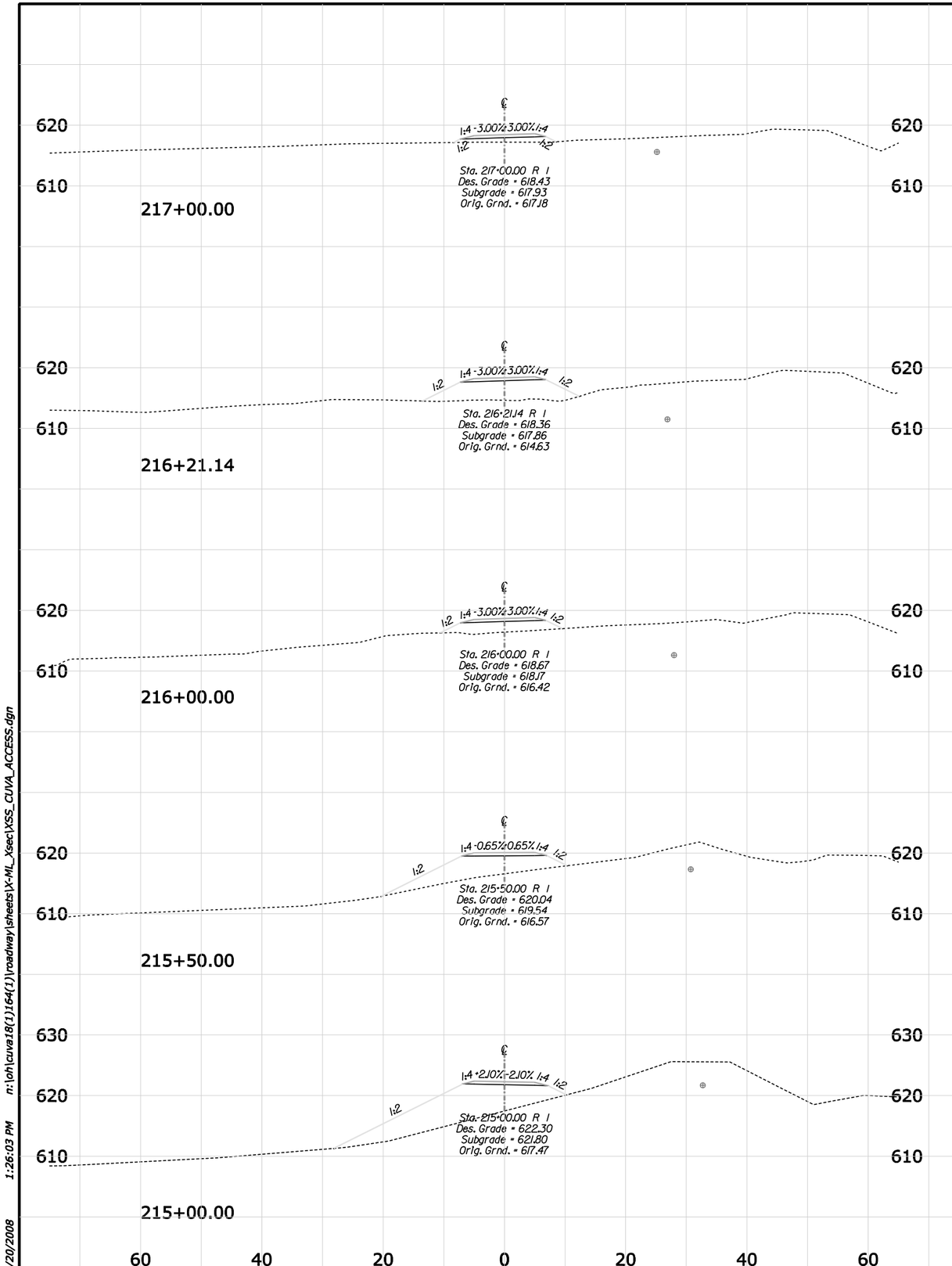
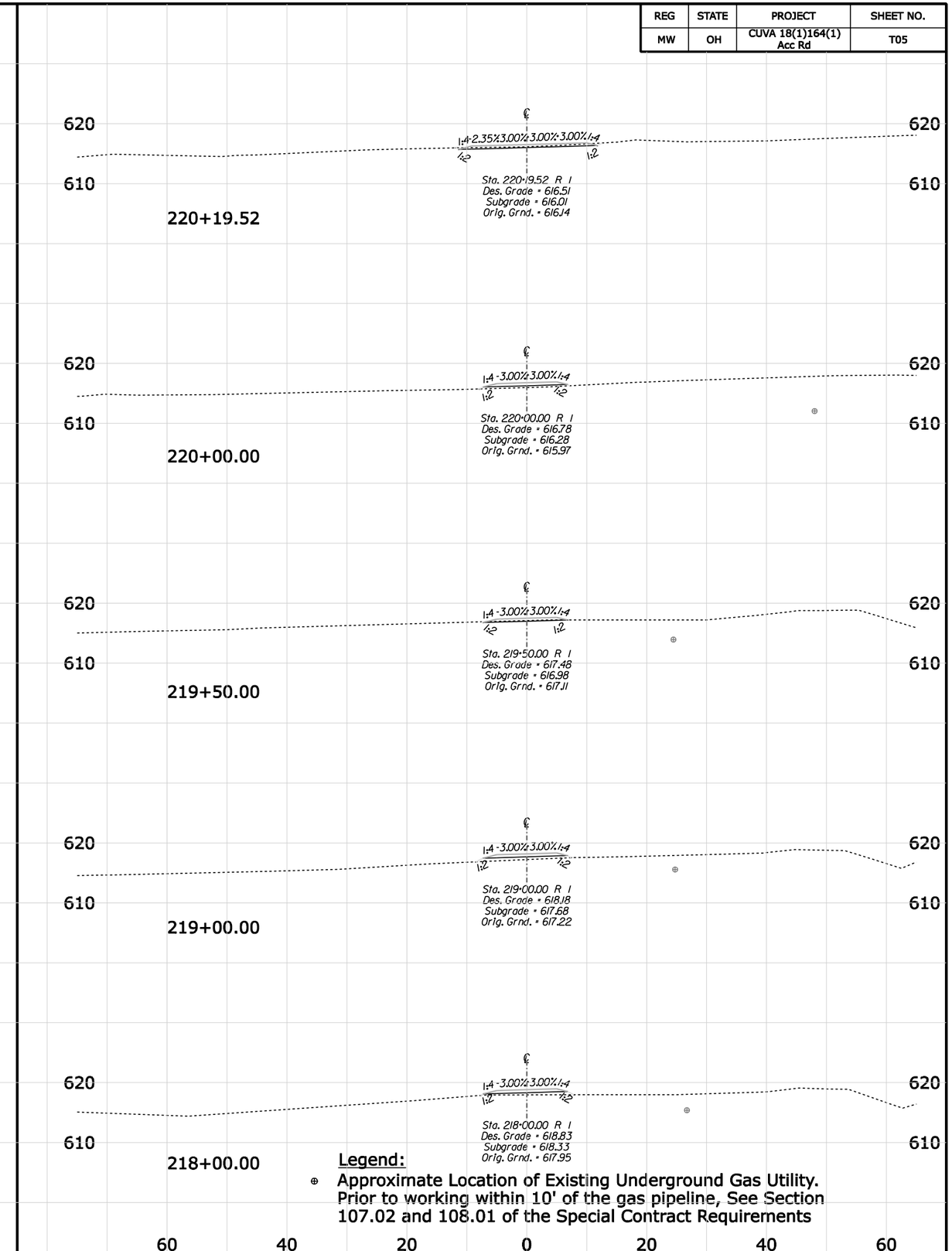
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	T05





Legend:

⊕ Approximate Location of Existing Underground Gas Utility. Prior to working within 10' of the gas pipeline, See Section 107.02 and 108.01 of the Special Contract Requirements

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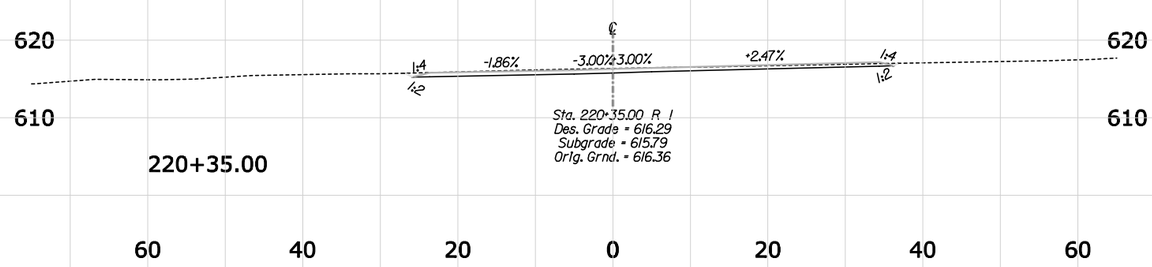
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	T06



Legend:

⊕ Approximate Location of Existing Underground Gas Utility. Prior to working within 10' of the gas pipeline, See Section 107.02 and 108.01 of the Special Contract Requirements

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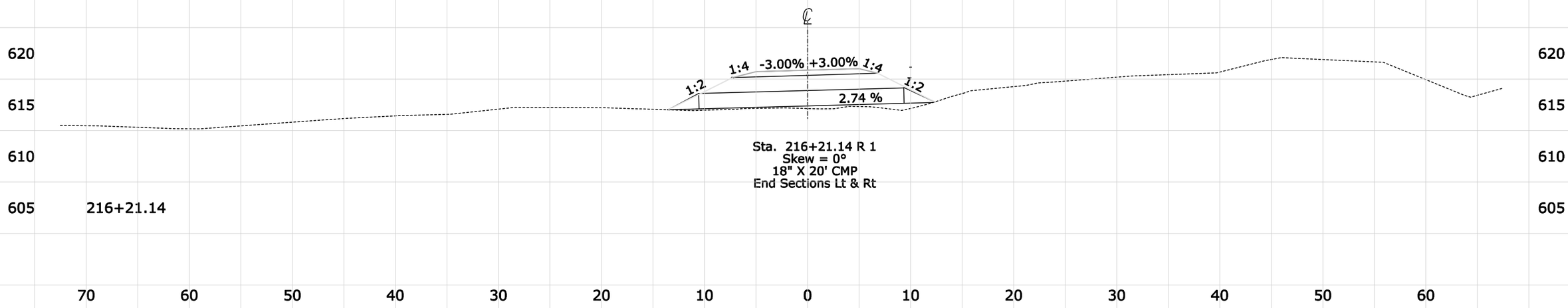
REG	STATE	PROJECT	SHEET NO.
MW	OH	CUVA 18(1)164(1) Acc Rd	Z01



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