IC-17187

STATE	PROJECT	SHEET NUMBER
	2009(8)	A.1

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

ALASKA KEY MAP

PLANS FOR PROPOSED PROJECT

AK DEN 2009(8)

MANOKOTAK HEIGHTS ROAD RECONSTRUCTION

MANOKOTAK, ALASKA
DILLINGHAM CENSUS AREA

SCHEDULE A: 4.347 MILES
SCHEDULE B: 3.655 MILES
SCHEDULE C: 2.140 MILES

As-Builts

As-Builts

TYPE OF CONSTRUCTION:

Grading, drainage, aggregate surfacing, aggregate stabilization, fencing, and lighting.

DESIGN DESIGNATION:

ADT (2010)	*225*
V	*25 MPH*
e (max)	*N/A*

SPECIFICATION:

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

FEDERAL LANDS HIGHWAY
COMMITMENT TO EXCELLENCE

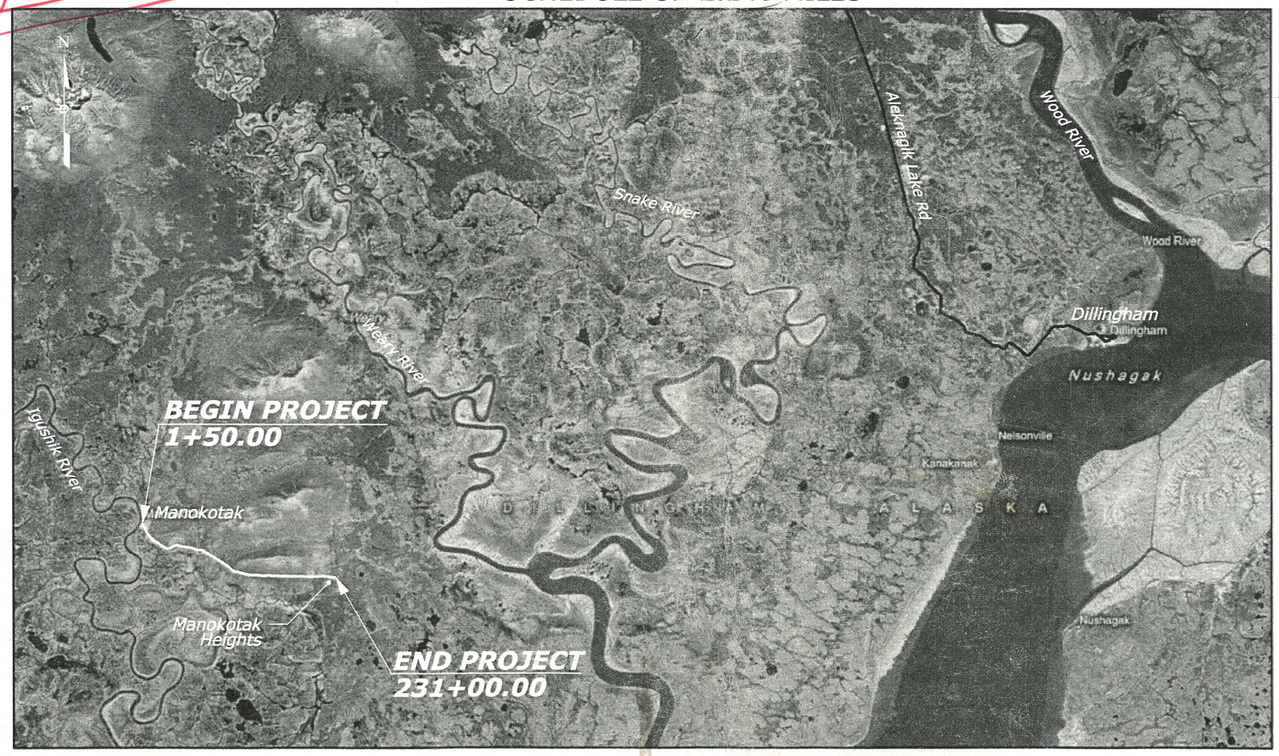
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION
VANCOUVER, WASHINGTON

PLANS PREPARED BY

RPA

ROBERT PECCIA AND ASSOCIATES
HELENA, MONTANA

PROJECT MANAGER
T. LONERGAN



INDEX TO SHEETS

APPROVED:

/s/Brent L. Coe DATE 8/30/2012

Acting Director, Project Delivery,
Western Federal Lands Highway Division

7/2012 B. Wacker
7/2012 Checked by: N. Bell
06-Sep-2012 02:34 PM Designed by:
...\dc0908aa.dgn

Δ	total central angle
Δc	curve central angle
Ø	diameter
θs	spiral central angle
abut.	abutment
ADT	average daily traffic
AH	ahead
appr.	approach
BK	back
BM	bench mark
BP	balance point
br.	bridge
brg.	bearing
cc or c. to c.	center to center
℄	centerline
clr.	clear
CMP	corrugated metal pipe
col.	column
conc.	concrete
conn.	connection
constr. jt.	construction joint
cont.	continuous
CS	point of curve to spiral
ctrs.	centers
CUFT	cubic foot (feet)
culv.	culvert
CUYD	cubic yard(s)
D	diameter
DHV	design hourly volume
dia.	diameter
diag.	diagonal
diaph.	diaphragm
dist.	distance
drwg(s).	drawing(s)
E	east
e	superelevation rate
El. 94.16 ft	elevation with number
elev.	elevation
emb.	embankment
EP	edge of pavement
EQ or eq.	equation
ER	edge of road
EW	edge of water
exc.	excavation
exp. jt.	expansion joint
fin.	finish
flg.	flange
ft2	square foot
ft3	cubic foot (feet)
ftg.	footing
ga.	gage (gauge)
galv.	galvanized
hdwl.	headwall
hex.	hexagon
HW	high water
ID	inside diameter
jt.	joint
L	length of curve
lam.	lamination
lat.	latitude
LNFT	linear foot (feet)
long.	longitudinal
LPSM	lump sum
Ls	length of spiral
lt. or LT	left
LW	low water

M.L.	main line
M.P.	mile post
matl.	material
max.	maximum
MGAL	thousand gallon
min.	minimum
mon.	monument
N	north
NC	normal crown
o. c.	on center
o. to o.	out to out
OD	outside diameter
OG	original ground
PC	point of curve
PCC	point of compound curve
PCS	point of curve to spiral
PI	point of intersection
pl.	plate
POC	point on curve
POS	point on spiral
POT	point on tangent
PS	point of tangent to spiral
PSC	point of spiral to curve
PST	point of spiral to tangent
PT	point of tangent
pvmt.	pavement
R	radius
R.	range
R/W	right-of-way
rdwy.	roadway
reinf.	reinforcement
reqd.	required
rt. or RT	right
rte.	route
S	south
SADT	seasonal average daily traffic
SC	point of spiral to curve
sec.	section
shldr.	shoulder
SLRY	slurry unit
spa.	spacing, spaces or spaced
SQFT	square foot
SQYD	square yard
SRS	point of spiral to reverse spiral
SS	point of spiral to spiral (no curve)
ST	point of spiral to tangent
STA, Sta.	station
std.	standard
stgr.	stringer
stiff.	stiffener
struc.	structural
STS	point of spiral to tangent spiral
sym.	symmetrical
T	tangent distance
T.	township
TBM	temporary bench mark
thd.	thread
TS	point of tangent to spiral
Ts	tangent distance (spiraled curve)
typ.	typical
V	design speed
vph	vehicles per hour
VPI	vertical point of intersection
W	west
yd2	square yard
yd3	cubic yard(s)

NOTE:

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

National Boundary

State Boundary

County Boundary

City Boundary

Township or Range Line

Section Line

Section Corner (Found, Projected)

¼ Section Line

¼ Section Corner (Found, Projected)

1/16 Section Line

1/16 Section Corner (Found, Projected)

Property Line w/Found Property Corner

Parcel Number

National Park Boundary

National Forest Boundary

National Wildlife Refuge Boundary

BLM Lands Boundary

Indian Reservation Boundary

Existing Roadway (Road, Paved, Gravel)

Railroad

Trail

Wattle

Silt Fence

Intermittent Drainage or Small Creek

Large Creek or River

Lake, Pond or Reservoir; Marshland

Spring or Seep

Treeline; Individual Trees

Material Source; Bore Hole; Test Pit

Spot Elevation; Coordinate Grid Tick

Above Ground Tank; Underground Tank

Boulder; Well; Satellite Dish; Grave

Cooking Grate; Garbage Can; Picnic Table

Flagpole; Fire Hydrant

Gas & Water Meter; Gas & Water Valve

Control Point (Terrestrial and GPS); Jump Hub

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	A.2

North Arrow

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

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

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

Miscellaneous Utility Features

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

Building		
Right-of-Way Line with Monument	R/W	R/W
Permanent Easement	P/E	P/E
Construction Easement	- no symbol -	C/E
Riprap		

NO SCALE

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

U.S. CUSTOMARY DETAIL

PLAN SYMBOLS AND ABBREVIATIONS

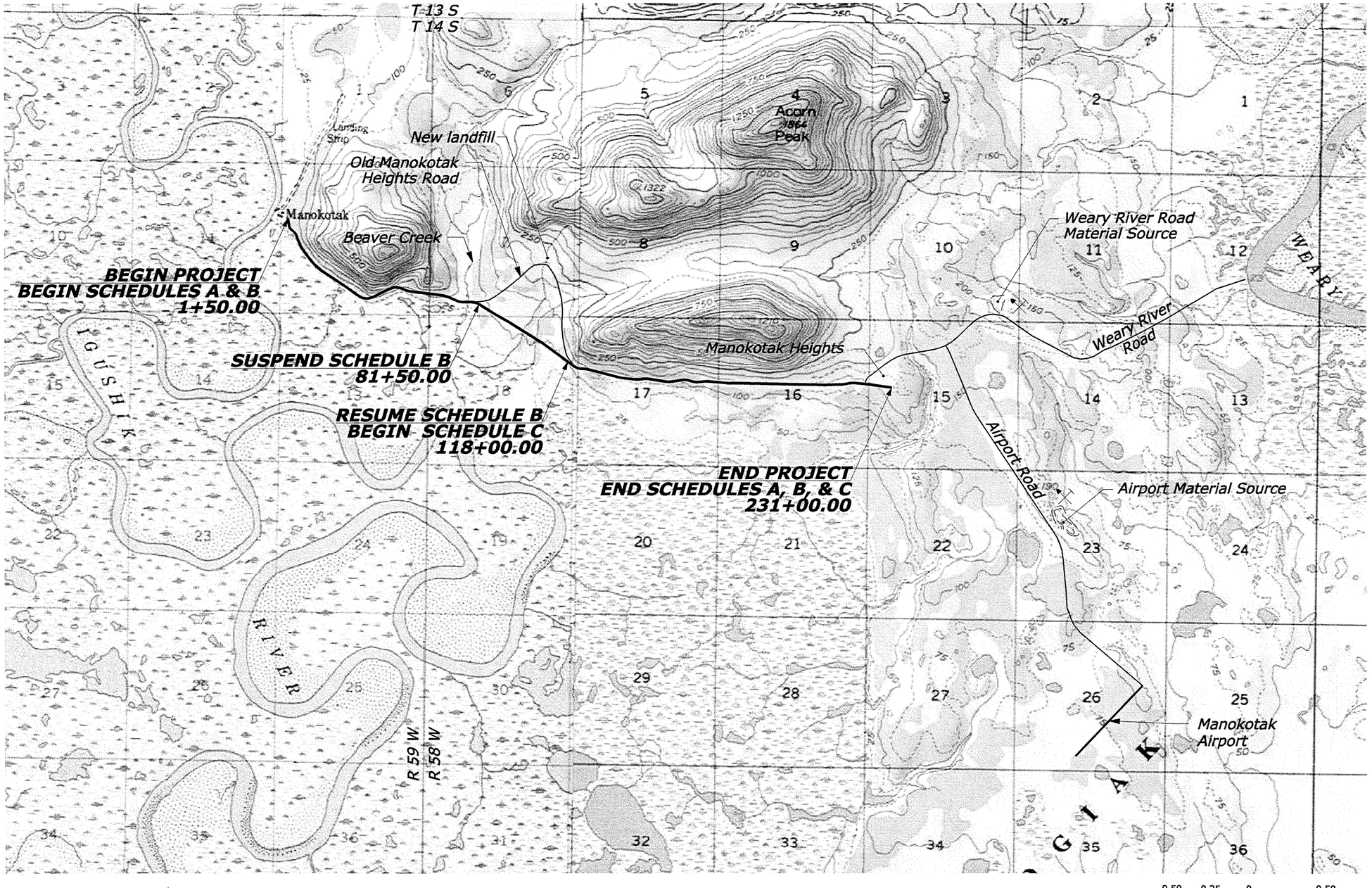
DETAIL APPROVED FOR USE 11/2001
REVISED: 9/2005 1/2007 10/2009

DETAIL W101-1

16 October 2009 1:08 PM

H:\StenDraw\W101\01.dgn [USC]

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	A.3



VICINITY MAP

...\dc0908ac.dgn | 15-Jul-2012 12:56 PM | Designed by: | N. Bell | 7/2012 | Checked by: | B. Wacker | 7/2012

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	B.1

SUMMARY OF QUANTITIES - SCHEDULE A

ITEM	DESCRIPTION	UNIT	SECTION C TYPICAL SECTION	SECTION D PLAN AND PROFILE	SECTION E APPROACH ROADS	SECTION F EROSION CONTROL	SECTION G DRAINAGE	SECTION H MISC-ELLANEOUS	SECTION I TEMPORARY TRAFFIC CONTROL	SECTION J PERMANENT TRAFFIC CONTROL						ESTIMATED QUANTITIES		
	PLAN SHEET SECTION -------->>															PLAN	BID SCHEDULE	
15101-0000	MOBILIZATION	LPSM														ALL	ALL	
15201-0000	CONSTRUCTION SURVEY AND STAKING	LPSM														ALL	ALL	
15301-0010	CONTRACTOR QUALITY CONTROL AND ASSURANCE	LPSM														ALL	ALL	
15401-0000	CONTRACTOR TESTING	LPSM														ALL	ALL	
15501-0000	CONSTRUCTION SCHEDULE	LPSM														ALL	ALL	
15703-1000	SOIL EROSION CONTROL, SOIL STABILIZATION , MULCHING	ACRE				22.51										22.51	23.00	
15705-1300	SOIL EROSION CONTROL, TEMPORARY DIVERSION CHANNEL	LNFT				900										900	1,000	
15705-1500	SOIL EROSION CONTROL, SEDIMENT WATTLE , GOVERNMENT-FURNISHED	LNFT				25,167										25,167	25,167	
15706-0400	SOIL EROSION CONTROL, SEDIMENT TRAP	EACH				6										6	7	
15801-0000	WATERING FOR DUST CONTROL	MGAL															1,700	
20101-0000	CLEARING AND GRUBBING	ACRE		24.37	0.77											25.14	25.14	(CQ)
20301-2400	REMOVAL OF SIGN	EACH								7						7	7	
20401-0000	ROADWAY EXCAVATION	CUYD		35,132	1,372											36,504	36,504	(CQ)
20402-0000	SUBEXCAVATION	CUYD	2,573													2,573	3,000	
20410-0000	SELECT BORROW	CUYD	3,421	55,949	473											59,843	62,000	
20701-0700	EARTHWORK GEOTEXTILE, TYPE II-A	SQYD	25,853													25,853	27,500	
21101-2000	ROADWAY OBLITERATION, METHOD 2	SQYD		440												440	440	(CQ)
25101-3000	PLACED RIPRAP, CLASS 3 , RIPRAP HEADWALL	CUYD					64									64	75	
25101-3000	PLACED RIPRAP, CLASS 3 , ENERGY DISSIPATOR	CUYD					14									14	20	
25120-1000	RIPRAP DITCH, CLASS 1	LNFT		2,108	300											2,408	2,500	
30410-3000	CALCIUM CHLORIDE AGGREGATE STABILIZATION, IMPORTED SURFACE COURSE AGGREGATE	TON	19,866													19,866	20,500	
30802-2000	ROADWAY AGGREGATE, METHOD 2	TON	22,527		1,262											23,789	24,600	
60201-0600	18-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	LNFT					312									312	350	
60201-0800	24-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	LNFT					1,872									1,872	1,972	
60201-1000	36-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	LNFT					158									158	172	
60201-2500	144-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	LNFT					56									56	60	

(CQ) means Contract Quantity

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	B.2

SUMMARY OF QUANTITIES - SCHEDULE A

			SECTION C TYPICAL SECTION	SECTION D PLAN AND PROFILE	SECTION E APPROACH ROADS	SECTION F EROSION CONTROL	SECTION G DRAINAGE	SECTION H MISC-ELLANEOUS	SECTION I TEMPORARY TRAFFIC CONTROL	SECTION J PERMANENT TRAFFIC CONTROL						ESTIMATED QUANTITIES	
PLAN SHEET SECTION -------->>																	
ITEM	DESCRIPTION	UNIT														PLAN	BID SCHEDULE
60210-0600	END SECTION FOR 18-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	EACH					16									16	16
60210-0800	END SECTION FOR 24-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	EACH					76									76	76
60210-1000	END SECTION FOR 36-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	EACH					6									6	6
60405-0000	MANHOLE ADJUSTMENT	EACH		6												6	6
60501-0000	STANDARD UNDERDRAIN SYSTEM	LNFT					200									200	225
60510-1000	8-INCH OUTLET PIPE	LNFT					105									105	115
61901-2000	FENCE, CHAIN LINK, 72-INCH HEIGHT	LNFT		380												380	405
62201-0250	DUMP TRUCK, 10 CUBIC YARD MINIMUM CAPACITY	HOUR															80
62201-1000	WHEEL LOADER, 4 CUBIC YARD MINIMUM RATED CAPACITY	HOUR															80
62201-2050	ROLLER , SMOOTH DRUM	HOUR															80
62201-2850	MOTOR GRADER, 12 FOOT MINIMUM BLADE	HOUR															80
62201-3400	HYDRAULIC EXCAVATOR, 1 CUBIC YARD MINIMUM CAPACITY WITH THUMB ATTACHMENT	HOUR															80
62301-0000	GENERAL LABOR	HOUR															80
62406-0400	PLACING CONSERVED TOPSOIL, 6-INCH DEPTH	ACRE		21.71	0.57											22.28	23.00
62503-0000	TURF ESTABLISHMENT	SLRY		88	3											91	91
63302-0000	SIGN SYSTEM	SQFT								68.17						68.17	75.00
63502-1000	TEMPORARY TRAFFIC CONTROL, CONE, TYPE 36-INCH	EACH							50							50	50
63502-1300	TEMPORARY TRAFFIC CONTROL, DRUM	EACH							25							25	25
63504-1000	TEMPORARY TRAFFIC CONTROL, CONSTRUCTION SIGN	SQFT							180							180	180
63509-1000	TEMPORARY TRAFFIC CONTROL, FLAGGER	FIX HR RATE							4,000							4,000	4,000
63611-0500	WIRE, ELECTRICAL CONDUCTORS, 6 AWG	LNFT		1,725												1,725	1,800
63612-0000	LUMINAIRE	EACH		10												10	10
63612-1200	LUMINAIRE, PHOTOCONTROLS, TYPE TWIN 20 LIGHT STANDARD	EACH		1												1	1
63620-0000	POLE , LIGHT	EACH		10												10	10
63703-0000	RESIDENTIAL HOUSING	EACH															2
63704-0000	VEHICLE	EACH															2

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	B.3

SUMMARY OF QUANTITIES - SCHEDULE B

ITEM	DESCRIPTION	UNIT	SECTION C TYPICAL SECTION	SECTION D PLAN AND PROFILE	SECTION E APPROACH ROADS	SECTION F EROSION CONTROL	SECTION G DRAINAGE	SECTION H MISC-ELLANEOUS	SECTION I TEMPORARY TRAFFIC CONTROL	SECTION J PERMANENT TRAFFIC CONTROL						ESTIMATED QUANTITIES		
	PLAN SHEET SECTION -------->>															PLAN	BID SCHEDULE	
15101-0000	MOBILIZATION	LPSM														ALL	ALL	
15201-0000	CONSTRUCTION SURVEY AND STAKING	LPSM														ALL	ALL	
15301-0010	CONTRACTOR QUALITY CONTROL AND ASSURANCE	LPSM														ALL	ALL	
15401-0000	CONTRACTOR TESTING	LPSM														ALL	ALL	
15501-0000	CONSTRUCTION SCHEDULE	LPSM														ALL	ALL	
15703-1000	SOIL EROSION CONTROL, SOIL STABILIZATION , MULCHING	ACRE				19.96										19.96	20.00	
15705-1300	SOIL EROSION CONTROL, TEMPORARY DIVERSION CHANNEL	LNFT				642										642	700	
15705-1500	SOIL EROSION CONTROL, SEDIMENT WATTLE , GOVERNMENT-FURNISHED	LNFT				19,676										19,676	20,500	
15706-0400	SOIL EROSION CONTROL, SEDIMENT TRAP	EACH				6										6	7	
15801-0000	WATERING FOR DUST CONTROL	MGAL															1,520	
20101-0000	CLEARING AND GRUBBING	ACRE		21.35	0.77											22.12	22.12	(CQ)
20301-2400	REMOVAL OF SIGN	EACH								7						7	7	
20401-0000	ROADWAY EXCAVATION	CUYD		32,433	1,372											33,805	33,805	(CQ)
20402-0000	SUBEXCAVATION	CUYD	2,573													2,573	3,000	
20410-0000	SELECT BORROW	CUYD	3,421	48,670	473											52,564	54,500	
20701-0700	EARTHWORK GEOTEXTILE, TYPE II-A	SQYD	21,025													21,025	22,000	
21101-2000	ROADWAY OBLITERATION, METHOD 2	SQYD		440												440	440	(CQ)
25101-3000	PLACED RIPRAP, CLASS 3 , RIPRAP HEADWALL	CUYD					46									46	55	
25101-3000	PLACED RIPRAP, CLASS 3 , ENERGY DISSIPATOR	CUYD					14									14	20	
25120-1000	RIPRAP DITCH, CLASS 1	LNFT		1,957	300											2,257	2,350	
30410-3000	CALCIUM CHLORIDE AGGREGATE STABILIZATION, IMPORTED SURFACE COURSE AGGREGATE	TON	16,702													16,702	17,500	
30802-2000	ROADWAY AGGREGATE, METHOD 2	TON	18,928		1,262											20,190	21,000	
60201-0600	18-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	LNFT					312									312	350	
60201-0800	24-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	LNFT					1,470									1,470	1,550	
60201-1000	36-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	LNFT					98									98	110	
60201-2500	144-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	LNFT					56									56	60	

(CQ) means Contract Quantity

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	B.4

SUMMARY OF QUANTITIES - SCHEDULE B

ITEM	DESCRIPTION	UNIT	SECTION C TYPICAL SECTION	SECTION D PLAN AND PROFILE	SECTION E APPROACH ROADS	SECTION F EROSION CONTROL	SECTION G DRAINAGE	SECTION H MISC-ELLANEOUS	SECTION I TEMPORARY TRAFFIC CONTROL	SECTION J PERMANENT TRAFFIC CONTROL					ESTIMATED QUANTITIES	
	PLAN SHEET SECTION ------->>														PLAN	BID SCHEDULE
60210-0600	END SECTION FOR 18-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	EACH					16								16	16
60210-0800	END SECTION FOR 24-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	EACH					60								60	60
60210-1000	END SECTION FOR 36-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	EACH					4								4	4
60405-0000	MANHOLE ADJUSTMENT	EACH		6											6	6
60501-0000	STANDARD UNDERDRAIN SYSTEM	LNFT					200								200	225
60510-1000	8-INCH OUTLET PIPE	LNFT					105								105	115
61901-2000	FENCE, CHAIN LINK, 72-INCH HEIGHT	LNFT		380											380	405
62201-0250	DUMP TRUCK, 10 CUBIC YARD MINIMUM CAPACITY	HOUR														60
62201-1000	WHEEL LOADER, 4 CUBIC YARD MINIMUM RATED CAPACITY	HOUR														60
62201-2050	ROLLER , SMOOTH DRUM	HOUR														60
62201-2850	MOTOR GRADER, 12 FOOT MINIMUM BLADE	HOUR														60
62201-3400	HYDRAULIC EXCAVATOR, 1 CUBIC YARD MINIMUM CAPACITY WITH THUMB ATTACHMENT	HOUR														60
62301-0000	GENERAL LABOR	HOUR														60
62406-0400	PLACING CONSERVED TOPSOIL, 6-INCH DEPTH	ACRE		19.16	0.57										19.73	20.00
62503-0000	TURF ESTABLISHMENT , HYDRAULIC METHOD	SLRY		77.7	3.0										80.7	81.0
63302-0000	SIGN SYSTEM	SQFT								68.17					68.17	75.00
63502-1000	TEMPORARY TRAFFIC CONTROL, CONE, TYPE 36-INCH	EACH							50						50	50
63502-1300	TEMPORARY TRAFFIC CONTROL, DRUM	EACH							25						25	25
63504-1000	TEMPORARY TRAFFIC CONTROL, CONSTRUCTION SIGN	SQFT							180						180	180
63509-1000	TEMPORARY TRAFFIC CONTROL, FLAGGER	FIX HR RATE							3,200						3,200	3,200
63611-0500	WIRE, ELECTRICAL CONDUCTORS, 6 AWG	LNFT		1,725											1,725	1,800
63612-0000	LUMINAIRE	EACH		10											10	10
63612-1200	LUMINAIRE, PHOTOCONTROLS, TYPE TWIN 20 LIGHT STANDARD	EACH		1											1	1
63620-0000	POLE , LIGHT	EACH		10											10	10
63703-0000	RESIDENTIAL HOUSING	EACH														2
63704-0000	VEHICLE	EACH														2

DID NOT USE

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	B.5

SUMMARY OF QUANTITIES - SCHEDULE C

			SECTION C TYPICAL SECTION	SECTION D PLAN AND PROFILE	SECTION E APPROACH ROADS	SECTION F EROSION CONTROL	SECTION G DRAINAGE	SECTION H MISC-ELLANEOUS	SECTION I TEMPORARY TRAFFIC CONTROL	SECTION J PERMANENT TRAFFIC CONTROL						ESTIMATED QUANTITIES		
ITEM	DESCRIPTION	UNIT														PLAN	BID SCHEDULE	
15101-0000	MOBILIZATION	LPSM														ALL	ALL	
15201-0000	CONSTRUCTION SURVEY AND STAKING	LPSM														ALL	ALL	
15301-0010	CONTRACTOR QUALITY CONTROL AND ASSURANCE	LPSM														ALL	ALL	
15401-0000	CONTRACTOR TESTING	LPSM														ALL	ALL	
15501-0000	CONSTRUCTION SCHEDULE	LPSM														ALL	ALL	
15703-1000	SOIL EROSION CONTROL, SOIL STABILIZATION , MULCHING	ACRE				11.94										11.94	12.00	
15705-1300	SOIL EROSION CONTROL, TEMPORARY DIVERSION CHANNEL	LNFT				642										642	700	
15705-1500	SOIL EROSION CONTROL, SEDIMENT WATTLE , GOVERNMENT-FURNISHED	LNFT				11,500										11,500	12,000	
15706-0400	SOIL EROSION CONTROL, SEDIMENT TRAP	EACH				4										4	5	
15801-0000	WATERING FOR DUST CONTROL	MGAL															940	
20101-0000	CLEARING AND GRUBBING	ACRE		12.65	0.64											13.29	13.29	(CQ)
20301-2400	REMOVAL OF SIGN	EACH								3						3	3	
20401-0000	ROADWAY EXCAVATION	CUYD		20,064	1,178											21,242	21,242	(CQ)
20402-0000	SUBEXCAVATION	CUYD	2,154													2,154	2,500	
20410-0000	SELECT BORROW	CUYD	2,864	29,261	420											32,545	34,000	
20701-0700	EARTHWORK GEOTEXTILE, TYPE II-A	SQYD	12,449													12,449	13,500	
21101-2000	ROADWAY OBLITERATION, METHOD 2	SQYD		89												89	89	(CQ)
25101-3000	PLACED RIPRAP, CLASS 3 , RIPRAP HEADWALL	CUYD					32									32	40	
25101-3000	PLACED RIPRAP, CLASS 3 , ENERGY DISSIPATOR	CUYD					10									10	15	
25120-1000	RIPRAP DITCH, CLASS 1	LNFT		1,051	200											1,251	1,300	
30410-3000	CALCIUM CHLORIDE AGGREGATE STABILIZATION, IMPORTED SURFACE COURSE AGGREGATE	TON	9,773													9,773	10,500	
30802-2000	ROADWAY AGGREGATE, METHOD 2	TON	11,056		1,087											12,143	13,000	
60201-0600	18-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	LNFT					246									246	270	
60201-0800	24-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	LNFT					1024									1024	1,100	
60201-1000	36-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	LNFT					98									98	110	
60210-0600	END SECTION FOR 18-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	EACH					12									12	12	

(CQ) means Contract Quantity

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	B.6

SUMMARY OF QUANTITIES - SCHEDULE C

ITEM	DESCRIPTION	UNIT	SECTION C TYPICAL SECTION	SECTION D PLAN AND PROFILE	SECTION E APPROACH ROADS	SECTION F EROSION CONTROL	SECTION G DRAINAGE	SECTION H MISC-ELLANEOUS	SECTION I TEMPORARY TRAFFIC CONTROL	SECTION J PERMANENT TRAFFIC CONTROL						ESTIMATED QUANTITIES	
	PLAN SHEET SECTION -------->>															PLAN	BID SCHEDULE
60210-0800	END SECTION FOR 24-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	EACH					42									42	42
60210-1000	END SECTION FOR 36-INCH PIPE CULVERT , GOVERNMENT-FURNISHED	EACH					4									4	4
60405-0000	MANHOLE ADJUSTMENT	EACH		5												5	5
62201-0250	DUMP TRUCK, 10 CUBIC YARD MINIMUM CAPACITY	HOUR															40
62201-1000	WHEEL LOADER, 4 CUBIC YARD MINIMUM RATED CAPACITY	HOUR															40
62201-2050	ROLLER , SMOOTH DRUM	HOUR															40
62201-2850	MOTOR GRADER, 12 FOOT MINIMUM BLADE	HOUR															40
62201-3400	HYDRAULIC EXCAVATOR, 1 CUBIC YARD MINIMUM CAPACITY WITH THUMB ATTACHMENT	HOUR															40
62301-0000	GENERAL LABOR	HOUR															40
62406-0400	PLACING CONSERVED TOPSOIL, 6-INCH DEPTH	ACRE		11.47	0.47											11.94	12.00
62503-0000	TURF ESTABLISHMENT , HYDRAULIC METHOD	SLRY		45.9	2.5											48.4	49.0
63302-0000	SIGN SYSTEM	SQFT								51.92						51.92	60.00
63502-1000	TEMPORARY TRAFFIC CONTROL, CONE, TYPE 36-INCH	EACH							50							50	50
63502-1300	TEMPORARY TRAFFIC CONTROL, DRUM	EACH							25							25	25
63504-1000	TEMPORARY TRAFFIC CONTROL, CONSTRUCTION SIGN	SQFT							180							180	180
63509-1000	TEMPORARY TRAFFIC CONTROL, FLAGGER	FIX HR RATE							2,000							2,000	2,000
63611-0500	WIRE, ELECTRICAL CONDUCTORS, 6 AWG	LNFT		1,725												1,725	1,800
63612-0000	LUMINAIRE	EACH		10												10	10
63612-1200	LUMINAIRE, PHOTOCONTROLS, TYPE TWIN 20 LIGHT STANDARD	EACH		1												1	1
63620-0000	POLE , LIGHT	EACH		10												10	10
63703-0000	RESIDENTIAL HOUSING	EACH															2
63704-0000	VEHICLE	EACH															2

DOES NOT USE

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	C.1

TYPICAL SECTION QUANTITIES

Item Number	Description	Schedule A	Schedule B	Schedule C	Unit	Remarks
30410-3000	Calcium chloride aggregate stabilization, imported surface course aggregate	19,866.0	16,702.0	9,773.0	TON	Based on 1.97 TON/CUYD, Calcium chloride is government-furnished
30802-2000	Roadway aggregate, method 2	22,527.0	18,928.0	11,056.0	TON	Based on 1.97 TON/CUYD

EARTHWORK GEOTEXTILE QUANTITIES 1/

Schedule A

Schedule B

Schedule B & Schedule C

Station to Station	Side	Width Range (LNFT)	Item 20701-0700 Earthwork geotextile, type II-A (SQYD) 4/
13+00 to 14+50	RT	14 - 16	172
21+00 to 31+50	RT	14 - 25	1,947
32+50 to 34+00	RT	14 - 19	200
35+50 to 39+50	RT	14 - 24	758
42+00 to 54+00	RT	14 - 40	2,467
65+00 to 67+00	RT	14 - 15	239
74+00 to 79+50	RT	14 - 21	959
74+00 to 79+50	LT	14 - 24	1,041
81+50 to 84+50	RT	14 - 19	464
83+50 to 85+50	LT	14	233
88+50 to 93+50	LT	14 - 16	578
91+50 to 108+50	RT	14 - 19	2,268
99+50 to 101+00	LT	14	153
109+50 to 112+50	RT	14 - 16	417
113+50 to 118+00	RT	14 - 18	715
118+00 to 120+50	RT	14 - 21	416
121+00 to 123+50	LT	14 - 26	473
123+00 to 128+00	RT	14 - 29	1,051
134+00 to 137+00	RT	14 - 18	440
141+00 to 143+00	RT	14 - 18	276
144+00 to 149+00	RT	14 - 21	876
147+00 to 150+00	LT	14 - 21	460
150+50 to 154+00	RT	14 - 32	815
156+50 to 158+00	RT	14 - 21	207
161+00 to 162+00	RT	14 - 15	83
163+00 to 164+50	LT	14 - 19	156
167+00 to 168+50	RT	14 - 19	188
170+50 to 171+50	RT	14 - 17	93
180+50 to 185+00	RT	14 - 22	856
188+00 to 189+00	RT	14	78
192+50 to 193+50	RT	14	78
194+50 to 195+50	RT	14	78
199+50 to 200+50	LT	14 - 16	89
210+50 to 214+00	RT	14 - 22	596
214+00 to 216+50	LT	14 - 19	374
215+00 to 221+50	RT	14 - 27	1,010
Schedule A Total			**21,304**
Schedule B Total			**16,476**
Schedule C Total			**8,693**

Not installed

Installed on top of subgrade

SUBGRADE GEOTEXTILE QUANTITIES 2/ 5/

Schedule A & Schedule B

Schedule C

Station to Station	Side	Width (LNFT)	Item 20701-0700 Earthwork geotextile, type II-A (SQYD)
4+40 to 4+50	LT	14	16
7+30 to 7+40	LT	14	16
35+00 to 35+20	LT	14	31
121+00 to 121+20	LT	14	31
128+00 to 128+20	LT	14	31
201+00 to 201+10	RT	14	16
206+75 to 206+85	RT	14	16
212+00 to 212+10	RT	14	16
213+30 to 213+40	RT	14	16
Schedule A Total			**189**
Schedule B Total			**189**
Schedule C Total			**126**

SUBEXCAVATION QUANTITIES 1/

Schedule A & Schedule B

Schedule C

Station to Station	Type	Item 20402-0000 Subexcavation (CUYD)	Item 20410-0000 Select borrow 3/ (CUYD)	Item 20701-0700 Earthwork geotextile, type II-A (SQYD)
68+00 to 69+00	1	25	33	80
80+00 to 81+50	2	394	524	650
118+50 to 121+00	2	465	618	775
154+50 to 157+50	2	765	1,017	1,245
158+50 to 161+00	2	528	702	891
165+00 to 166+50	2	248	330	438
191+00 to 192+00	1	57	76	106
202+00 to 203+50	1	91	121	175
Schedule A Total		**2,573**	**3,421**	**4,360**
Schedule B Total		**2,573**	**3,421**	**4,360**
Schedule C Total		**2,154**	**2,864**	**3,630**

201+50 to 203+50

~68+28 to ~68+73

72+08 to 73+62

FOOTNOTE:

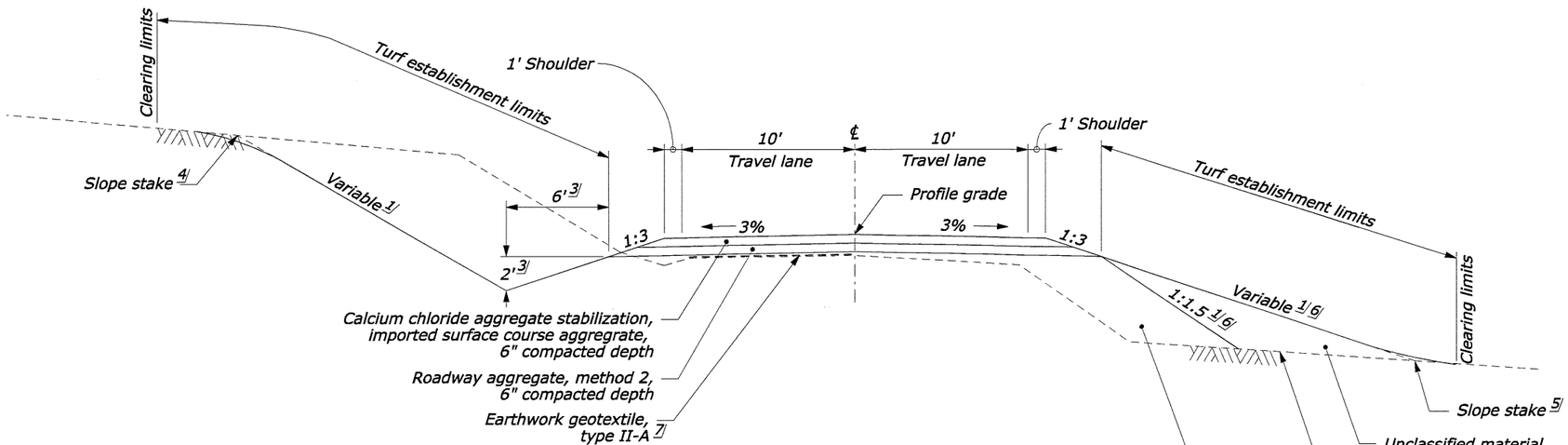
1/ See Sheet C.3 for details.
2/ See Sheet C.2 for details.
3/ Based on 1.33 compaction factor.
4/ Quantity does not account for overlap.
5/ Adjust locations for field conditions as approved by CO.

TABULATION OF TYPICAL SECTION QUANTITIES

7/2012 | B. Wacker | 7/2012 | Checked by: | N. Bell | 9-Aug-2012 10:53 AM | Designed by:

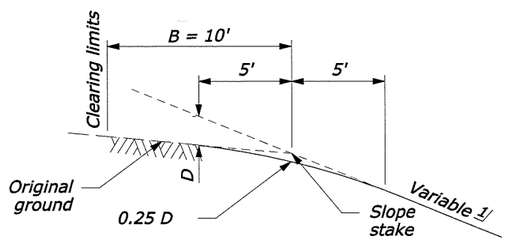
F:\highways\FHWA\12500001_Manokotak\Design\Typical Sections\[dc0908_Section C

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	C.2

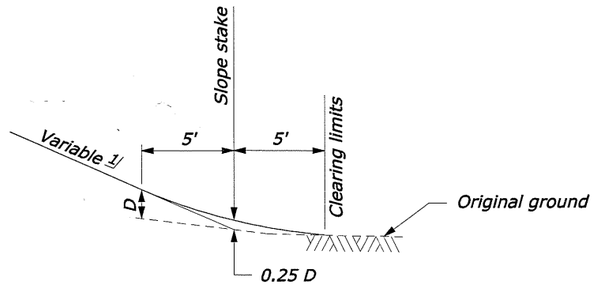


TYPICAL SECTION
MANOKOTAK HEIGHTS ROAD

SCHEDULE A: 1+50.00 to 231+00.00
SCHEDULE B: 1+50.00 to 81+50.00
118+00.00 to 231+00.00
SCHEDULE C: 118+00.00 to 231+00.00



CUT SLOPE 2/ ROUNDING DETAIL



FILL SLOPE ROUNDING DETAIL

FOOTNOTE:

1/ *Construct slopes as shown in the Staking Report.*

2/ *For cut heights less than "B" reduce "B" to the cut height dimension and reduce the front slope rounding distance proportionally.*

3/ *See Standard 602-6, "Pipe Culvert Inlet Treatment in Cut Slopes" and cross sections for variances.*

4/ *See cut slope rounding detail.*

5/ *See fill slope rounding detail.*

6/ *See Sheet C.3 for embankment construction details.*

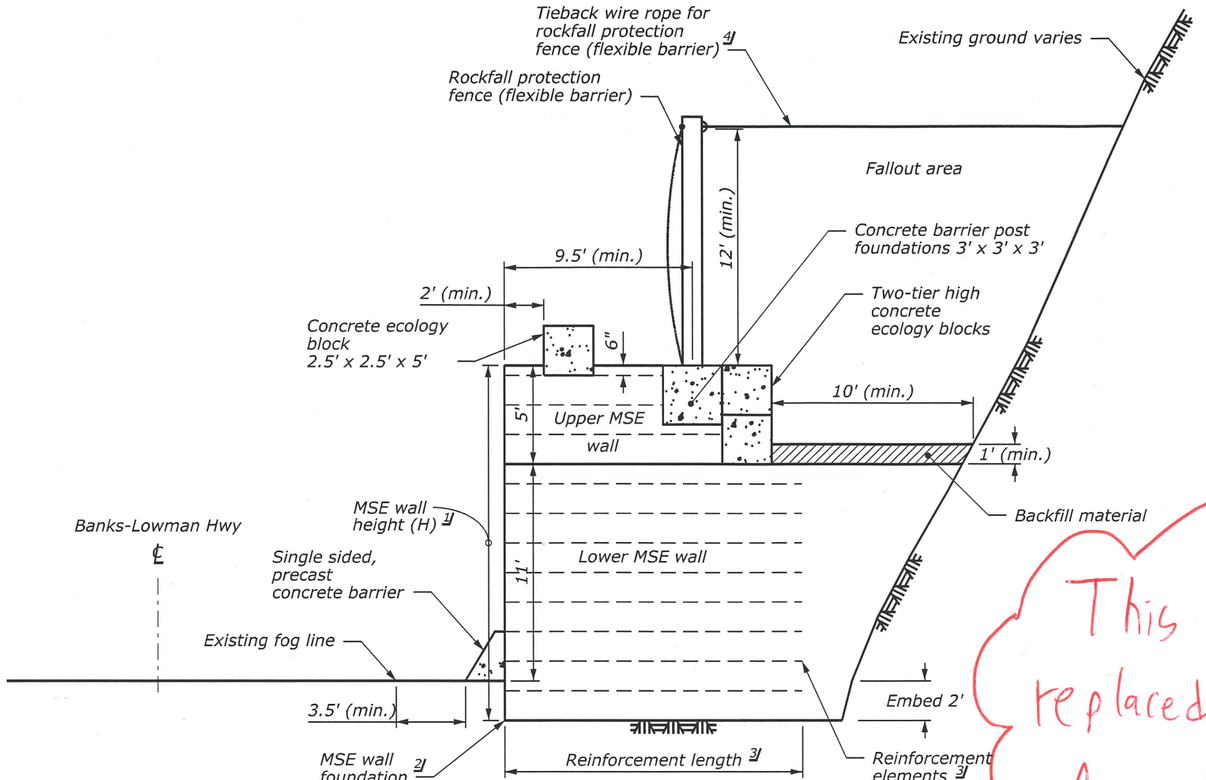
7/ *Place geotextile over existing road surface at localized soft spots as approved by CO. See Sheet C.1 for locations and quantities.*

NO SCALE

TYPICAL SECTION

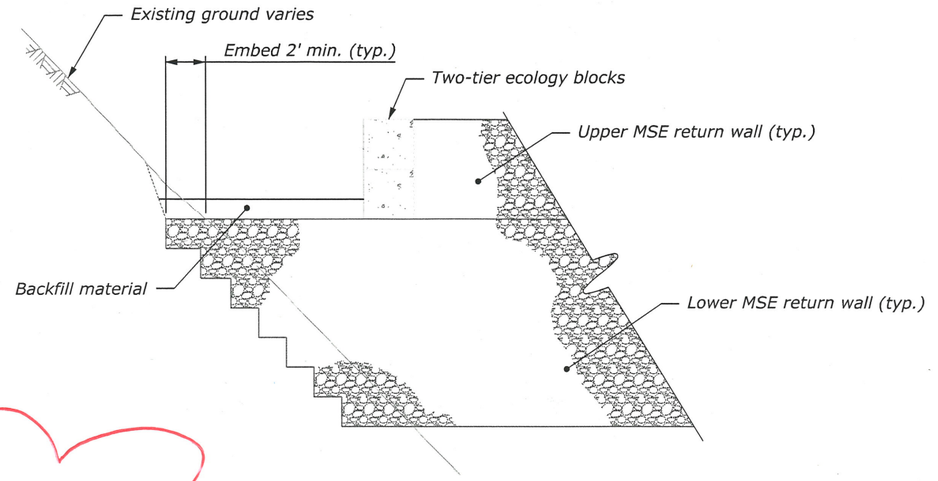
7/2012 | B. Wacker | Designed by:
7/2012 | N. Bell | Checked by:
13-Sep-2012 08:14 AM
...\Typical Sections\dc0906ca.dgn

STATE	PROJECT	SHEET NUMBER
ID	PFH 24(13)	C.3



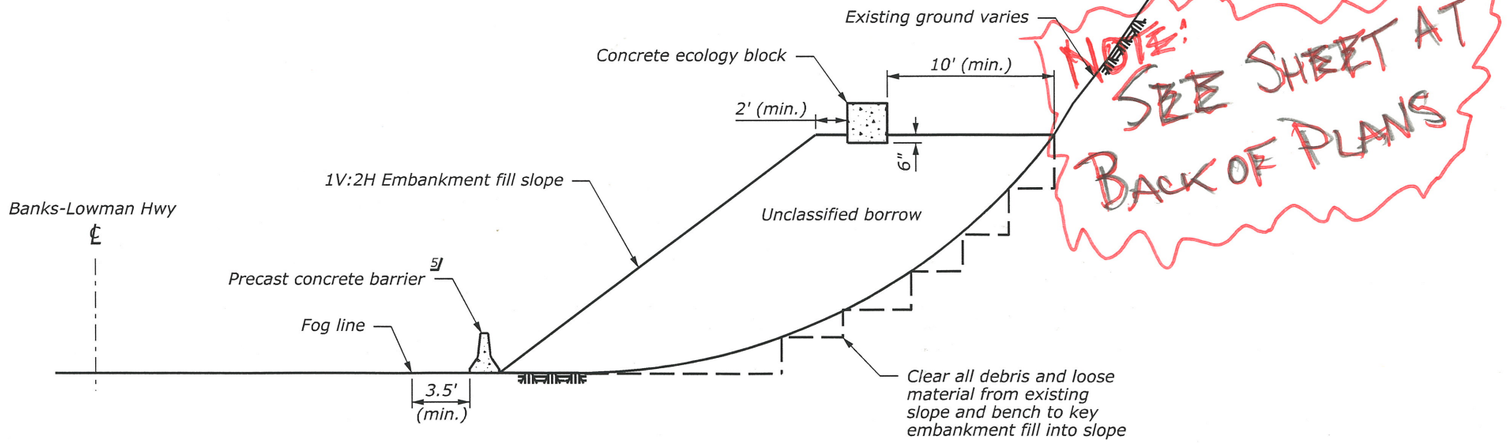
TYPICAL SECTION

MSE WALL



MSE RETURN WALL DETAIL

This sheet replaced per Amendment A001



TYPICAL SECTION

EMBANKMENT

NOTE: SEE SHEET AT BACK OF PLANS

NO SCALE

NOTE:

1. MSE wall and embankment locations shown on Sheet D.6. MSE wall to be constructed according to special contract requirements Section 255. See MSE wall details on Sheet D.23 for General Notes and design requirements.
2. See Concrete Ecology Block details on Sheet D.24, for block dimensions and stacking requirements.

FOOTNOTE:

1/ MSE wall face to be vertical. MSE profile provided in MSE wall details on Sheet D.23.

2/ Clear MSE wall foundation of all debris and prepare according to Section 209.

3/ Use reinforcement elements for the lower MSE wall that are a length (L) ≥ 0.8 H. Use elements that are (L) ≥ 8-feet for the upper MSE wall. Extend reinforcement elements in the upper MSE wall either to the barrier fence post foundation or the two-tier concrete ecology blocks.

4/ Install tieback wire ropes for the rockfall protection fence (flexible barrier) within manufacturer's tolerances to provide a minimum of 12-feet of vertical clearance between the ditch and tieback wire rope.

5/ Place precast concrete barrier at the toe of the embankment fill slope to fit field conditions as approved by the CO.

TYPICAL SECTIONS FOR SLOPE 112 MSE WALL & EMBANKMENT

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

c:\mvfiles\pw_production\0011512O\f02413cc.dgn [US_Sur_ft2D]

29 August 2012 9:58 AM

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	D.1

ROADWAY QUANTITIES

Station to Station	Item 20101-0000 Clearing and grubbing (ACRE)	Item 20401-0000 Roadway excavation (CUYD) 1/	Item 20410-0000 Select borrow (CUYD) 2/	Unclassified material (CUYD) 3/ FOR INFORMATION ONLY	Conserved topsoil (CUYD) 4/ FOR INFORMATION ONLY	Item 62406-0400 Placing conserved topsoil, 6-inch depth (ACRE)	Item 62503-0000 Turf establishment, hydraulic method (SLRY)
Schedule A: 1+50 to 25+00	2.57	3,891	4,628	927	2,225	2.27	9.3
25+00 to 55+00	3.65	5,418	9,383	2,809	3,563	3.34	13.4
Schedule B: 55+00 to 81+50	2.48	3,060	5,398	390	1,923	2.01	8.8
81+50 to 85+00	0.30	310	782	248	306	0.26	1.0
85+00 to 115+00	2.46	2,139	5,792	2,041	2,104	2.07	8.3
115+00 to 118+00	0.26	250	705	248	248	0.22	0.9
Schedule B & Schedule C: 118+00 to 145+00	2.68	2,996	7,127	1,236	2,052	2.37	9.5
145+00 to 175+00	4.16	8,616	7,032	2,336	4,017	3.88	15.5
175+00 to 205+00	3.63	6,289	8,835	1,296	3,315	3.32	13.3
205+00 to 231+00	2.18	2,163	6,267	1,084	1,690	1.88	7.5
Schedule A Total	**24.37**	**35,132**	**55,949**	**12,615**	**21,443**	**21.62**	**87.5**
Schedule B Total	**21.35**	**32,433**	**48,670**	**10,078**	**18,785**	**19.07**	**77.3**
Schedule C Total	**12.65**	**20,064**	**29,261**	**5,952**	**11,074**	**11.45**	**45.8**

Ditch skewed to drain off slope 7+25 to 73+38, terminating there.

4+64 to 7+25

ROADWAY OBLITERATION QUANTITIES

Station to Station	Side	Item 21101-2000 Roadway obliteration, method 2 5/ (SQYD)	Item 62406-0400 Placing conserved topsoil, 6-inch depth (ACRE)	Item 62503-0000 Turf establishment, hydraulic method (SLRY)
Schedule A & Schedule B: 79+43 to 80+51	LT	203	0.04	0.2
80+92 to 81+38	LT	148	0.03	0.1
Schedule C: 119+36 to 120+16	LT	89	0.02	0.1
Schedule A Total		**440**	**0.09**	**0.4**
Schedule B Total		**440**	**0.09**	**0.4**
Schedule C Total		**89**	**0.02**	**0.1**

ITEM 25120-1000 RIPRAP DITCH, CLASS 1 6/

Station to Station 7/	Side	Quantity (LNFT)
Schedule A: 7+00 to 9+50	LT	254
19+00 to 21+00	LT	198
72+00 to 73+50	LT	150
Schedule B: 72+00 to 74+00	RT	201
80+00 to 80+35	LT	36
80+85 to 81+50	LT	67
81+50 to 83+00	LT	151
120+50 to 126+50	LT	592
Schedule C: 165+62 to 166+50	LT	88
170+50 to 171+00	LT	50
176+29 to 179+50	LT	321
Schedule A Total		**2,108**
Schedule B Total		**1,957**
Schedule C Total		**1,051**

126+34 Extra material used for check dams

165+62 to 166+50 = 57 = 95 LN

170+50 to 171+00 = 54 LN

176+29 to 179+50 = 324

ITEM 60405-0000 MANHOLE ADJUSTMENT

Station	Side	Adjustment (LNFT)	Quantity (EACH)
Schedule A & Schedule B: 3+88	LT	0.5	1
Schedule C: 216+88	LT	10/	1
217+92	RT	10/	1
225+56	RT	10/	1
229+55	RT	10/	1
230+81	RT	10/	1
Schedule A Total			**6**
Schedule B Total			**6**
Schedule C Total			**5**

Investigated, no adjustment made per agreement w/ City

NO ADJUSTMENT NEEDED (MANHOLE OUT OF ROADWAY FROM

SUMMARY OF LIGHTING SYSTEM INSTALLATION QUANTITIES SCHEDULES A, B, & C 8/

Item Number	Description	Unit	Quantity
63611-0500	Wire, electrical conductors, 6 AWG	LNFT	1,725.0
63612-0000	Luminaire	EACH	10
63612-1200	Luminaire, photocontrols	EACH	1
63620-0000	Pole, light	EACH	10

ITEM 61901-2000 FENCE, CHAIN LINK, 72" HEIGHT SCHEDULES A & B 9/

Station to Station	Side	Offset (LNFT)	Quantity (LNFT)
5+40 to 9+20	RT	18	380.0

16 LNFT

NOTE:

1. See Sheet E.1 for approach road quantities.

FOOTNOTE:

1/ Includes conserved topsoil.
2/ Quantities shown represent volume required to construct 1:1.5 embankments. Based on 1.33 compaction factor.
3/ Represents quantity placed on 1:1.5 embankments to construct flattened slopes.
4/ Based on a conserved topsoil depth of 9 inches.
5/ See Sheet H.1 for roadway obliteration details.
6/ See Sheet G.4 for riprap ditch details.
7/ See Sheets D.2-D.9 for locations of riprap ditches relative to the construction centerline.
8/ See Sheets H.2-H.3 for lighting system details.
9/ See Sheets H.4-H.5 for fence details.
10/ Manholes built after field survey. Adjust to grade as needed.

TABULATION OF PLAN AND PROFILE QUANTITIES

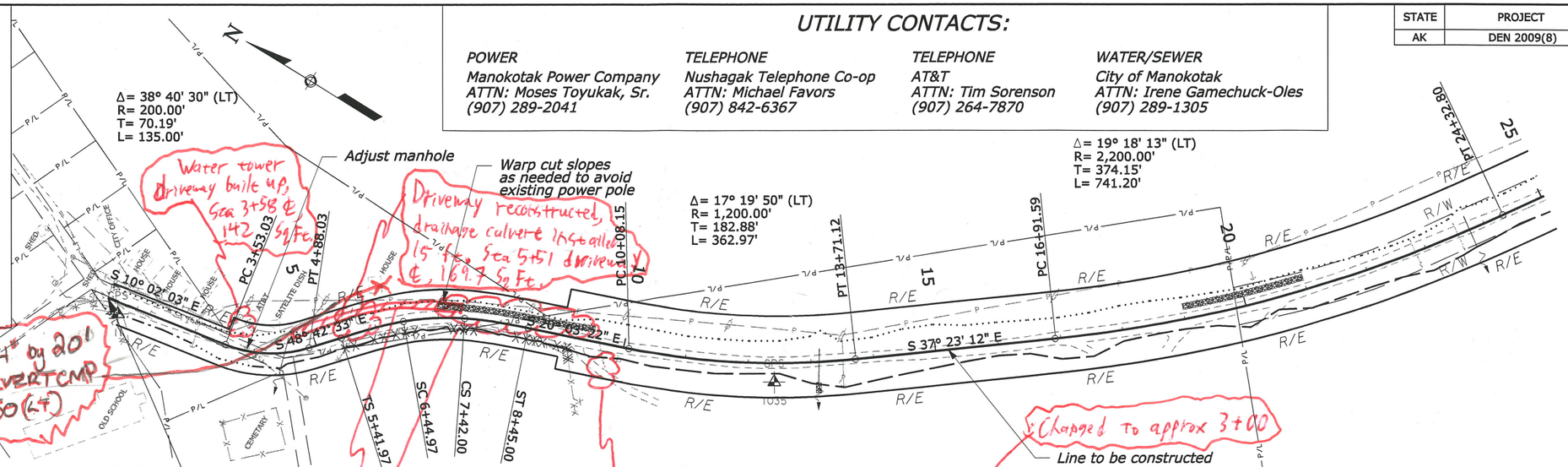
STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	D.2

PLAN AND PROFILE LEGEND:

- Line to be constructed — 50
- Culvert with inlet/outlet ditch — 24"
- Typical inlet/outlet ditch (1:2, 3', 1:2)
- Energy dissipator
- Riprap ditch, class 1
- Roadway obliteration, method 2
- Right of entry — R/E

UTILITY CONTACTS:

POWER	TELEPHONE	TELEPHONE	WATER/SEWER
Manokotak Power Company	Nushagak Telephone Co-op	AT&T	City of Manokotak
ATTN: Moses Toyukak, Sr.	ATTN: Michael Favors	ATTN: Tim Sorenson	ATTN: Irene Gamechuck-Oles
(907) 289-2041	(907) 842-6367	(907) 264-7870	(907) 289-1305

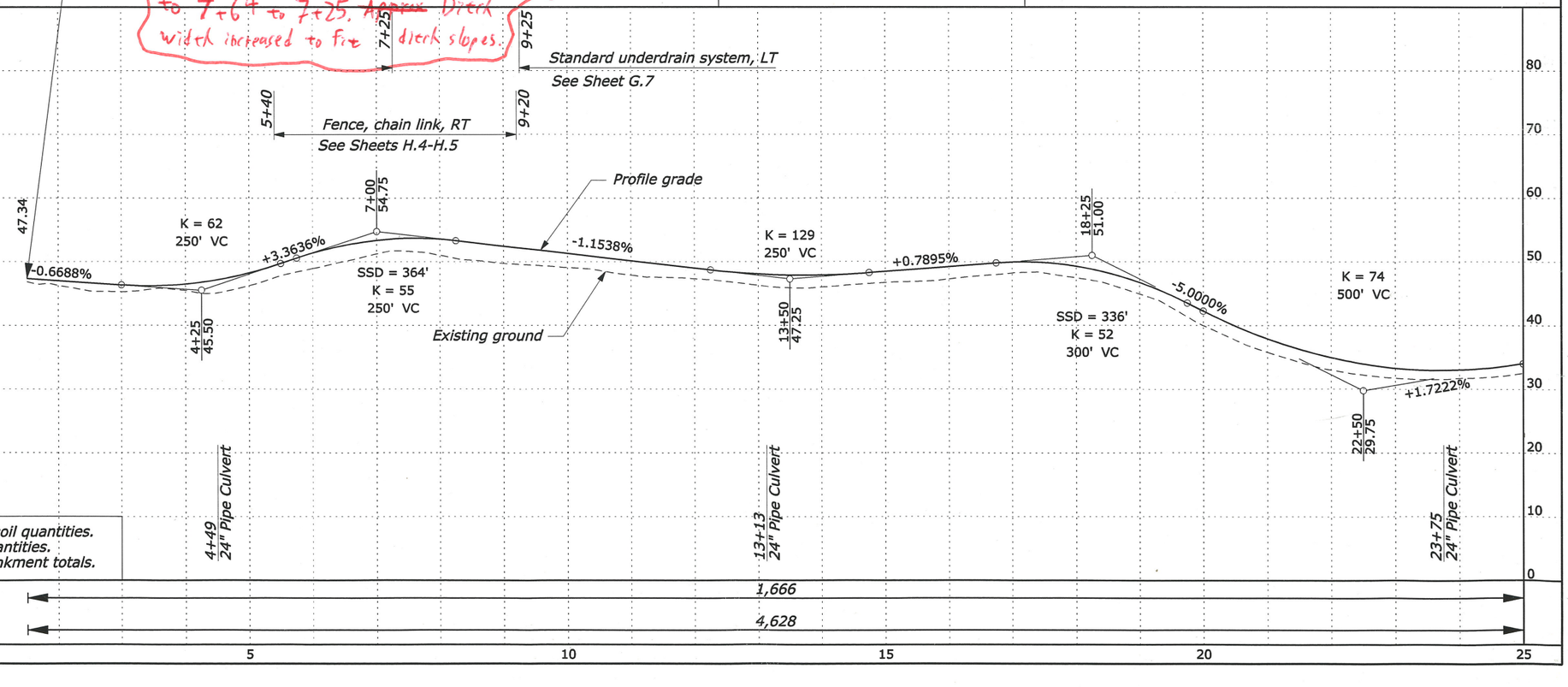


BEGIN PROJECT AK DEN 2009(8)
MANOKOTAK HEIGHTS ROAD RECONSTRUCTION
BEGIN SCHEDULES A & B
1+50.00
N= 1820450.355
E= 1441280.797
EL= 47.34

NOTE:
Refer to right of entry documents for right of entry boundary decriptions.

CONTROL POINTS

NAME	NORTHING	EASTING	ELEVATION
11	1820423.16	1441267.39	45.75
1035	1819474.13	1441721.22	45.39

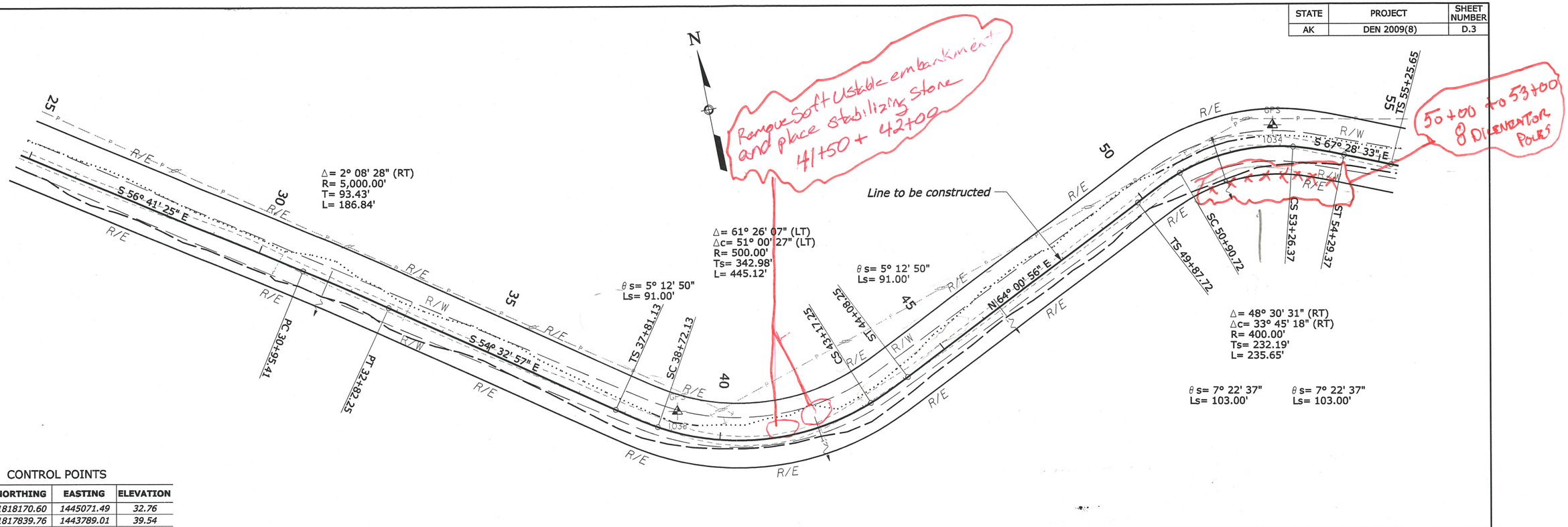


Excavation volumes do not include conserved topsoil quantities.
Embankment volumes represent select borrow quantities.
See Sheet D.1 for complete excavation and embankment totals.

EXC. CUYD	1,666
EMB. CUYD	4,628

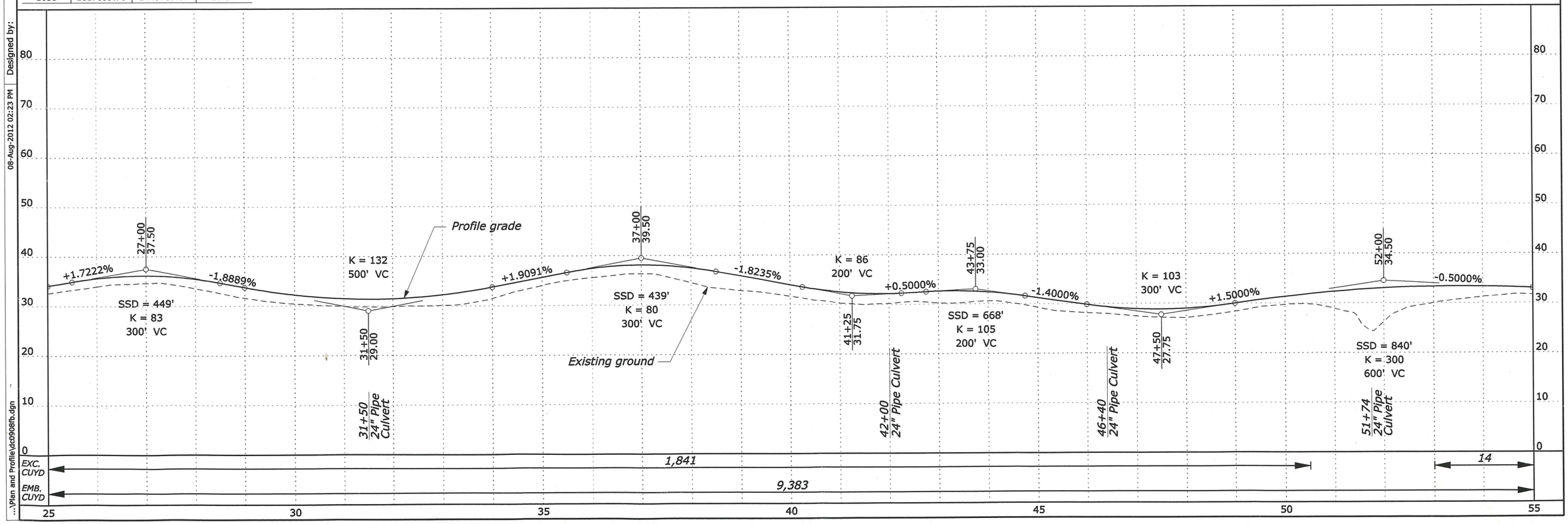
7/2012 B. Wacker | 7/2012 N. Bell | Checked by: | Designed by: | 06-Sep-2012 02:45 PM | ...\Plan and Profile\dc09008fa.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	D.3



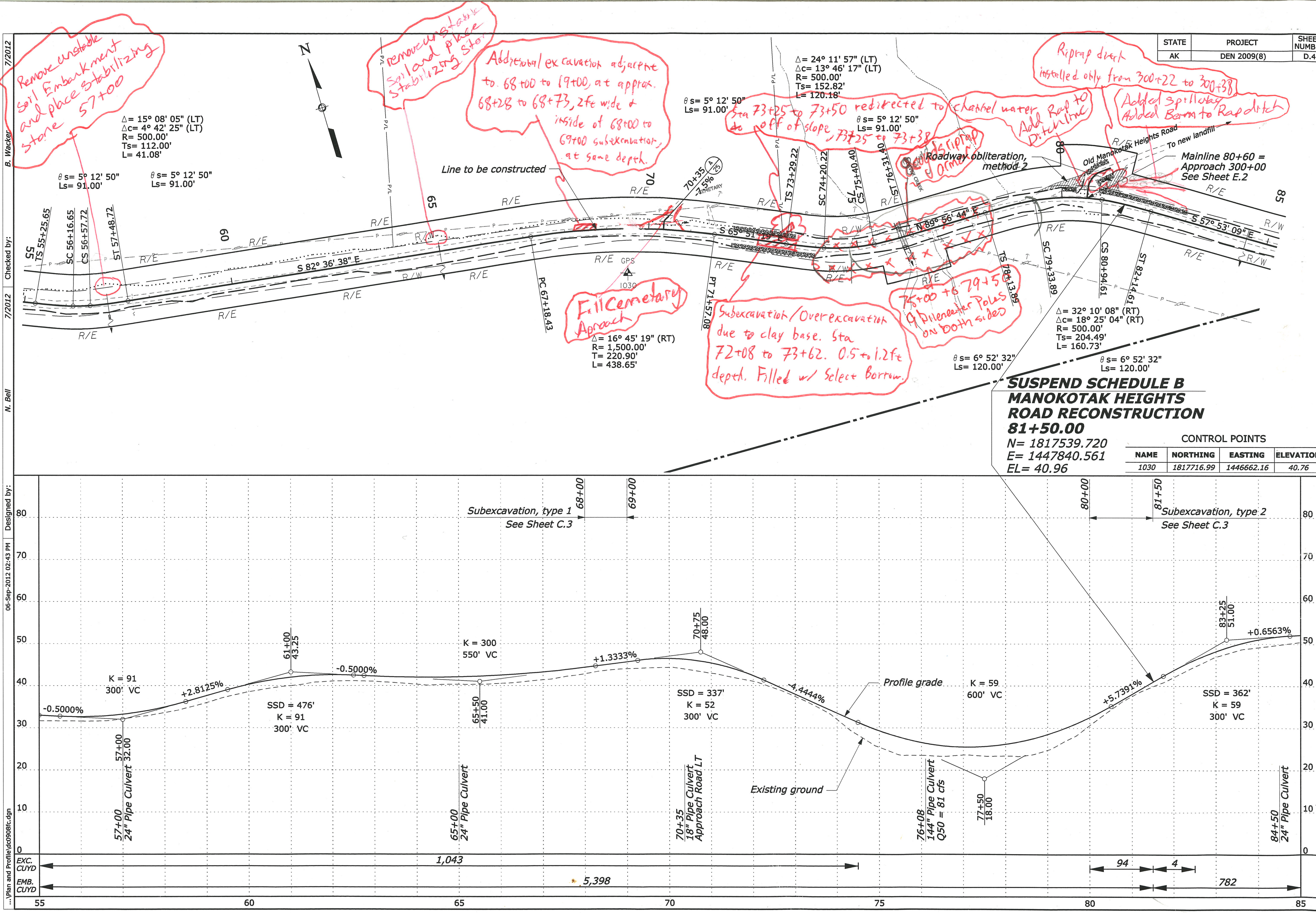
CONTROL POINTS

NAME	NORTHING	EASTING	ELEVATION
1034	1818170.60	1445071.49	32.76
1038	1817839.76	1443789.01	39.54



7/2012 B. Wacker
Checked by:
7/2012 N. Bell
Designed by:
08-Aug-2012 02:23 PM
...\Plan and Profile\dc0908fb.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	D.4

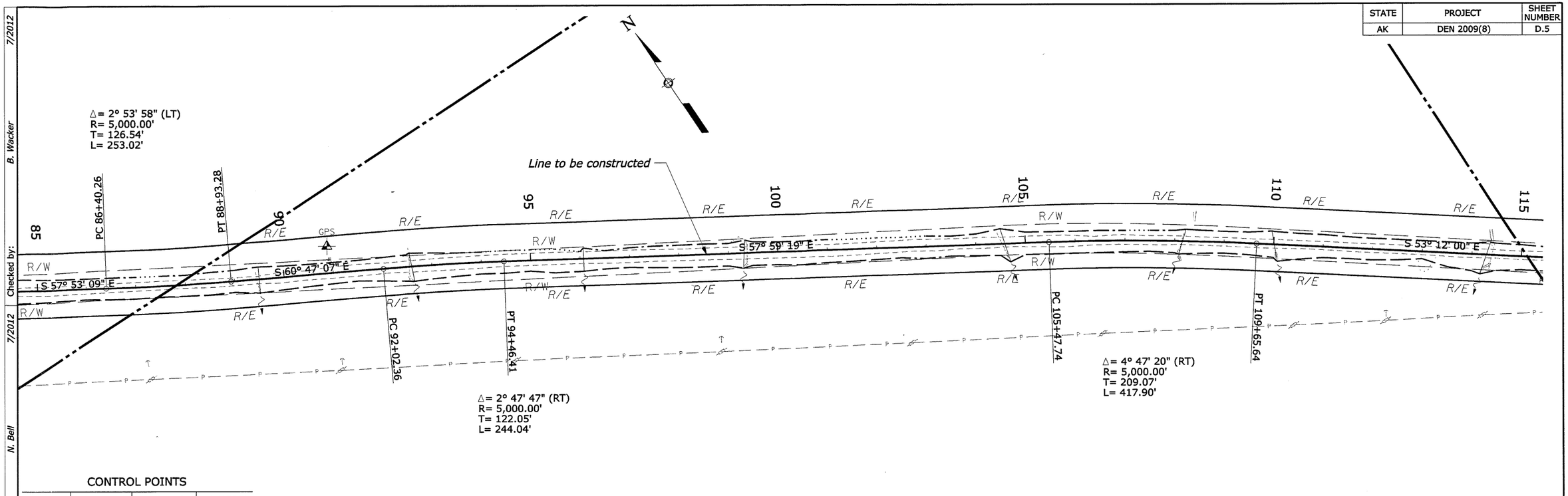


CONTROL POINTS

NAME	NORTHING	EASTING	ELEVATION
1030	1817716.99	1446662.16	40.76

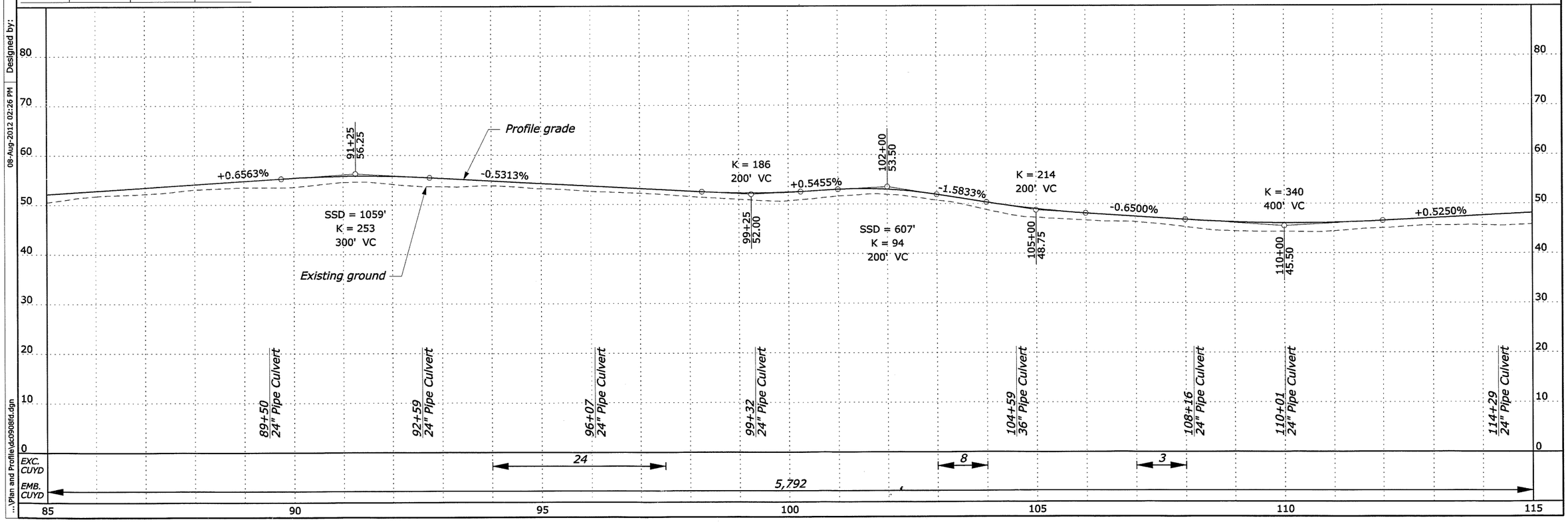
STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	D.5

7/2012 B. Wacker Checked by:
7/2012 N. Bell
08-Aug-2012 02:26 PM Designed by:
...\Plan and Profile\dc0908fd.dgn



CONTROL POINTS

NAME	NORTHING	EASTING	ELEVATION
5	1817101.59	1448673.81	54.50



STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	D.6

Add Rap to Ditch line

Riprap check dams installed at culverts 122+50 and 126+13

Riprap ditch reduced to 120+50 to 126+34

TURN OUT 6 grade break

Line to be constructed

Roadway obliteration, method 2

Old Manokotak Heights Road

To new landfill

Mainline 119+10
Approach 400+00
See Sheet E.2

RESUME SCHEDULE B
BEGIN SCHEDULE C
MANOKOTAK HEIGHTS ROAD RECONSTRUCTION
118+00.00
N= 1815555.910
E= 1450900.247
EL= 50.20

CONTROL POINTS

NAME	NORTHING	EASTING	ELEVATION
6	1815368.89	1451235.91	65.82
7	1815247.65	1451856.06	92.60

Δ= 33° 49' 55" (LT)
Δc= 23° 24' 15" (LT)
R= 500.00'
Ts= 197.76'
L= 204.24'

θ s= 5° 12' 50"
Ls= 91.00'

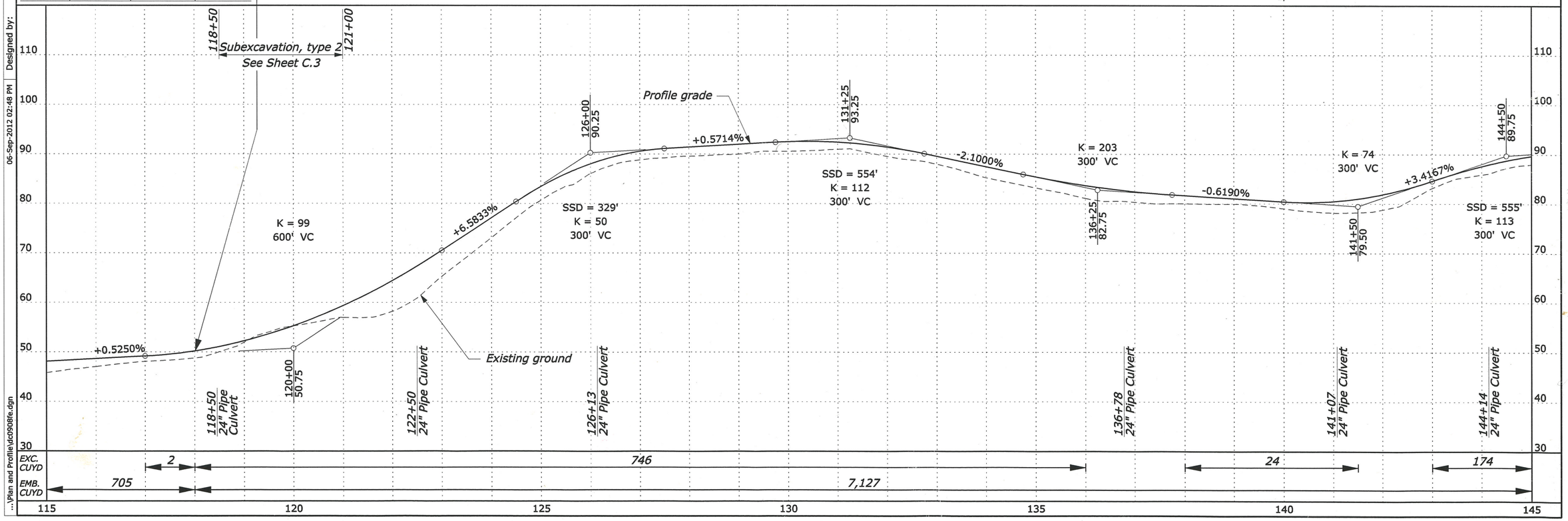
Δ= 11° 47' 32" (RT)
Δc= 1° 21' 52" (RT)
R= 500.00'
Ts= 97.19'
L= 11.91'

Δ= 13° 59' 52" (LT)
Δc= 3° 34' 12" (LT)
R= 500.00'
Ts= 106.95'
L= 31.15'

Δ= 7° 59' 01" (LT)
R= 2,000.00'
T= 139.57'
L= 278.68'

S 53° 12' 00" E
S 87° 01' 54" E
S 75° 14' 23" E
S 83° 13' 23" E
N 82° 46' 44" E

TS 120+07.41
SC 120+98.41
CS 123+02.65
ST 123+93.65
TS 124+31.05
SC 125+22.05
CS 125+33.96
ST 126+24.96
PC 135+61.42
PT 138+40.10
TS 141+94.27
SC 142+85.27
CS 143+16.43
ST 144+07.43
TS 145+09.11



7/2012 B. Wacker Checked by: 7/2012 N. Bell Designed by: 06-Sep-2012 02:48 PM ...\Plan and Profile\dc0908fe.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	D.7

CONTROL POINTS

NAME	NORTHING	EASTING	ELEVATION
1033	1814895.61	1455427.34	121.04

150+00 to 151+00
REMOVED UNSTABILIZED SOIL PUT IN STABILIZATION STONE

153+25 to 153+75
154+00 to 154+50
REMOVED UNSTABILIZED SOIL PUT IN STABILIZATION STONE

N

145 150 155 160 165 170 175

R/E R/W P

TS 145+08.11
SC 145+99.11
CS 146+46.89
ST 147+37.89

△= 15° 54' 10" (RT)
△c= 5° 28' 30" (RT)
R= 500.00'
Ts= 115.42'
L= 47.78'

θ s= 5° 12' 50" Ls= 91.00'
θ s= 5° 12' 50" Ls= 91.00'

S 81° 19' 06" E

TS 152+82.18
SC 153+73.18
CS 154+31.47
ST 155+22.47

△= 17° 06' 25" (LT)
△c= 6° 40' 45" (LT)
R= 500.00'
Ts= 120.79'
L= 58.29'

θ s= 5° 12' 50" Ls= 91.00'
θ s= 5° 12' 50" Ls= 91.00'

Line to be constructed

156+26 HEADWALL
156+26 Dissipator

N 81° 34' 29" E

TS 158+39.09
SC 159+30.09
CS 160+62.49
ST 161+53.49

△= 25° 35' 59" (RT)
△c= 15° 10' 19" (RT)
R= 500.00'
Ts= 159.24'
L= 132.40'

θ s= 5° 12' 50" Ls= 91.00'
θ s= 5° 12' 50" Ls= 91.00'

S 72° 49' 32" E

△= 22° 55' 54" (LT)
△c= 12° 30' 13" (LT)
R= 500.00'
Ts= 147.04'
L= 109.12'

θ s= 5° 12' 50" Ls= 91.00'
θ s= 5° 12' 50" Ls= 91.00'

TS 161+95.20
SC 162+86.20
CS 163+95.32
ST 164+86.32

1033

N 84° 14' 35" E

Riprap Ditch Added 7ft

PC 166+37.91
PT 167+88.06

△= 10° 45' 12" (RT)
R= 800.00'
T= 75.29'
L= 150.14'

S 85° 00' 14" E

Riprap Ditch Added 4ft

△= 5° 01' 03" (LT)
R= 3,000.00'
T= 131.44'
L= 262.71'

PC 173+73.17

Y/d

Subexcavation, type 2 See Sheet C.3
154+50 to 157+50
158+50 to 161+00
165+00 to 166+50

150 140 130 120 110 100 90 80 70

147+50 92.00
148+04 24" Pipe Culvert
150+00 95.75
153+50 87.00
153+78 24" Pipe Culvert
156+26 24" Pipe Culvert
158+00 104.00
161+24 24" Pipe Culvert
163+58 24" Pipe Culvert
165+68 36" Pipe Culvert
168+00 120.75
170+50 24" Pipe Culvert
173+00 132.25

+0.7500% +1.5000% -2.5000% +3.7778% +1.6750% +2.3000% +1.4375%

K = 267 200' VC
SSD = 420' K = 75 300' VC
K = 48 300' VC
SSD = 713' K = 190 400' VC
K = 480 300' VC
SSD = 1401' K = 348 300' VC

Profile grade
Existing ground

EXC. CUYD	4,599
EMB. CUYD	7,032

145 150 155 160 165 170 175

7/2012 B. Wacker
7/2012 Checked by:
N. Bell Designed by:
08-Aug-2012 02:28 PM
...\Plan and Profile\dc0908ft.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	D.8

CONTROL POINTS

NAME	NORTHING	EASTING	ELEVATION
1031	1814843.16	1457229.76	166.08

△= 1° 09' 58" (RT)
R= 10,000.00'
T= 101.76'
L= 203.52'

Riprap ditch added 3ft

Subex Deleted

Line to be constructed

N

PT 176+35.88

PC 178+53.79

PT 180+57.31

P/L

GPS 1031

N 89° 56' 43" E

S 88° 51' 19" E

R/W

R/E

175 180 185 190 195 200 205

Subexcavation, type 1
See Sheet C.3

191+00 192+00

202+00 203+50

181+75
163.00

191+00
152.00

200+00
156.75

188+25
144.50

Profile grade

Existing ground

K = 78
300' VC

+5.2632%

SSD = 416'
K = 80
650' VC

-2.8462%

K = 54
300' VC

+2.7273%

SSD = 591'
K = 91
200' VC

+0.5278%

SSD = 851'
K = 139
200' VC

-0.9091%

+1.4375%

177+00
138.00

176+29
24" Pipe Culvert

188+45
24" Pipe Culvert

192+84
24" Pipe Culvert

194+80
24" Pipe Culvert

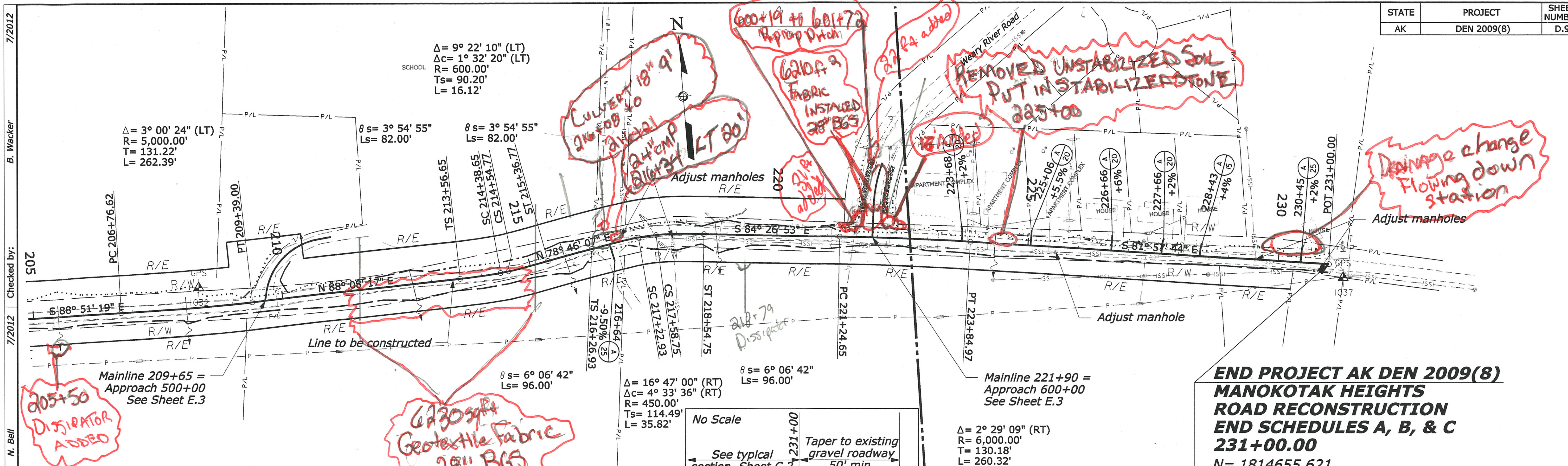
EXC. CUYD	2,974
EMB. CUYD	8,835

190 180 170 160 150 140 130 120 110

175 180 185 190 195 200 205

7/2012 B. Wacker Checked by:
7/2012 N. Bell Designed by:
08-Aug-2012 02:29 PM
...\Plan and Profile\dc0908fg.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	D.9



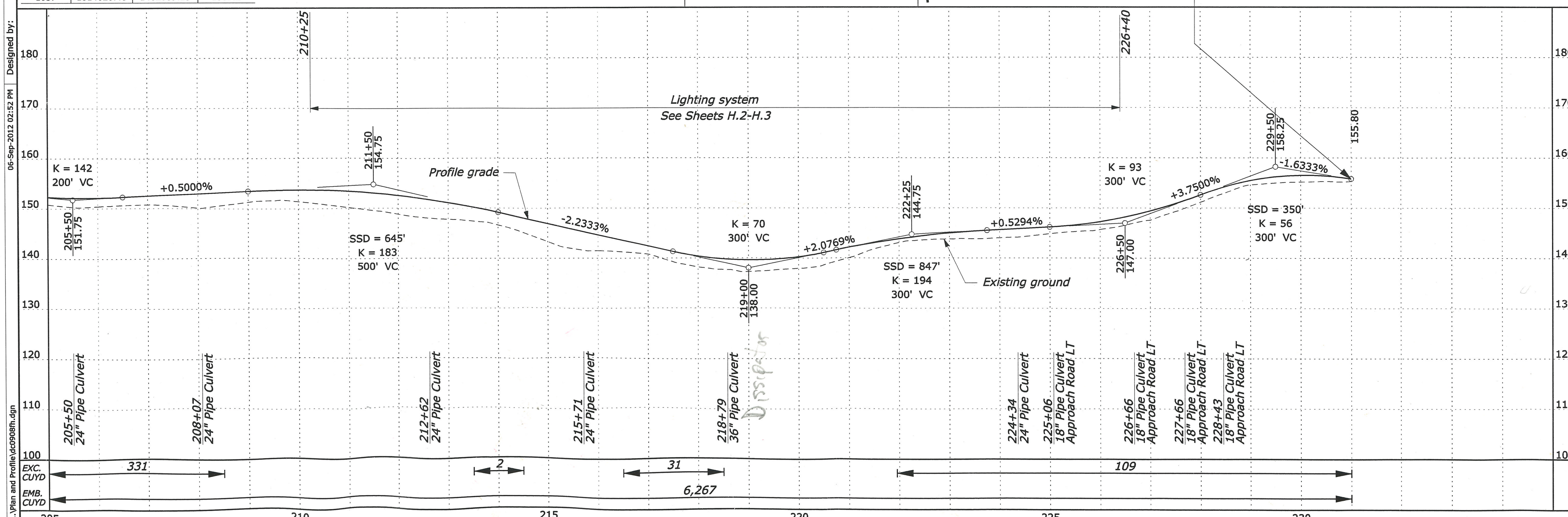
Δ= 9° 22' 10" (LT)
Δc= 1° 32' 20" (LT)
R= 600.00'
Ts= 90.20'
L= 16.12'
SCHOOL
Δ= 3° 00' 24" (LT)
R= 5,000.00'
T= 131.22'
L= 262.39'
θ s= 3° 54' 55"
Ls= 82.00'
θ s= 3° 54' 55"
Ls= 82.00'
PC 206+76.62
PT 209+39.00
TS 213+56.65
SC 214+38.65
CS 214+54.77
ST 215+36.77
S 88° 51' 19" E
N 88° 08' 17" E
N 78° 46' 07" E
S 84° 26' 53" E
S 81° 57' 44" E
Adjust manholes
Adjust manhole
Line to be constructed
Mainline 209+65 =
Approach 500+00
See Sheet E.3
θ s= 6° 06' 42"
Ls= 96.00'
Δ= 16° 47' 00" (RT)
Δc= 4° 33' 36" (RT)
R= 450.00'
Ts= 114.49'
L= 35.82'
TS 216+26.93
SC 217+22.93
CS 217+58.75
ST 218+54.75
PC 221+24.65
PT 223+84.97
Mainline 221+90 =
Approach 600+00
See Sheet E.3
Δ= 2° 29' 09" (RT)
R= 6,000.00'
T= 130.18'
L= 260.32'
Weary River Road
APARTMENT COMPLEX
HOUSE
POT 231+00.00
No Scale
See typical section, Sheet C.2
Taper to existing gravel roadway 50' min.
CONNECTION DETAIL
205+50 Dissipator Added
6230 sq ft Geotextile Fabric 28" BGS
Culvert 18" 9' 216+08 to 216+21
24" CMP 216+34 LT 20'
600+19 to 601+72 Riprap Ditch
6210 ft2 Fabric installed 28" BGS
22 ft added
Removed unstabilized soil put in stabilizer stone 223+00
Drainage change flowing down station
218+79 Dissipator

END PROJECT AK DEN 2009(8)
MANOKOTAK HEIGHTS
ROAD RECONSTRUCTION
END SCHEDULES A, B, & C
231+00.00

N= 1814655.621
E= 1462043.081
EL= 155.80

CONTROL POINTS

NAME	NORTHING	EASTING	ELEVATION
1032	1814787.19	1459793.06	154.66
1037	1814626.46	1462069.13	153.42



Lighting system
See Sheets H.2-H.3
210+25
226+40
K = 142
200' VC
+0.5000%
211+50
154.75
Profile grade
-2.2333%
SSD = 645'
K = 183
500' VC
K = 70
300' VC
219+00
138.00
+2.0769%
SSD = 847'
K = 194
300' VC
222+25
144.75
+0.5294%
Existing ground
K = 93
300' VC
226+50
147.00
+3.7500%
229+50
158.25
-1.6333%
155.80
SSD = 350'
K = 56
300' VC
205+50
151.75
205+50 24" Pipe Culvert
208+07 24" Pipe Culvert
212+62 24" Pipe Culvert
215+71 24" Pipe Culvert
218+79 36" Pipe Culvert
Dissipator
224+34 24" Pipe Culvert
225+06 18" Pipe Culvert Approach Road LT
226+66 18" Pipe Culvert Approach Road LT
227+66 18" Pipe Culvert Approach Road LT
228+43 18" Pipe Culvert Approach Road LT
EXC. CUYD
EMB. CUYD
331
2
31
109
6,267

7/2012 B. Wacker Checked by: 7/2012 N. Bell Designed by: 06-Sep-2012 02:52 PM ...\Plan and Profile\dc0908h.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	E.1

Designed by: N. Bell | Checked by: 7/2012 | 20-Jul-2012 1:28 PM | B. Wacker 7/2012

F:\highways\FHWA\12500001_Manokotak\Design\Approach Roads\[dc0908_Section E

APPROACH ROAD QUANTITIES

Mainline Station	Item 20101-0000 Clearing and grubbing (ACRE)	Item 20401-0000 Roadway excavation (CUYD) 1/	Item 20410-0000 Select borrow (CUYD) 2/	Item 30802-2000 Roadway aggregate, method 2 (TON) 5/	Item 62406-0400 Placing conserved topsoil, 6-inch depth (ACRE)	Item 62503-0000 Turf establishment, hydraulic method (SLRY)
70+35 LT	0.02	6	5	33.0	0.01	0.1
80+60 LT	0.11	188	48	142.0	0.09	0.4
119+10 LT	0.17	476	293	179.0	0.15	0.7
209+65 LT	0.10	86	113	236.0	0.06	0.3
216+64 RT	0.02	9	3	57.0	0.01	0.1
221+90 LT	0.24	545	11	362.0	0.19	0.8
223+68 LT	0.02	13		63.0	0.01	0.1
225+06 LT	0.02	13		71.0	0.01	0.1
226+66 LT	0.02	9		28.0	0.01	0.1
227+66 LT	0.02	8		28.0	0.01	0.1
228+43 LT	0.01	11		28.0	0.01	0.1
230+45 LT	0.02	8		35.0	0.01	0.1
Schedule A Total	**0.77**	**1,372**	**473**	**1,262.0**	**0.57**	**3.0**
Schedule B Total	**0.77**	**1,372**	**473**	**1,262.0**	**0.57**	**3.0**
Schedule C Total	**0.64**	**1,178**	**420**	**1,087.0**	**0.47**	**2.5**

Schedule A & Schedule B — 70+35 LT to 230+45 LT

Schedule C — 80+60 LT to 228+43 LT

Subexcavation
300+50 to 300+94

300+22 to 300+38

ITEM 25120-1000 RIPRAP DITCH, CLASS 1 3/

Station to Station 4/	Side	Quantity (LNFT)
300+50 to 301+00	LT	59
300+50 to 301+00	RT	41
600+50 to 601+50	LT	~~107~~
600+50 to 601+50	RT	~~93~~
Schedule A Total		**300**
Schedule B Total		**300**
Schedule C Total		**200**

Schedule A & Schedule B — 300+50 to 301+00 (LT, RT)

Schedule C — 600+50 to 601+50 (LT, RT)

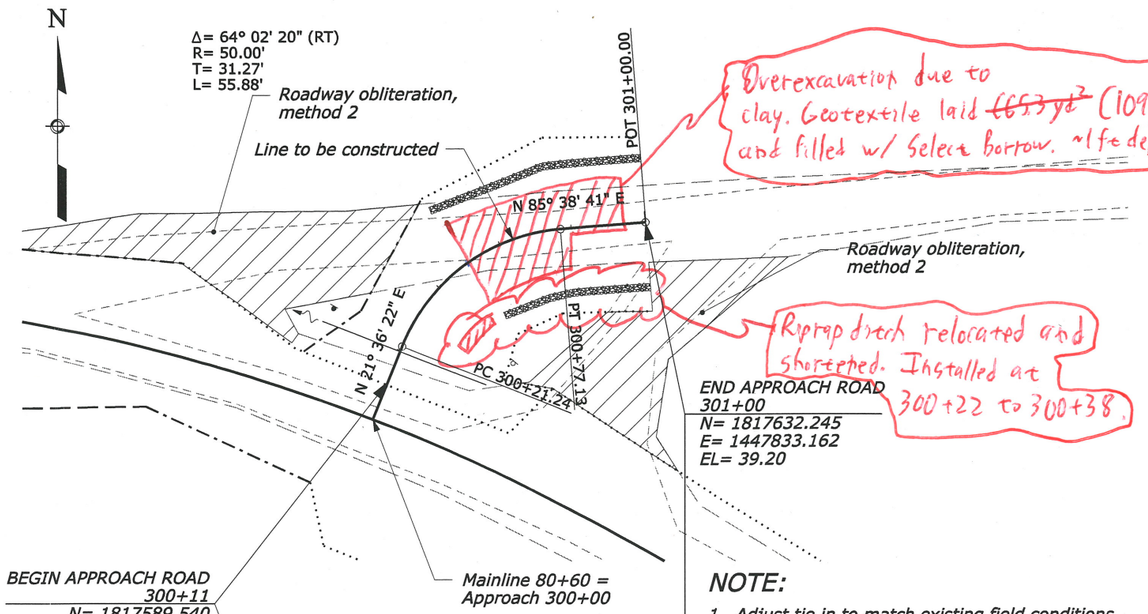
160 Ft = 600+19 to 601+72
109 Ft = 600+34 to 601+50

FOOTNOTE:

1/ *Includes conserved topsoil.*
2/ *Quantities shown represent volume required to construct 1:3 embankments. Based on 1.33 compaction factor.*
3/ *See Sheet G.4 for riprap ditch details.*
4/ *See Sheets E.2-E.3 for locations of riprap ditches relative to the construction centerline.*
5/ *Based on 1.97 TON/CUYD.*

TABULATION OF APPROACH QUANTITIES

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	E.2



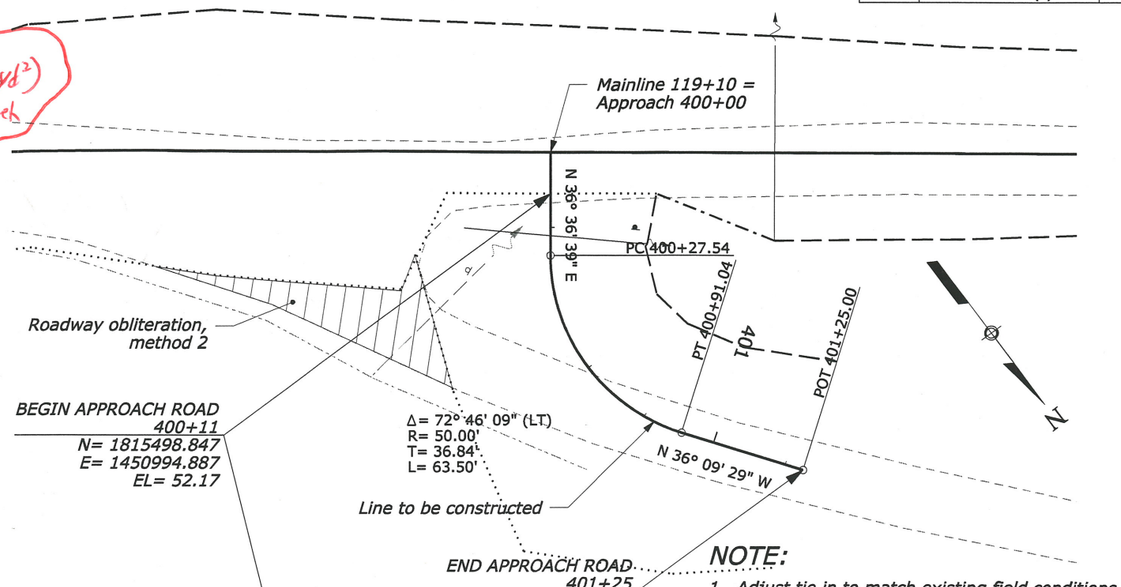
Overexcavation due to clay. Geotextile laid ~~1553 yd²~~ (109 yd²) and filled w/ Select borrow. ~1 ft deep.

Riprap ditch relocated and shortened. Installed at 300+22 to 300+38.

NOTE:

1. Adjust tie in to match existing field conditions

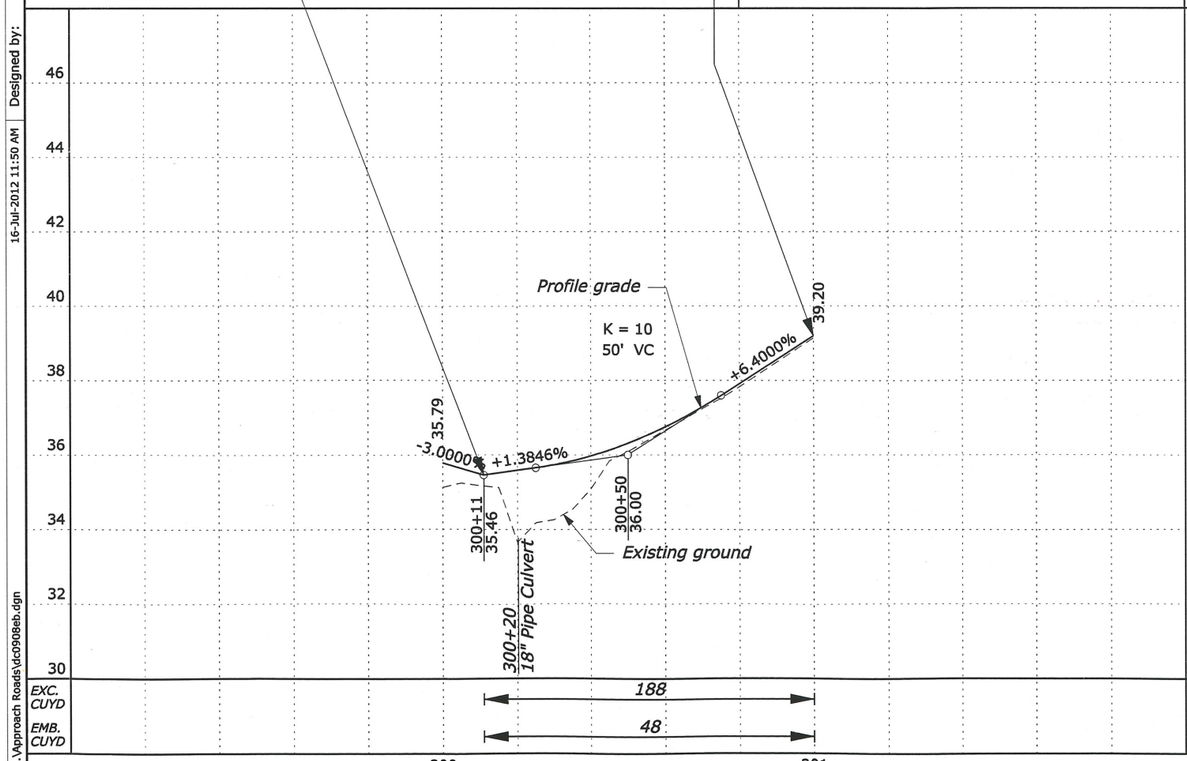
OLD MANOKOTAK HEIGHTS ROAD 300+11 TO 301+00 (MAINLINE 80+60 LT)

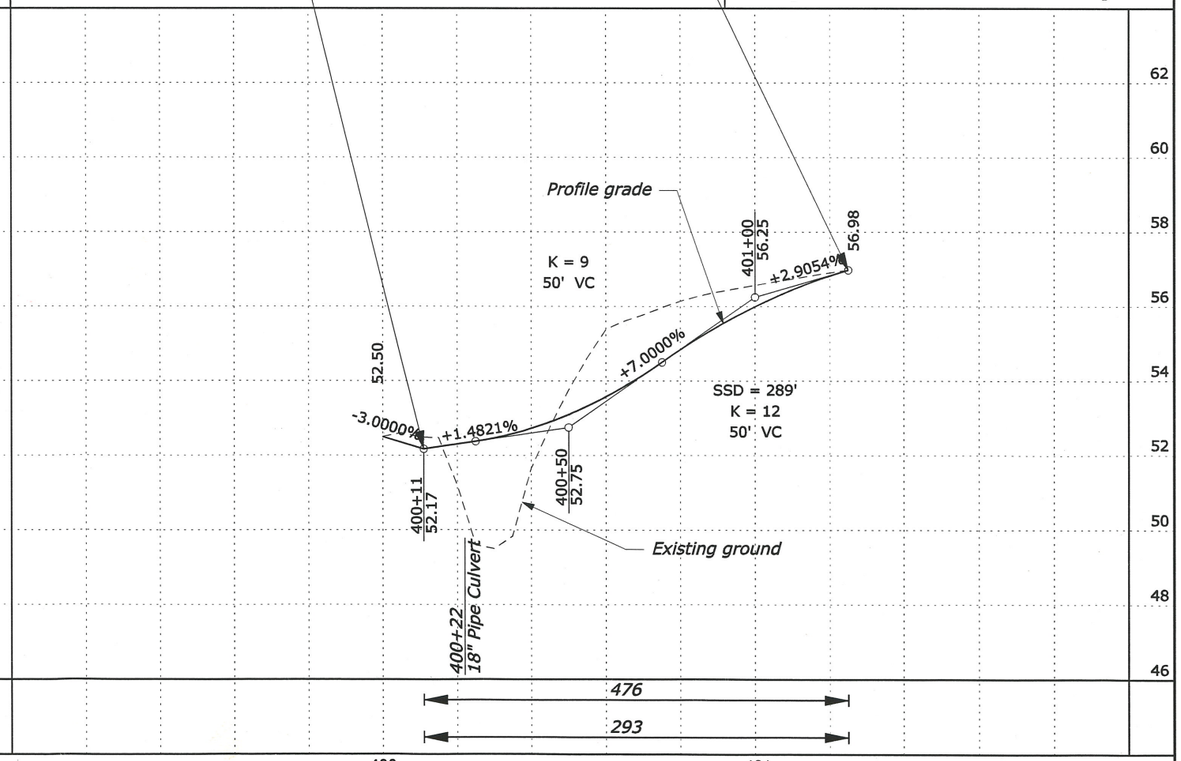


NOTE:

1. Adjust tie in to match existing field conditions

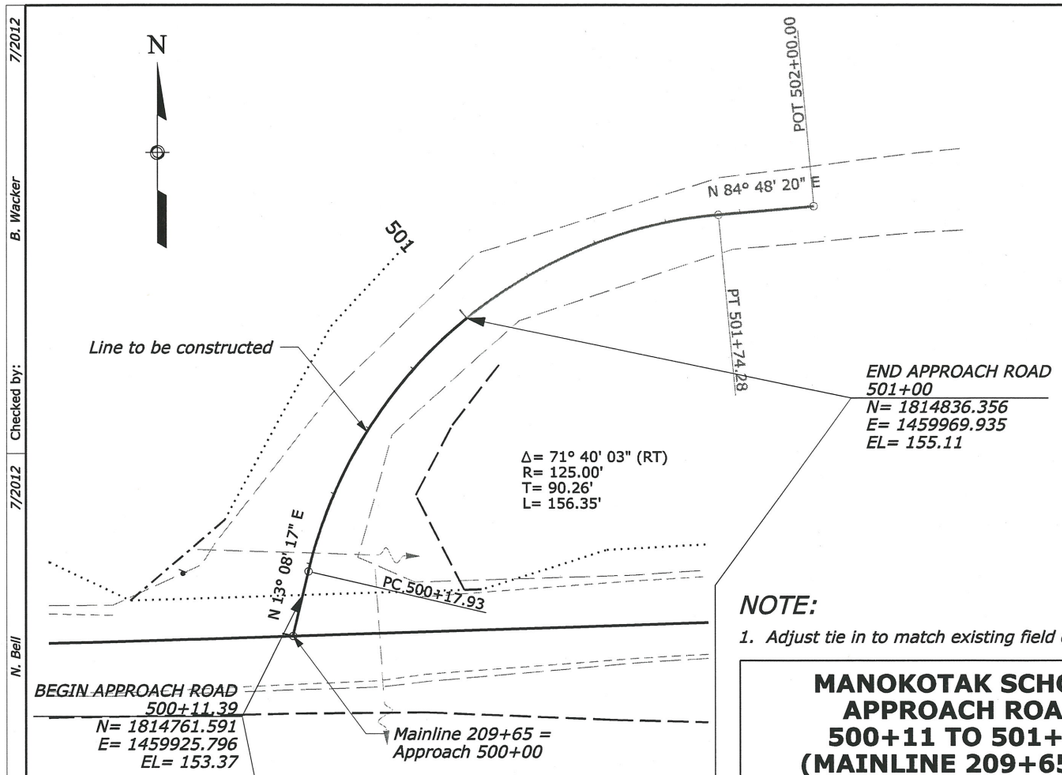
OLD MANOKOTAK HEIGHTS ROAD 400+11 TO 401+25 (MAINLINE 119+10 LT)





7/2012 B. Wacker
7/2012 Checked by:
N. Bell
16-Jul-2012 11:50 AM Designed by:
...\Approach Roads\dc0908eb.dgn

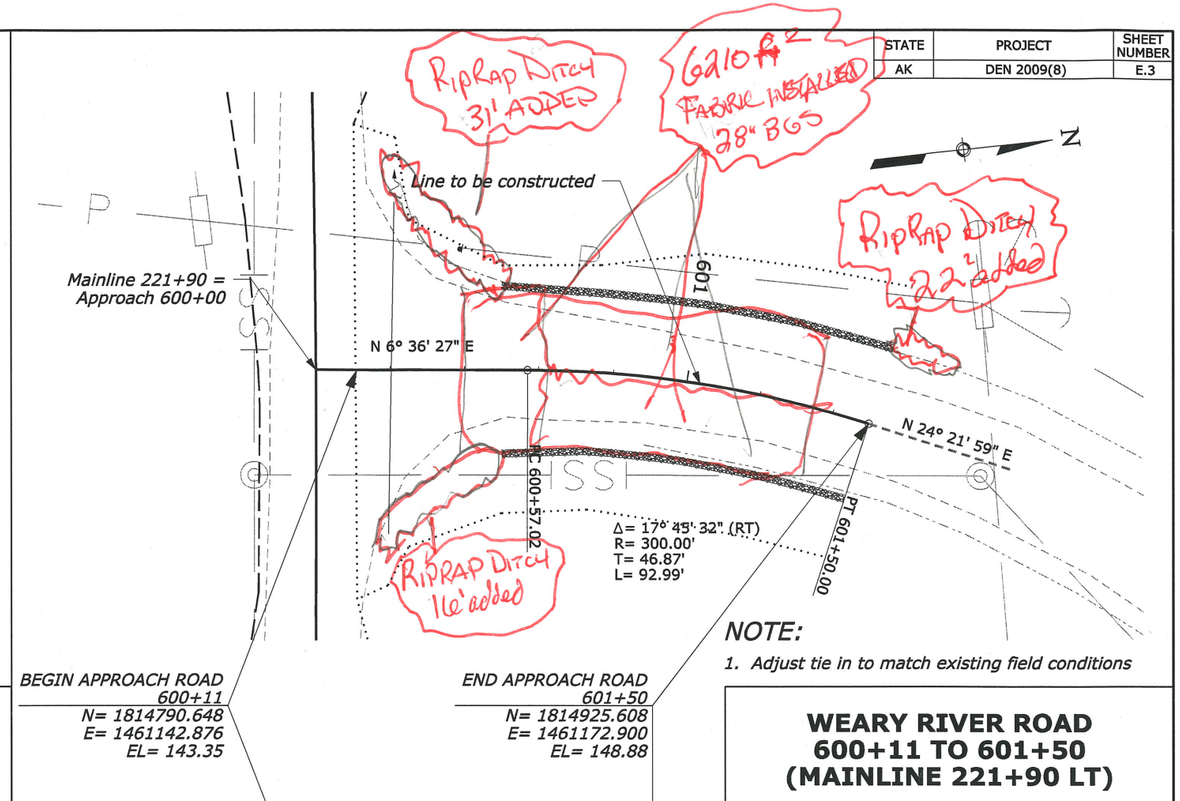
STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	E.3



NOTE:

1. Adjust tie in to match existing field conditions

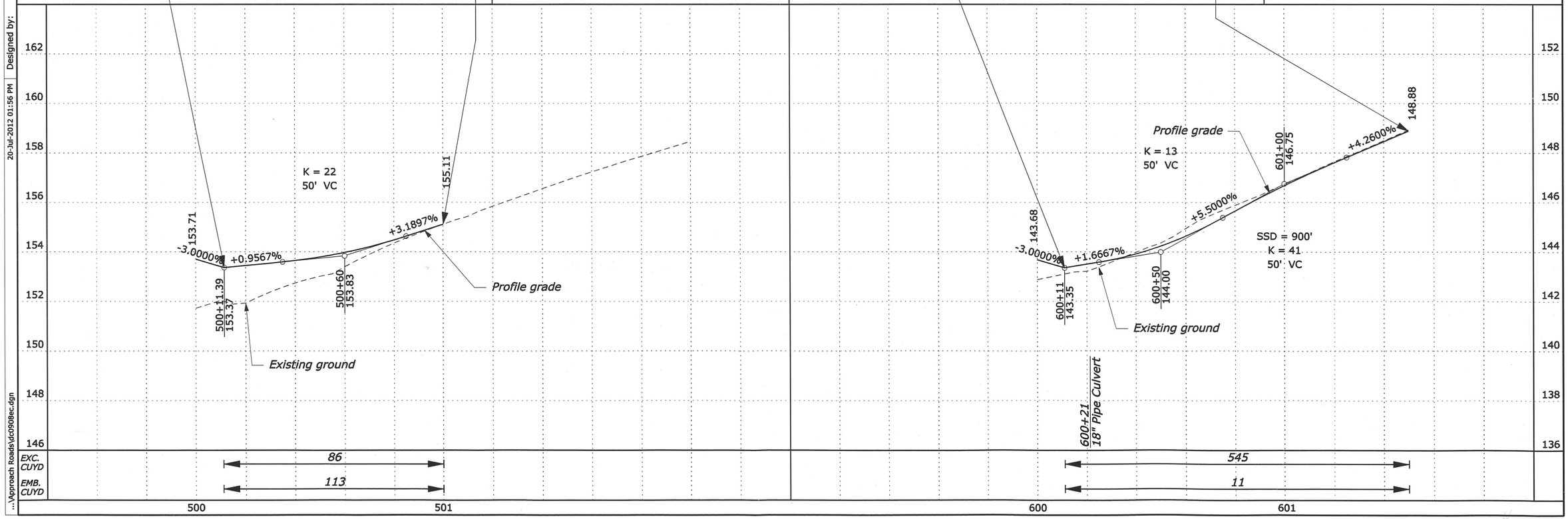
MANOKOTAK SCHOOL APPROACH ROAD 500+11 TO 501+00 (MAINLINE 209+65 LT)



NOTE:

1. Adjust tie in to match existing field conditions

WEARY RIVER ROAD 600+11 TO 601+50 (MAINLINE 221+90 LT)

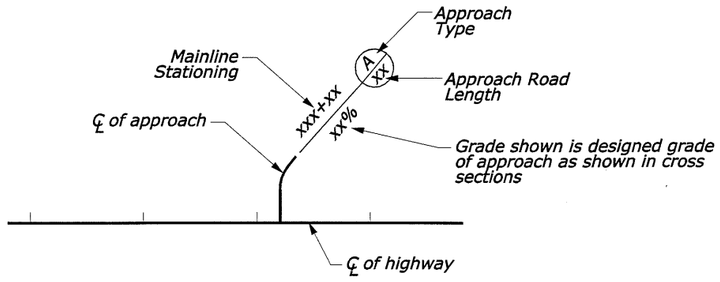


7/2012 B. Wacker
7/2012 Checked by:
N. Bell Designed by:
20-Jul-2012 01:56 PM
...\Approach Roads\dc0908ec.dgn

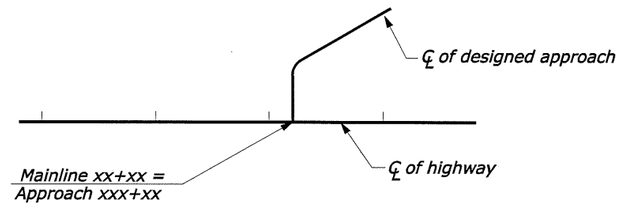
STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	E.4

APPROACH ROAD TABLE

MAINLINE STATION	Type 1/	W 1/	R1 1/	R2 1/	L 1/	REMARKS
70+35 LT	A	14	10	10	25	
80+60 LT	B	16	20	20	89	Old Manokotak Heights Road
119+10 LT	B	16	20	20	114	Old Manokotak Heights Road
209+65 LT	B	20	50	25	89	Manokotak School Approach Road
216+64 RT	A	20	25	25	25	
221+90 LT	B	24	50	50	139	Weary River Road
223+68 LT	A	26	15	40	20	
225+06 LT	A	30	30	30	20	
226+66 LT	A	14	15	15	20	
227+66 LT	A	14	20	10	20	
228+43 LT	A	20	20	10	15	
230+45 LT	A	18	10	10	25	



TYPE A APPROACH ROAD LOCATION SYMBOL



TYPE B APPROACH ROAD LOCATION SYMBOL

FOOTNOTE:

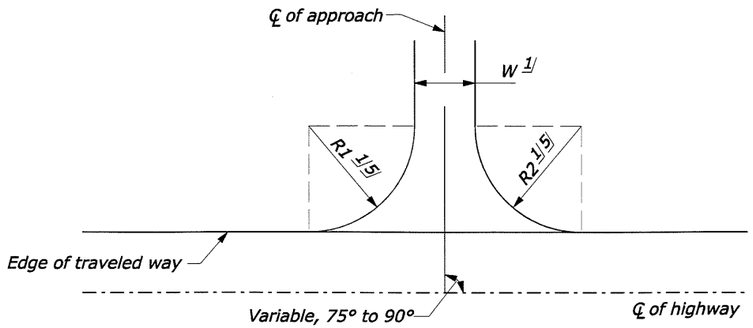
1/ See Sheet E.5.

NO SCALE

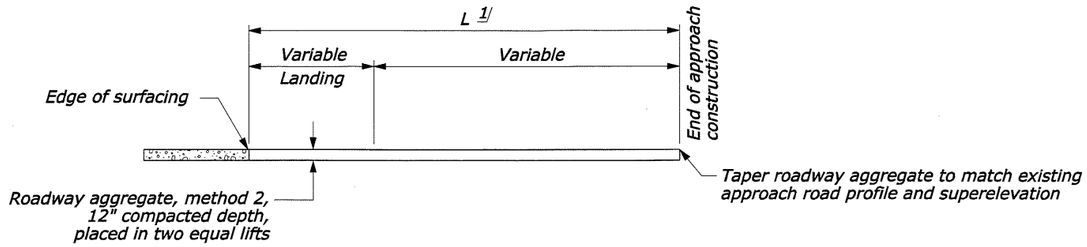
APPROACH ROAD DETAILS

7/2012 B. Wacker
Checked by:
7/2012 N. Bell
Designed by:
20-Jul-2012 02:00 PM
...\Approach Roads\dc0908ea.dgn

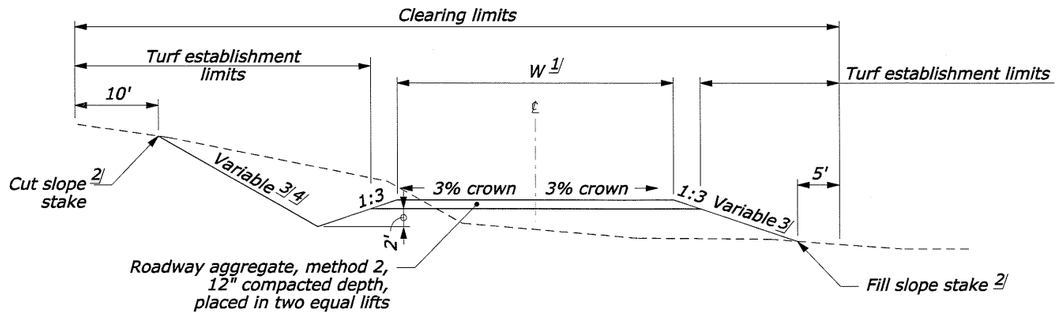
STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	E.5



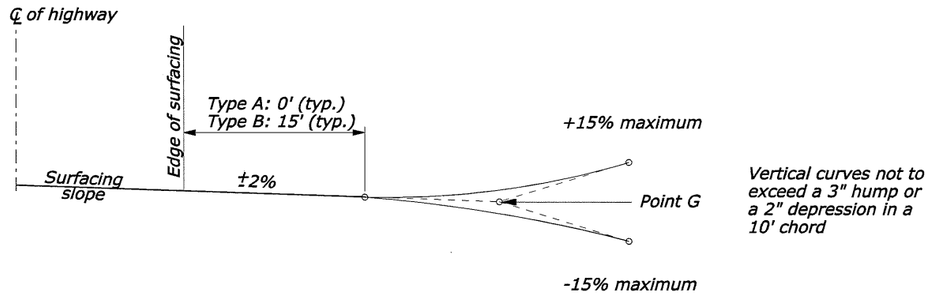
APPROACH ROAD PLAN DETAIL



APPROACH ROAD CONNECTION DETAIL



APPROACH ROAD SECTION DETAIL TYPES A AND B



APPROACH ROAD PROFILE DETAIL

FOOTNOTE:

1/ See Sheet E.4.

2/ Round slopes as shown on Sheet C.2.

3/ Construct side slopes of approaches to be compatible with adjacent roadway construction.

4/ See Standard 602-6, "Pipe Culvert Inlet Treatment in Cut Slopes."

5/ Continue approach radius as required if connection to existing alignment of approach is at an angle.

NO SCALE

APPROACH ROAD DETAILS

7/2012 B. Wacker
7/2012 Checked by:
N. Bell Designed by:
22-Jul-2012 01:43 PM
...\Approach Roads\dc0908ea.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	F.1

TEMPORARY EROSION CONTROL QUANTITIES

	Location	Side	Item 15703-1000 Soil erosion control, soil stabilization, mulching 4/ (ACRE)	Item 15705-1300 Soil erosion control, temporary diversion channel 1/ (LNFT)	Item 15705-1500 Soil erosion control, sediment wattle, government-furnished 2/ (LNFT)	Item 15706-0400 Soil erosion control, sediment trap 3/ (EACH)
Schedule A	1+50 to 81+50	LT/RT	8.02		100.0 5/	
	4+50 to 67+50	RT			6,441.0	
	70+00 to 72+00	RT			165.0	
	73+25	LT				1
	74+00 to 80+50	LT			677.0	
	74+00 to 81+50	RT			745.0	
	74+00	RT				1
Schedule B	81+00 to 81+50	LT			48.0	
	81+50 to 118+00	LT/RT	2.55			
	81+50 to 100+00	RT			1,821.0	
	84+00 to 99+00	LT			1,500.0	
	99+43	LT/RT		56.0		
	102+00 to 104+00	LT			220.0	
	104+65	LT/RT		60.0		
	105+50 to 115+50	LT			1,000.0	
	106+00 to 115+50	RT			950.0	
	108+21	LT/RT		53.0		
	114+42	LT/RT		89.0		
Schedule B & Schedule C	118+00 to 231+00	LT/RT	11.94		200.0 5/	
	118+00 to 222+00	RT			10,486.0	
	118+30 to 118+80	LT			80.0	
	119+30 to 120+20	LT			110.0	
	119+55	LT				1
	135+50 to 137+00	LT			150.0	
	136+81	LT/RT		62.0		
	144+07	LT/RT		75.0		
	147+98	LT/RT		81.0		
	153+72	LT/RT		84.0		
	161+33	LT/RT		64.0		
	163+52	LT/RT		63.0		
	164+00	LT				1
	165+58	LT/RT		80.0		
	166+00	LT				1
	212+50 to 213+00	LT			72.0	
	212+68	LT/RT		78.0		
	215+50 to 216+00	LT			52.0	
	217+95	LT				1
	218+00 to 221+50	LT			350.0	
	218+64	LT/RT		55.0		
Schedule A Total			**22.51**	**900.0**	**25,167.0**	**6**
Schedule B Total			**19.96**	**642.0**	**19,676.0**	**6**
Schedule C Total			**11.94**	**642.0**	**11,500.0**	**4**

FOOTNOTE:

1/ See Sheet F.7 for details.
2/ See Sheet F.9 for details.
3/ See Sheet F.8 for details.
4/ Apply to all disturbed areas. See Section 157.
5/ For use across ditches at culvert inlets in cut sections as approved by CO. See Sheet F.6.

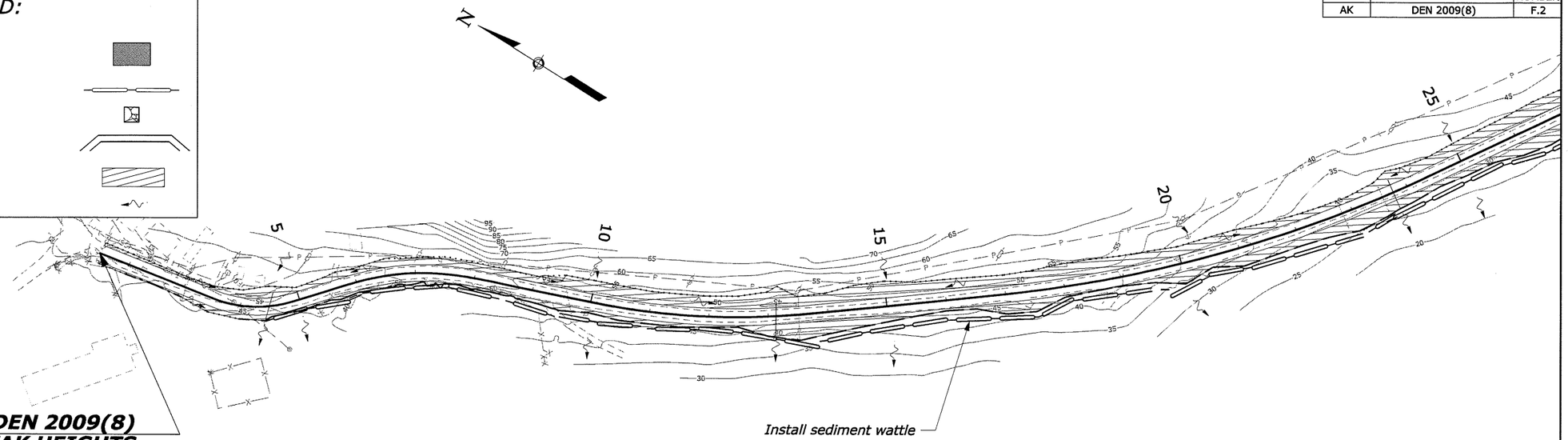
TABULATION OF EROSION CONTROL QUANTITIES

F:\highways\FHWA\12500001_Manokotak\Design\Erosion Control\dc0908_Section F | 22-Jul-2012 1:47 PM | Designed by: N. Bell | 7/2012 | Checked by: B. Wacker | 7/2012

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	F.2

EROSION CONTROL LEGEND:

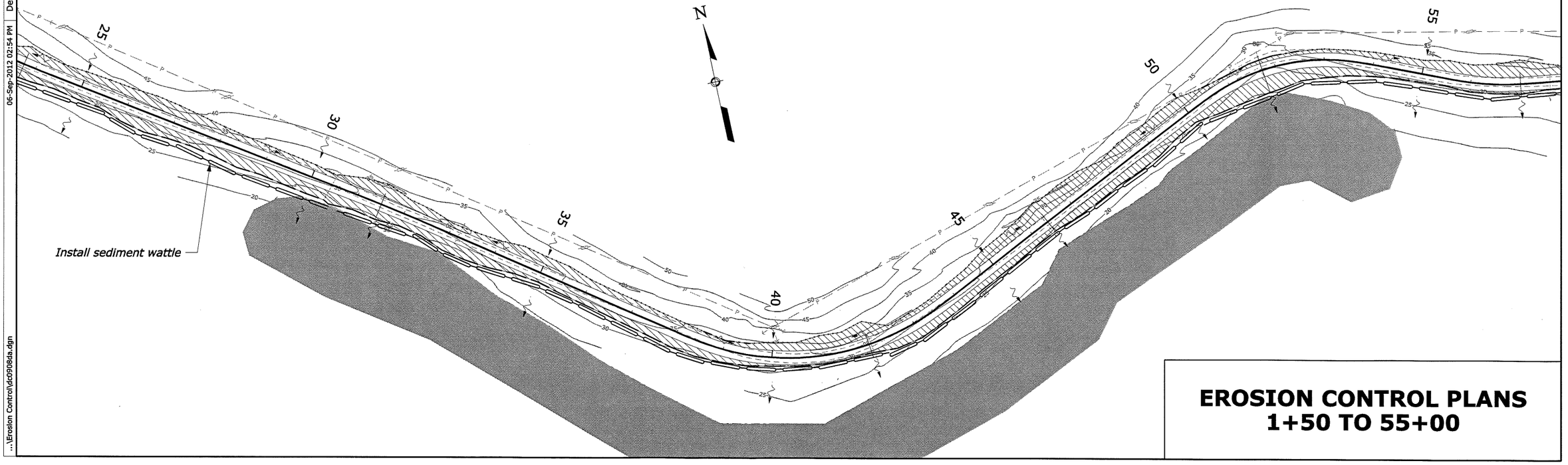
- Delineated wetland
- Sediment wattle
- Sediment trap
- Temporary diversion channel
- Soil stabilization, mulching, seeding
- Runoff direction



BEGIN PROJECT AK DEN 2009(8)
MANOKOTAK HEIGHTS
ROAD RECONSTRUCTION
BEGIN SCHEDULES A & B
1+50.00

NOTE:

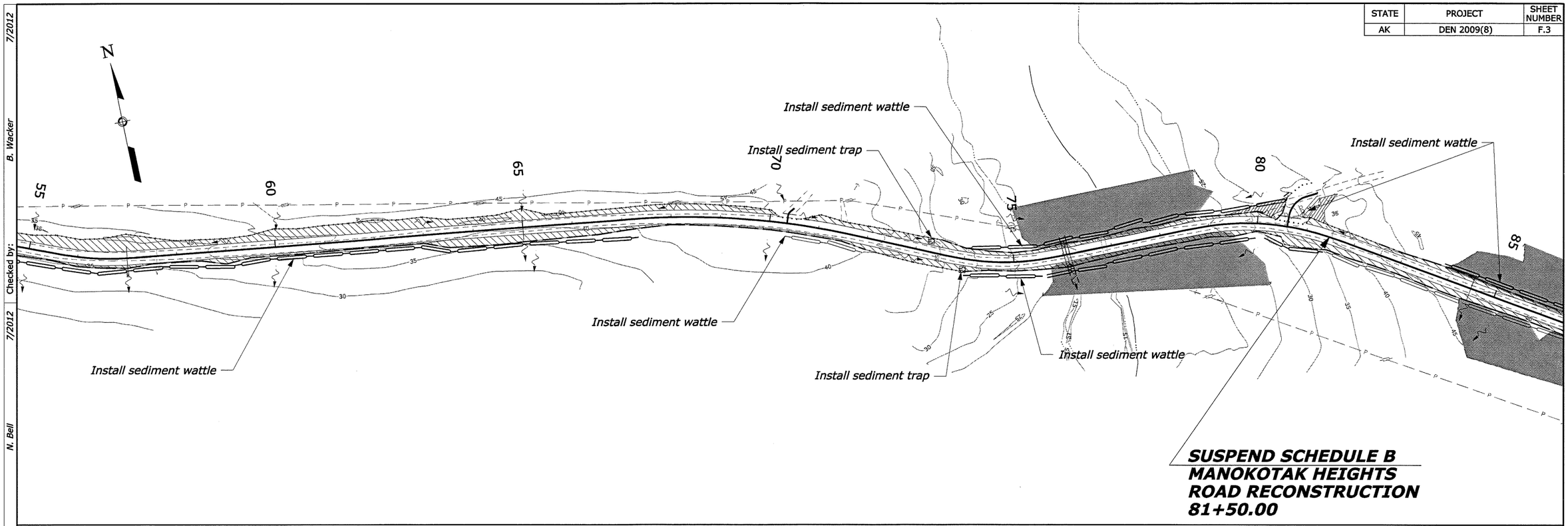
Contours shown represent existing topography, prior to construction.



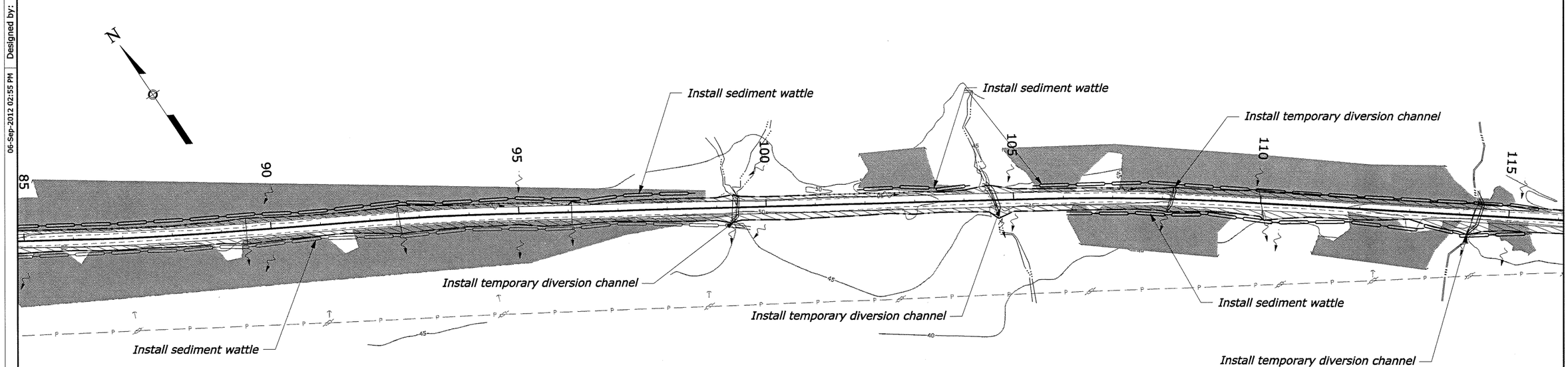
EROSION CONTROL PLANS
1+50 TO 55+00

7/2012 B. Wacker
7/2012 Checked by:
N. Bell
Designed by:
06-Sep-2012 02:54 PM
...\Erosion Control\dc0908da.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	F.3



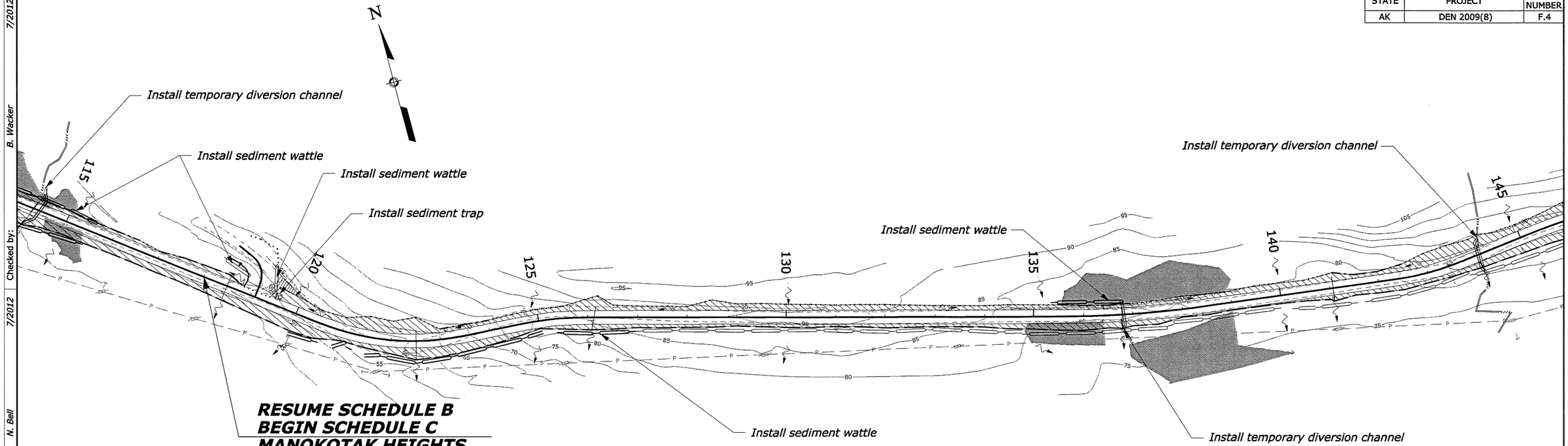
SUSPEND SCHEDULE B
MANOKOTAK HEIGHTS
ROAD RECONSTRUCTION
81+50.00

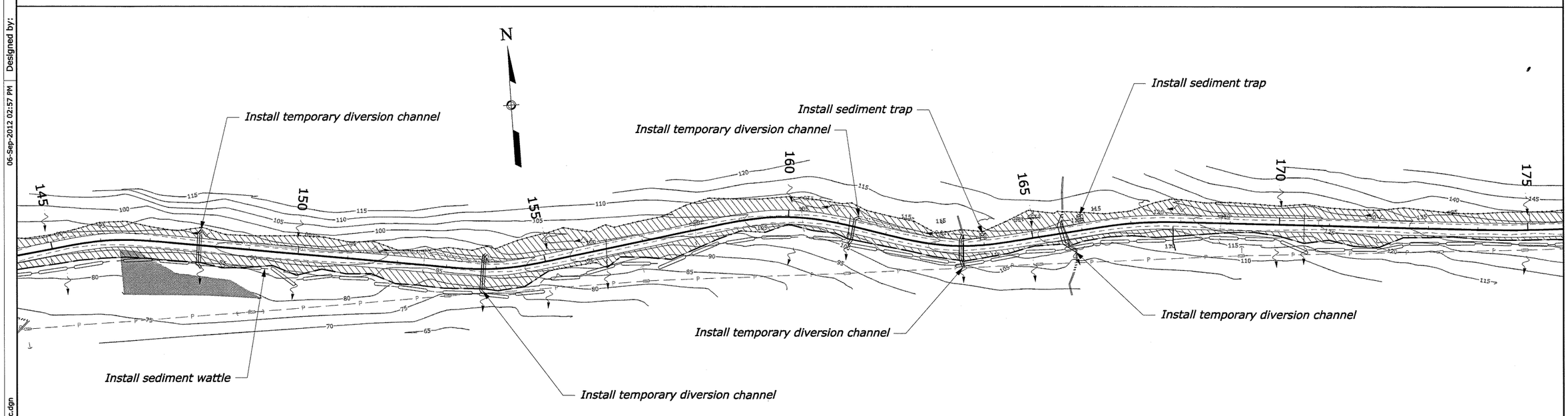


EROSION CONTROL PLANS
55+00 TO 115+00

7/2012 B. Wacker
Checked by:
7/2012 N. Bell
Designed by:
06-Sep-2012 02:55 PM
...\Erosion Control\dc0908db.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	F.4





EROSION CONTROL PLANS
115+00 TO 175+00

7/2012 B. Wacker Checked by:
7/2012 N. Bell Designed by:
06-Sep-2012 02:57 PM
...\Erosion Control\da09084c.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	F.5

7/2012 B. Wacker

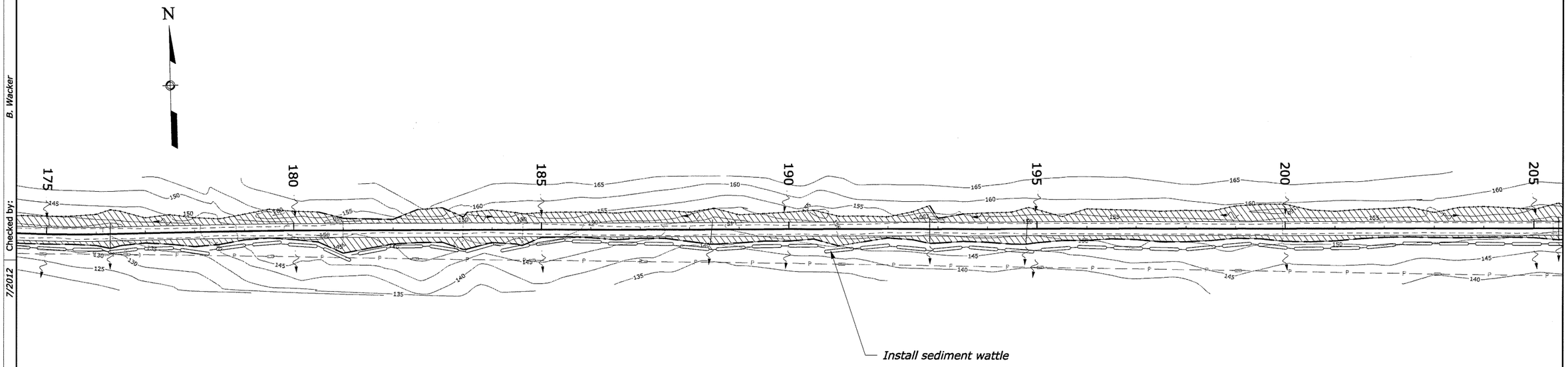
Checked by:

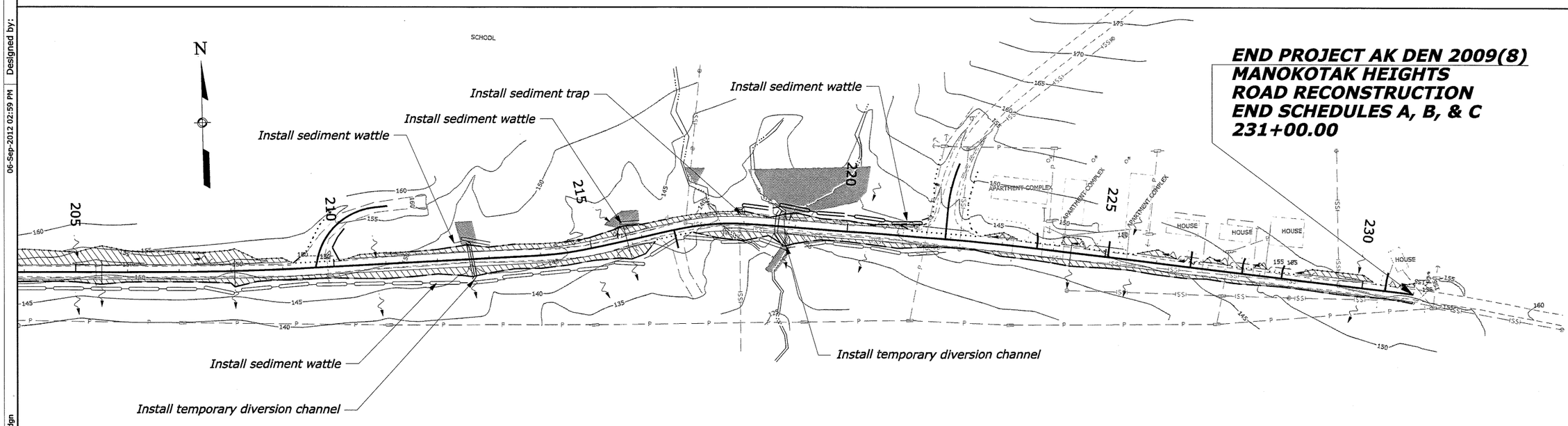
7/2012 N. Bell

Designed by:

06-Sep-2012 02:59 PM

...\Erosion Control\dc0908dd.dgn

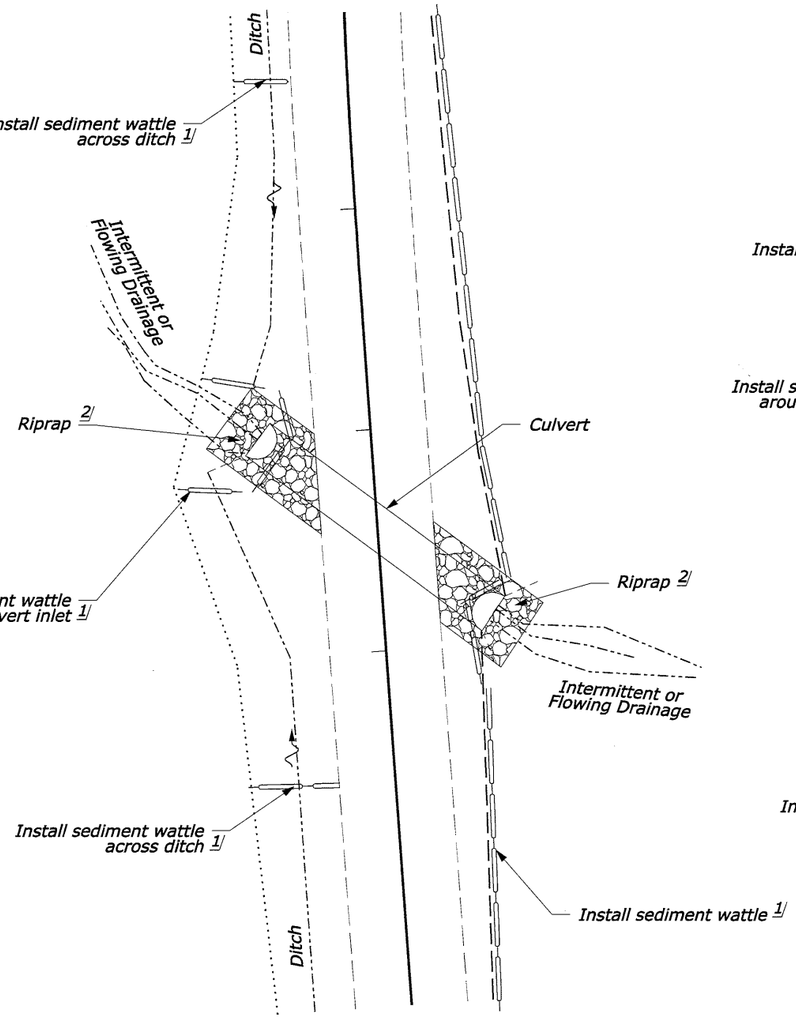




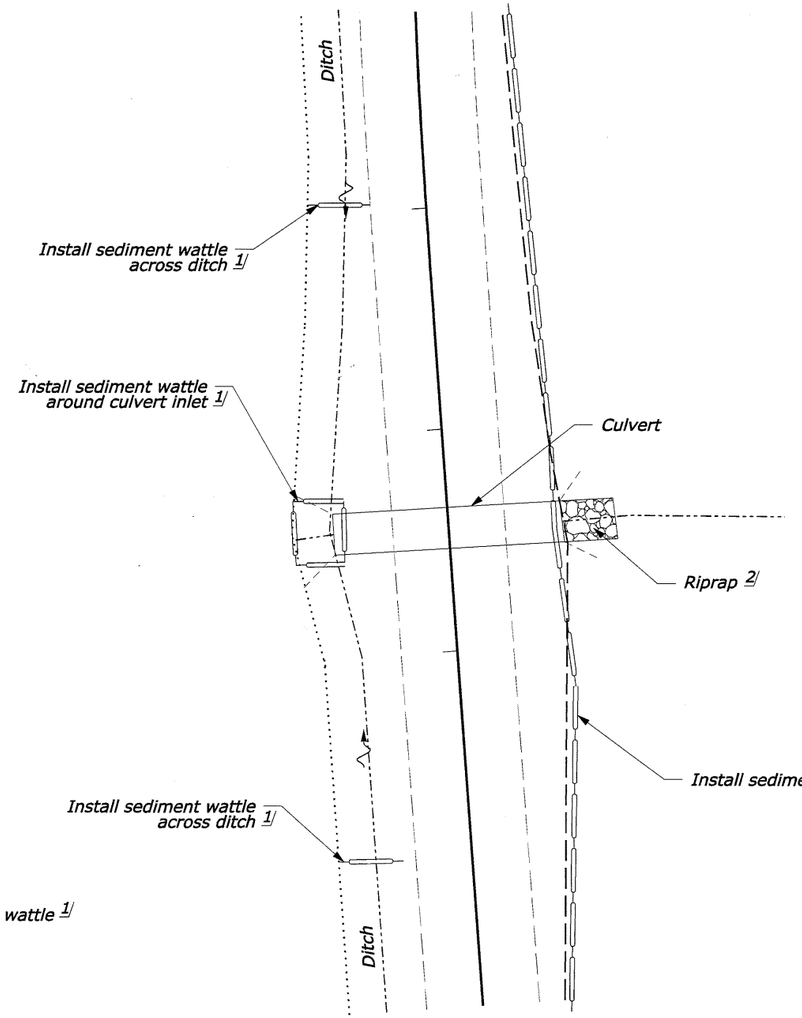
END PROJECT AK DEN 2009(8)
MANOKOTAK HEIGHTS
ROAD RECONSTRUCTION
END SCHEDULES A, B, & C
231+00.00

EROSION CONTROL PLANS
175+00 TO 231+00

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	F.6



TYPICAL SEDIMENT WATTLE PLACEMENT AT CULVERTS WITHIN FLOWING DRAINAGES



TYPICAL SEDIMENT WATTLE PLACEMENT AT CULVERTS

NO SCALE

NOTE:

1. Adjust locations throughout project to fit field conditions as approved by CO.
2. Construct inlet/outlet protection at each culvert as specified on Sheets G.1-G.2.
3. Construct culvert outlet energy dissipators at time of culvert installation. Energy dissipators serve as an outlet erosion/sediment control.

FOOTNOTE:

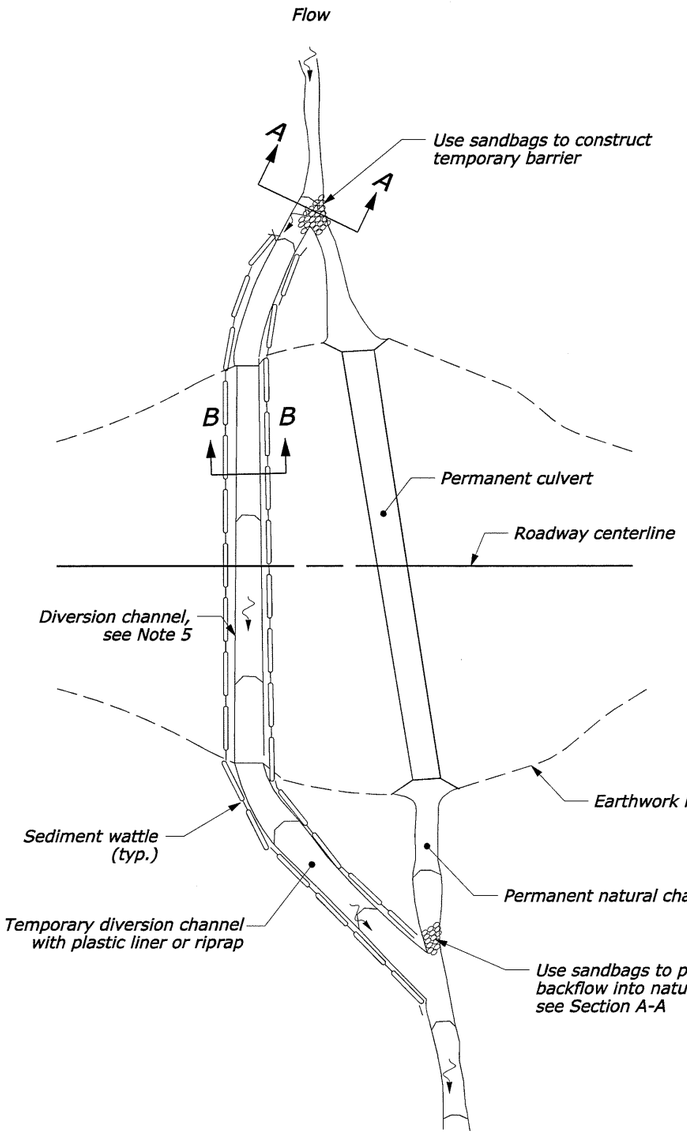
1/ See Sheet F.1 for locations and quantities. Install wattles across ditch in 50' intervals as approved by CO.

2/ See Sheets G.1-G.2 for riprap inlet/outlet protection locations.

SEDIMENT WATTLES AT CULVERTS

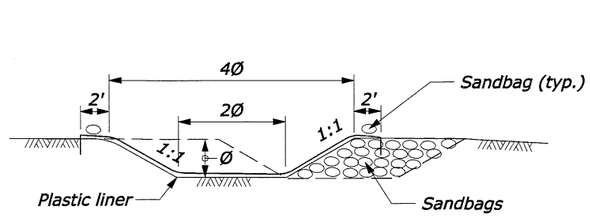
...\Erosion Control\dc0908dh.dgn | 15-Aug-2012 04:33 PM | Designed by: N. Bell 7/2012 | Checked by: B. Wacker 7/2012

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	F.7

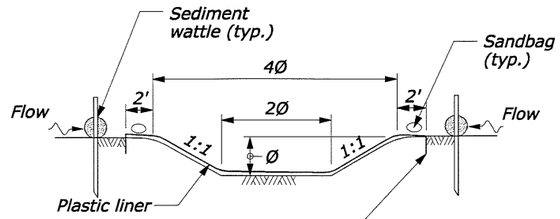


PLAN

DIVERSION CHANNEL

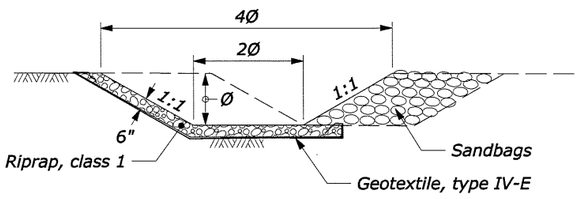


SECTION A-A

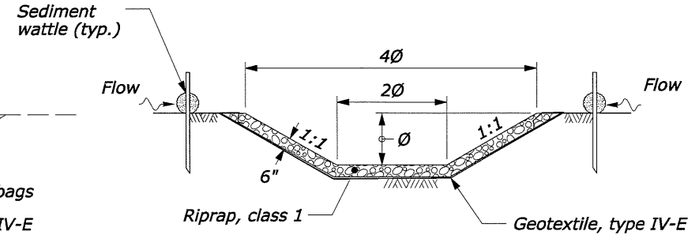


SECTION B-B

PLASTIC LINED DIVERSION CHANNEL

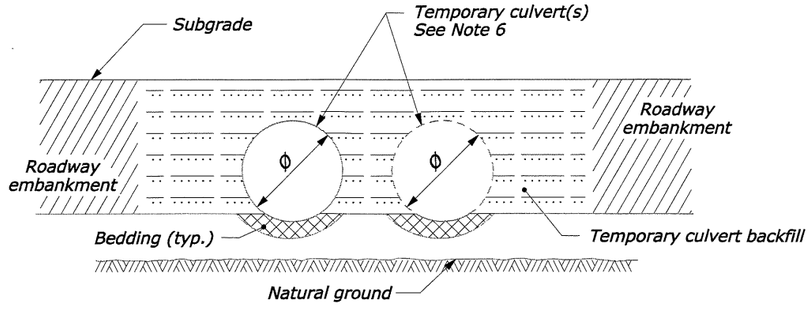


SECTION A-A



SECTION B-B

RIPRAP LINED DIVERSION CHANNEL



SECTION B-B

TEMPORARY CULVERT(S)

NOTE:

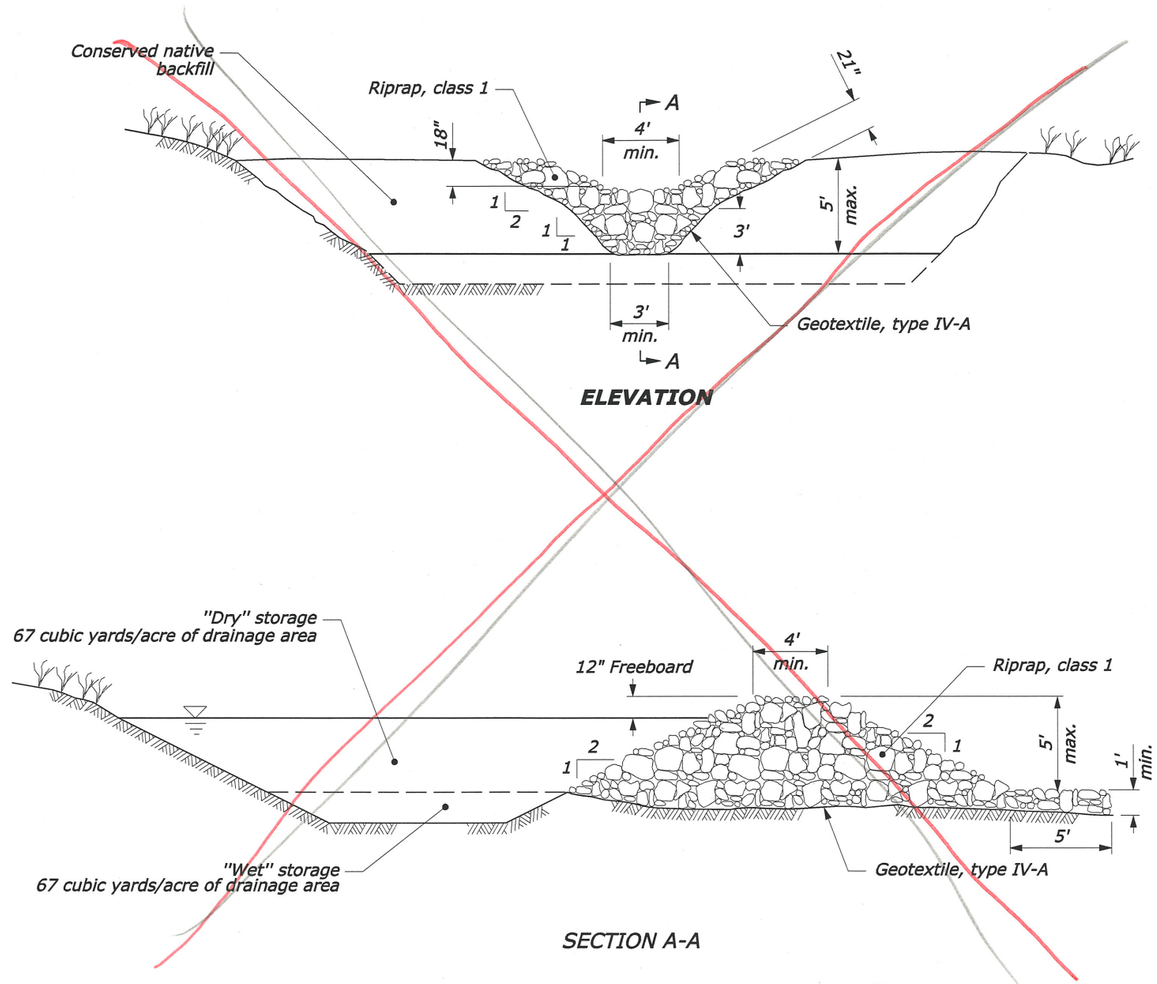
1. See Sheet F.1 for temporary diversion channel locations.
2. Use plastic liner or riprap along the entire length and width of the temporary diversion channel.
3. Construct channel at a minimum grade of 0.5 percent.
4. Do not construct channel with longitudinal joints if using a plastic liner. Bury the upstream edge of the liner a minimum of 6" deep and secure with riprap or sandbags.
5. Replace the portion of the diversion channel through the roadway embankment with temporary culvert as approved by CO. Compact temporary culvert backfill using methods listed in Subsection 204.11(a).
6. Single or multiple temporary culverts may be used. Conform to the requirements of Subsection 157.09.
7. Ø = 2' or diameter of temporary culvert, whichever is greater.

NO SCALE

TEMPORARY DIVERSION CHANNELS

7/2012 B. Wacker
7/2012 N. Bell
Checked by:
20-Jul-2012 02:06 PM Designed by:
...\Erosion Control\dc0908de.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	F.8



ELEVATION

SECTION A-A

NOT INCORPORATED INTO PROJECT

NOTE:

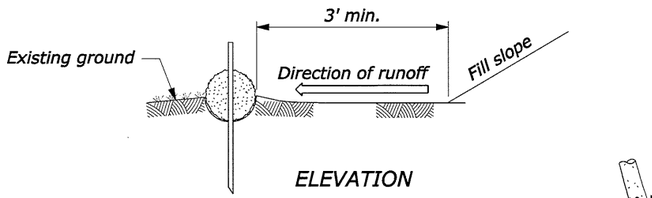
1. See Section 157.
2. See Sheet F.1 for sediment trap locations.

NO SCALE

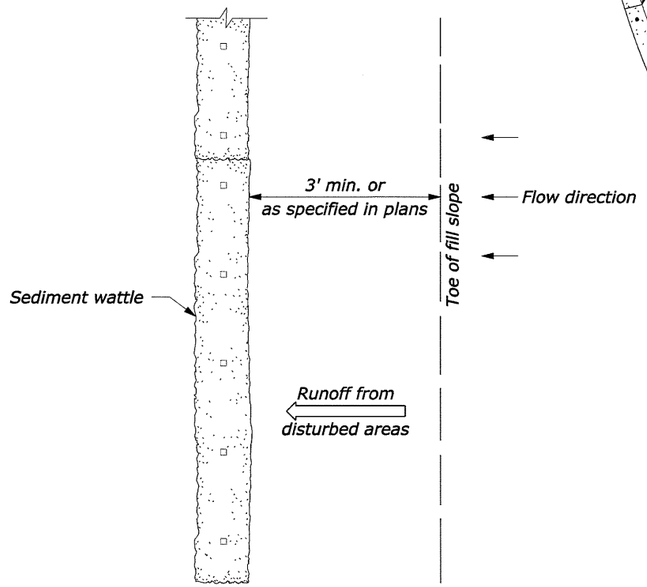
SEDIMENT TRAPS

7/2012 B. Wacker
7/2012 Checked by:
N. Bell Designed by:
13-Jul-2012 03:18 PM
...\Erosion Control\dc0908df.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	F.9

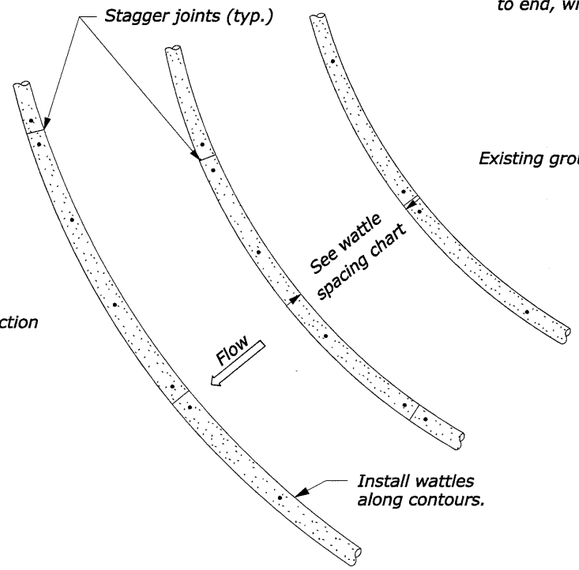


ELEVATION

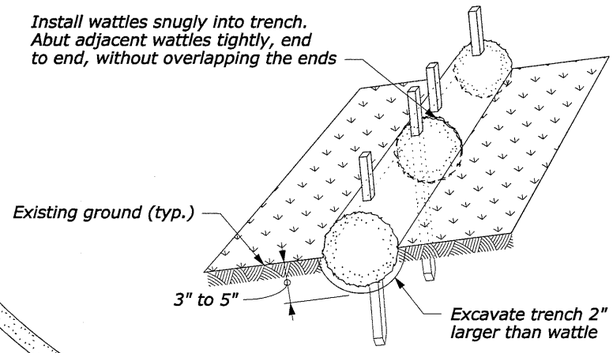


PLAN

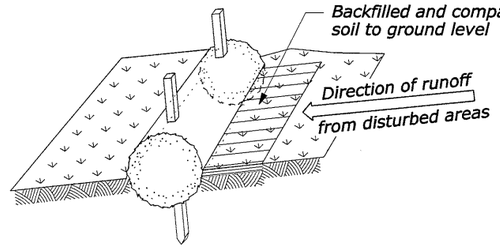
INSTALLATION BEYOND TOE OF SLOPE



INSTALLATION ALONG SLOPES



Step 1: Excavate trench and install wattles



Step 2: Backfill soil against wattles

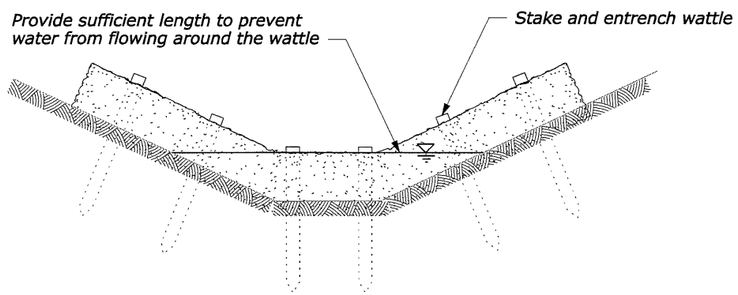
PROPERLY STAKED AND ENTRENCHED WATTLE

NOTE:

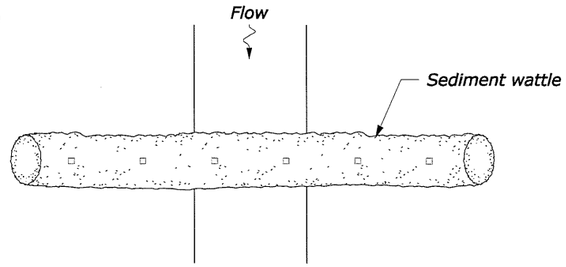
1. Drive stakes at each end and at 4' spacing until wattle is secure to slope. Do not crush wattle while staking. Live stakes may be used for permanent installations.
2. Use drainage ditch installation only in low flow conditions.

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

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

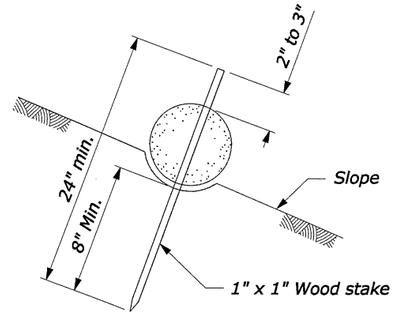


ELEVATION



PLAN

DRAINAGE DITCH INSTALLATION



WATTLE STAKING DETAIL

NO SCALE

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

U.S. CUSTOMARY DETAIL

SEDIMENT WATTLE

DETAIL APPROVED FOR USE 9/2007

REVISED:

DETAIL W157-20

14 October 2009 11:51 AM

H:\StanDraw\w15720.dgn [USC]

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

TABULATION OF DRAINAGE QUANTITIES

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	G.1

PAY ITEM NUMBER				25101		60201				60210			60501	60510		Allow. Pipe Material (See key below)	BEVELS 1V:nH		FOOTNOTES See below for numbered footnotes
				-3000		-0600	-0800	-1000	-2500	-0600	-0800	-1000	-0000	-1000					
STATION	EST MAX COVER (ft)	STR EXC (CUYD)		Placed Riprap, Class 3 (CUYD)		Pipe Culvert, Government-Furnished (LNFT)				End Section, Government-Furnished (EACH)			Standard underdrain system (LNFT)	8-Inch Outlet Pipe (LNFT)					
DIAMETER or SPAN x RISE (inch)				Riprap Headwall	Energy Dissipator	18	24	36	144	18	24	36					Lt	Rt	
4+49	2.59	18					46				2					X/C,P			6, 7
7+25 to 9+25													200	105					10
13+13	4.18	28			2		54				2					X/C,P			2, 6, 7
23+75	3.13	22					48				2					X/C,P			6, 7
31+50	4.07	34					50				2					X/C,P			6, 7
42+00	2.82	23					44				2					X/C,P			5, 6, 7
46+40	2.61	22					42				2					X/C,P			6, 7
51+74	7.52	30			2		72				2					X/C,P			2, 5, 6, 7
57+00	2.91	31					44				2					X/C,P			5, 6, 7
65+00	3.39	27					46				2					X/C,P			6, 7
70+35 LT	2.00	10				22				2						X/C,P			1, 6, 7
76+08	2.91	320		14					56							X/C,P	1.5	1.5	3, 4, 5, 8, 9
80+60 LT	2.24	16				44				2						X/C,P			1, 6, 7
84+50	2.81	17					42				2					X/C,P			6, 7
89+50	3.43	21					46				2					X/C,P			6, 7
92+59	4.22	26					52				2					X/C,P			6, 7
96+07	2.65	21					42				2					X/C,P			6, 7
99+32	4.11	30		4			50				2					X/C,P			3, 6, 7
104+59	4.86	53		7				60				2				X/C,P			3, 6, 7
108+16	3.05	21		3			46				2					X/C,P			3, 6, 7
110+01	4.75	33					56				2					X/C,P			6, 7
114+29	6.38	48		4			68				2					X/C,P			3, 6, 7
118+50	3.72	27					48				2					X/C,P			6, 7
119+10 LT	2.80	11				42				2						X/C,P			1, 6, 7
122+50	4.79	13			2		54				2					X/C,P			2, 6, 7
126+13	2.70	20					44				2					X/C,P			6, 7
136+78	2.93	19		2			44				2					X/C,P			3, 6, 7
141+07	2.91	14					44				2					X/C,P			6, 7
144+14	3.02	21		3			44				2					X/C,P			3, 6, 7
148+04	4.28	13		3	2		52				2					X/C,P			2, 3, 6, 7
153+78	5.26	34		3	2		60				2					X/C,P			2, 3, 6, 7
156+26	4.07	42			2		52				2					X/C,P			2, 6, 7
161+24	2.91	21		3			44				2					X/C,P			3, 6, 7
163+58	3.71	24		3			48				2					X/C,P			3, 6, 7
165+68	2.62	42		6				46				2				X/C,P			3, 6, 7
170+50	4.54	31			2		54				2					X/C,P			2, 6, 7
176+29	3.45	24					46				2					X/C,P			6, 7
CUMULATIVE TOTAL		1,207		55	14	108	1,482	106	56	6	60	4	200	105					

Schedule B

Schedule A

Schedule B & Schedule C

NOTE:

1. Steel pipe culvert minimum wall thickness as required by the Std. 602-1 fill height table.
2. Aluminized steel pipe culvert minimum wall thickness as required by the Std. 602-1 fill height table (steel).
3. Aluminum pipe culvert minimum wall thickness as required by the Std. 602-1 fill height table.
4. In cut sections, construct cut slope inlets as shown on Std. 602-6.

FOOTNOTES:

1. Approach road culvert.
2. Energy dissipator at outlet.
3. Riprap headwall at inlet.
4. Riprap headwall at outlet.
5. Inlet / Outlet ditch included in structural excavation.
6. Install end section at inlet.
7. Install end section at outlet.
8. Aquatic Organism Passage (AOP) culvert. Do not modify culvert installation unless approved by the CO. See Sheet G.3 for details.
9. Step bevel.
10. See Sheet G.7 for details.

Allowable pipe culvert material

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

7/2012 B. Wacker Designed by: | 7/2012 Checked by: | 23-Jul-2012 2:17 PM N. Bell | F:\highways\FHWA\12500001_Manokotak\Design\Drainage\[dc0908_Section G

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

TABULATION OF DRAINAGE QUANTITIES

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	G.2

PAY ITEM NUMBER				25101		60201				60210			60501	60510		Allow. Pipe Material (See key below)	BEVELS 1V:nH		FOOTNOTES See below for numbered footnotes
				-3000		-0600	-0800	-1000	-2500	-0600	-0800	-1000	-0000	-1000					
STATION	EST MAX COVER (ft)	STR EXC (CUYD)		Placed Riprap, Class 3 (CUYD)		Pipe Culvert, Government-Furnished (LNFT)				End Section, Government-Furnished (EACH)			Standard underdrain system (LNFT)	8-Inch Outlet Pipe (LNFT)					
DIAMETER or SPAN x RISE (inch)				Riprap Headwall	Energy Dissipator	18	24	36	144	18	24	36					Lt	Rt	
PREVIOUS SHEET		1,207		55	14	108	1,482	106	56	6	60	4	200	105					
188+45	3.58	21					48				2					X/C,P			6, 7
192+84	3.42	23					46				2					X/C,P			6, 7
194+80	3.91	22					48				2					X/C,P			6, 7
205+50	2.54	19					40				2					X/C,P			6, 7
208+07	3.65	18					48				2					X/C,P			6, 7
212+62	4.96	22		4			56				2					X/C,P			3, 6, 7
215+71	5.61	24					60				2					X/C,P			6, 7
218+79	4.50	38		5				52				2				X/C,P			3, 6, 7
221+90 LT	2.27	41				84				2						X/C,P			1, 6, 7
224+34	2.87	21					44				2					X/C,P			6, 7
225+06 LT	2.00	25				52				2						X/C,P			1, 6, 7
226+66 LT	2.00	11				22				2						X/C,P			1, 6, 7
227+66 LT	2.00	13				20				2						X/C,P			1, 6, 7
228+43 LT	2.00	17				26				2						X/C,P			1, 6, 7
SCHEDULE A TOTAL		**1,522**		**64**	**14**	**312.0**	**1,872.0**	**158.0**	**56.0**	**16**	**76**	**6**	**200.0**	**105.0**					
SCHEDULE B TOTAL		**1,252**		**46**	**14**	**312.0**	**1,470.0**	**98.0**	**56.0**	**16**	**60**	**4**	**200.0**	**105.0**					
SCHEDULE C TOTAL		**671**		**32**	**10**	**246.0**	**1,024.0**	**98.0**	**0.0**	**12**	**42**	**4**	**0.0**	**0.0**					

Schedule B & Schedule C

Schedule A

NOTE:

1. Steel pipe culvert minimum wall thickness as required by the Std. 602-1 fill height table.
2. Aluminized steel pipe culvert minimum wall thickness as required by the Std. 602-1 fill height table (steel).
3. Aluminum pipe culvert minimum wall thickness as required by the Std. 602-1 fill height table.
4. In cut sections, construct cut slope inlets as shown on Std. 602-6.

FOOTNOTES:

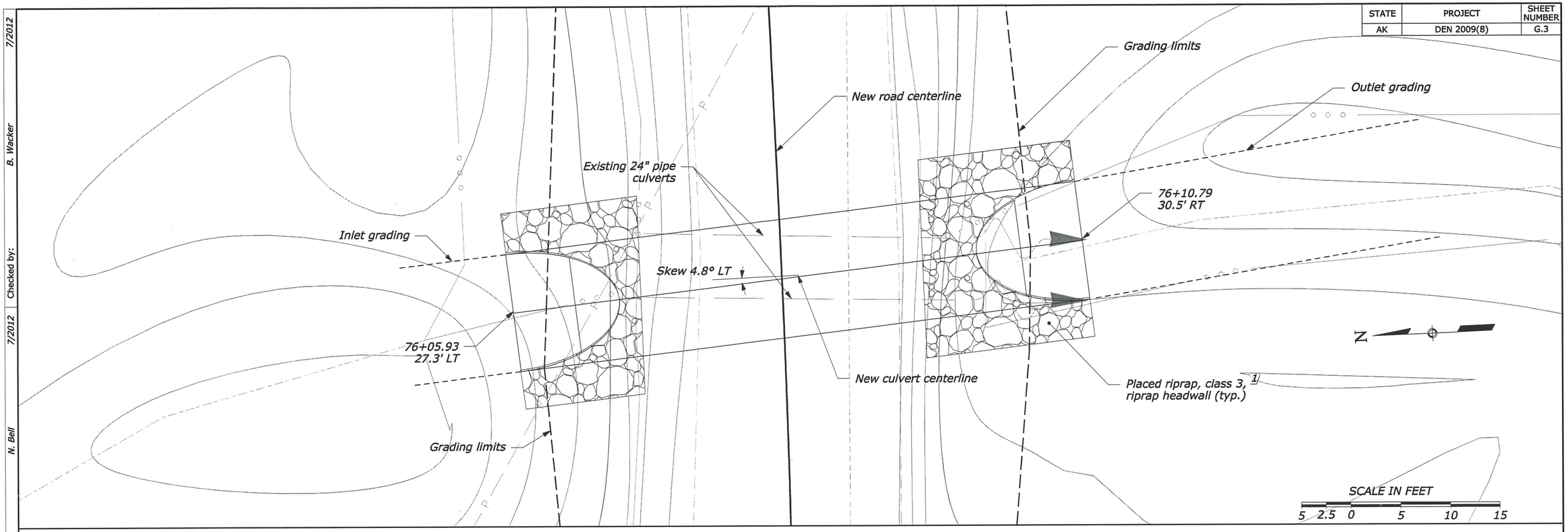
1. Approach road culvert.
2. Energy dissipator at outlet.
3. Riprap headwall at inlet.
4. Riprap headwall at outlet.
5. Inlet / Outlet ditch included in structural excavation.
6. Install end section at inlet.
7. Install end section at outlet.
8. Aquatic Organism Passage (AOP) culvert. Do not modify culvert installation unless approved by the CO. See Sheet G.3 for details.
9. Step bevel.
10. See Sheet G.7 for details.

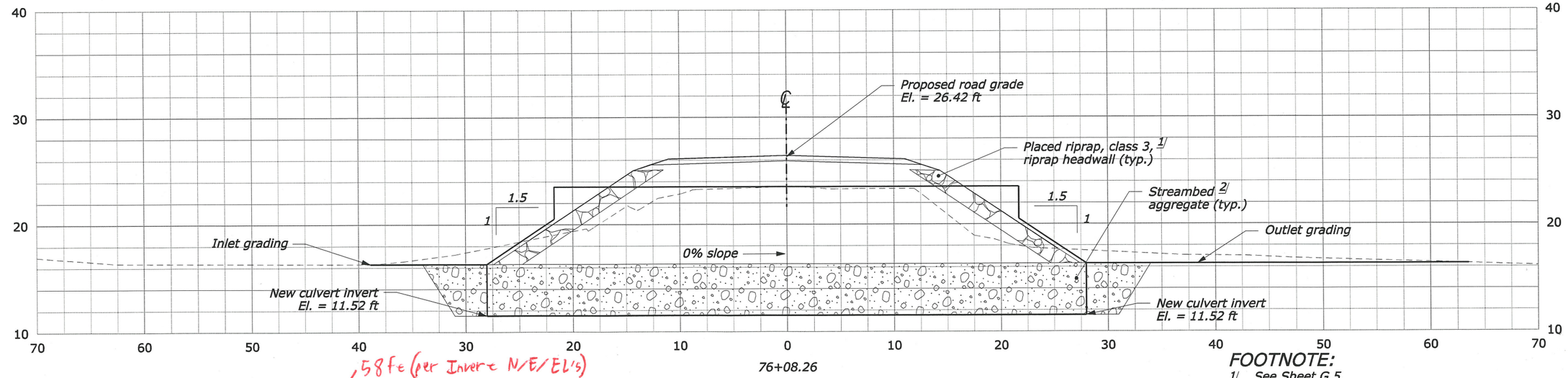
Allowable pipe culvert material

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

7/2012 B. Wacker | Checked by: 7/2012 N. Bell | Designed by: 23-Jul-2012 2:17 PM | F:\highways\FHWA\12500001_Manokotak\Design\Drainage\[dc0908_Section G

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	G.3





FOOTNOTE:

1/ See Sheet G.5.

2/ See Sheet G.6.

HYDRAULIC INFORMATION

Q_2: 21 CFS HW25 : _____

Q_{50}: 81 CFS

ACTIVE CHANNEL WIDTH: 15 FT

PIPE

TYPE: CMP ROUND SPAN: 144 in RISE: 144 in

LENGTH: 56 FT WALL THICKNESS: 0.168 in

PIPE SLOPE: 0 FT/FT FLOWLINE SLOPE: 0 FT/FT

INLET

INV N/E/EL: 1817641.65/1447310.21/11.52

BURIAL DEPTH: 57.6 in

UPPER/LOWER BEVEL HEIGHT: 36.0 in/57.6 in

BEVEL: STEP, 1.5(H):1(V)

HEADWALL: RIPRAP

OUTLET

INV N/E/EL: 1817583.84/1447314.78/11.52

BURIAL DEPTH: 57.6 in

UPPER/LOWER BEVEL HEIGHT: 36.0 in/57.6 in

BEVEL: STEP, 1.5(H):1(V)

HEADWALL: RIPRAP

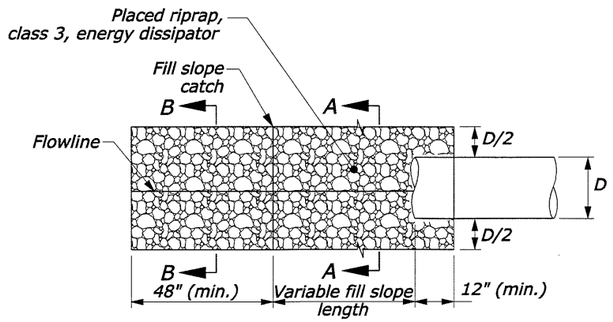
76+08
BEAVER CREEK
CULVERT DETAIL

Designed by: N. Bell 7/2012 | Checked by: B. Wacker 7/2012

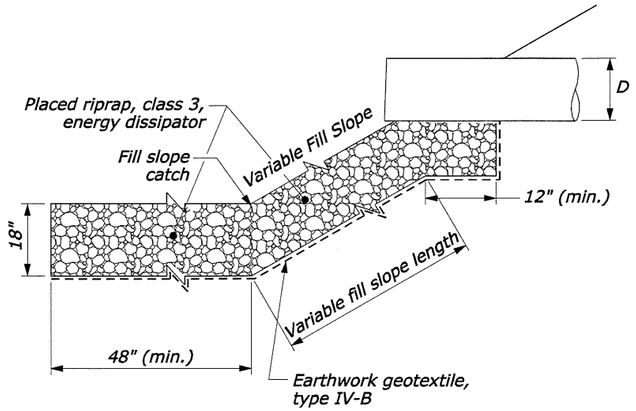
16-Jul-2012 10:12 AM

...\Design\Drainage\dc0908ea.dgn

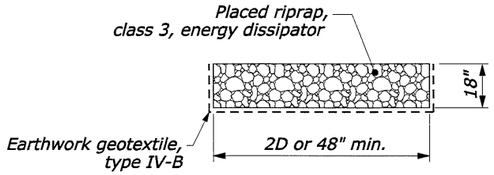
STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	G.4



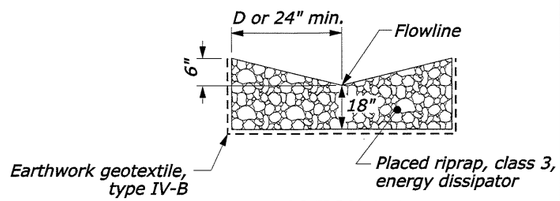
ENERGY DISSIPATOR - PLAN



ENERGY DISSIPATOR - ELEVATION



SECTION B-B



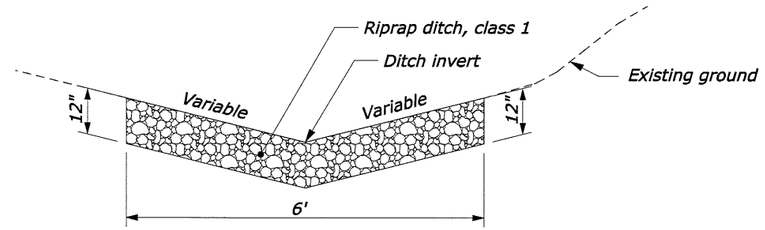
SECTION A-A

NOTE:

1. Place riprap in energy dissipators at the following rates:

Outlet Diameter	Section	Placed Riprap, Class 3	Earthwork Geotextile, Type IV-B
24"	A-A	0.26 cuyd/ft	0.89 sqyd/ft
24"	B-B	0.22 cuyd/ft	0.78 sqyd/ft
36"	A-A	0.39 cuyd/ft	1.11 sqyd/ft
36"	B-B	0.33 cuyd/ft	1.00 sqyd/ft

2. See Sheets G.1-G.2 for location and quantity.



RIPRAP DITCH, CLASS 1

NOTE:

1. Place riprap in ditches at the following rates:

Location	Riprap ditch, class 1
Mainline	0.22 cuyd/ft
Approaches	0.22 cuyd/ft

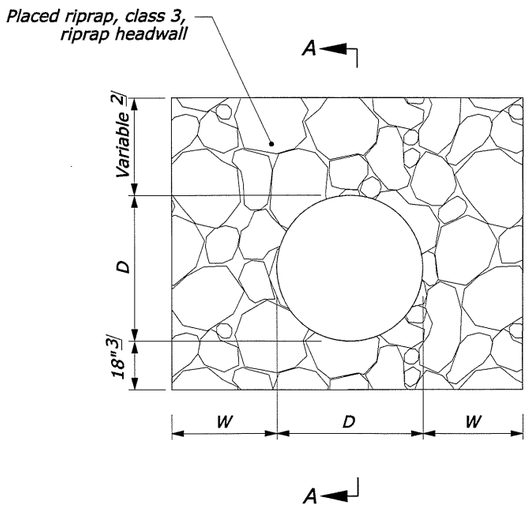
2. See Sheets D.1 and E.1 for location and quantities.
3. Grade ditch to define well established flowline.

NO SCALE

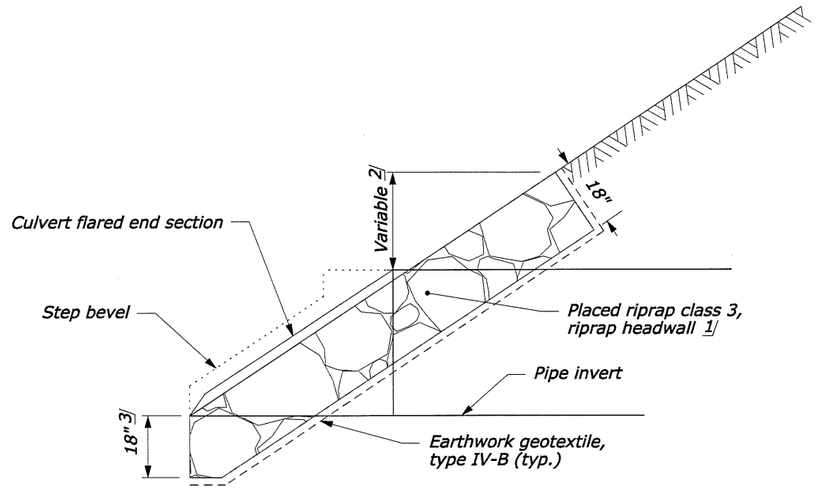
ENERGY DISSIPATOR AND RIPRAP DITCH DETAILS

Designed by: N. Bell 7/2012 | Checked by: B. Wacker 7/2012 | 20-Jul-2012 02:48 PM | ...\Design\Drainage\dc0908eb.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	G.5



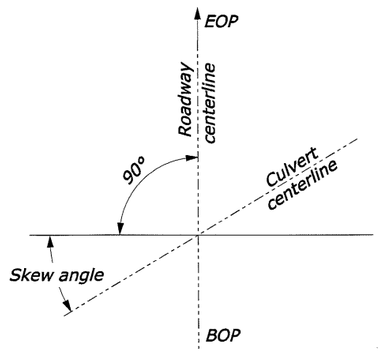
ELEVATION



SECTION A-A

RIPRAP HEADWALL DETAILS

RIPRAP HEADWALL QUANTITIES (FOR INFORMATION ONLY)			
Station	D (in)	Width (W) (ft)	Earthwork geotextile type IV-B (sqyd)
76+08	144	4	39.8
99+32	24	2	9.7
104+59	36	3	17.2
108+16	24	2	8.4
114+29	24	2	9.9
136+78	24	2	6.6
144+14	24	2	7.6
148+04	24	2	7.6
153+78	24	2	7.6
161+24	24	2	7.6
163+58	24	2	7.6
165+68	36	3	14.0
212+62	24	2	9.7
218+79	36	3	12.4



SKEW ANGLE DIAGRAM

NO SCALE

NOTE:

1. Orient pipe to match existing channel centerline.
2. See Sheets G.1-G.2 for locations and quantities.

FOOTNOTE:

1/ Slope to match roadway embankment.

2/ 2' standard, 1' if headwall extends into subgrade.

3/ Do not extend riprap headwall below the bottom of the culvert if it conflicts with bed rock or riprap ditch.

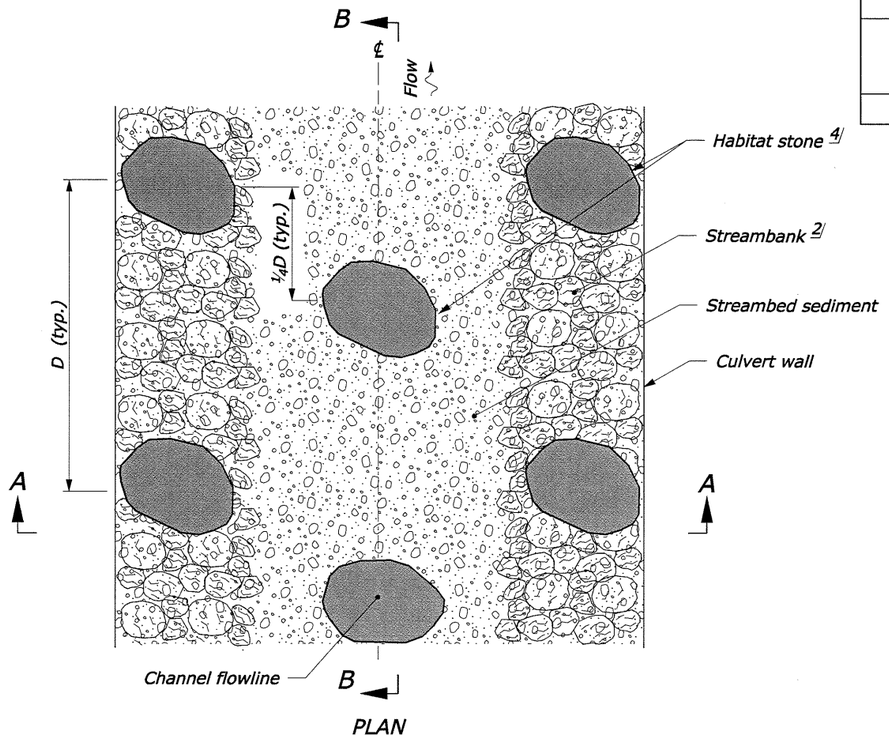
RIPRAP HEADWALL AND PIPE END TREATMENT DETAILS

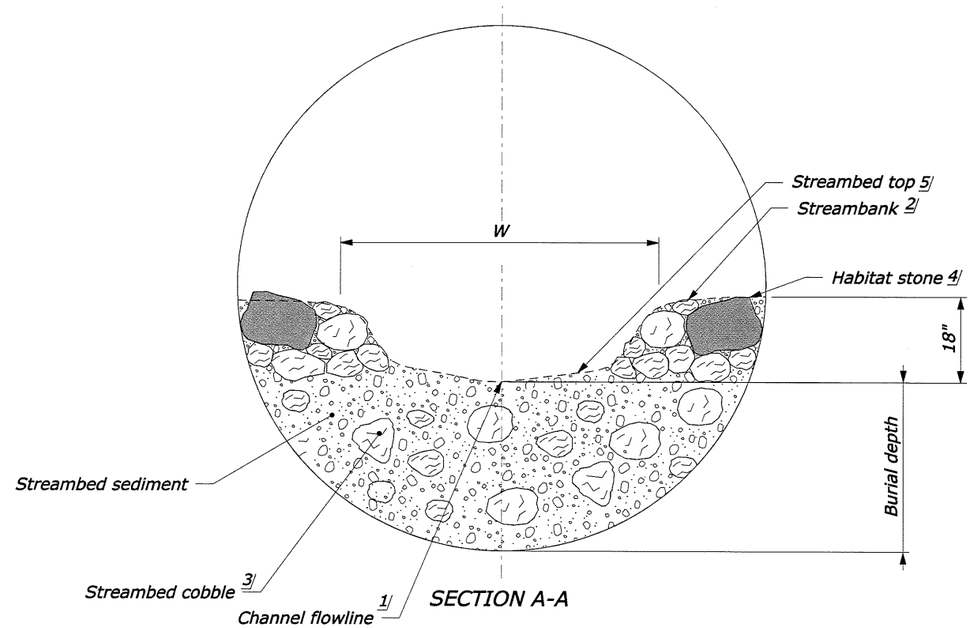
7/2012 | Designed by: N. Bell
7/2012 | Checked by: B. Wacker
20-Jul-2012 02:53 PM
...\Design\Drainage\dc0908ec.dgn

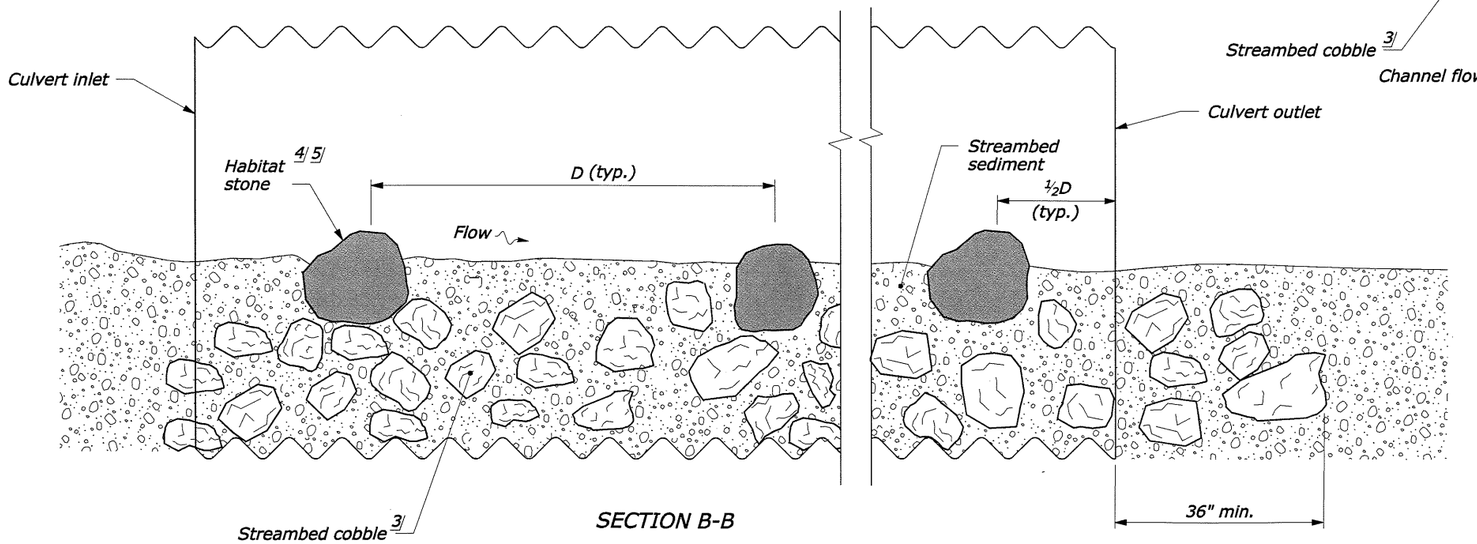
STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	G.6

INFILL INFORMATIONAL QUANTITIES

LOCATION	D (ft)	W (ft)	STREAMBED COBBLE GRADATION (in)	STREAMBED COBBLE (cuyd)	STREAMBED SEDIMENT (cuyd)	HABITAT STONE DIAMETER (in +/- 4)	HABITAT STONE (each)
76+08	12	9	6	45	75	18	14







NOTE:

1. See Section 602.

FOOTNOTE:

1/ Slope streambed aggregate towards flowline to ensure parabolic shape.

2/ Construct well defined banks with streambed cobble and streambed sediment.

3/ Mix streambed cobbles evenly throughout streambed sediment.

4/ Stagger in-channel habitat stones within the culvert span.

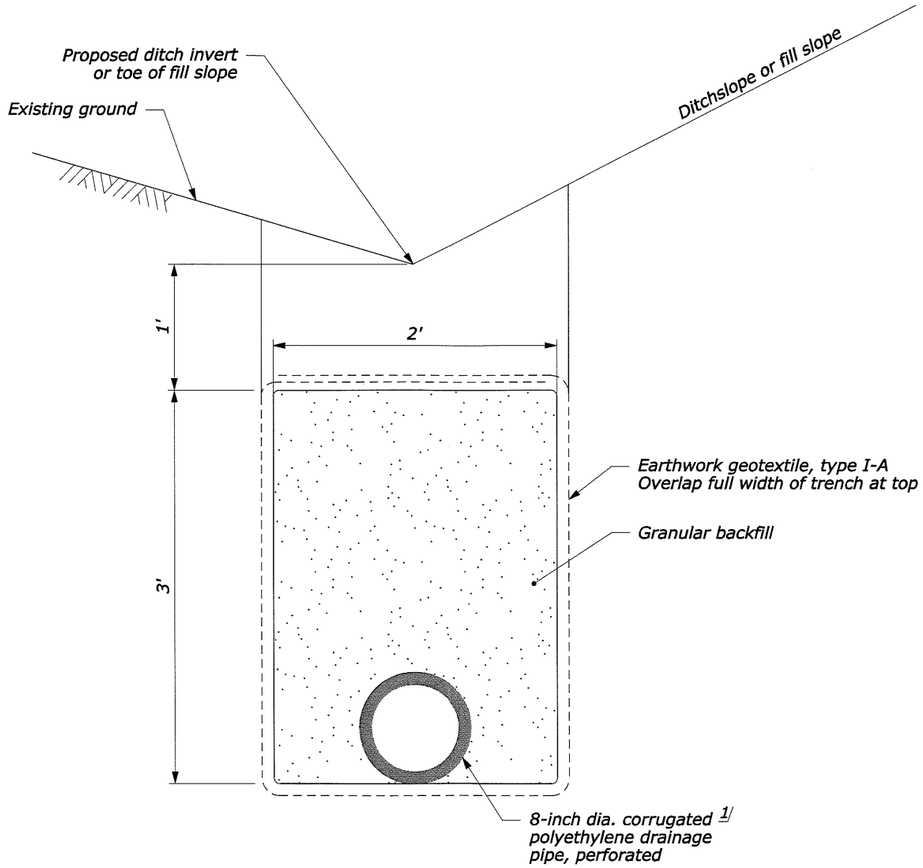
5/ Embed habitat stones within active channel by ¾ of the smallest dimension.

NO SCALE

SIMULATED STREAM CULVERT INTERIOR TREATMENT

Designed by: N. Bell 7/2012 | Checked by: B. Wacker 7/2012
15-Jul-2012 02:05 PM
...\Design\Drainage\dc0908ed.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	G.7



STANDARD UNDERDRAIN SYSTEM DETAIL

NOTE:

1. See Sheets G.1-G.2 for locations and quantities.
2. Place materials in the underdrain at the following rates:

Granular Backfill	Earthwork Geotextile, Type I-A
0.22 CUYD/FT	1.33 SQYD/FT

FOOTNOTE:

1/ Daylight drainage pipe across road with 8" non-perforated outlet pipe at locations approved by CO.

See page D.2 for location

NO SCALE

STANDARD UNDERDRAIN SYSTEM DETAIL

Designed by: B. Wacker 7/2012
Checked by: N. Bell 7/2012
23-Jul-2012 01:57 PM
...\Design\Drainage\dc0908ej.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	G.8

METAL ROUND PIPE CULVERT

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

STEEL

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

ALUMINUM

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

NOTE:

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

METAL PIPE ARCH CULVERT

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

STEEL

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

ALUMINUM

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

NO SCALE

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

U.S. CUSTOMARY STANDARD

METAL PIPE CULVERT

STANDARD APPROVED FOR USE 12/1993	STANDARD
REVISED: 4/1994 6/2005	602-1

23-Jul-2012 01:37 PM

...\Design\Drainage\dc0908ee.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	G.9

COUPLING BANDS FOR METAL PIPE CULVERT [1]

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

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

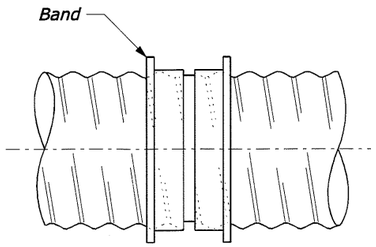
2/ For helically corrugated pipe with rerolled ends, the nominal corrugations size refers to the dimension of the end corrugation in the pipe.

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

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

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

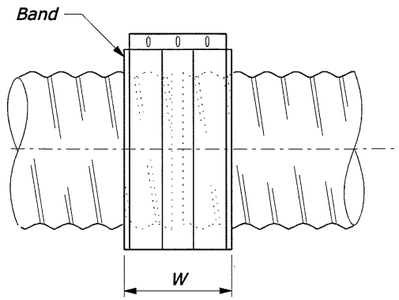
6/ Smooth sleeve-type couplers and flat bands may be used for pipe diameters of 12" or less. Use a matching metal having a nominal thickness of not less than 0.040 inch for steel, or 0.036 inch for aluminum, or a plastic with an equivalent strength to metal.



SLEEVE JOINT

Smoother sleeve with center stop.
Stab type joint

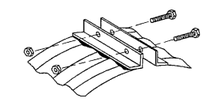
SMOOTH SLEEVE BAND



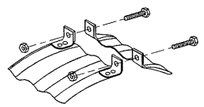
FLAT BAND

NOTE:

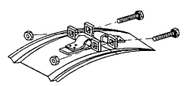
1. Watertight pipe joints are not required unless specified in the Special Contract Requirements.
2. Other types of coupling bands or fastening devices that comply with the joint performance criteria of AASHTO Standard specifications for Highway Bridges, Division II Section 26 may be used.



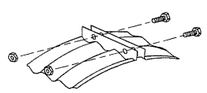
Band Angle



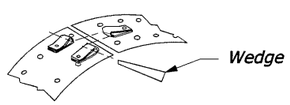
Oval Lug



Bar & Strap

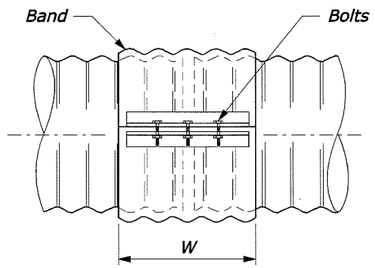


Integral Flange

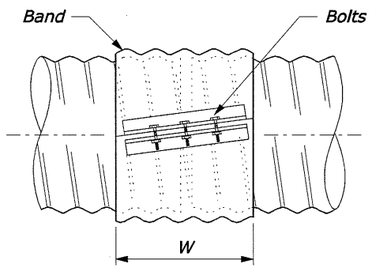


Wedge and Strap

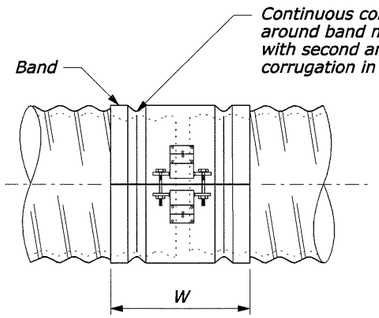
STANDARD BAND CONNECTIONS



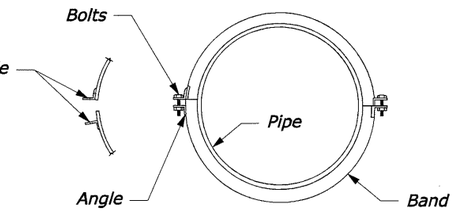
SIDE VIEW



SIDE VIEW



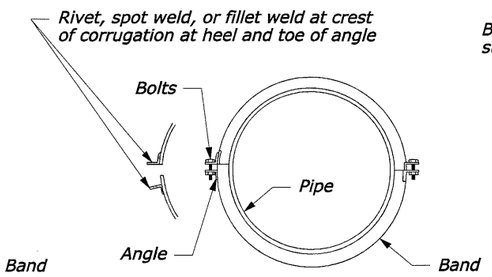
SIDE VIEW



END VIEW

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

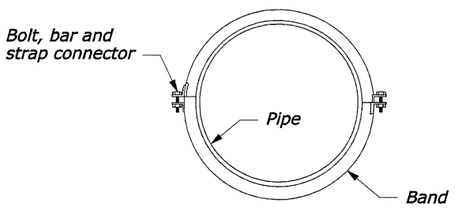
ANNULAR BAND



END VIEW

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

HELICAL BAND



END VIEW

SEMI-CORRUGATED BAND

NO SCALE

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

U.S. CUSTOMARY STANDARD

METAL PIPE CULVERT COUPLING BAND

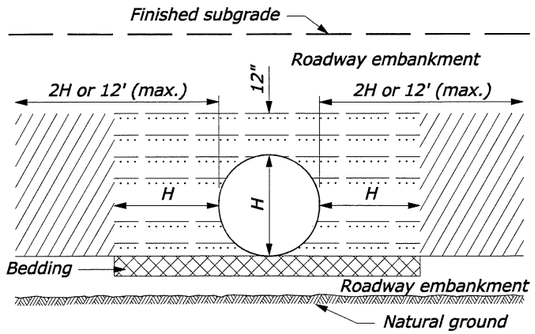
STANDARD APPROVED FOR USE 12/1993
REVISED: 4/1994 6/2005

STANDARD 602-2

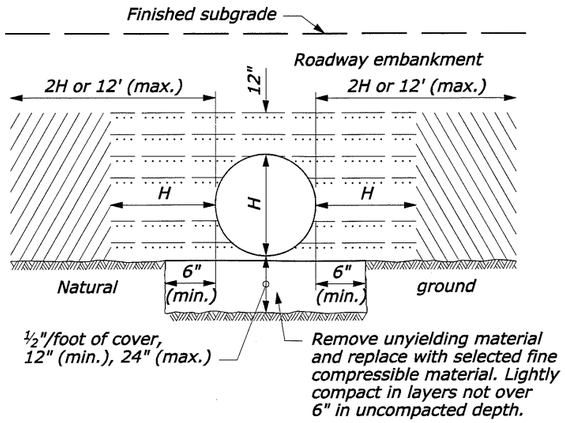
23-Jul-2012 01:38 PM

...\Design\Drainage\dc0908ef.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	G.10

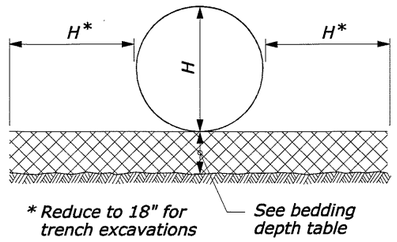


ABOVE NATURAL GROUND



ON UNYIELDING MATERIAL

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

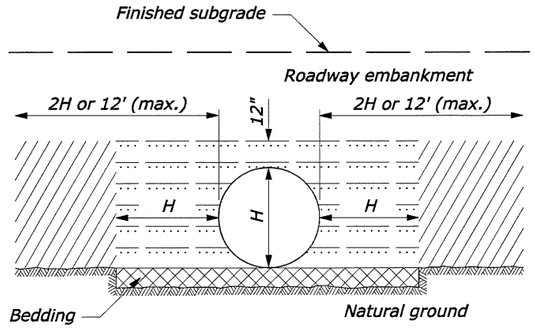


PIPE BEDDING

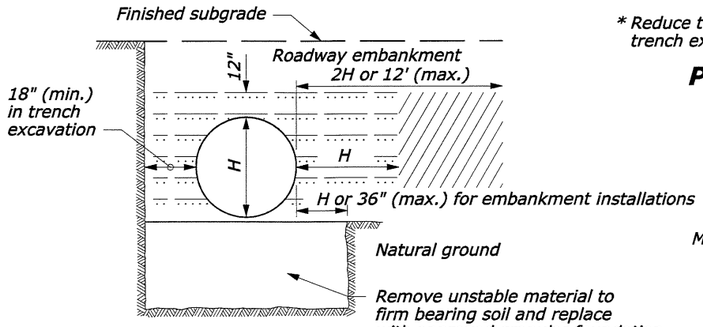
NOTE:

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

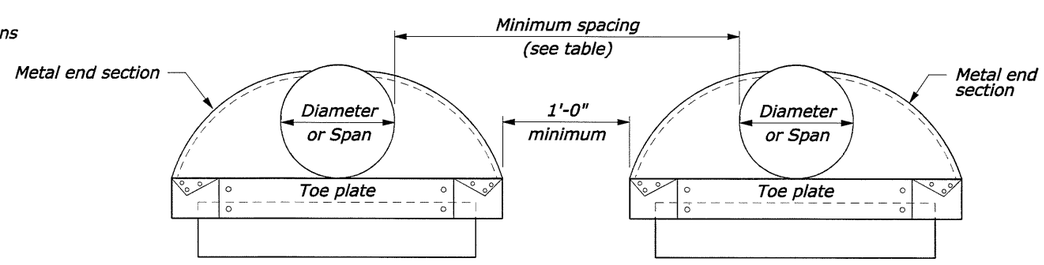
MINIMUM SPACING	
DIAMETER or SPAN	SPACING
UP to 48"	24"
48" and UP	Half diameter or span OR 36" whichever is less



ON NATURAL GROUND

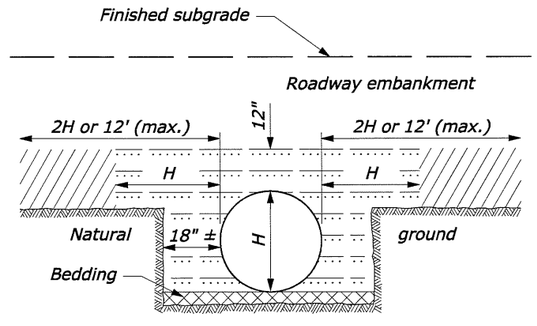


ON UNSTABLE MATERIAL

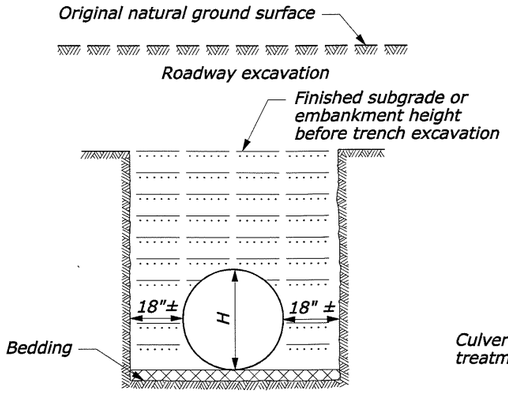


ELEVATION

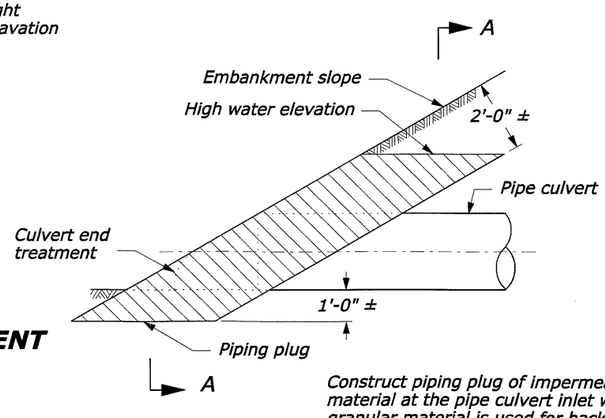
MULTIPLE PIPE INSTALLATION

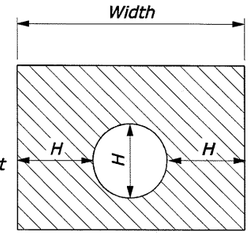


ABOVE AND BELOW NATURAL GROUND



BELOW NATURAL GROUND OR TRENCH EXCAVATION IN EMBANKMENT





SECTION A-A

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

PIPING PLUG NO SCALE

Bedding material (uncompacted)

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

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

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

U.S. CUSTOMARY STANDARD

METAL AND PLASTIC PIPE CULVERT BEDDING

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

STANDARD 602-3

23-Jul-2012 01:39 PM
...\Design\Drainage\dc0908eg.dgn

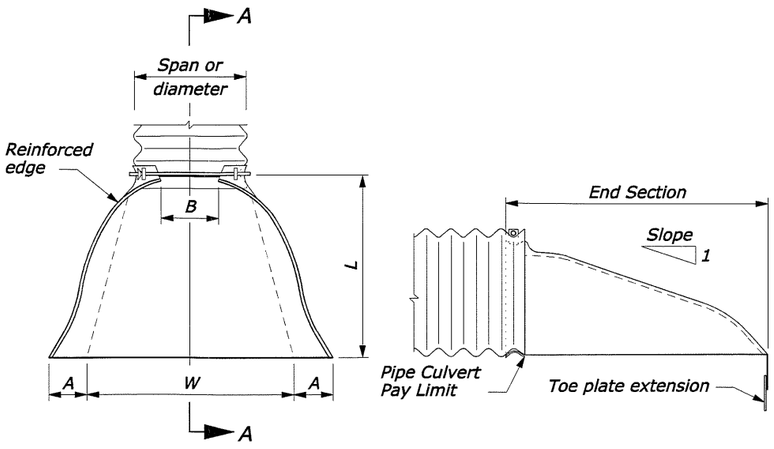
STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	G.11

END SECTIONS FOR ROUND PIPE CULVERT

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

END SECTIONS FOR PIPE ARCH CULVERT

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

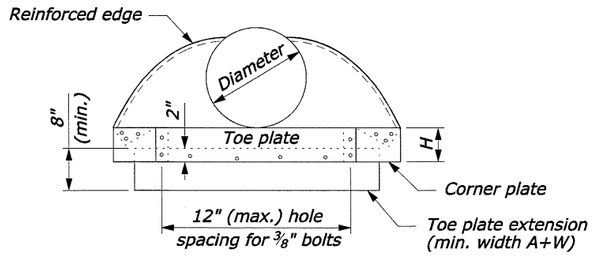


PLAN SECTION A-A

ROUND OR PIPE ARCH CULVERT

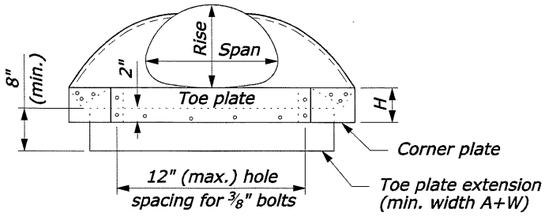
NOTE:

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



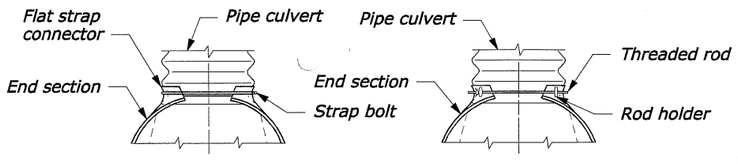
ELEVATION

ROUND PIPE CULVERT



ELEVATION

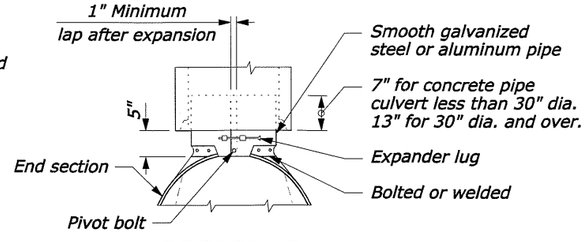
PIPE ARCH CULVERT



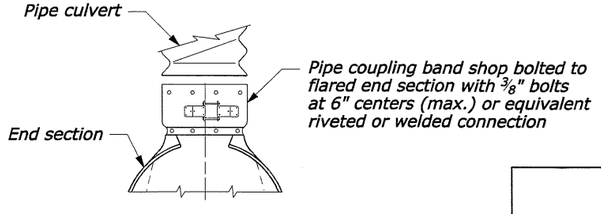
For 12" thru 24" round pipe and 17" x 13" thru 28" x 20" pipe arch

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

DESIGN A
CONNECTION TO ANNULAR CORRUGATED METAL PIPE



DESIGN B
CONNECTION TO CONCRETE PIPE INLET END



For all sizes of round pipe and pipe arch

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

NO SCALE

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

U.S. CUSTOMARY STANDARD

METAL END SECTIONS

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

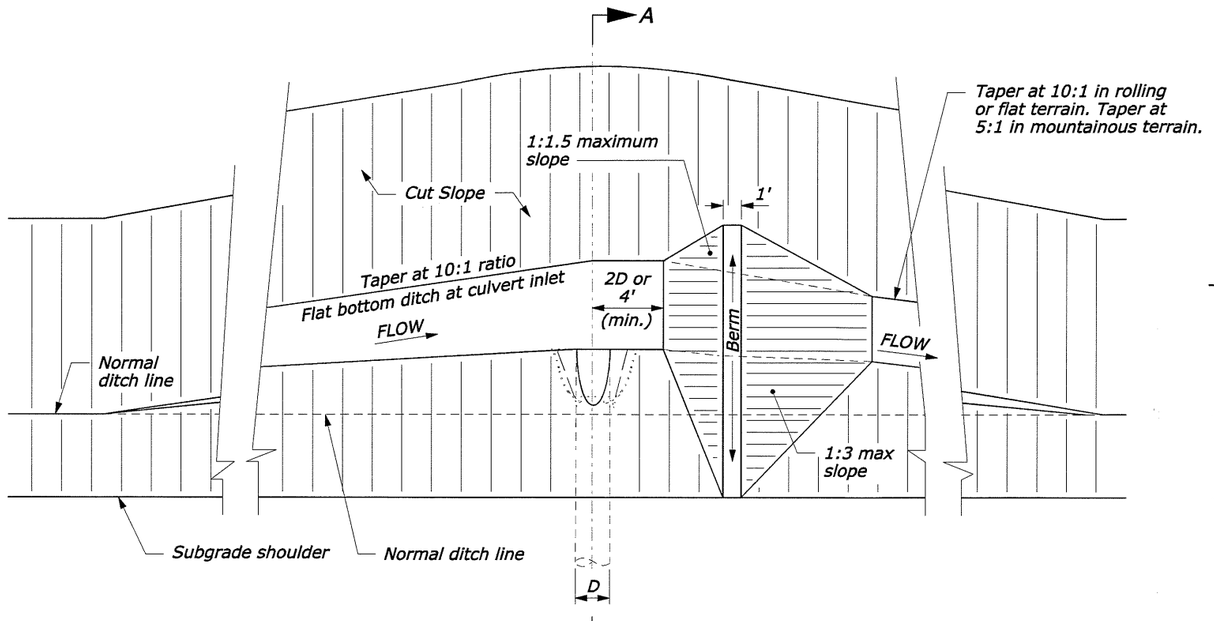
STANDARD 602-4

23-Jul-2012 01:40 PM
...\Design\Drainage\dc0908eh.dgn

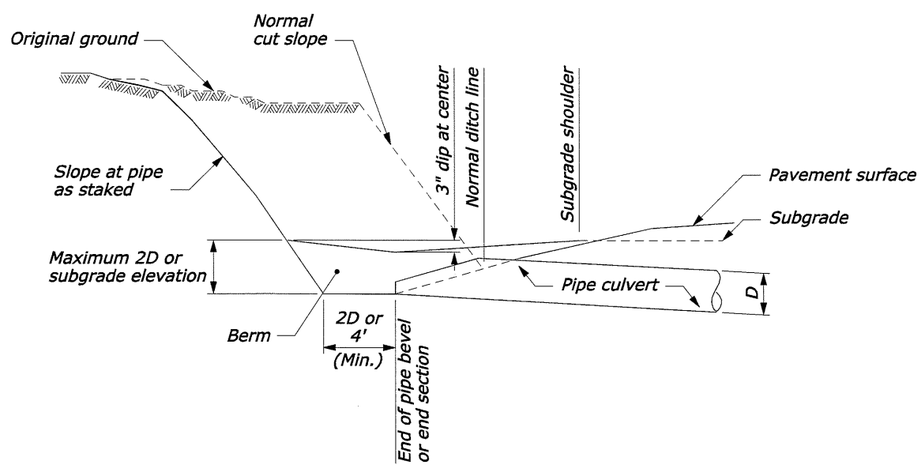
STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	G.12

NOTE:

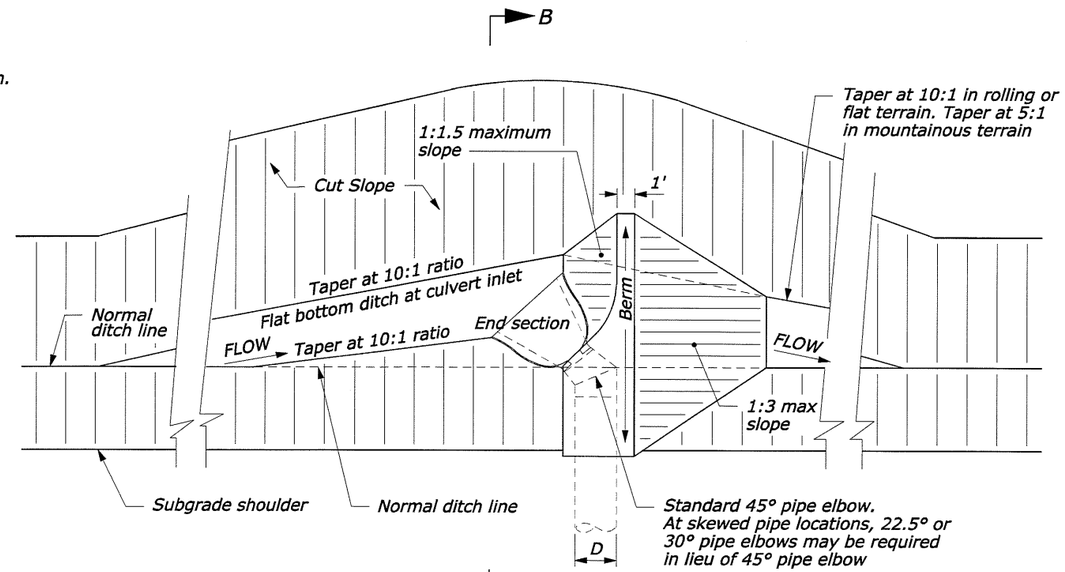
1. *D equals the diameter of all round pipe or the rise dimension of all pipe arch culverts.*



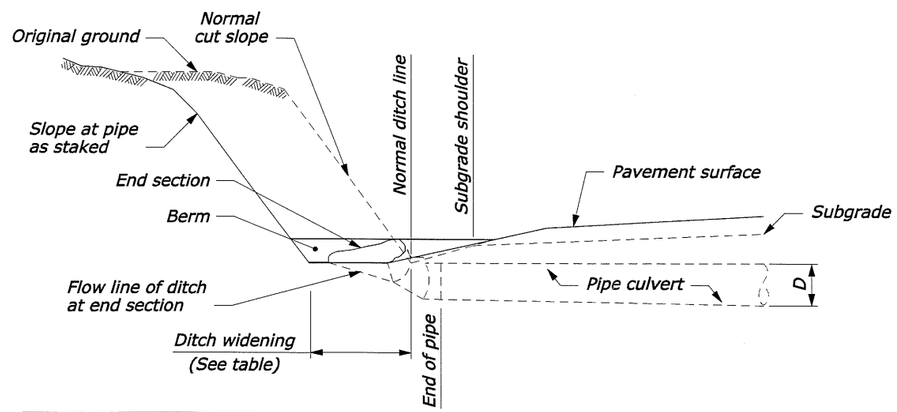
PLAN



SECTION A-A
TYPE I



PLAN



DITCH WIDENING	
PIPE SIZE (D)	WIDENING
18"	5'
24"	6'
30"	7'

SECTION B-B
TYPE II

NO SCALE

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

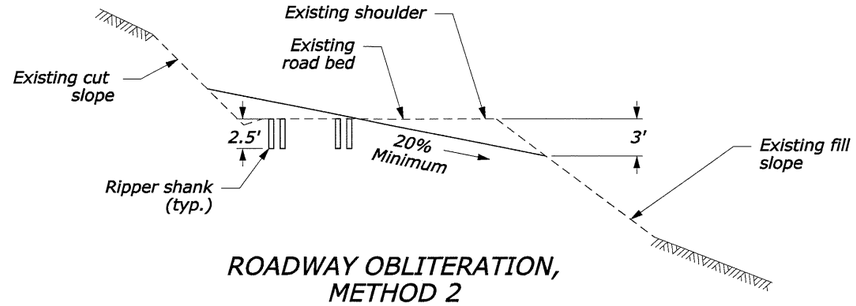
U.S. CUSTOMARY STANDARD

PIPE CULVERT INLET TREATMENT IN CUT SLOPES

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

STANDARD 602-6

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	H.1



ROADWAY OBLITERATION, METHOD 2

1. Rip the inside lane using two passes with a minimum of two ripper shanks.
2. Excavate outside shoulder 3' deep.
3. Outslope roadbed 20% minimum.
4. Place excavated shoulder material against back slope.

NO SCALE

NOTE:

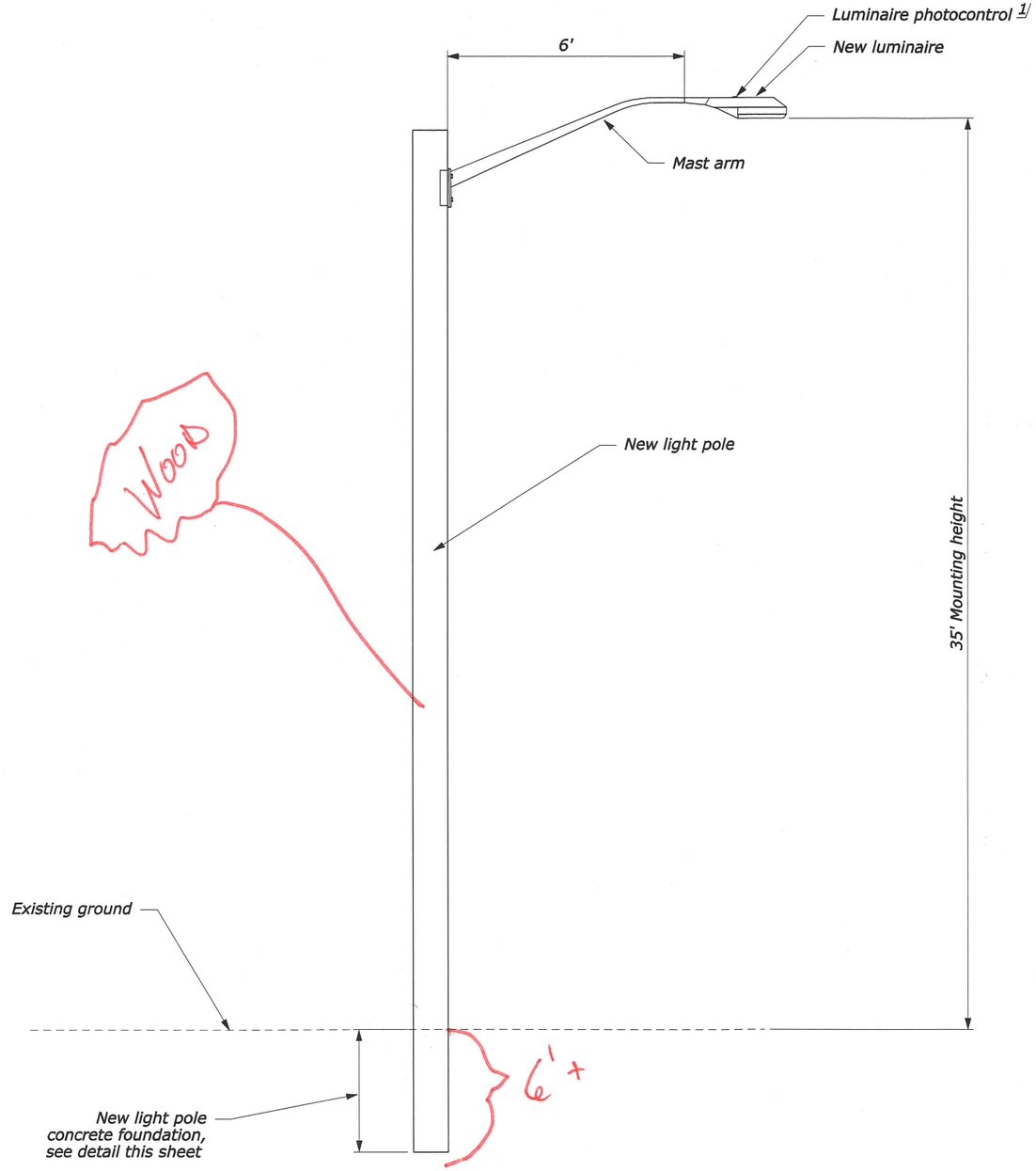
1. See Sheet D.1 for locations and quantities.
2. See Section 211.

ROADWAY OBLITERATION DETAILS

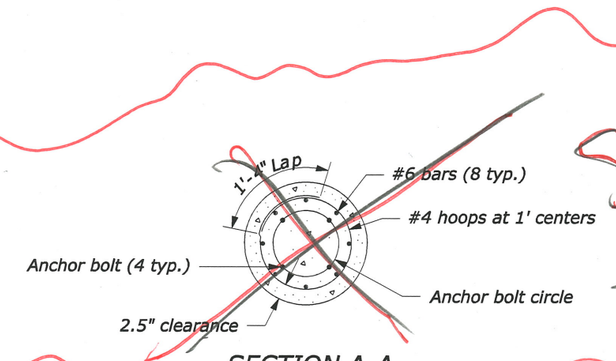
Designed by: N. Bell 7/2012
Checked by: B. Wacker 7/2012
13-Jul-2012 03:32 PM
...\Miscellaneous\dc0908qa.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	H.2

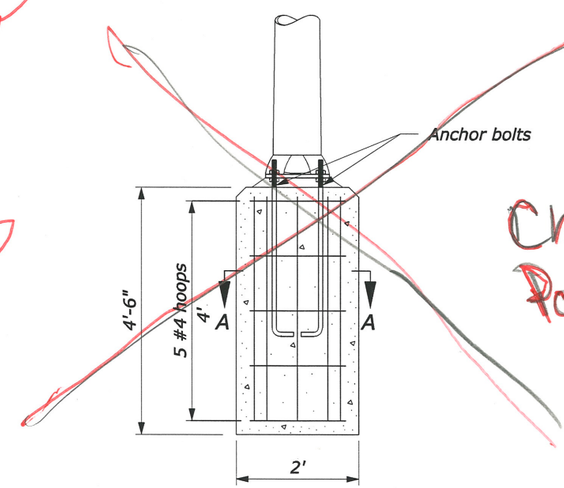
7/2012 B. Thompson
7/2012 Checked by:
N. Bell Designed by:
23-Jul-2012 01:27 PM
...\Miscellaneous\dc0908qb.dgn



LUMINAIRE DETAIL



SECTION A-A



LIGHT POLE CONCRETE FOUNDATION DETAIL

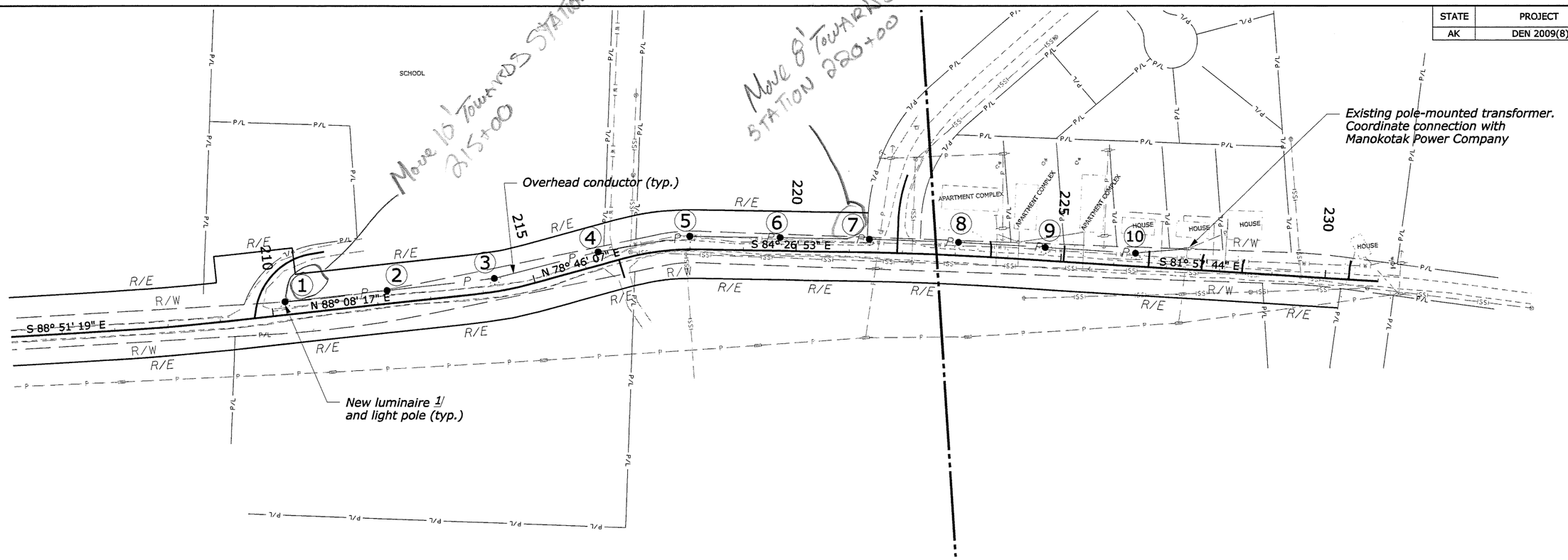
FOOTNOTE:

1/ Mount luminaire photocontrol on first system luminaire.

NO SCALE

LIGHTING SYSTEM INSTALLATION DETAILS

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	H.3



LIGHTING SYSTEM PLAN

LUMINAIRE SCHEDULE

Station	Luminaire No.	Offset from ℄ (ft)
210+25 LT	1	25
212+20 LT	2	25
214+25 LT	3	25
216+30 LT	4	25
218+00 LT	5	25
219+69 LT	6	25
221+37 LT	7	25
223+05 LT	8	25
224+69 LT	9	25
226+40 LT	10	25

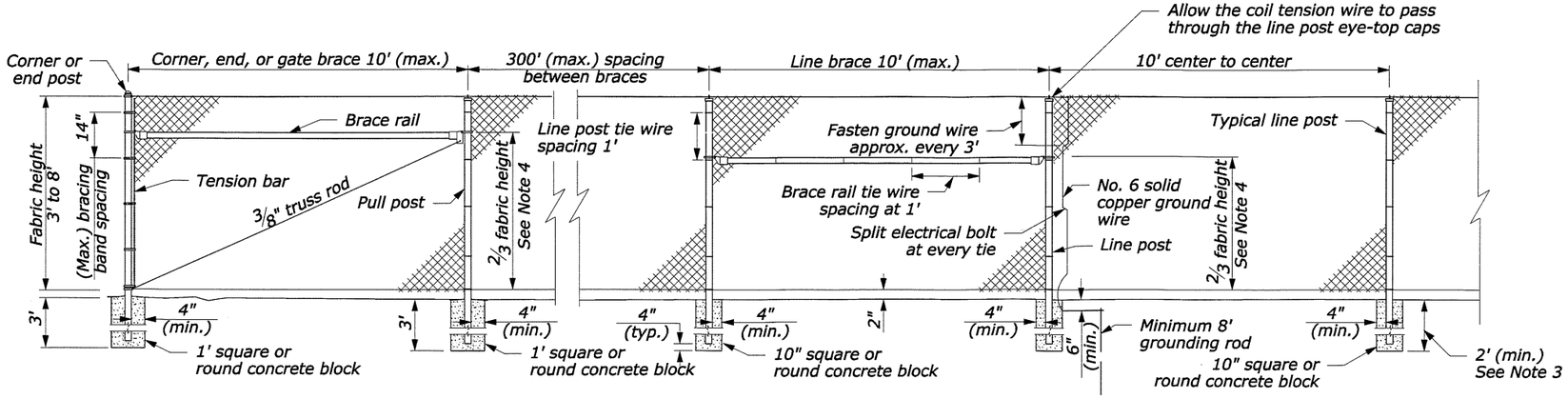
FOOTNOTE:

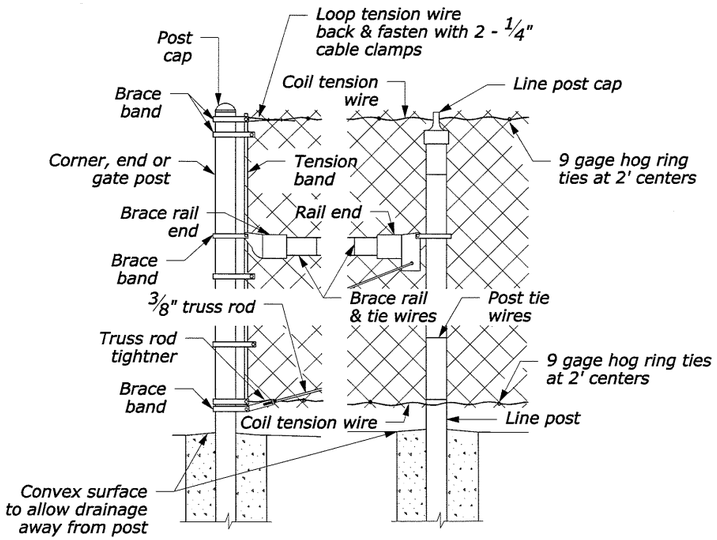
1/ See Sheet H.2 for details.

LIGHTING SYSTEM INSTALLATION DETAILS

7/2012 B. Thompson
7/2012 N. Bell
09-Aug-2012 02:42 PM Designed by:
...\Miscellaneous\dc0908qc.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	H.4





CHAIN LINK DETAIL

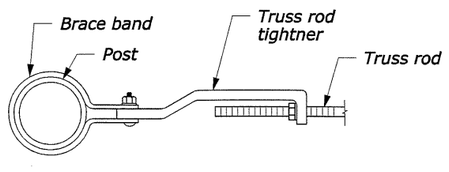
NOTE:

1. Set all posts in concrete. Set corner, end, pull posts to the dimensions shown. The minimum depth of concrete for line posts is 24". Increase depth 3" for each additional 1' of fence height over 4'.
2. Install braces on all terminals on fences without a top rail. No braces are required on fabric 6' in height or less where a top rail is specified. Install braces where fabric is over 6' in height. Where a top rail is used, attach the brace at the halfway point of the terminal post above grade and, where the rail is omitted, at the two-thirds point above grade. Do not install top rail unless so specified in the special contract requirements.
3. Adjust the post top elevations to provide a smooth visual fence profile. Install corner posts at horizontal breaks in the fence of 15° or more.
4. Provide fence fabric with a 2" mesh. Use 11 gage wire in fabric heights of 4' or less and 9 gage wire in fabric heights greater than 4'. Provide a Class D coating when zinc-coated steel fence fabric is provided. Knuckle both selvages on fabric less than 6' high. For fabric 6' high or higher, knuckle one selvage and twist the other.
5. See Sheet H.5 for hardware requirements.

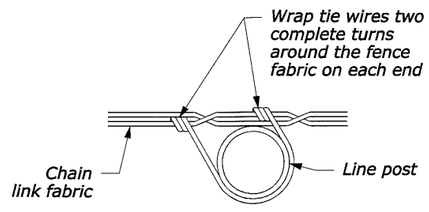
CHAIN LINK FENCE

POST SIZE AND WEIGHT TABLE

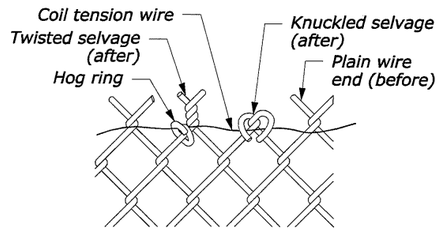
DESCRIPTION	ROUND PIPE			
	Steel		Aluminum	
	Min. yield strength (psi)			
	25,000		25,000	
	Size and mass			
	OD (inches)	mass (lb/ft)	OD (inches)	mass (lb/ft)
Brace rail & top rail	1.660	2.27	1.660	0.79
Line post	2.375	3.65	2.375	1.25
End, corner, & pull post	2.875	5.79	2.875	2.00



TRUSS ROD TIGHTENER DETAIL



CHAIN LINK FENCE TIE DETAIL



WIRE SELVAGE DETAIL

NO SCALE

CHAIN LINK FENCE DETAILS

7/2012 B. Wacker
7/2012 N. Bell
Checked by:
Designed by:
23-Jul-2012 01:42 PM
...\Miscellaneous\dc0908qd.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	H.5

HARDWARE ITEM DESCRIPTION	STANDARD REQUIREMENTS
Brace rail and top rail	See table on Sheet H.4
Line post	See table on Sheet H.4
Corner, end and pull posts	See table on Sheet H.4
Post cap 	Cast non-ferrous alloy or galvanized pressed steel cap must fit snuggly on post and gate top
Line post cap 	Galvanized pressed steel minimum 0.09" thickness or galvanized malleable ferrous alloy
Tension band 	Minimum 1/8" x 3" galvanized steel
Brace band 	Minimum 1/8" x 3" galvanized steel
Band bolt 	Minimum 3/8" x 1.75" galvanized carriage bolt, (Lock washer & flat washer for each band)
Rail end 	Galvanized pressed steel or galvanized malleable ferrous alloy minimum 3/8" thickness on back bolting appendage
Brace rail end 	Galvanized pressed steel or galvanized malleable ferrous alloy minimum 3/8" thickness on back bolting appendage
Truss rod tightener 	Minimum 3/8" formed galvanized steel
Truss rod 	3/8" galvanized, NC threaded rod, lock washer, & flat washer with two 90° bends opposite of threaded end
Top rail sleeve 	Galvanized steel 0.05" minimum thickness by 6" minimum length
Tension bar 	Minimum 3/16" x 3" galvanized steel
Fence fabric 	2" diamond mesh fabric, See Note 4 on Sheet H.4
Tie wires 	Minimum 9 gage aluminum with one hooked end
Coil tension wire	7 gage metallic coated wire

NOTE:

1. The design of the chain link hardware may vary from the details shown, however, all hardware and materials used in a single installation shall be uniform and compatible.

NO SCALE

CHAIN LINK FENCE DETAILS

Designed by: N. Bell 7/2012
Checked by: B. Wacker 7/2012
23-Jul-2012 01:43 PM
...\Miscellaneous\dc0908qe.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	I.1

ITEM 63504-1000
TEMPORARY TRAFFIC CONTROL, CONSTRUCTION SIGN

Sign Number	MUTCD Number	Description	Sign size (in x in)	Number of signs	Quantity (SQFT)
1	G20-1	ROAD WORK NEXT 4 MILES	36 x 18	2	9
2	G20-2	END ROAD WORK	36 x 18	6	27
3	W20-1	ROAD WORK AHEAD	36 x 36	8	72
4	W20-4	ONE LANE ROAD AHEAD	36 x 36	2	18
5	W20-7a	FLAGGER (SYMBOL)	36 x 36	4	36
6	W3-4	BE PREPARED TO STOP	36 x 36	2	18
Schedules A, B, & C Total					**180**

SUMMARY OF TEMPORARY
TRAFFIC CONTROL DEVICES - SCHEDULES A, B, & C

Item Number	Description	Unit	Quantity
63502-1000	Temporary traffic control, cone, type 36-inch	EACH	50
63502-1300	Temporary traffic control, drum	EACH	25

SUMMARY OF TEMPORARY TRAFFIC CONTROL FLAGGER HOURS

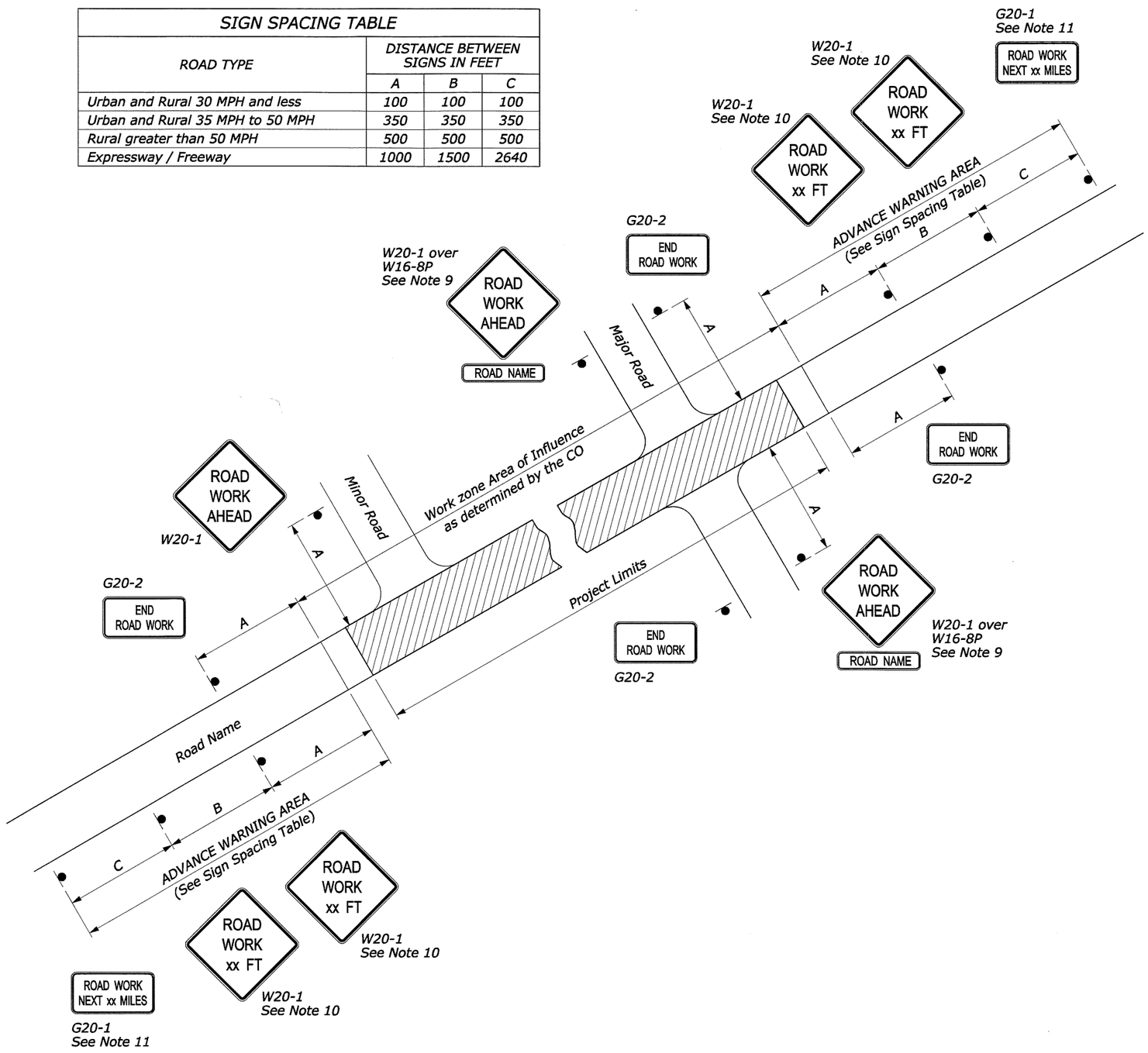
Item Number	Description	Unit	Schedule A	Schedule B	Schedule C
63509-1000	Temporary traffic control, flagger	FIX HR RATE	4,000.0	3,200.0	2,000.0

TABULATION OF TEMPORARY TRAFFIC CONTROL QUANTITIES

7/2012 | B. Wacker | 7/2012 | Checked by: | N. Bell | F:\Highways\FHWA\12500001_Manokotak\Design\Temporary Traffic Control\[dc0908_Section J 20-Jul-2012 3:04 PM | Designed by:

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	I.2

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



NOTE:

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

NO SCALE

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

U.S. CUSTOMARY STANDARD

TEMPORARY TRAFFIC CONTROL ADVANCE SIGNING

STANDARD APPROVED FOR USE 6/2005
REVISED:
DRAFT: 9/2010

STANDARD 635-1

17 September 2010 9:43 AM H:\StanDraw\st63501.dgn [USC]

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	I.3

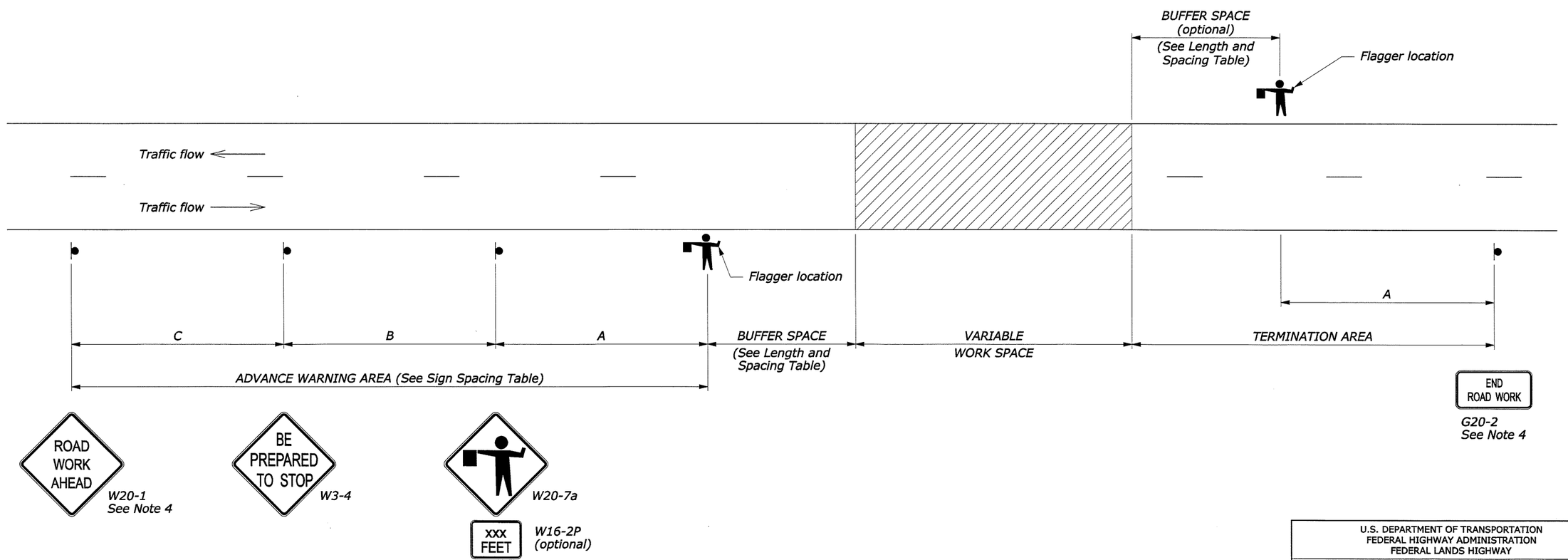
LENGTH AND SPACING TABLE	
APPROACH SPEED*	BUFFER SPACE LENGTH
MPH	FEET
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730

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

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

NOTE:

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



NO SCALE

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

U.S. CUSTOMARY STANDARD

TEMPORARY TRAFFIC CONTROL ROAD CLOSURE LAYOUT (WITH FLAGGERS)

STANDARD APPROVED FOR USE 6/2005
REVISED:
DRAFT: 9/2010

STANDARD 635-5

22 September 2010 6:18 AM H:\StanDraw\st63505.dgn [USC]

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	I.4

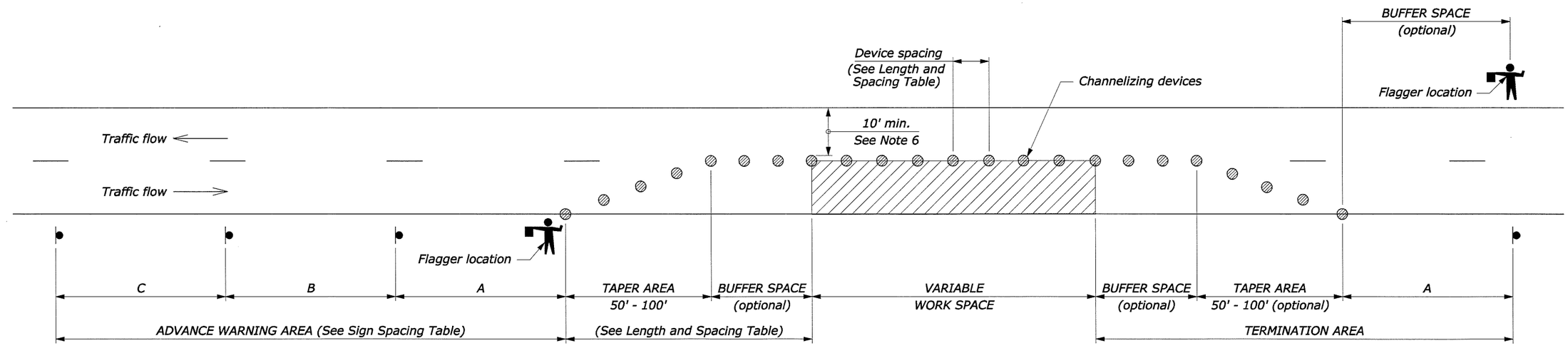
LENGTH AND SPACING TABLE				
APPROACH SPEED*	BUFFER SPACE LENGTH	CHANNELIZING DEVICE		
		TAPER AREA	BUFFER SPACE	WORK SPACE
MPH	FEET	SPACING IN FEET		
20	115	20	40	40
25	155	20	50	50
30	200	20	60	60
35	250	20	70	70
40	305	20	80	80
45	360	20	90	90
50	425	20	100	100
55	495	20	110	110
60	570	20	120	120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

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

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

NOTE:

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



W20-1
See Note 4

W20-4

W20-7a

W13-1P
(optional)

W16-2P
(optional)

G20-2
See Note 4

NO SCALE

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

U.S. CUSTOMARY STANDARD

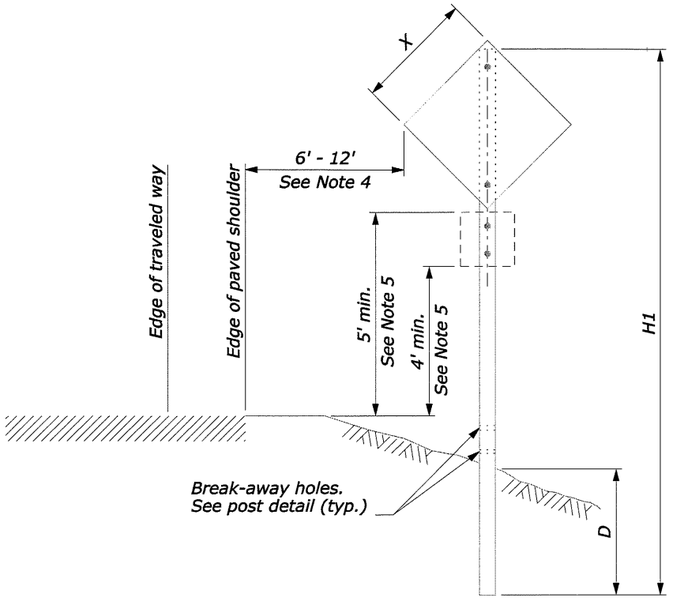
TEMPORARY TRAFFIC CONTROL SINGLE LANE CLOSURE LAYOUT (WITH FLAGGERS)

STANDARD APPROVED FOR USE 6/2005
REVISED:
DRAFT: 9/2010

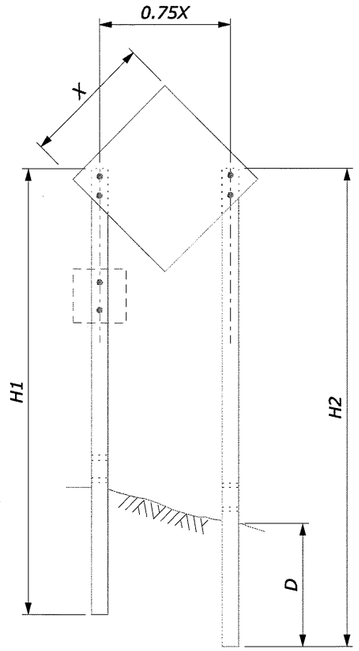
STANDARD 635-6

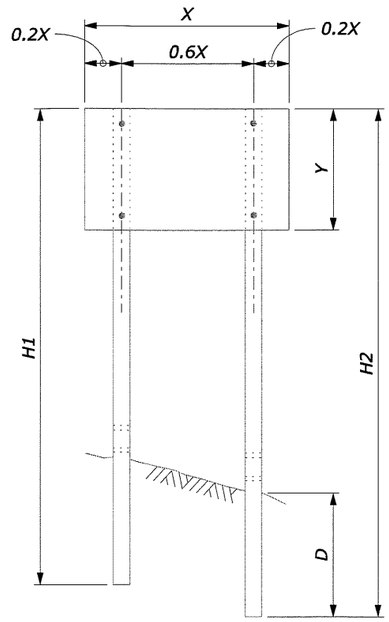
15 October 2010 3:48 PM C:\MyFiles\PW_Production\dms67497\st63506.dgn [USC]

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	I.5



SINGLE POST SIGN





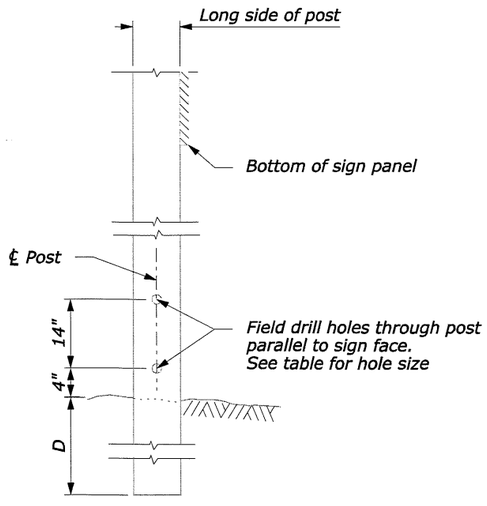
TWO POST SIGN

NOTE:

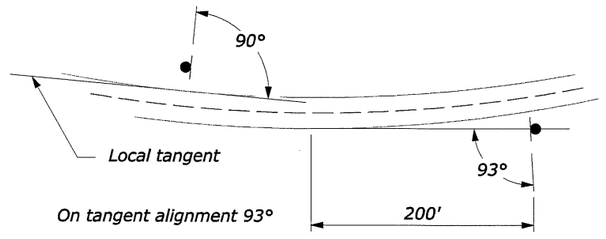
1. *Attach sign panels with a minimum of 2 - ¼" dia. bolts per post.*
2. *H1 and H2 = Overall post length. Select post lengths to fit field conditions.*
3. *D = Post embedment depth for average soil conditions.*
4. *In rural areas where lateral distance is limited, a minimum lateral offset of 2' may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

WOOD POST SELECTION TABLE

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



POST DETAIL



SIGN INSTALLATION ANGLE

NO SCALE

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

U.S. CUSTOMARY STANDARD

TEMPORARY TRAFFIC CONTROL SIGN INSTALLATION WOOD POSTS

STANDARD APPROVED FOR USE 6/2005

REVISED:
DRAFT: 9/2011

STANDARD 635-14

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	J.1

Designed by: N. Bell 7/2012 | Checked by: B. Wacker 7/2012 | 21-Aug-2012 3:31 PM | F:\highways\FHWA\12500001_Manokotak\Design\Permanent Traffic Control\[dc0908_Section J

Schedule A & Schedule B

Schedule C

ITEM 63302-0000 SIGN SYSTEM

Sign Number	MUTCD Number	Location		Description	Sign size (in x in)	Number of signs	Quantity (SQFT)
		Station	Side				
1	R2-1	9+96	LT	Speed Limit 20	24 x 30	1	5.00
2	R2-1	9+96	RT	Speed Limit 35	24 x 30	1	5.00
3	R1-1	80+40	LT	Stop	30 x 30	1	6.25
4	R1-1	118+87	LT	Stop	30 x 30	1	6.25
5	R2-1	206+50	LT	Speed Limit 35	24 x 30	1	5.00
6	R2-1	206+50	RT	Speed Limit 20	24 x 30	1	5.00
7	S1-1	207+50	RT	School	36 x 36	1	6.75
8	R1-1	209+36	LT	Stop	30 x 30	1	6.25
9	S1-1	220+00	LT	School	36 x 36	1	6.75
10	S1-1	220+75	LT	Speed Limit 20	24 x 30	1	5.00
11	R1-1	221+58	LT	Stop	30 x 30	1	6.25
	D3-1			Weary River Rd	42 x 8	2	4.67
Schedule A Total							**68.17**
Schedule B Total							**68.17**
Schedule C Total							**51.92**

Schedule A & Schedule B

Schedule C

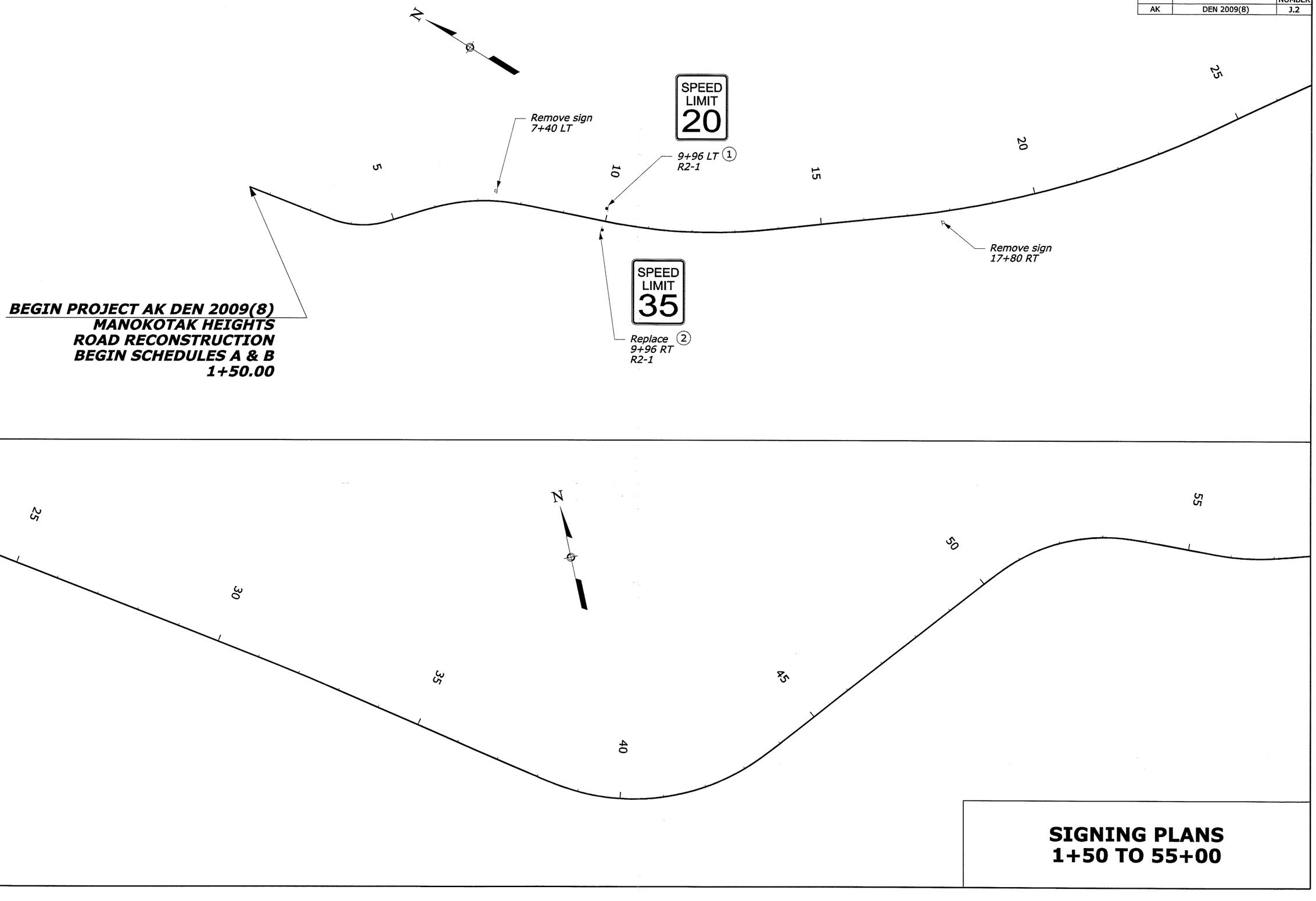
ITEM 20301-2400 REMOVAL OF SIGNS

Location		Sign Legend	Quantity (EACH)
Station	Side		
7+40	LT	Speed Limit 20	1
17+80	RT	Watch for Children	1
77+80	RT	Y Intersection	1
80+88	LT	Stop	1
119+32	LT	Stop	1
123+13	LT	Intersection RT	1
216+55	LT	Speed Limit 35	1
Schedule A Total			**7**
Schedule B Total			**7**
Schedule C Total			**3**

Did not exist.

TABULATION OF PERMANENT TRAFFIC CONTROL QUANTITIES

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	J.2

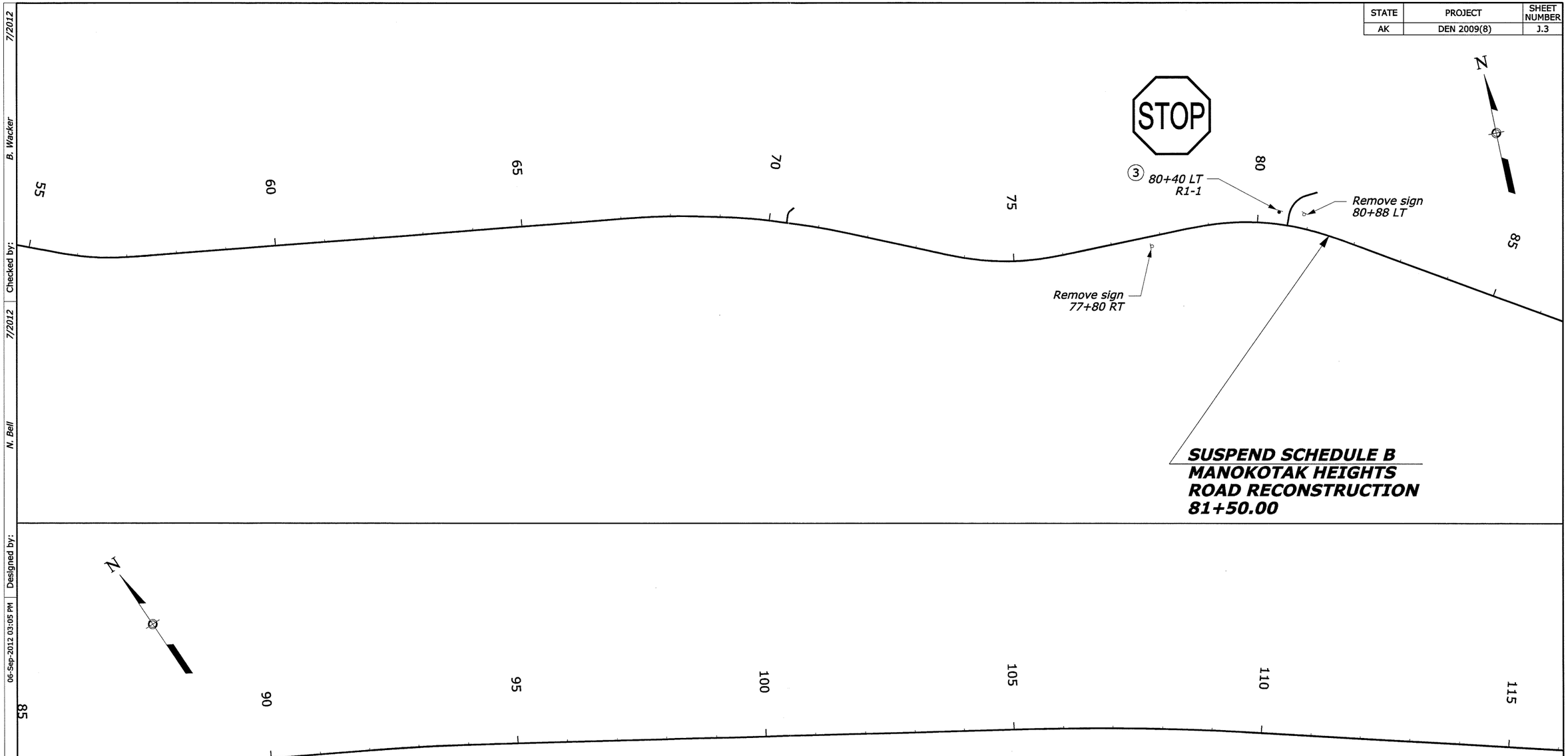


BEGIN PROJECT AK DEN 2009(8)
MANOKOTAK HEIGHTS
ROAD RECONSTRUCTION
BEGIN SCHEDULES A & B
1+50.00

SIGNING PLANS
1+50 TO 55+00

Designed by: N. Bell 7/2012
Checked by: B. Wacker 7/2012
06-Sep-2012 03:04 PM
...\dc0908pa.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	J.3

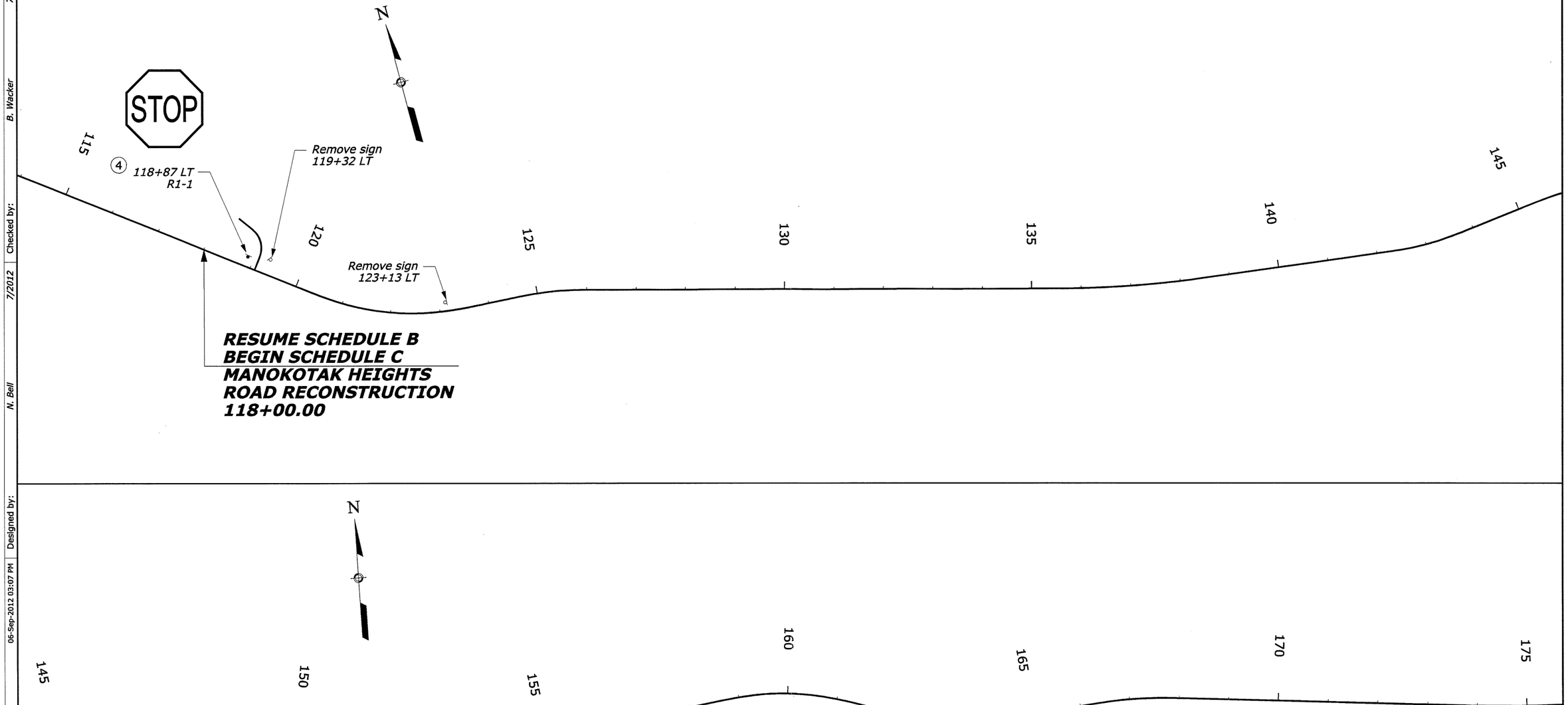


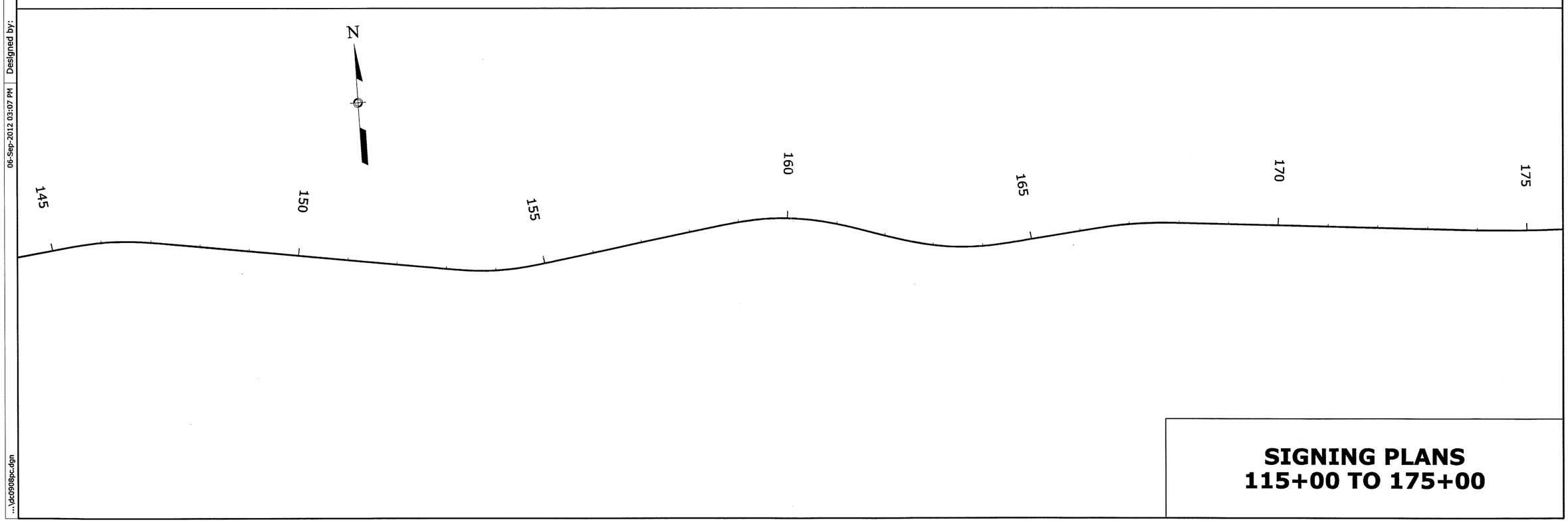
SUSPEND SCHEDULE B
MANOKOTAK HEIGHTS
ROAD RECONSTRUCTION
81+50.00

SIGNING PLANS
55+00 TO 115+00

7/2012 B. Wacker
7/2012 Checked by:
N. Bell Designed by:
06-Sep-2012 03:05 PM
...\dc0908pb.dgn

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	J.4



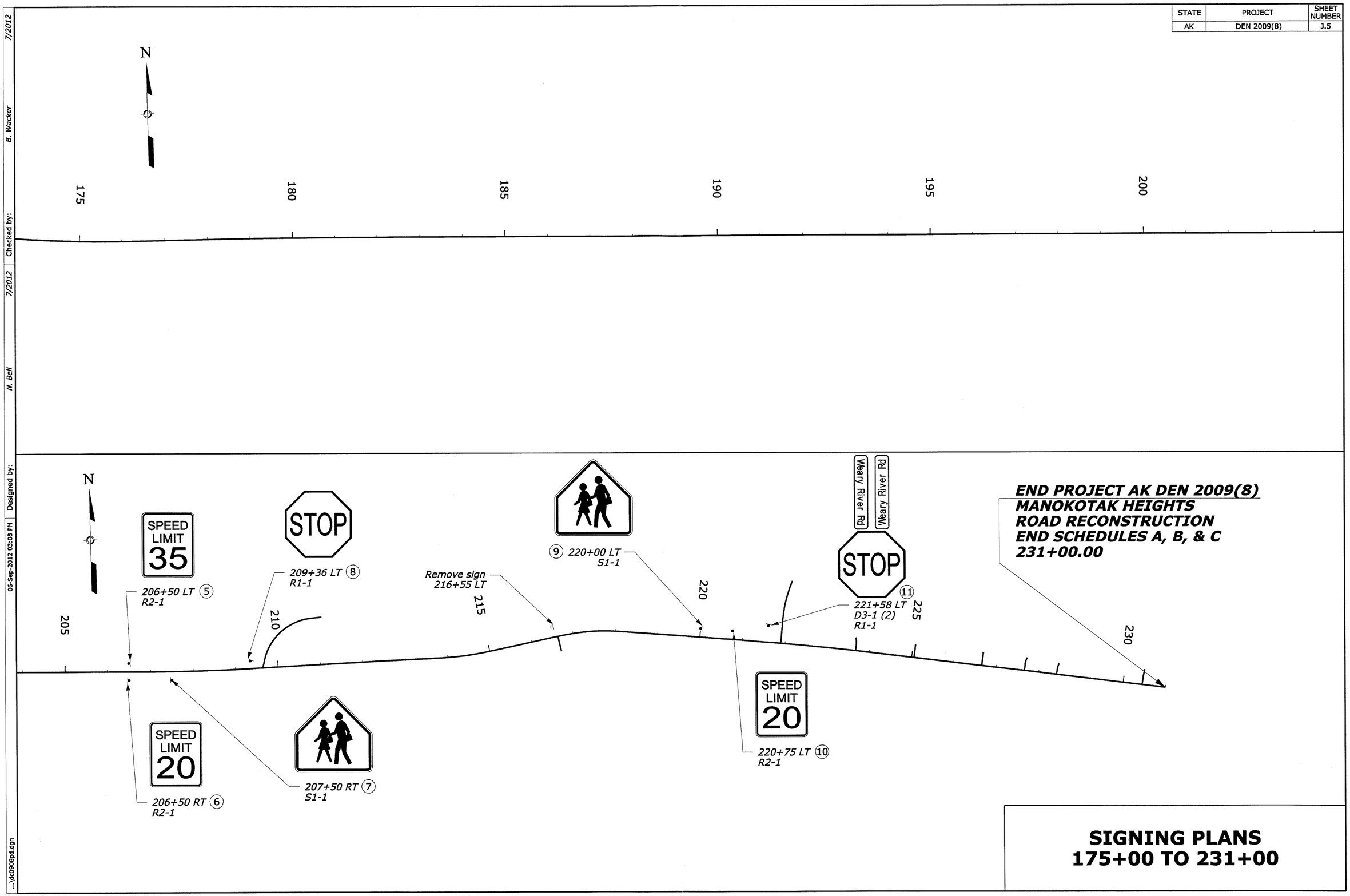


SIGNING PLANS
115+00 TO 175+00

7/2012 B. Wacker
Checked by:
7/2012 N. Bell
Designed by:
06-Sep-2012 03:07 PM
...\dc0908pc.dgn

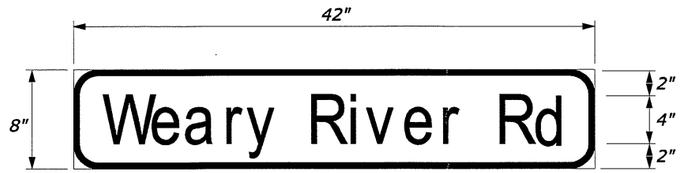
STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	J.5

Designed by: N. Bell 7/2012
Checked by: B. Wacker 7/2012
06-Sep-2012 03:08 PM
...\dc0908pd.dgn



SIGNING PLANS
175+00 TO 231+00

STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	J.6



(11) 221+58 LT
D3-1

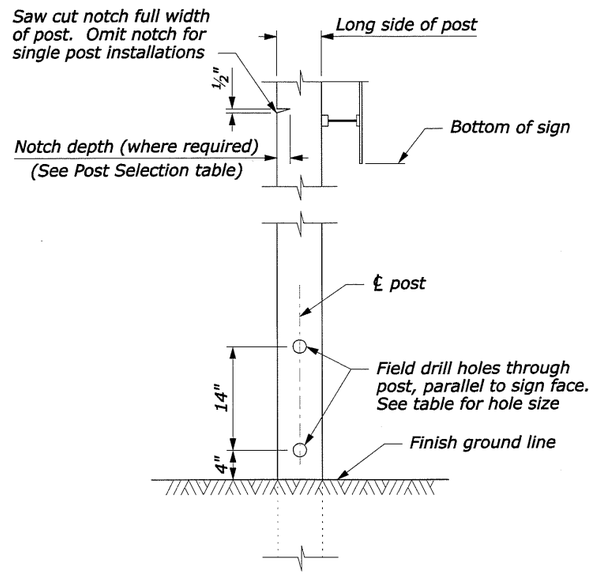
NOTE:

1. *Sign has a white reflectorized legend and green reflectorized background.*
2. *Use letter series C font and standard letter spacing for legend.*

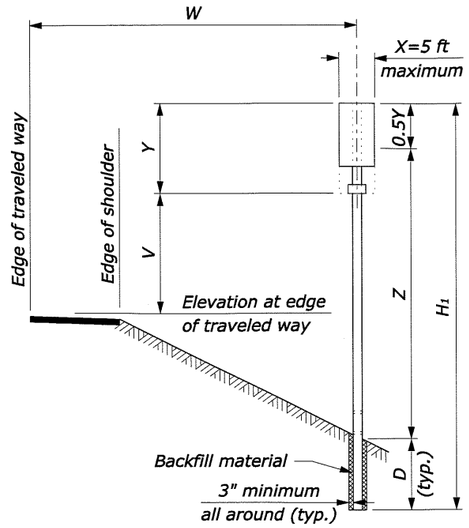
PERMANENT SIGN DETAILS

N. Bell 7/2012 | Checked by: B. Wacker 7/2012 | Designed by: 21-Aug-2012 03:22 PM | ...\dc0908pf.dgn

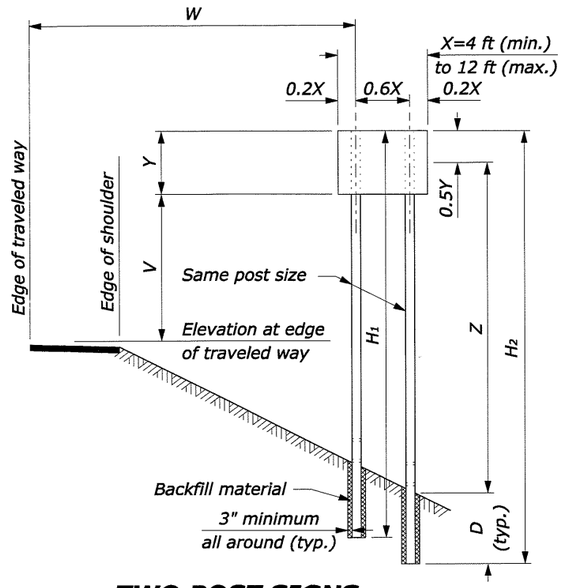
STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	J.7



POST DETAIL



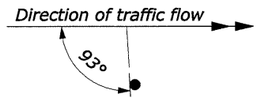
SINGLE POST SIGNS



TWO POST SIGNS

NOTE:

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

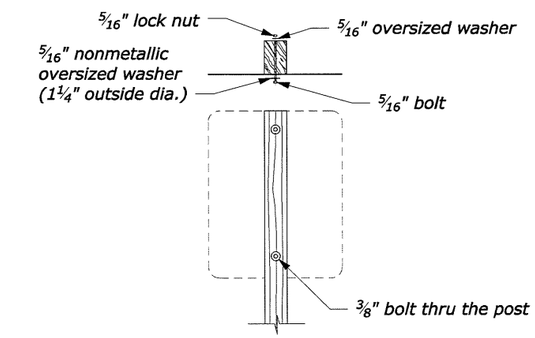


SIGN INSTALLATION ANGLE

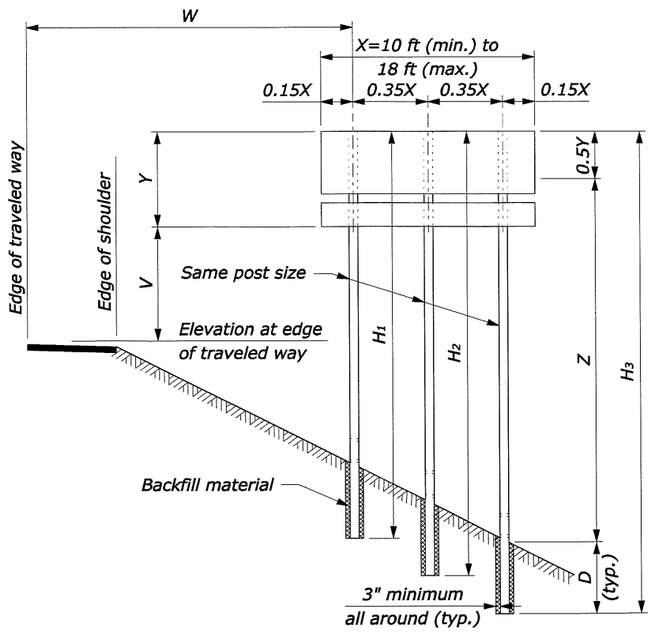
For all retroflectorized signs where W > 25'

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

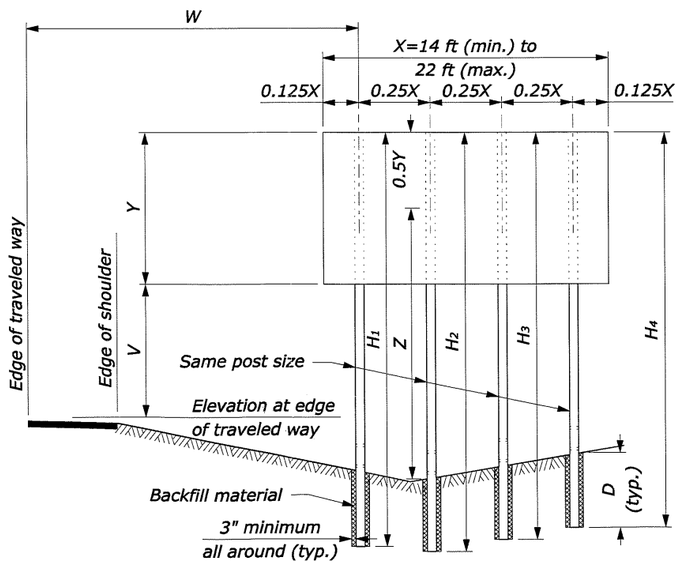
V may be reduced by 1 foot in rural districts for a secondary sign mounted below another sign.



TYPICAL MOUNTING FOR SIGNS WITHOUT ANGLES



THREE POST SIGNS



FOUR POST SIGNS

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

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

NO SCALE

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

U.S. CUSTOMARY DETAIL

PERMANENT SIGN INSTALLATION WOOD POSTS

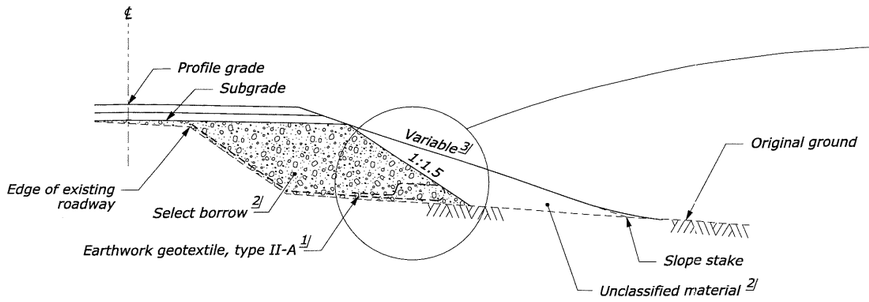
DETAIL APPROVED FOR USE --/----
REVISED: 2/1998
DRAFT: 10/2009

DETAIL W633-7

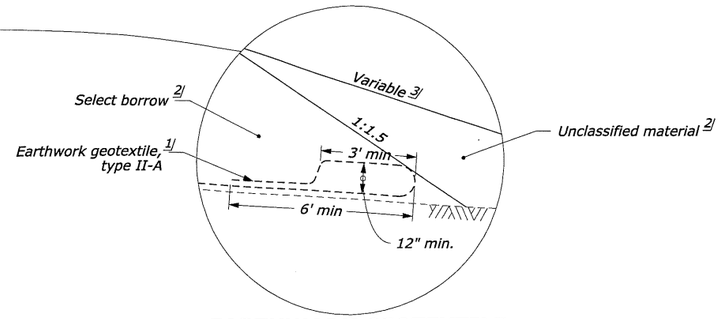
21 October 2009 10:49 AM

H:\StanDraw\w63307.dgn [USC]

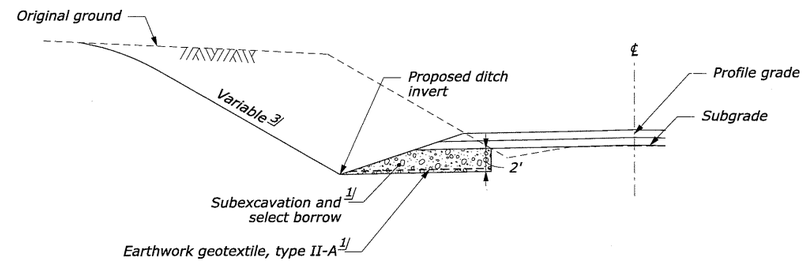
STATE	PROJECT	SHEET NUMBER
AK	DEN 2009(8)	C.3



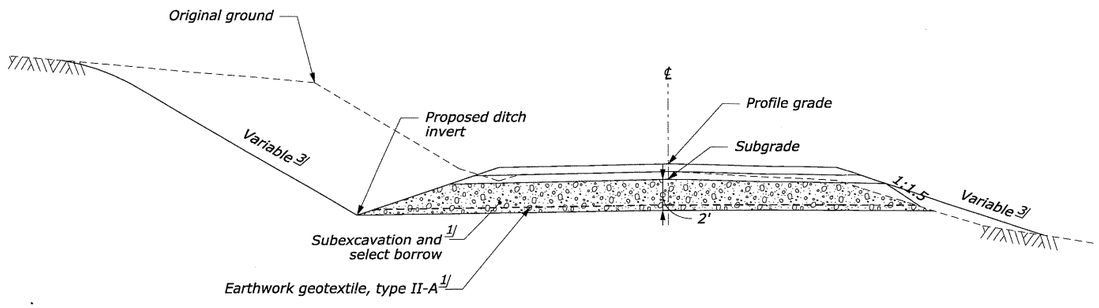
EMBANKMENT CONSTRUCTION DETAIL



EARTHWORK GEOTEXTILE END WRAP DETAIL



SUBEXCAVATION, TYPE 1 DETAIL



SUBEXCAVATION, TYPE 2 DETAIL

Sheet added by Amendment A001

NO SCALE

NOTE:

1. See mainline typical section for proposed surfacing structure.
2. Mirror details as appropiate.

FOOTNOTE:

1/ See Sheet C.1 for locations and quantities.

2/ See Sheet D.1 for quantities.

3/ Construct slopes as shown in the Staking Report.

SUBEXCAVATION AND EMBANKMENT CONSTRUCTION DETAILS

...\Typical Sections\dc09008cb.dgn | 13-Sep-2012 08:15 AM | Designed by: N. Bell 7/2012 | Checked by: B. Wacker 7/2012