

U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

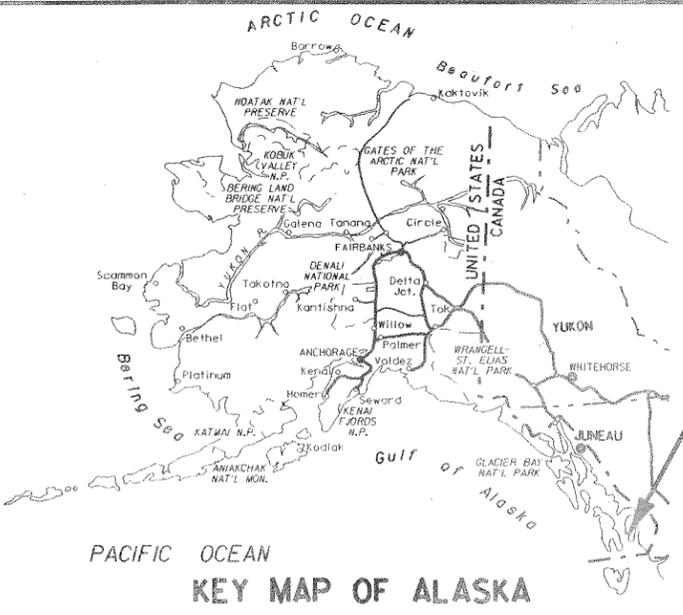


Project **PFH 39 - 1(3)**

PLANS FOR PROPOSED

ALASKA FOREST HIGHWAY PROJECT PFH 39-1(3) WARD LAKE ROAD LENGTH 2.709 MILES

TONGASS NATIONAL FOREST REVILLAGIGEDO ISLAND ALASKA



PACIFIC OCEAN
KEY MAP OF ALASKA

INDEX TO SHEETS

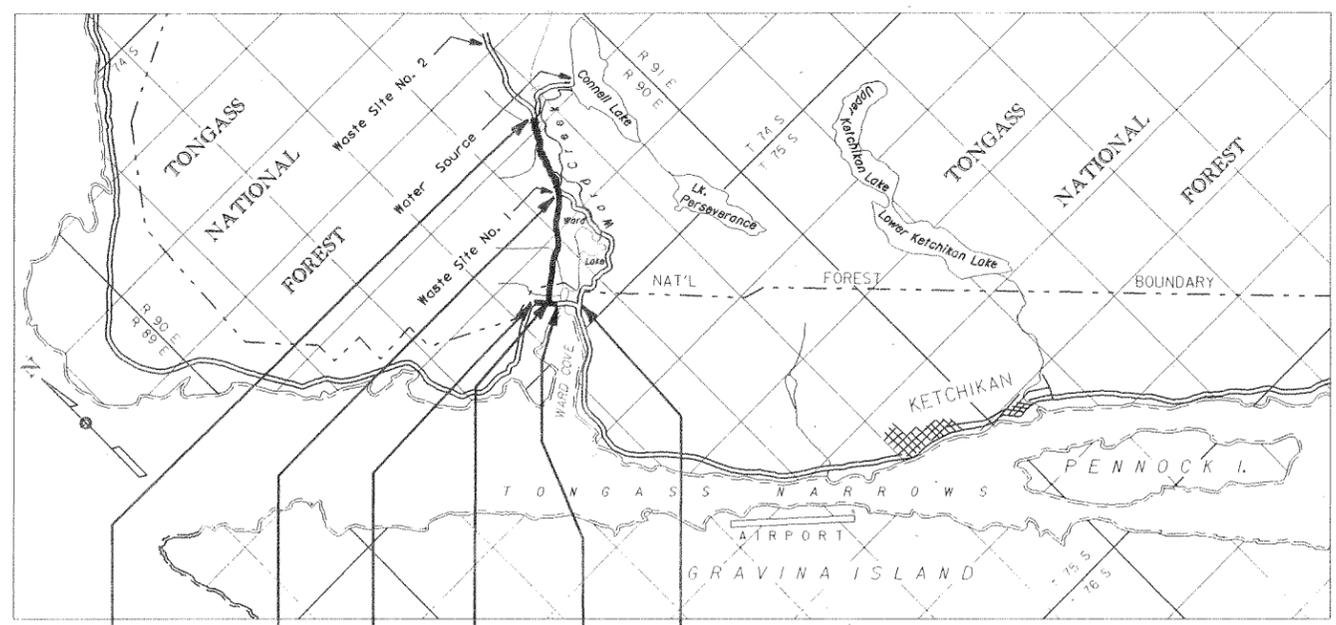
- A. GENERAL INFORMATION
 - A.1 Title Sheet
 - A.2 Conventional Plan Symbols and Abbreviations
- B. SUMMARIES
 - B.1-4 Summary of Quantities
- C. TYPICAL SECTIONS
 - C.1 Typical Sections - North Tongass Highway
 - C.2 Typical Sections - Ward Lake Road
 - C.3 Typical Section - Subexcavation
- D. PLAN - PROFILE
 - D.1 Tabulation of Quantities
 - D.2 Plan and Profile - North Tongass Highway
 - D.3-7 Plan and Profile - Ward Lake Road
- E. DRAINAGE
 - E.1-3 Summary of Drainage Quantities
 - E.4-6 Fish Passage Culvert Details
 - E.7 Temporary Diversion Channel
 - E.8-9 Culvert Outlet Control System
 - E.10 Culvert Extension and Pipe Riser Assembly
 - E.11-19 Drainage Standard Drawings
- F. TRAFFIC CONTROL
 - F.1-2 Temporary Traffic Control
 - F.3 Construction Signs
 - F.4-8 Permanent Traffic Signing
 - F.9-13 Sign Installation and Connection Details
 - F.14-15 Permanent Pavement Markings
- G. EROSION CONTROL
 - G.1-2 Erosion Control Plan
 - G.3 Sediment Control Silt Fences
 - G.4 Sediment Control Check Dams and Brush Barriers
- H. MISCELLANEOUS
 - H.1 Road Reconditioning
 - H.2 Rubblizing Details
 - H.3 Waste Site 1 Development Plan
 - H.4 Waste Site 2 Development Plan
 - H.5 Landscaping and Roadway Obliteration
 - H.6-7 Centerline Monuments
 - H.8 Guardrail Summary
 - H.9-14 Guardrail Standard Drawings
 - H.15 Utility Crossing Details
 - H.16 Rock Retaining Wall
 - H.17 Pedestrian Underpass and Hiking Trail
 - H.18 Reinforced Concrete Headwall
- I. APPROACH ROADS
 - I.1-2 Approach Roads Sta. 73+00
 - I.3 Approach Road Details

By: P. Anderson
 Date: 5/94
 Revised: 8/95
 Checked: F. Anderson
 Approved:

Type of Construction:
Grading, Drainage and Bituminous Surfacing

Specifications:
Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-92

Design Designation
 ADT 1995 - 430
 ADT 2015 - 640
 DHV 100
 D 50/50
 V 50 MPH
 e 0.060 max.



STA. 129+00
 END PROJECT
 WARD LAKE ROAD

 M.P. 1.9
 END RECONDITIONING
 EXISTING ROAD

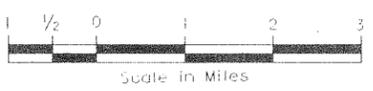
 STA. 33+00
 END CONSTRUCTION
 NORTH TONGASS HWY.

 STA. 0+19.77
 BEGIN PROJECT
 WARD LAKE ROAD

 STA. 18+50
 BEGIN CONSTRUCTION
 NORTH TONGASS HWY.

 M.P. 0.0
 BEGIN RECONDITIONING
 EXISTING ROAD

7± Miles to Ketchikan



PLANS PREPARED BY
 U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 WESTERN FEDERAL LANDS HIGHWAY DIVISION
 VANCOUVER, WASHINGTON

Recommended for Approval
Matthew Langley DATE 3/8/96
 Project Manager
Approved
James Hall DATE 3-11-96
 Division Engineer,
 Western Federal Lands Highway Division

AF0393AC.DGN

Abutment	abut.	Lineal Foot (feet)	ln ft
Aggregate	aggr.	Longitudinal	long.
Ahead	AH	Low Water	LW
Alternate	alt.	Lump Sum	LS
And	&	Magnetic	mag.
And Others	et al	Maintenance	maint.
And Wife	et ux	Material	matl.
And So Forth (et cetera)	etc.	Maximum	max.
Approach	appr.	Meter (measurement)	m
Approximate	approx.	M-Gallon	M-gal
Asphalt	asph.	Millimeter	mm
Average Daily Traffic	ADT	Mile	mi
Back	BK	Mile Per Hour	mph
Back to Back	b. to b.	Minute(s) (angular)	'
Balance Point	BP	Minimum	min.
Batter	btr.	Miscellaneous	misc.
Beam	bm.	Monument	mon.
Bearing	brg.	Mountain(s)	mtn(s).
Beginning	beg.	M-Square Feet	M-sq ft
Bench Mark	BM	Negative	neg.
Bridge	br.	North	N
Centerline	E	Number	no.
Center to Center	cc or c. to c.	Original Ground	OG
Centers	ctrs.	Out to Out	o. to o.
Channel Change	ch. ch.	Outside Diameter	OD
Clear	clr.	Pavement	pvmt.
Column	col.	Percent	pc. or %
Concrete	conc.	Perforate	perf.
Connection	conn.	Plate	pl.
Construction	constr.	Point of Compound Curve	PCC
Construction Joint	constr. jt.	Point of Curve	PC
Contingent Sum	CTSM	Point on Curve	POC
Continuous	cont.	Point of Intersection	PI
Corrugated	corr.	Point of Spiral to Curve	PSC or SC
Corrugated Metal Pipe	CMP	Point of Curve to Spiral	PCS or CS
County	co.	Point on Spiral	POS
Countersink	ctsk.	Point of Curve to Tangent	PST or ST
Creek	cr.	Point on Tangent	POT
Cubic Inches	cu in(s)	Point of Tangent to Spiral	PS or TS
Cubic Foot(feet)	cu ft	Point of Tangent	PT
Cubic Yards	cu yd(s)	Pound	lb
Cubic Yard Mile	cym	Pounds Per Square Inch	psi
Culvert	culv.	Pounds Per Square Foot	psf
Curve Delta	Δ	Pounds Per Cubic Foot	pcf
Curve Left	CL	Project	proj.
Curve Right	CR	Quantities	quant.
Degree of Curve	D	Radius	R
Degree	°, deg. or D	Range	R
Design Hour Volume	DHV	Reconstruction	reconst.
Diagonal	diag.	Reinforcement	reinf.
Diameter	dia. or D	Required	reqd.
Diaphragm	diaph.	Reservoir, Reservation	res.
District	Dist.	Retaining Wall	ret. wall
Donation Land Claim	DLC	Right	rt.
Drawing(s)	drwg(s).	Right-of-Way	R/W
East	E	Road	rd.
Edge of Pavement	EP	Roadway	rdwy.
Edge of Water	EW	Route	rte.
Edge of Road	ER	School	sch.
Elevation	elev.	Section	sec.
Elevation with Number	El. 94.0	Slope Protection	sl. prot.
Embankment	emb.	Slurry Unit	slry unit
Engineer(s)	enrg(s).	South	S
Equation	EQ or eq.	Spacing, Spaces, of Spaced	spa.
Excavation	exc.	Specification	spec.
	exp. jt.	Square	sq
Federal	Fed.	Square foot	sq ft
Finish	fin.	Square yard	sq yd
Flange	fig.	Standard	std.
Foot	ft	Station	sta.
Footing	ftg.	Stiffener	stiff.
Foot Kips	ft kips	Straight	str.
Foot Pounds	ft lbs	Street	st.
For example	e.g.	Stringer	strg.
Gallon	gal	Structural	struc.
Galvanized	galv.	Superelevation Rate	e
Gauge (Gage)	ga.	Symmetrical	sym.
Headwall	hdwl.	Tangent	tan.
Hexagon	hex.	Tangent Length	T
High Water	HW	Temporary Bench Mark	TBM
Highway	hwy.	Thousand	M
House	hse.	Thousand Feet Board Measure	MFBM
Homestead Entry Survey	HES	That Is	i.e.
Identification	iden.	Thread	thd.
Inches Per Linear Foot	in/ln ft	Township	T.
Inches Per Square Foot	in/sq ft	Typical	typ.
Inclusive	incl.	Vehicles Per Hour	vph
Inside Diameter	ID	Vertical Point of Intersection	VPI
Joint	jt.	Warehouse	whs.
Lamination	lam.	Water Tank	WT
Latitude	lat.	West	W
Left	lt.		
Length of Curve	L		

NATIONAL BOUNDARY	
STATE BOUNDARY	
COUNTY BOUNDARY	
CITY BOUNDARY	
TOWNSHIP or RANGE LINE	
SECTION LINE	
1/4 SECTION LINE	
1/16 SECTION LINE	
NATIONAL PARK or FOREST BOUNDARY	
PROPERTY LINE	
RIGHT-OF-WAY LINE	EXISTING FINAL
RIGHT-OF-WAY MONUMENT	EXISTING FINAL
PARTIAL CONTROL OF ACCESS	EXISTING FINAL
FULL CONTROL OF ACCESS	EXISTING FINAL
EASEMENT	
SLOPE STAKE	TOP OF CUT TOE OF FILL
ROADWAY, EXISTING	
RAILROAD	SINGLE TRACK MULTIPLE TRACK
TRAIL	
INTERMITTENT DRAINAGE & SMALL CREEK	
LARGE CREEK	
RIVER	
LAKE, POND or RESERVOIR; MARSHLAND	
SPRING	
TREELINE; TREE	
MATERIAL SOURCE	
SECTION CORNER	FOUND PROJECTED
1/4 SECTION CORNER	
1/16 SECTION or PROPERTY CORNER	
PROPERTY CORNER	
PARCEL NUMBER	

	EXISTING	PROPOSED
FENCE		
FENCE with GATE		
CATTLEGUARD		
GUARDRAIL		
MEDIAN & SIDE BARRIER		
SIGNS	POST MOUNTED PORTABLE COMMERCIAL	
RETAINING WALL		
POWER POLE with UTILITY LINE		
TELEPHONE POLE WITH UTILITY LINE		
JOINT USE POLE with UTILITY LINE		
SUPPORT POLE with ANCHOR		
TELEPHONE BOOTH or PEDESTAL		
STREET LIGHT		
UNDERGROUND UTILITIES		
BRIDGE		
PIPE CULVERT		
PIPE CULVERT with END SECTION		
PIPE CULVERT with HEADWALL		
BOX CULVERT		
PIPE CULVERT with INLET		
PIPE CULVERT with END SECTION		
UNDERDRAIN		
BOX CULVERT on PROFILE		
PIPE CULVERT on PROFILE		
TRAVERSE POINT (Horizontal & Vertical)		No Symbol
TRAVERSE POINT (Horizontal)		No Symbol
BRASS CAP		No Symbol
STEEL PIN		No Symbol
HUB & TACK		No Symbol
SPOT ELEVATION		No Symbol
RIPRAP or SLOPE PROTECTION	No Symbol	

NOTE:
Other symbols when used in the plans will be either labelled or shown in a legend on a plan sheet.

CONVENTIONAL PLAN SYMBOLS & ABBREVIATIONS

PLAN SHEET NUMBER ----->>			C.1 TYPICAL SECTIONS	C.2-3 TYPICAL SECTIONS	D.1 TAB. OF QTY'S	D.2 PLAN-PROFILE	D.3-6 PLAN-PROFILE	E.1-10 DRAINAGE QTY'S	F.1-10 TRAFFIC CONTROL	G.1-4 SEDIMENT & EROSION CONTROL	H.1-17 MISC. DETAILS	I.1 INTERSEC./APPROACH ROADS	I.2 INTERSEC./APPROACH ROADS	I.3 INTERSEC./APPROACH ROADS	ESTIMATED QUANTITIES		
ITEM	DESCRIPTION	UNIT														PLAN	BID SCHEDULE
15101	Mobilization	Lump Sum														ALL	ALL
15201	Construction survey and staking	Lump Sum														ALL	ALL
15401	Contractor testing	Lump Sum														ALL	ALL
15501	Construction schedule	Lump Sum														ALL	ALL
15703	Silt fence	Ln Ft								4095						4095	4300
15704	Brush barriers	Ln Ft								2600						2600	2750
15707A	Temporary 36-inch culvert pipe	Ln Ft						200								200	220
15707B	Temporary 48-inch culvert pipe	Ln Ft						430								430	450
15707C	Temporary 60-inch culvert pipe	Ln Ft						340								340	350
15709	Check dams	Each								112						112	120
15713	Plastic lining	Sq Yd						1015								1015	1200
15716A	Equipment for soil erosion control (loader/backhoe, wheel type tractor, 50 E.H.P. minimum)	Hour															40
15716B	Equipment for soil erosion control (truck, dump, 10 cu.yd minimum capacity)	Hour															40
15718	Diversion channel	Ln Ft						605								605	700
15801	Electronic documentation system	Lump Sum														ALL	ALL
20101	Clearing and grubbing	Acre				2.0	37.1				6.8		1.4	0.8		48	50
20204	Removal of individual trees	Sq Ft															100
20301A	Removal of pipe culvert	Each			1											1	1
20301B	Removal of headwall	Each			4											4	4
20301C	Removal of structural plate pipe	Each			2											2	2
20301D	Removal of sign	Each			2											2	2
20304	Removal of structures and obstructions	Lump Sum														ALL	ALL
20401	Roadway excavation	Cubic Yard				36835	428312				2100	113	6722	240		474322	495000
20402	Subexcavation	Cubic Yard		138100												138100	145000
20408	Select topping	Ton	1060	39120								740	2100	564		43584	45000
20501	Controlled blast hole	Ln Ft			39815											39815	42000
20504	Rubblized blasting	Cubic Yard									113900					113900	113900 (CO)

(CO) Contract Quantity; see Subsection 109.02(c) of FP-92

By: _____ Date: _____
 Designed: _____ Checked: _____

AF0393DD.DGN

SUMMARY OF QUANTITIES

PLAN SHEET NUMBER ----->>			C.1 TYPICAL SECTIONS	C.2-3 TYPICAL SECTIONS	D.1 TAB. OF QTY'S	D.2 PLAN-PROFILE	D.3-6 PLAN-PROFILE	E.1-10 DRAINAGE QTY'S	F.1-10 TRAFFIC CONTROL	G.1-4 SEDIMENT & EROSION CONTROL	H.1-17 MISC. DETAILS	I.1 INTERSEC./APPROACH ROADS	I.2 INTERSEC./APPROACH ROADS	I.3 INTERSEC./APPROACH ROADS	ESTIMATED QUANTITIES		
ITEM	DESCRIPTION	UNIT														PLAN	BID SCHEDULE
20510	Blasting consultant services	Lump Sum														ALL	ALL
20601	Watering	M-Gal															2500
21102	Roadway obliteration	Lump Sum														ALL	ALL
25101	Loose riprap, class 4	Cubic Yard						125								125	200
25107	Riprap lined ditch	Ln Ft									220					220	250
25110A	Culvert outlet control system	Each						6								6	6
25110B	Culvert outlet control system (waterfall)	Each						1								1	1
30110	Crushed aggregate	Ton						65			8000	590				8655	9000
30303	Road reconditioning	Mile									1.9					1.900	1.900
31001	Emulsified asphalt treated aggregate base, grading D	Ton	405	15300								50	850	435		17040	17500
31004	Emulsified asphalt, grade CSS-1	Ton	4.1	153								0.5	8.5	4.5		171	175
40901A	Surface treatment aggregate, designation E-70, grading B	Ton	24	910								4	54	25		1017	1100
40901B	Surface treatment aggregate, designation E-70, grading D	Ton	12	460								2	27	13		514	525
40901C	Surface treatment aggregate, designation E-70, grading E	Ton	8	275								2	16	8		309	325
40904	Emulsified asphalt, grade CRS-2	Ton	0.5	188.8								0.8	10.9	4.8		204	220
60104A	Concrete, headwall for 120-inch pipe culvert	Each						2								2	2
60104B	Concrete, headwall for 144-inch pipe culvert	Each						2								2	2
60104C	Concrete, headwall for 156-inch structural plate pipe culvert	Each						1								1	1
60201A	18-inch pipe culvert	Ln Ft						88								88	100
60201B	24-inch pipe culvert	Ln Ft						2016								2016	2100
60201C	36-inch pipe culvert	Ln Ft						952								952	1000
60201D	48-inch pipe culvert	Ln Ft						136								136	150
60201E	84-inch pipe culvert	Ln Ft						184								184	190
60201F	108-inch pipe culvert	Ln Ft						94								94	100
60201G	120-inch pipe culvert	Ln Ft						270								270	280
60201H	144-inch pipe culvert	Ln Ft						254								254	270

Date: _____
 By: _____
 Designed: _____
 Checked: _____

AF0393DD.DGN

SUMMARY
 OF QUANTITIES

PLAN SHEET NUMBER ----->>			C.1 TYPICAL SECTIONS	C.2-3 TYPICAL SECTIONS	D.1 TAB. OF QTY'S	D.2 PLAN-PROFILE	D.3-6 PLAN-PROFILE	E.1-10 DRAINAGE QTY'S	F.1-10 TRAFFIC CONTROL	G.1-4 SEDIMENT & EROSION CONTROL	H.1-17 MISC. DETAILS	I.1 INTERSEC./APPROACH ROADS	I.2 INTERSEC./APPROACH ROADS	I.3 INTERSEC./APPROACH ROADS	ESTIMATED QUANTITIES		
ITEM	DESCRIPTION	UNIT														PLAN	BID SCHEDULE
60206A	End section for 18-inch pipe culvert	Each						4								4	4
60206B	End section for 24-inch pipe culvert	Each						36								36	36
60206C	End section for 36-inch pipe culvert	Each						2								2	2
60209	Elbow, 48-inch	Each						1								1	1
60211	Pipe riser assembly, 48-inch	Each						1								1	1
60301	156-inch structural plate pipe, 0.188 inch	Ln Ft						190								190	200
61006	Drilled holes	Ln Ft			1080											1080	1200
61701	Guardrail, system G4, type I, class A (wood posts)	Ln Ft									5975					5975	6000
61702A	Terminal section, type MELT	Each									16					16	16
61702B	Terminal section, type G4-BAT	Each									2					2	2
61906	Remove and reinstall gate	Each			2											2	2
62101	Centerline monument	Each									58					58	58
62201A	Tractor, crawler (dozer), power angle and power tilt blade, 65 E.H.P. minimum	Hour									120					120	120
62201B	Grader, motor, 150 E.H.P. minimum	Hour									320					320	320
62301	General labor	Hour									80					80	80
62503A	Seeding, hydraulic method	Siry Unit					82				25			2		109	120
62503B	Seeding, hydraulic method "Wildflower mix"	Siry Unit											4			4	5
62506	Mulching, hydraulic method	Siry Unit					82				25		4	2		113	120
63302	Sign installation	Sq Ft							350.67							351	400
63312A	Remove and reset sign	Each			4											4	4
63312B	Remove and reset sign base	Each			1											1	1
63401A	Pavement markings, type K, broken yellow	Ln Ft							13400							13400	13500
63401B	Pavement markings, type K, solid yellow	Ln Ft							47324							47324	47500
63401C	Pavement markings, type K, solid white	Ln Ft							62322							62322	62500
63405A	Pavement markings, type K, arrow symbol	Each							6							6	6
63405B	Pavement markings, type K, word	Each							4							4	4
63407	Recessed pavement marker	Each							73							73	73
63505A	Barricade, type I	Each							50							50	50

Date: _____
 By: _____
 Designed: _____
 Checked: _____

AF0393DD.DGN

SUMMARY
OF QUANTITIES

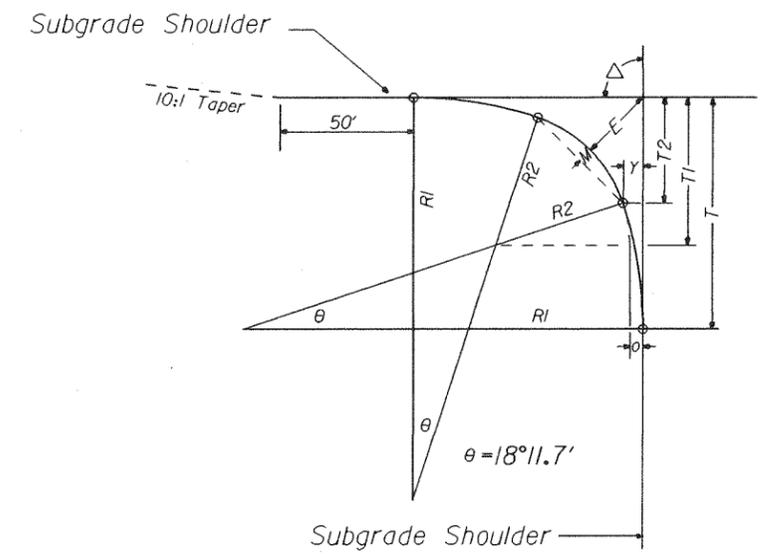
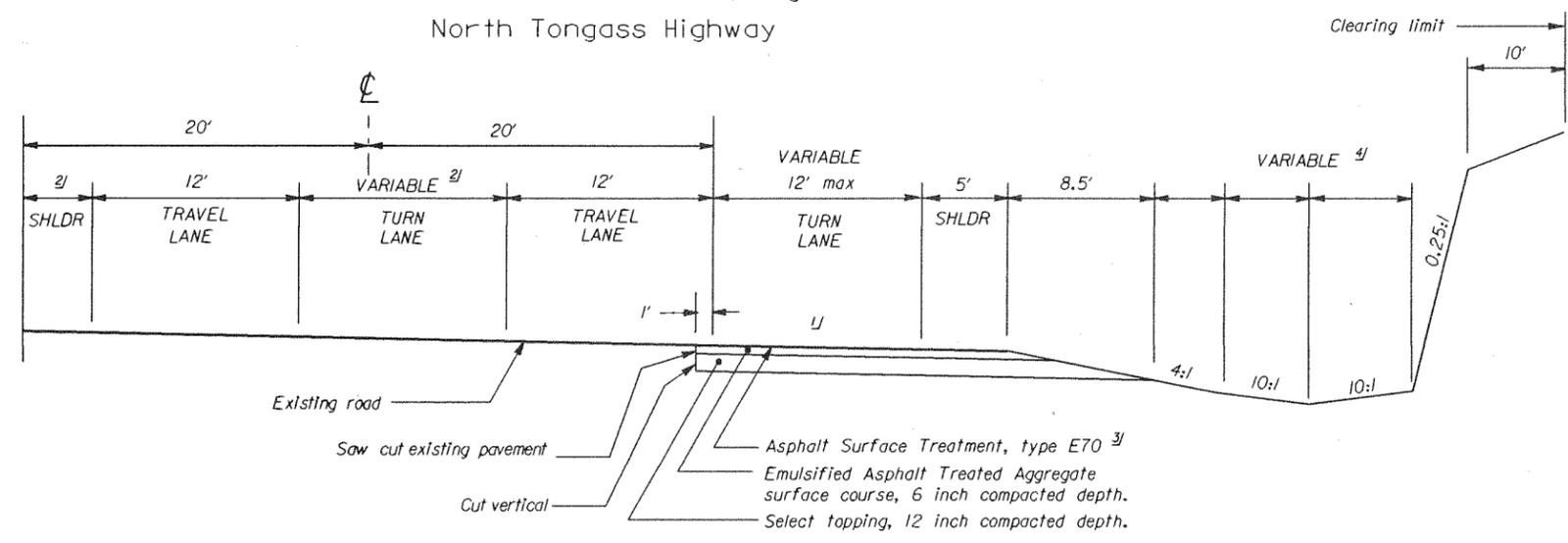
PLAN SHEET NUMBER ----->			C.1 TYPICAL SECTIONS	C.2-3 TYPICAL SECTIONS	D.1 TAB. OF QTY'S	D.2 PLAN-PROFILE	D.3-6 PLAN-PROFILE	E.1-10 DRAINAGE QTY'S	F.1-10 TRAFFIC CONTROL	G.1-4 SEDIMENT & EROSION CONTROL	H.1-17 MISC. DETAILS	I.1 INTERSEC./APPROACH ROADS	1.2 INTERSEC./APPROACH ROADS	1.3 INTERSEC./APPROACH ROADS	ESTIMATED QUANTITIES		
ITEM	DESCRIPTION	UNIT														PLAN	BID SCHEDULE
63505B	Barricade, type III	Each							10							10	10
63506	Cone, type 26-inch	Each							50							50	50
63507	Construction sign	Sq Ft							790.5							791	800
63509	Flagger	Fix Hr Rat							5000							5000	5000
63510	Pilot car	Hour							120							120	120
63519	Pavement marking removal	Ln Ft							2550							2550	2600
63521A	Warning light, type A	Each							20							20	20
63521B	Warning light, type C	Each							30							30	30
63559	Traffic control laborer	Hour							900							900	900
63701	Field office	Each															1
63703	Residential housing	Each															4
63704	Vehicles	Each															4
65003	Spawning gravel	Ton						81								81	90
65501	Boulders	Each					10									10	10
65511	Remove and reinstall rock barrier	Lump Sum														ALL	ALL
65520	Rock retaining wall	Sq Ft									750					750	750
69501	Material source development and reclamation	Lump Sum														ALL	ALL

Date: 8/95
 By: P. Anderson
 Designed:
 Checked:

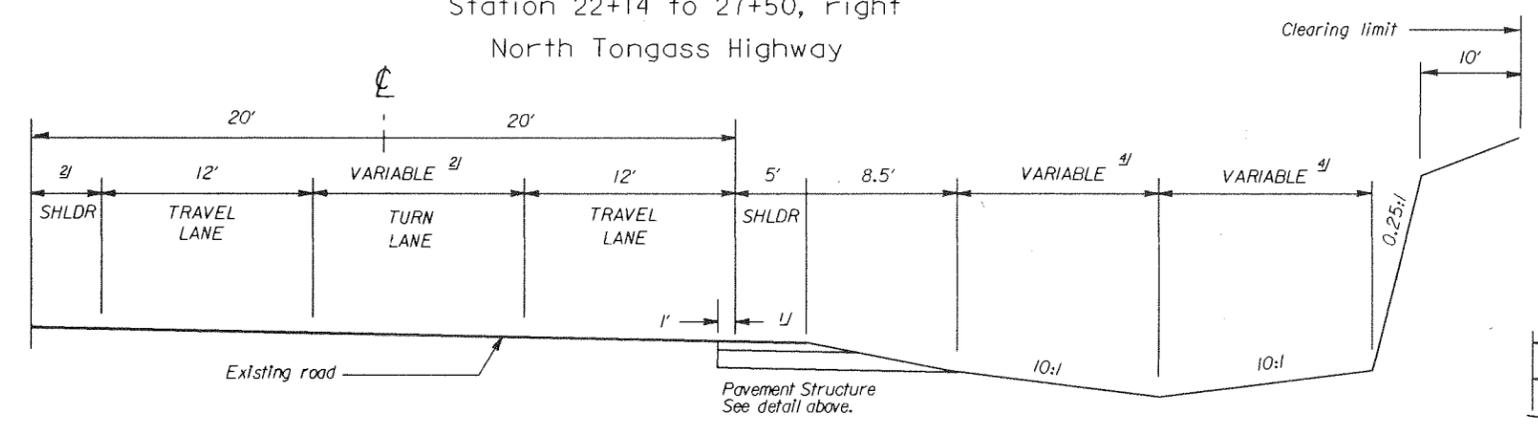
AF0393DD.DGN

SUMMARY
 OF QUANTITIES

Station 19+23 to 21+90, right
North Tongass Highway



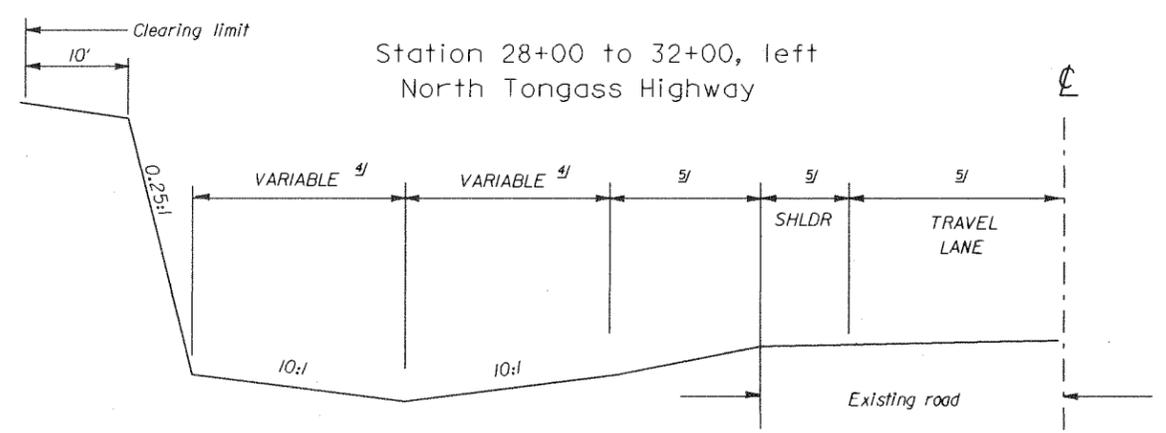
Station 22+14 to 27+50, right
North Tongass Highway



LAYOUT DIMENSIONS									
Δ	R1	R2	T2	T1	T	E	M	Y	O
90	150'	50'	39.39	55.00	86.23	27.78	5.37	7.50	5.00

LAYOUT DETAIL
WARD LAKE ROAD INTERSECTION

Station 28+00 to 32+00, left
North Tongass Highway



FOOTNOTES;

- 1) Superelevation shall match that of the existing road.
- 2) See Plan Sheet F.14 for turn lane, taper and pavement marking details.
- 3) Adjust surfacing depth as necessary to match AST surfacing to elevation of existing road.
- 4) Variable ditch, see earthwork listing for details.
- 5) No changes to be made to existing road.

SURFACING QUANTITIES (Quantities shown include Ward Lake Road to Sta. 1+30)			ESTIMATING VALUES	
Item 20408	Select Topping	1,060 Ton	2800 lb/cu yd	
Item 31001	Emulsified Asphalt Treated Aggregate Base, Grading D	405 Ton	2800 lb/cu yd	
Item 31004	Emulsified Asphalt, grade CSS-1	4.1 Ton	1% of Item 31001	
Item 40901A	Surface Treatment Aggregate, designation E-70, Grading B	24 Ton	Based on 40 lb/sq yd	
Item 40901B	Surface Treatment Aggregate, designation E-70, Grading D	12 Ton	Based on 20 lb/sq yd	
Item 40901C	Surface Treatment Aggregate, designation E-70, Grading E	8 Ton	Based on 12 lb/sq yd	
Item 40904	Emulsified Asphalt, grade CRS-2	0.5 Ton	Based on 1 gal/sq yd	

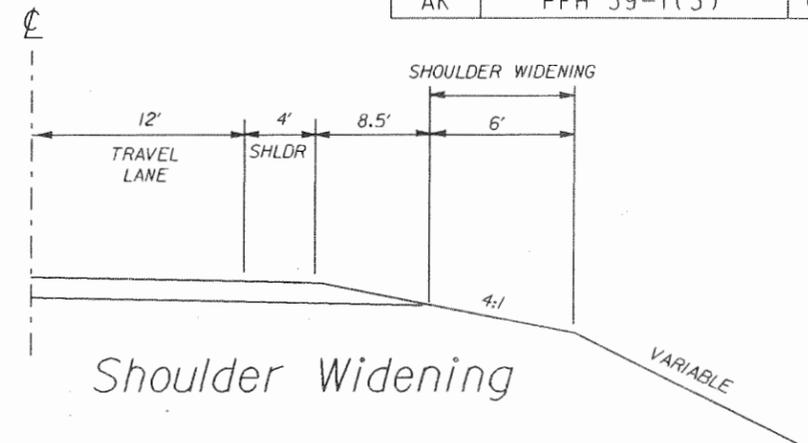
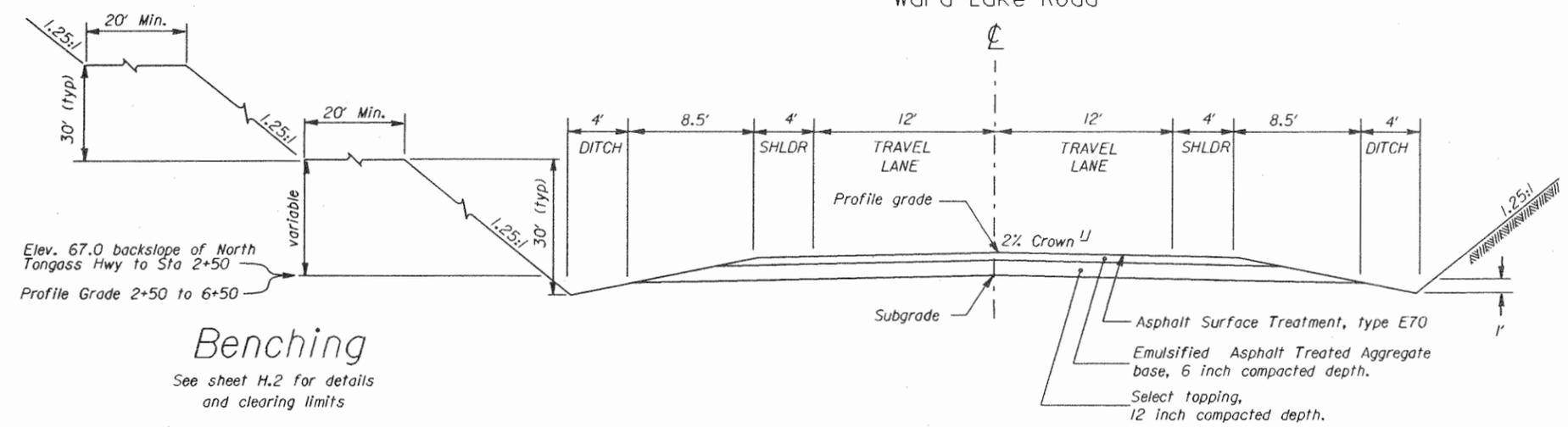
U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION
VANCOUVER, WASHINGTON

**TYPICAL SECTIONS
NORTH TONGASS HIGHWAY**

Date:	5/94
By:	P. Anderson
Designed:	P. Anderson
CADD:	P. Anderson
Checked:	
Approved:	

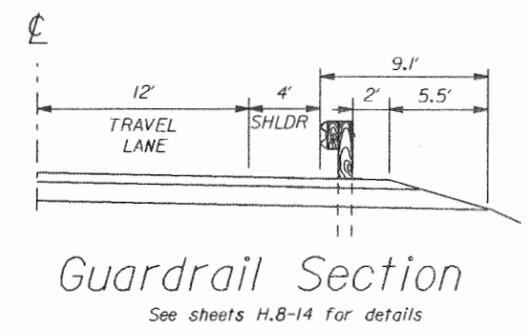
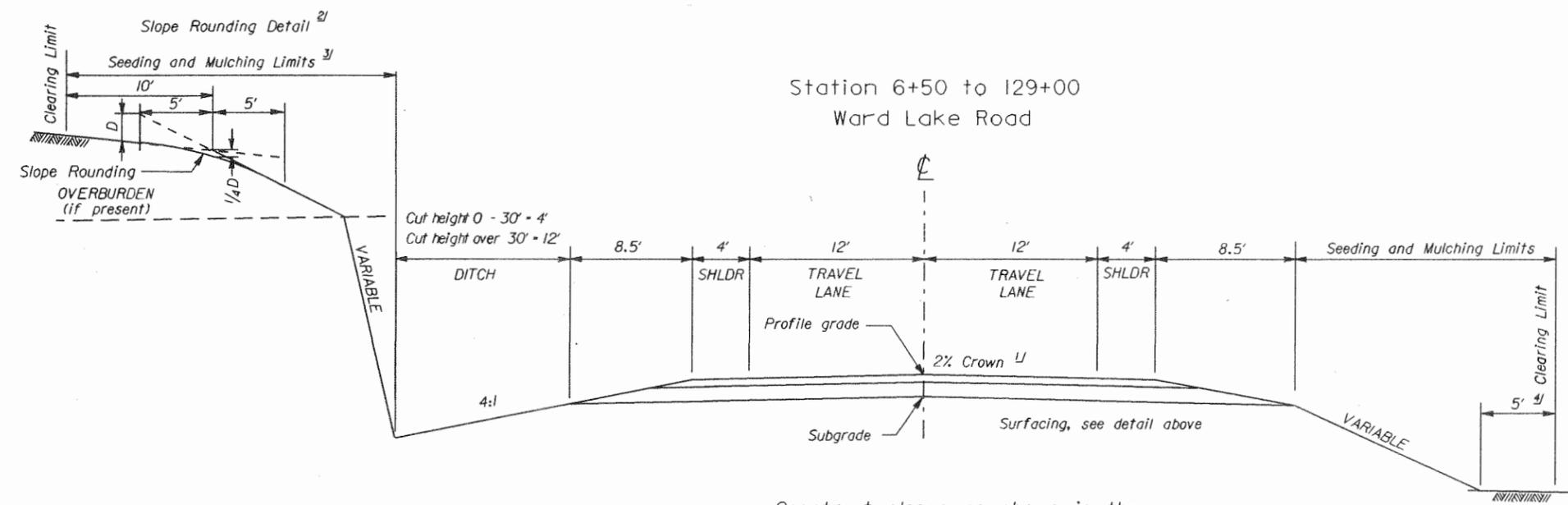
AF0393CA.DGN

Station 0+19.77 to 6+50
Ward Lake Road



STATION LIMITS LEFT	STATION LIMITS RIGHT
6+25 to 10+75	6+25 to 10+75
52+25 to 54+75	52+25 to 54+75
56+75 to 65+25	105+76 to 107+25
106+25 to 106+75	115+26 to 116+75
115+25 to 116+75	

Station 6+50 to 129+00
Ward Lake Road



Construct slopes as shown in the staking report and data listing.
(See FAR Clause 52.236-4)

FOOTNOTES:

- 1 Maximum superelevation on curves is at the rate "e" as indicated under the curve data on the plan-profile.
- 2 Slope rounding not required in solid rock. Slope overburden above solid rock to 2:1 or flatter and round as shown.
- 3 Seeding and mulching not required on solid rock slopes.
- 4 Limit clearing limit to back of slope rounding on cuts or toe of fill on fills adjacent to Last Chance Campground, Sta 112+50 to 122+50 right.

SURFACING QUANTITIES Station 1+30 to 129+00			
Item	Description	Quantities	Remarks
Item 20408	Select Topping	39,120 tons	Based on 2800 lb/cu yd
Item 31001	Emulsified Asphalt Treated Aggregate Base, Grading D	15,300 tons	Based on 2800 lb/cu yd
Item 31004	Emulsified Asphalt, grade CSS-1	153.0 tons	1% of Item 31001
Item 40901A	Surface Treatment Aggregate, designation E-70, Grading B	910 tons	Based on 40 lb/sq yd
Item 40901B	Surface Treatment Aggregate, designation E-70, Grading D	460 tons	Based on 20 lb/sq yd
Item 40901C	Surface Treatment Aggregate, designation E-70, Grading E	275 tons	Based on 12 lb/sq yd
Item 40904	Emulsified Asphalt, grade CRS-2	188.8 tons	Based on 1.0 gal/sq yd

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

**TYPICAL SECTIONS
WARD LAKE ROAD**

Date:	1/95
By:	P. Anderson
Designed:	P. Anderson
CADD:	
Checked:	
Approved:	

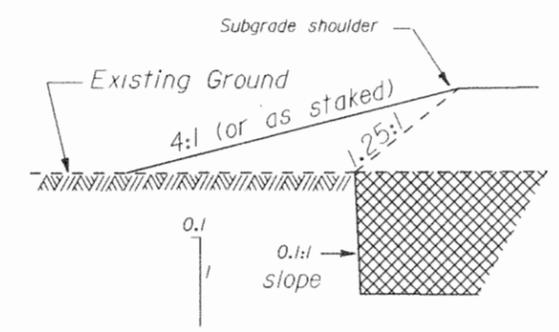
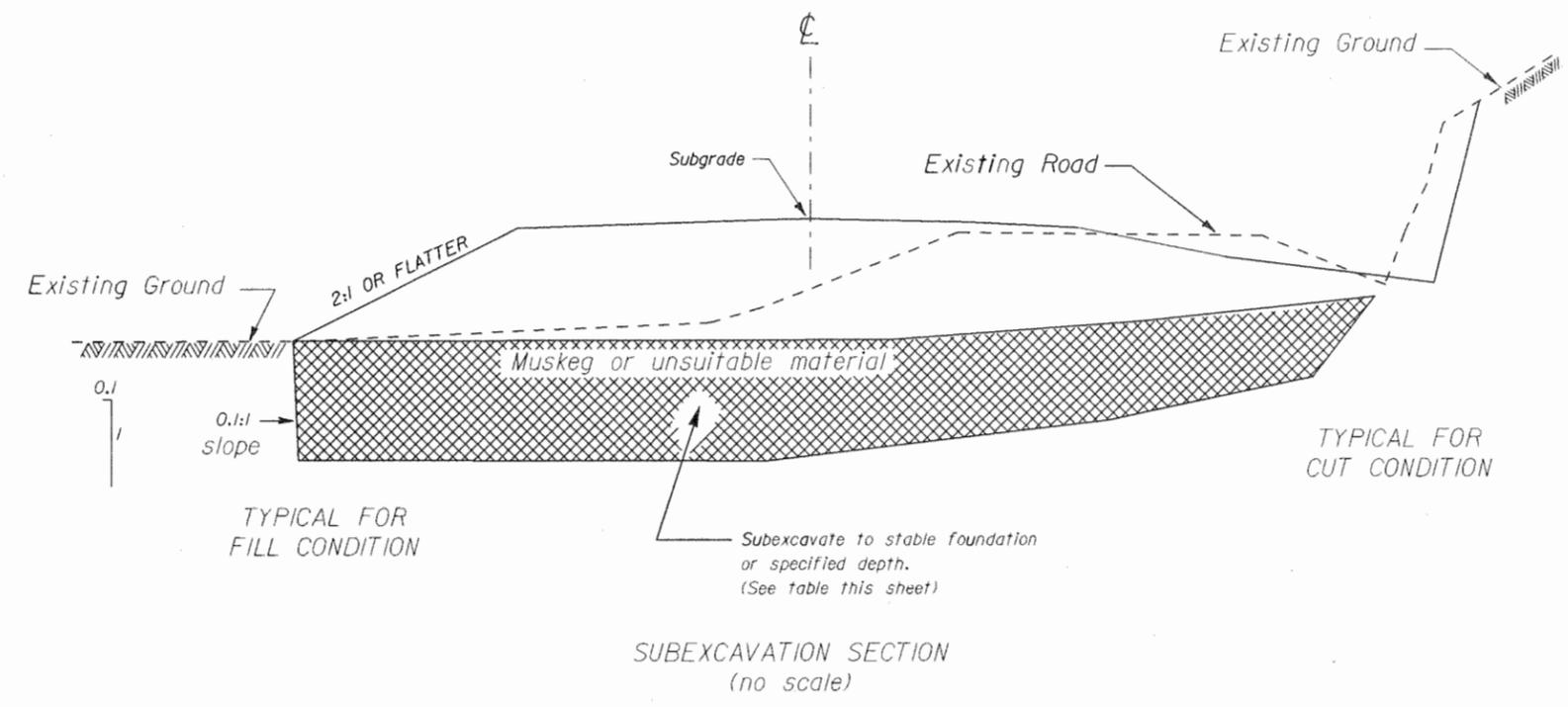
AF0393CA.DGN

SUBEXCAVATION

Item 20402

(rounded to nearest 100 cu yd)

STATION LIMITS	Quantity Cu Yd
6+40 - 10+20 ^u	20,000
15+70 - 24+75	21,700
26+60 - 34+50	9,300
35+75 - 47+75	19,100
52+25 - 58+75	8,100
59+75 - 64+75	3,800
69+25 - 74+25	18,000
75+50 - 78+35	4,200
80+75 - 84+75	5,200
88+00 - 89+15	1,200 ^g
92+50 - 106+00 ^g ^h	9,300 ^g
111+60 - 113+49 ^h	1,600 ^g
114+00 - 119+00	3,500 ^g
119+25 - 123+50	3,600 ^g
124+50 - 128+50 ^g	9,500 ^g
Total	138,100



FOOTNOTES:

- ^u Sta 6+50 to 10+20, subexcavate 15' below existing ground.
- ^g Sta 97+50 to 99+75, remove peat layer only, ± 10' below subgrade
- ^h Sta 102+50 to 103+75, remove peat layer only, ± 8' below subgrade
- ⁱ Subexcavate to 10' below subgrade elev.
- ^j Subexcavate peat layer only, ± 2' to 8' below existing ground elev.
- ^k Includes removal of existing road.

By:	Date:
P. Anderson	5/94
P. Anderson	5/95
Designed:	
CADD:	
Checked:	
Approved:	

AF0393CA.DGN

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

TYPICAL SECTION
SUBEXCAVATION

STATE	PROJECT	SHEET NO.
AK	PFH 39-1(3)	C.4

Designed:	By:	Date:
CADD:		
Checked:		
Approved:		

BLANKS.DGN

This sheet intentionally left blank

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

BLANK
 SHEET

Item 2030IA REMOVAL OF PIPE CULVERT		
82+50	RT	1 Each
Total		1 Each

Item 2030IB REMOVAL OF HEADWALL		
106+50	LT & RT	2 Each
116+00	LT & RT	2 Each
Total		4 Each

ITEM 2030IC REMOVAL OF STRUCTURAL PLATE PIPE		
106+50		1 Each
116+00		1 Each
Total		2 Each

Item 2030ID REMOVE SIGNS (Ward Lake Road)		
124+75	LT	1 Each
125+00	RT	1 Each
Total		2 Each

ITEM 20304 REMOVAL OF STRUCTURES AND OBSTRUCTIONS		
71+50 - 75+00		All

Item 2050I CONTROLLED BLAST HOLES			
Station to Station left	Ln Ft	Station to Station right	Ln Ft
NORTH TONGASS HIGHWAY			
28+40 to 31+00	840	20+00 to 21+50	1275
		22+82 to 27+15	4870
WARD LAKE ROAD			
10+50 to 15+50	4280	10+50 to 15+50	5570
24+75 to 26+50	420	46+50 to 52+50	7060
79+00 to 82+00	2895	63+50 to 69+15	4520
		86+00 to 88+62	4405
108+40 to 111+65	2920		
118+40 to 119+75	760		
Quantities based on 30" hole spacing			Total 39,815 Ln Ft

Item 61006 DRILLED HOLES					
Sta. to Sta. left	No. of holes	In ft	Sta. to Sta. right	No. of holes	In ft
11+00 to 14+50	8	160	10+50 to 15+00	10	200
26+00 to 26+50	2	40	47+50 to 51+50	9	180
79+50 to 81+50	5	100	64+00 to 68+50	10	200
			86+50 to 88+00	4	80
123+50 to 124+00	2	40	109+50 to 111+00	4	80
Total				1080 In ft	

Item 61906 REMOVE AND REINSTALL GATE		
74+50	Right	1 Each
97+85	Left	1 Each
Total		2 Each

Item 63312A REMOVE AND RESET SIGNS (North Tongass Highway)		
17+95	right U	1 Each
19+16	right	1 Each
20+36	right	1 Each
21+90	left U	1 Each
Total		4 Each

Item 63312B REMOVE & RESET SIGN BASE		
120+75	Right	1 Each

FOOTNOTE:
U Reset in locations established by the C.O.

Date: 2/95
 Revised 8/95
 By: P. Anderson
 Designed: P. Anderson
 CADD: P. Anderson
 Checked:
 Approved:
 AF0393DC.DGN

UTILITIES:

ELECTRIC:

Ketchikan Public Utilities
2930 Tongass Avenue
Ketchikan, AK 99901
(907) 225-1000
Contact Jan Rislo, Ext. 371

TELEPHONE:

Ketchikan Public Utilities
2930 Tongass Avenue
Ketchikan, AK 99901
(907) 225-1000
Contact Al Kartarov, Ext. 356
Steve Hallam, Ext. 391

TELEVISION:

Alaskan Cable Network
2030 Sea Level Drive, Suite 214
Ketchikan, AK 99901
(907) 225-2191
Contact Don Harrison
Seth Matthews

T. 74 S, R. 90 E, CRM

WARD COVE

STATE	PROJECT	SHEET NO.
AK	PFH 39-1(3)	D.2

0+19.77 Ward Lake Road-
22+02.69 North Tongass Hwy.
BEGIN PROJECT
WARD LAKE ROAD

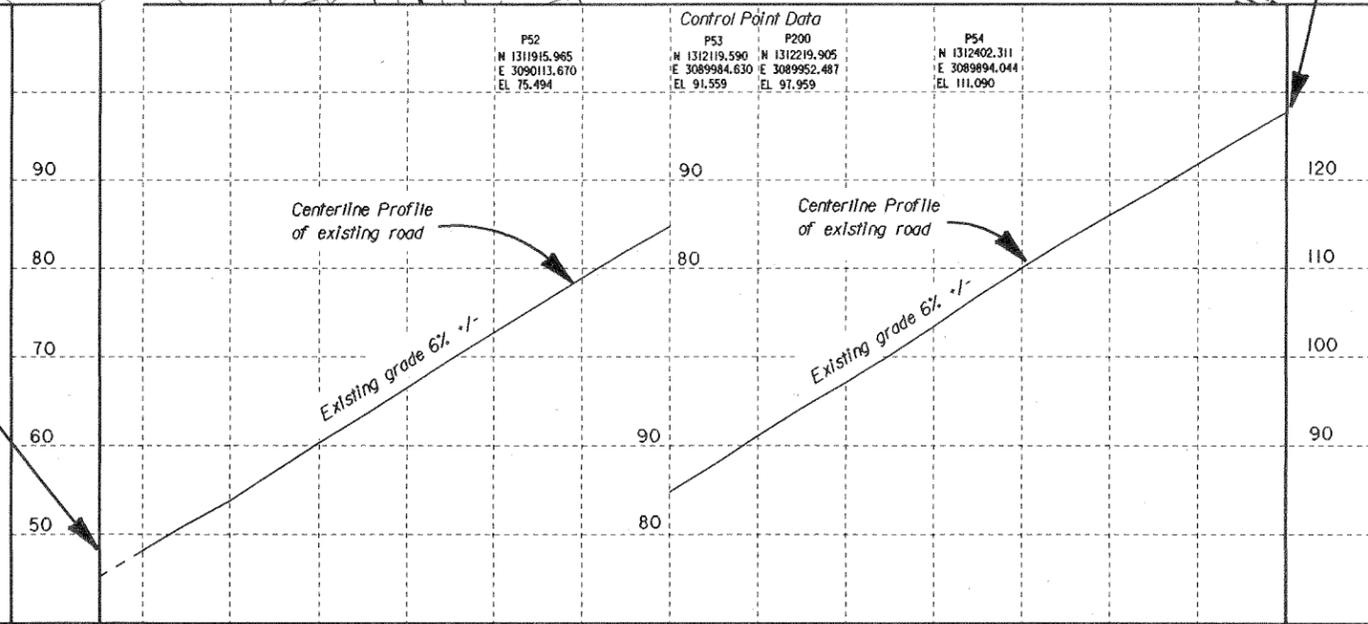
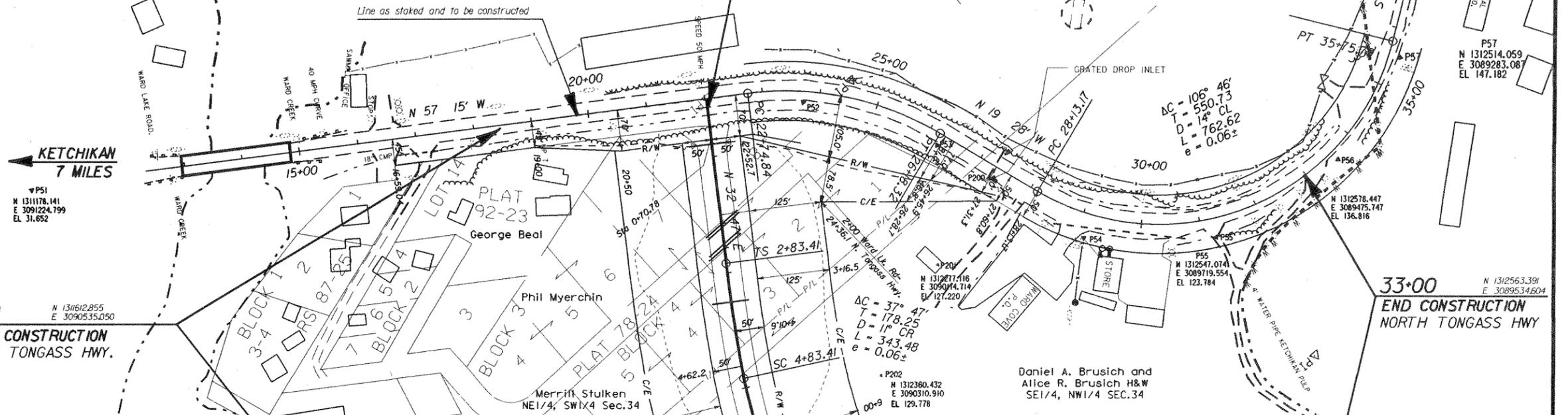
KETCHIKAN
7 MILES

18+50
BEGIN CONSTRUCTION
NORTH TONGASS HWY.

33+00
END CONSTRUCTION
NORTH TONGASS HWY

Date: 3/95
By: P. ANDERSON
Designed:
Checked:

AF0393F AUGH



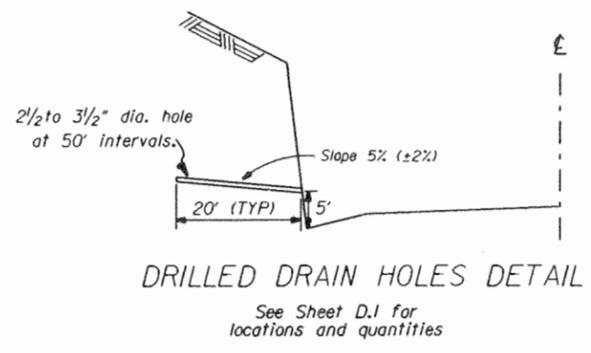
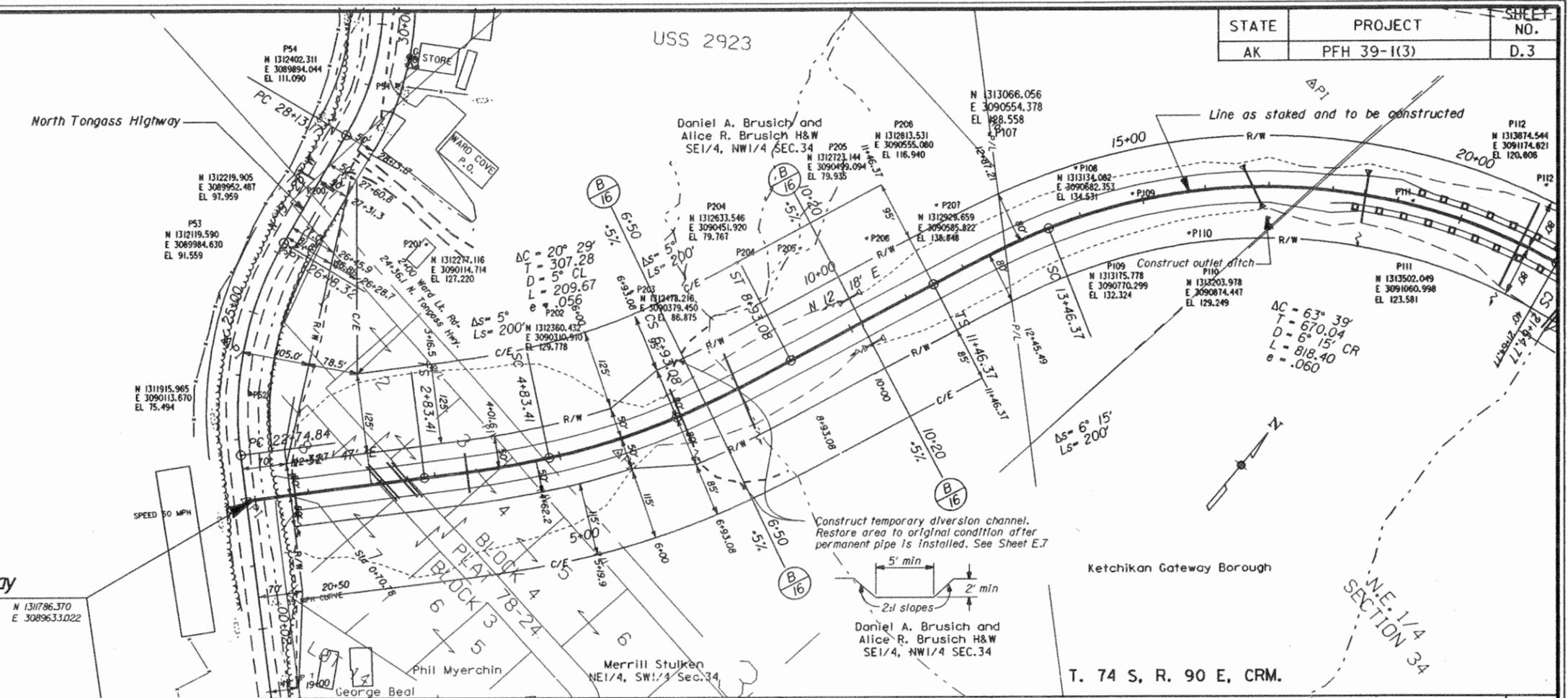
SUMMARY		Exc. cu yds		Emb. cu yds		Clr & Grb Acres	
36.835	Exc. cu yds	36.035	(right side only)	800	(left side only)		
239	Emb. cu yds	198	(right side only)	41	(left side only)		
2.0	Clr & Grb Acres	1.6	(right side only)	0.4	(left side only)		

Control Point Data

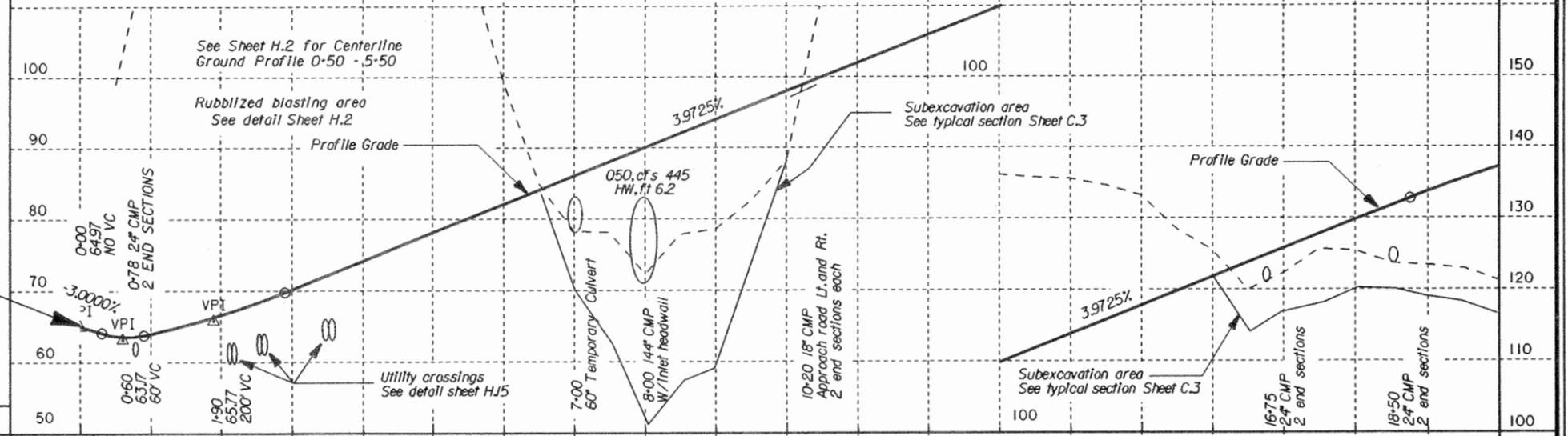
P52	N 1311915.965	E 3090113.670	EL 75.494
P53	N 1312119.590	E 3089984.630	EL 91.559
P200	N 1312219.905	E 3089952.487	EL 97.959
P54	N 1312402.311	E 3089894.044	EL 111.090

Date: 3/95
 By: P. Anderson
 Designed:
 Checked:

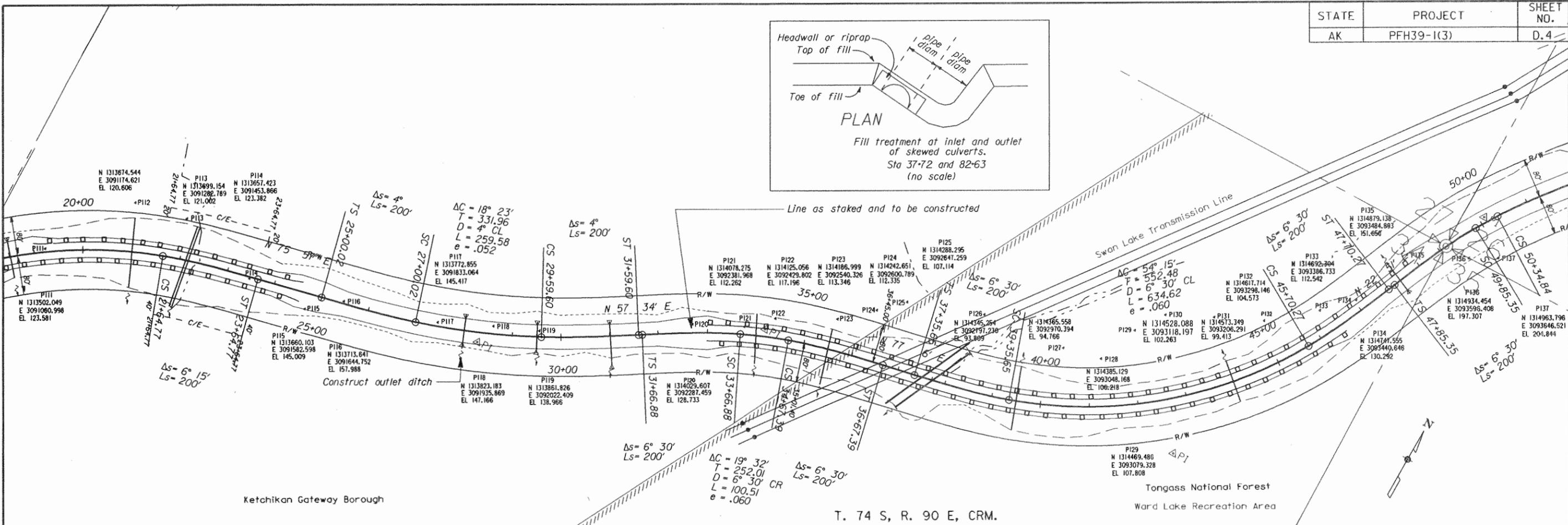
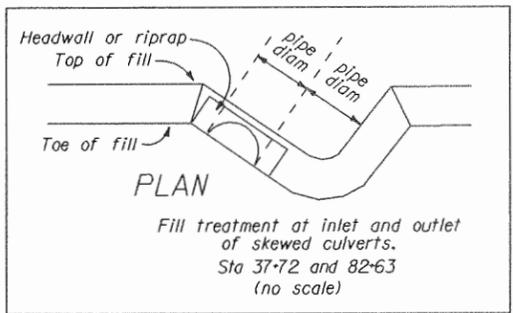
0+19.77 Ward Lake Road
-22+02.69 North Tongass Highway
 BEGIN PROJECT WARD LAKE ROAD



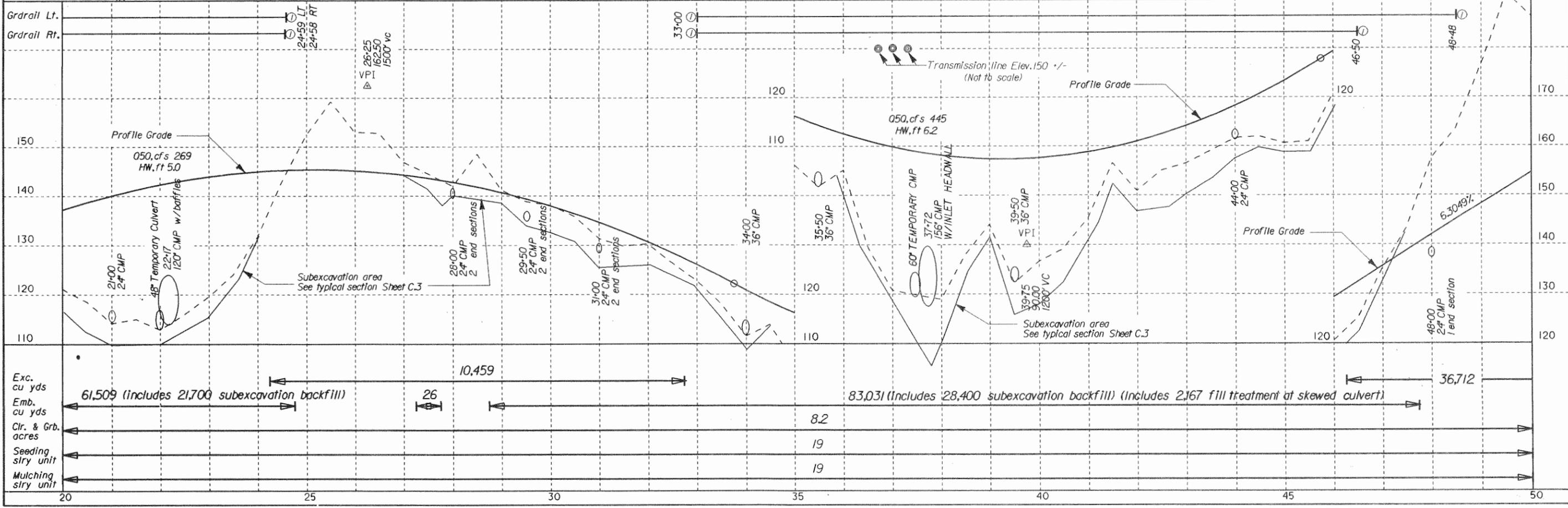
LEGEND:
 Grd rail Lt. ① Terminal section, type MELT
 Grd rail Rt. ② Terminal section, type G4-BAT



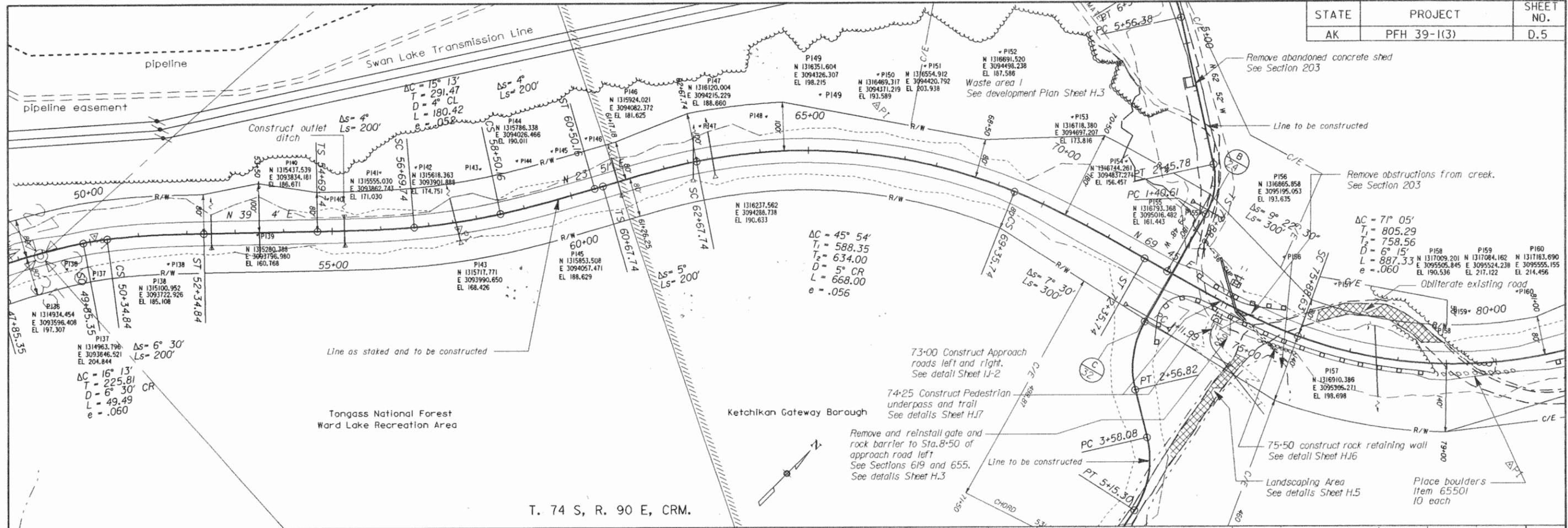
SUMMARY		Stationing	Quantity
428,312	Exc. cu yds	0+00 to 230+342	230,342
343,718	Emb. cu yds	230+342 to 271+876	31,528 (Includes 20,000 subexcavation backfill)
37.1	Clr. & Grb. acres	0+00 to 271+876	7.5
82	Seeding sily unit	0+00 to 271+876	9
82	Mulching sily unit	0+00 to 271+876	9



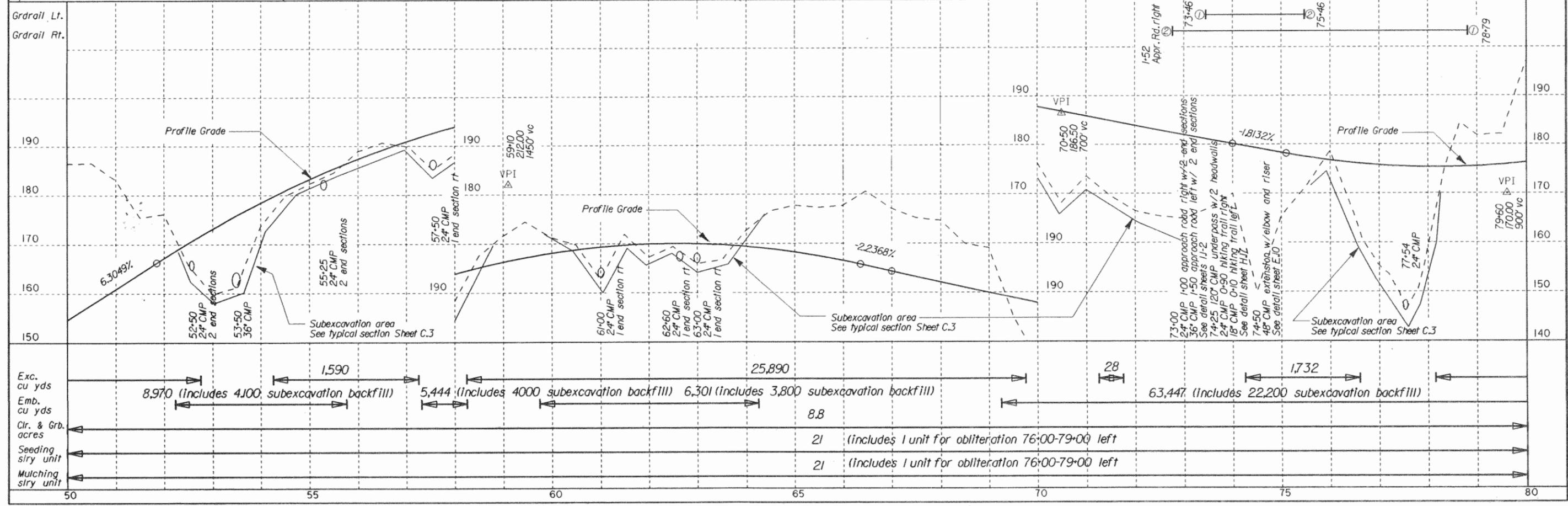
Date: 3/95
 By: P. Anderson
 Designed:
 Checked:



af0393fb.dgn

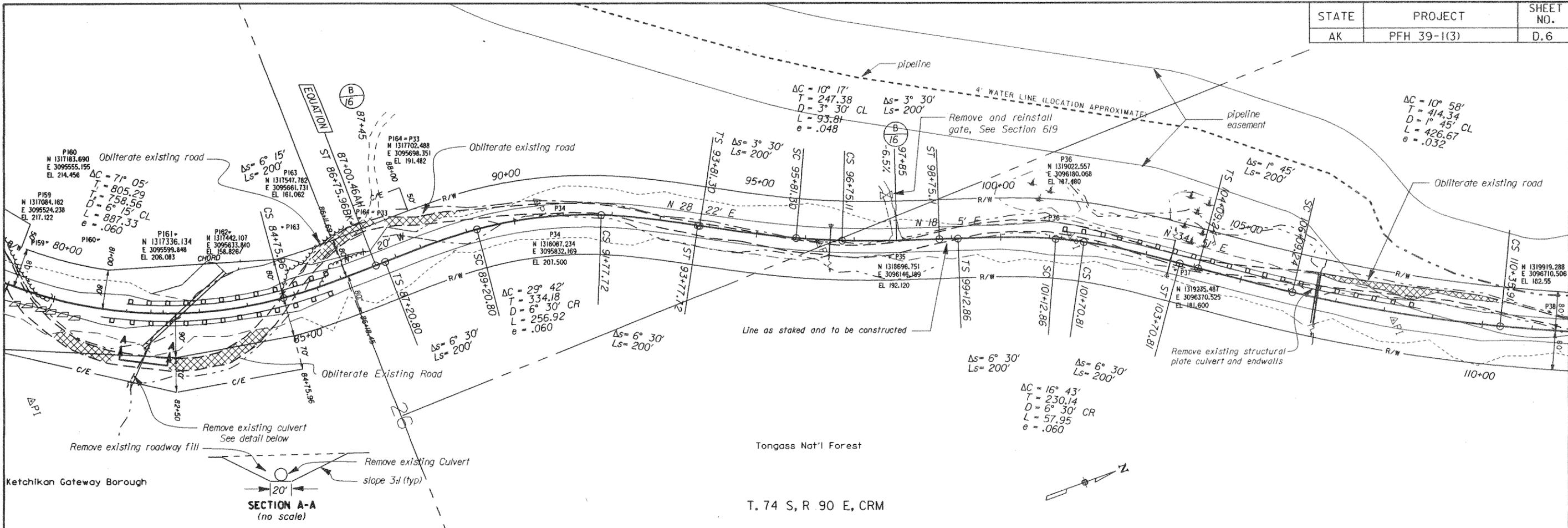


Date: _____
 By: _____
 Designed: _____
 Checked: _____

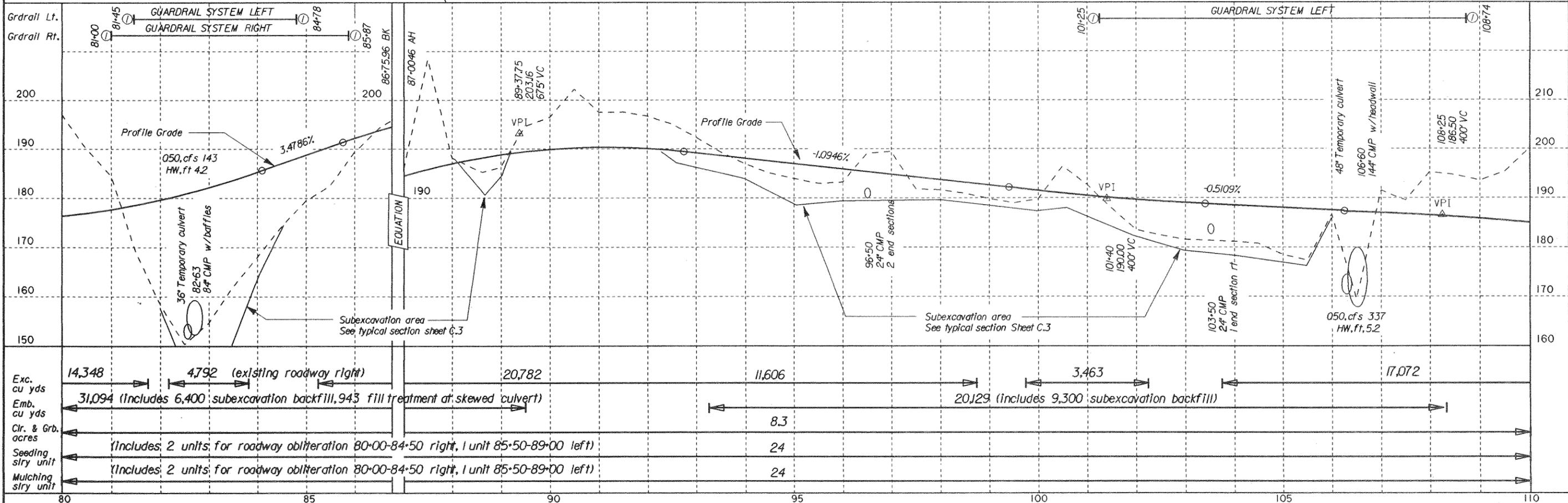


af0393fb.dgn

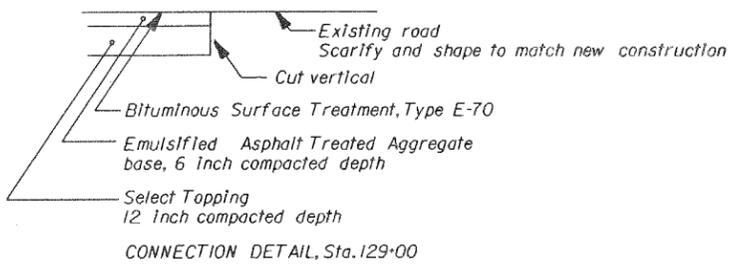
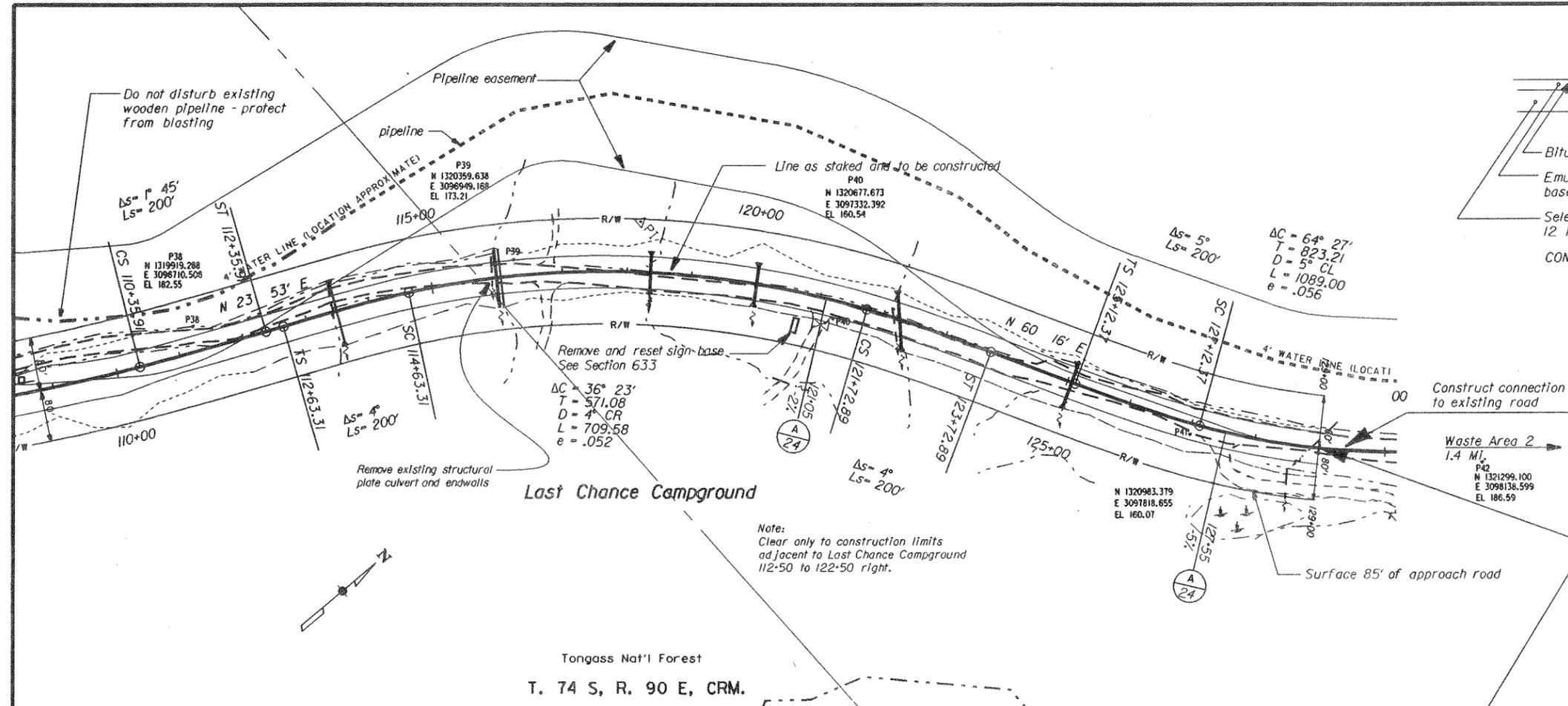
STATE	PROJECT	SHEET NO.
AK	PFH 39-1(3)	D.6



Date: _____
 By: _____
 Designed: _____
 Checked: _____



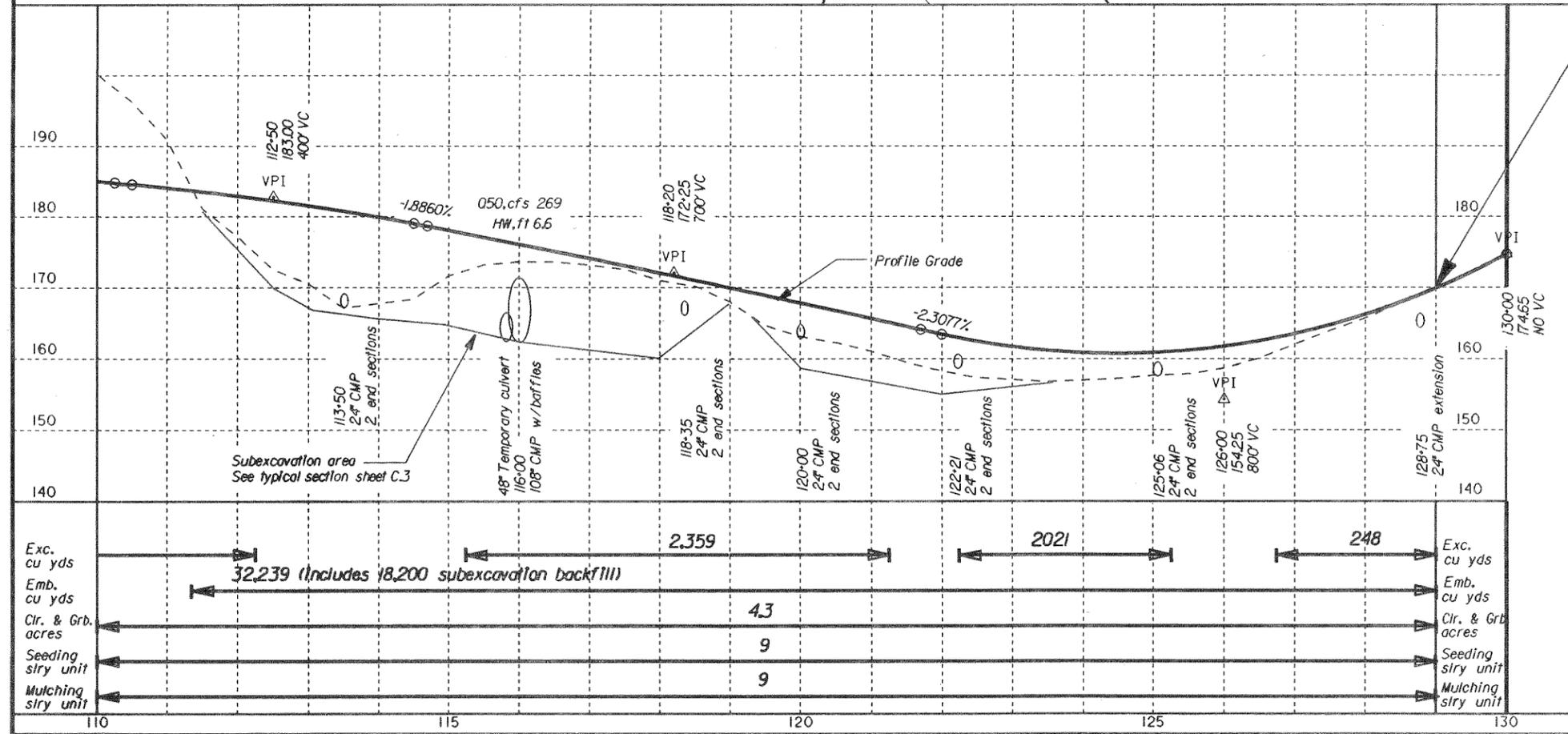
af0393rc.dgn



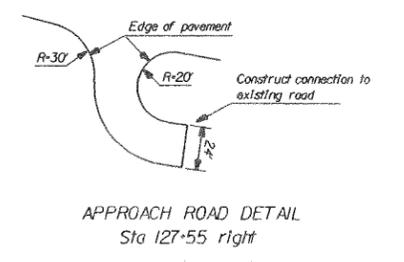
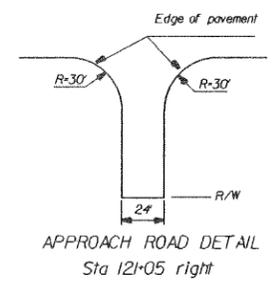
129+00 END PROJECT PFH 39-1(3)
WARD LAKE ROAD
N 1321121.957
E 3097962.689

Date:	
By:	
Designed:	
Checked:	

AF0393FC.DGN



Exc. cu yds	32,239 (Includes 18,200 subexcavation backfill)	Exc. cu yds	248
Emb. cu yds		Emb. cu yds	
Clr. & Grb. acres	4.3	Clr. & Grb. acres	
Seeding slyr unit	9	Seeding slyr unit	
Mulching slyr unit	9	Mulching slyr unit	



STATE	PROJECT	SHEET NO.
AK	PFH 39-1(3)	D.8

Designed:	By:	Date:
CADD:		
Checked:		
Approved:		

BLANKS.DGN

This sheet intentionally left blank

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

BLANK
 SHEET

SUMMARY OF DRAINAGE QUANTITIES

STATE	PROJECT	SHEET NO.
AK	PFH 39-1(3)	E.1

THE QUANTITIES SHOWN HEREON ARE APPROXIMATE, AND ARE SUBJECT TO FIELD ADJUSTMENT

STATION	EST MAX COVER FEET	STR EXC CUYD	PIPE CULVERT (LINEAR FEET)				END SECTIONS			B E V E L S	SKEW ANGLE	STEEL: CORRUGATIONS (INCHES)			ALUMINUM: CORRUGATIONS (INCHES)			CON- CRETE	PLA- STIC				
			DIA	OR SPAN	X RISE	18"	24"	36"	48"			18"	24"	36"	2 2/3 X 1/2	3XI	5XI			STR PLT 6X2	2 2/3 X 1/2	3XI	5XI
ITEM NO					60201A	60201B	60201C	60201D	60206A	60206B	60206C	INLET	OUTLET	DEGREES	NOTES	THICKNESS (INCHES)			THICKNESS (INCHES)				
0+78	1	45		70					2					0		.079			.075			II	X
2+15	7	290			78									55	1	.079			.075			II	X
2+15					78									55		.079			.075			II	X
2+57	5	260			78									55		.079			.075			II	X
2+57					78									55		.079			.075			II	X
3+50	6	192			60									0		.079			.075			II	X
3+50					60									0		.079			.075			II	X
10+20	1	15	34						2					0	2	.079			.075			II	X
10+20	1	15	34						2					0	3	.079			.075			II	X
16+75	2	30		84					2					0		.079			.075			II	X
18+50	5	4		74					2					0		.079			.075			II	X
21+00	21	0		144										0		.079			.075			II	X
28+00	4	65		74					2					0		.079			.075			II	X
29+50	4	71		66					2					0		.079			.075			II	X
31+00	4	35		88					2					0		.079			.075			II	X
34+00	7	10			88									0		.079			.075			II	X
35+50					102									0		.079			.075			II	X
39+50	17	12			132									0		.079			.075			II	X
44+00	4	22		88										0		.079			.075			II	X
48+00	2	67		82					1					0		.079			.075			II	X
52+50	2	17		62					2					0		.079			.075			II	X
53+50	15	68			144									0		.079			.075			II	X
55+25	1	53		72					2					0		.079			.075			II	X
57+56	6	13		86					1					6		.079			.075			II	X
61+00	7	23		82										0		.079			.075			II	X
62+60	4	48		86										12		.079			.075			II	X
63+00	9	45		86										0		.079			.075			II	X
73+00	5	0			54					2				0	2, 5	.079			.075			II	X
73+00	1	50		90					2					0	3	.079			.075			II	X
74+50							136							4		.079			.105			II	
SHEET TOTAL			68	1334	952	136			4	23	2												

By:	Date:	3/95
Designed:	P. Anderson	6/95
CADD:	P. Anderson	
Checked:		
Approved:		

AF0393EB.DGN

NOTES: 1 UTILITY CROSSING, SEE DETAIL SHEET H.15 5 CULVERT OUTLET CONTROL SYSTEM SEE DETAIL SHEET E.9
 2 APPROACH ROAD LEFT
 3 APPROACH ROAD RIGHT
 4 EXTEND EXISTING CULVERT LEFT

S U M M A R Y O F D R A I N A G E Q U A N T I T I E S

STATE	PROJECT	SHEET NO.
AK	PFH 39-1(3)	E.2

THE QUANTITIES SHOWN HEREON ARE APPROXIMATE, AND ARE SUBJECT TO FIELD ADJUSTMENT

STATION	EST MAX COVER FEET	STR EXC CUYD	PIPE CULVERT (LINEAR FEET)				END SECTIONS			B E V E L S	SKEW ANGLE	STEEL: CORRUGATIONS (INCHES)			ALUMINUM: CORRUGATIONS (INCHES)			CON- CRETE	PLA- STIC		
			DIA OR SPAN	X RISE	18"	24"	36"	48"	18"			24"	36"	2 2/3 X 1/2	3XI	5XI	STR PLT 6X2			2 2/3 X 1/2	3XI
ITEM NO			160201A	160201B	160201C	160201D	160206A	160206B	160206C	INLET	OUTLET	DEGREES	NOTES	THICKNESS (INCHES)			THICKNESS (INCHES)				
74+25	1	6	20										1	.079			.075			II	X
74+25	1	13		30									2	.079			.075			II	X
77+54	25	0		156										.079			.075			II	X
96+50	5	47		64				2			0			.079			.075			II	X
103+50	8	9		72				1			0			.079			.075			II	X
113+50	11	30		104				2			0			.079			.075				
118+35	1	42		60				2			0			.079			.075			II	X
120+00	1	23		66				2			0			.079			.075			II	X
122+21	1	22		60				2			22			.079			.075			II	X
125+06	2	23		60				2			0			.079			.075			II	X
128+75	4	0		10									3	.079			.075				
SHEET TOTAL			20	682				4	23	2											
TOTAL			88	2016	952	136		4	36	2											

NOTES: 1 HIKING TRAIL LEFT
2 HIKING TRAIL RIGHT
3 EXTEND EXISTING CULVERT RIGHT

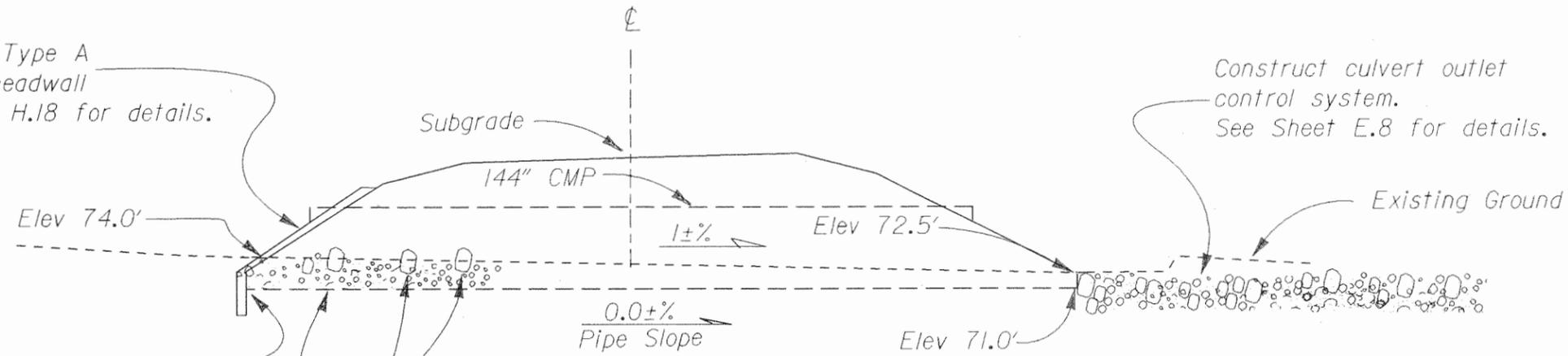
Date:	3/95
By:	P. Anderson
Designed:	P. Anderson
CADD:	
Checked:	
Approved:	

AFO393EB.DGN

STA 8+00

Construct Type A concrete headwall See Sheet H.18 for details.

Construct culvert outlet control system. See Sheet E.8 for details.



Place conserved streambed material throughout the culvert.

Place 1.5' dia. (minimum weight 300 lb.) boulders at 10' random spacing throughout the culvert. Embed 0.5 ft. into streambed material.

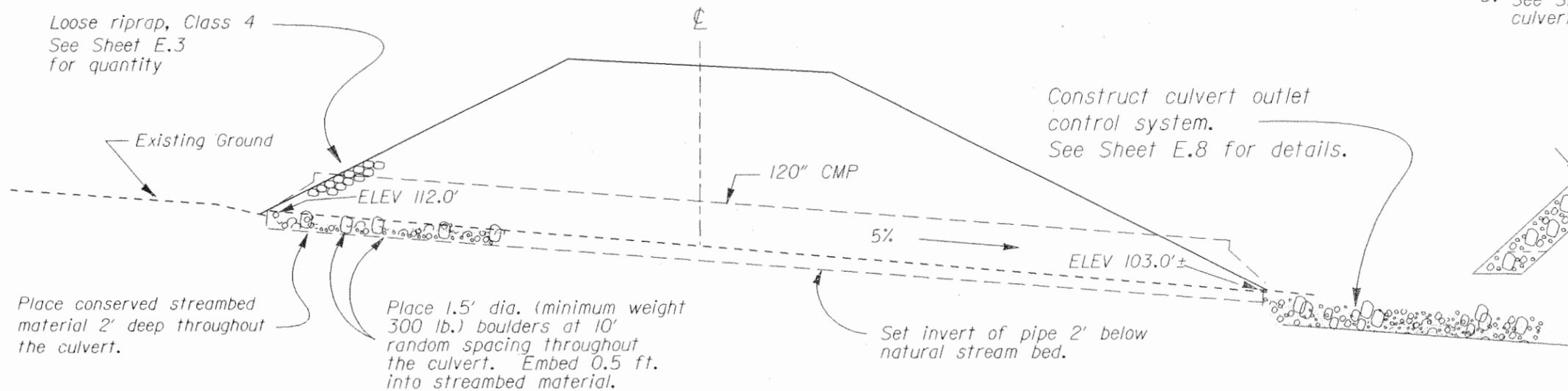
GENERAL NOTES:

1. Conserve suitable native streambed material encountered in the excavation for use as streambed material.
2. If sufficient streambed material is not available, provide material in accordance with Subsection 704.13. Material will not be measured for payment.
3. See Sheet E.7 for details on temporary culvert installation.

STA 22+17

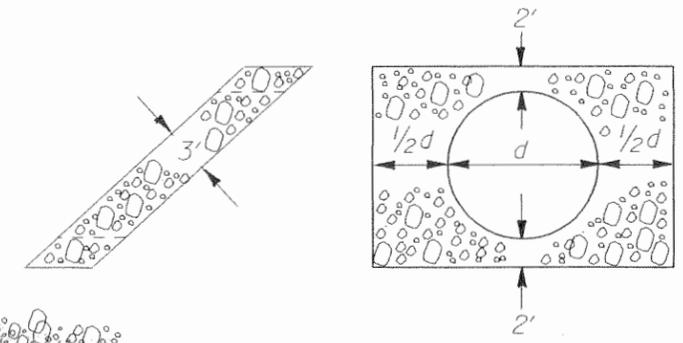
Loose riprap, Class 4 See Sheet E.3 for quantity

Construct culvert outlet control system. See Sheet E.8 for details.



Place conserved streambed material 2' deep throughout the culvert.

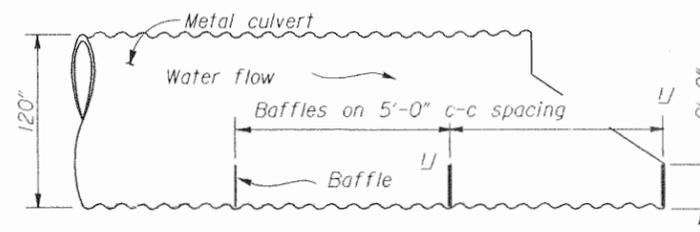
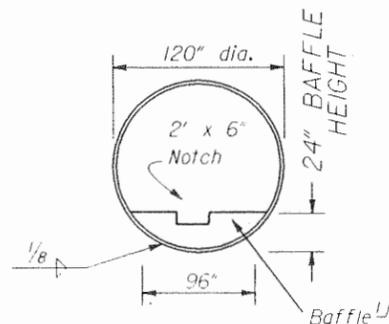
Place 1.5' dia. (minimum weight 300 lb.) boulders at 10' random spacing throughout the culvert. Embed 0.5 ft. into streambed material.



RIPRAP DETAILS

BAFFLED CULVERT DETAIL

NOT TO SCALE



FOOTNOTE

⌋ All baffles to be 3/8" galvanized steel plate, A36 steel.

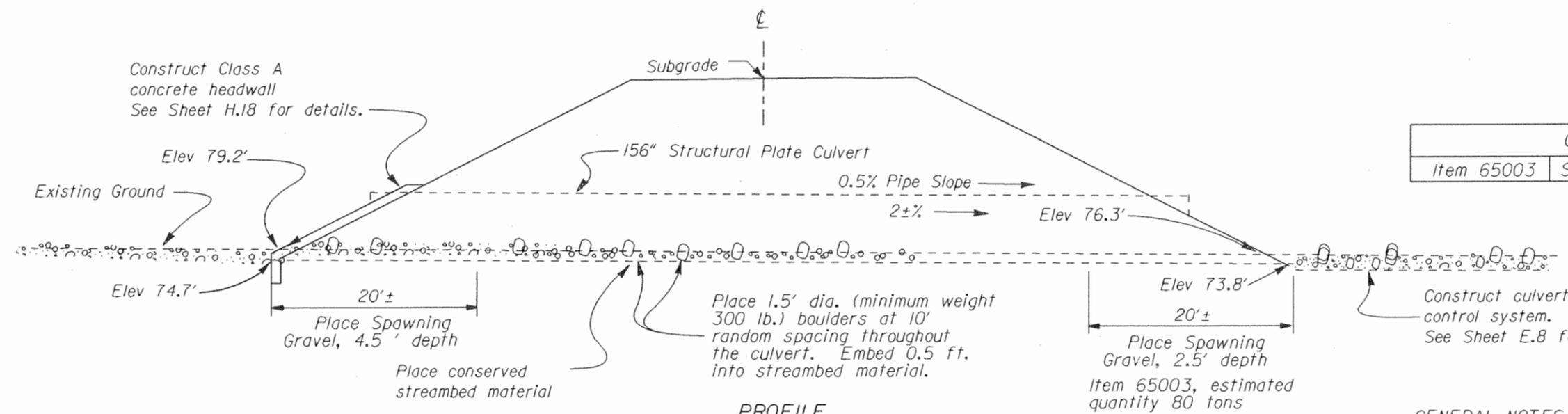
U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION
VANCOUVER, WASHINGTON

FISH PASSAGE
CULVERT DETAILS
Sta. 8+00
Sta. 22+17

Date:	9/94
By:	P. ANDERSON
Designed:	P. ANDERSON
CADD:	P. ANDERSON
Checked:	
Approved:	

AF0393XP.DGN

STA 37+72



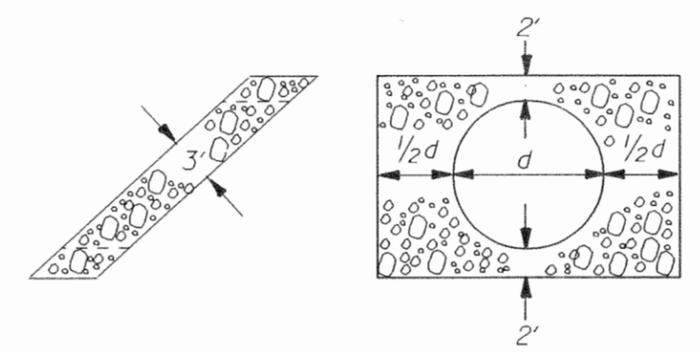
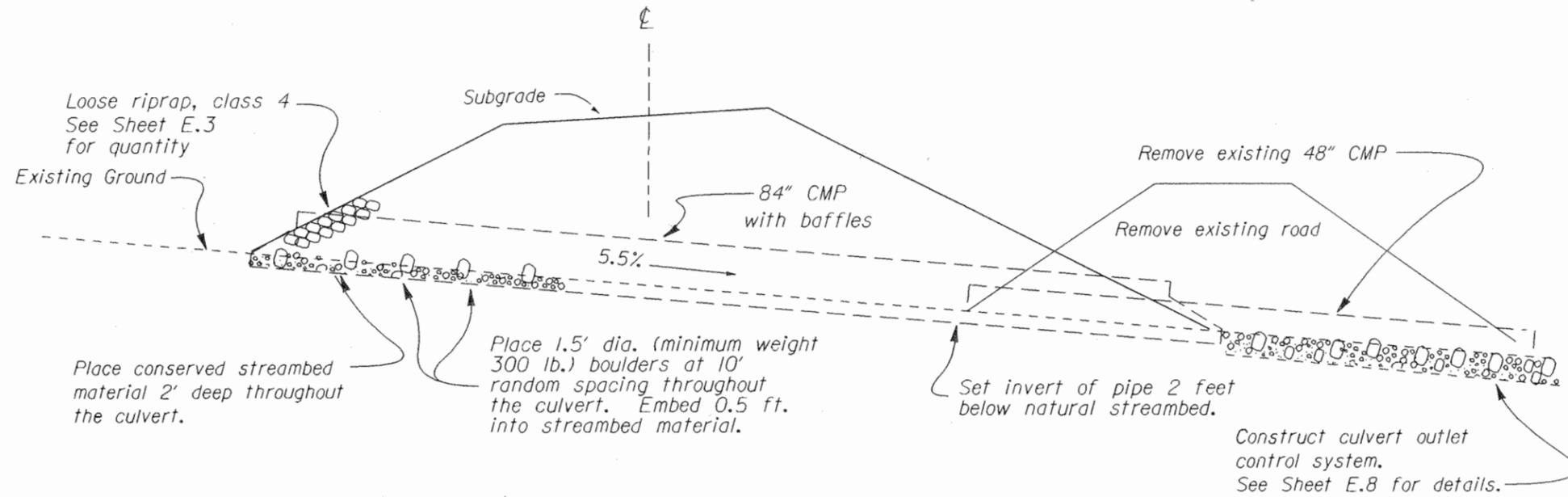
QUANTITIES		
Item 65003	Spawning Gravel	81 ton

PROFILE NOT TO SCALE

GENERAL NOTES:

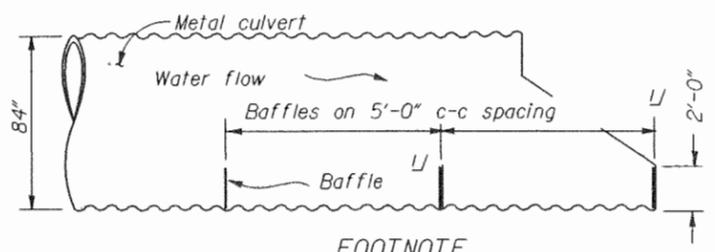
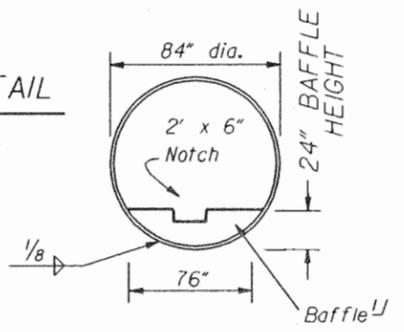
1. Conserve suitable native streambed material encountered in the excavation for use as streambed material.
2. If sufficient streambed material is not available, provide material in accordance with Subsection 704.13. Material will not be measured for payment.
3. See Sheet E.7 for details on temporary culvert installation.

STA 82+63



RIPRAP DETAILS

BAFFLED CULVERT DETAIL NOT TO SCALE



FOOTNOTE
 All baffles to be 3/8" galvanized steel plate, A36 steel.

Date:	9/94
By:	P. ANDERSON
Designed:	P. ANDERSON
CADD:	P. ANDERSON
Checked:	
Approved:	

AF0393XP.DGN

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

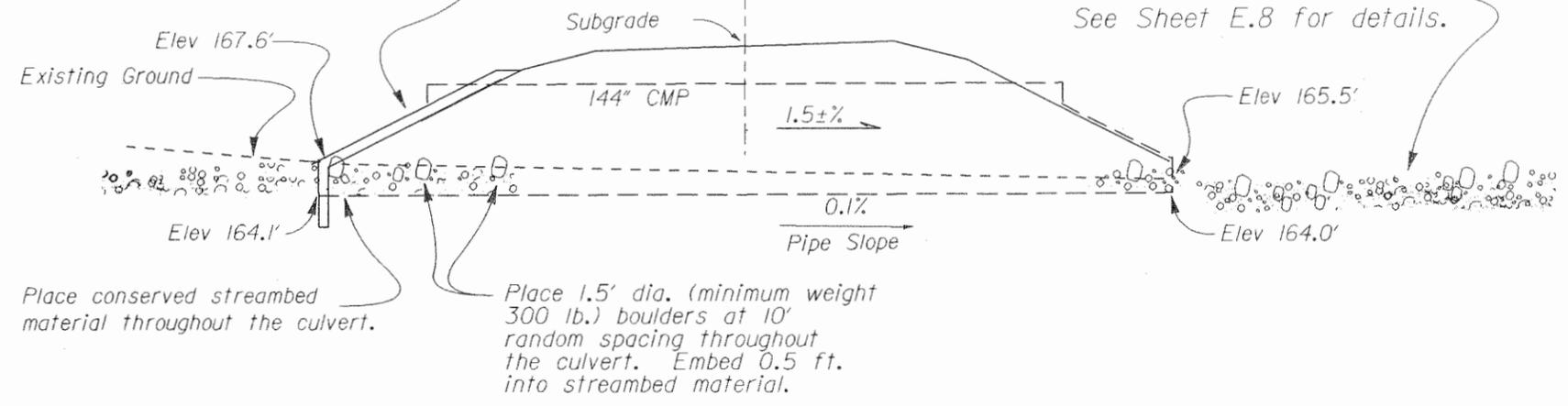
FISH PASSAGE CULVERT DETAILS

Sta. 37+72
 Sta. 82+63

STA 106+50

Construct Type A concrete headwall
See Sheet H.18 for details.

Construct culvert outlet control system.
See Sheet E.8 for details.



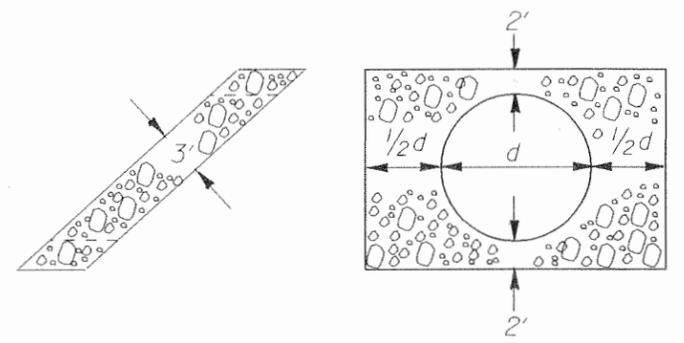
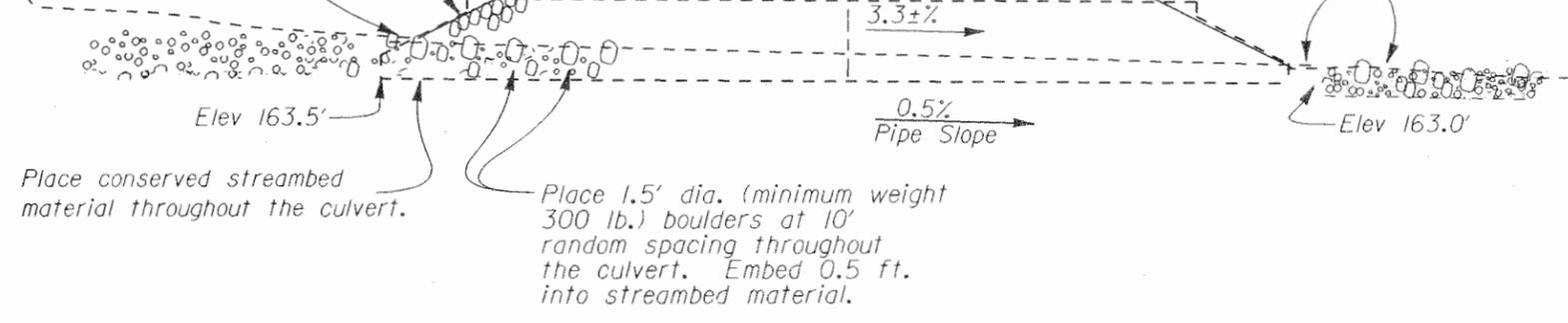
GENERAL NOTES:

1. Conserve suitable native streambed material encountered in the excavation for use as streambed material.
2. If sufficient streambed material is not available, provide material in accordance with Subsection 704.13. Material will not be measured for payment.
3. See Sheet E.7 for details on temporary culvert installation.

STA 116+00

Loose riprap, class 4
See Sheet E.3 for quantity
Elev 167.5'

Construct culvert outlet control system.
See Sheet E.8 for details.



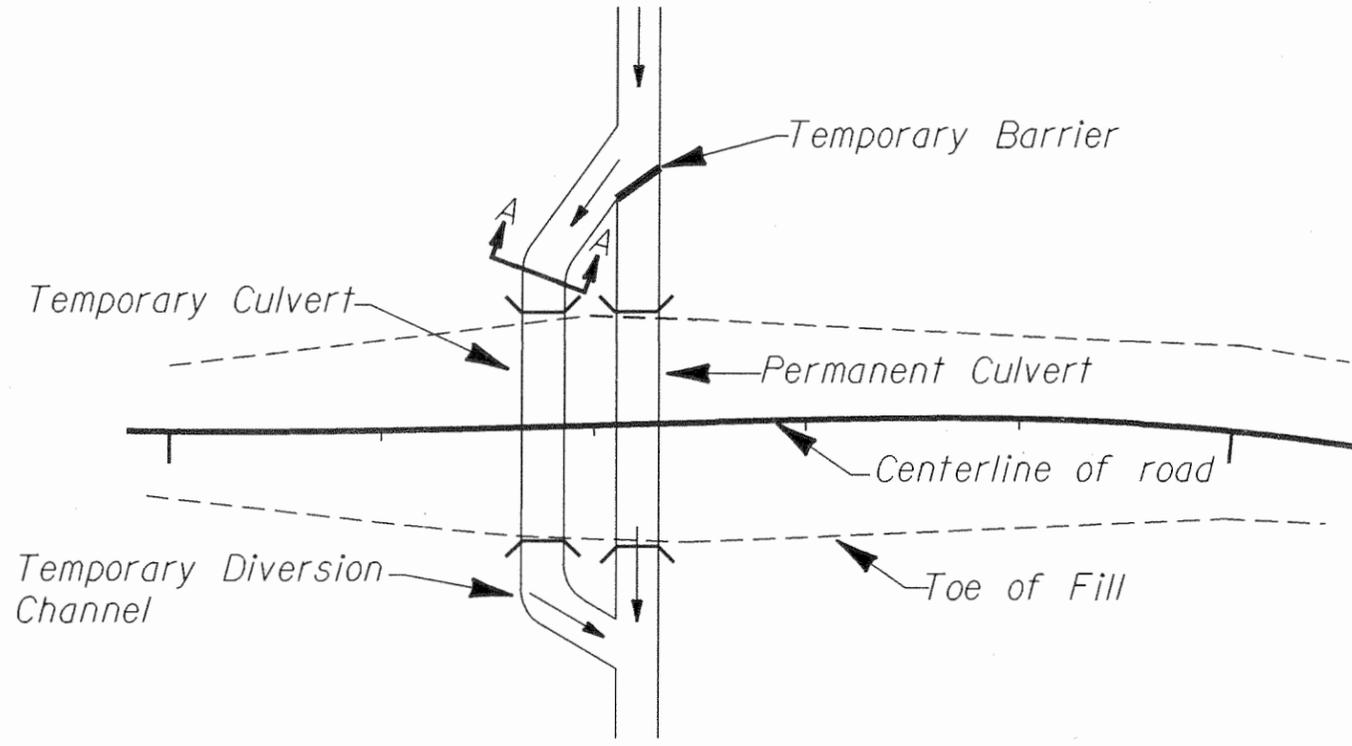
RIPRAP DETAILS

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

FISH PASSAGE
CULVERT DETAILS
Sta. 106+50
Sta. 116+00

Date:	9/94
By:	P. ANDERSON
Designed:	P. ANDERSON
CADD:	P. ANDERSON
Checked:	
Approved:	

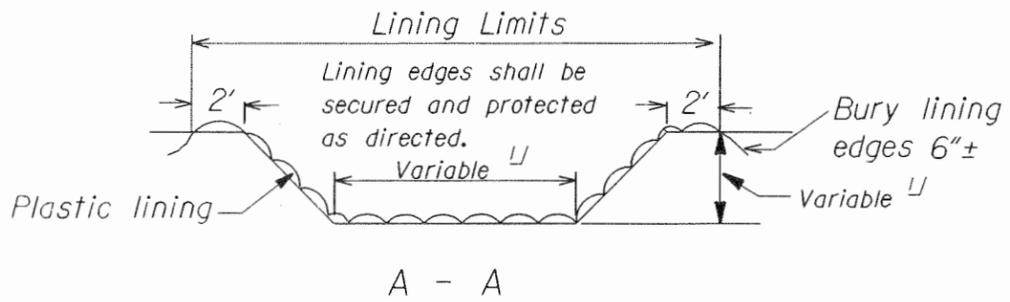
AF0393XP.DGN



GENERAL NOTES:

1. Construct temporary diversion channels at the locations shown on the plans or designated by the C.O..
2. The C.O. will establish dimensions, alignment, and grade of temporary diversion channels.
3. Place plastic lining along the length and width of the temporary diversion channel as shown in Section A-A.
4. Place lining laps transversely and lap a minimum of 2 feet. Secure all external edges by earth mounds or other appropriate materials.
5. Use the temporary barrier to divert all the water into the temporary diversion channel.

Date:	
By:	
Designed:	
CADD:	
Checked:	
Approved:	



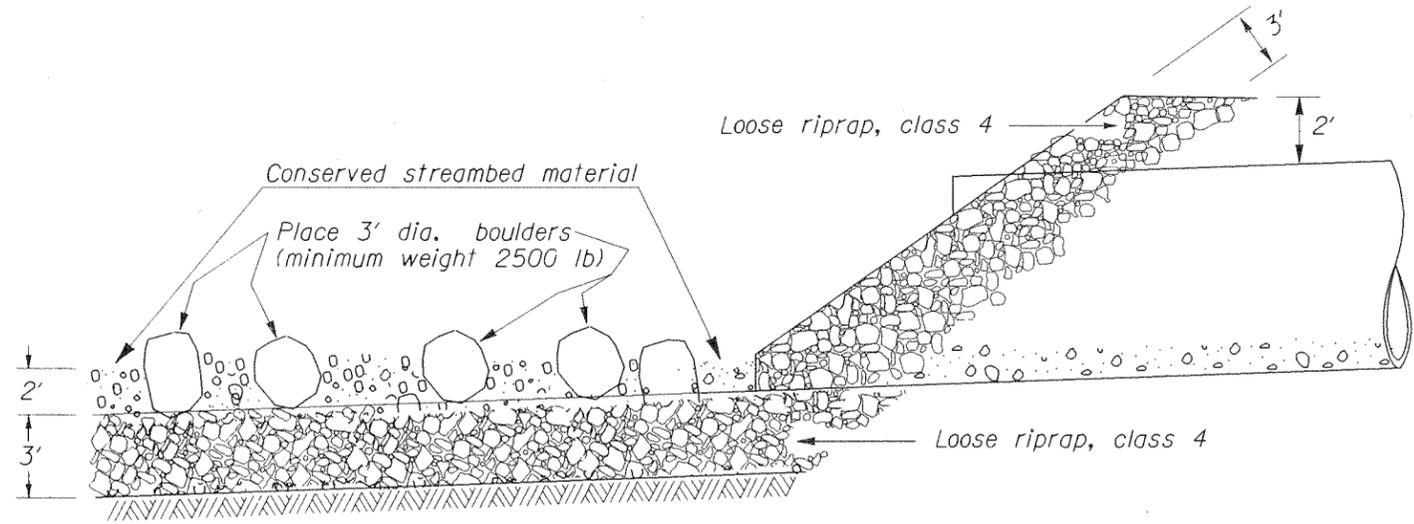
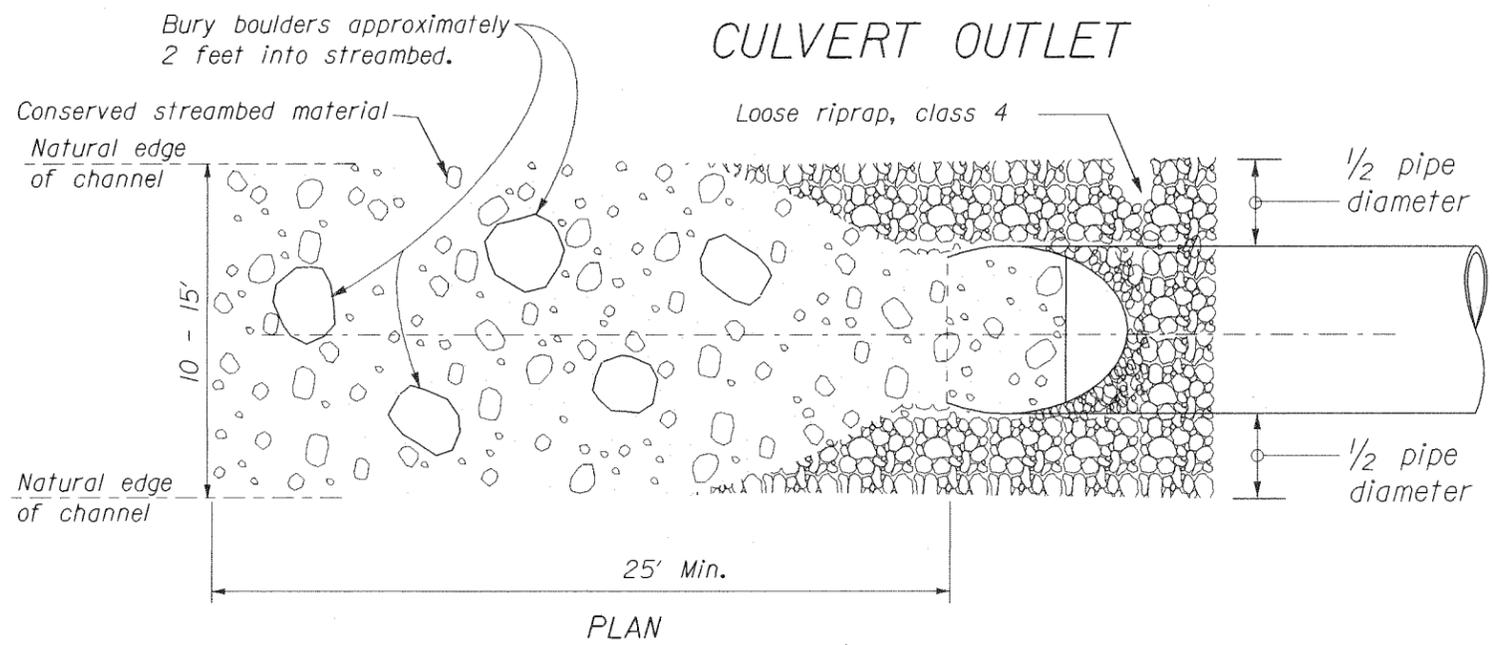
FOOTNOTE:
 1/ Construct temporary diversion channel to approximate width and depth of existing stream channel.

QUANTITIES		
Location	Item 15713 Plastic Lining Area (sq yd) 2/	Item 15718 Temporary Diversion Channel In ft
7+00	435	260
22+17	85	50
37+72	125	75
82+63	200	120
106+50	85	50
116+00	85	50
Schedule A Totals	1015	605

2/ Based on lining limit width 15'.

AF03930E.DGN

TEMPORARY
DIVERSION CHANNEL



CULVERT OUTLET CONTROL SYSTEM ^U			
Item 25110A			
STATION	BOULDERS (each) 3' DIA.	CLASS 4 RIPRAP (cu yds)	CONSERVED STREAMBED MATERIAL (cu yds)
8+00	5	134	44
22+17	5	106	37
37+72	5	177	49
82+63	5	68	26
106+50	5	134	44
116+00	5	93	34

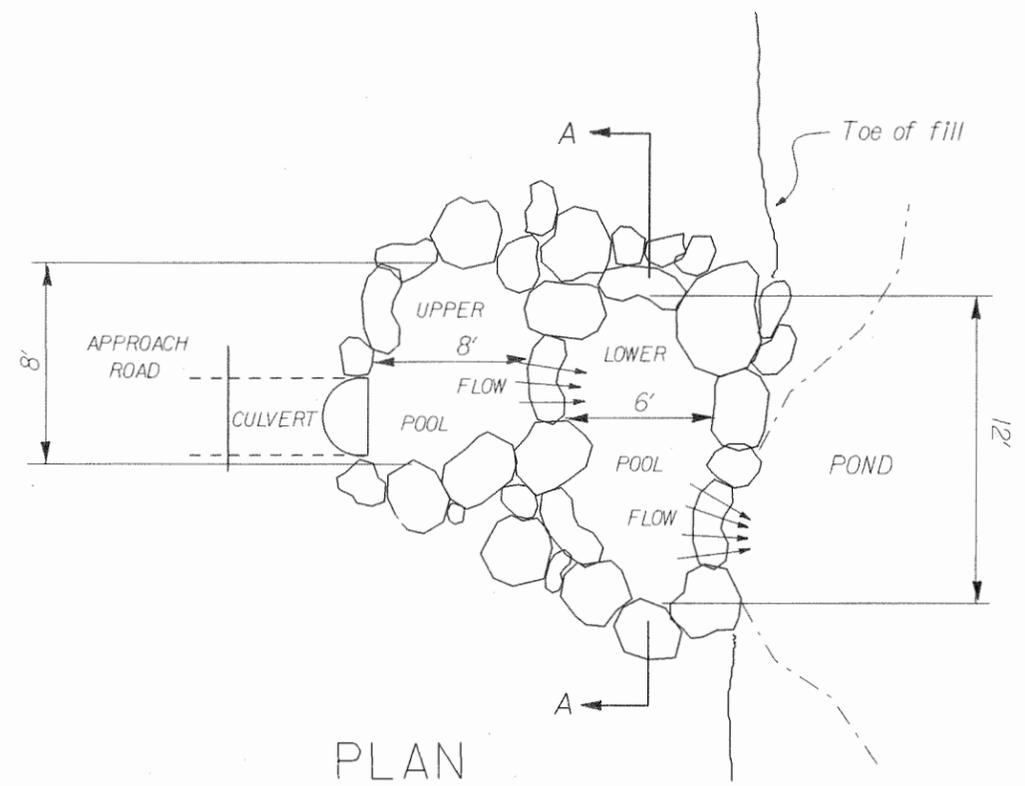
^U For Information only.

QUANTITIES		
Item 25110A	Culvert Outlet Control System	
Total	6 Each	

CULVERT OUTLET CONTROL SYSTEM

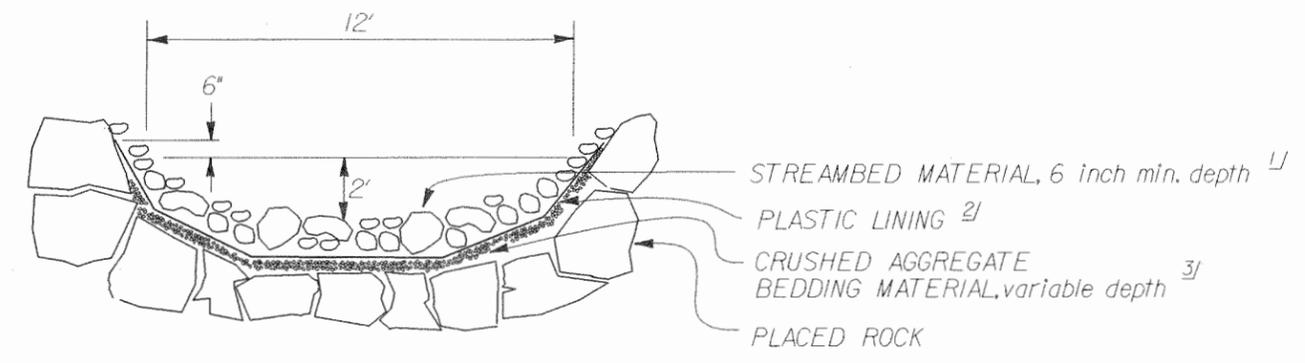
Date:	7/94
By:	P. ANDERSON
Designed:	P. ANDERSON
CADD:	P. ANDERSON
Checked:	
Approved:	

AF03930E.DGN



PLAN
(NO SCALE)

See Sheet H.3 for location



POOL DETAIL
Section A-A

(NO SCALE)

FOOTNOTES:

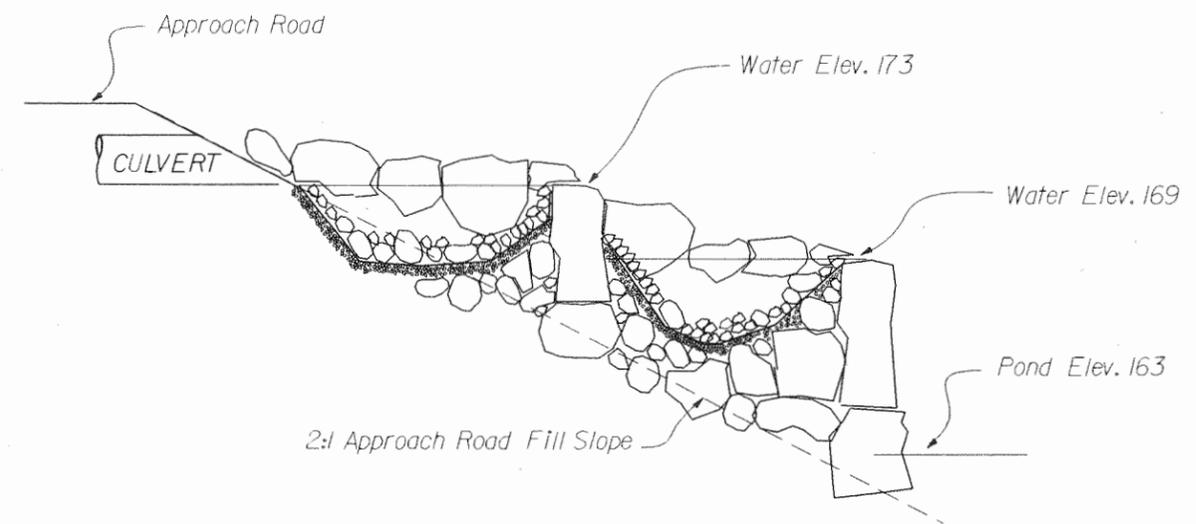
- 1/ Furnish rounded 3 inch minus material (well-graded gravel and sand) for streambed material. Material will not be measured for payment.
- 2/ Place 2 layers of 7-mil plastic lining. Extend lining 6 inches above waterline around sides of pools.
- 3/ Place crushed aggregate bedding material as needed below waterline to smooth bottom of ponds and prevent puncturing of plastic lining.

NOTES:

- 1. Construct outlet control system to create 2 waterfalls and pools of the approximate sizes and shapes shown.
- 2. Adjust rock placement as necessary to simulate a "natural" appearance.
- 3. Place larger rocks in outflow areas. Place exposed face as nearly vertical as possible, with flow area near level.
- 4. Rock sizes shall vary from 1/2 cu ft to 2 cu yd, with the larger rocks exposed to view.

Date:	3/95
By:	P. Anderson
Designed:	P. Anderson
CADD:	P. Anderson
Checked:	
Approved:	

AF033306.DGN



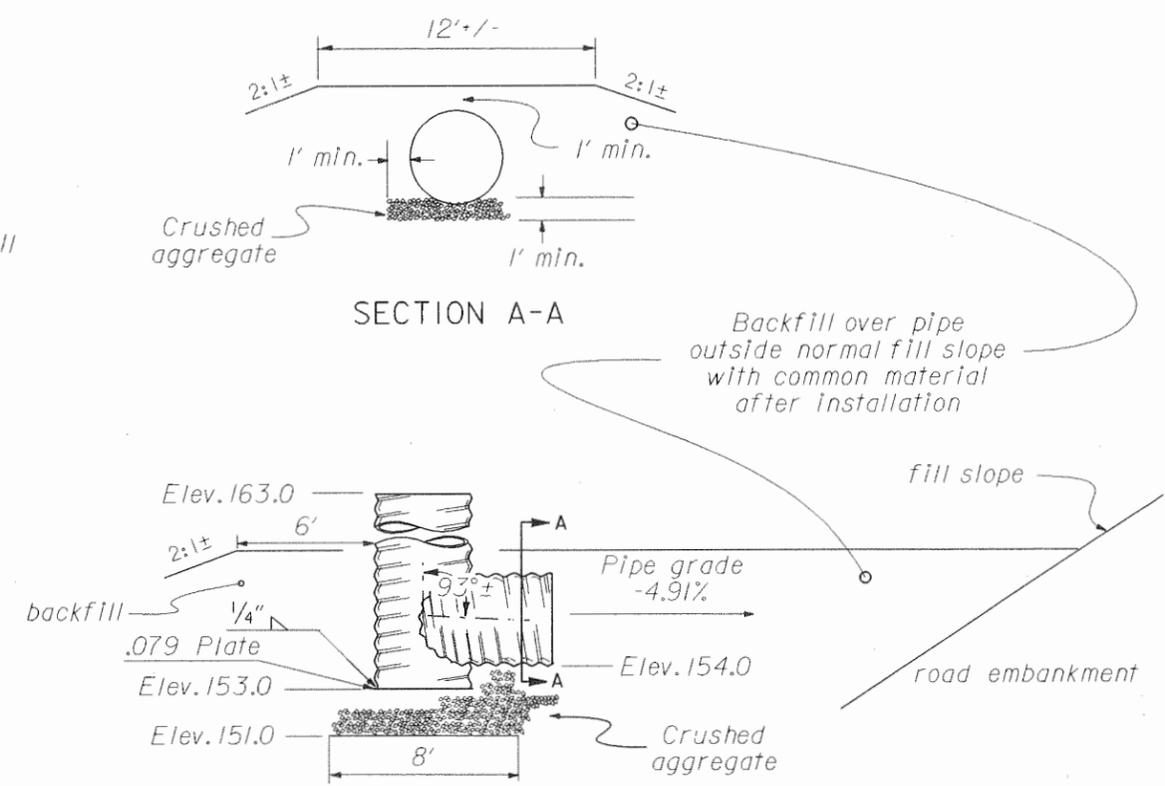
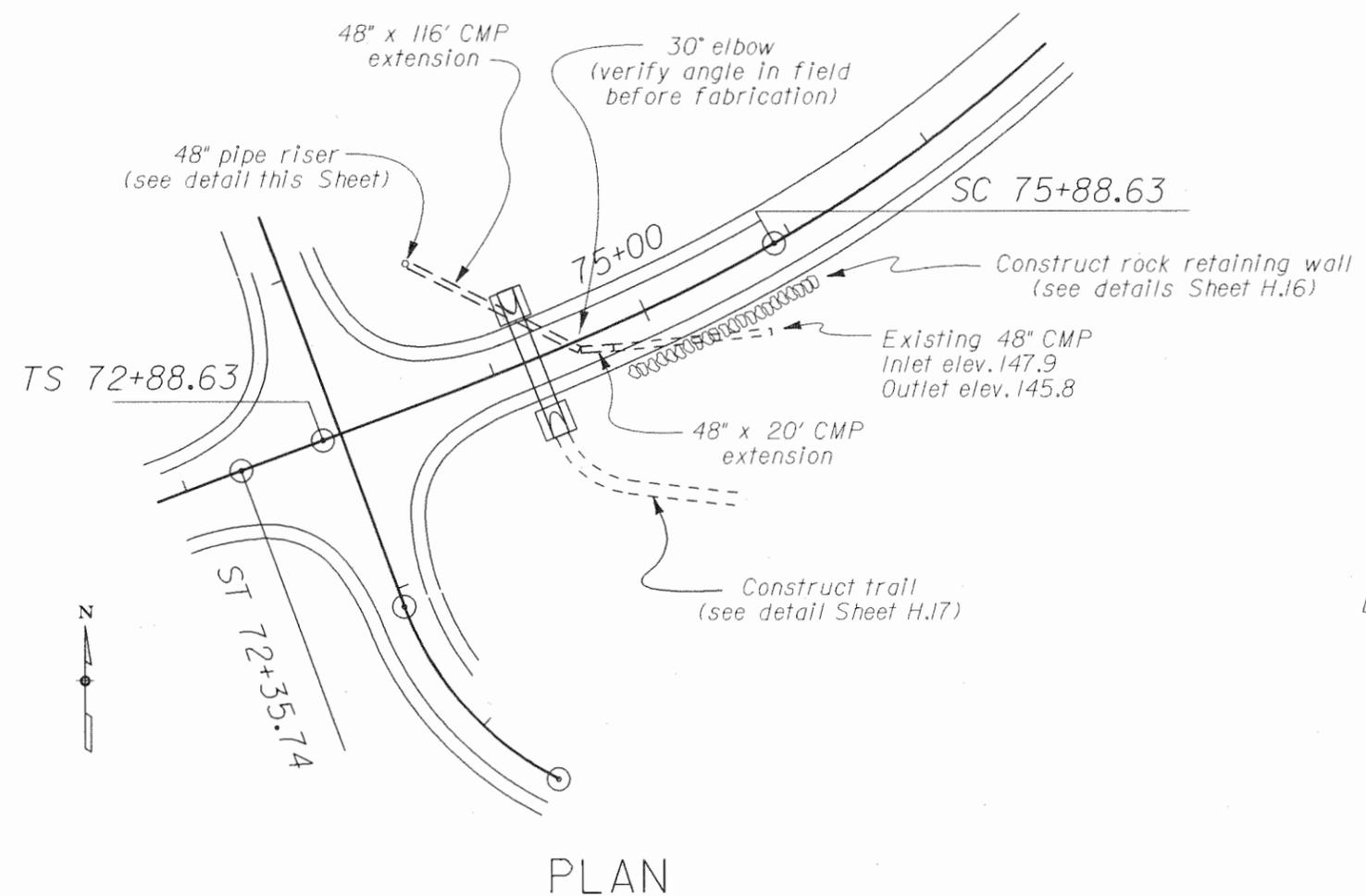
PROFILE
(NO SCALE)

ESTIMATED QUANTITIES		
Item 25110B	Culvert Outlet Control System (waterfall)	1 Each
	Placed Rock 4/	60 cu yd
	Plastic Lining 4/	92 sq yd
	Crushed aggregate 4/ 5/ bedding material	4 cu yd
	Streambed Material 4/	6 cu yd

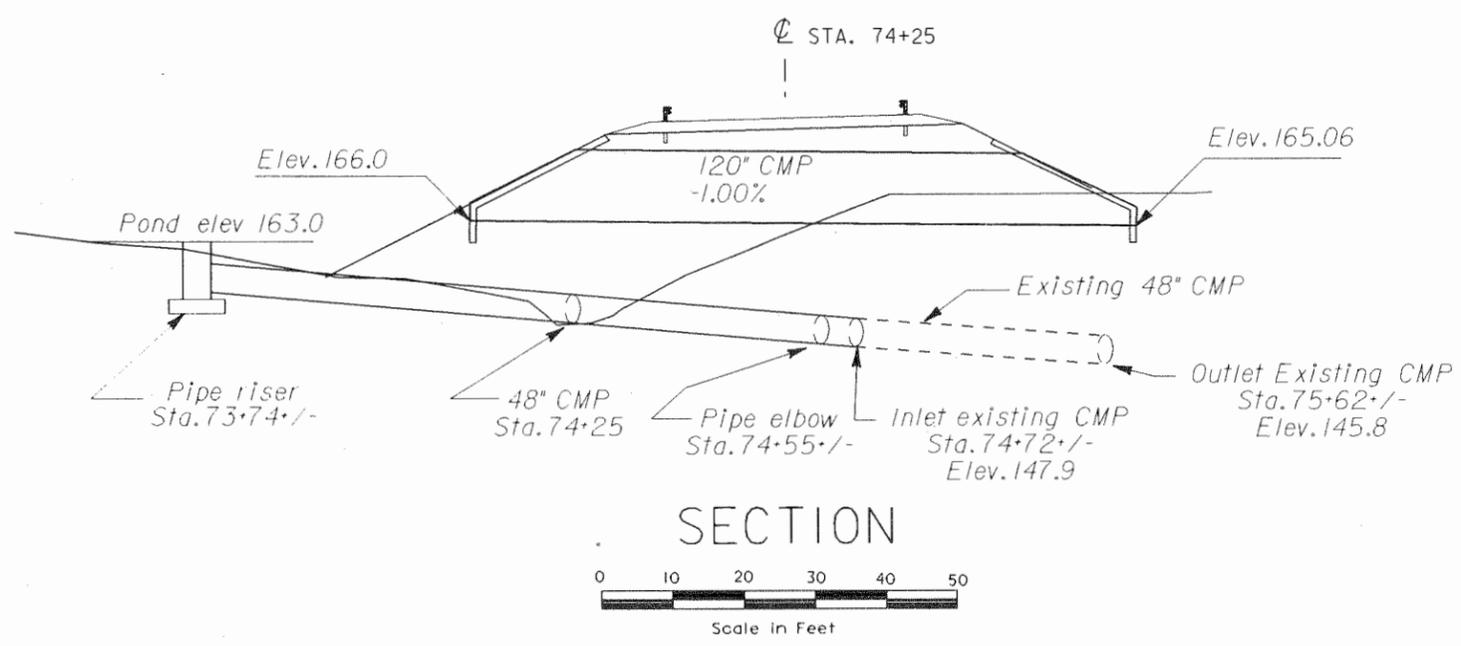
- 4/ For information only.
- 5/ Based on 4 inch average depth.

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

CULVERT OUTLET CONTROL SYSTEM (WATERFALL) DETAILS



48" PIPE RISER ASSEMBLY



ESTIMATED QUANTITIES		
	Structural Excavation ^{1/}	35 Cu Yd
Item 30110	Crushed Aggregate	65 Ton
Item 60201D	48-inch pipe culvert ^{2/}	136 In ft
Item 60209	48 inch Pipe Elbow ^{2/}	1 each
Item 60211	48 inch x 10 foot Pipe Riser Assembly ^{2/}	1 each

^{1/} For information only.
^{2/} Quantity included on summary sheets E.1-3

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

CUVERT EXTENSION
 PIPE RISER ASSEMBLY

By:	Date:
P. Anderson	2/95
P. Anderson	5/95
Designed:	
CADD:	
Checked:	
Approved:	

AF039307.DGN

METAL ROUND PIPE CULVERT																												
FILL HEIGHT AND METAL THICKNESS TABLE																												
HELICAL LOCKSEAM AND WELDED SEAM PIPE CULVERT																												
PIPE SIZE	MINIMUM COVER	STEEL															MINIMUM COVER	ALUMINUM										
		2 3/8" x 1/2" CORRUGATIONS					3" x 1" CORRUGATIONS					5" x 1" CORRUGATIONS					2 3/8" x 1/2" CORRUGATIONS		3" x 1" CORRUGATIONS									
		METAL THICKNESS IN INCH/GAGE															METAL THICKNESS IN INCH/GAGE											
		DIAMETER INCHES	INCHES	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	INCHES	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 IN FEET																												
12	12	100	100														12	100	100									
15	12	100	100														12	100	100									
18	12	100	100	100													12	100	100									
24	12	100	100	100													12	77	96	100								
30	12	85	100	100													12		77	100			71	89	100			
36	12	71	88	100	100		81	100	100								12		64	90	100	59	74	100	100			
42	12	60	76	100	100	100	69	87	100								12			77	99	50	63	89	100			
48	12	53	66	93	100	100	61	76	100			54	68	95			12			66	86	44	55	78	100			
54	18		59	82	100	100	54	67	95	100	100	48	60	84	100	100	18			54	70	39	49	69	92			
60	18			74	95	100	48	61	85	100	100	43	54	76	98	100	18			59			44	62	83			
66	18				87	100	44	55	78	100	100	39	49	69	89	100	18						40	56	75			
72	18				79	97	40	50	71	92	100	36	45	63	81	100	18						37	52	69			
78	18					86	37	47	66	85	100	33	41	58	75	92	24						34	48	64			
84	18					75	34	43	61	78	96	31	38	54	70	85	24							44	59			
90	18						32	40	57	73	90	29	36	50	65	80	24							41	55			
96	18							38	53	69	84		34	47	61	75	24							38	51			
102	18							35	50	65	79		32	44	57	70	24								46			
108	18								47	61	75			42	54	66	24									41		
114	18								45	58	71			40	51	63	24											
120	18								42	55	67			38	49	60	24											
126	18									52	64				46	57	24											
132	18									50	61				44	50	24											
138	18									48	58				42	50	24											
144	18										56					50	24											

- NOTE:
- 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.
 - Fill heights exceeding 100 feet require special analysis by the Government.
 - 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 corrugated pipe.
 - 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																											
HELICAL LOCKSEAM AND WELDED SEAM PIPE ARCH CULVERT																											
PIPE ARCH SIZE	CORNER RADIUS	MINIMUM COVER	STEEL															MINIMUM COVER	ALUMINUM								
			2 3/8" x 1/2" CORRUGATIONS					3" x 1" CORRUGATIONS					5" x 1" CORRUGATIONS						2 3/8" x 1/2" CORRUGATIONS		3" x 1" CORRUGATIONS						
			METAL THICKNESS IN INCH/GAGE																METAL THICKNESS IN INCH/GAGE								
			SPAN X RISE INCHES	INCHES	INCHES	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	INCHES	0.060/16	0.075/14	0.105/12	0.135/10	0.060/16	0.075/14	0.105/12
MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE IN FEET																											
17 x 13	3 1/2	12	13														12	13									
21 x 15	4 1/8	12	12														12	12									
24 x 18	4 7/8	12	13														12	13									
28 x 20	5 1/2	12	13														12		13								
35 x 24	6 1/8	12	12														12		12								
42 x 29	8 1/4	12	12														12			12							
49 x 33	9 5/8	12															12										
57 x 38	11	12				12											12										
64 x 43	12 3/8	12				12											12				12						
71 x 47	13 3/4	12				12											12										
77 x 52	15 1/8	12								12							12										
83 x 57	16 1/2	12								12							12										

60 x 46	18 3/4	12									21				21		15				21						
66 x 51	20 3/4	12									21				21		18				21						
73 x 55	22 7/8	12									20				20		18					20					
81 x 59	20 7/8	12								17	--			17	--	21									17		
87 x 63	22 5/8	12								17	--			17	--	21									17		
95 x 67	24 3/8	12								17	--			17	--	24									17		
103 x 71	26 1/8	18								17	--			17	--	24										17	
112 x 75	27 3/4	18								16	--			16	--	27											
117 x 79	29 1/2	18								16	--			16	--	27											
128 x 83	31 1/4	24									16				16		24										
137 x 87	33	24									16				16		24										
142 x 91	34 3/4	24									16				16		24										

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

STANDARD

METAL PIPE CULVERT

STANDARD APPROVED FOR USE 12/93
REVISED: 4/94

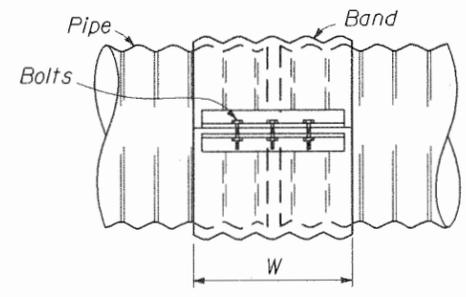
STANDARD
602-I

NO SCALE

3-56220-05-1

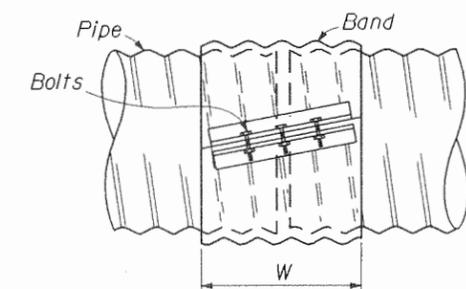
COUPLING BANDS FOR METAL PIPE CULVERT ^{1/}

CORRUGATION SIZE ^{2/}	PIPE DIAMETER	PIPE-ARCH SPAN X RISE	MINIMUM BAND WIDTH		
			ANNULAR ^{3/} CORRUGATED BANDS	HELICALLY ^{4/} CORRUGATED BANDS	SEMI- ^{5/} CORRUGATED BANDS
INCHES	INCHES	INCHES	INCHES	INCHES	INCHES
1 1/2 by 1/4	underdrain ^{6/}	-	7	7	10 1/2
2 2/3 by 1/2	12 to 36	17x13 to 42x29	7	12	10 1/2
	42 to 72	49x33 to 83x57	10 1/2	12	10 1/2
	78 to 84	-	10 1/2	12	10 1/2
3 by 1	36 to 72	42x29 to 81x59	12	14	10 1/2
	78 to 144	87x63 to 142x91	12	14	10 1/2
5 by 1	48 to 72	57x38 to 81x59	20	22	10 1/2
	78 to 144	87x63 to 142x91	20	22	10 1/2



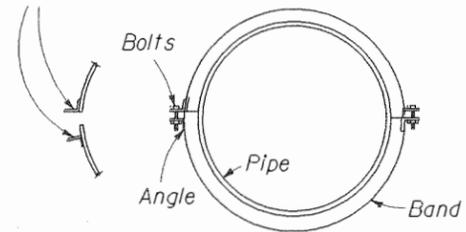
SIDE VIEW

Rivet, Spotweld, or Fillet weld at crest of corrugation at heel and toe of angle.



SIDE VIEW

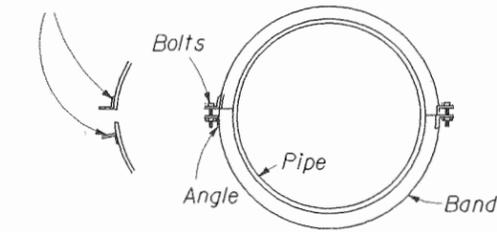
Rivet, Spotweld, or Fillet weld at crest of corrugation at heel and toe of angle.



END VIEW

Note:
Second angle connection optional to 42" diameter, required above 42" diameter.

ANNULAR BAND



END VIEW

Note:
Second angle connection optional to 42" diameter, required above 42" diameter.

HELICAL BAND

^{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 (18 gage) for steel or 0.048 inch (18 gage) for aluminum. Fasten coupling bands with the following sizes of bolt:

- 3/8" diameter - 18" (21"x15" pipe arch) or less
- 1/2" diameter - 21" (24"x18" pipe arch) or more

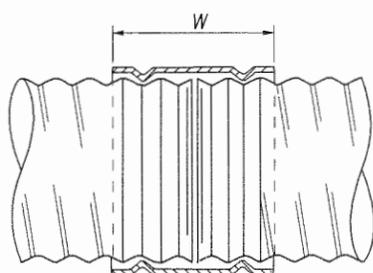
^{2/} For helically corrugated pipe with rerolled ends, the nominal corrugation size refers to the dimension of the end corrugation in the pipe.

^{3/} Use annular corrugated bands with pipes having annular corrugations or with helical pipe having rerolled ends to form annular corrugations. A 10 1/2 inch band is acceptable on pipe ends rerolled with 2 2/3 by 1/2 inch corrugations. A 12 inch band is acceptable on pipe ends rerolled with 3 by 1 inch pipe corrugations.

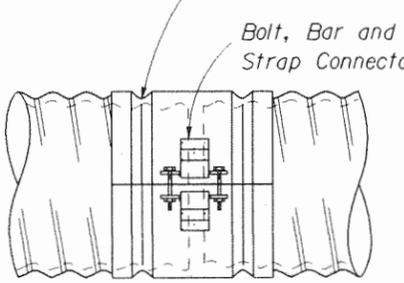
^{4/} Use helical corrugated bands with pipes having helically corrugated ends.

^{5/} The minimum band widths shown for 3 by 1 and 5 by 1 inch corrugated sizes apply to 2 2/3 by 1/2 corrugations on rerolled pipe ends.

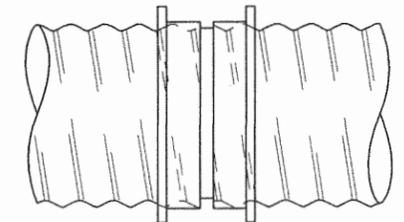
^{6/} Smooth sleeve-type couplers and flat bands may be used for pipe diameters of 12 inches or less. Use a matching metal having a nominal thickness of not less than 0.040 inch (20 gage) for steel, or 0.036 inch (20 gage) for aluminum, or a plastic with an equivalent strength to metal.



Continuous corrugation around band meshes with second annular corrugation in pipe end.

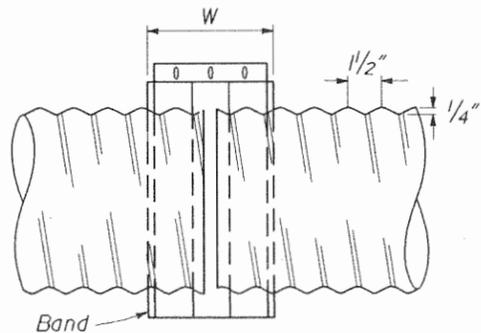


SEMI-CORRUGATED BAND



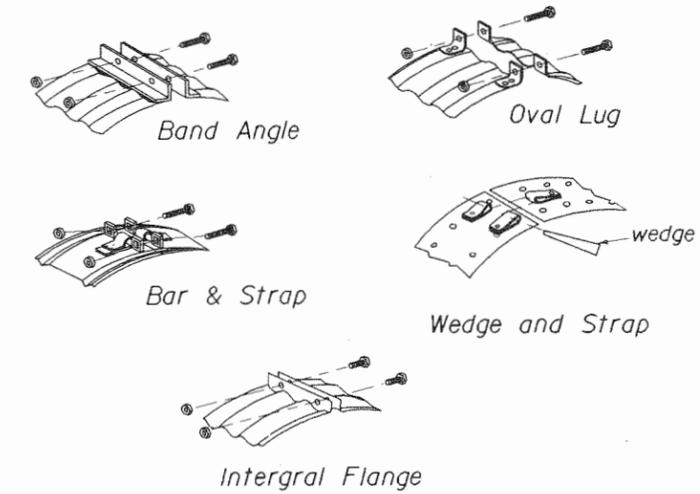
SLEEVE JOINT
Smoother sleeve with center stop.
Stab type joint.

SMOOTH SLEEVE BAND



CROSS SECTION THRU PIPE JOINTS

FLAT BAND



STANDARD BAND CONNECTIONS

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

STANDARD
METAL PIPE CULVERT
COUPLING BAND

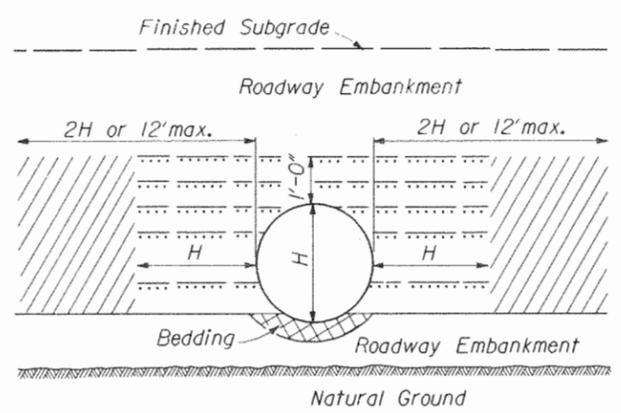
STANDARD APPROVED FOR USE 12/93
REVISED: 4/94

STANDARD
602-2

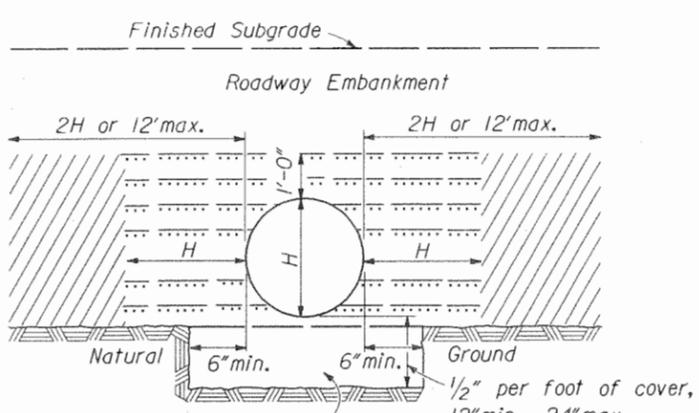
NOTE:
1. Watertight pipe joints are not required unless specified in the Special Contract Requirements.
2. Other types of coupling bands or fastening devices that comply with the joint performance criteria of AASHTO Standard specifications for Highway Bridges, Division II Section 26 may be used.

NO SCALE

2706202.D51

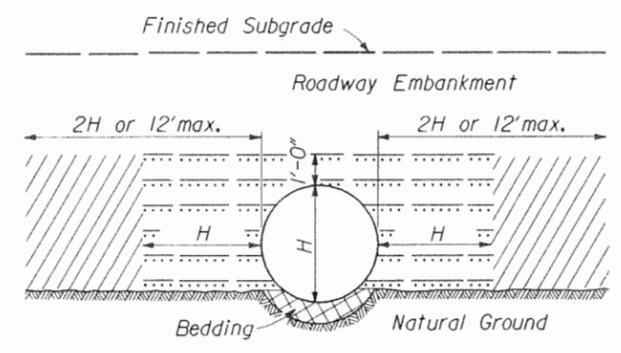


ABOVE NATURAL GROUND

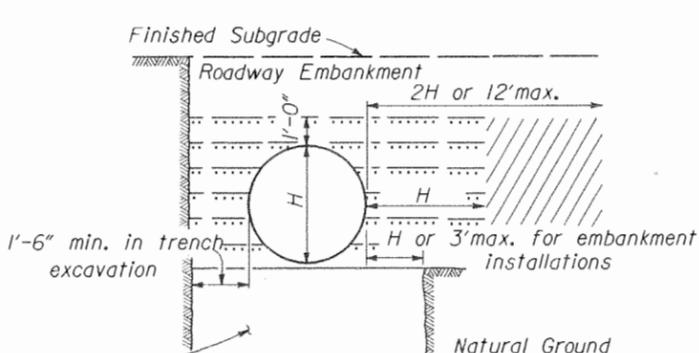


Remove unyielding material and replace with selected fine compressible material. Lightly compact in layers not over 6 inches in uncompacted depth.

ON UNYIELDING MATERIAL

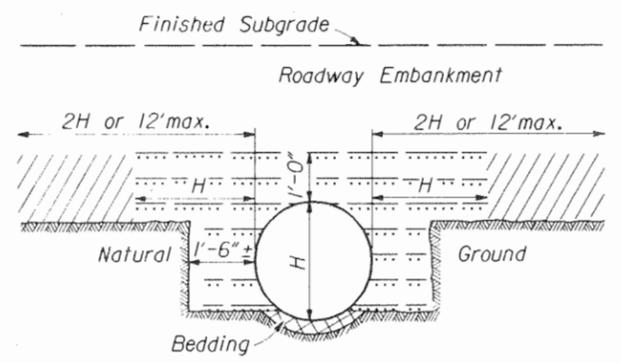


ON NATURAL GROUND

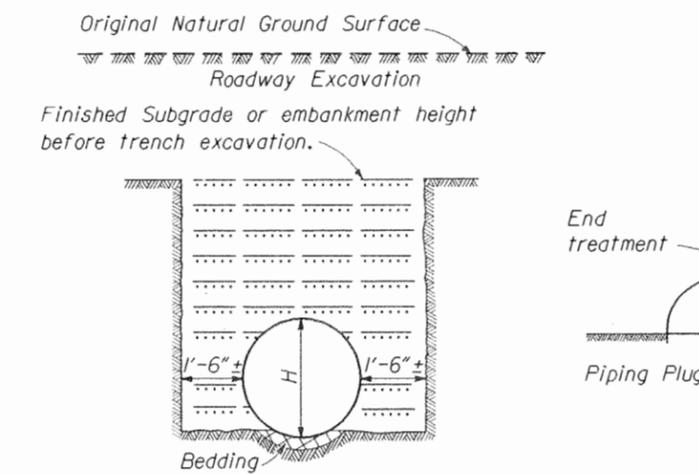


Remove unstable material to firm bearing soil and replace with approved granular foundation fill material properly compacted.

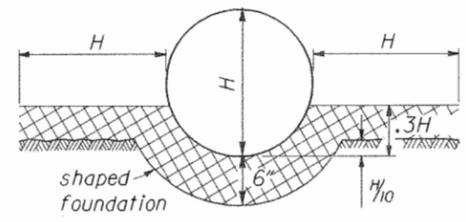
ON UNSTABLE MATERIAL



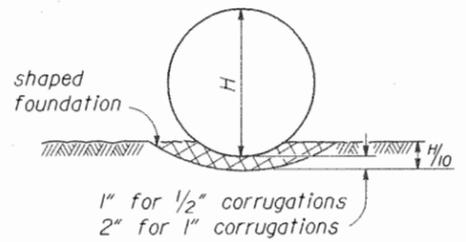
ABOVE AND BELOW NATURAL GROUND



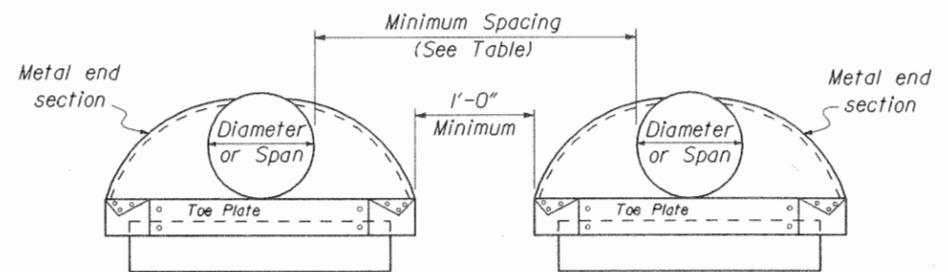
BELOW NATURAL GROUND OR TRENCH EXCAVATION IN EMBANKMENT



CLASS B BEDDING

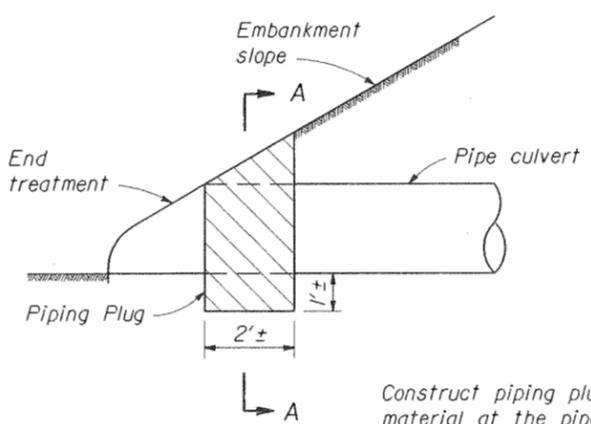


CLASS C BEDDING



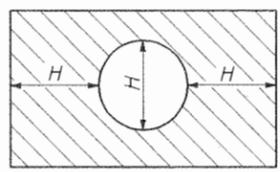
MINIMUM SPACING	
DIAMETER or SPAN INCHES	SPACING INCHES
UP to 48	24
48 and UP	1/2 Diameter or Span or 36 whichever is less

MULTIPLE PIPE INSTALLATION



Construct piping plug of impermeable backfill material at the pipe culvert inlet where granular material is used for backfill.

PIPING PLUG



SECTION A-A

- Bedding Material
- Embankment material placed in layers not exceeding 6" compacted depth.
- Approved granular material or fine compactable soil placed in layers not exceeding 6" compacted depth.

NO SCALE

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

STANDARD

**METAL AND PLASTIC
PIPE CULVERT BEDDING**

STANDARD APPROVED FOR USE 12/93

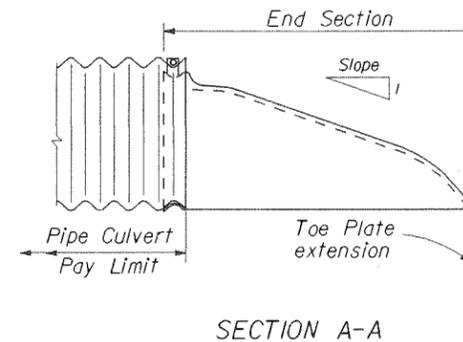
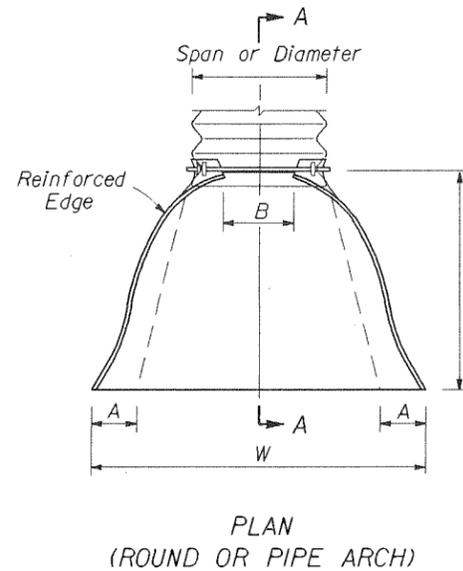
REVISOR: 4/94

STANDARD
602-3

STD60203.DGI

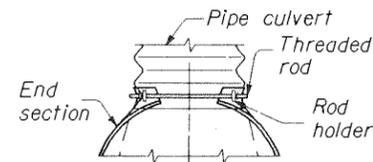
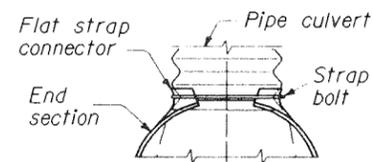
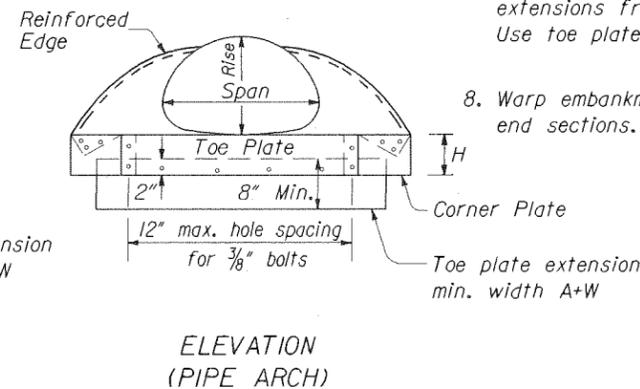
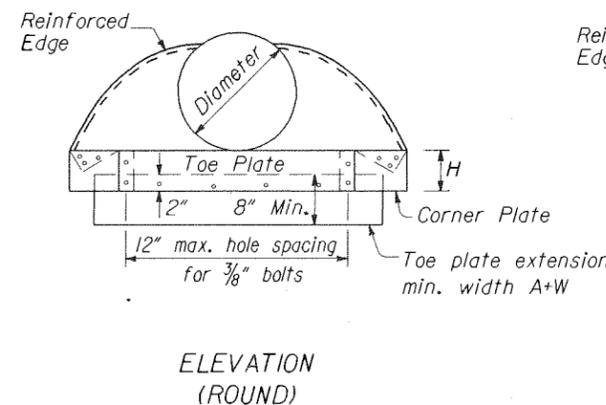
END SECTIONS FOR PIPE ARCH CULVERT

PIPE SIZE SPAN X RISE INCHES	MINIMUM METAL THICKNESS				DIMENSIONS						SLOPE Approx.
	STEEL		ALUM.		A	B	H	F	L	W	
	INCH	GAGE	INCH	GAGE	INCHES	INCHES	INCHES	INCHES	INCHES	INCHES	
17 x 13	.064	16	.060	16	5	9	6	28	20	52	2 1/8
21 x 15	.064	16	.060	16	6	11	6	34	24	58	2
24 x 18	.064	16	.060	16	7	12	6	40	28	63	2 1/8
28 x 20	.064	16	.060	16	7	16	6	46	32	70	2
35 x 24	.079	14	.075	14	9	16	6	58	39	85	1 7/8
42 x 29	.079	14	.075	14	11	18	7	73	46	104	1 7/8
49 x 33	.109	12	.105	12	12	21	9	82	53	117	1 3/4
57 x 38	.109	12	.105	12	16	26	12	88	62	132	1 7/8
53 x 41	.109	12	.105	12	17	26	12	88	63	130	1 3/4
64 x 43	.109	12	.105	12	17	30	12	100	69	144	1 7/8
60 x 46	.109	12	.105	12	17	36	12	100	70	142	1 7/8
71 x 47	.109	12	.105	12	17	36	12	112	77	156	1 7/8
66 x 51	.109	12	.105	12	17	36	12	112	77	156	1 3/4
77 x 52	.109	12	.105	12	17	36	12	124	77	167	1 7/8
73 x 55	.109	12	.105	12	17	36	12	124	77	168	1 1/2
83 x 57	.109	12	.105	12	17	44	12	130	77	177	1 1/2
81 x 59	.109	12	.105	12	17	44	12	136	77	179	1 5/8
87 x 63	.109	12	.105	12	17	44	12	136	77	186	1 1/2
95 x 67	.109	12	.105	12	17	44	12	160	87	210	1 1/2
103 x 71	.109	12	.105	12	17	44	12	172	87	222	1 1/3
112 x 75	.109	12	.105	12	17	44	12	172	87	226	1 1/4



END SECTIONS FOR ROUND PIPE CULVERT

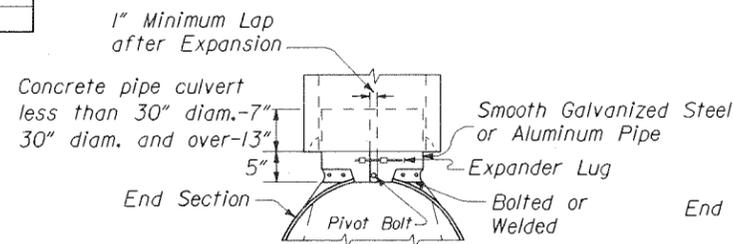
PIPE SIZE DIAMETER INCHES	MINIMUM METAL THICKNESS				DIMENSIONS						SLOPE Approx.
	STEEL		ALUM.		A	B	H	F	L	W	
	INCH	GAGE	INCH	GAGE	INCHES	INCHES	INCHES	INCHES	INCHES	INCHES	
12	.064	16	.060	16	6	7	6	22	21	44	2 1/4
15	.064	16	.060	16	6	8	6	28	26	52	2 1/4
18	.064	16	.060	16	7	10	6	34	31	58	2 1/8
21	.064	16	.060	16	8	12	6	40	36	66	2 1/8
24	.064	16	.060	16	9	13	6	46	41	72	2 1/8
30	.079	14	.075	14	11	16	8	55	51	88	2 1/8
36	.079	14	.075	14	13	19	9	70	60	105	2
42	.109	12	.105	12	15	25	10	82	69	122	2 1/8
48	.109	12	.105	12	17	29	12	88	78	131	2
54	.109	12	.105	12	17	33	12	100	84	143	2
60	.109	12	.105	12	17	36	12	112	87	157	1 7/8
66	.109	12	.105	12	17	39	12	118	87	162	1 5/8
72	.109	12	.105	12	17	44	12	120	87	169	1 1/2
78	.109	12	.105	12	17	48	12	130	87	178	1 3/8
84	.109	12	.105	12	17	52	12	136	87	184	1 1/3
90	.109	12	.105	12	17	58	12	142	87	188	1 1/4
96	.109	12	.105	12	17	58	12	144	87	197	1 1/8



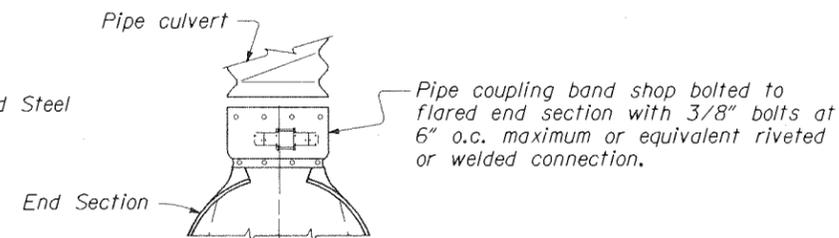
For 12" thru 24" round pipe and 17"x 13" thru 28"x 20" pipe arch

For 30" thru 60" round pipe and 35"x24" thru 66"x51" pipe arch

DESIGN A
CONNECTION TO ANNULAR CORRUGATED METAL PIPE



DESIGN B
CONNECTION TO CONCRETE PIPE
INLET END



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

For all sizes of round pipe and pipe arch.

NOTE:

- Variations in design and dimensions are permitted to allow for manufacturer's standards.
- Fabricate the diameter of the end section of Design B to match the inside diameter of the concrete pipe culvert.
- 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.
- Fabricate multiple piece bodies with lap seams tightly joined by 3/8" rivets or bolts. Fabricate end section center panels for 60" and larger diameter pipe and 71" x 47" and larger pipe arch from 0.138" (10 gage) steel or 0.135" (10 gage) aluminum.
- On end section center panels for 77" x 52", 73" x 55" and larger pipe arch, provide 2 1/2" x 2 1/2" x 1/4" angle reinforcement bolted or riveted under the center panel seam.
- Supplement the reinforced edges of end sections for 60" and larger diameter pipe and 77" x 52", 73" x 55" and larger pipe arch with 2" x 2" x 1/4" stiffener angles attached with bolts or rivets.
- 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.
- Warp embankment slopes to match the slope of the flared end sections.

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

STANDARD

METAL END SECTION

STANDARD APPROVED FOR USE 12/93
REVISED: 4/94

STANDARD
602-4

NO SCALE

POLYVINYL CHLORIDE (PVC) PLASTIC ROUND PIPE CULVERT									
FILL HEIGHT TABLE AND MINIMUM CELL CLASSIFICATION NUMBER PER ASTM D 1784									
SMOOTH WALL AND RIBBED PIPE CULVERT									
SMOOTH WALL (SOLID WALL)				RIBBED					
PIPE SIZE DIAMETER INCHES	MINIMUM COVER INCHES	CELL CLASS. NO. 12454C		CELL CLASS. NO. 12364C		PIPE SIZE DIAMETER INCHES	MINIMUM COVER INCHES		
		MIN. WALL THICKNESS IN INCHES						CELL CLASS. NO. 12454C	CELL CLASS. NO. 12364C
		0.358	0.438	0.358	0.438				
12	12	65		69		12	12	37	26
15	12		62		66	15	12	32	22
						18	12	33	23
						24	12	29	21
						30	12	28	20
						36	12	27	19
						42	12	26	18
						48	12	24	17

NOTE:

- 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.
- 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.

POLYETHYLENE (PE) PLASTIC ROUND PIPE CULVERT															
FILL HEIGHT TABLE AND MINIMUM CELL CLASSIFICATION NUMBER PER ASTM D 3350															
SMOOTH WALL, CORRUGATED AND RIBBED PIPE CULVERT															
PIPE SIZE DIAMETER INCHES	MINIMUM COVER INCHES	SMOOTH WALL (SOLID WALL)						CORRUGATED				RIBBED			
		CELL CLASSIFICATION NUMBER 335434C						PIPE SIZE DIAMETER INCHES	MINIMUM COVER INCHES	CELL CLASS. NO. 315412C	CELL CLASS. NO. 324420C	PIPE SIZE DIAMETER INCHES	MINIMUM COVER INCHES	CELL CLASS. NO. 334433C	CELL CLASS. NO. 335434C
		MINIMUM WALL THICKNESS IN INCHES													
		0.607	0.857	0.923	1.154	1.385	1.292	1.477							
12	12	57								18	12	18	24		
18	12		52						11	10	24	28			
24	12			38					12	10	30	28			
30	12				38				12	10	36	31			
36	12					38			12	10	42	27			
42	12						27		12	10	48	27			
48	12								11	10		26			

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

STANDARD

PLASTIC PIPE CULVERT

NO SCALE

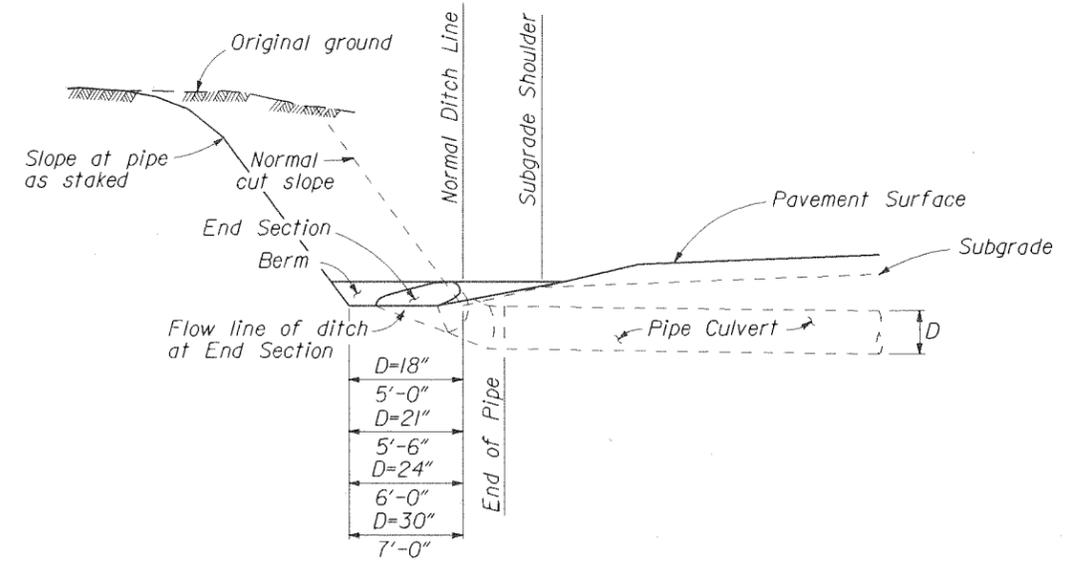
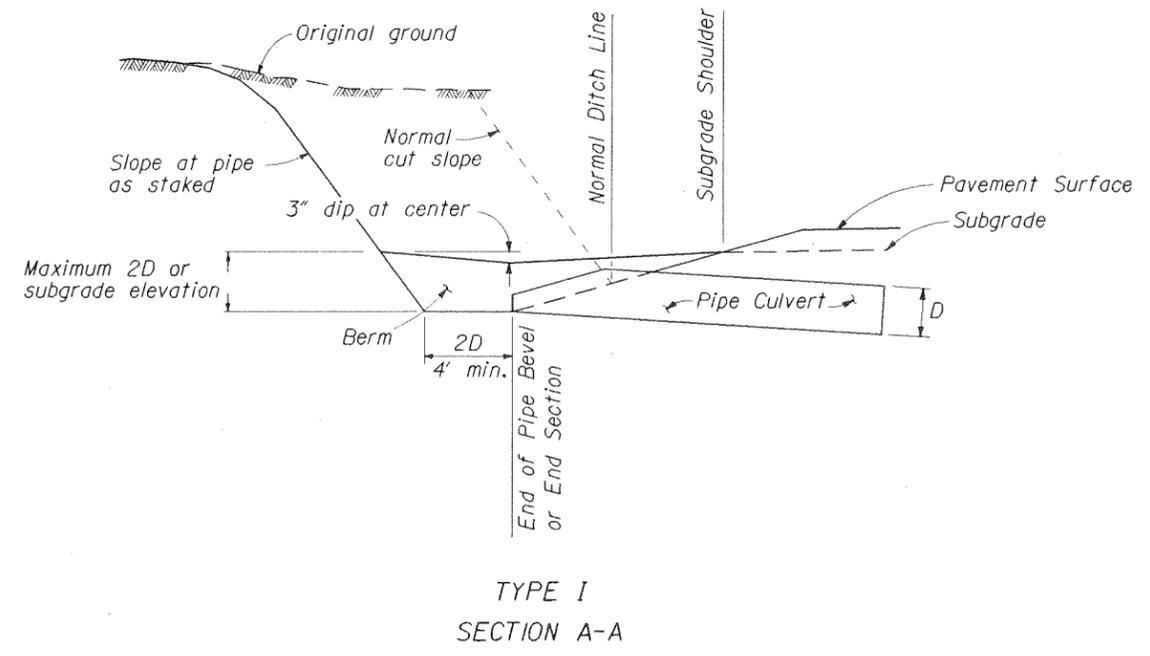
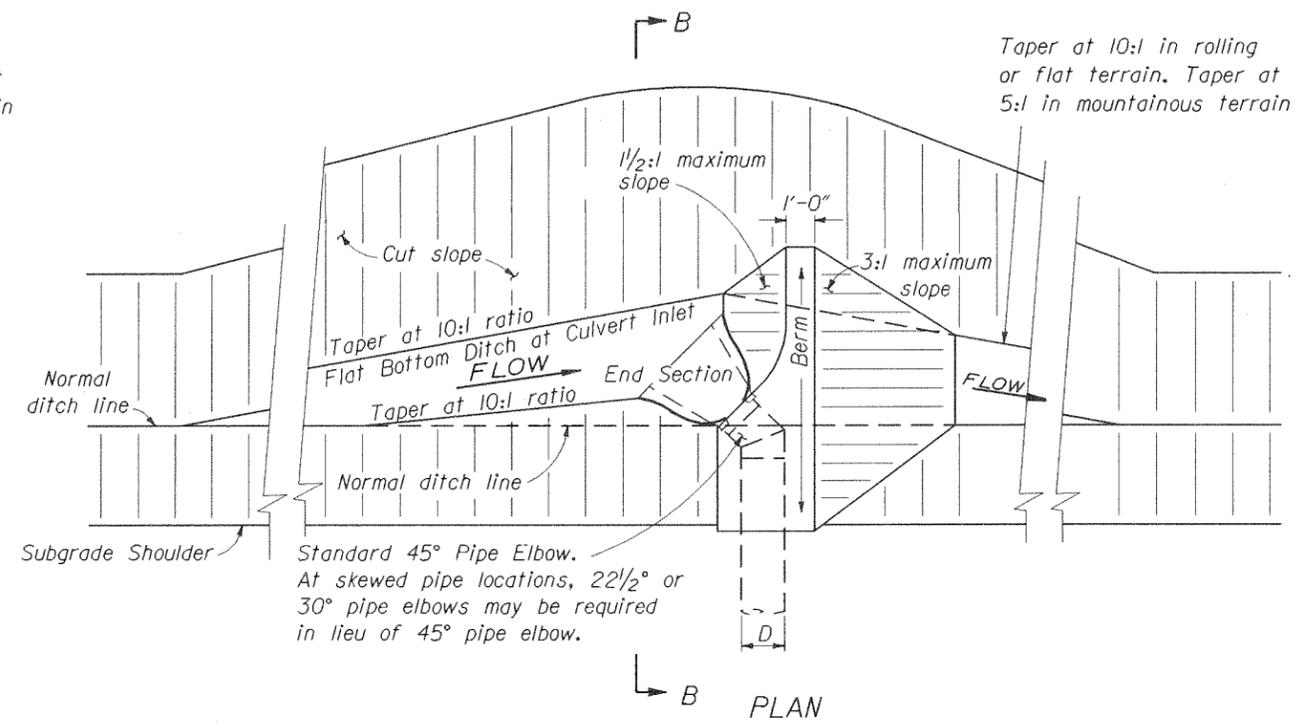
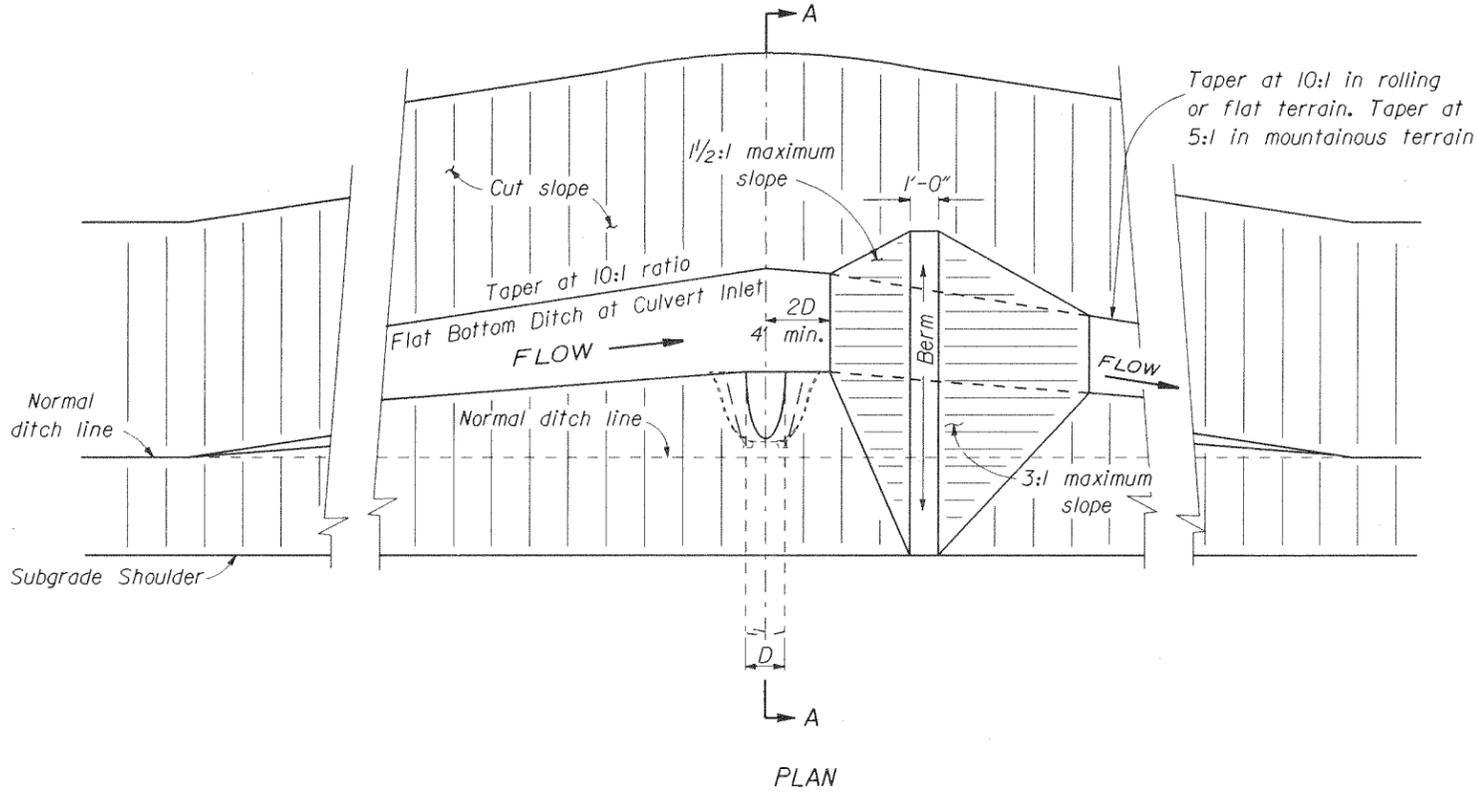
STANDARD APPROVED FOR USE 12/93

REVISED: 4/94

STANDARD

602-5

NOTE:
 1. D equals the diameter of all round pipe or the rise dimension of all pipe arch culverts.



TYPE II
SECTION B-B

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

STANDARD
 PIPE CULVERT INLET
 TREATMENT IN CUT SLOPES

STANDARD APPROVED FOR USE 12/93
 REVISED: 4/94

STANDARD
 602-6

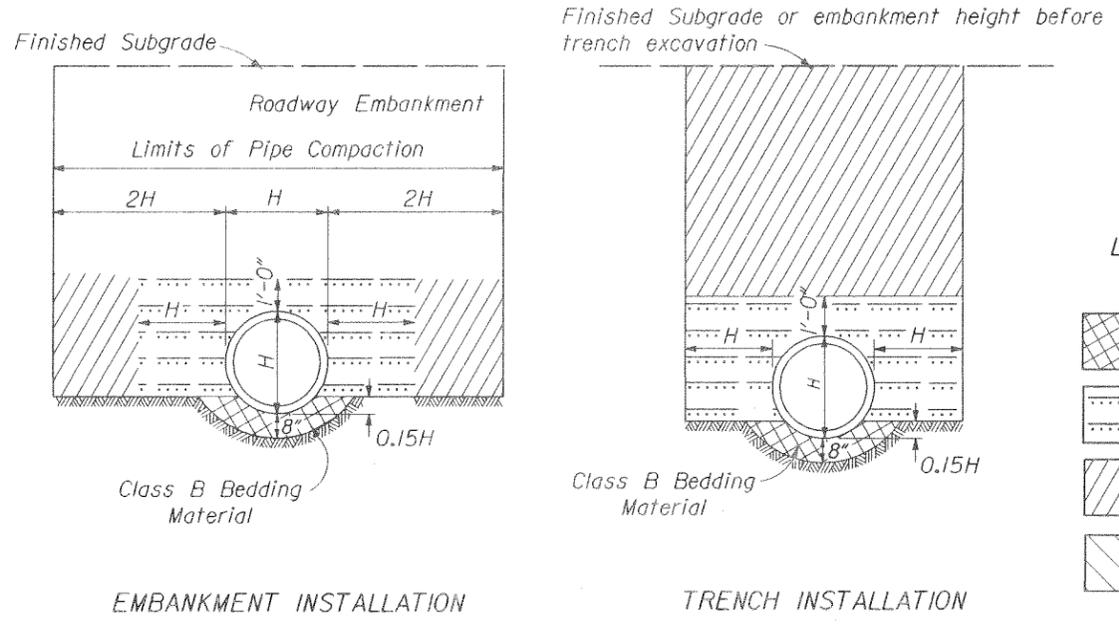
NO SCALE

STD60206.D91

CONCRETE ROUND PIPE CULVERT									
FILL HEIGHT AND PIPE CLASS TABLE									
PIPE SIZE DIAMETER INCHES	MINIMUM COVER INCHES	EMBANKMENT				TRENCH			
		CLASS II	CLASS III	CLASS IV	CLASS V	CLASS II	CLASS III	CLASS IV	CLASS V
MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE IN FEET									
12	24	11	11	16	23	18	18	26	37
18	24	10	10	25	39	14	14	31	45
24	24	11	11	15	31	15	15	22	40
30	24	9	13	16	35	13	17	20	46
36	24	9	9	20	41	11	14	26	56
48	24	12	14	26	44	16	17	31	50
60	24	15	17	28	44	15	20	32	50
72	24	13	17	31	41	16	20	35	49
84	24	13	19	31		15	23	37	
96	24	13	20			16	24		
108	24	16	20			19	26		

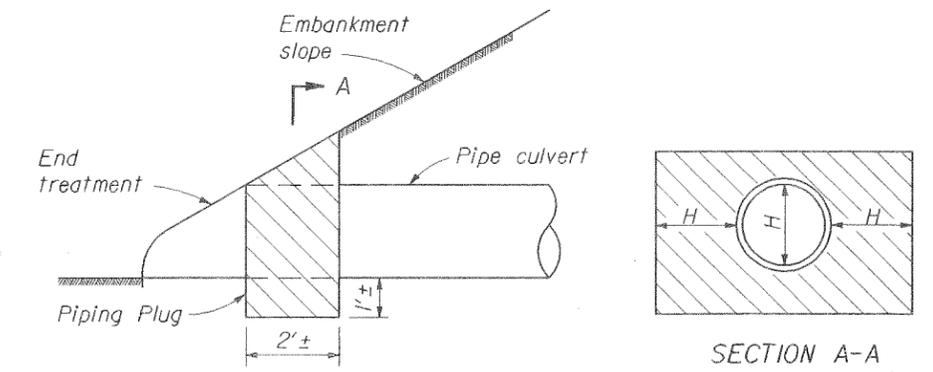
NOTE:

- 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.
- Measure minimum cover from the top of the pipe culvert to the subgrade for flexible pavements, and to the top of the pavement for rigid pavements. Measure maximum fill height from the top of the pipe to the top of the pavement for both flexible and rigid pavements.
- Pipe compaction limits shown are for pipe installation in an embankment. For pipe installation in a trench, the compaction limits shall be the walls of the trench.
- Where unyielding or unstable material is encountered, install the pipe culvert according to the limits of pipe compaction shown on standard 602-3.
- When grades exceed 10%, install supplemental concrete pipe ties on pipe culvert or install bell and spigot pipe.
- Maximum fill heights for pipe culvert installations may be increased on approval of site-specific structural pipe designs meeting the criteria of AASHTO Standard Specifications for Highway Bridges.

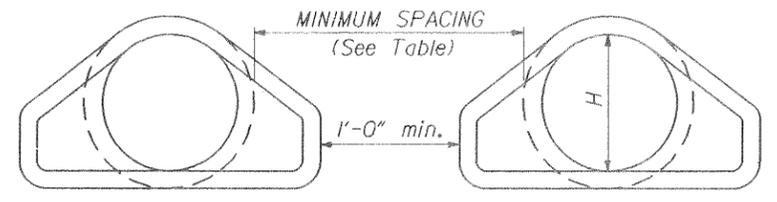


LEGEND:

- Bedding Material
- Approved granular material or fine compactable soil placed in layers not exceeding 6" compacted depth.
- Embankment material placed in layers not exceeding 6" compacted depth.
- Impermeable backfill material

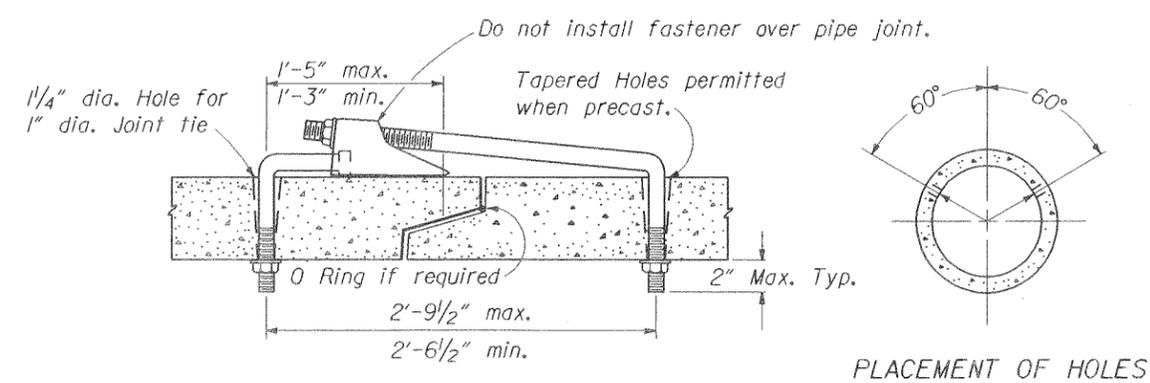


Construct a piping plug of impermeable backfill material at the pipe inlet where granular material is used for backfill.



MINIMUM SPACING		
DIAMETER INCHES	EMBANKMENT	TRENCH
12-36	15"	2H
36-96	1 1/2'	72"
OVER 96	48"	72"

MULTIPLE ROUND PIPE INSTALLATION



SUPPLEMENTAL CONCRETE PIPE TIE

PLACEMENT OF HOLES

NO SCALE

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

STANDARD
CONCRETE PIPE
CULVERT INSTALLATION

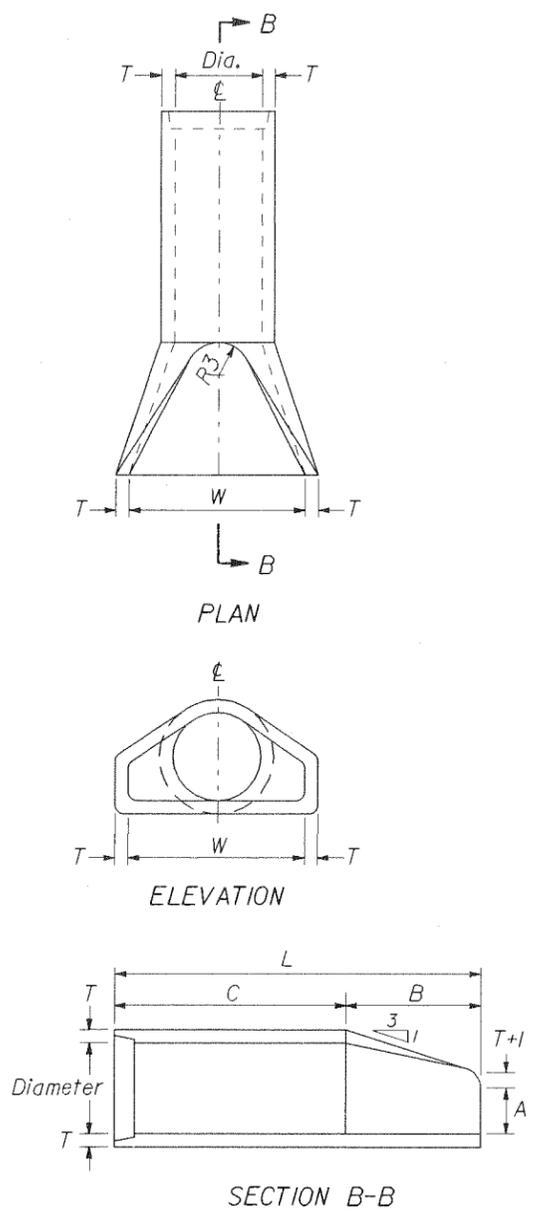
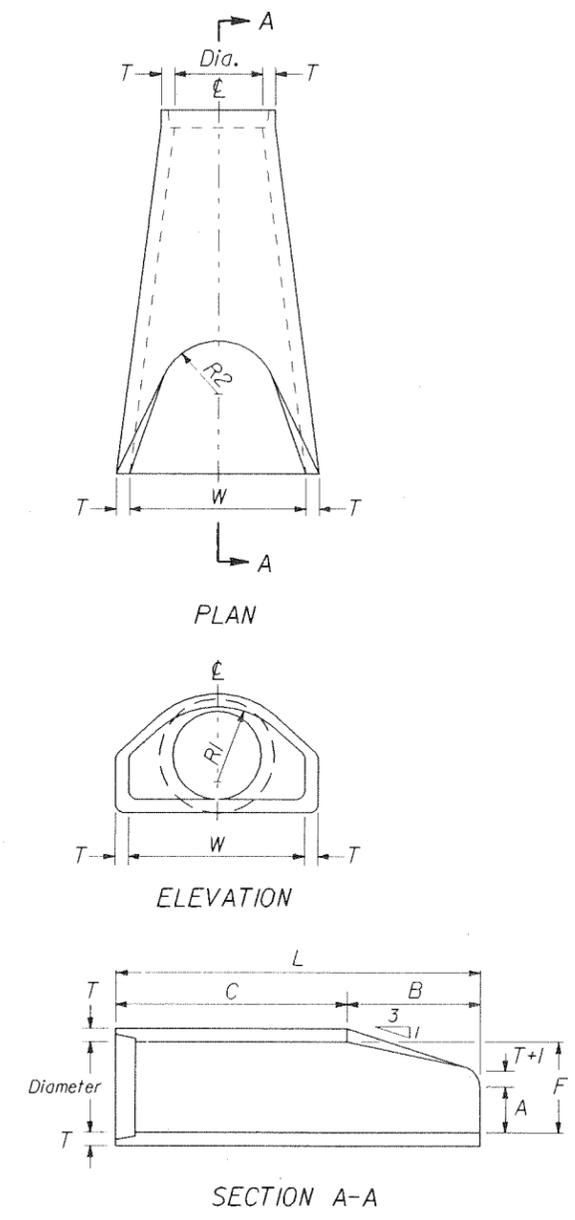
STANDARD APPROVED FOR USE 12/93
REVISED: 4/94

STANDARD
602-7

STD60207.DGN

NOTE:

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



END SECTIONS FOR ROUND PIPE CULVERT										
PIPE SIZE	DIMENSIONS									
	T	A	B	C	L	W	F	R1	R2	R3
DIAMETER INCHES	INCHES	INCHES	INCHES	INCHES	INCHES	INCHES	INCHES	INCHES	INCHES	INCHES
12	2	4	24	48 ⁷ / ₈	72 ⁷ / ₈	24	13	10 ¹ / ₈	9	4
15	2 ¹ / ₄	6	27	46	73	30	16	12 ¹ / ₂	11	6
18	2 ¹ / ₂	9	27	46	73	36	19	15 ¹ / ₂	12	7 ¹ / ₂
21	2 ³ / ₄	9	36	37	73	42	22	16 ¹ / ₂	13	5
24	3	9 ¹ / ₂	43 ¹ / ₂	30	73 ¹ / ₂	48	25	16 ³ / ₁₆	14	8
27	3 ¹ / ₄	10 ¹ / ₂	48	25 ¹ / ₂	73 ¹ / ₂	54	28	--	14 ¹ / ₂	9
30	3 ¹ / ₂	12	54	19 ³ / ₄	73 ³ / ₄	60	31	18 ¹ / ₂	15	8
33	3 ³ / ₄	13 ¹ / ₂	58 ¹ / ₂	37 ¹ / ₂	96	66	34	23 ³ / ₄	17 ¹ / ₂	9
36	4	15	63	33	96	72	37	23 ³ / ₁₆	20	11
42	4 ¹ / ₂	21	63	33	96	78	43	--	22	11
48	5	24	72	24	96	84	49	--	22	12

STD60206.03M

NO SCALE

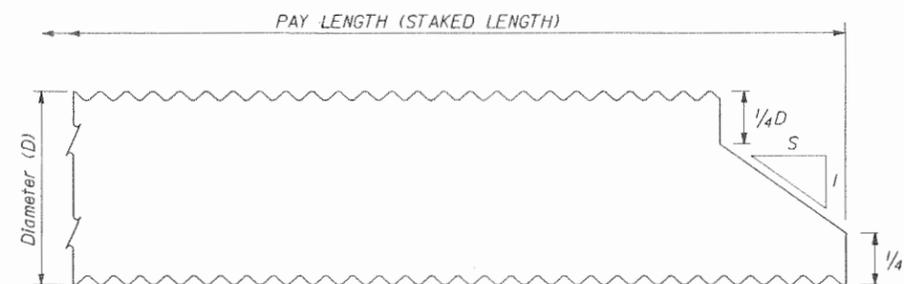
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY OFFICE	
STANDARD CONCRETE END SECTION FOR ROUND PIPE	
STANDARD APPROVED FOR USE 12/93 REVISED: 4/94	STANDARD 602-8

STRUCTURAL PLATE PIPE CULVERT
FILL HEIGHT AND METAL THICKNESS TABLE

PIPE SIZE DIAMETER INCHES	MINIMUM COVER INCHES	STEEL 6" x 2" CORRUGATIONS								ALUMINUM 9" x 2 1/2" CORRUGATIONS							
		3/4 Inch Steel Bolts. 4 Bolts per foot								3/4 Inch Steel Bolts. 5/3 Bolts per foot							
		METAL THICKNESS IN INCH/GAGE								METAL THICKNESS IN INCH/GAGE							
		0.111/12	0.140/10	0.170/8	0.188/7	0.218/5	0.249/3	0.280/1	0.280/1	0.100/12	0.125/11	0.150/9	0.175/7	0.200/6	0.225/4	0.250/2	
MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE IN FEET																	
60	12	46	68	90	100	100	100	100	100	15	31	45	60	70	81	92	100
66	12	42	62	81	93	100	100	100	100	15	28	41	54	64	74	84	94
72	12	38	57	75	86	100	100	100	100	18	25	37	50	58	67	77	86
78	12	35	52	69	79	95	100	100	100	18	23	35	46	54	62	71	79
84	12	33	49	64	73	88	100	100	100	18	22	32	42	50	58	66	73
90	12	31	45	60	68	82	97	100	100	21	20	30	40	47	54	61	68
96	12	29	43	56	64	77	91	100	100	21	19	28	37	44	50	57	64
102	18	27	40	52	60	73	86	94	100	24	18	26	35	41	47	54	60
108	18	25	38	50	57	69	81	88	100	24	17	25	33	39	45	51	57
114	18	24	36	47	54	65	77	84	100	27	16	23	31	37	42	48	54
120	18	23	34	45	51	62	73	80	100	27	15	22	30	35	40	46	51
126	18	22	32	42	49	59	69	76	95	30	14	21	28	33	38	44	49
132	18	21	31	40	46	56	66	72	91	30	14	20	27	32	37	42	47
138	18	20	29	39	44	54	63	69	87	33	13	19	26	30	35	40	44
144	18	19	28	37	43	51	61	66	83	33	12	18	25	29	33	38	43
150	24	18	27	36	41	49	58	64	80	33		18	24	28	32	36	41
156	24	17	26	34	39	47	56	61	76	33		17	23	27	31	35	39
162	24	17	25	33	38	46	54	59	73	33			22	26	30	34	38
168	24	16	24	32	36	44	52	57	71	33			21	25	29	33	36
174	24	16	23	31	35	42	50	55	68	33			20	24	28	31	35
180	24	15	22	30	34	41	48	53	66	33				23	27	30	34
186	24	15	22	29	33	40	47	51	64	33				22	26	29	33
192	24		21	28	32	38	45	50	62	36					25	28	32
198	30		20	27	31	37	44	48	60	36					24	28	31
204	30		20	26	30	36	43	47	58	36					23	27	30
210	30		19	25	29	35	41	45	56	36						26	29
216	30			25	28	34	40	44	54	36						25	28
222	30			24	27	33	39	43	53	36							27
228	30			23	27	32	38	42	51	36							27
234	30			23	26	31	37	41	50								
240	36				25	31	36	40	49								
246	36				25	30	35	39	48								
252	36					29	34	38	46								
258	36					28	34	37	45								
264	36					28	33	36	44								
270	36					27	32	35	43								
276	36						31	34	42								
282	36						31	34	41								
288	36						30	33	40								
294	42							32	40								
300	42							32	39								
306	42							31	38								

NOTE:

1. Fabricate the bottom plates one (1) thickness heavier than the side plates but not heavier than 0.280 inch for steel or 0.250 inch for aluminum.
2. 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.
3. 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.



S
 I
 $S = 1/2$ for $1/2:1$ fill slopes
 $S = 2$ for $2:1$ of flatter slopes

END TREATMENT DIAGRAM

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

STANDARD
STRUCTURAL PLATE
PIPE CULVERT

STANDARD APPROVED FOR USE 12/93

NO SCALE

REVISED: 4/94

STANDARD

603-1

STATE	PROJECT	SHEET NO.
AK	PFH 39-1(3)	E.20

By:	Date:
Designed:	
DRAWN:	
Checked:	
Approved:	

BLANKS.DGN

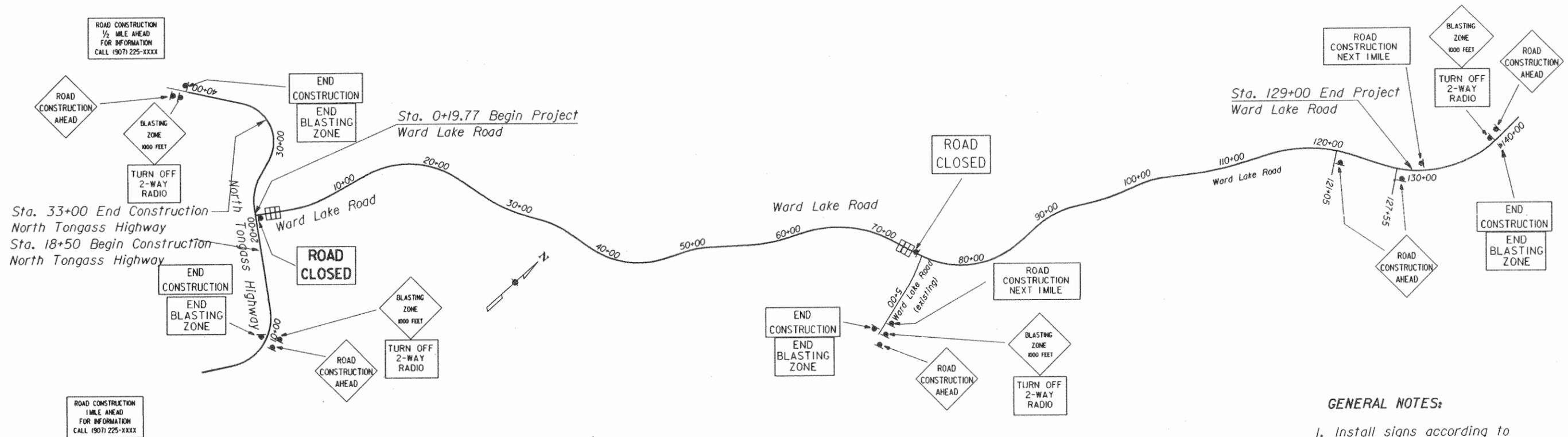
This sheet intentionally left blank

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

BLANK
 SHEET

Date:	8/94
By:	P. ANDERSON
Designed:	P. ANDERSON
CADD:	P. ANDERSON
Checked:	
Approved:	

AF0393WA.DGN



PLAN

GENERAL NOTES:

1. Install signs according to Construction Signs Drawing 92-635-2

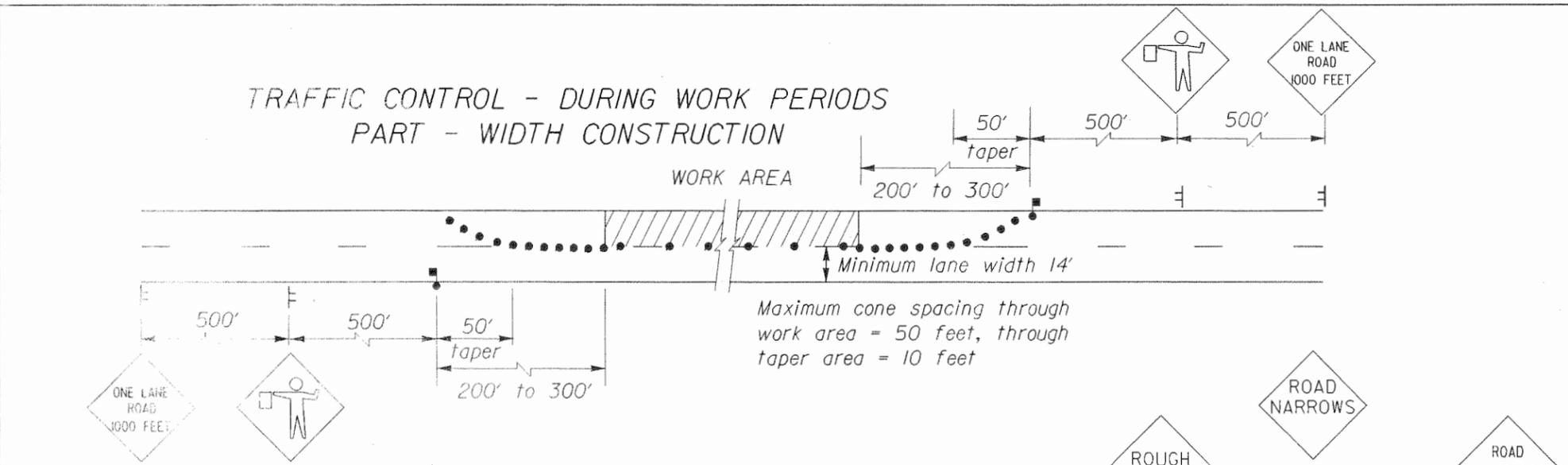
SYMBOLS

- ▶ Post Mounted Sign
- ▬ Type III Barricade

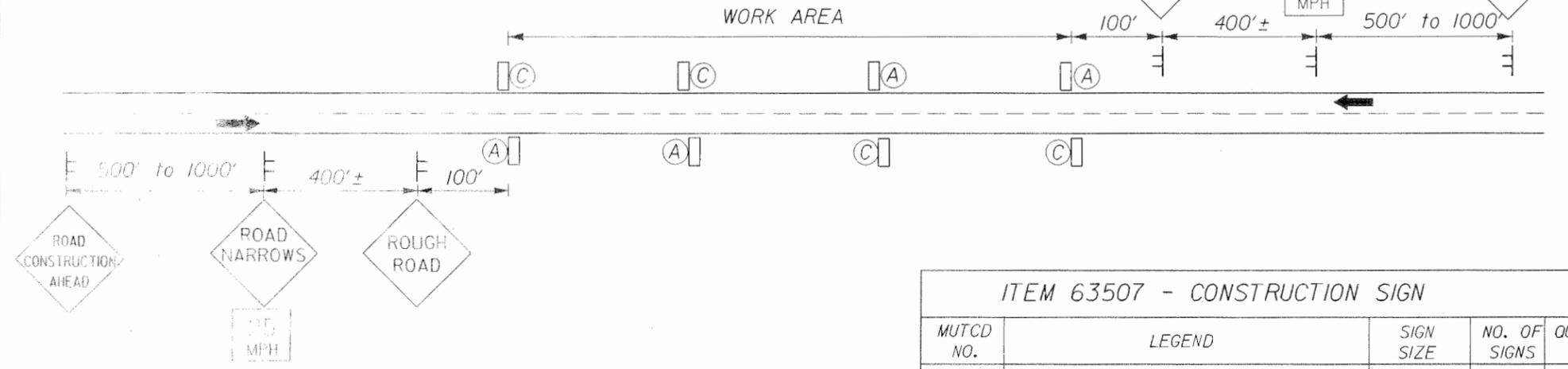
U. S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 WESTERN FEDERAL LANDS HIGHWAY DIVISION
 VANCOUVER, WASHINGTON

**TEMPORARY
 TRAFFIC CONTROL**

TRAFFIC CONTROL - DURING WORK PERIODS
PART - WIDTH CONSTRUCTION



TRAFFIC CONTROL - DURING NON-WORK PERIODS



SYMBOLS

- ▬ Post Mounted Sign
- ⊢ Portable Sign
- Flagger Location
- Cone
- Type I Barricade
- ▤ Type III Barricade
- ⊙ Warning light, type A
- ⊙ Warning light, type C

GENERAL NOTES:

1. Install signs according to Construction Signs Drawing 92-635-2
2. See sheet F.1 for advance project signing requirements

BY: DCP:et
 DESIGNED: P. ANDERSON 8.94
 CHECKED: P. ANDERSON 4.95
 DATE: 10/1/94

ITEM 63507 - CONSTRUCTION SIGN

MUTCD NO.	LEGEND	SIGN SIZE	NO. OF SIGNS	QUANTITY sq ft
	ROAD CONSTRUCTION 1 MILE AHEAD FOR INFORMATION CALL (907) 225-XXXX	60" x 48"	1	20
	ROAD CONSTRUCTION 1/2 MILE AHEAD FOR INFORMATION CALL (907) 225-XXXX	60" x 48"	1	20
W20-1	ROAD CONSTRUCTION AHEAD	48" x 48"	10	160
G20-2	END CONSTRUCTION	60" x 24"	4	40
G20-1	ROAD CONSTRUCTION NEXT 1.0 MILES	60" x 36"	2	30
W20-7a	FLAGGER SYMBOL	36" x 36"	8	72
W8-1U	BUMP	30" x 30"	4	25
W8-8U	ROUGH ROAD	30" x 30"	4	25
W20-4	ONE LANE ROAD 1,000 FEET	48" x 48"	6	96
W8-6U	TRUCK CROSSING	30" x 30"	4	25
W5-1	ROAD NARROWS	36" x 36"	4	36
W13-1	25 MPH	18" x 18"	4	9
G20-4 U	PILOT CAR FOLLOW ME	36" x 18"	2	9
W21-2U	FRESH OIL	30" x 30"	4	25
W21-3U	ROAD MACHINERY AHEAD	36" x 36"	2	18
W21-6U	SURVEY CREW	30" x 30"	2	12.5
R11-2	ROAD CLOSED	48" x 30"	2	20
W22-1	BLASTING ZONE 1000 FEET	48" x 48"	4	64
W22-2	TURN OFF 2-WAY RADIO	42" x 36"	4	42
W22-3	END BLASTING ZONE	42" x 36"	4	42
			Totals	790.5

U Not shown on plans, use as required.

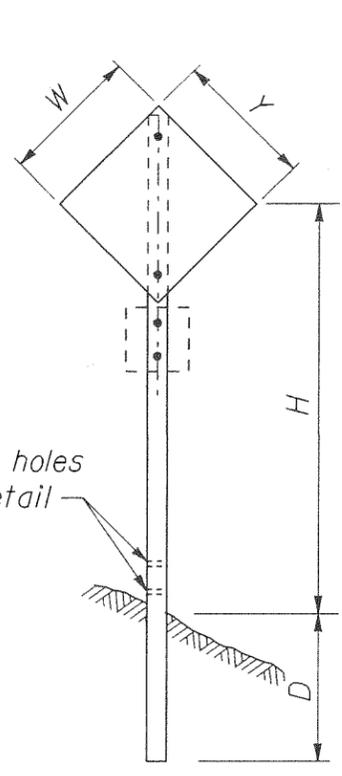
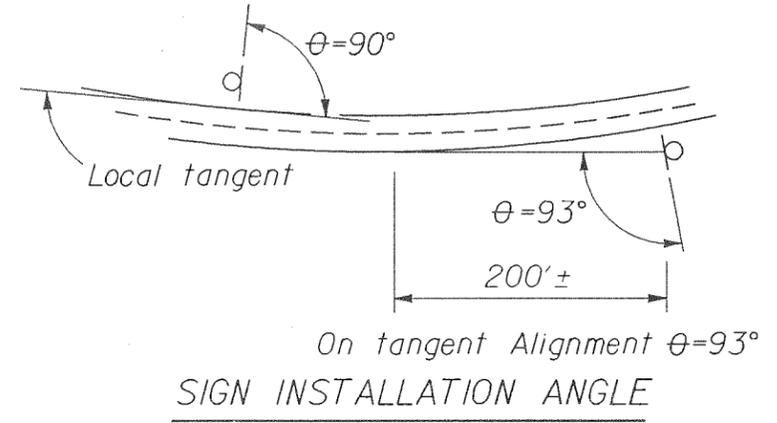
TRAFFIC CONTROL DEVICES		
QUANTITIES		
Item 63505A	Barricade, type I	50 each
Item 63505B	Barricade, type III	10 each
Item 63506	Cone, type 26 inch	50 each
Item 63507	Construction sign	790.5 sq. ft.
Item 63509	Flagger	5000 hour
Item 63510	Pilot car	120 hour
Item 63521A	Warning light, type A	20 each
Item 63521B	Warning light, type C	30 each
Item 63559	Traffic control laborer	900 hour

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

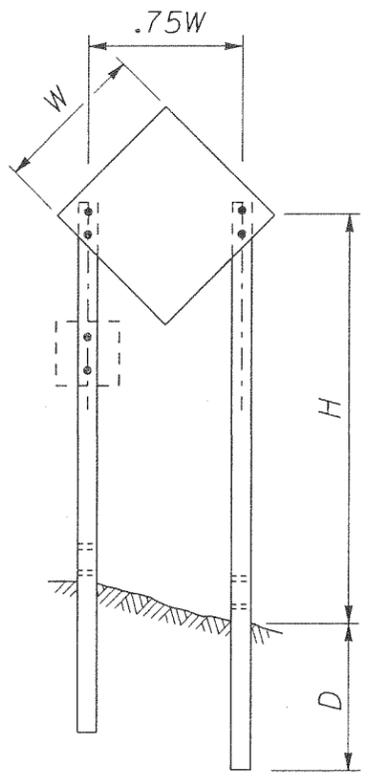
TEMPORARY
TRAFFIC CONTROL

NOTES:

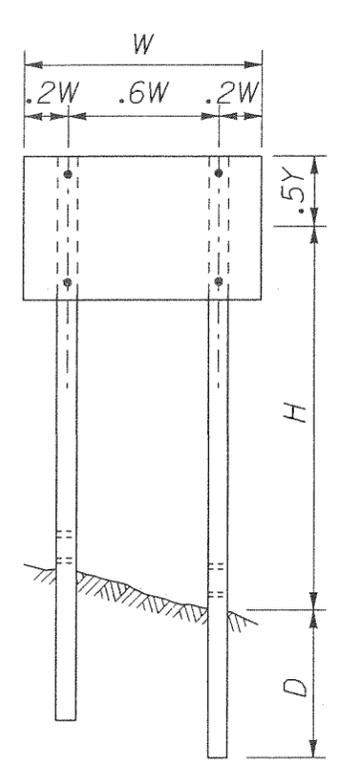
1. Install signs in relation to the road according to Part VI of the MUTCD
2. Attach sign panels with a minimum of 2-1/4"φ bolts per post
3. Mount signs smaller than listed on 1-4"x4" post.



SINGLE POST SIGN



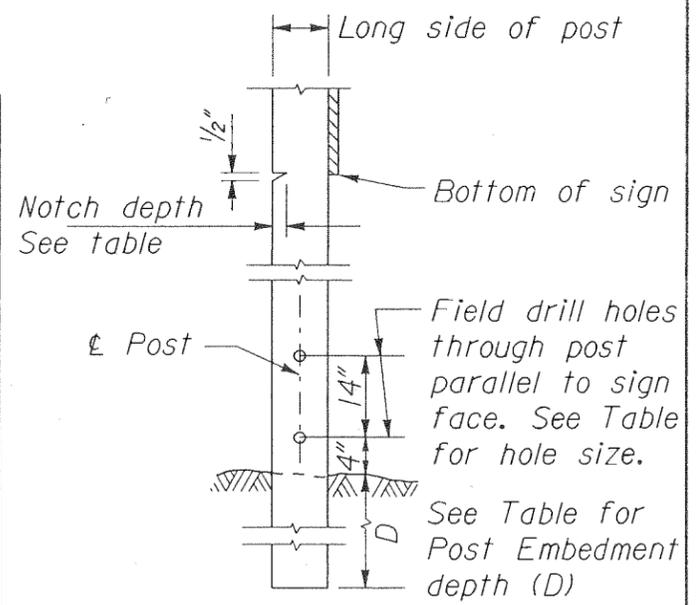
TWO POST SIGN



TWO POST SIGN
(Rectangular)

WOOD POST INSTALLATION TABLE

SIGN SHAPE	W x Y	GROUNDLINE TO CENTER OF SIGN HEIGHT (H)									
		H IS 10' OR LESS					H IS GREATER THAN 10'				
		NUMBER OF POSTS	POST SIZE	D	HOLE SIZE	NOTCH DEPTH	NUMBER OF POSTS	POST SIZE	D	HOLE SIZE	NOTCH DEPTH
	30" x 30"	1	4" x 4"	36"	0	0	1 or 2	4" x 6" 4" x 4"	48" 36"	1.5" 0	0
		1 or 2	4" x 6" 4" x 4"	48" 36"	1.5" 0	0	1 or 2	4" x 6" 4" x 4"	48" 36"	1.5" 0	0
	48" x 48"	1	4" x 6"	48"	1.5"	0	1 or 2	6" x 8" 4" x 6"	48" 48"	3.0" 1.5"	0 1.75"
		1	4" x 6"	48"	1.5"	0	1 or 2	6" x 8" 4" x 6"	48" 48"	3.0" 1.5"	0 1.75"
	60" x 24"	2	4" x 4"	36"	0	0	2	4" x 4"	36"	0	0
	60" x 36"	2	4" x 4"	36"	0	0	2	4" x 6"	48"	1.5"	1.75"



POST DETAIL

Date: _____

By: _____

Designed: _____

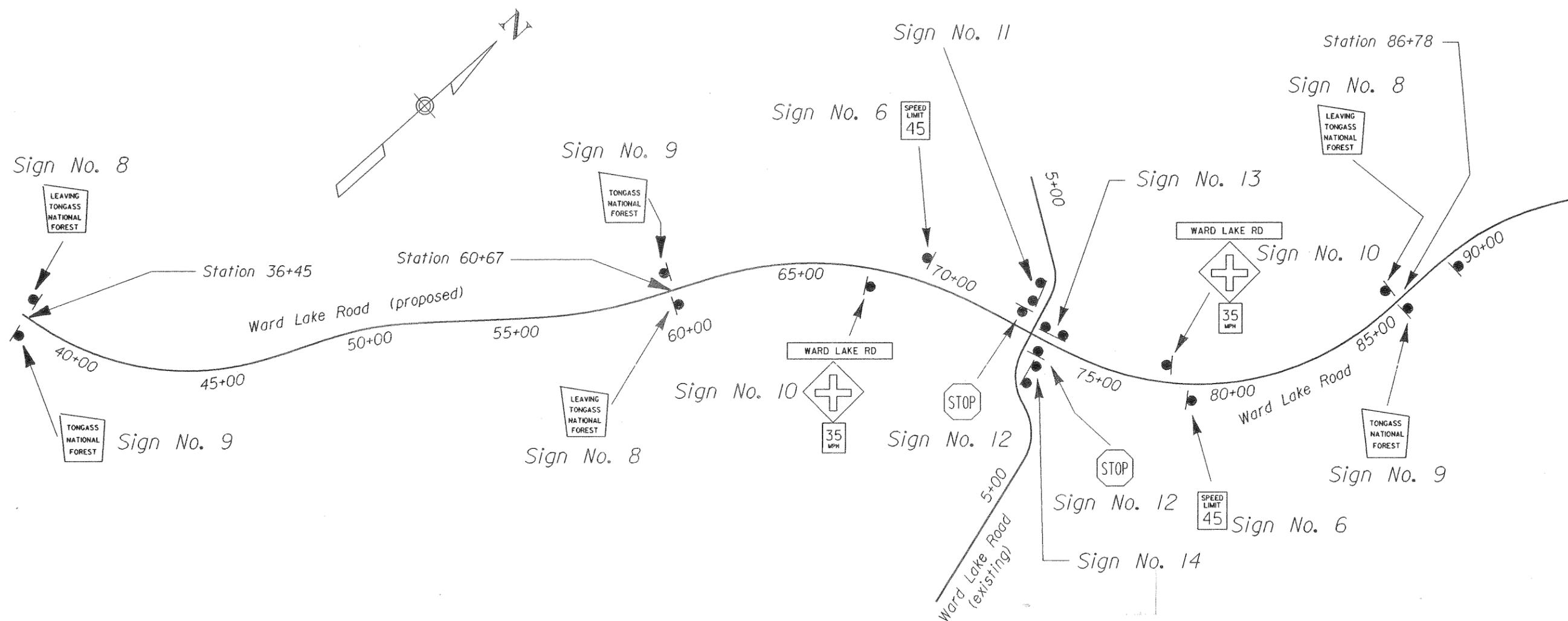
CADD: _____

Checked: _____

Approved: _____

AF039/NA.DGN

Date:	REvised 1/96
By:	P. Anderson
Designed:	P. Anderson
CADD:	3/95
Checked:	
Approved:	



SYMBOLS

- - Post mounted sign
- - Post mounted sign (2 Posts)

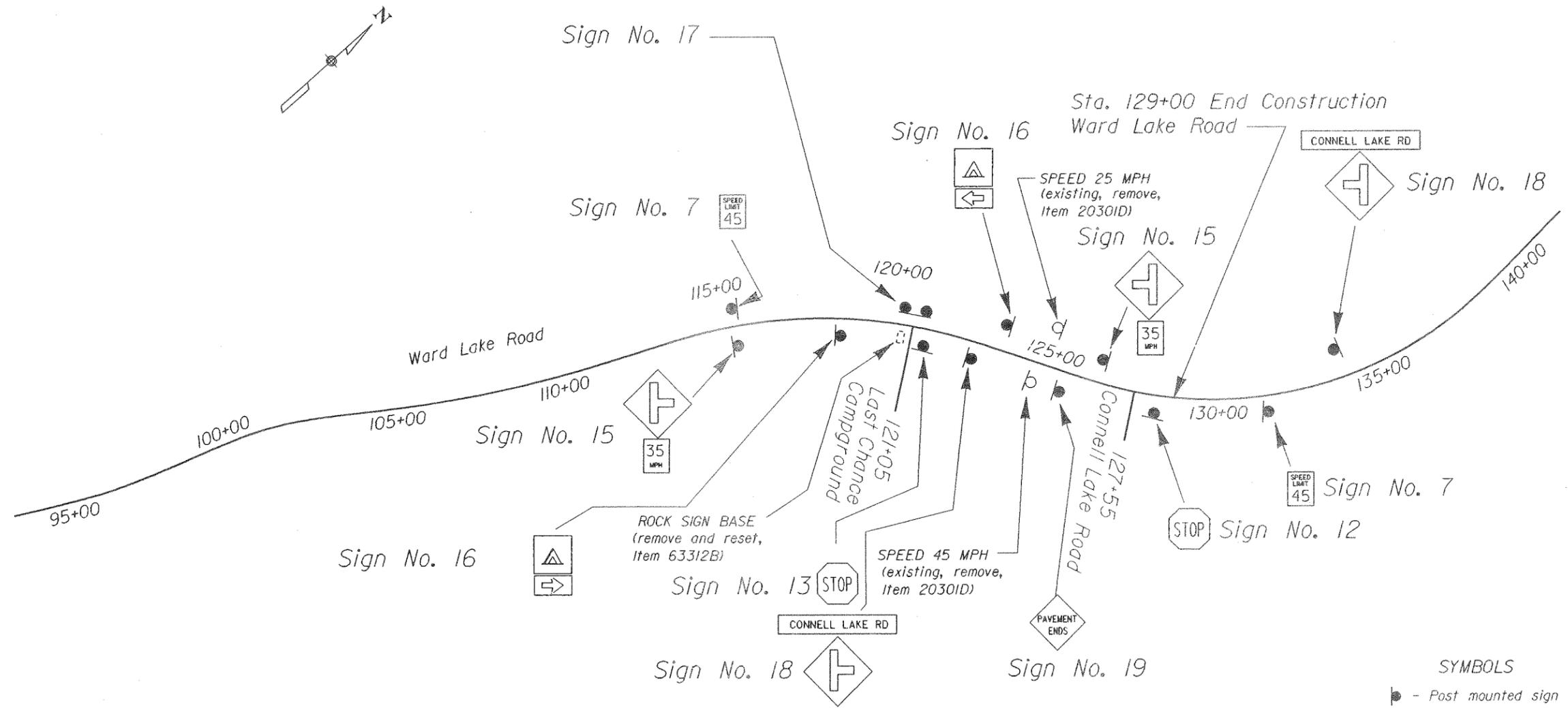
GENERAL NOTES:

1. Determine sign post lengths in the field prior to ordering.
2. Location of Signs 11, 13 and 14 will be determined in the field by the C.O.
3. Install signs according to sheet F.9-13 and part 2 of MUTCD
4. See Sheets F.7-8 for sign details and quantities

**PERMANENT TRAFFIC
SIGNING**

AF0393PB.DGN

By:	Date:
P. Anderson	3/95
CADD:	Checked:
P. Anderson	3/95
Approved:	



GENERAL NOTES:

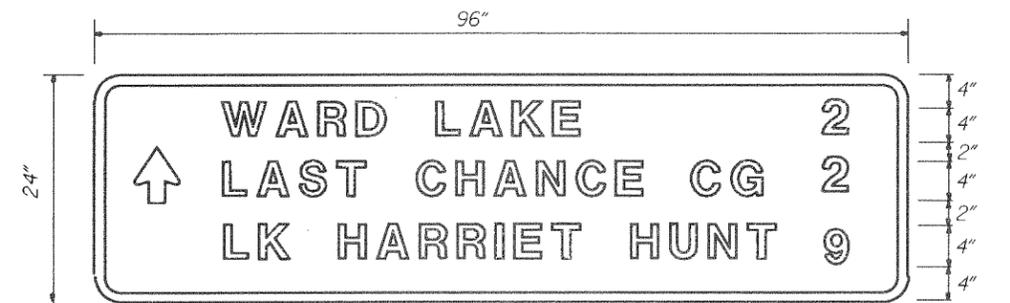
1. Sign post lengths shall be determined in the field prior to ordering.
2. Install signs according to sheet F.9-13 and part 2 of MUTCD
3. See Sheets F.7-8 for sign details and quantities

SYMBOLS

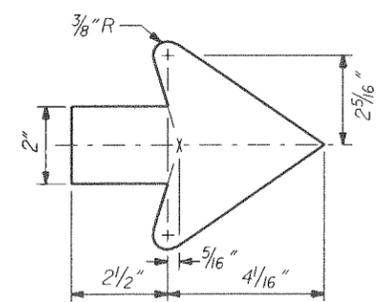
- - Post mounted sign
- - Post mounted sign (2 Posts)

PERMANENT TRAFFIC SIGNING

AF0393PB.DGN

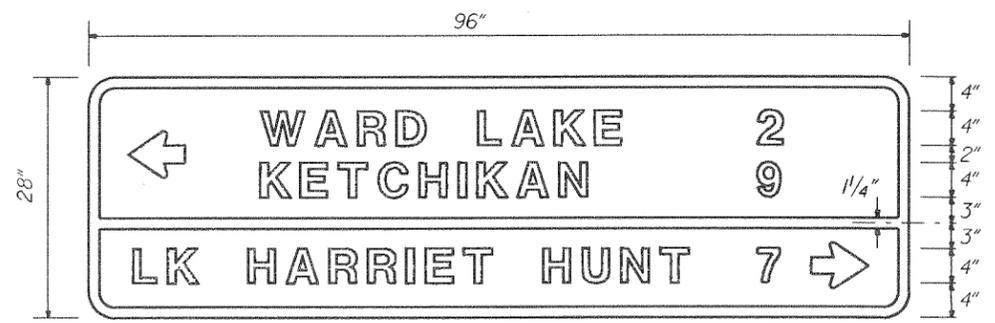


Sign No. 7



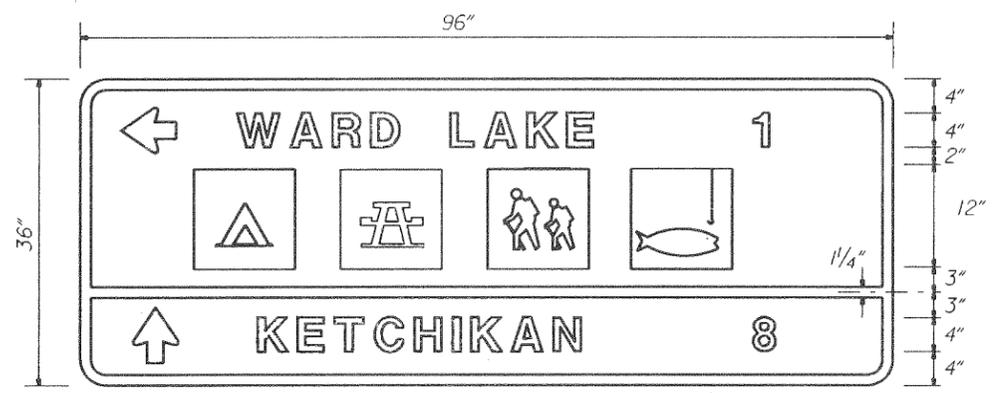
DETAIL

Arrow for Signs
7, 11, 13, 14 and 17



Sign No. 17

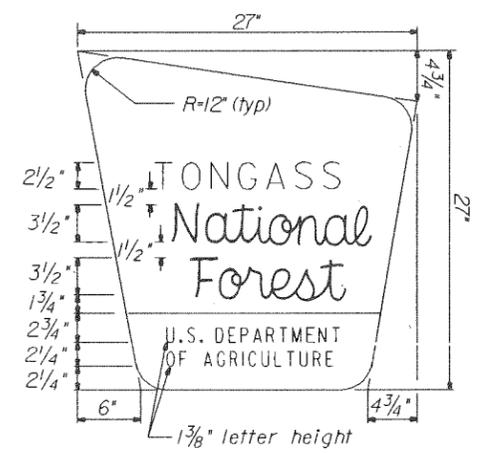
By:	Date:
P. Anderson	8/94
P. Anderson	3/95
Designed:	Revised 1/96
CADD:	
Checked:	
Approved:	



Sign No. 11

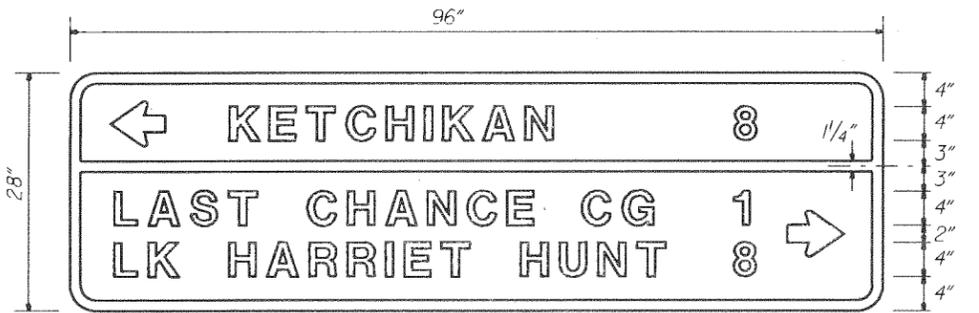


Sign No. 8



DETAIL

Signs No. 8 and 9
Construct from Fiberglass

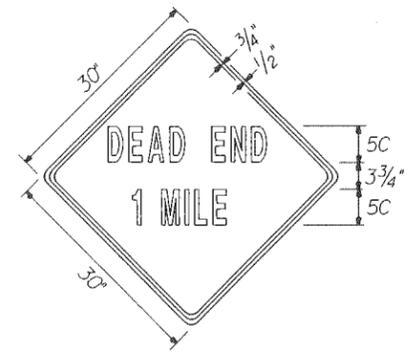


Sign No. 13

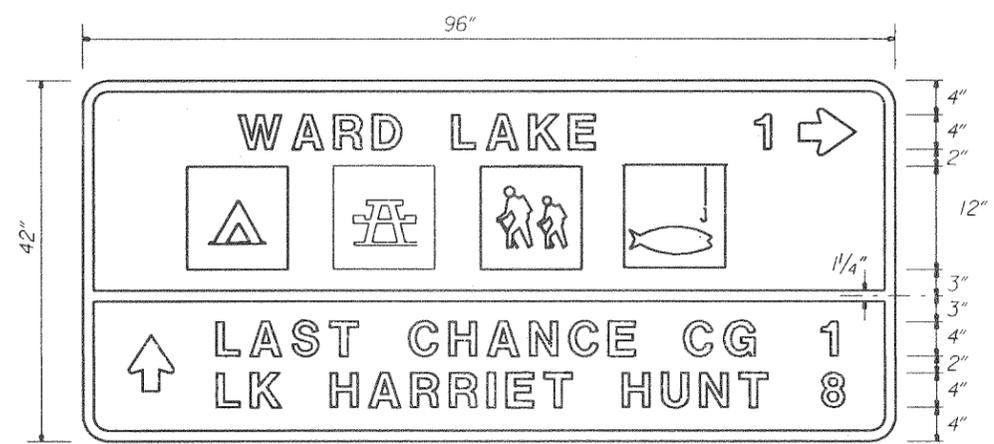


DETAIL

Sign No. 4
Fabricate
arrow right
arrow left



DETAIL
Sign No. 3



Sign No. 14

**PERMANENT TRAFFIC
SIGNING**

ITEM 63302 - SIGN INSTALLATION

PLAN SIGN NUMBER	MUTCD NUMBER	LEGEND	SIGN SIZE	No. of signs	QUANTITY (sq. ft.)	No. of posts	Post type	PLAN SIGN NUMBER	MUTCD NUMBER	LEGEND	SIGN SIZE	No. of signs	QUANTITY (sq. ft.)	No. of posts	Post type	
1	RM-010	CAMPING SYMBOL	1/ 24" X 24"	1	4.00	1	3" TS	10	W2-1	CROSS ROAD	30" X 30"	2	12.50	1	2 1/2" PT	
	RL-100	HIKING SYMBOL	1/ 24" X 24"	1	4.00				WI3-1	35 MPH ADVISORY PLATE	18" X 18"	2	4.50			
	RW-050	FISHING SYMBOL	1/ 24" X 24"	1	4.00				WARD LAKE RD	3/ 42" X 6"	2	3.50				
	RM-120	PICNICING SYMBOL	1/ 24" X 24"	1	4.00			11	SPECIAL	↔ WARD LAKE	1	96" X 36"	1	24.00	2	2 1/2" PT
	M6-3	ARROW	1/ 21" X 15"	1	2.19					↑	KETCHIKAN	8				
2	RI-1	STOP	30" X 30"	1	6.25	1	2 1/2" PT	12	RI-1	STOP	30" X 30"	4	25.00	1	2 1/2" PT	
	D-3	WARD LAKE RD	2/ 42" X 6"	1	1.75				↔ KETCHIKAN	8	96" X 28"	1	18.67			2 1/2" PT
	D-3	NO TONGASS HWY	2/ 48" X 6"	1	2.00				↔ LAST CHANCE CG	1						
3	WI4-1	DEAD END 1 MILE	4/ 30" X 30"	1	6.25	1	2 1/2" PT	13	SPECIAL	↔ KETCHIKAN	8	96" X 28"	1	18.67	2 1/2" PT	
	D-3	REVILLA RD	5/ 72" X 12"	2	12.00				↔ WARD LAKE	1	96" X 42"	1	28.00	3		2 1/2" PT
4	RM-010	CAMPING SYMBOL	1/ 24" X 24"	2	8.00	1	3" TS	14	SPECIAL	↑	LAST CHANCE CG	1				
	RL-100	HIKING SYMBOL	1/ 24" X 24"	2	8.00					↔	LK HARRIET HUNT	8				
	RW-050	FISHING SYMBOL	1/ 24" X 24"	2	8.00					↔	WARD LAKE	1	96" X 28"	1	18.67	2 1/2" PT
	RM-120	PICNICING SYMBOL	1/ 24" X 24"	2	8.00					↔	WARD LAKE	1	96" X 28"	1	18.67	
	M6-1	ARROW	1/ 21" X 15"	2	4.38					↔	WARD LAKE	2	96" X 28"	1	18.67	2 1/2" PT
5	RI-1	STOP	30" X 30"	1	6.25	1	2 1/2" PT	16	W2-2	SIDE ROAD	30" X 30"	2	12.50	1	2 1/2" PT	
	D-3	REVILLA RD	2/ 36" X 6"	1	1.50				WI3-1	35 MPH ADVISORY PLATE	18" X 18"	2	4.50			
	D-3	NO TONGASS HWY	2/ 48" X 6"	1	2.00				RM-010	CAMPING SYMBOL	1/ 24" X 24"	2	8.00			
6	R2-1	SPEED LIMIT 45	24" X 30"	5	25.00	1	2 1/2" PT	17	SPECIAL	↔	WARD LAKE	2	96" X 28"	1	18.67	
7	SPECIAL	WARD LAKE 2 LAST CHANCE CG 2 LK HARRIET HUNT 9	96" X 24"	1	16.00	2	2 1/2" PT			↔	KETCHIKAN	9				
8		LEAVING TONGASS NATL FOREST	1/ 27" X 27"	3	15.19	1	2 1/2" PT	18	W2-2	SIDE ROAD	30" X 30"	2	12.50	1	2 1/2" PT	
		TONGASS NATL FOREST	1/ 27" X 27"	3	15.19					1	2 1/2" PT	↔	CONNELL LAKE RD			3/ 54" X 6"
9		TONGASS NATL FOREST	1/ 27" X 27"	3	15.19	1	2 1/2" PT	19	W8-3	PAVEMENT ENDS	30" X 30"	1	6.25	1	2 1/2" PT	
												TOTAL	351.42			

Post type legend:

2 1/2" PT = 2 1/2" x 2 1/2" perforated steel tubing, 0.105" wall thickness
 3" TS = 3" x 3" x 3/16" steel tubing with slip base, see Sheet F.13

FOOTNOTES:

- 1/ Color white on brown, reflective.
- 2/ Color white on green, reflective.
Lettered on both sides, see mounting bracket detail Sheet F.II.
- 3/ Fabricate from extruded aluminum.
- 4/ Furnish with post and sleeve.
Sign to be installed by others.
- 5/ Color white on green, reflective.
Lettered on one side, see mounting bracket detail Sheet F.II.
- 6/ Install with wind brace, see detail Sheets F.9 and F.II
- 7/ Construct from Fiberglass
Color yellow-cream on brown, non-reflective.

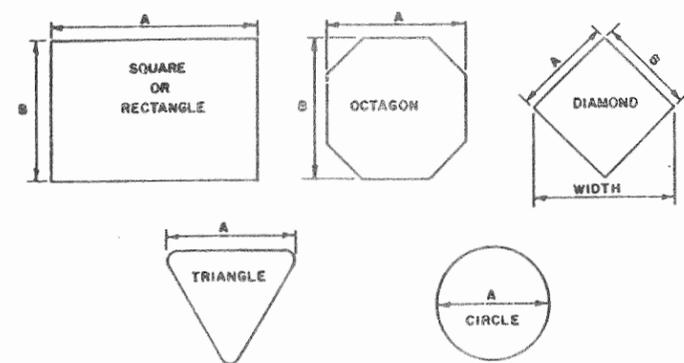
GENERAL NOTES:

- Lettering for road names based on Alaska DOT/PF Sign Design Specifications manual.
- Lettering for road names, signs 2, 5, 10 and 18, Series C, 4" height, upper case.
- Lettering for road name, sign 4
6" height upper case, 4 1/2" lower case.

**PERMANENT TRAFFIC
SIGNING**

METRIC CONVERSION
 1" = exactly 25.4 mm (millimeters)
 1'-0" = exactly 0.3048 m (meters)

S - 00.00



LIGHT SIGNS

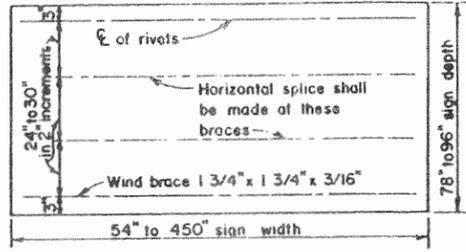
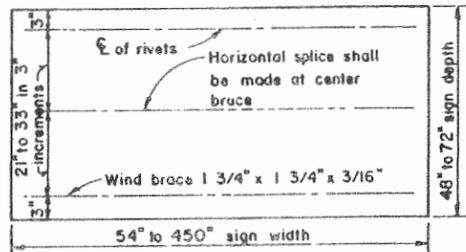
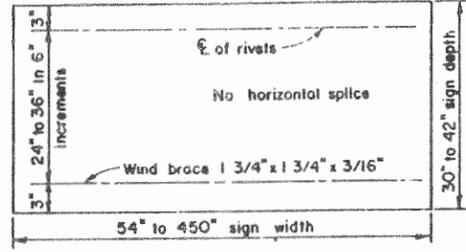
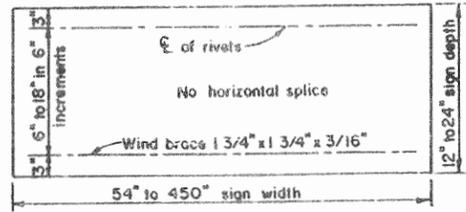
Maximum unframed alloy 6061-T6 aluminum sign blank per installation for light sign structure single and double post.

Sign Shapes	Thickness inches	Single Post		Double Post		Sign Width	Post Spacing
		A	B	A	B		
Squares	0.080"	36"	36"	60"	60"	12"	7"
Shields	0.100"	42"	42"	72"	72"	18"	11"
Rta. Markers	0.125"	54"	54"	90"	90"	24"	14"
Rectangles	0.080"	36"	96"	60"	96"	30"	18"
	0.100"	42"	84"	72"	96"	36"	22"
	0.125"	54"	66"	90"	78"	42"	25"
	0.080"	30"	30"	48"	48"	48"	29"
Diamonds	0.100"	36"	36"	54"	54"	54"	32"
	0.125"	42"	42"	66"	66"	60"	36"
Triangles	0.080"	42"		72"		66"	40"
	0.100"	54"		90"		72"	43"
Round & Octagons	0.125"	60"		96"		78"	47"
	0.080"	42"		72"		84"	50"
	0.100"	54"		90"		90"	54"
	0.125"	60"		96"		96"	58"

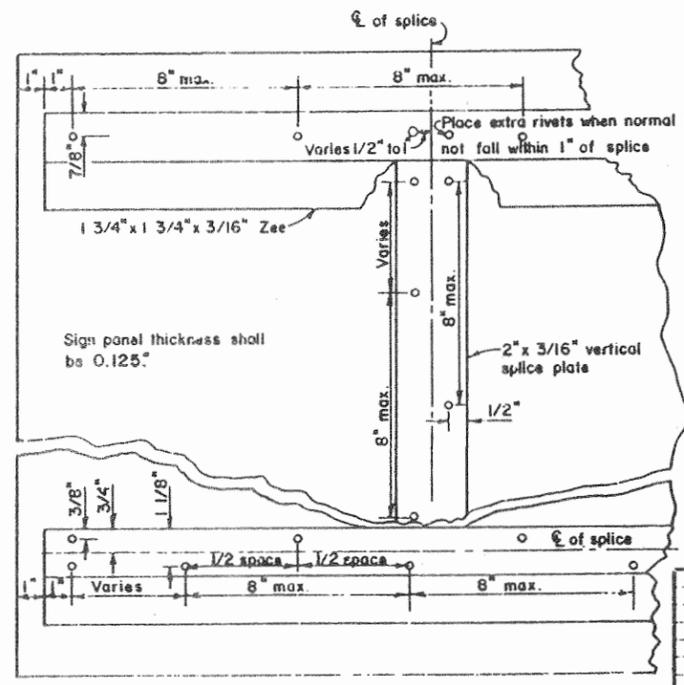
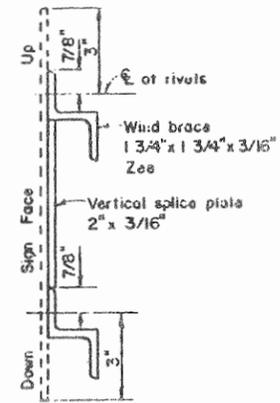
Heavy sign structure and multi-post spacing

Sign Width	No. of Post	Post Spacing		
		Overhang	Between Post	Overhang
12 1/2'	2	0.2W	1 space at 0.6W	0.2W
13' to 21 1/2'	3	0.15W	2 spaces at 0.35W	0.15W
22' to 30'	4	0.125W	3 spaces at 0.25W	0.125W
30' to 37 1/2'	5	0.1W	4 spaces at 0.2W	0.1W

Heavy sign structures shall require framing.



HEAVY SIGN STRUCTURE



RIVET DETAIL FOR ZEE WIND BRACE & SPLICE PLATE

GENERAL NOTES

- Aluminum alloy 6061-T6 shall be used for sign sheets and extruded zeos.
- Rivets shall be 3/16" diameter conforming to aluminum alloy 6061-T6 for cold driven rivets, or aluminum alloy 6061-T43 for hot driven rivets.
- Alternative to zee wind brace as shown may be substituted with approval of the engineer if the alternative equals or exceeds in strength the design shown.
- Extruded sign panels and extruded wind beams may be used if manufacturers guarantee their design is equal to or exceed strength design shown on this drawing.

Designed: ALASKA DOT&PF
 CADD:
 Checked:
 Approved:

REVISIONS		
Date	Description	By

STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 & PUBLIC FACILITIES

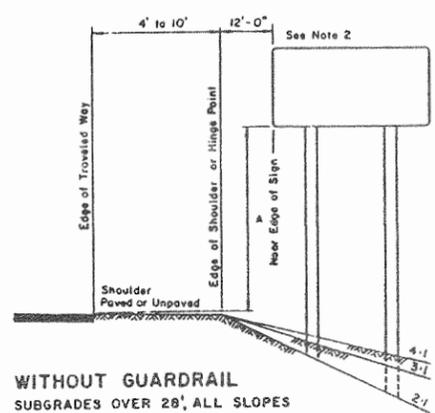
**SHEET ALUMINUM SIGN
 AND FRAMING**

Date: 7/11/02

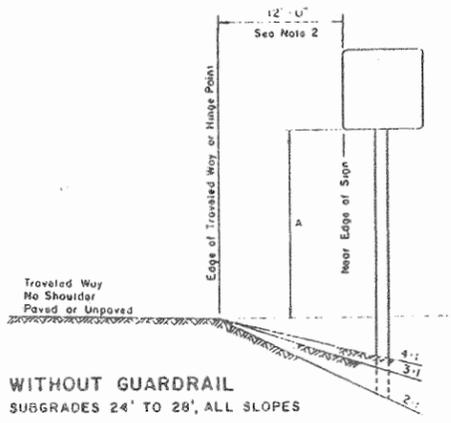
PERMANENT TRAFFIC
SIGNING

METRIC CONVERSION
 1" = exactly 25.4 mm (millimeters)
 1'-0" = exactly 0.3048 m (meters)

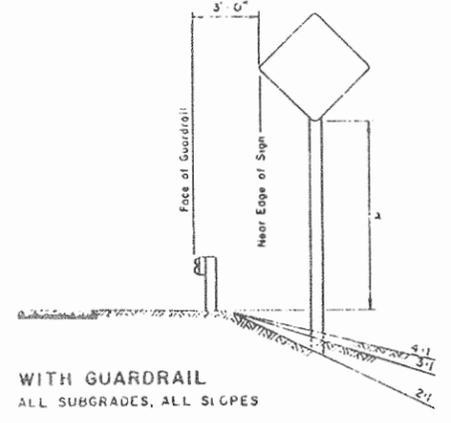
S-05.00



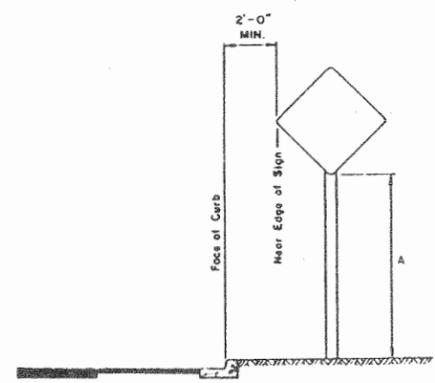
WITHOUT GUARDRAIL
 SUBGRADES OVER 28', ALL SLOPES



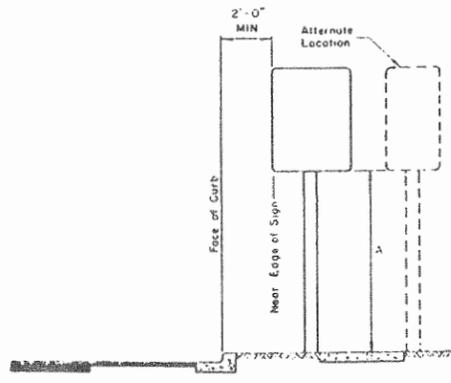
WITHOUT GUARDRAIL
 SUBGRADES 24' TO 28', ALL SLOPES



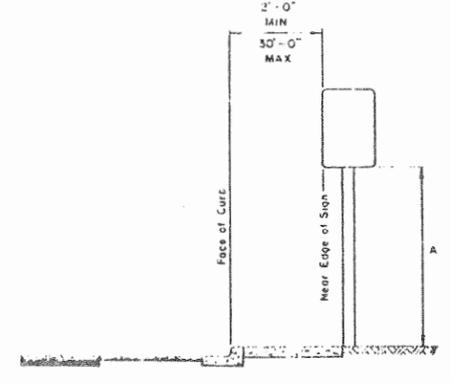
WITH GUARDRAIL
 ALL SUBGRADES, ALL SLOPES



CURB WITHOUT SIDEWALK



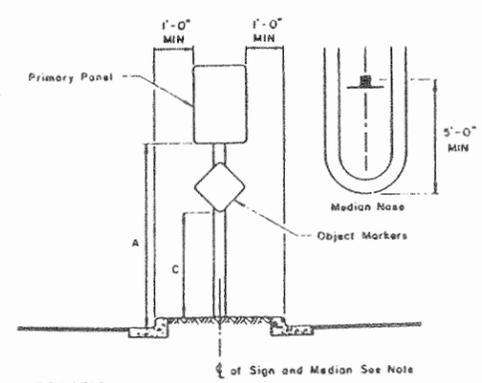
CURB WITH PARKWAY AND SIDEWALK
 (If R/W width permits, signs should be placed behind sidewalk.)



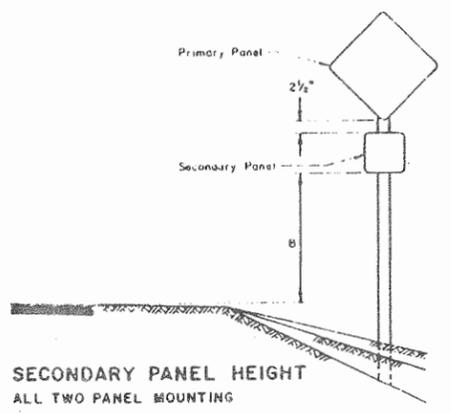
CURB WITH SIDEWALK WITHOUT PARKWAY

GENERAL NOTES:

1. Signs in median shall be placed at midpoint of median up to a maximum distance of 20ft. from Edge of Traveled Way. When appropriate, signs for opposing directions shall be placed back to back.
2. Unless shown on plans, or as directed by the engineer the standard sign offset is 12'. The minimum shall be 2'-0".
3. Where local condition requires signs over sidewalk, they shall be mounted on a single post with a cantilever or unbalance style mount and a minimum of 7'-0" clearance over sidewalk, unless noted otherwise on the plan sheet.



MEDIANS
 MINIMUM 4' WIDTH FOR SIGNING



SECONDARY PANEL HEIGHT
 ALL TWO PANEL MOUNTING

DIMENSION TABLE

ROADWAY	DIMENSION		
	A	B	C
PAVED			
RURAL	5'-0"	4'-0"	4'-0"
EXPRESSWAY	7'-0"	6'-0"	4'-0"
URBAN	7'-0"	7'-0"	4'-0"

NOTE: For Unpaved Roadway Add 0'-6" to Dimensions



SIGN POSITIONING

REVISIONS		
Date	Description	By

STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 & PUBLIC FACILITIES

SIGN LOCATION
POST MOUNTED

DATE: 11/10

PERMANENT TRAFFIC SIGNING

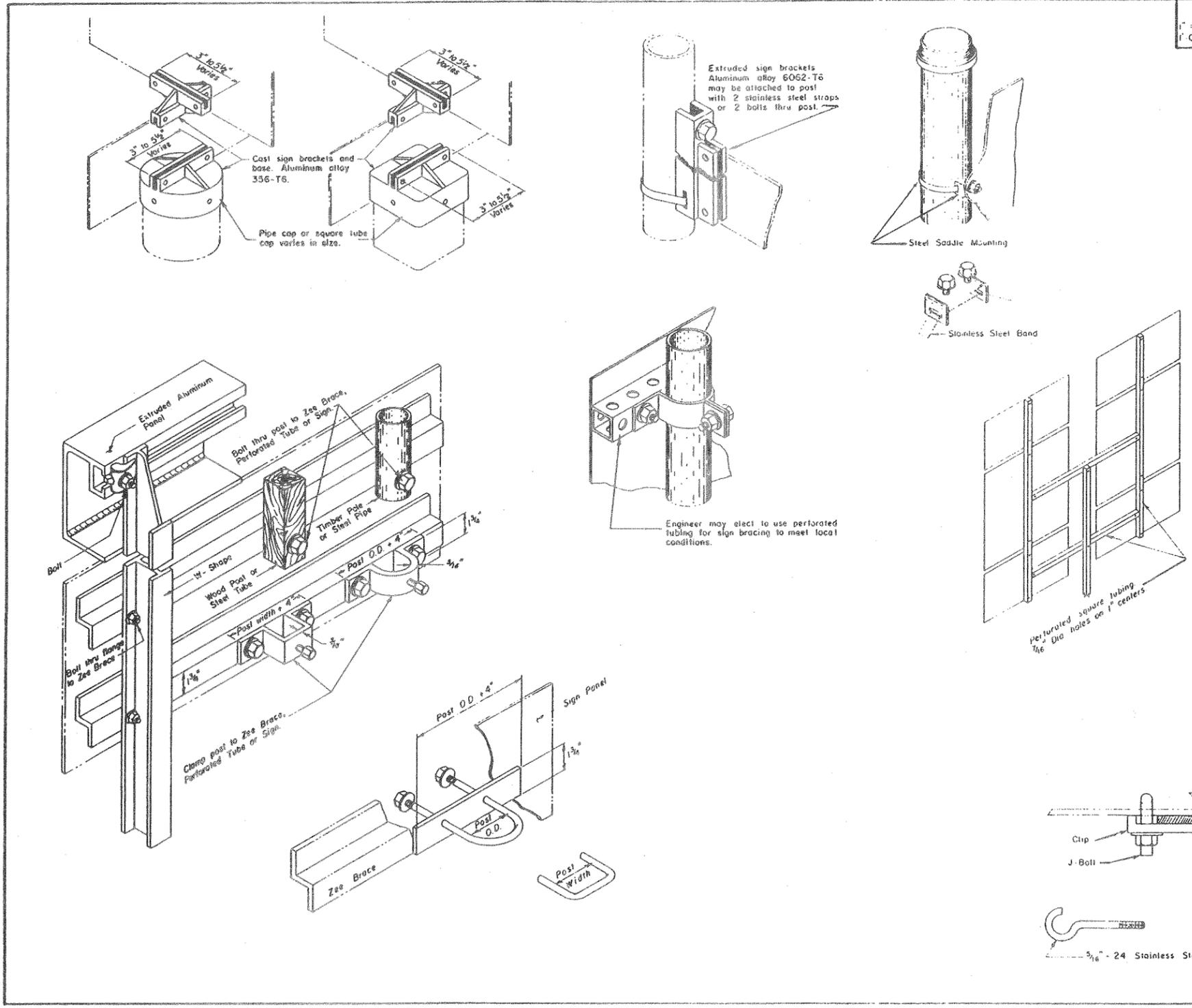
METRIC CONVERSION
 1" = exactly 25.4mm (millimeters)
 1' 0" = exactly 0.3048m (meters)

S-20.00

GENERAL NOTES

1. Details shown are to indicate general design only. Dimensions and design may vary among the manufacturers.
2. Pipe and tube post shall have a weather tight cap. Drive caps shall be used on posts being driven.
3. Top of post, mounting brackets, etc., shall have a minimum clearance of 3" from top edge of sign.
4. All sign mounting fasteners on sign face shall be painted as closely as possible in matching color to sign face.
5. All signs, zees, and braces mounted to the posts shall be attached with $\frac{3}{16}$ " bolt.
6. All steel nuts, bolts and washers shall be galvanized to A.S.T.M. A-153.
7. All aluminum nuts, bolts and washers shall be anodized.
8. Fastener specification table.

FASTENERS	STAINLESS STEEL		
	ALUMINUM	STEEL	STAINLESS STEEL
BOLTS MACHINE CARRIAGE	2024-T4	A-307	A-276
NUTS REGULAR LOCK	6061-T6 2017-T4	A-307	A-276
WASHERS	2024-T4	A-36	A-276
"J" BOLTS			A-276
POST CLIP	356-T6		



REVISIONS		
Date	Description	By

STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 & PUBLIC FACILITIES

**SIGN MOUNTING
 POST TYPE**

APPROVED

Date: 7/1/22

**PERMANENT TRAFFIC
 SIGNING**

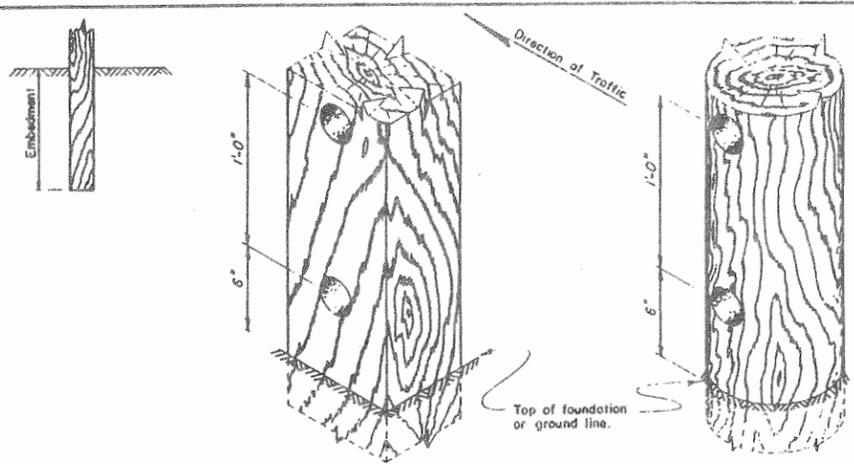
Designed: ALASKA DOT&PF
 CADD:
 Checked:
 Approved:

AF0393FB.DGN

S-30.01

GENERAL NOTES:

1. Refer to Standard Drawing "Sheet Aluminum Sign and Framing" for light sign details.
2. Type of post, size and embedment type shall be specified on plans.



POST SIZE	HOLE DIA.
4" x 6"	1 1/2"
6" x 6"	1 1/2"
6" x 8"	2 1/2"
8" x 8"	2 1/2"

POST DIA. (At ground line)	HOLE DIA.
7" to less than 8"	2"
8" " " " 9"	2 1/2"
9" " " " 10 1/2"	3"
10 1/2" " " " 12"	3 1/2"
Over 12"	4"

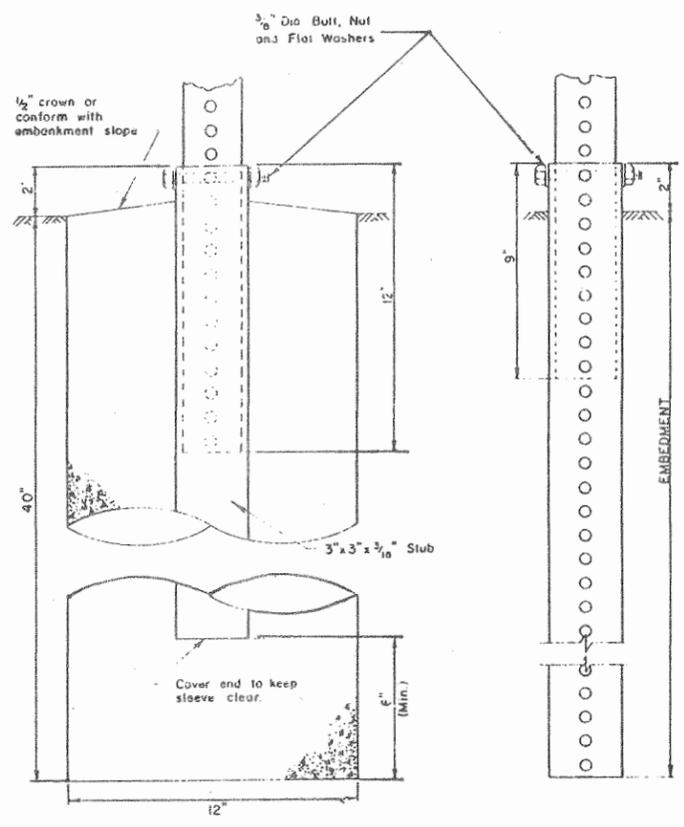
Note: If holes are field drilled after post has been treated, the holes shall be thoroughly swabbed with a 5% solution of pentachlorophenol and mineral spirits.

RECTANGULAR POST

ROUND POST

Embedment Depth For Wood Post			
POST SIZE		POORLY DRAINED SILTY SOILS	WELL DRAINED GRAVELLY SOILS
RECTANGULAR	ROUND		
4" x 4"	4 1/2"	3'-6"	3'-6"
4" x 6"	5 1/2"	5'-0"	4'-0"
6" x 6"	6 1/2"	5'-0"	4'-0"
6" x 8"	7 1/2"	7'-6"	5'-6"
8" x 8"	9"	7'-6"	5'-6"

WOODEN POST



SLEEVE TYPE
- CONCRETE FOUNDATION -

SLEEVE TYPE
- SOIL EMBEDMENT -*

Embedment Depth For Perforated Steel Tube (0.105" PST Wall Thickness)		
POST SIZE		
1 1/2" x 1 1/2"	3'-0"	2'-0"
1 3/4" x 1 3/4"	3'-0"	2'-0"
2" x 2"	3'-6"	2'-6"
2 1/2" x 2 1/2"	4'-0"	3'-0"
2 1/2" x 2 1/2"	4'-6"	3'-6"

*Use 3" x 3" x 3/16" Stub for 2 1/2" x 2 1/2" PST Applications

PERFORATED STEEL TUBE (PST) POST

REVISIONS		
Date	Description	By
11/18	Redroll - Deleted Pipe Post	206

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES

LIGHT SIGN
STRUCTURE POST
EMBEDMENT

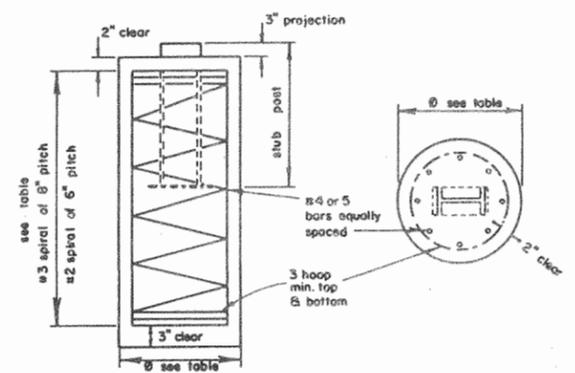
APPROVED

Sam J. Rossman

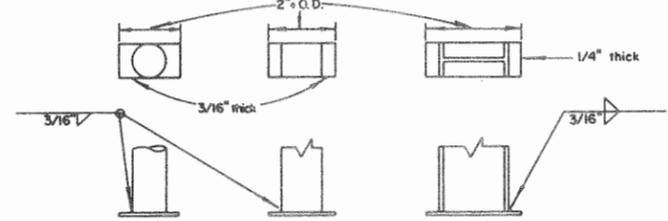
S-30.01

PERMANENT TRAFFIC SIGNING

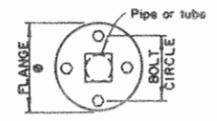
S-34.00



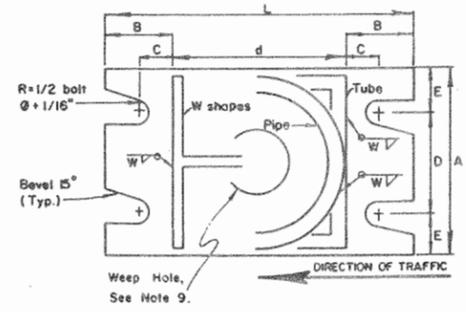
FOUNDATION AND STUB POST



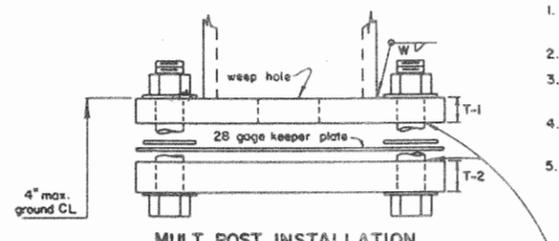
STUB POST ANCHOR PLATE



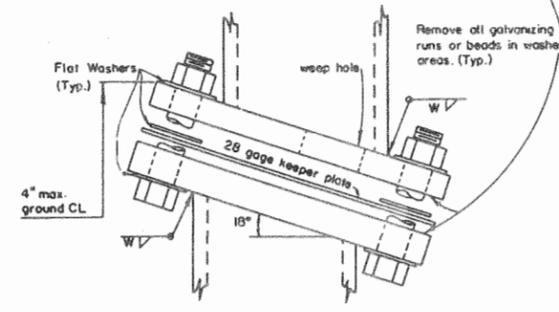
POST & STUB CONNECTION DETAIL



TOP PLATE

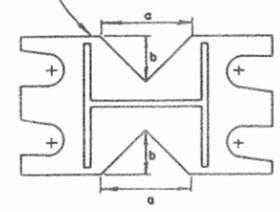


MULT. POST INSTALLATION



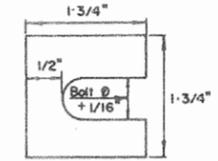
SINGLE POST INSTALLATION

Reduces weight of T-1 W6x15.5 & W6x20 by clips on sides.
W6x15.5 a=4-3/4" b=1-1/2"
W6x20 a=6" b=1-9/16"



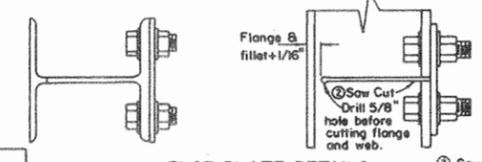
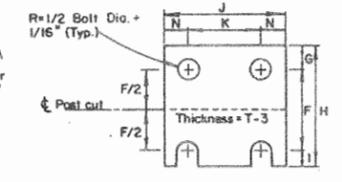
SHIM DETAIL

Furnish 2 shims 0.012" thick and 2 shims 0.032" thick per pole.



BASE CONNECTION NOTES

1. Assemble post to stub with H.S. bolts and three flat washers on each bolt as shown.
2. Shims may be used between plates to level post.
3. Tighten bolts in base plate in a systematic order to the required torque.
4. Loosen each bolt and retighten to the required torque in the same order as initial tightening.
5. Burr or center punch threads of juncture of bolt and nut to prevent nut from loosening.



FUSE PLATE DETAILS

② Saw cut shall be 4" below sign base B a minimum of 7'-0" above ground level.

FABRICATION NOTE

1. The slot, 5/8" hole in web and fuse bolt hole in flange shall be made before galvanizing. Post flange shall be saw cut after galvanizing. There is to be no galvanize between fuse plate and post flange surfaces. After fuse plate has been installed and bolts tightened, bare metal surfaces shall be painted with zinc rich paint.

FUSE PLATE DATA TABLE ①

POST	F	G	H	I	J	K	N	T-3	Ø 4
W6x12	2	1 1/8	3 5/8	1/2	4	2 1/4	7/8	1/4	1/2
W6x15.5	2 1/4	1 1/4	4 1/8	5/8	6	3 1/2	1 1/4	3/8	5/8
W6x20	2 1/2	1 3/8	4 7/8	3/4	6	3 1/2	1 1/4	3/8	3/4

* Fuse bolts shall be tightened to A.A.S.H.T.O. M164-68 tensile requirements for "Proof Load Length Measurement Method."

① All dimensions in inches.

FUSE PLATE DATA TABLE

POST TYPE & SIZE	FOUNDATION			REINFORCEMENT				STUB POST		
	Ø	MIN. DEPTH	C.Y. CONC.	VERTICAL BARS NO. SIZE LGTH.	SPIRALS SIZE LGTH.	STUB Ø	BOLT LGTH.	FLANGE Ø	BOLT CIRCLE	
1 1/2" PIPE	12"	4'-0"	0.12	6 #4 3'-7"	2 #8 27"	2'-3"	1 1/2"	5 3/8"	3"	
2" PIPE	12"	4'-0"	0.12	6 #4 3'-7"	2 #8 27"	2'-3"	1 1/2"	5 7/8"	3 1/2"	
2" TUBE	12"	4'-0"	0.12	6 #4 3'-7"	2 #8 27"	2'-3"	1 1/2"	5 1/2"	3 1/8"	
2 1/2" PIPE	12"	4'-0"	0.12	6 #4 3'-7"	2 #8 27"	2'-3"	1 1/2"	6 3/8"	4"	
3" TUBE	18"	4'-0"	0.26	6 #4 3'-7"	2 #14 48"	2'-6"				
3" PIPE	18"	4'-0"	0.26	6 #4 3'-7"	2 #14 48"	2'-6"				
3 1/2" TUBE	18"	4'-6"	0.29	6 #4 4'-1"	2 #14 51"	2'-6"				
3 1/2" PIPE	18"	4'-6"	0.29	6 #4 4'-1"	2 #14 51"	2'-6"				
4" TUBE	18"	5'-6"	0.36	6 #4 5'-1"	2 #14 59"	2'-6"				
4" PIPE	18"	5'-6"	0.36	6 #4 5'-1"	2 #14 59"	2'-6"				
5" TUBE	30"	5'-0"	0.91	7 #5 4'-7"	3 #26.5 90"	2'-6"				
5" PIPE	30"	5'-6"	1.00	7 #5 5'-1"	3 #26.5 97"	2'-6"				
W6 x 12	36"	5'-6"	1.44	8 #5 5'-1"	3 #32.5 119"	2'-6"				
W6 x 15.5	36"	6'-6"	1.70	8 #5 6'-1"	3 #32.5 128"	3'-0"				
W6 x 20	36"	7'-6"	1.96	8 #5 7'-1"	3 #32.5 145"	3'-0"				

FOUNDATION & STUB POST TABLE

POST TYPE & SIZE	TORQUE & BOLT SIZE	SLIP BASE DATA TABLE ①									
		A	B	C	D	E	L	T-1	T-2	W	
3 x 3 x 3/16 Tube		3 3/4	1 1/2	3/8	1/4	3	1	6	3/8	3/8	3/16
3 Pipe std. wt.		4 1/4	1 1/2	3/8	2 1/4	3 1/2	1	6 1/2	3/8	7/8	3/16
3 1/2 x 3 1/2 x 3/16 Tube		4 1/4	1 1/2	3/8	2 1/4	3 1/2	1	6 1/2	3/8	7/8	3/16
3 1/2 Pipe std. wt.	1/2 Ø	4 3/4	1 1/2	3/8	2 3/4	4	1	7	3/8	7/8	3/16
4 x 4 x 3/16 Tube	T=18' lbs.	4 3/4	1 1/2	3/8	2 3/4	4	1	7	3/8	7/8	3/16
4 Pipe std. wt.		5 1/4	1 1/2	3/8	3 1/4	4 1/2	1	7 1/2	3/8	7/8	3/16
5 x 5 x 3/16 Tube	3/8 Ø	5 3/4	1 3/4	1	3 3/4	5	1 1/4	8 1/2	3/8	7/8	3/16
5 Pipe std. wt.	T=38' lbs.	6 3/4	1 3/4	1	4 1/4	5 3/8	1 1/4	9 1/16	3/8	7/8	3/16
W6 x 12	3/8 Ø	4 3/4	2	1 1/8	2	6	1 3/8	10	3/8	1	3/16
W6 x 15.5	T=59' lbs.	6 3/4	2	1 1/8	4	6	1 3/8	10	3/8	1	3/16
W6 x 20	3/8 Ø T=68' lbs.	6 3/4	2 1/4	1 1/4	3 1/4	6 3/8	1 3/8	10 1/16	3/8	1 1/8	1/16

① All dimensions in inches except torque which is in foot pounds.

SLIP BASE DATA TABLE

GENERAL NOTES:

1. Post material: Steel shall conform to the requirements of A.S.T.M. A 501 for steel tubing, A.S.-T.M. A53 for steel pipe standard weight (schedule 40) and A.S.T.M. A36 for W shape beams and plates.
2. Stub post shall be of the same size and type as sign support post.
3. Shims shall be fabricated from brass shim stock conforming to A.S.T.M. B36.
4. All welding continuous and shall conform to current A.W.S. specifications.
5. Bolts, nuts, and washers shall conform to A.S.T.M. A325 and will be galvanized.
6. After fabrication, the post, fuse plate, base plates, and upper 8" of stub post shall be hot dipped galvanized.
7. Galvanizing shall conform to Alaska Standard Specification; 660-2.15.
8. Foundation placement shall conform to Alaska Standard Specification; 660-2.03.
9. Maximum diameter of weep hole cannot exceed 1/2 the inside dimension of tube or pipe post.

REVISIONS		
Date	Description	By

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES

SIGN POST, SLIP BASE & FOUNDATION DETAILS

APPROVED

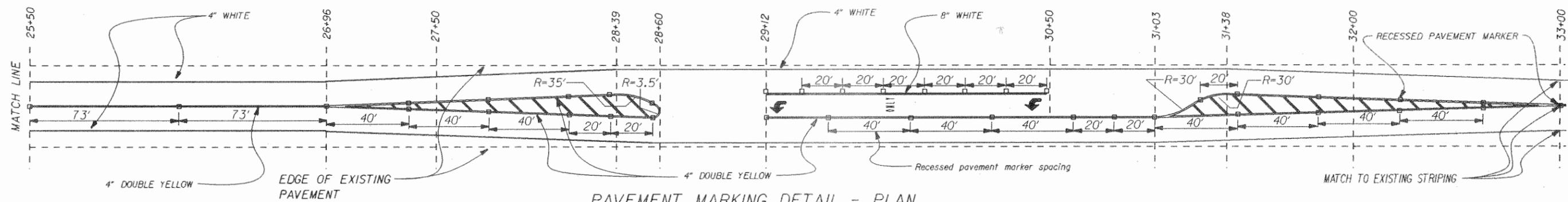
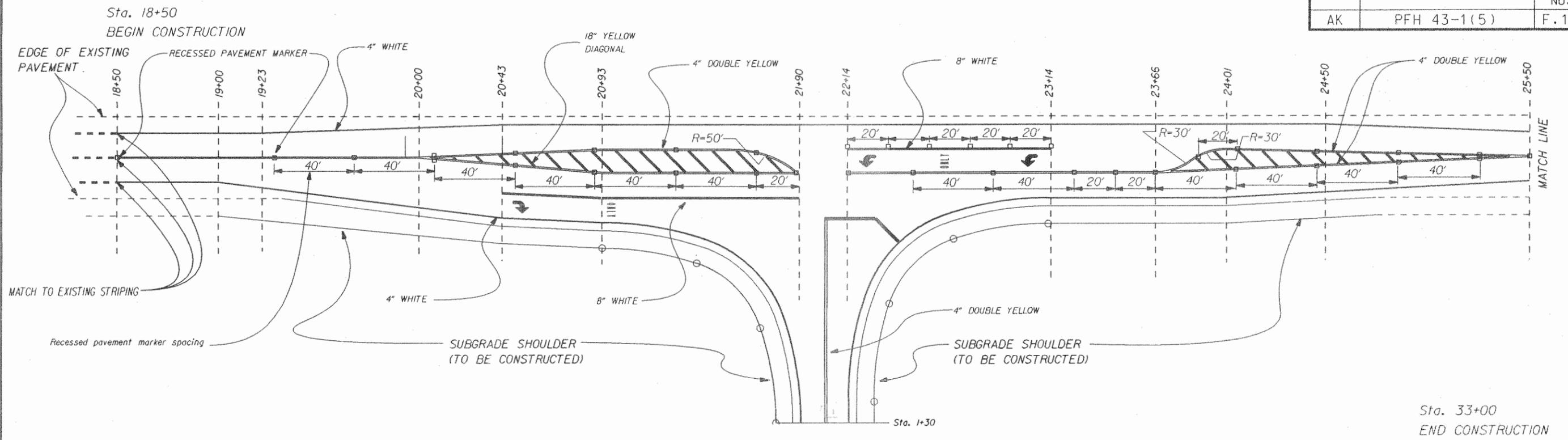
Date: 7/10/92

PERMANENT TRAFFIC
SIGNING

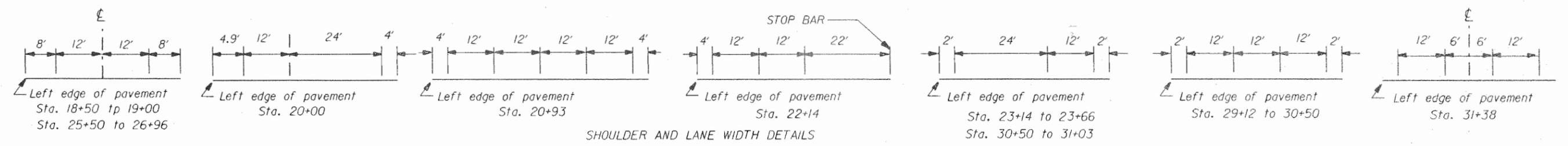
By: ALASKA DOT&PF
Designed:
CADD:
Checked:
Approved:

AF0393PB.DGN

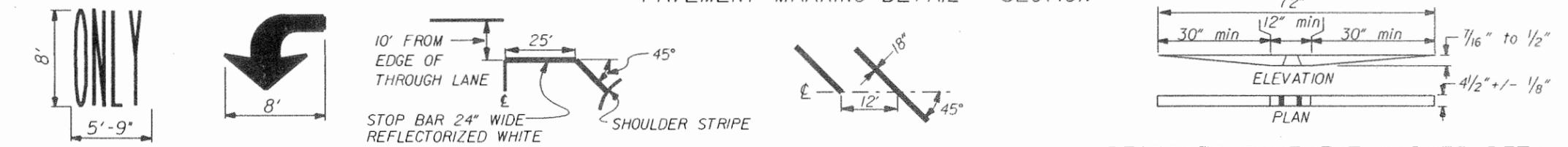
STATE	PROJECT	SHEET NO.
AK	PFH 43-1(5)	F.14



See Sheet F.15 for Quantities
See Sheet I.2 for turn lane Sta. 73+00 right.



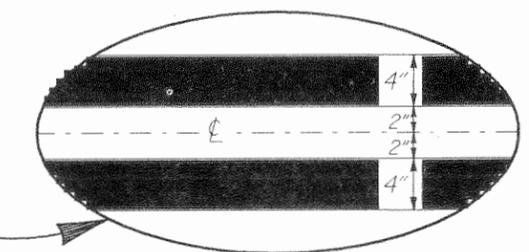
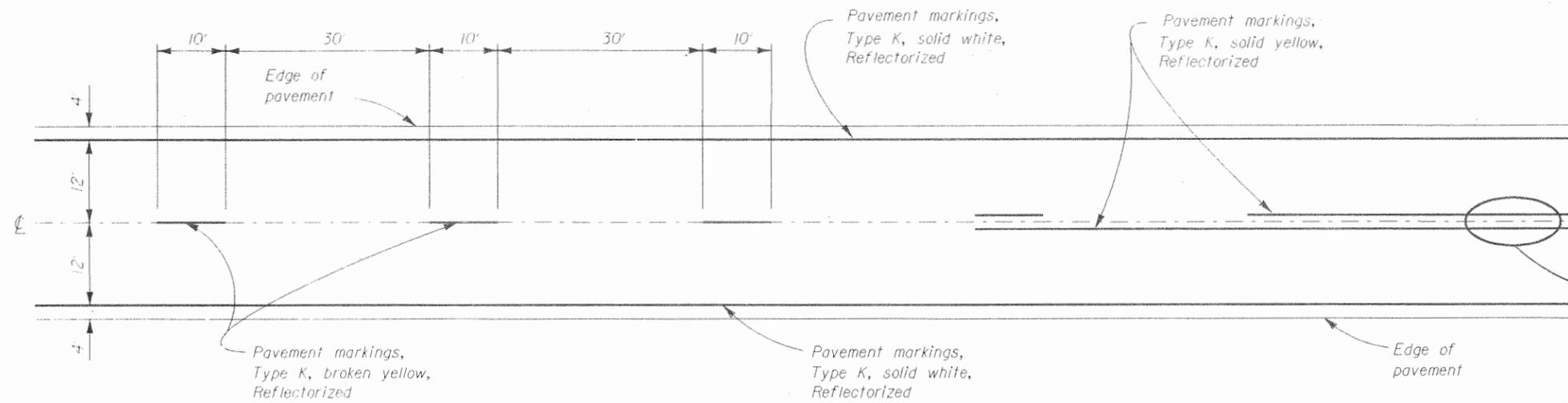
PAVEMENT MARKING DETAIL - SECTION



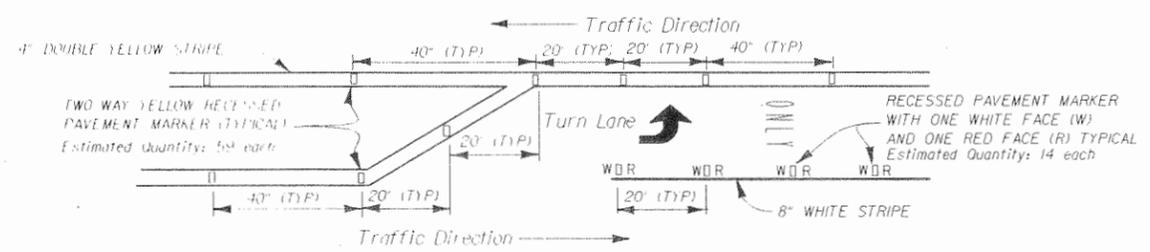
U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION
VANCOUVER, WASHINGTON

**PERMANENT
PAVEMENT MARKINGS**

NORTH TONGASS HIGHWAY



PAVEMENT MARKINGS											
Solid Yellow 18" Diagonal stripes Item 63401B		Solid Yellow Left Center Item 63401B		Solid Yellow Right Center Item 63401B		Broken Yellow Center Item 63401A		Solid White Left Shoulder Item 63401C		Solid White Right Shoulder Item 63401C	
PAVEMENT MARKING - NORTH TONGASS HIGHWAY											
STATION TO STATION	In ft	STATION TO STATION	In ft	STATION TO STATION	In ft	STATION TO STATION	In ft	STATION TO STATION	In ft	STATION TO STATION	In ft
20+00 to 21+90	754 U	18+50 to 21+90	532	18+50 to 21+90	521			18+50 to 33+00	1451	19+00 to 21+90	404
23+66 to 25+50	410 U	22+14 to 28+60	982	22+14 to 28+60	982			22+14 to 23+14	200	20+43 to 21+90	295
26+96 to 28+60	442 U	29+12 to 33+00	494	29+12 to 33+00	490			29+12 to 30+50	276	22+14 to 33+00	1162
31+03 to 33+00	545 U										
SUBTOTALS (In ft)	2131 U		2008		1993				1927		1861
PAVEMENT MARKINGS - WARD LAKE ROAD											
0+29 to 10+50	1021	0+20 to 3+50	321	3+50 to 8+50	500	1+30 to 72+50	7120	1+30 to 70+19	6889		
15+00 to 32+50	1750	8+50 to 25+50	1700	10+50 to 15+00	450	73+50 to 129+00	5550	71+40 to 72+78	276		
43+00 to 72+78	2978	36+50 to 72+78	3628	25+50 to 43+00	1750			74+11 to 120+55	4644		
73+12 to 96+00	2288	73+12 to 89+00	1588	89+00 to 129+00	4000			121+55 to 127+05	550		
119+00 to 124+50	550	112+50 to 118+00	550					128+05 to 129+00	95		
SUBTOTALS (In ft)	8587		7787		6700		12670		12454		
PAVEMENT MARKINGS - APPROACH ROAD 73+00 RIGHT											
0+22 to 6+00	578	0+22 to 6+00	578			Begin taper to 6+00	653	End taper to 6+00	810		
SUBTOTALS (In ft)	578		578				653		810		



- NOTES:
1. Install recessed pavement markers such that they are 0 to 1/16" below pavement surface.
 2. Lateral placement of recessed pavement markers shall be between double yellow stripes on centerline or turn lane striping.
 3. Lateral placement of recessed pavement markers shall be adjacent to white turn lane stripe, on the turn lane side of the stripe.
 4. Place recessed pavement markers as shown only on existing pavement of the North Tongass Highway.

- Footnotes:
1. Quantities based on actual length X 1.5 for 18" stripe.
 2. Includes turn lane and approach flares.
 3. Turn lane, 8 inches wide. Quantities based on actual length X 1.5 for 8" stripe.
 4. Quantities based on actual length X 1.5 for 24" stripe.
 5. Includes quantities for two applications.

Solid white 24" Stop Bar	
0+29 Left	246 U
73+00 Approach Rd. Lt	150 U
73+00 Approach Rd. Rt	246 U
121+05 Approach Rd. Rt	150 U
TOTALS	792 U

QUANTITIES		
Item 63401A	Pavement marking, Type K, Broken yellow	13,400 In ft U
Item 63401B	Pavement marking, Type K, Solid Yellow	47,324 In ft U
Item 63401C	Pavement marking, Type K, Solid White	62,332 In ft U
Item 63405A	Pavement marking, Type K, Arrow Symbol	6 each
Item 63405B	Pavement marking, type K, Word	4 each
Item 63407	Recessed Pavement Marker	73 each
Item 63519	Pavement marking removal	2,550 In ft

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

**PERMANENT
PAVEMENT MARKING
DETAILS**

DATE: 5/94
 CHECKED: S. JOHNSON
 APPROVED:

AF03954.DWG

STATE	PROJECT	SHEET NO.
AK	PFH 39-1(3)	F.16

Designed:	By:	Date:
CADD:		
Checked:		
Approved:		

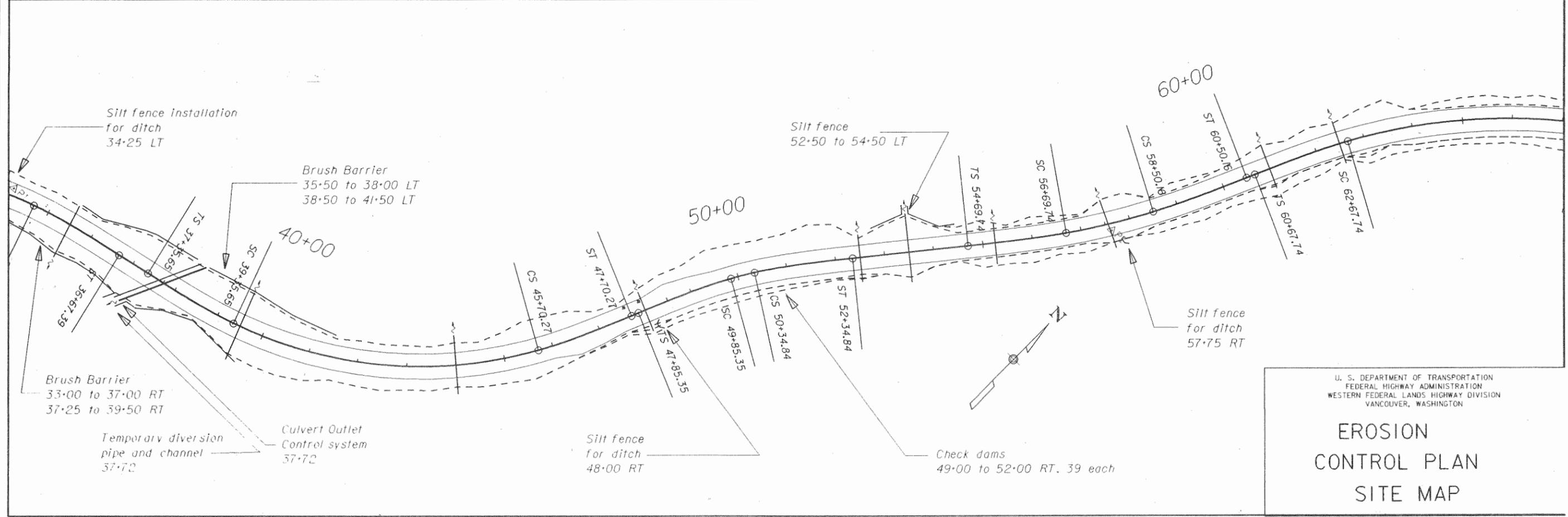
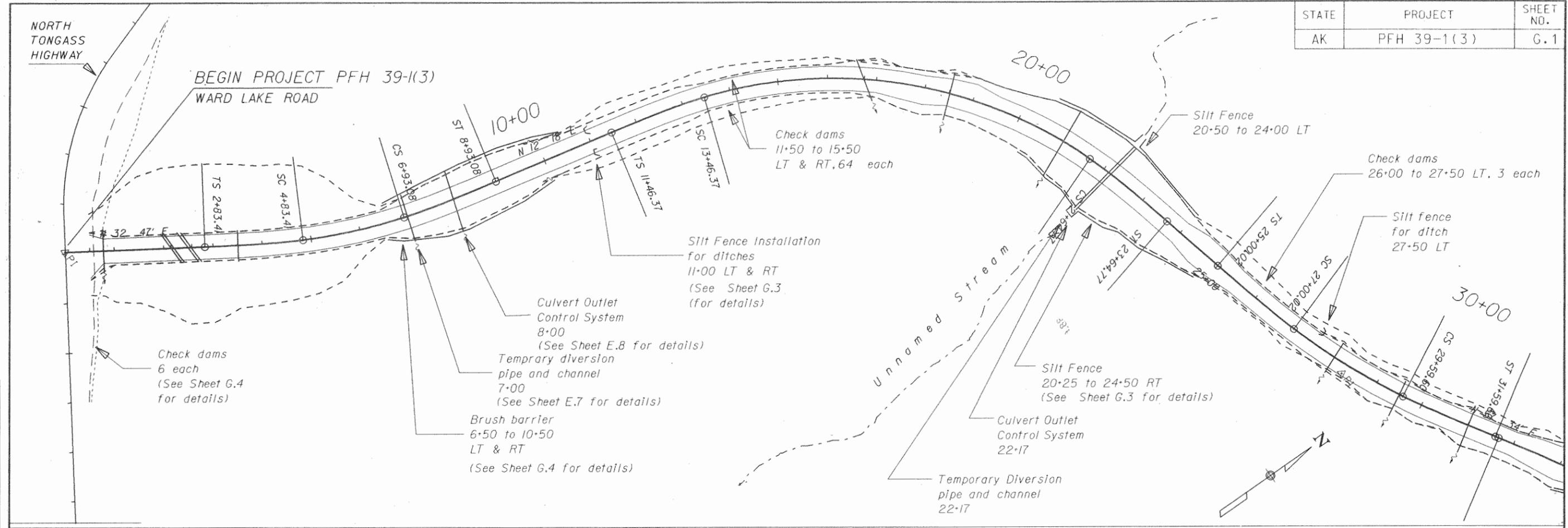
BLANKS.DWG

This sheet intentionally left blank

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

BLANK
SHEET

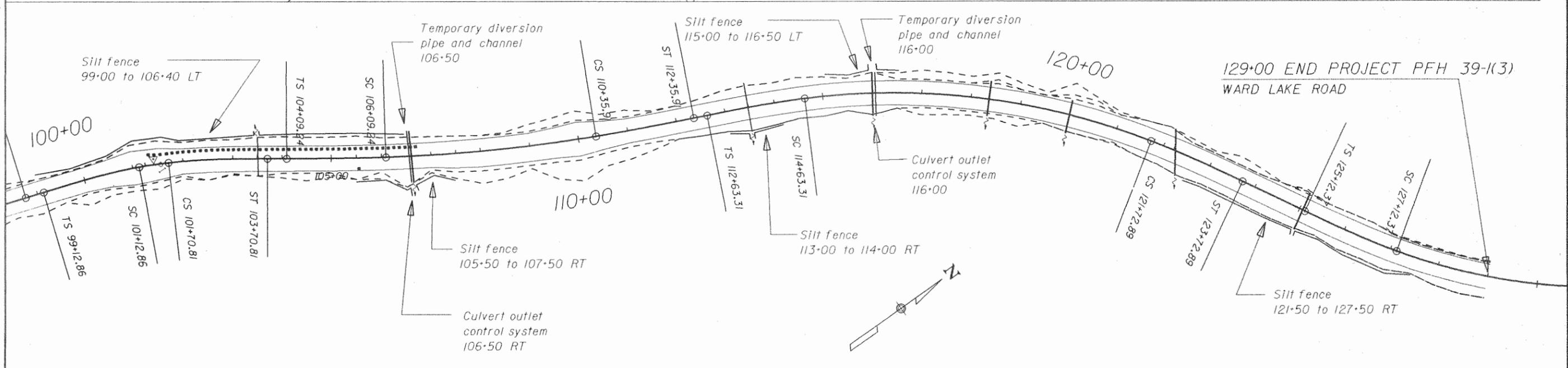
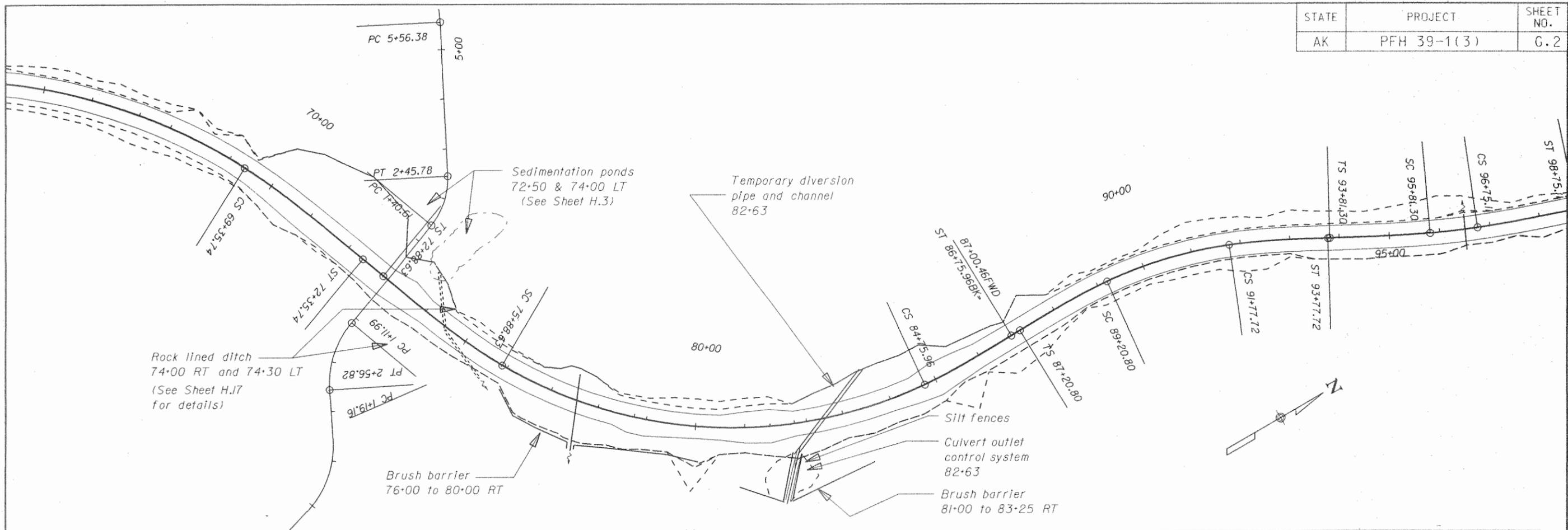
By:	Date:
P. ANDERSON	10/94
P. ANDERSON	3/95
Checked:	
Approved:	



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

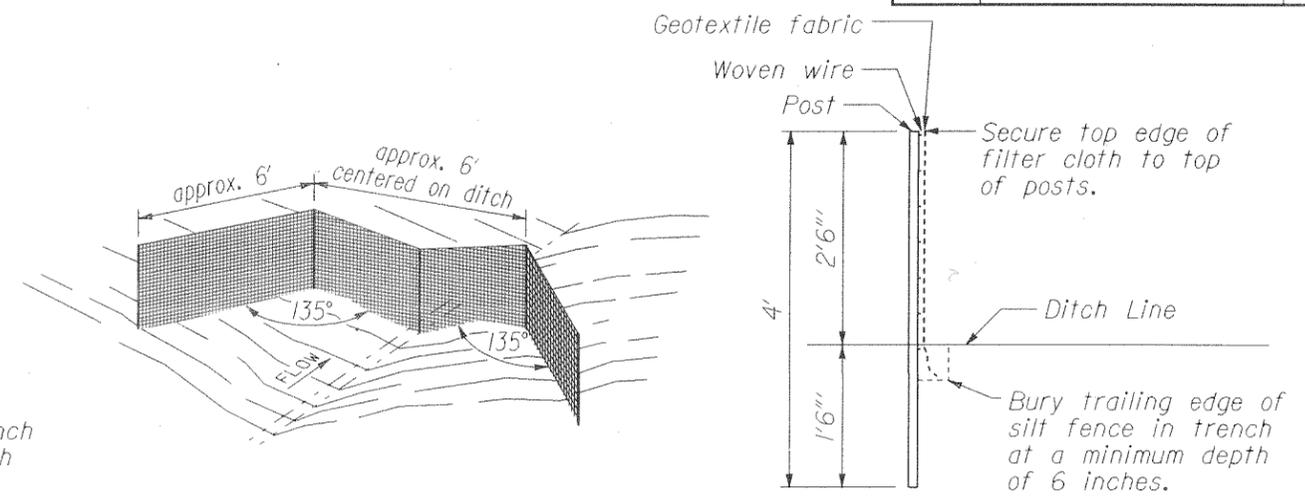
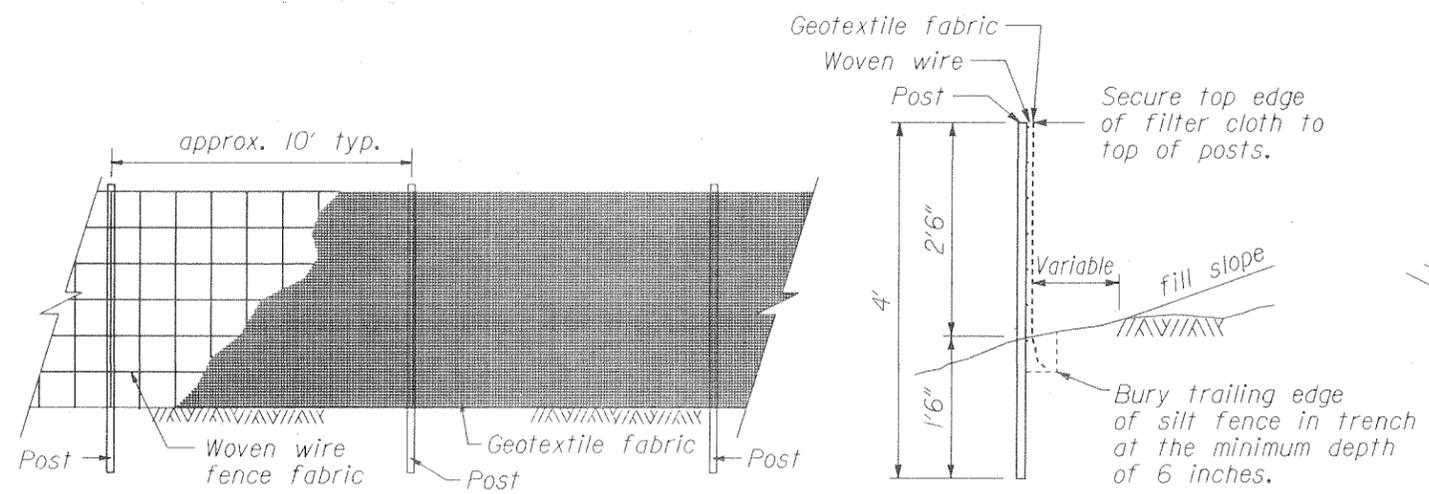
EROSION CONTROL PLAN SITE MAP

STATE	PROJECT	SHEET NO.
AK	PFH 39-1(3)	G.2



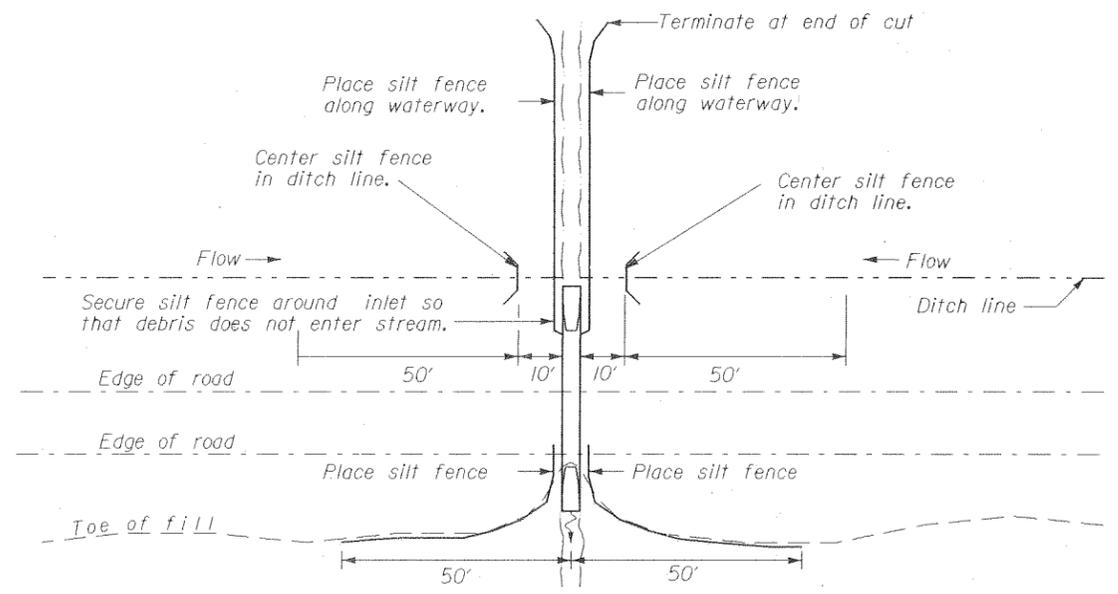
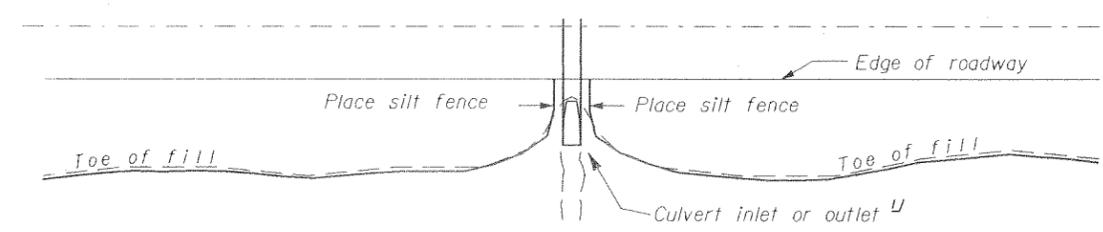
U. S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 WESTERN FEDERAL LANDS HIGHWAY DIVISION
 VANCOUVER, WASHINGTON

EROSION CONTROL PLAN SITE MAP



SILT FENCE INSTALLATION FOR WATERWAYS, CULVERTS AND FILL SLOPES

SILT FENCE INSTALLATION FOR DITCHES



TYPICAL SEDIMENT CONTROL AT FILL SLOPES

TYPICAL SEDIMENT CONTROL AT CULVERTS

LOCATIONS FOR SILT FENCES Item 15703							
FILL SLOPE OR CULVERT				DITCH			
LEFT	In ft	RIGHT	In ft	LEFT	In ft	RIGHT	In ft
20+50 to 24+00	350	20+25 to 24+50	425	11+00	20	11+00	20
52+50 to 54+50	200	83+00 to 85+00	200	27+50	20	48+00	20
				31+50	20	57+75	20
Waste site 1 ^{2/}	500			34+25	20		
99+00 to 106+40	740	105+50 to 107+50	200				
115+00 to 116+40	140	113+00 to 114+00	100				
Waste site 2 ^{3/}	500	121+50 to 127+50	600				
Total							4095

FOOTNOTES:
^{1/} Culverts not specified at all locations.
^{2/} See Sheet H.3 for location
^{3/} See Sheet H.4 for location

- GENERAL NOTES:**
1. Wire fence for silt fence consists of woven wire fence fabric, at the minimum height of 30 inches and with a maximum 6 inch mesh.
 2. The CO may require adjustments to actual lengths or locations to fit field conditions.
 3. Inspect after each runoff event and immediately repair all erosion along edges or bottom of silt fences.
 4. Remove sediment so that the accumulated depth of sediment does not exceed one half the original height of the silt fence.

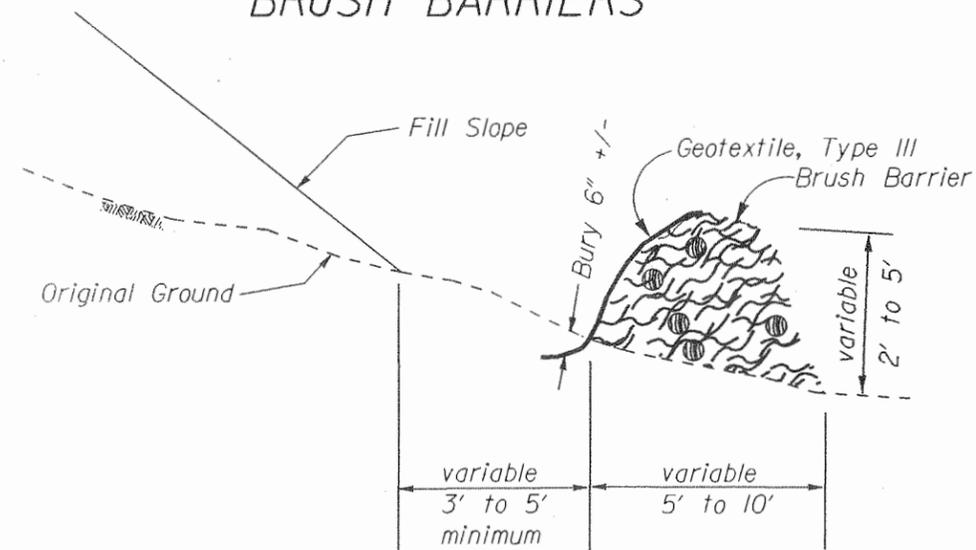
U. S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 WESTERN FEDERAL LANDS HIGHWAY DIVISION
 VANCOUVER, WASHINGTON

SEDIMENT CONTROL SILT FENCES

Date:	
By:	
Designed:	
CADD:	
Checked:	
Approved:	

4F03930H.DGN

BRUSH BARRIERS



GENERAL NOTES:

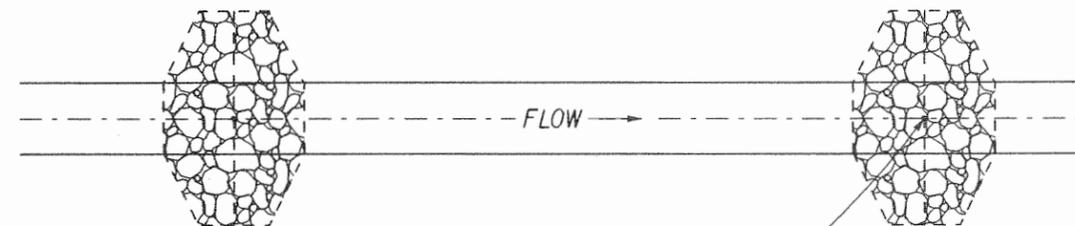
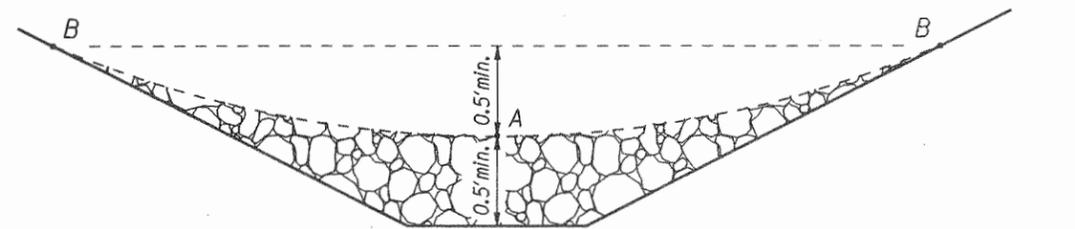
BRUSH BARRIERS

1. Limit clearing to trees, shrubs and plants less than 4-inches in diameter in areas designated for brush barriers. Grubbing shall not be performed.
2. Construct brush barrier approximately parallel to original ground contour.
3. Construct brush barrier of a well intermingled mass of brush, trees, trimmings, etc., porous to allow water to filter through, but properly secured by placing some of the heavier material (trees, logs, etc.) throughout and on top of the brush.
4. Adjoin brush barrier with roadway slope on the low end if needed to contain sediments.

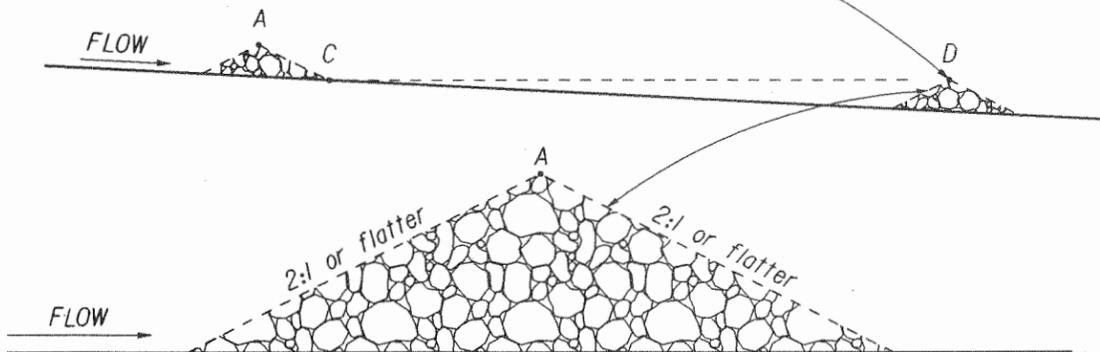
CHECK DAMS

1. Install check dams in roadway ditches as directed by the C.O. at spacing detailed on this sheet.
2. Inspect after each runoff event and immediately repair all erosion along edges of the check dams.
3. Remove sediment so that the accumulated depth of sediment does not exceed one half the original height of the check dam.
4. Construct check dams with rock of the approximate gradation of Class I riprap

CHECK DAMS



Place downstream structure such that the crest, point "D", is approximately level with the lowest ground elevation of the upstream structure, point "C".



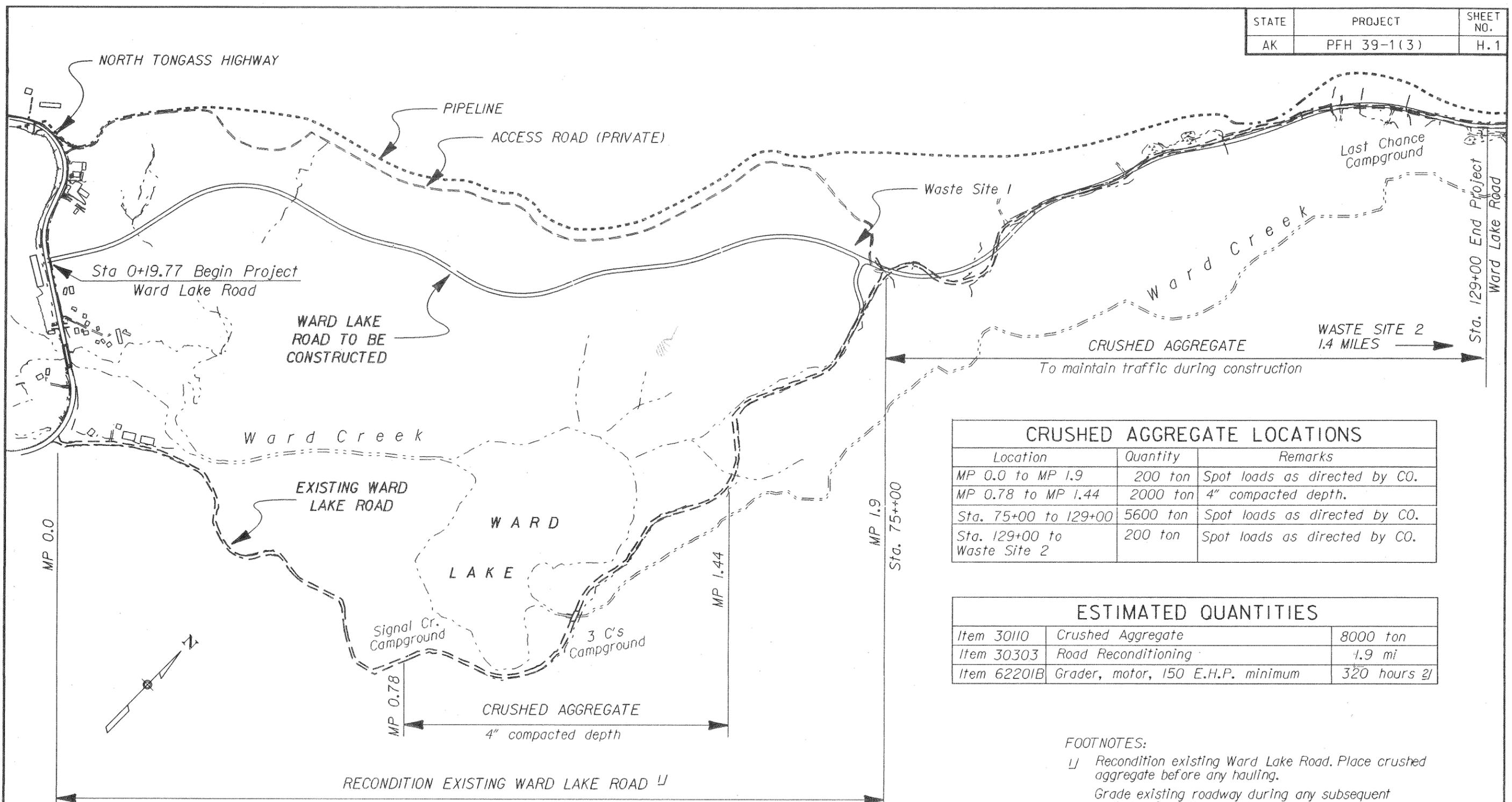
CHECK DAMS	
Item 15709	
Check dams U	112 each

U See Sheets G.1-2 for locations

BRUSH BARRIERS			
Item 15704			
LEFT	In ft	RIGHT	In ft
6+50 to 10+50	400	6+50 to 10+50	400
35+50 to 38+00	250	33+00 to 37+00	400
38+50 to 41+50	300	37+25 to 39+50	225
		76+00 to 80+00	400
		81+00 to 83+25	225
		Total	2600

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

**SEDIMENT CONTROL
CHECK DAMS AND
BRUSH BARRIERS**



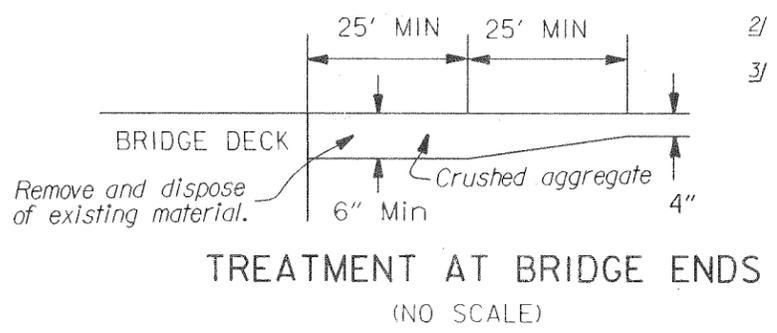
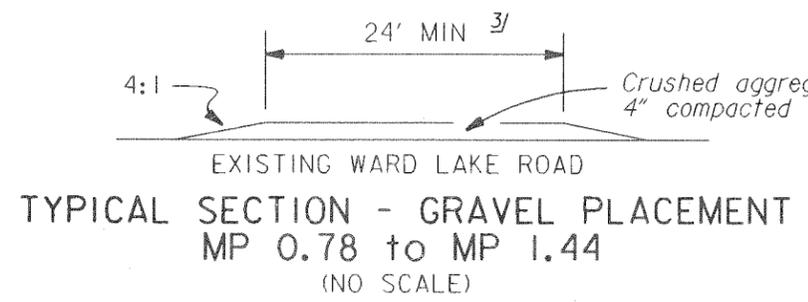
Date:	9/94
By:	P. Anderson
Designed:	P. Anderson
CADD:	P. Anderson
Checked:	
Approved:	

AF0393BM.DGN

Location	Quantity	Remarks
MP 0.0 to MP 1.9	200 ton	Spot loads as directed by CO.
MP 0.78 to MP 1.44	2000 ton	4" compacted depth.
Sta. 75+00 to 129+00	5600 ton	Spot loads as directed by CO.
Sta. 129+00 to Waste Site 2	200 ton	Spot loads as directed by CO.

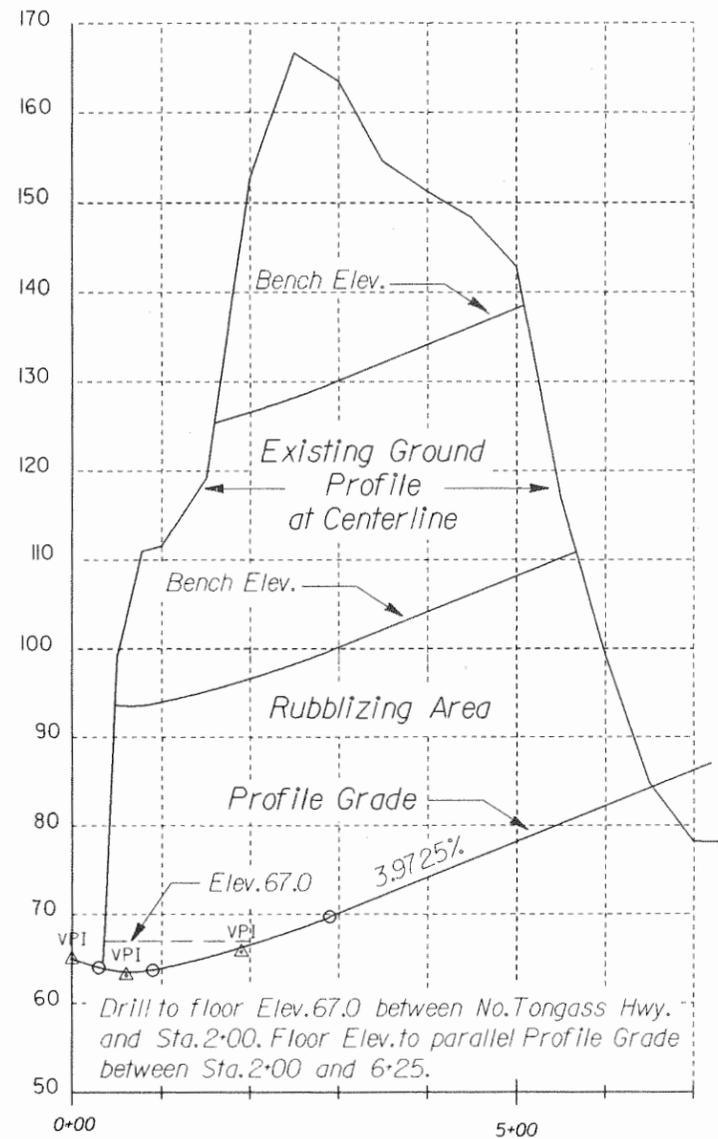
Item	Description	Quantity
Item 30110	Crushed Aggregate	8000 ton
Item 30303	Road Reconditioning	1.9 mi
Item 62201B	Grader, motor, 150 E.H.P. minimum	320 hours 2/

- FOOTNOTES:
- 1/ Recondition existing Ward Lake Road. Place crushed aggregate before any hauling. Grade existing roadway during any subsequent periods of hauling activity.
 - 2/ Includes Ward Lake Road Sta. 129+00 to Waste site 2.
 - 3/ Taper aggregate to full width of deck within 50 feet of bridge.



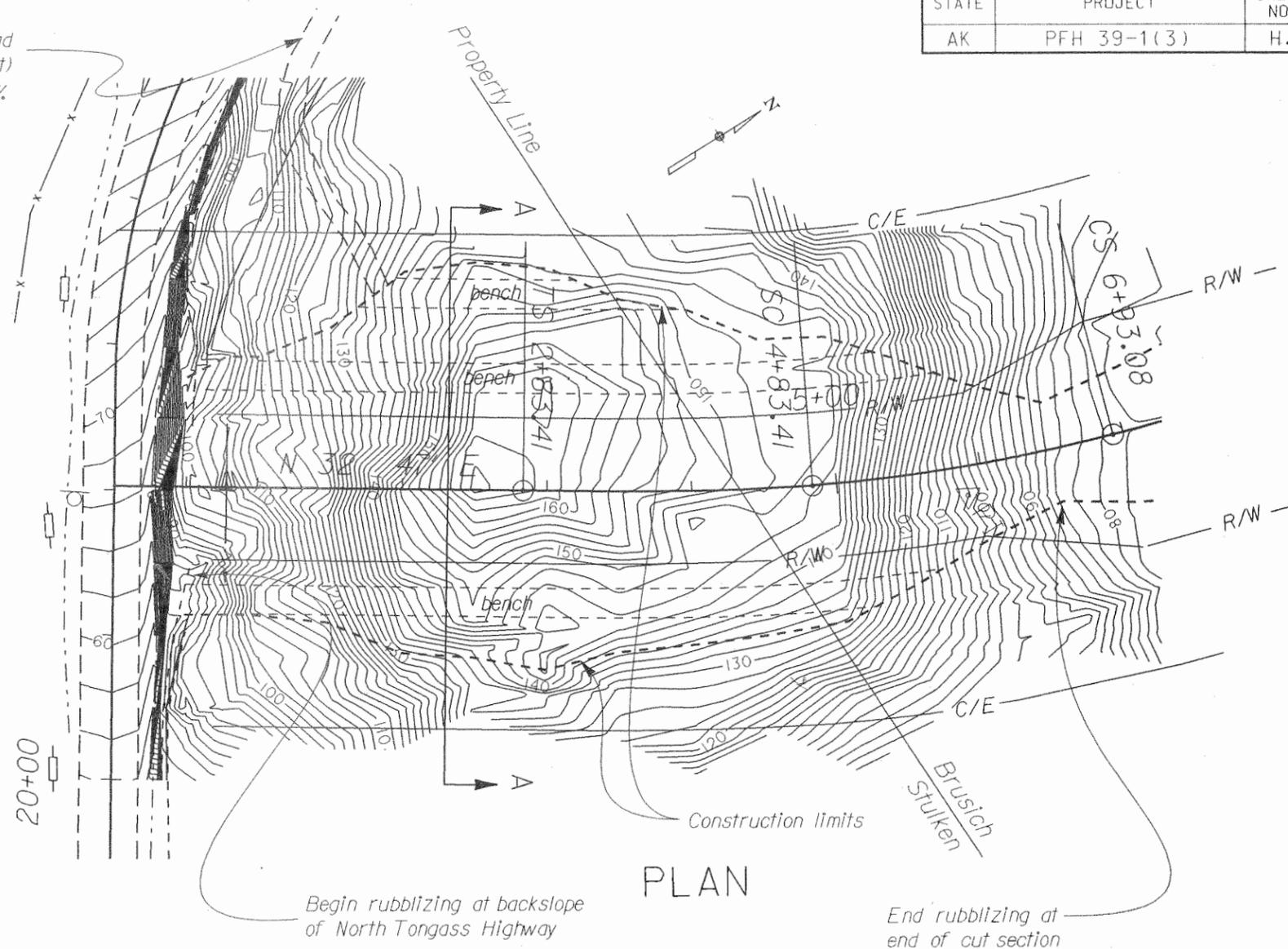
U. S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 WESTERN FEDERAL LANDS HIGHWAY DIVISION
 VANCOUVER, WASHINGTON

ROAD RECONDITIONING
 Vicinity Map

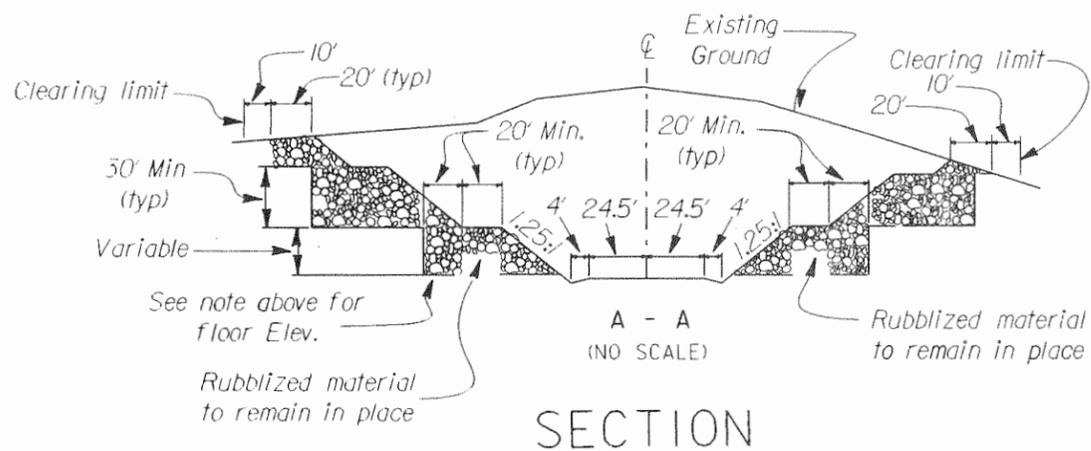


PROFILE

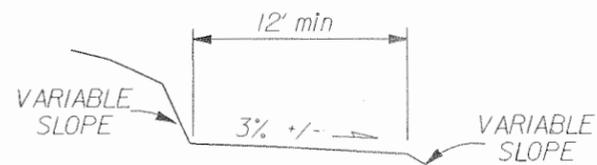
Construct access road
(see detail this sheet)
Maximum grade 15%.



PLAN



SECTION



ACCESS ROAD
Sta. 25+00 Right

Line and grade to be established
in the field by the C.O.
Road to be constructed south of
the Stulken-Brusich property line.
Not measured for payment

GENERAL NOTES:

1. Construct access road right of No. Tongass Hwy. Sta. 25+00 to intersect upper bench of rubblized material. Road to remain in place after completion of work.
2. Rock to be rubblized and remain in place shall have a maximum dimension of 24 inches.

ESTIMATED QUANTITIES		
Item 20504	Rubblized Blasting	113,900 Cu Yd
Item 20510	Blasting Consultant Services	All

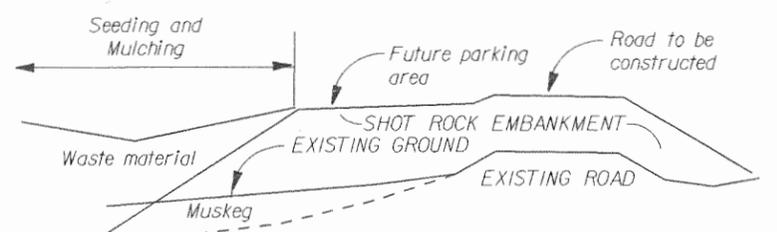
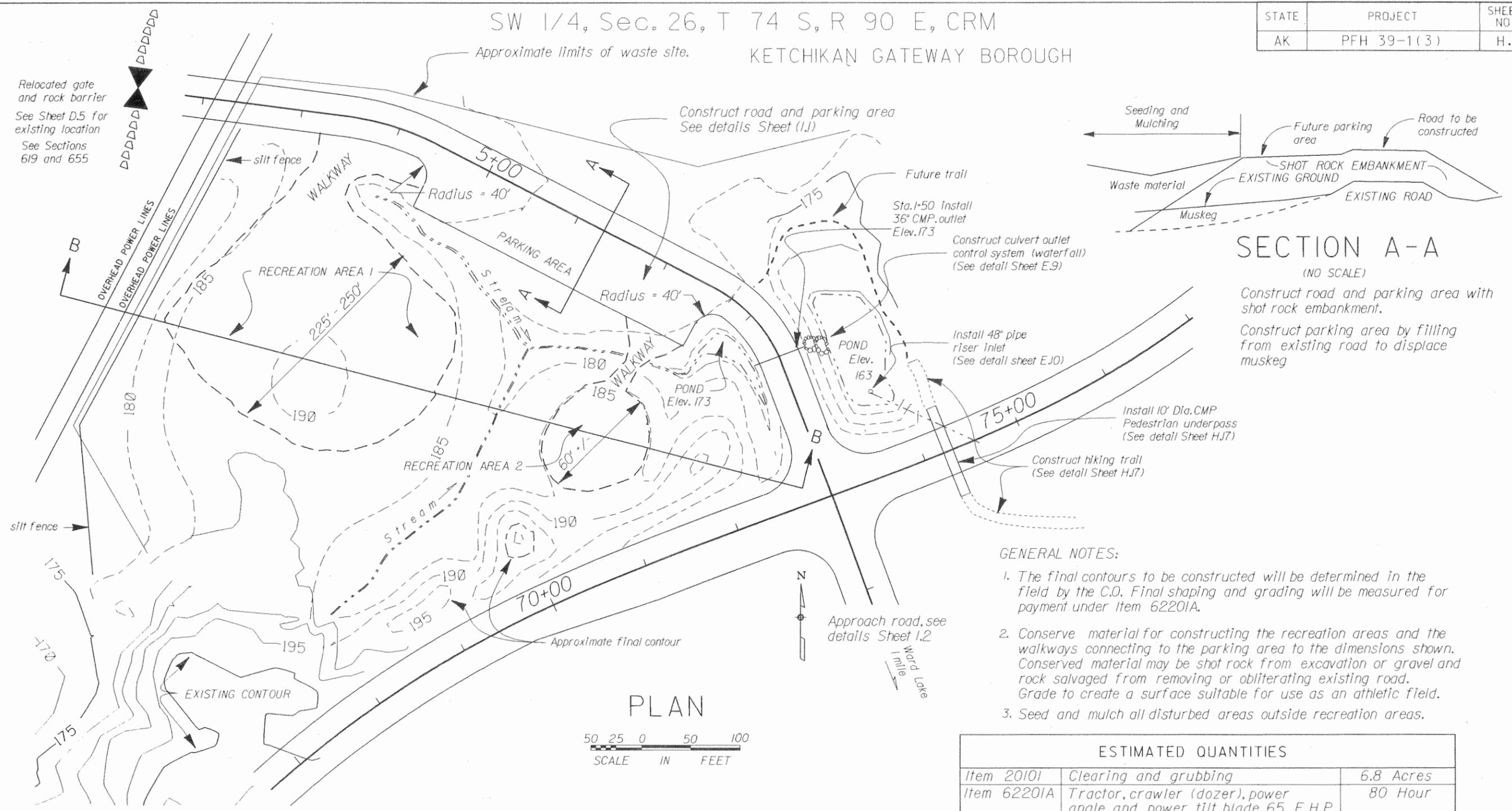
U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION
VANCOUVER, WASHINGTON

0+50 to 6+25
RUBBLIZING DETAILS

SW 1/4, Sec. 26, T 74 S, R 90 E, CRM
KETCHIKAN GATEWAY BOROUGH

STATE	PROJECT	SHEET NO.
AK	PFH 39-1(3)	H. 3

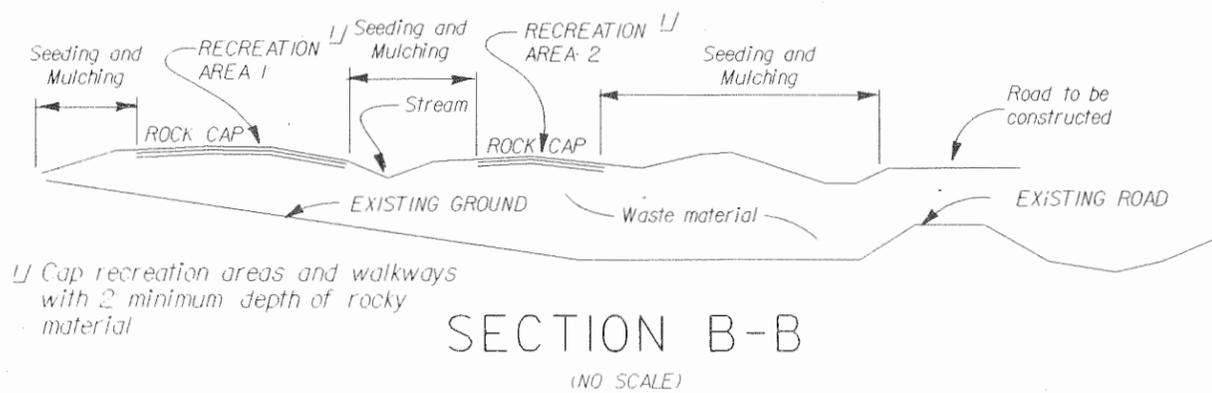
Relocated gate and rock barrier
See Sheet D.5 for existing location
See Sections 619 and 655



GENERAL NOTES:

- The final contours to be constructed will be determined in the field by the C.O. Final shaping and grading will be measured for payment under Item 62201A.
- Conserve material for constructing the recreation areas and the walkways connecting to the parking area to the dimensions shown. Conserved material may be shot rock from excavation or gravel and rock salvaged from removing or obliterating existing road. Grade to create a surface suitable for use as an athletic field.
- Seed and mulch all disturbed areas outside recreation areas.

ESTIMATED QUANTITIES		
Item 20101	Clearing and grubbing	6.8 Acres
Item 62201A	Tractor, crawler (dozer), power angle and power tilt blade, 65 E.H.P. minimum	80 Hour
Item 62301	General labor	80 Hour
Item 62503A	Seeding, Hydraulic method	20 Stry Units
Item 62506	Mulching, hydraulic method	20 Stry Units



LEGEND:
CONTOURS:

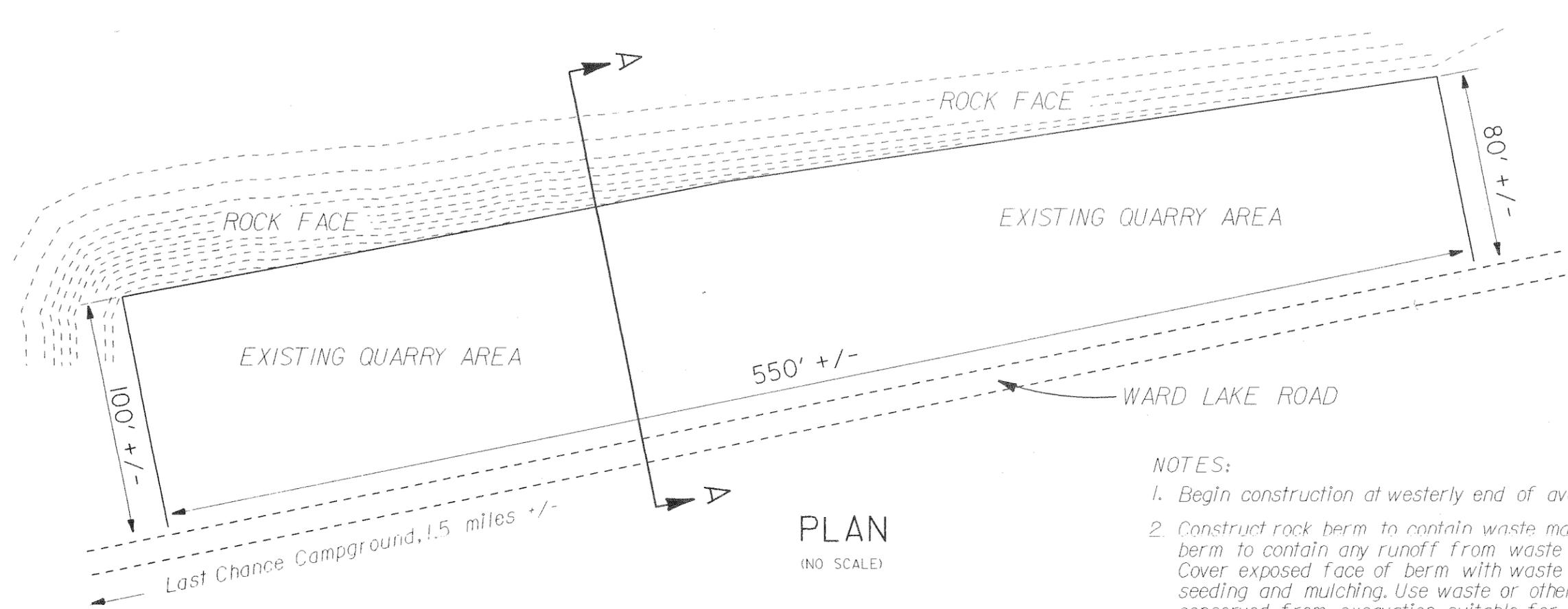
Existing Contour	—195—
Final contour to be constructed	- -190 - -

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

**WASTE SITE I
DEVELOPMENT PLAN**

Date:	2/95
By:	P. Anderson
Designed:	2/95
CADD:	P. Anderson
Checked:	5/95
Approved:	

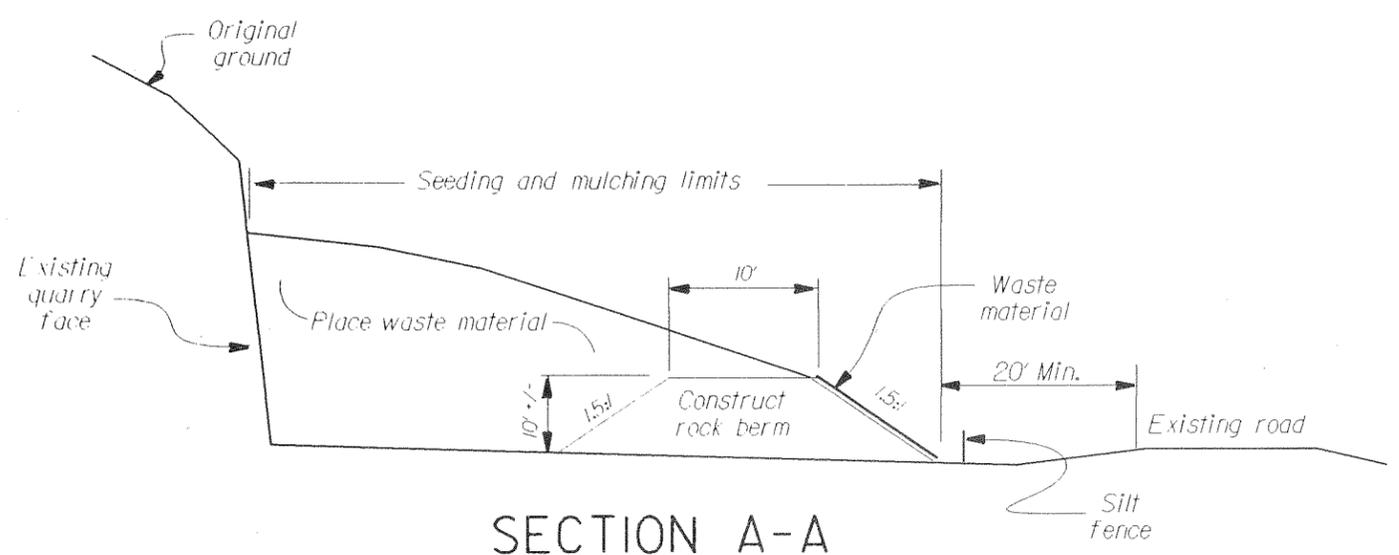
4F0393BE.DGN



PLAN
(NO SCALE)

NOTES:

1. Begin construction at westerly end of available area.
2. Construct rock berm to contain waste material. Construct berm to contain any runoff from waste material. Cover exposed face of berm with waste material prior to seeding and mulching. Use waste or other material conserved from excavation suitable for planting as approved by the CO.
3. Finish grade to match original ground contours as closely as possible.
4. Estimated capacity of site is 20,000 cu yd, including rock berm.



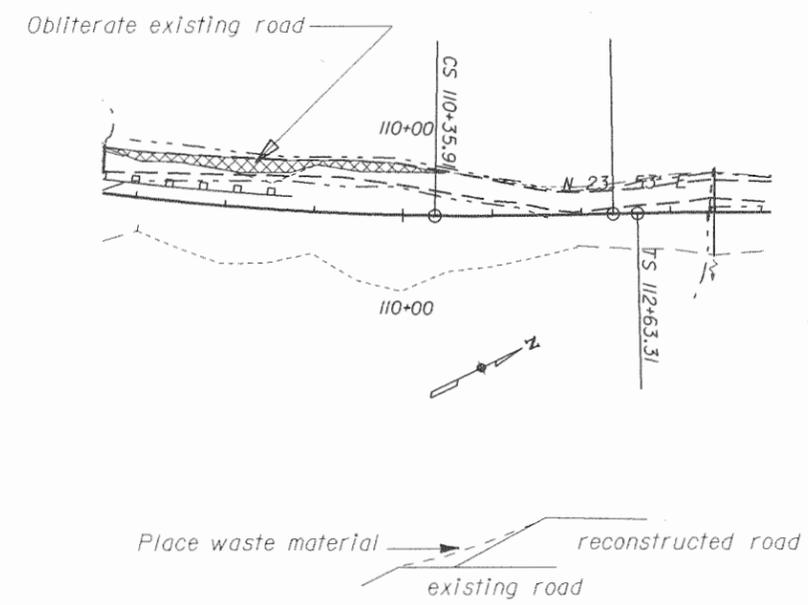
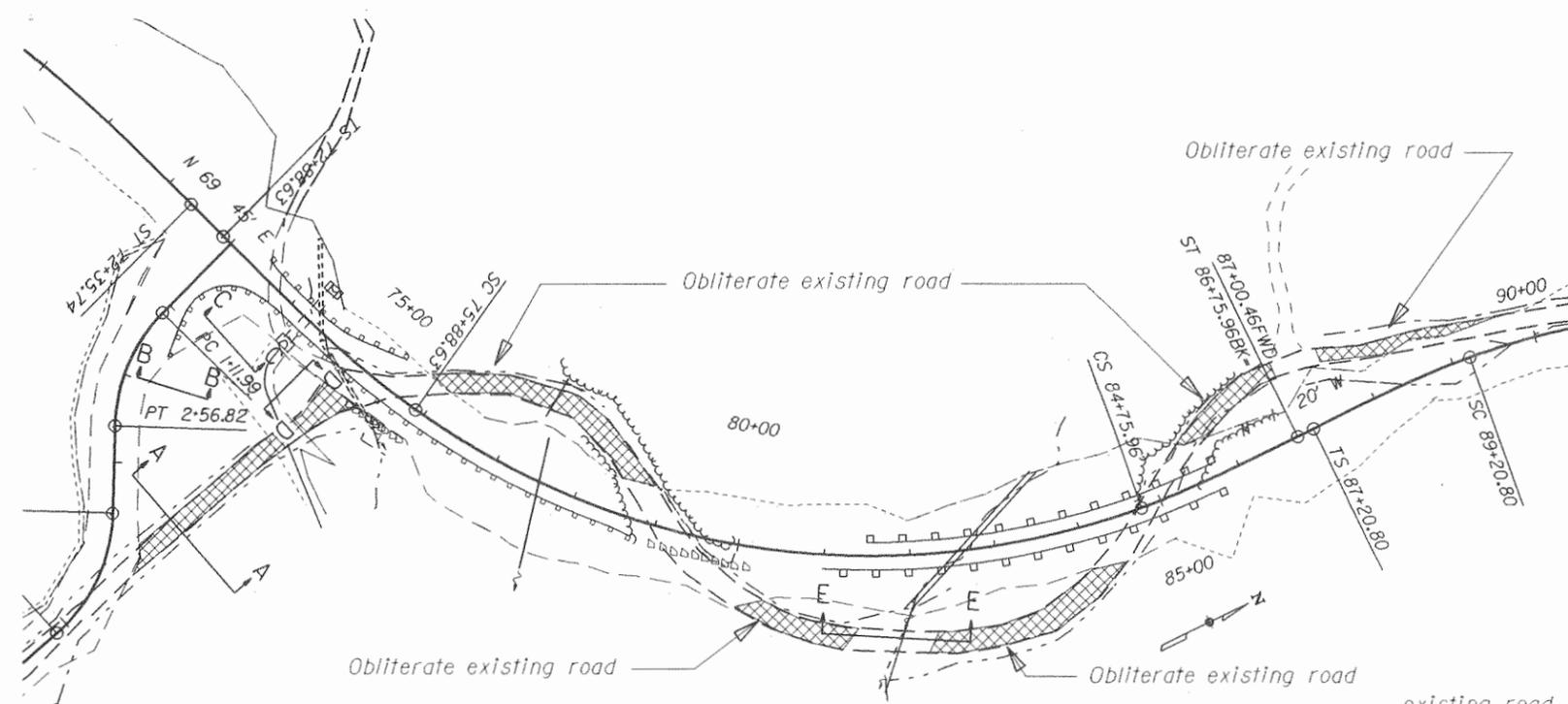
SECTION A-A
(NO SCALE)

ESTIMATED QUANTITIES		
Item 15703	Silt Fence U	500 Ln Ft
Item 62503A	Seeding, hydraulic method	5 Stry Unit
Item 62506	Mulching, hydraulic method	5 Stry Unit
Item 69501	Materials source reclamation	All

U Quantity included on sheet G.3

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

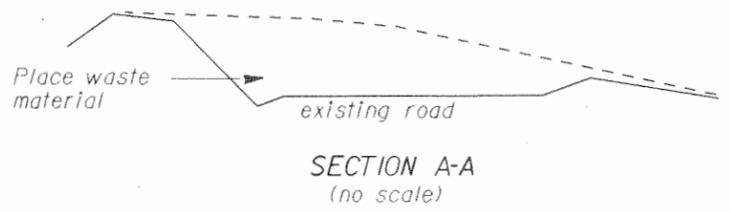
**WASTE SITE 2
DEVELOPMENT PLAN**



Place waste material → reconstructed road
 existing road
ROADWAY OBLITERATION DETAIL
 106+50 to 110+40 left
 (no scale)

ESTIMATED OBLITERATION AREAS	
75+50 to 79+50 left	810 sq yd
80+00 to 84+50 right	6700 sq yd
85+50 to 87+10 left	3100 sq yd
87+60 to 89+50 left	2670 sq yd
106+50 to 110+40 left	4000 sq yd

Date:	8/94
By:	P. ANDERSON
Designed:	P. ANDERSON
CADD:	P. ANDERSON
Checked:	
Approved:	

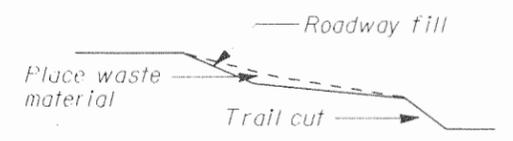
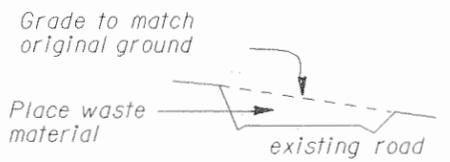
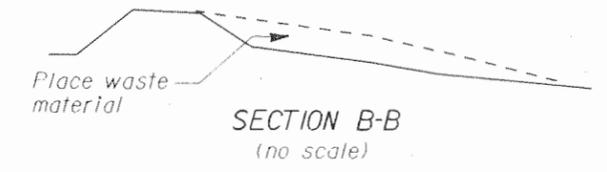


- existing road
1. Remove existing surfacing
 2. Grade to rounded contour
 3. Scarify 1' min. depth
 4. Seed and mulch

ROADWAY OBLITERATION DETAIL
 75+50 to 79+50 left
 (no scale)

- existing road
1. Remove existing surfacing
 2. Grade to rounded contour
 3. Scarify 1' min. depth
 4. Seed and mulch

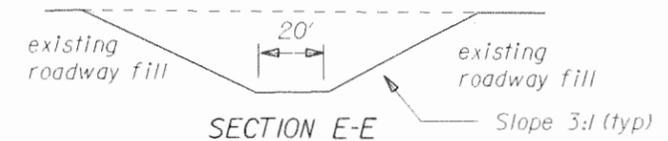
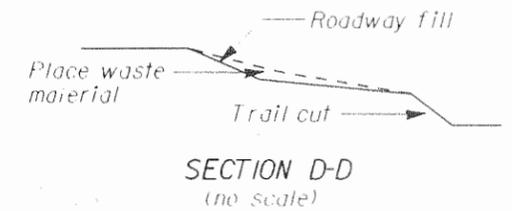
ROADWAY OBLITERATION DETAIL
 85+50 to 87+10 left
 (no scale)



- existing road
1. Remove existing surfacing
 2. Grade to rounded contour
 3. Scarify 1' min. depth
 4. Seed and mulch

ROADWAY OBLITERATION DETAIL
 80+00 to 84+50 right
 (no scale)

- GENERAL NOTES:**
1. Landscaping will be measured for payment under Item 62201A
 2. Place and shape waste material as directed by the C.O.
 3. Seed all disturbed areas right of Sta. 72+50 to 75+50, including roadway and trail cuts and fills, with "wildflower mix". See sheet I.2



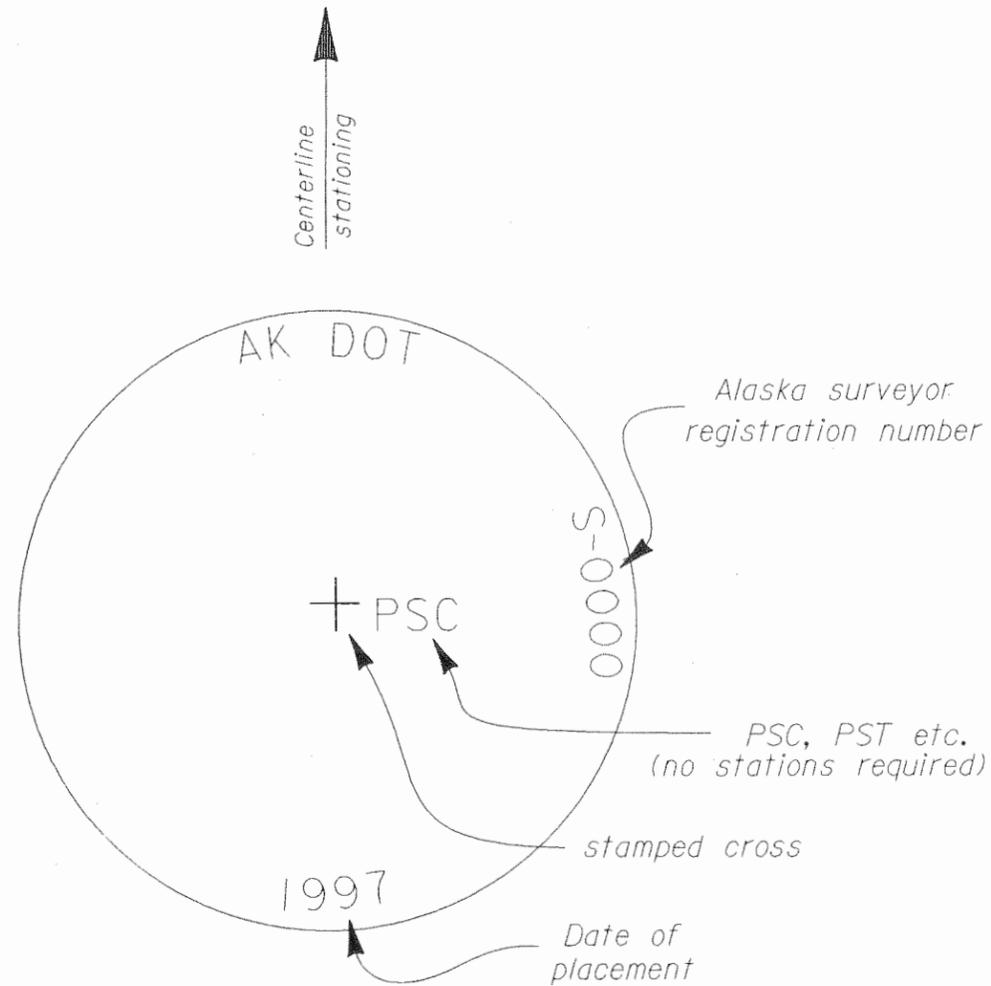
LANDSCAPING DETAILS

QUANTITIES		
Item 62201A	Tractor, crawler (dozer), power angle and power tilt blade, 65 E.H.P. minimum	40 Hour

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

LANDSCAPING
ROADWAY OBLITERATION

4F03930J.DGN



TYPICAL BRASS CAP
MONUMENT MARKING

LOCATIONS	
PS 2+83.41	PCS 69+35.74
PSC 4+83.41	PT 72+35.74
PCS 6+93.08	PS 72+88.63
PT 8+93.08	PST 75+88.63
PS 11+46.37	PCS 84+75.96
PSC 13+46.37	PT EQU
PCS 21+64.77	87+00.46 AH
PT 23+64.77	86+75.96 BK
PS 25+00.02	PS 87+20.80
PSC 27+00.02	PSC 89+20.80
PCS 29+59.60	PCS 91+77.72
PT 31+59.60	PT 93+77.72
PS 31+66.88	PS 93+81.30
PSC 33+66.88	PSC 95+81.30
PCS 34+67.39	PCS 96+75.11
PT 36+67.39	PT 98+75.11
PS 37+35.65	PS 99+12.86
PSC 39+35.65	PSC 101+12.86
PCS 45+70.27	PCS 101+70.81
PT 47+70.27	PT 103+70.81
PS 47+85.35	PS 104+09.24
PSC 49+85.35	PSC 106+09.24
PCS 50+34.84	PCS 110+35.91
PT 52+34.84	PT 112+35.91
PS 54+69.74	PS 112+63.31
PSC 56+69.74	PSC 114+63.31
PCS 58+50.16	PCS 121+72.89
PT 60+50.16	PT 123+72.89
PS 60+67.74	PS 125+12.37
PSC 62+67.74	PSC 127+12.37

QUANTITY	
Item 62101	Centerline Monument
Total	58 each

GENERAL NOTES:

1. Install markers as detailed on sheet H.7 at all of the following centerline points: Points of Spiral, Points of Spiral to Curve, Points of Curve to Spiral and Points of Spiral to Tangent

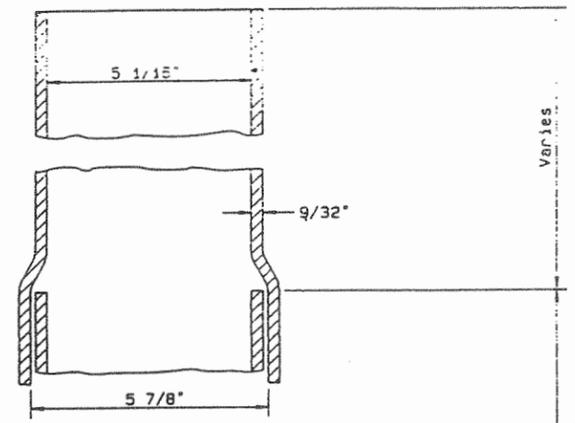
U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION
VANCOUVER, WASHINGTON

CENTERLINE
MONUMENT

STATE	PROJECT	SHEET NO.
AK	PFH 39-1(3)	H.7

GENERAL NOTES

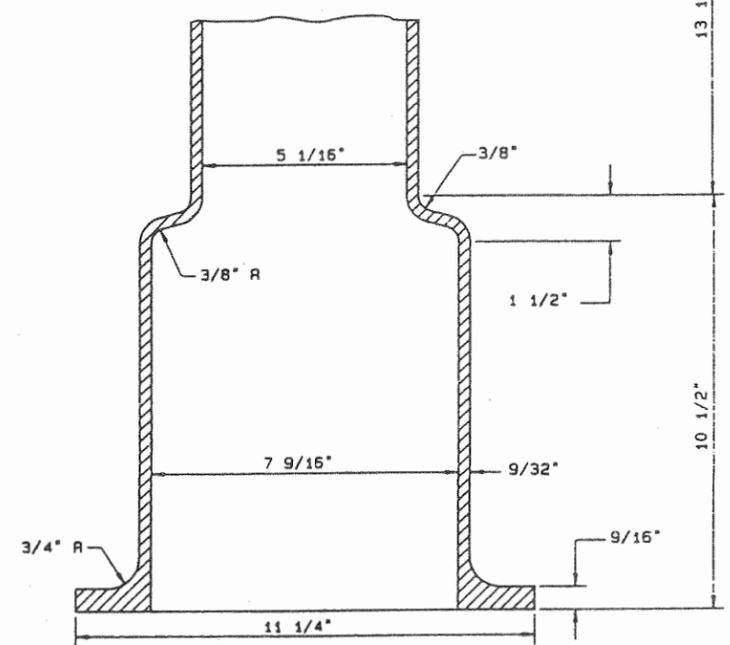
1. Details shown are to indicate general design only. Dimensions and design may vary among the manufacturers.
2. Where monument cases are to be placed in paved area of a roadway or sidewalk, the top of the case and/or cover shall be the same elevation as the top of the finish surface with bolting type access cover.
3. Where monument cases are to be placed in a gravel surfaced roadway, the top of the case shall be placed 1'-0" below the top of the surface of the roadway.
4. In solid rock, drill a 2" Dia. hole a minimum of 1'-0" deep, fill with mortar and set cap. 3/4"x9" galvanized pipe, designated length when set in mortar.
5. The top of the monument cap shall be placed 1'± above the bottom of the monument case.



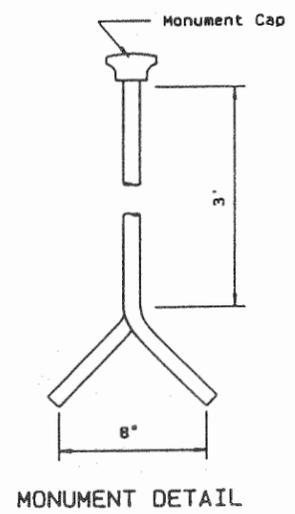
Var. 185

13 1/2"

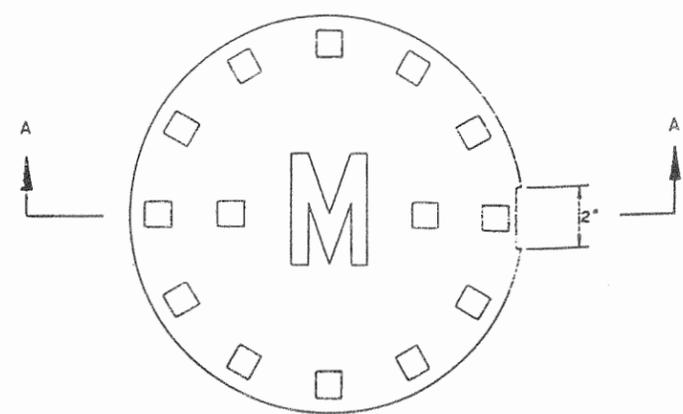
10 1/2"



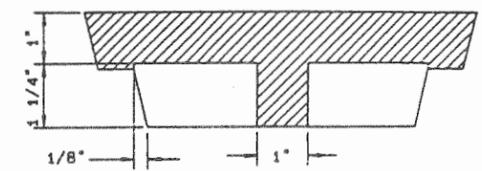
EXTENSION PIPES



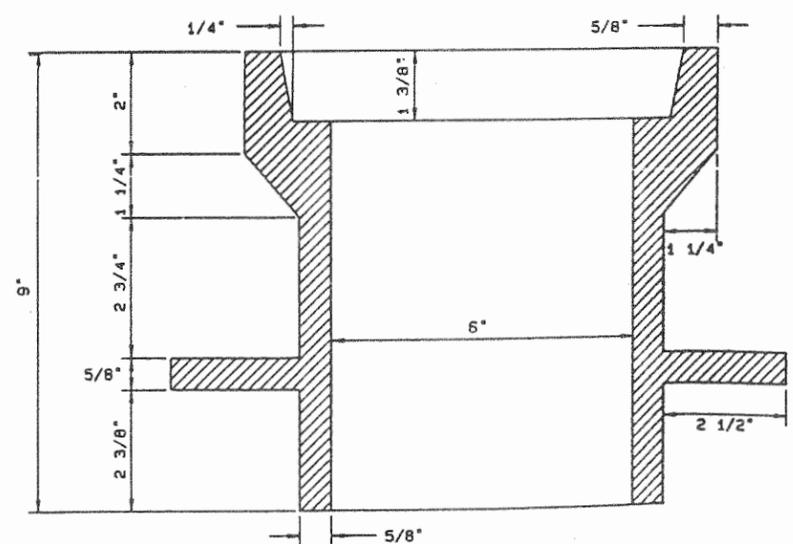
MONUMENT DETAIL



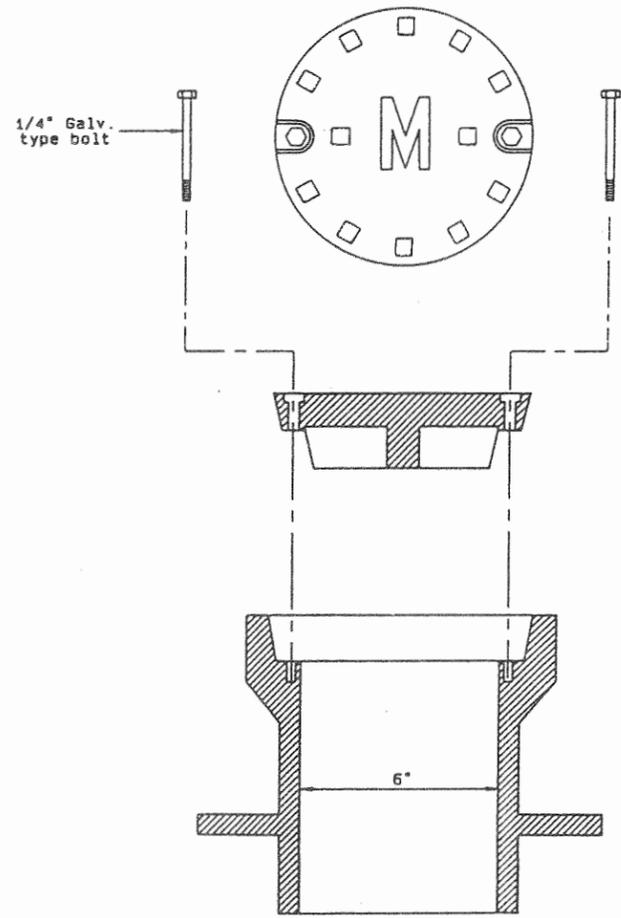
PLAN VIEW ACCESS COVER



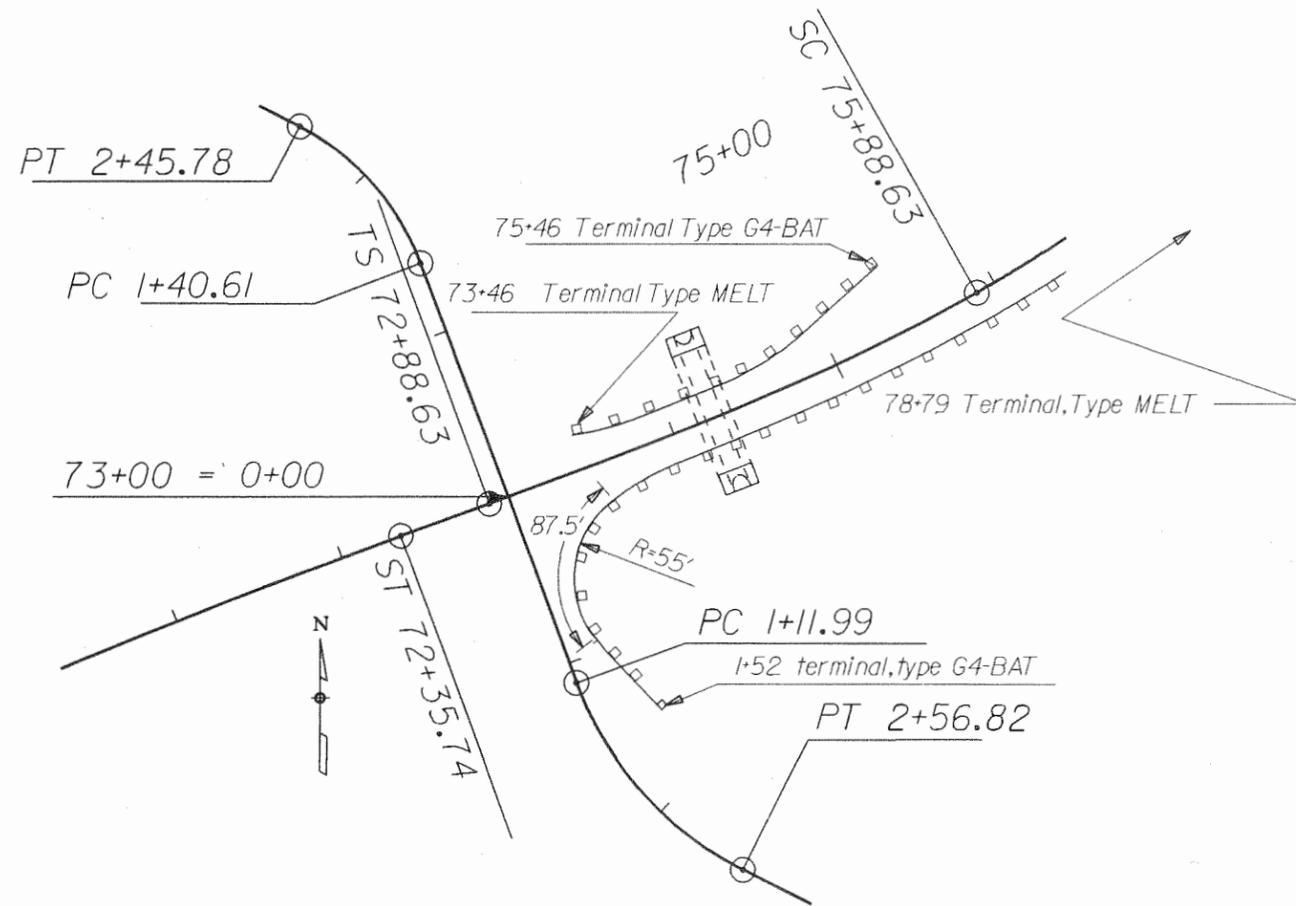
SECTION A-A



MONUMENT CASE



**BOLTING MONUMENT CASE ASSEMBLY
(See Note 2)**

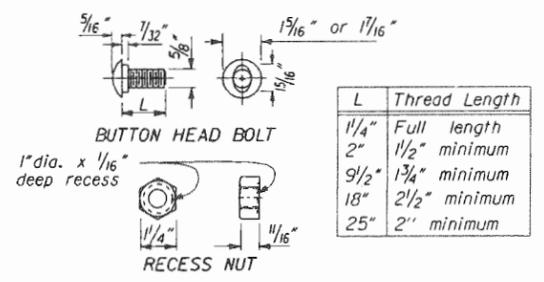
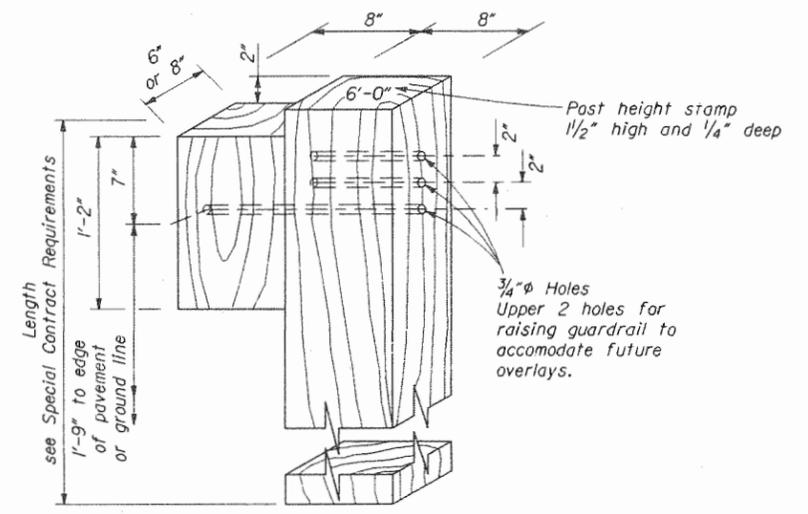
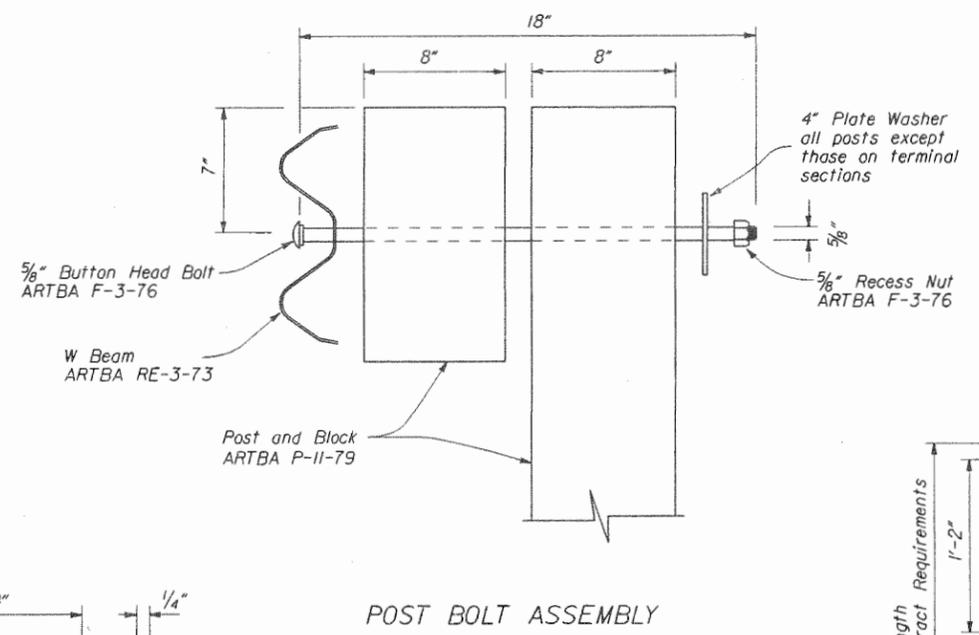
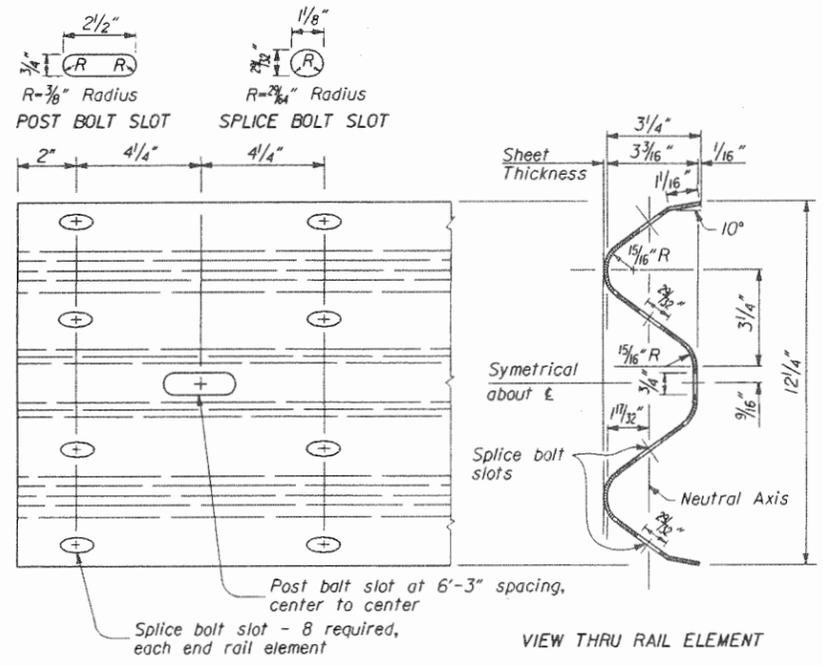


APPROACH ROADS Sta. 73+00
GUARDRAIL INSTALLATION DETAIL

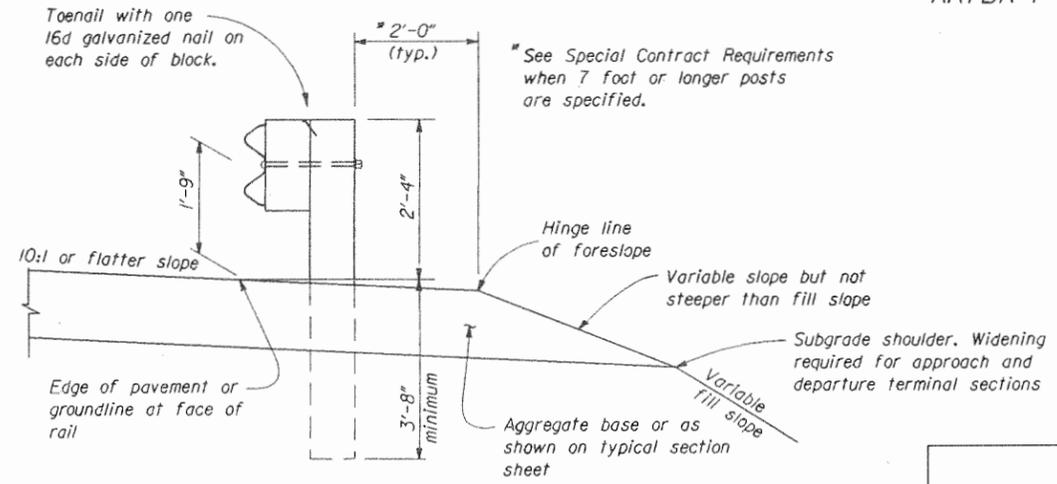
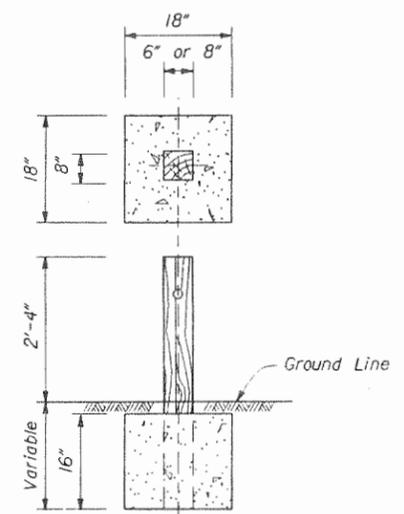
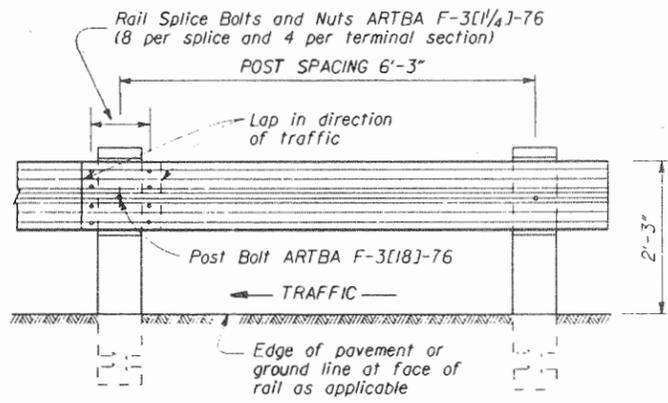
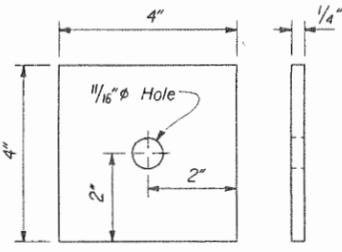
GUARDRAIL LOCATION				
BEGIN ANCHOR TYPE	STATION TO STATION	END ANCHOR TYPE	LT/RT	Ln Ft
MELT	19+00 to 24+59	MELT	LT	487.5
MELT	18+00 to 24+58	MELT	RT	575
MELT	33+00 to 48+48	MELT	LT	1462.5
MELT	33+00 to 46+50	MELT	RT	1287.5
MELT	73+46 to 75+46	G4-BAT	LT	125
G4-BAT	Appr. 1+52 to 78+79 ^u	MELT	RT	600
MELT	81+45 to 84+78	MELT	LT	350
MELT	81+00 to 85+87	MELT	RT	412.5
MELT	101+25 to 108+74	MELT	LT	675

^u Requires 87.5' of 55' radius convex factory formed rail.
See detail this sheet.

QUANTITIES		
Item	Description	Quantity
61701	Guardrail System G4, Type 1, Class A, Wood posts	5975 In ft
61702A	Terminal Section, Type Melt	16 Each
61702B	Terminal Section, Type G4-BAT	2 Each



L	Thread Length
1 1/4"	Full length
2"	1 1/2" minimum
9/2"	1 3/4" minimum
18"	2 1/2" minimum
25"	2" minimum



Use 20" diameter round anchor or 18" square anchor. Reduced sized acceptable in solid rock. Wrap post with 1/2" styrofoam where it contacts the concrete anchor.

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

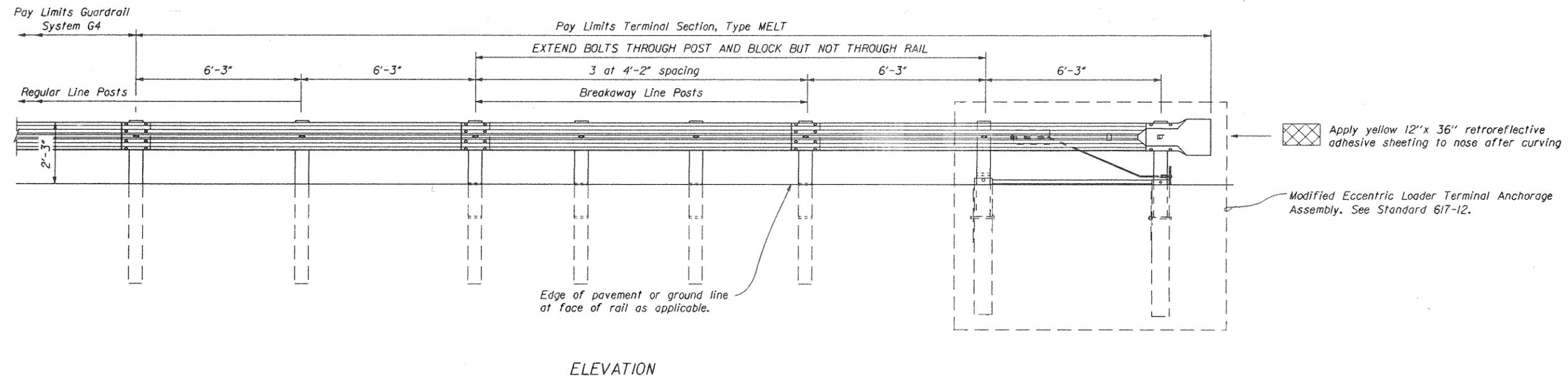
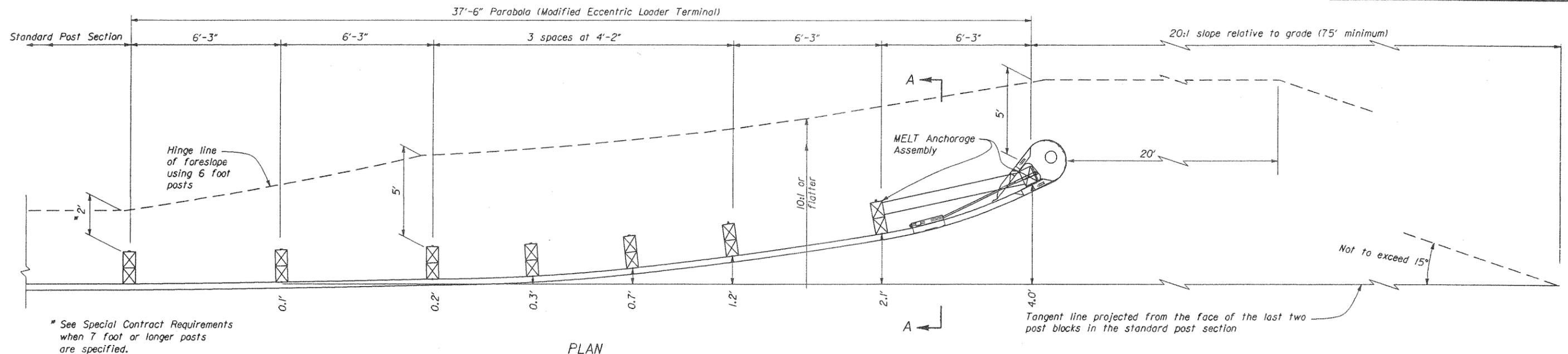
STANDARD
G4 W BEAM GUARDRAIL
WOOD POSTS

STANDARD APPROVED FOR USE 1/94
REVISED 4/94

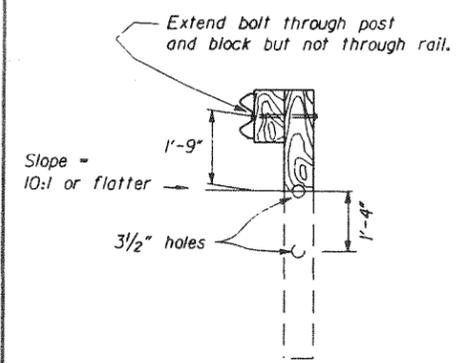
STANDARD
617-10

STD61710.DGN

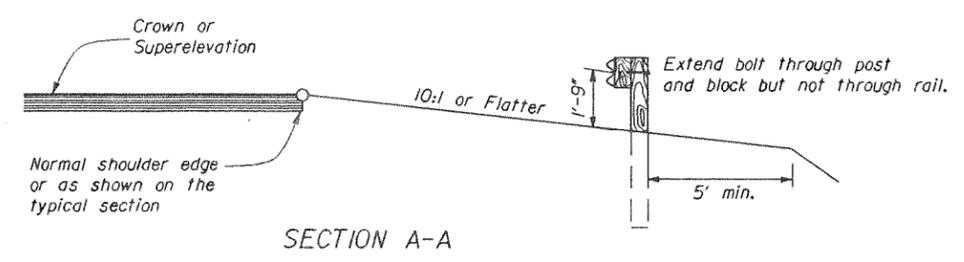
NO SCALE



APPROACH & DEPARTURE FLARE WITH MODIFIED ECCENTRIC LOADER TERMINAL (MELT)



BREAKAWAY LINE POST AND BLOCK (Modified ARTBA P-11-79)



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

STANDARD
G4 W BEAM GUARDRAIL
MODIFIED ECCENTRIC
LOADER TERMINAL
TERMINAL SECTION, TYPE MELT

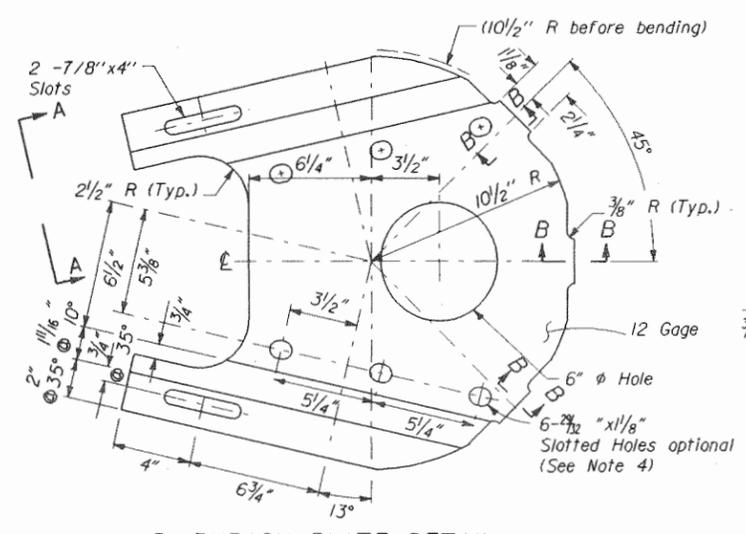
STANDARD APPROVED FOR USE 1/94

REVISOR: 4/94

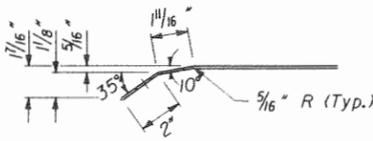
STANDARD
617-II

NO SCALE

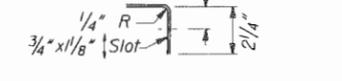
STATE	PROJECT	SHEET NO.
AK	PFH 39-1(3)	H.11



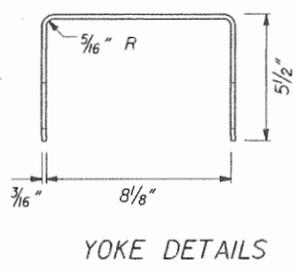
DIAPHRAGM PLATE DETAIL
(2 Required each Terminal)



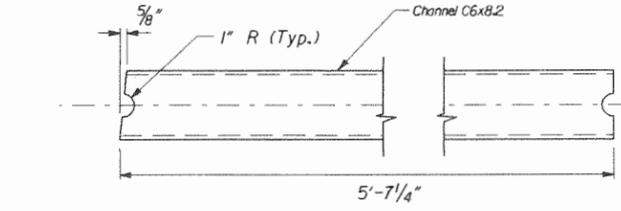
DIAPHRAGM PLATE DETAIL
VIEW A-A



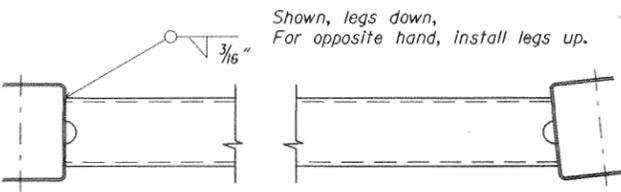
DIAPHRAGM PLATE DETAIL
SECTION B-B



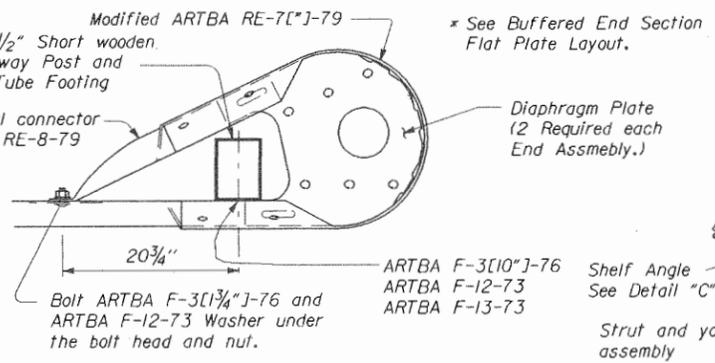
YOKE DETAILS



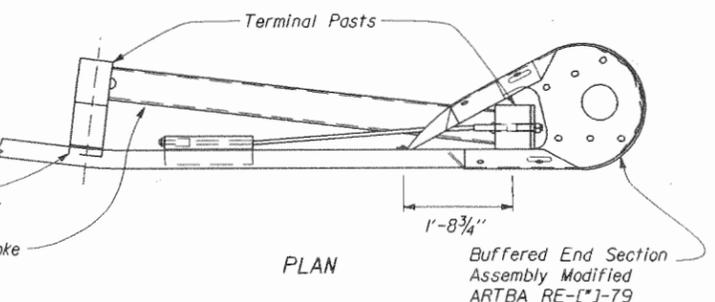
STRUT DETAILS



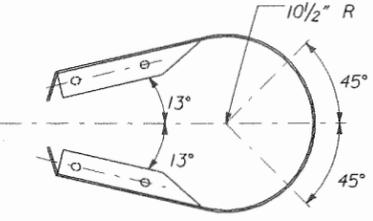
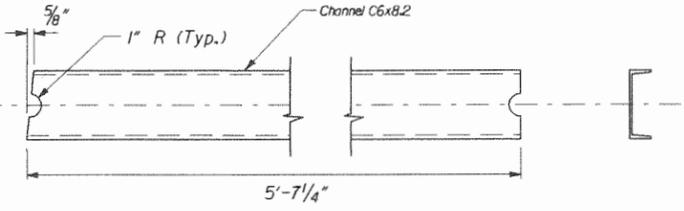
STRUT AND YOKE ASSEMBLY



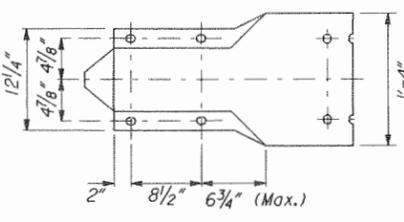
BUFFERED END SECTION ASSEMBLY



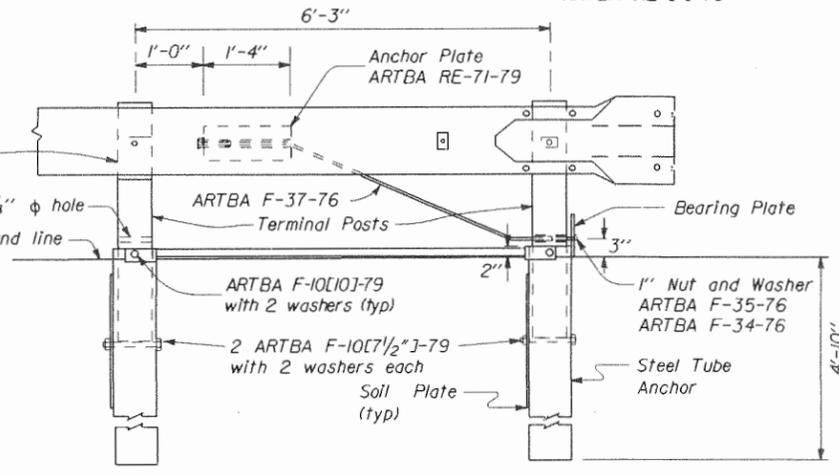
PLAN



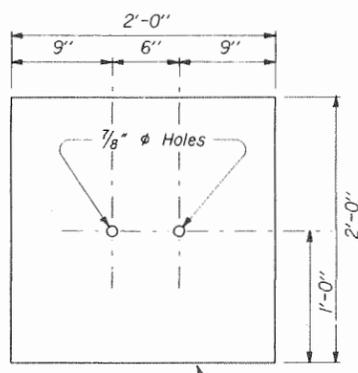
BUFFERED END SECTION
PLAN



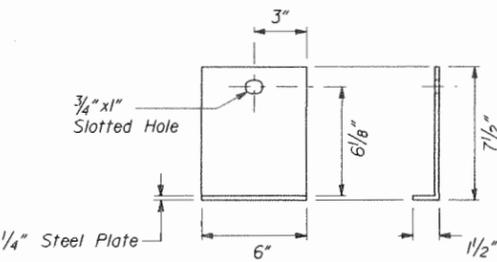
BUFFERED END SECTION
ELEVATION



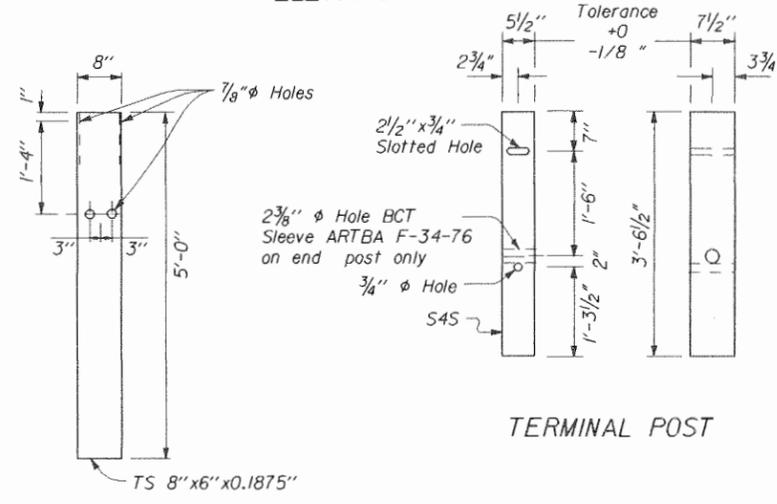
ANCHORAGE ASSEMBLY
ELEVATION



SOIL PLATE (2 Req'd)

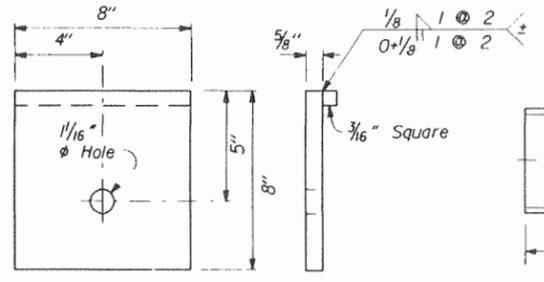


DETAIL "C"
SHELF ANGLE



TERMINAL POST

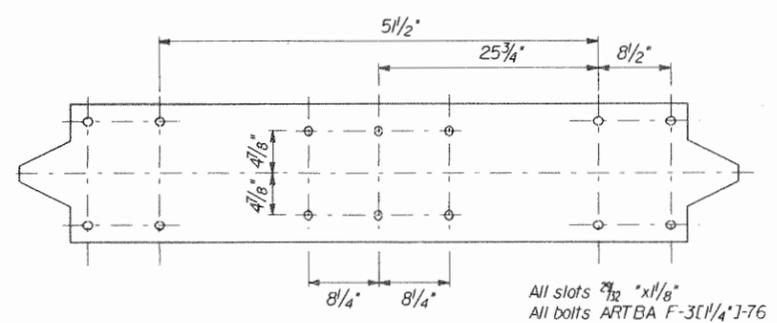
STEEL TUBE ANCHOR



BEARING PLATE



BREAKAWAY TERMINAL
POST SLEEVE
ARTBA F-34-76



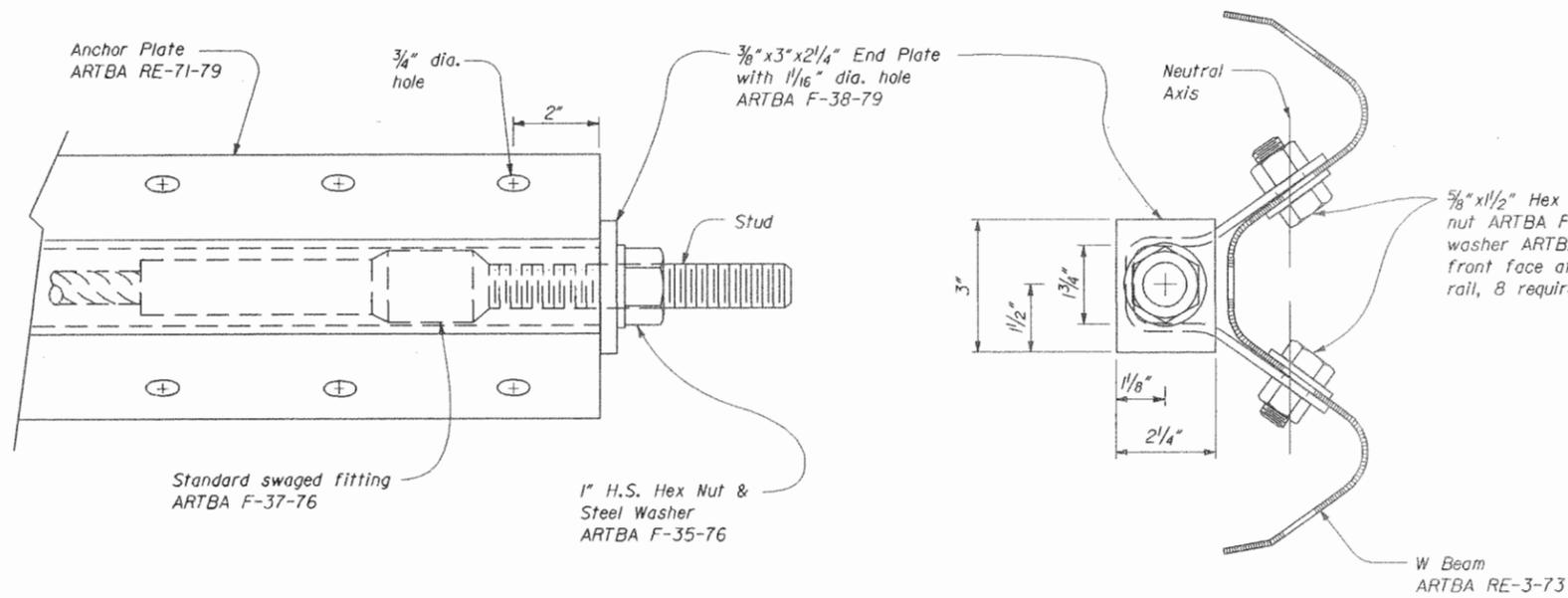
BUFFERED END SECTION
FLAT PLATE LAYOUT
(Modified ARTBA RE-7-79)

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY OFFICE	
STANDARD G4 W BEAM GUARDRAIL MODIFIED ECCENTRIC LOADER TERMINAL ANCHORAGE ASSEMBLY	
STANDARD APPROVED FOR USE 1/94	STANDARD
REVISED: 4/94	617-12

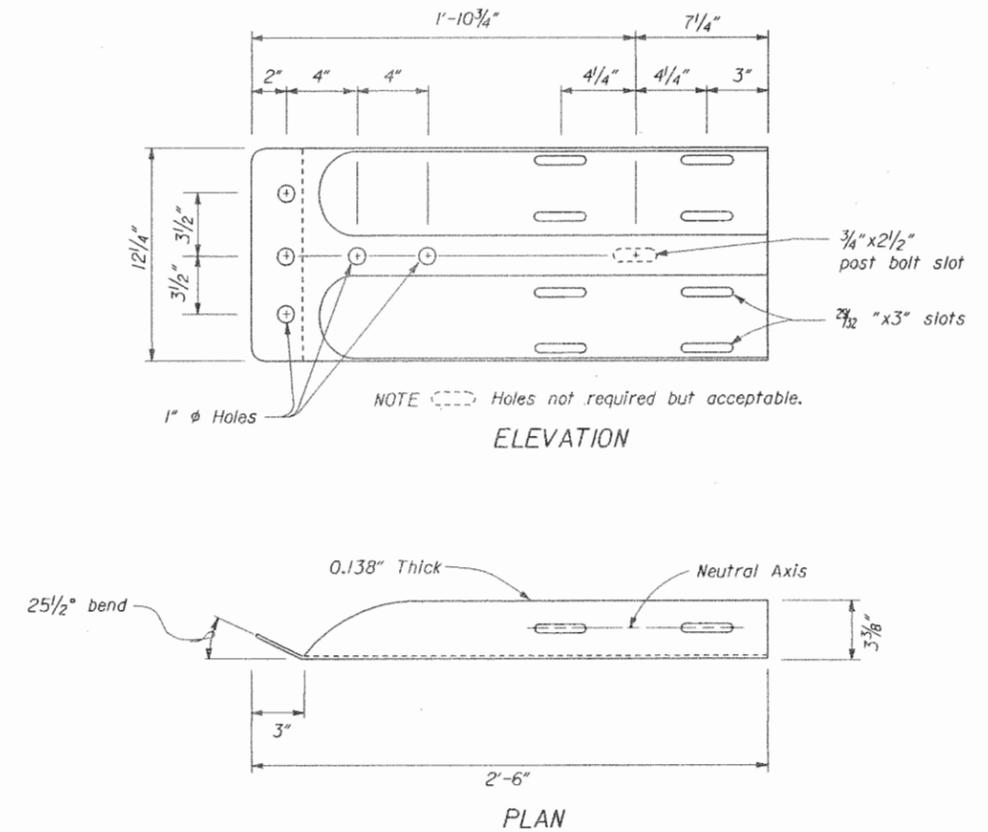
NO SCALE

STD 617.2.DSN

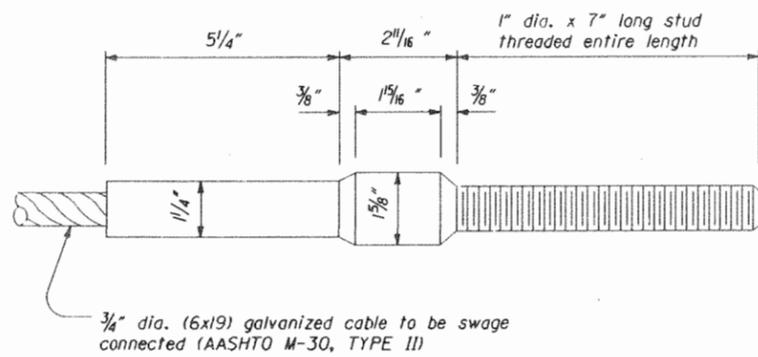
STATE	PROJECT	SHEET NO.
AK	PFH 39-1(3)	H. 12



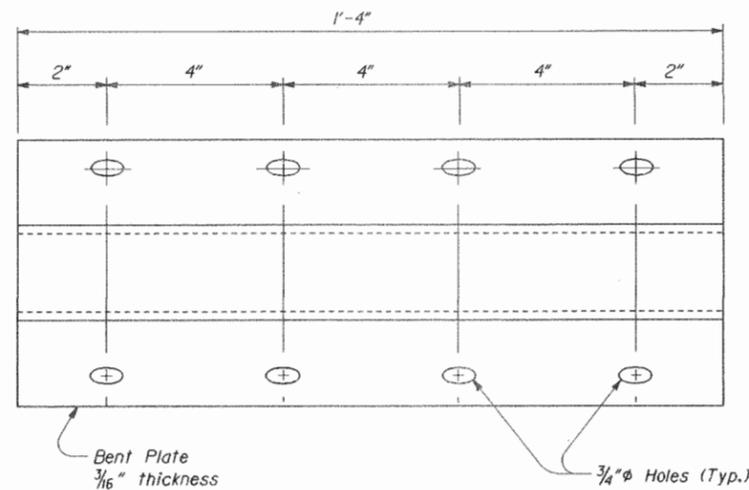
ANCHOR PLATE DETAILS FOR BCT AND MELT ANCHORAGE ASSEMBLY
ARTBA RE-71-79



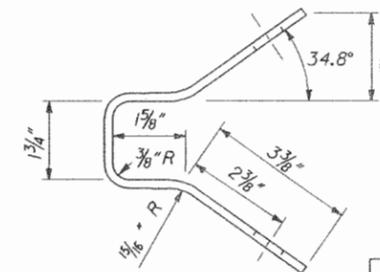
TERMINAL CONNECTOR
ARTBA RE-8-79



Standard swaged fitting and stud
CABLE ASSEMBLY
ARTBA F-37-76



ANCHOR PLATE
ARTBA RE-71-79



NO SCALE

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

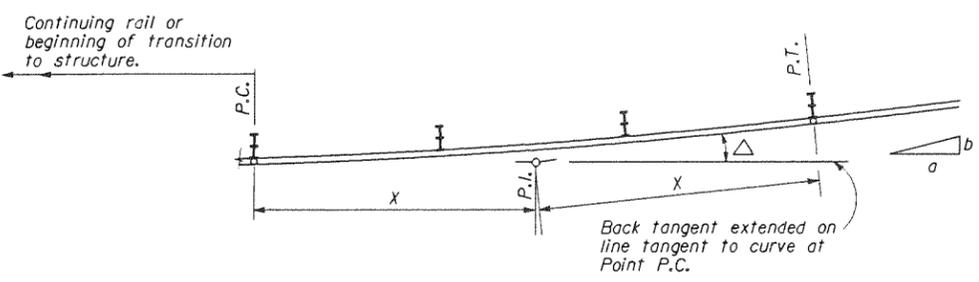
STANDARD
G4 W BEAM GUARDRAIL
BCT AND MELT
ANCHORAGE ASSEMBLY
DETAILS

STANDARD APPROVED FOR USE 1/94

REVISED: 4/94

STANDARD

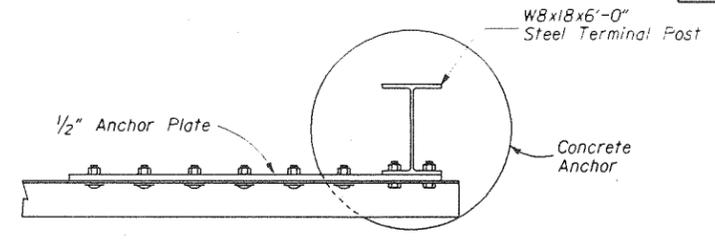
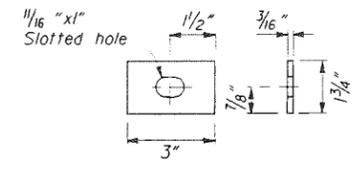
617-13



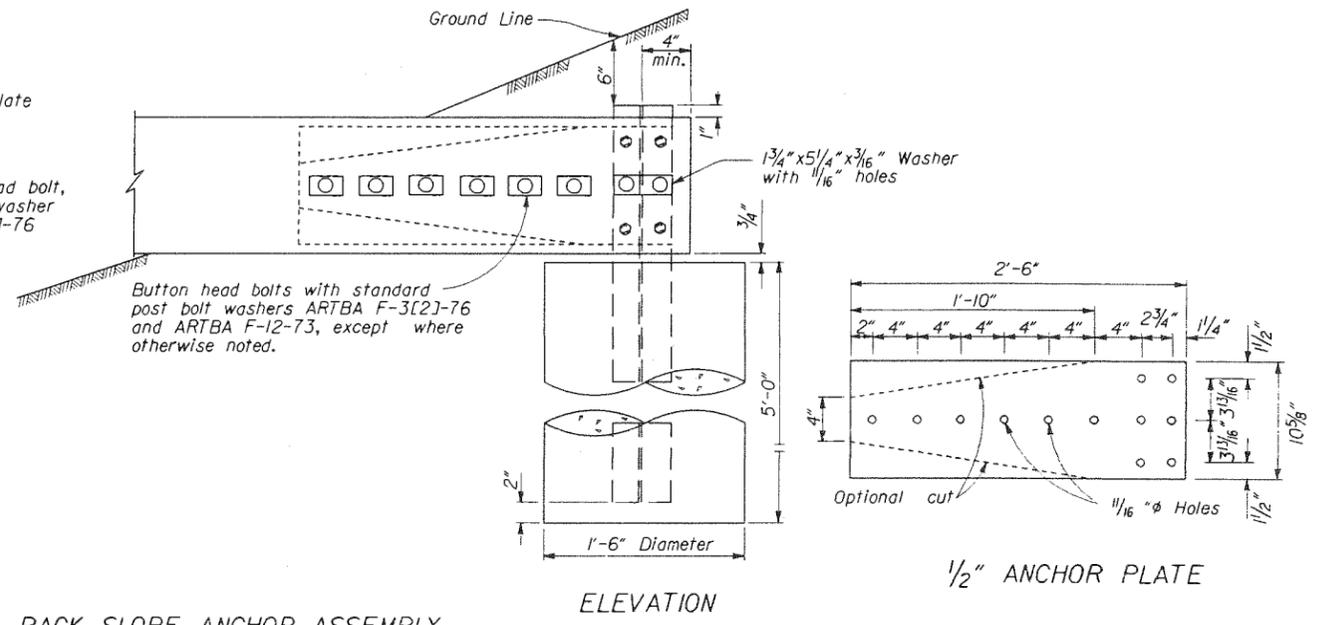
DESIGN SPEED	a:b	Δ	RADIUS (FT.)	X (FT.)
70 MPH	15:1	3°48'51"	281.67	9.38
60 MPH	13:1	4°23'55"	244.23	9.38
50 MPH	11:1	5°11'40"	206.82	9.38
40 MPH	9:1	6°20'25"	169.44	9.38
30 MPH	7:1	8°07'48"	132.14	9.39

DETAIL "A"

RECTANGULAR PLATE WASHER
ARTBA F-12-73



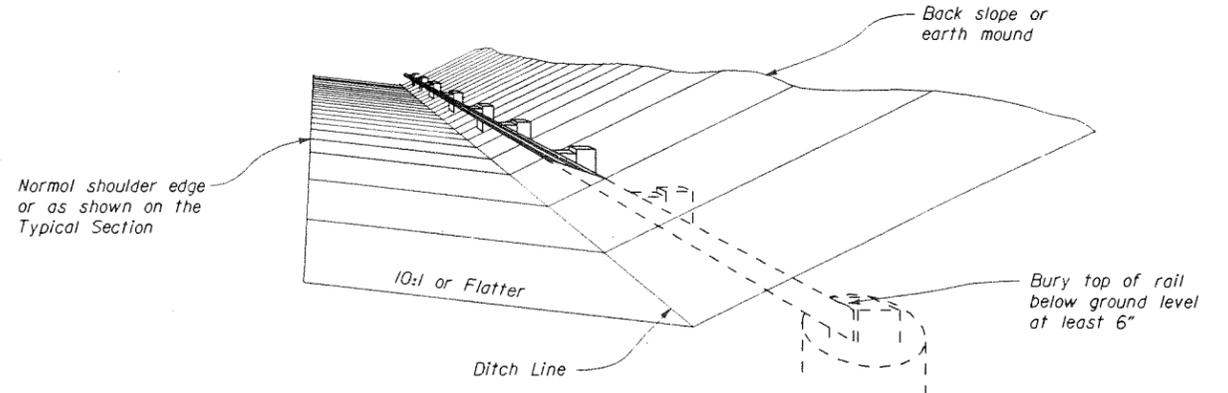
PLAN



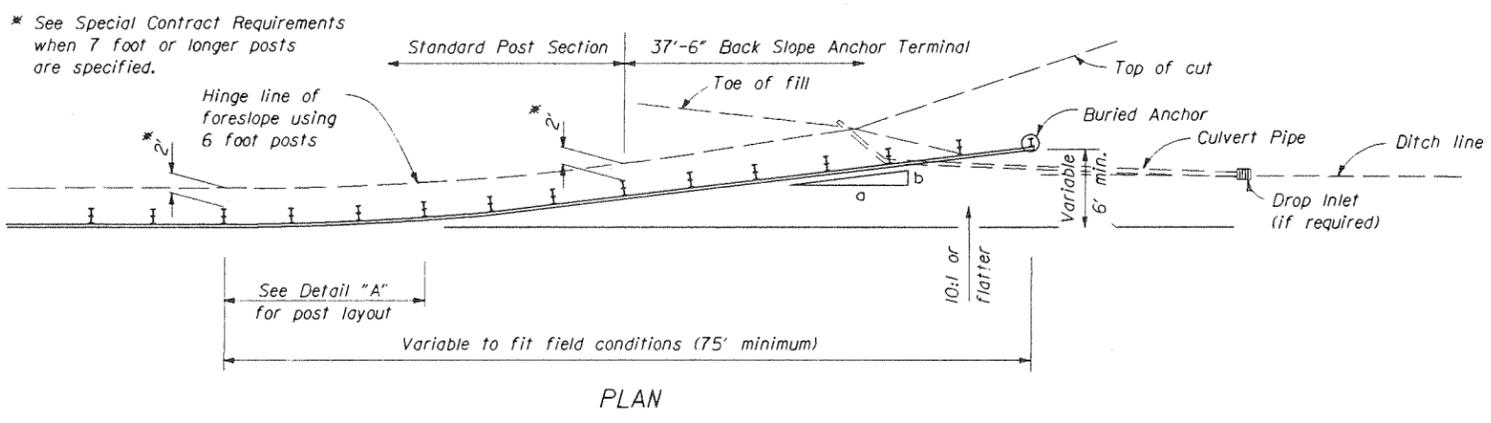
ELEVATION

1/2" ANCHOR PLATE

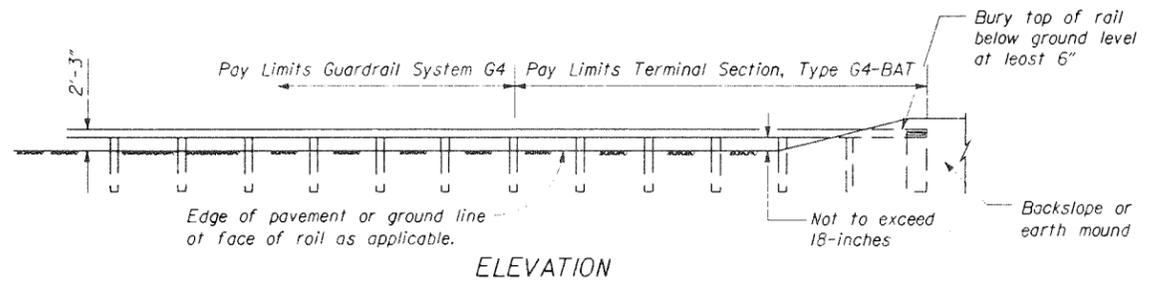
BACK SLOPE ANCHOR ASSEMBLY
No ARTBA Designation



PERSPECTIVE VIEW



PLAN



ELEVATION

APPROACH & DEPARTURE FLARE
WITH BACK SLOPE ANCHOR TERMINAL

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

STANDARD
G4 W BEAM GUARDRAIL
BACK SLOPE ANCHOR TERMINAL
WOOD OR STEEL POSTS
TERMINAL SECTION, TYPE G4-BAT

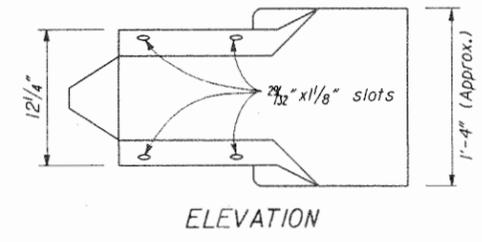
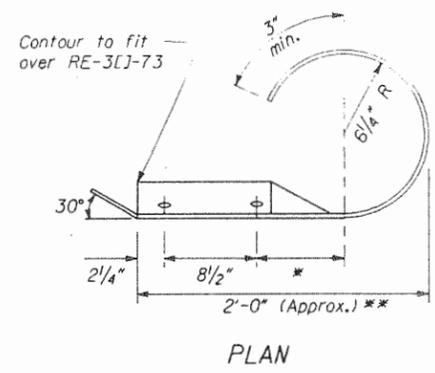
STANDARD APPROVED FOR USE 1/34

REVISOR: 4/94

STANDARD
617-17

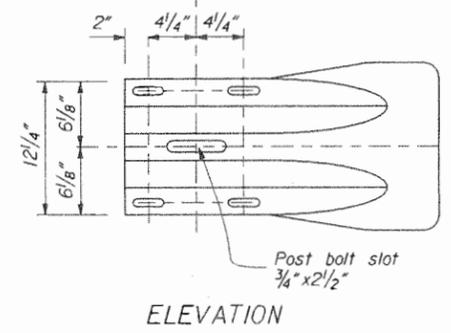
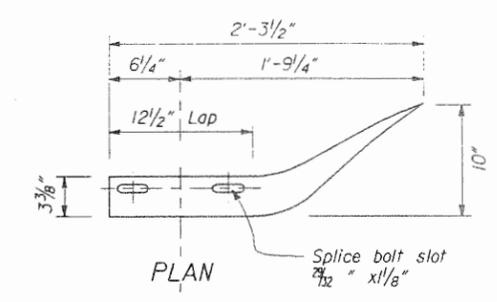
NO SCALE

STANDARD 7-561



* This dimension is 7 1/2" in RE-7-79. If the same dimension is used in this part, it will give an acceptable overall length (**) of approximately 2'-1 1/2".

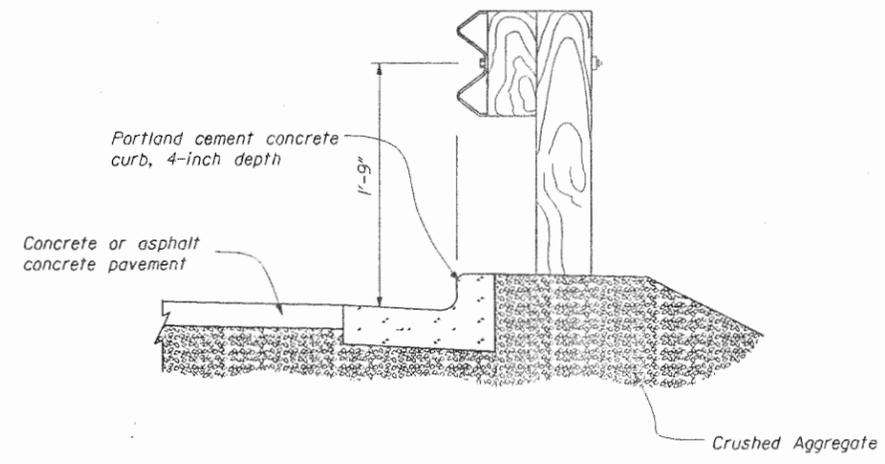
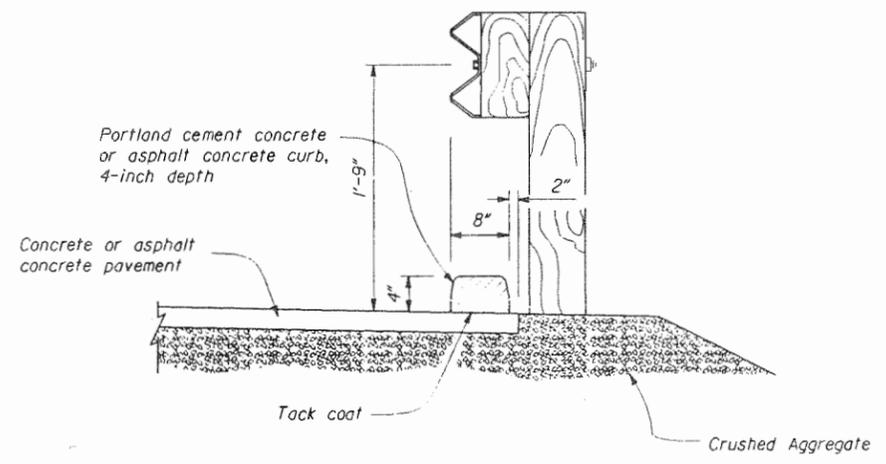
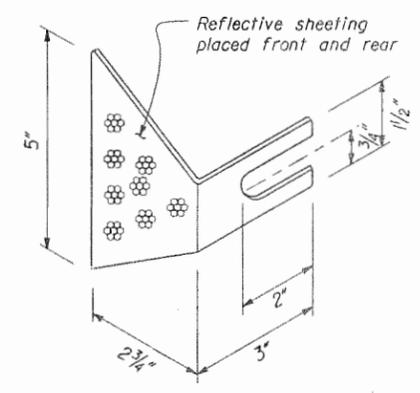
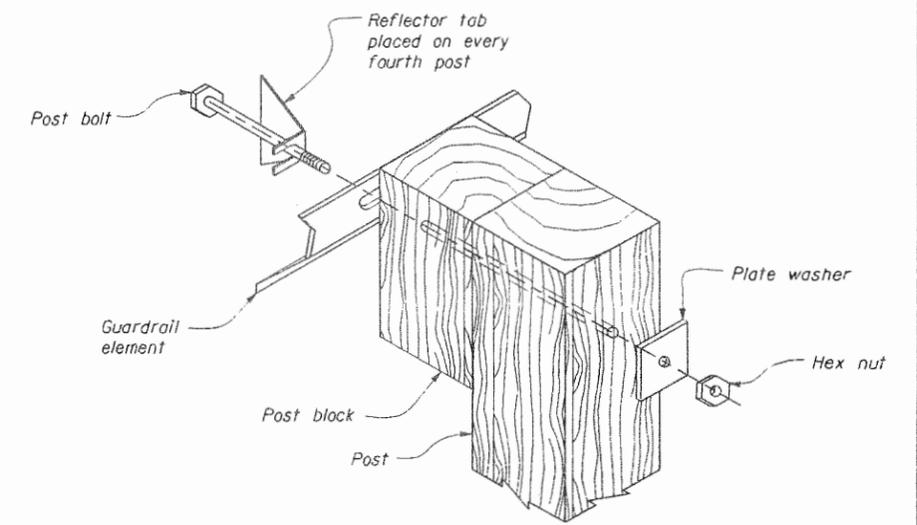
ROUND END SECTION
ARTBA RE-6-79



FLARED END SECTION
ARTBA RE-5-76

NOTE:

1. Rounded or flared end sections are acceptable alternates to buffered end sections and type I end sections on terminal sections at the trailing ends of guardrail runs on the right side of multilane roadways and where shown on the plans on the left side of multilane roadways.
2. The curb and curb and gutter shapes shown are for illustration only. Actual curb and curb and gutter shapes and dimensions will show on the plans.
3. Alternate reflector tab shapes are acceptable.



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

STANDARD
G4 W BEAM GUARDRAIL
SUPPLEMENTARY INSTALLATION
DETAILS

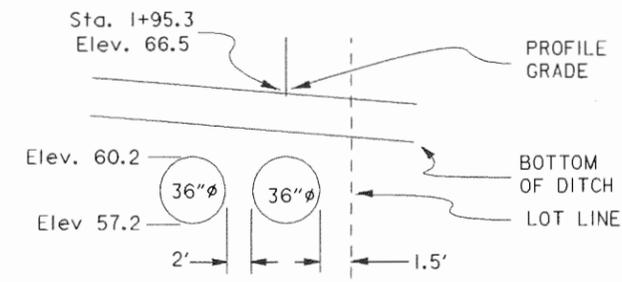
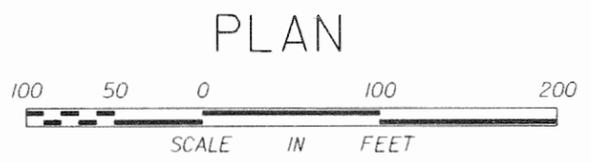
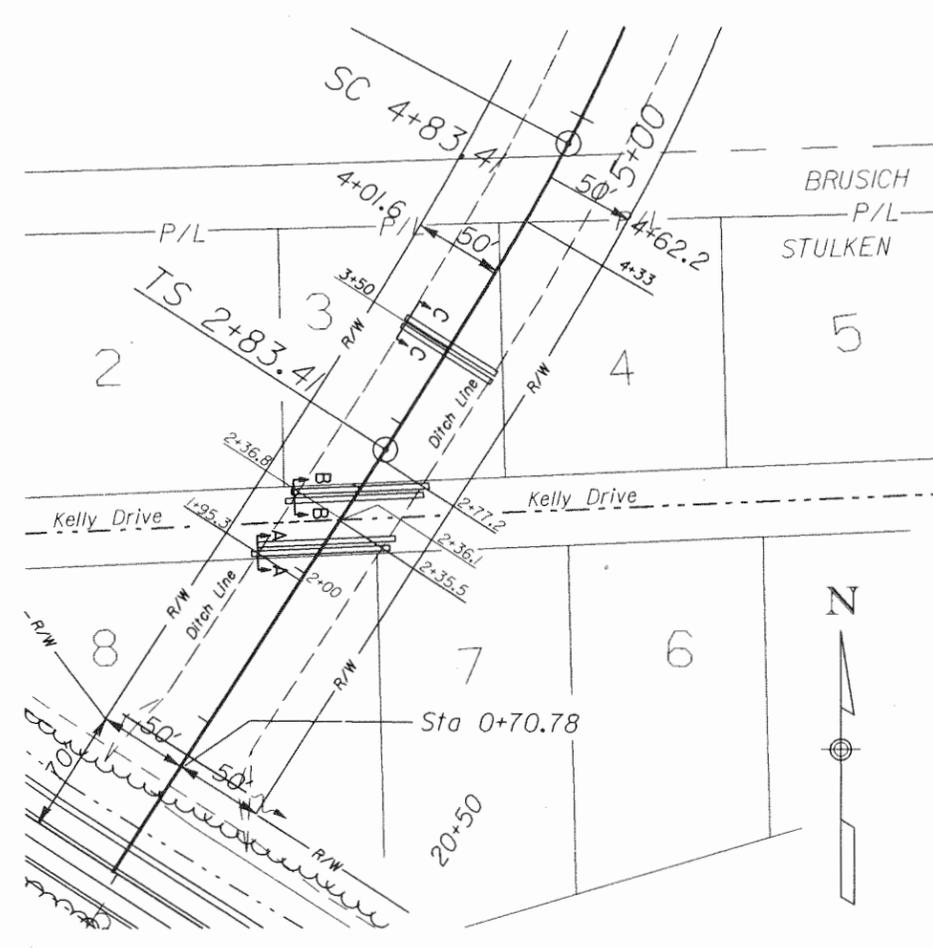
STANDARD APPROVED FOR USE 1/94
REVISED: 4/94

STANDARD
617-23

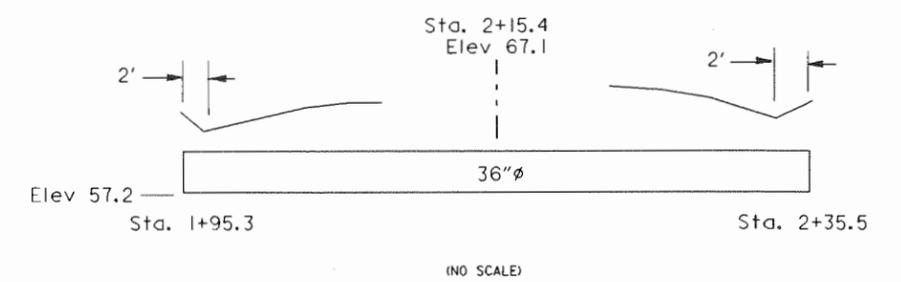
NO SCALE

21001123-0001

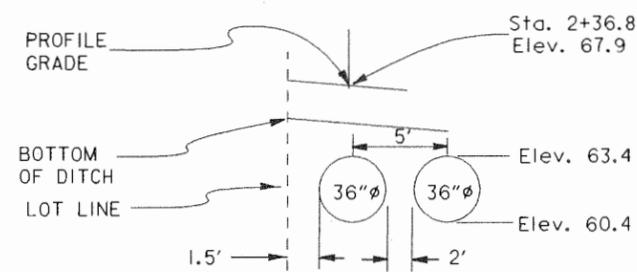
Date:	2/95
By:	P. Anderson
Designed:	P. Anderson
CADD:	P. Anderson
Checked:	
Approved:	



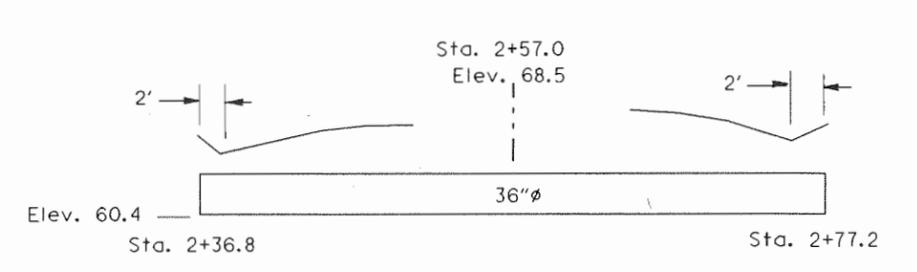
SECTION A-A
Inlet Sta. 1+95.3
(NO SCALE)



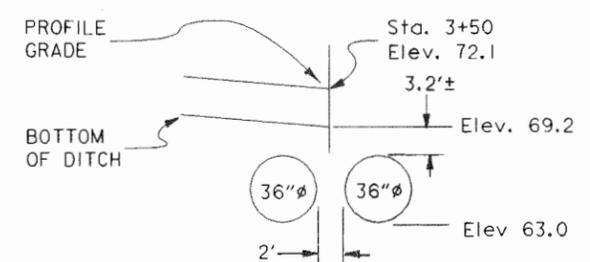
SECTION A-A
Inlet Sta. 1+95.3
(NO SCALE)



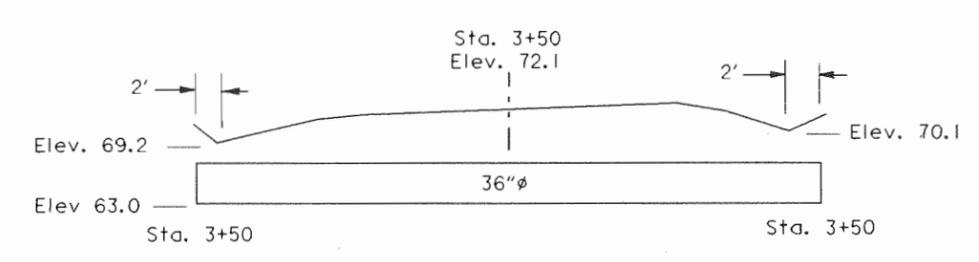
SECTION B-B
Inlet Sta. 2+36.8
(NO SCALE)



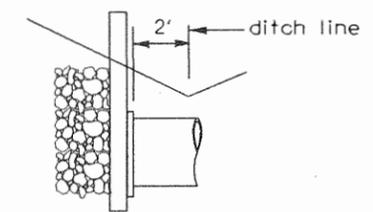
SECTION B-B
Inlet Sta. 2+36.8
(NO SCALE)



SECTION C-C
Inlet Sta. 3+50
(NO SCALE)



SECTION C-C
Inlet Sta. 3+50
(NO SCALE)

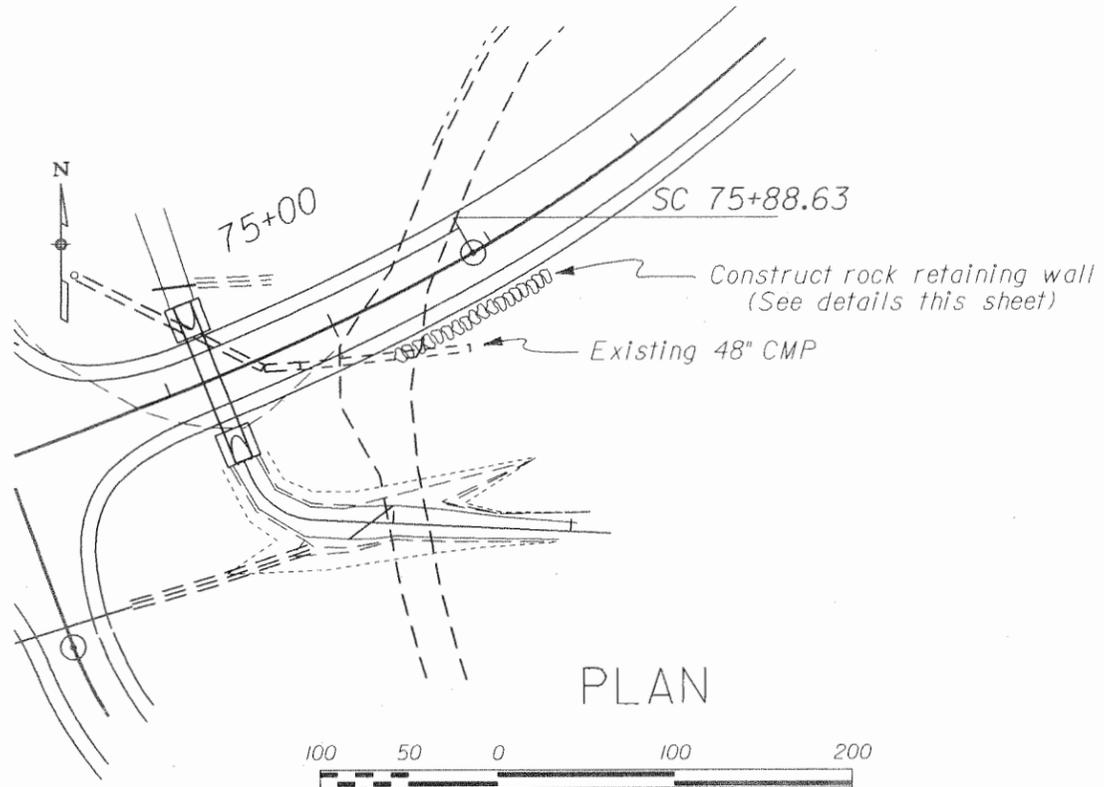


Cap both ends of all pipes with 1/2" plywood (typ)
Mark with 4"x4" wood post or metal fence post
Backfill with native material
Not measured for payment

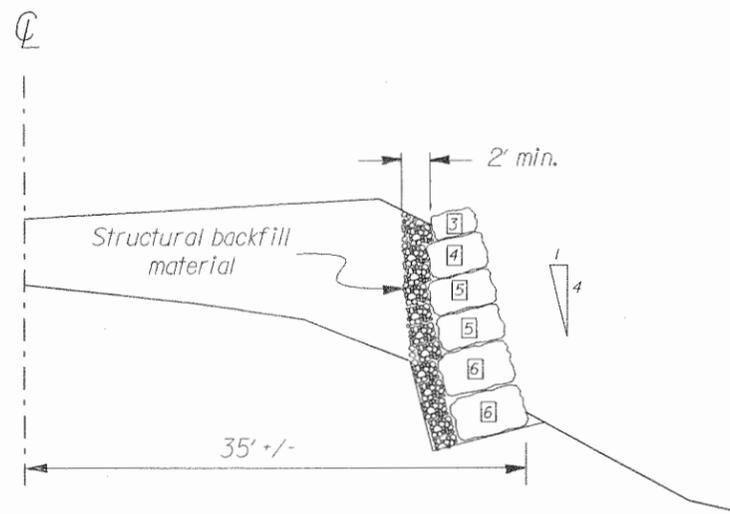
U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION
VANCOUVER, WASHINGTON

UTILITY CROSSING DETAILS

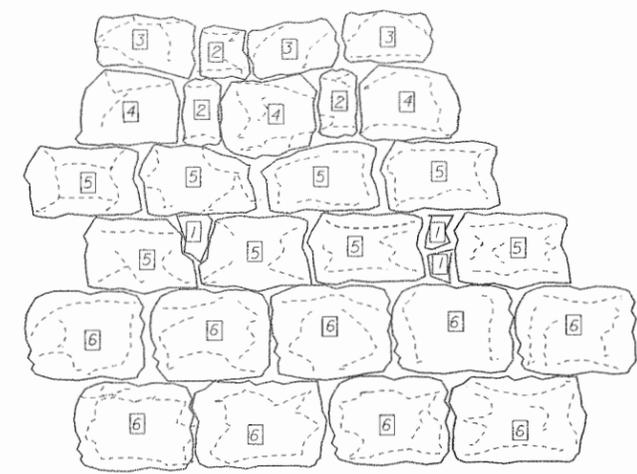
AF03930P.DGN



PLAN



CROSS SECTION
(NOT TO SCALE)

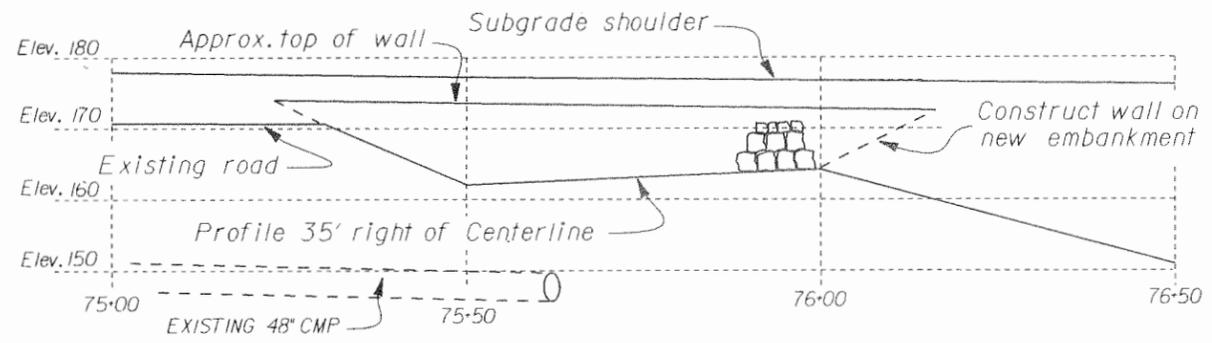


CONSTRUCTION DETAIL
(NOT TO SCALE)

ROCK SIZE	ROCK WEIGHT	AVERAGE LONGEST DIMENSION
1	50-200 lb	12 to 18 inches
2	200-700 lb	18 to 28 inches
3	700-2000 lb	28 to 36 inches
4	2000-4000 lb	36 to 48 inches
5	4000-6000 lb	48 to 54 inches
6	6000-8000 lb	54 to 60 inches

GENERAL NOTES:

1. Excavate foundation trench a minimum of 1 foot depth into existing ground.
2. Place larger rocks (Size 4-6) with longest axis perpendicular to wall.
3. Each larger rock (Size 4-6) should bear firmly on at least two rocks beneath it. Use smaller rocks as needed to maintain spacing and eliminate gaps over 6 inches. Cutting or dressing of rocks will not be required.
4. Backfill 2 feet behind wall with structural backfill material.
5. Wall location and dimensions will be established in the field by the CO.



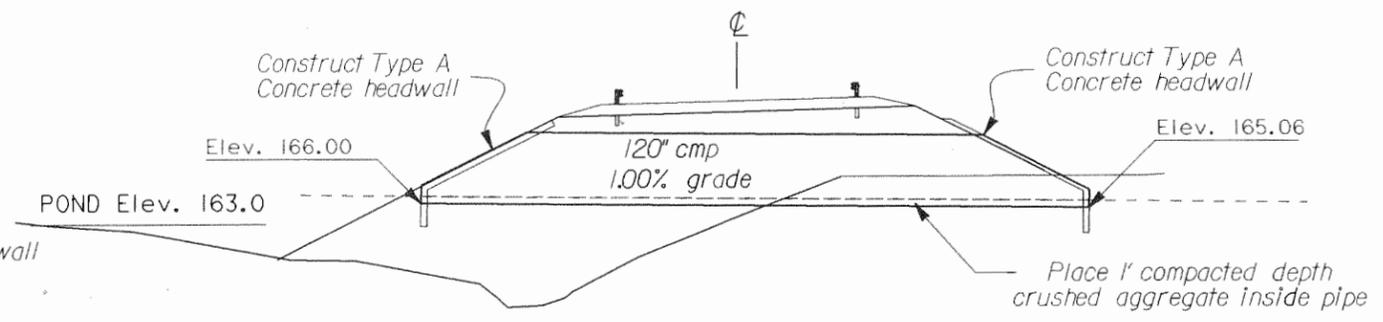
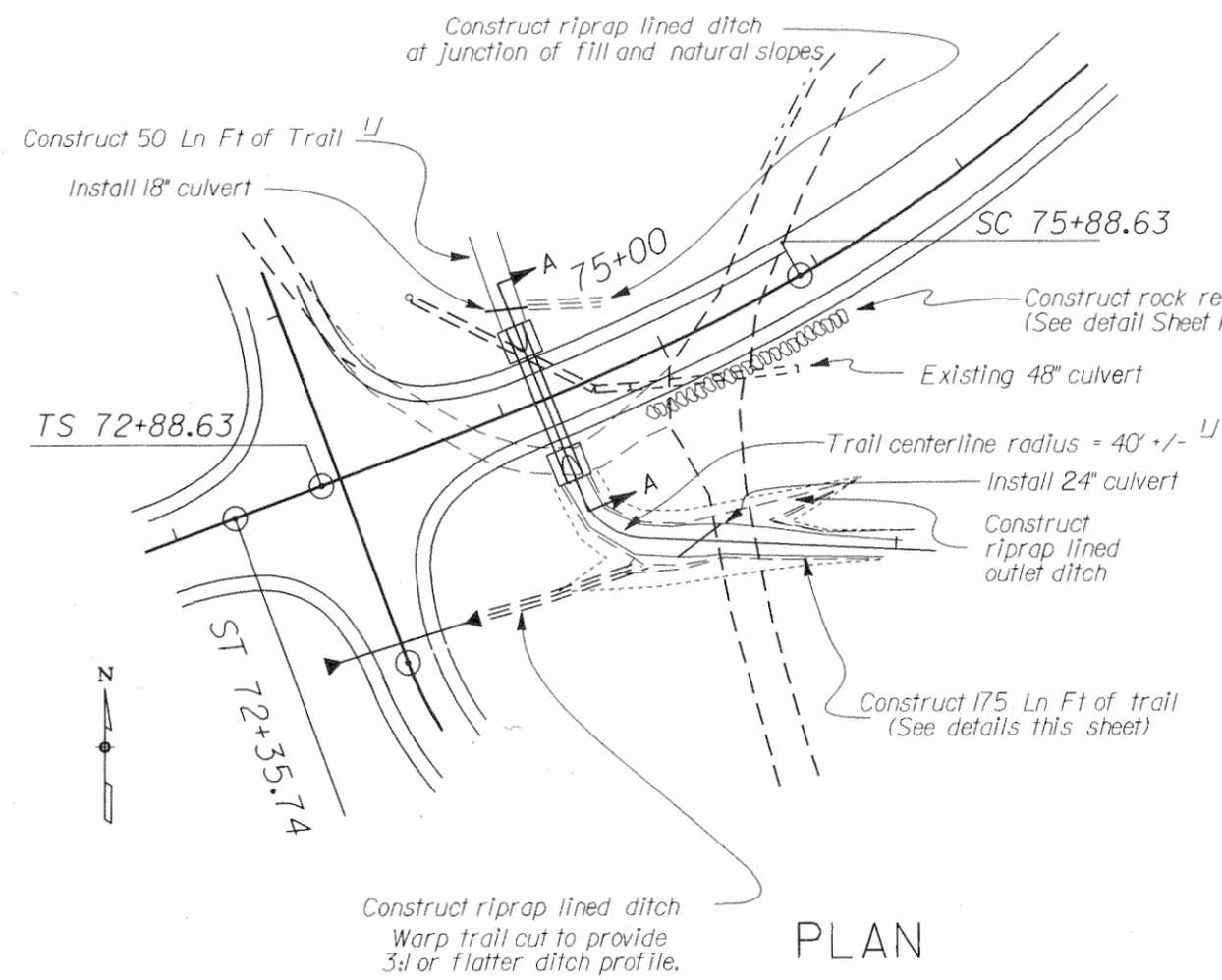
PROFILE

QUANTITIES		
	Structure excavation	U 67 cu yd
	Structural backfill material	U 87 cu yd
Item 65520	Rock retaining wall	750 sq ft

U For information only

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

ROCK RETAINING WALL
Sta. 75+75



SECTION A-A

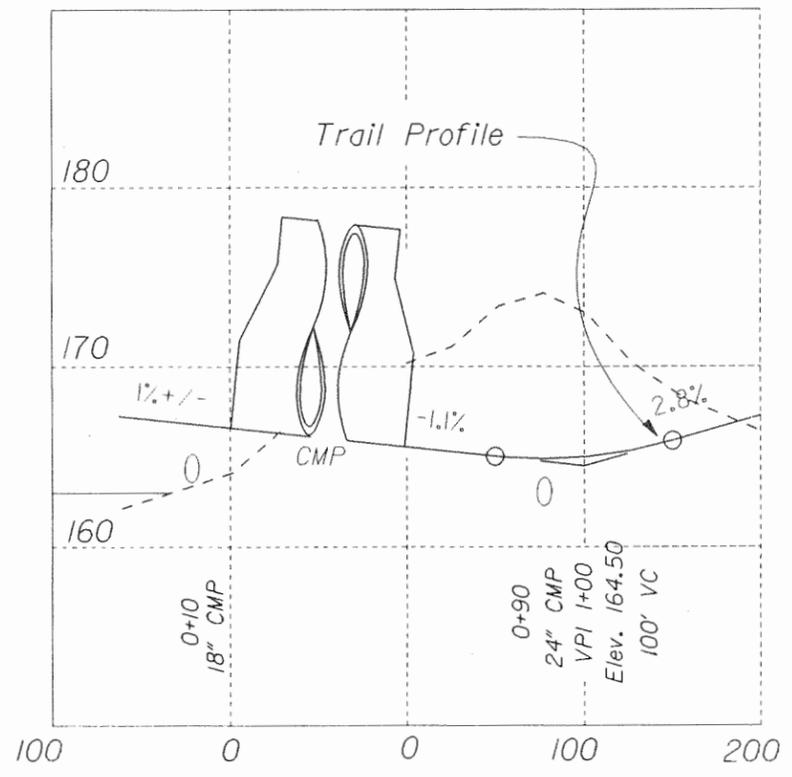


TYPICAL SECTIONS
(NO SCALE)

- GENERAL NOTES:
- Actual location of the trail will be established in the field by the C.O.
 - Trail construction will be measured for payment under Item 2040I.
 - See Sheet H.5 for landscaping and seeding details.

QUANTITIES		
Item 2040I	Roadway Excavation	2100 Cu Yd
Item 25107	Riprap lined ditch	220 Ln Ft
Item 30110	Crushed Aggregate	78 Ton
Item 6020IA	18" Culvert Pipe	20 Ln Ft
Item 6020IB	24" Culvert Pipe	30 Ln Ft

U Quantities included Sheet E.2

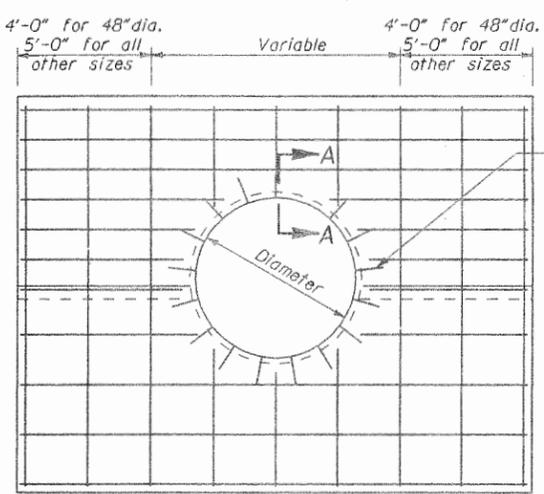
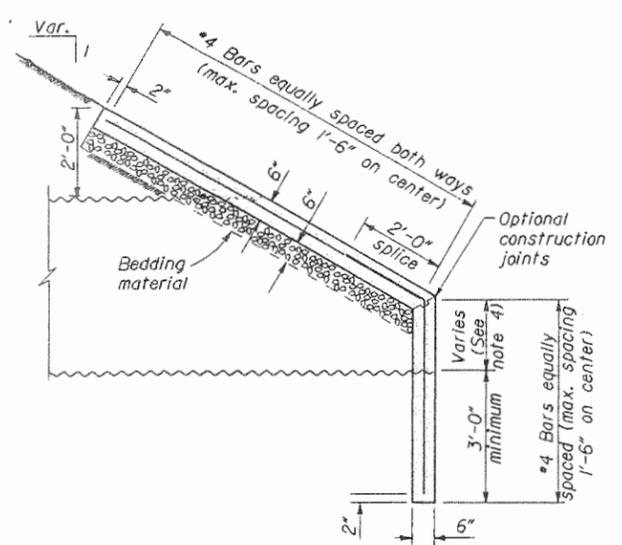


By:	Date:
P. Anderson	2/95
P. Anderson	2/95
Checked:	
Approved:	

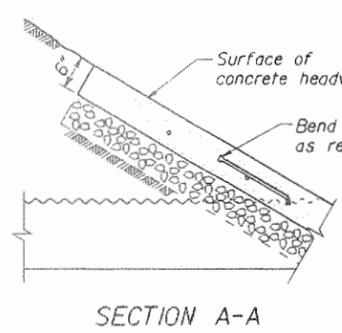
4F039307.D5W

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

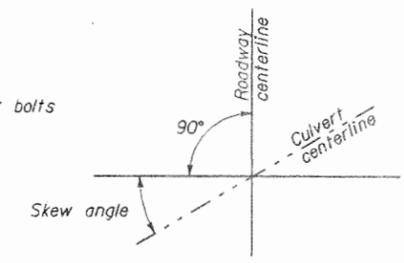
PEDESTRIAN UNDERPASS AND HIKING TRAIL
Sta. 74+25



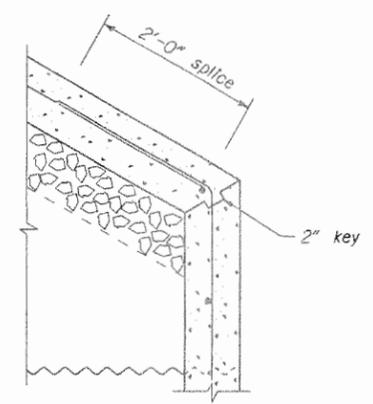
Anchor bolts on 1'-6" centers (max.)



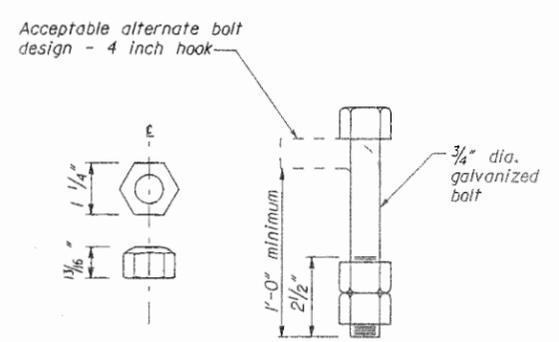
SECTION A-A



SKEW ANGLE DIAGRAM



CONSTRUCTION JOINT DETAIL

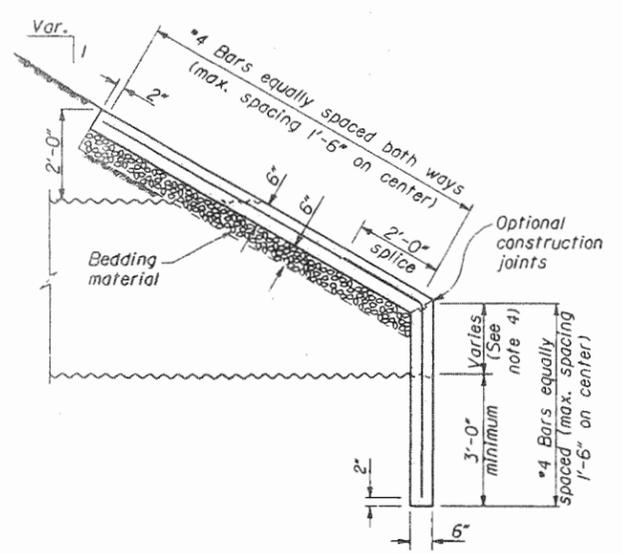


ANCHOR BOLT DETAIL

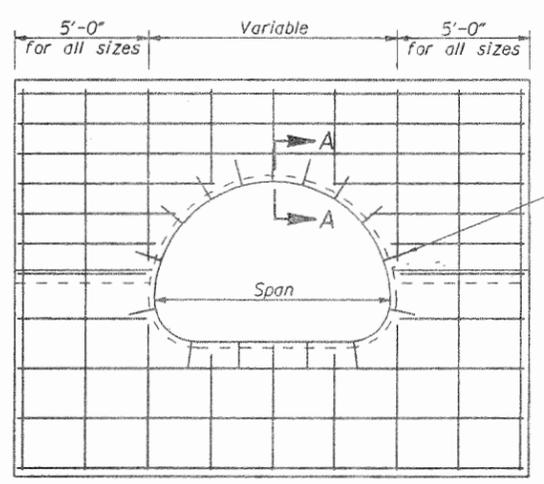
TYPE A STEP BEVEL FOR ROUND PIPE

REINFORCED CONCRETE HEADWALL STEP BEVEL PIPE ARCH CULVERT				
PIPE ARCH SIZE	SKEW ANGLE			
	0°	15°	30°	45°
Span x rise	Concrete (cu yd)			
6'-1" x 4'-7"	3.2	3.4	3.7	4.6
7'-0" x 5'-1"	3.5	3.7	4.1	5.0
8'-2" x 5'-9"	4.0	4.2	4.7	5.7
9'-6" x 6'-5"	4.4	4.6	5.1	6.2
11'-5" x 7'-3"	5.0	5.2	5.8	7.1
12'-10" x 8'-4"	5.8	6.0	6.7	8.2
13'-11" x 8'-7"	6.2	6.4	7.1	8.7
15'-4" x 10'-4"	6.6	6.8	7.6	9.3
16'-3" x 10'-10"	7.3	7.5	8.3	9.5

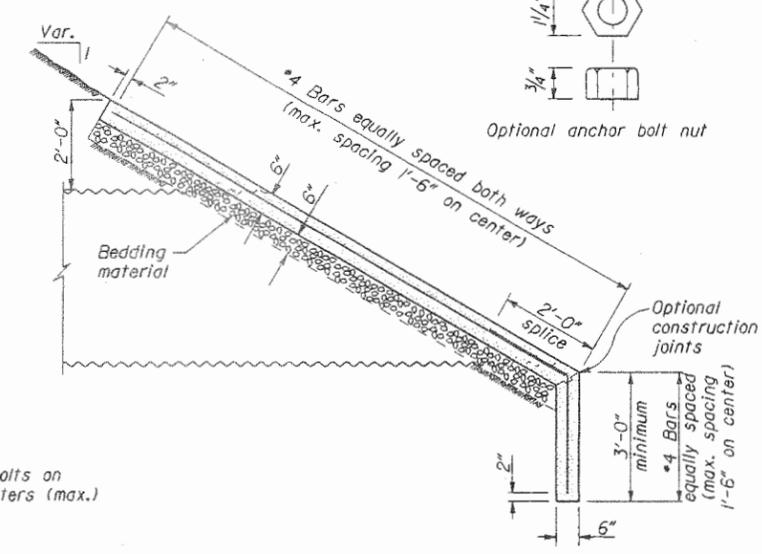
REINFORCED CONCRETE HEADWALL ROUND PIPE CULVERT								
PIPE SIZE	SKEW ANGLE							
	TYPE A STEP BEVEL				TYPE B FULL BEVEL			
	0°	15°	30°	45°	0°	15°	30°	45°
Diameter	Concrete (cu yd)				Concrete (cu yd)			
48	3.2	3.2	3.3	3.5	2.7	3.0	3.4	3.4
60	3.6	3.7	3.8	4.0	3.7	3.7	3.8	4.0
72	4.1	4.1	4.2	4.5	4.2	4.3	4.4	4.6
84	4.5	4.6	4.7	5.0	4.8	4.8	5.0	5.3
96	5.1	5.2	5.3	5.7	5.3	5.4	5.6	5.9
108	5.6	5.7	5.9	6.3	5.9	6.0	6.2	6.7
120	6.0	6.1	6.3	6.8	6.5	6.6	6.8	7.3
132	6.9	7.0	7.3	7.9	7.1	7.2	7.5	8.0
144	7.4	7.5	7.8	8.5	7.7	7.9	8.1	8.8
156	7.9	8.0	8.3	9.1	8.4	8.5	8.8	9.5
168	8.6	8.8	9.2	10.0	9.0	9.2	9.5	10.4
180	8.9	9.1	9.4	10.3	9.7	9.8	10.2	11.1



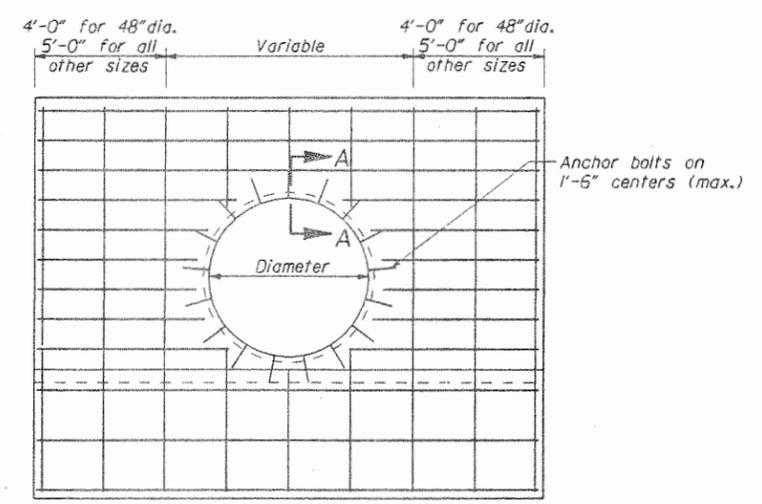
STEP BEVEL FOR PIPE ARCH CULVERT



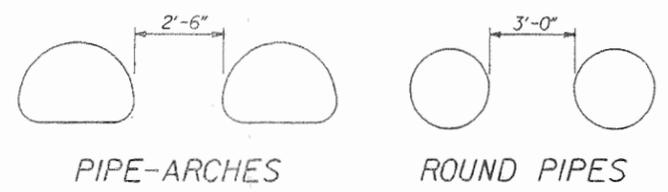
Anchor bolts on 1'-6" centers (max.)



TYPE 'B' FULL BEVEL FOR ROUND PIPE



Anchor bolts on 1'-6" centers (max.)



PIPE-ARCHES

ROUND PIPES

MULTIPLE PIPE INSTALLATION

NOTE:

1. CONCRETE: Chamfer all exposed edges 3/4 inch.
2. REINFORCING STEEL: Grade 60 (ASTM A615, Grade 60) deformed billet steel bars conforming to AASHTO M31. The minimum concrete cover to the face of any bar is 2 inches unless otherwise shown.
3. HEADWALL TYPE: Use Type A Step Bevel headwalls for round pipe unless otherwise specified in the special contract requirements.
4. STEP BEVEL: The variable dimension indicated for the height or step conform to manufacturer's recommendations unless otherwise specified in the special contract requirements.
5. CUTOFF WALLS: The minimum depth shown may be reduced in solid rock, provided wall is keyed into the rock at least 1'-0".
6. ANCHOR BOLTS: Conform to ASTM A 307. Nuts shall conform to ASTM A563, Grade C. Galvanize in accordance with ASTM A 153.
7. BEDDING: Construct a firm and uniform foundation before placing the bedding. Use clean 3/8 inch sandy material for bedding unless otherwise specified in the special contract requirements.
8. ESTIMATED QUANTITIES: The concrete quantities are based on a 3'-0" cut-off wall and 1/2:1 fill slopes for each of the skew angles. Interpolate concrete quantities for headwalls not shown. Reinforcing steel is estimated at 68 pounds per cubic yard of concrete excluding the weight of the anchor bolts.

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

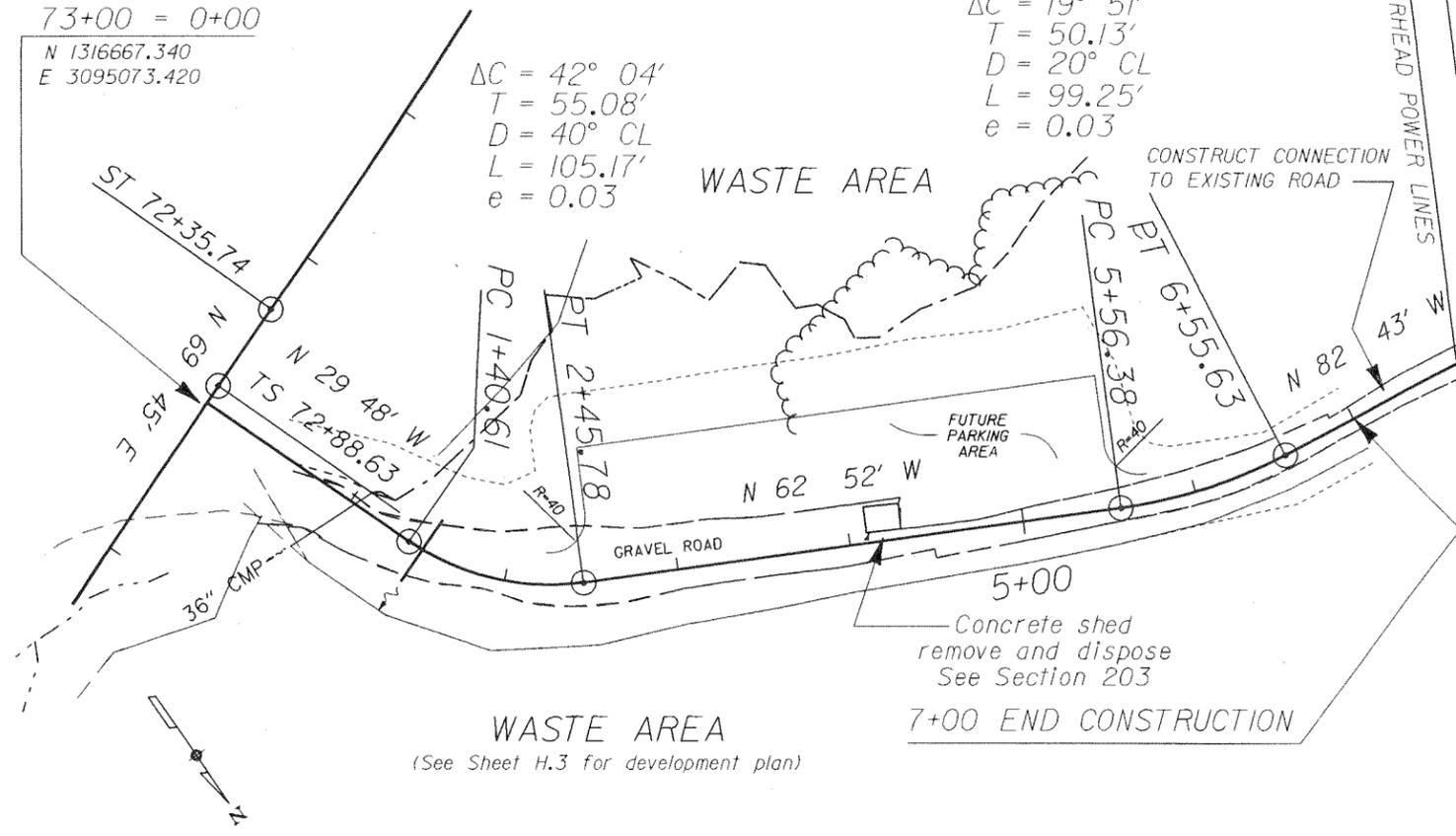
DETAIL
REINFORCED CONCRETE
HEADWALL

APPROVED FOR USE	DETAIL
REVISOR:	W601-50

73+00 = 0+00
 N 1316667.340
 E 3095073.420

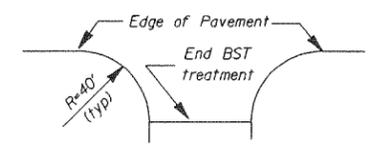
$\Delta C = 42^\circ 04'$
 $T = 55.08'$
 $D = 40^\circ CL$
 $L = 105.17'$
 $e = 0.03$

$\Delta C = 19^\circ 51'$
 $T = 50.13'$
 $D = 20^\circ CL$
 $L = 99.25'$
 $e = 0.03$

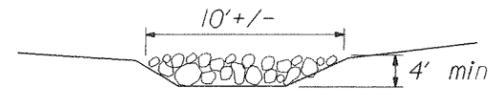


Approximate location relocated gate and rock barrier (See Sheet D.5 for existing location)

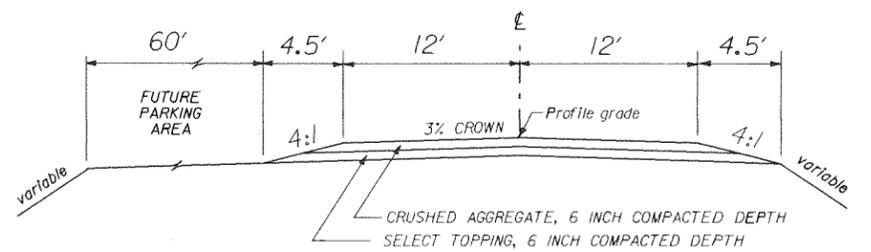
POT 8+18.56
 N 1317066.920
 E 3094422.550



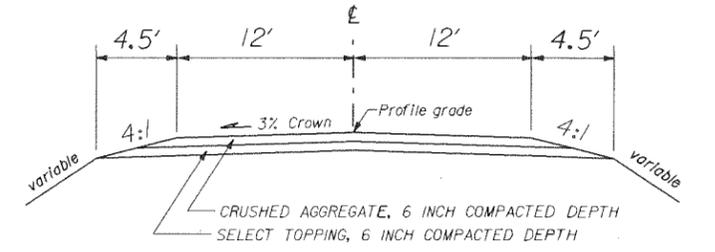
APPROACH DETAIL
(NO Scale)



SECTION A-A
(NO Scale)

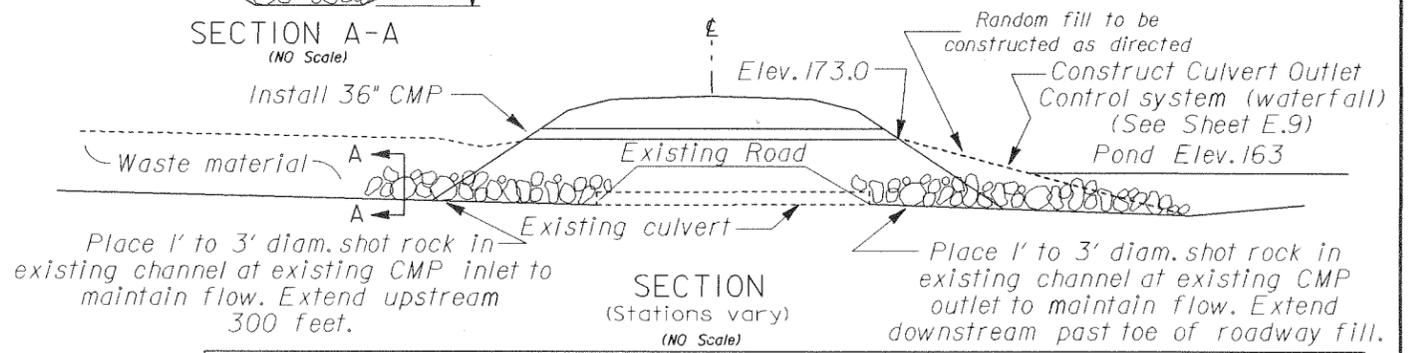


Sta. 2+50 to Sta. 5+50

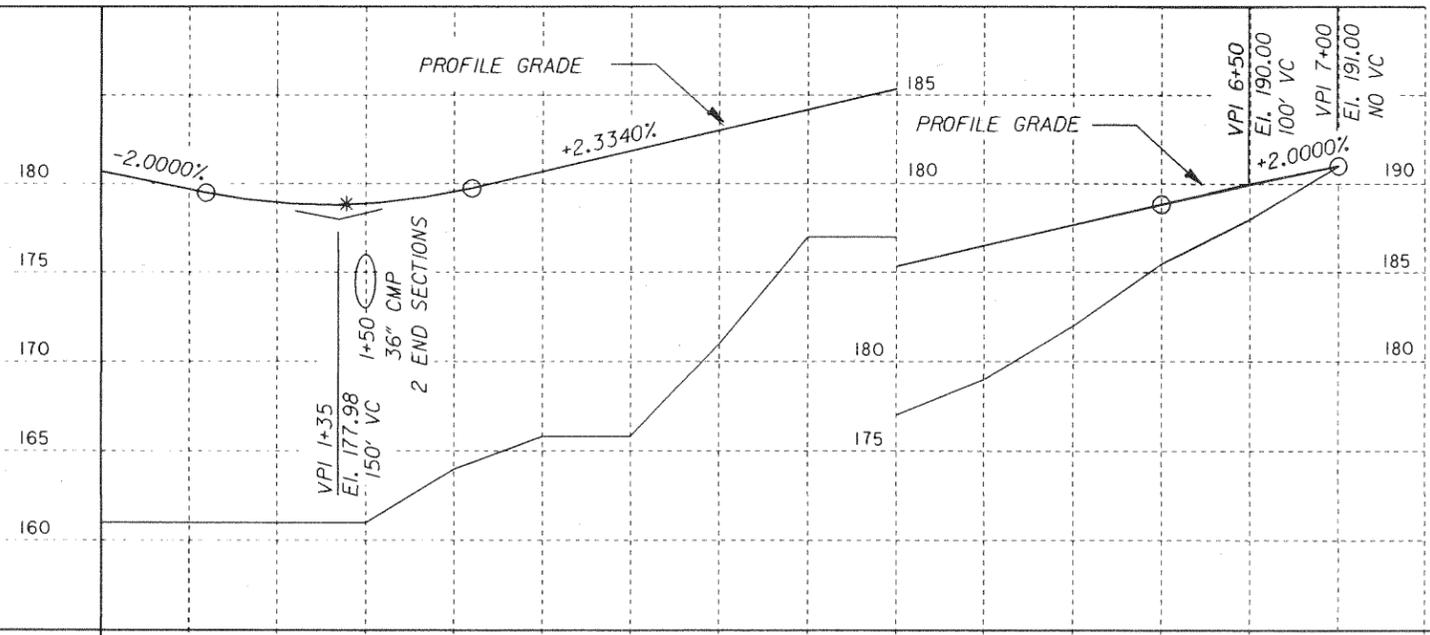


Sta. 0+00 to Sta. 2+50
 Sta. 5+50 to Sta. 7+00

TYPICAL SECTIONS



SECTION
(Stations vary)
(NO Scale)



Summary

Exc. cu yds	113	Exc.	113 cu yd
Emb. cu yds	26797	Emb.	26,797 cu yd
Clr. & Grb. acres	See waste site I development plan, sheet H.3	Clr. & Grb.	6.8 acre
Seeding sly unit	See waste site I development plan, sheet H.3	Seeding	20 sly unit
Mulching sly unit	See waste site I development plan, sheet H.3	Mulching	20 sly unit

QUANTITIES		
Item 20401	Roadway Excavation	113 cu yd
Item 20408	Select Topping	740 Ton
Item 30110	Crushed Aggregate	590 Ton
Item 31001	Emulsified Asphalt Treated Aggregate Base, Grading D	50 Ton
Item 31004	Emulsified Asphalt, Grade CSS-1	0.5 Ton
Item 40901A	Surface Treatment Aggregate, Designation E-70, Grading B	4 Ton
Item 40901B	Surface Treatment Aggregate, Designation E-70, Grading D	2 Ton
Item 40901C	Surface Treatment Aggregate, Designation E-70, Grading E	2 Ton
Item 40904	Emulsified Asphalt, Grade CRS-2	0.8 Ton
Item 60201C	36 inch Pipe Culvert U	54 Ln Ft
Item 60206C	End Section for 36 inch Pipe Culvert U	2 Each

U Quantity included on Sheet E.1

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

APPROACH ROAD
 73+00 LEFT

By: P. Anderson
 Date: 3/95
 Checked:

4F0393HW.DGN

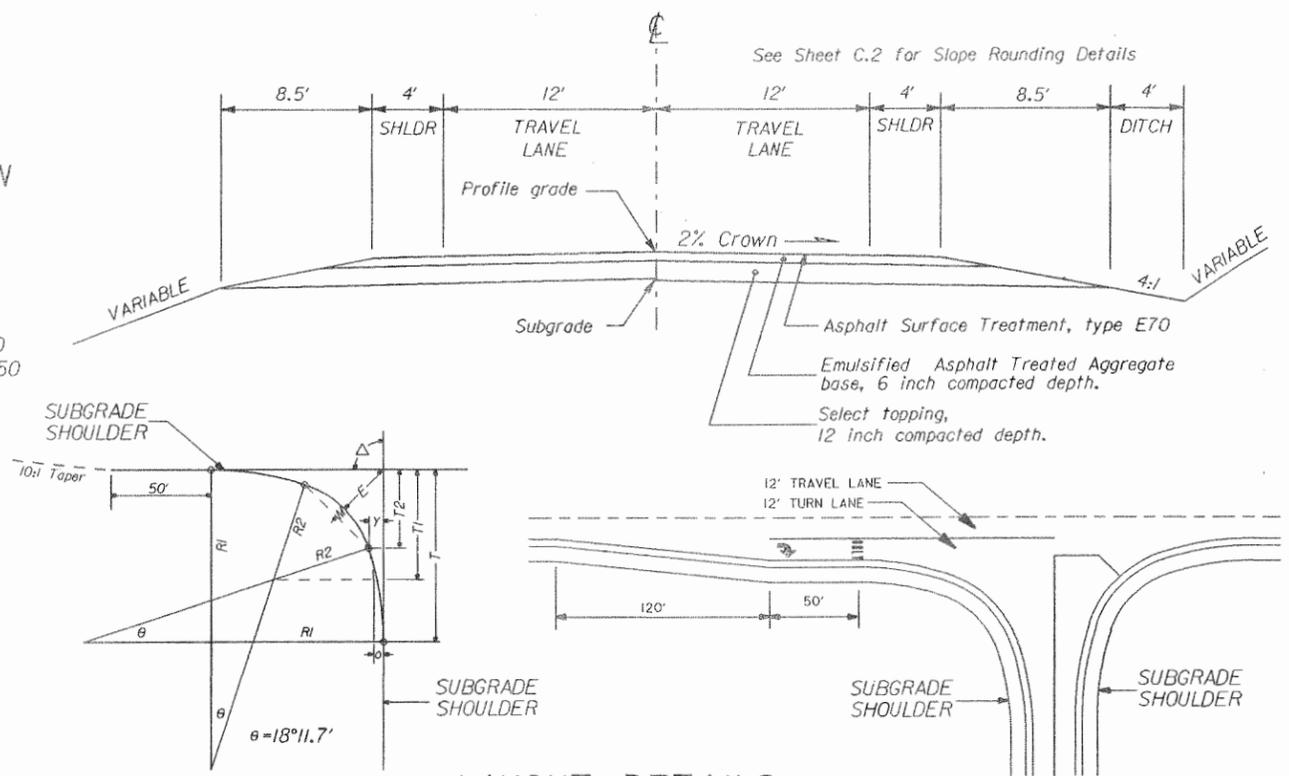
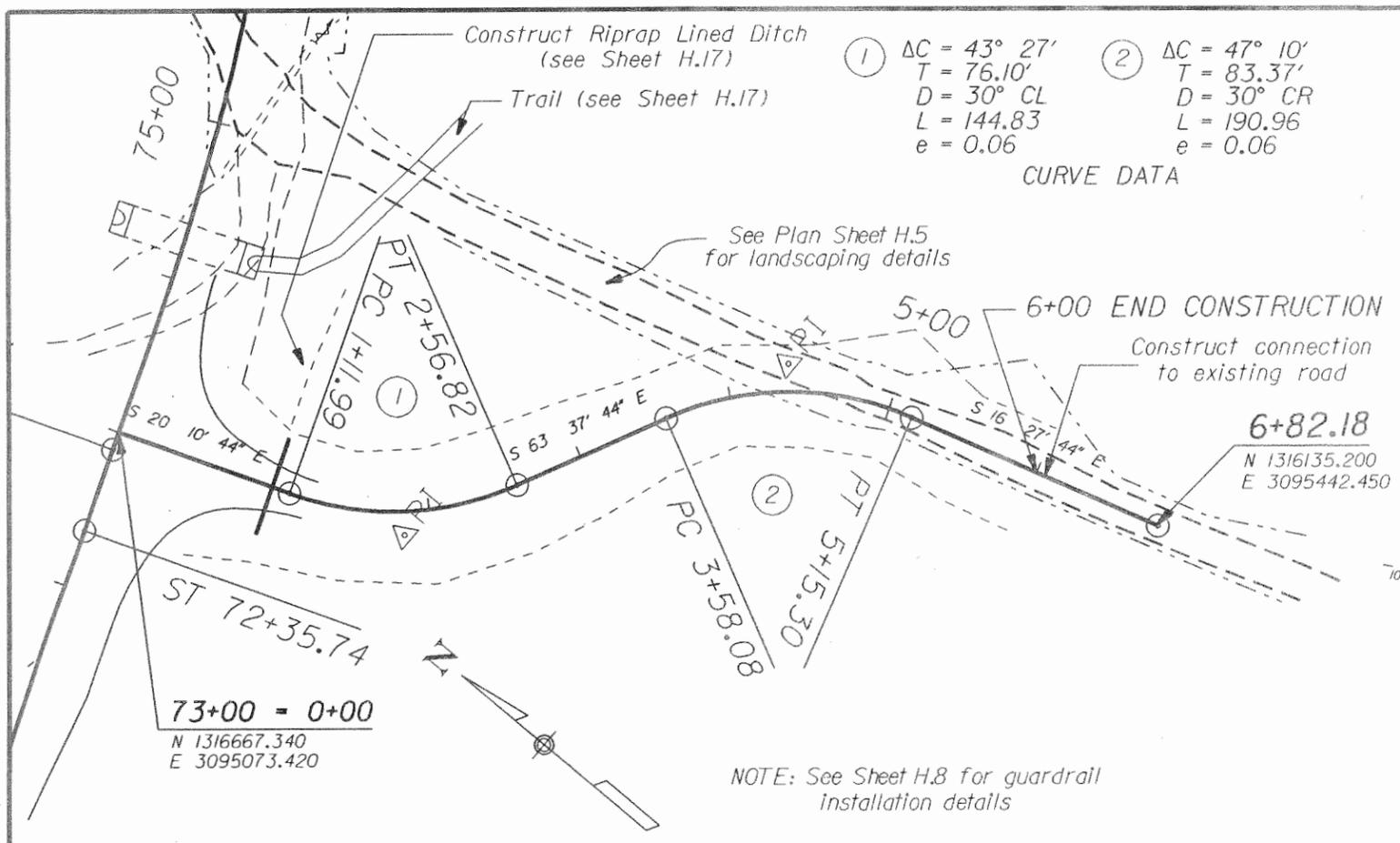
TYPICAL SECTION

Sta. 0+28 to Sta. 6+00

① $\Delta C = 43^\circ 27'$
 $T = 76.10'$
 $D = 30^\circ CL$
 $L = 144.83$
 $e = 0.06$

② $\Delta C = 47^\circ 10'$
 $T = 83.37'$
 $D = 30^\circ CR$
 $L = 190.96$
 $e = 0.06$

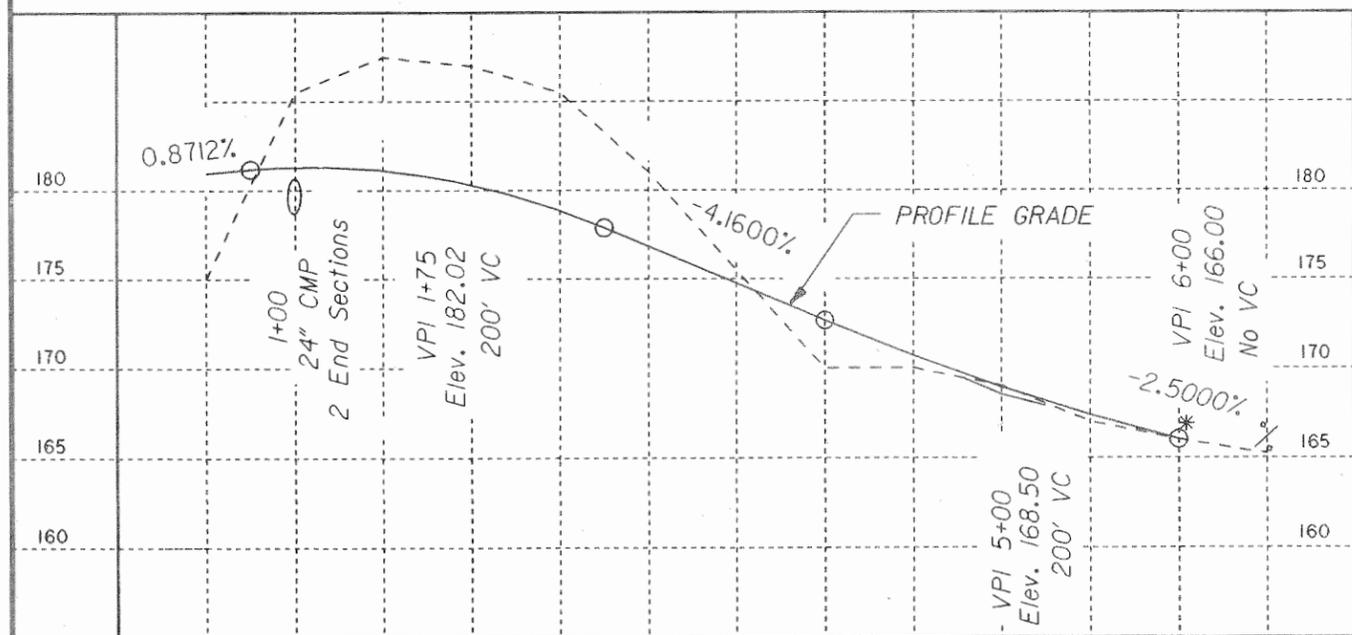
CURVE DATA



LAYOUT DETAILS

See Sheet F.14 for turn lane marking detail

LAYOUT DIMENSIONS									
Δ	RI	R2	T2	TI	T	E	M	Y	O
90	150'	50'	39.39	55.00	86.23	27.78	5.37	7.50	5.00



Summary

Exc. cu yds	6722	Exc.	6722 cu yd
Emb. cu yds	489	Emb.	957 cu yd
Clr. & Grb. acres	1.4	Clr. & Grb.	1.4 acre
Seeding slyr unit	4 "wildflower mix"	Seeding	4.0 slyr unit
Mulching slyr unit	4	Mulching	4.0 slyr unit

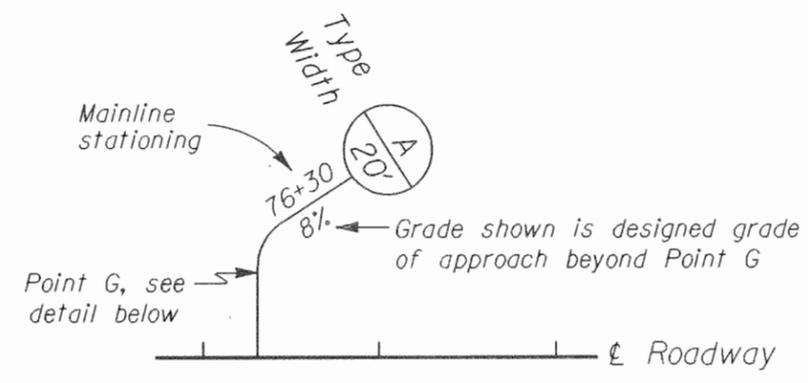
ESTIMATED QUANTITIES U		
Item 20101	Clearing and Grubbing	1.4 acre
Item 20401	Roadway Excavation	6722 cu yd
Item 20408	Select Topping	2100 Ton
Item 31001	Emulsified Asphalt Treated Aggregate Base, Grading D	850 Ton
Item 31004	Emulsified Asphalt, Grade CSS-1	8.5 Ton
Item 40901A	Surface Treatment Aggregate, Designation E-70, Grading B	54 Ton
Item 40901B	Surface Treatment Aggregate, Designation E-70, Grading D	27 Ton
Item 40901C	Surface Treatment Aggregate, Designation E-70, Grading E	16 Ton
Item 40904	Emulsified Asphalt, Grade CRS-2	10.9 Ton
Item 62503B	Seeding, hydraulic method, "wildflower mix"	4 Slyr unit
Item 62506	Mulching, hydraulic method	4 Slyr unit

U Includes turn lane and approach flares.

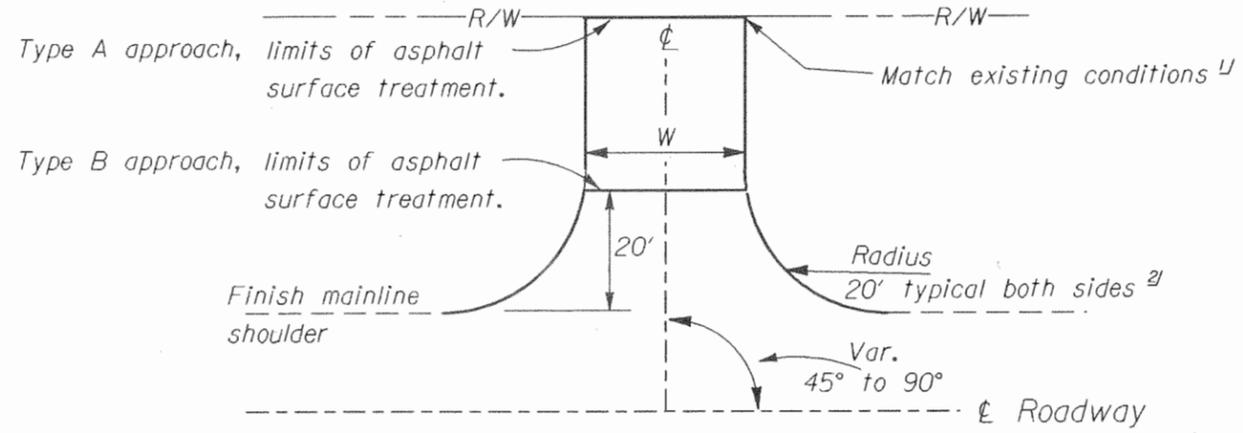
U. S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 WESTERN FEDERAL LANDS HIGHWAY DIVISION
 VANCOUVER, WASHINGTON

APPROACH ROAD DETAILS 73+00 RIGHT

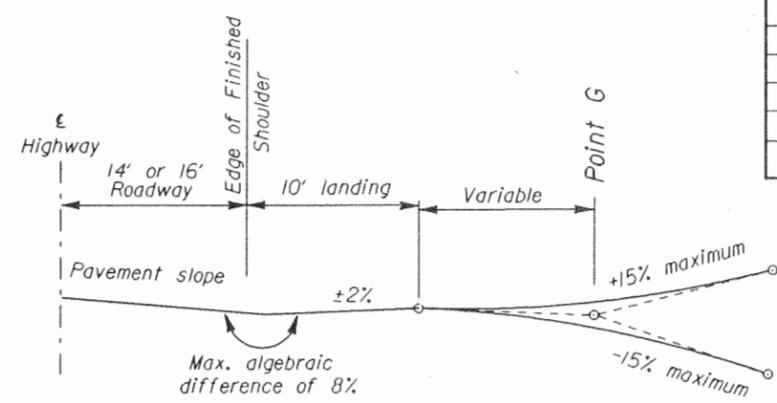
Example illustrating symbol showing standard road approach locations on plan sheets.



PLAN FOR APPROACH ROADS

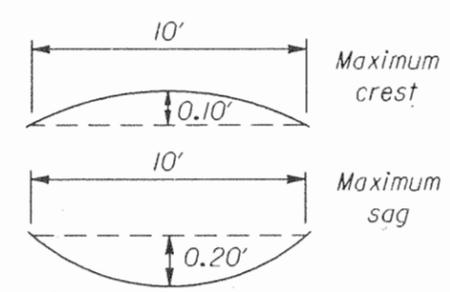


APPROACH PROFILE TYPES A and B



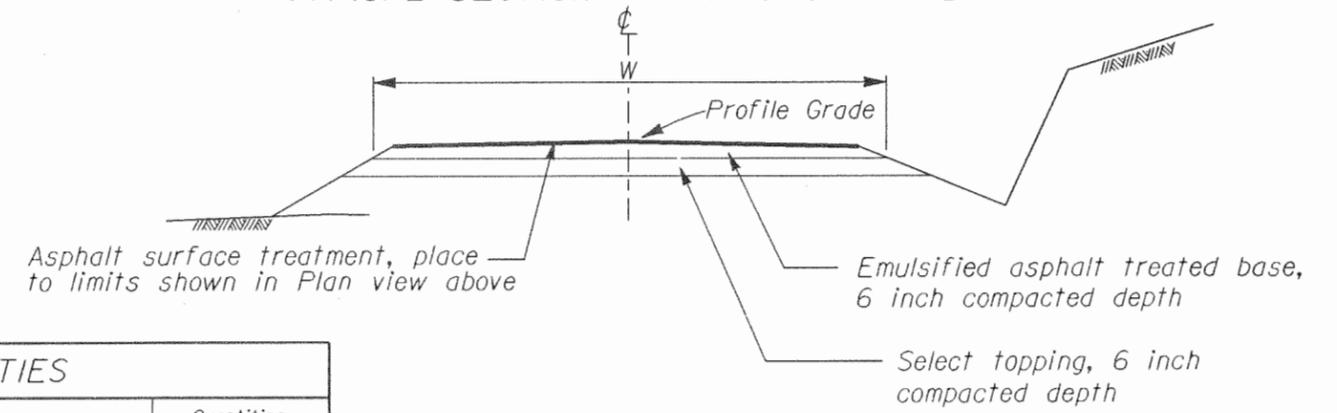
Vertical curves not to exceed a 0.10 foot hump or a 0.20 foot depression in a 10 foot chord, see detail below

TO PREVENT OVERHANG OR BOTTOM DRAG



LOCATIONS			
STATION	SIDE	TYPE	WIDTH
6+50	LT & RT	B	16
10+20	LT & RT	B	16
73+00 ^{1/3}	LT	B	24
73+00 ^{2/3}	RT	C	32
87+45	LT	B	16
97+85	LT	B	16
121+05	RT	A	24
127+55	RT	A	24

TYPICAL SECTION - APPROACH ROADS



QUANTITIES		
Item	Description	Quantities
20101	Clearing and grubbing	0.8 acre
20401	Roadway Excavation	240 cu yd
20408	Select Topping	565 tons
31001	Emulsified asphalt treated aggregate base, grading D	435 tons
31004	Emulsified asphalt, grade CSS-1	4.5 tons
40901A	Surface treatment aggregate, designation E-70, grading B	25 tons
40901B	Surface treatment aggregate, designation E-70, grading D	13 tons
40901C	Surface treatment aggregate, designation E-70, grading E	8 tons
40904	Emulsified asphalt, grade CRS-2	4.8 tons
62503A	Seeding, hydraulic method	2 slyr unit
62506	Mulching, hydraulic method	2 slyr unit

General Notes:

1. Cut and fill slope ratios for approaches to be compatible with mainline roadway construction.
2. Vary radii as needed to fit field conditions.
3. Clearing limits are 5 feet outside the roadway slope catchpoint. Do not clear beyond the Right-Of-Way limits.
4. Place select topping and aggregate course on the full length of reconstructed portions of approaches, taper depths to existing surface at Right-Of-Way line
5. Construct 2% crown to end of asphalt treated apron, on Type A and B approaches, 3% crown on aggregate surface of type B approaches.

Footnotes:

- ^{1/3} Construct approach at Sta. 87+30 to match existing road at Construction Easement line, 120' left of centerline. See sheet D.6.
- ^{2/3} See Sheet D.7 for construction details at Sta. 121+05 and 127+55.
- ^{3/3} See Sheets I.1-2 for details and quantities.

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

APPROACH ROAD DETAILS

Date:	7/94
By:	P. Anderson
Designed:	P. Anderson
CADD:	P. Anderson
Checked:	
Approved:	

AF0393RA.DGN

STATE	PROJECT	SHEET NO.
AK	PFH 39-1(3)	1.4

By:	Date:
Designed:	
CADD:	
Checked:	
Approved:	

BLANKS.DGN

This sheet intentionally left blank

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

BLANK
 SHEET