STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-471	1	35

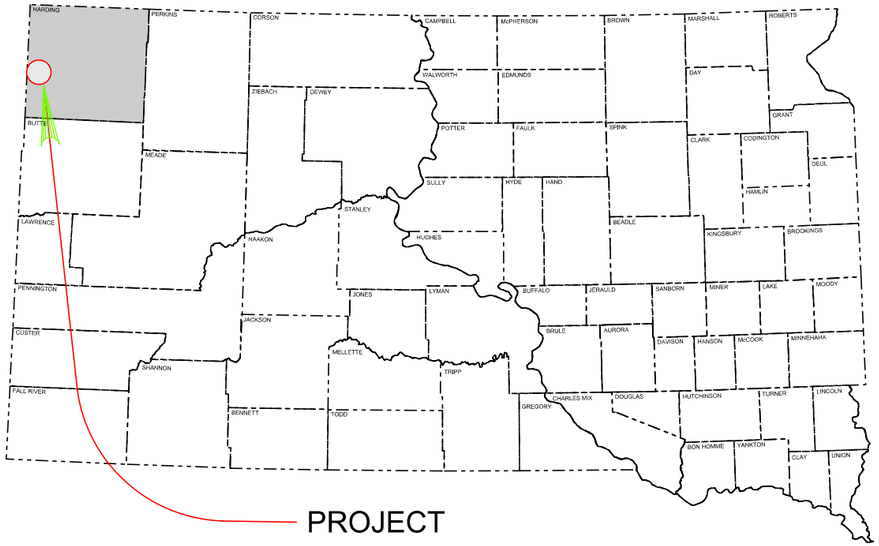
Plotting Date: 04/25/2013

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

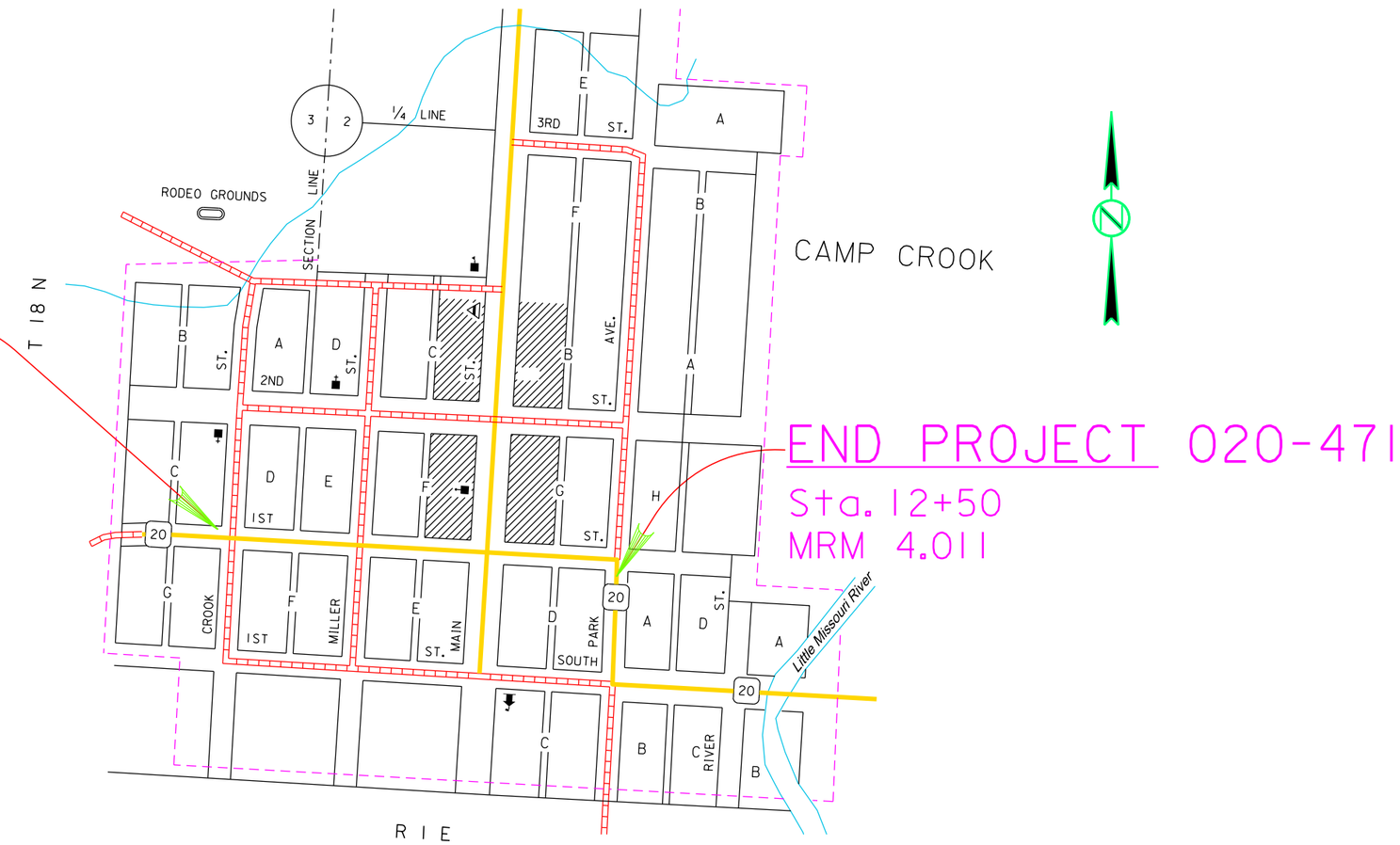
PLANS FOR PROPOSED

PROJECT 020-471
SD HIGHWAY 20
HARDING COUNTY

DRAINAGE IMPROVEMENT
PCN i2u2



INDEX OF SHEETS



DESIGN DESIGNATION

ADT (2011)	235
ADT (2021)	271
DHV	36.9
D	50 %
T DHV	0.9 %
T ADT	2 %
V	25 MPH

STORM WATER PERMIT

None Required

SCALES

		RURAL	SUBURBAN	URBAN
PLAN		1"=200'	1"=100'	1"=40'
PROFILE,	HORIZONTAL:	1"=200'	1"=100'	1"=40'
	VERTICAL:	1"=20'	1"=20'	1"=10'
CROSS SECTIONS	HORIZONTAL:	1"=40'	1"=20'	1"=20'
	VERTICAL:	1"=20'	1"=10'	1"=10'

GROSS LENGTH	1184 FEET	0.2242 MILES
LENGTH OF EXCEPTIONS	FEET	MILES
NET LENGTH	1184 FEET	0.2242 MILES

ESTIMATE OF QUANTITIES

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E1010	Remove Asphalt Concrete Pavement	752.6	SqYd
120E0010	Unclassified Excavation	869	CuYd
230E0100	Remove and Replace Topsoil	Lump Sum	LS
250E0010	Incidental Work	Lump Sum	LS
260E1010	Base Course	242.3	Ton
320E1200	Asphalt Concrete Composite	232.0	Ton
421E0100	Pipe Culvert Undercut	45	CuYd
450E0142	24" RCP Class 2, Furnish	30	Ft
450E0150	24" RCP, Install	30	Ft
450E2200	24" RCP Sloped End, Furnish	2	Each
450E2201	24" RCP Sloped End, Install	2	Each
450E3022	30" RCP Arch Class 2, Furnish	90	Ft
450E3030	30" RCP Arch, Install	90	Ft
450E4604	30" RCP Arch Sloped End, Furnish	4	Each
450E4605	30" RCP Arch Sloped End, Install	4	Each
450E4759	18" CMP 16 Gauge, Furnish	276	Ft
450E4760	18" CMP, Install	276	Ft
450E4769	24" CMP 16 Gauge, Furnish	100	Ft
450E4770	24" CMP, Install	100	Ft
450E5406	18" CMP Safety End, Furnish	14	Each
450E5407	18" CMP Safety End, Install	14	Each
450E5410	24" CMP Safety End, Furnish	4	Each
450E5411	24" CMP Safety End, Install	4	Each
450E5509	18" CMP Arch 16 Gauge, Furnish	34	Ft
450E5510	18" CMP Arch, Install	34	Ft
450E6006	18" CMP Arch Safety End, Furnish	2	Each
450E6007	18" CMP Arch Safety End, Install	2	Each
632E2510	Type 2 Object Marker Back to Back	26	Each
633E1400	Pavement Marking Paint, 4" White	4,000	Ft
633E1405	Pavement Marking Paint, 4" Yellow	4,300	Ft
634E0010	Flagging	40	Hour
634E0100	Traffic Control	1,747	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
734E0010	Erosion Control	Lump Sum	LS
734E0154	12" Diameter Erosion Control Wattle	640	Ft

SPECIFICATIONS

Standard Specifications for Roads & Bridges, 2004 Edition and Required Provisions, Supplemental Specifications and/or Special Provisions as included in the Proposal.

GRADING OPERATIONS

Water for Embankment is estimated at the rate of 10 gallons of water per cubic yard of Embankment minus Waste. The estimated quantity of Water for Embankment is 2 MGal. No separate payment will be made for the Water for Embankment and all costs associated shall be incidental to the contract unit price per cubic yard of "Unclassified Excavation"

.

All moisture/density requirements for the pipe installation shall be to the satisfaction of the Engineer

The estimated cubic yards of excavation and/or embankment required to construct approaches are included in the earthwork balance note.

Ditch grades of the roadway shall be constructed to the limits shown on the cross sections. If significant changes to the cross sections are necessary during construction, the Engineer shall contact the Designer for the proposed change.

UTILITIES

The Contractor shall be aware that the existing utilities shown in the plans were surveyed prior to the design of this project and might have been relocated or replaced by a new utility facility prior to construction of this project, might be relocated or replaced by a new utility facility during the construction of this project, or might not require adjustment and may remain in its current location. The Contractor shall contact each utility owner and confirm the status of all existing and new utility facilities. The utility contact information is provided elsewhere in the plans or bidding documents.

WATER SOURCE

The Contractor shall not withdraw water with equipment previously used outside the State of South Dakota without prior approval from the DOT Environmental Office.

The DOT Environmental Office contact is the Environmental Project Scientist, 605-773-3268. The WATER SOURCE plan note does not relieve the Contractor of his/her responsibility to obtain the necessary permits from other agencies such as the Department of Environment and Natural Resources (DENR) and the United States Army Corps of Engineers (COE).

WORK AFFECTING WATERWAYS

A. WATER QUALITY

Storm Water

At a minimum and regardless of project size, appropriate erosion and sediment control measures must be installed to control the discharge of pollutants from the construction site.

HISTORICAL PRESERVATION OFFICE CLEARANCES

To obtain State Historical Preservation Office (SHPO) clearance, a cultural resources survey may need to be conducted by a qualified archaeologist. In lieu of a cultural resources survey, the Contractor could request a records search from Jim Donohue, State Archaeological Research Center (SARC). Provide SARC with the following: a topographical map or aerial view on which the site is clearly outlined, site dimensions, project number, and PCN. If applicable, provide evidence that the site has been previously disturbed by farming, mining, or construction activities with a landowner statement that no artifacts have been found *on* the site. The Contractor shall arrange and pay for the cultural resource survey and/or records search.

If any earth disturbing activities occur within the current geographical or historic boundaries of any South Dakota reservation, the Contractor shall obtain Tribal Historical Preservation Office (THPO) clearance. If no THPO exists, the required SHPO clearance shall suffice, with documentation of Tribal contact efforts provided to SHPO.

To facilitate SHPO or THPO responses, the Contractor should submit a records search or cultural resources survey report to the DOT Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3268). Allow 30 days from the date this information is submitted to the Environmental Engineer for SHPO/THPO approval. The Contractor is responsible for obtaining all required permits and clearances for staging areas, borrow sites, waste disposal sites, and all material processing sites. The Contractor shall provide the required permits and clearances to the Engineer at the preconstruction meeting.

WASTE DISPOSAL SITE

The Contractor will be required to furnish a site(s) for the disposal of construction/demolition debris generated by this project.

Construction/demolition debris may not be disposed of within the State ROW.

The waste disposal site(s) shall be managed and reclaimed in accordance with the following from the General Permit for Highway, Road, and Railway Construction/Demolition Debris Disposal Under the South Dakota Waste Management Program issued by the Department of Environment and Natural Resources.

The waste disposal site(s) shall not be located in a wetland, within 200 feet of surface water, or in an area that adversely affects wildlife, recreation, aesthetic value of an area, or any threatened or endangered species, as approved by the Engineer.

If the waste disposal site(s) is located such that it is within view of any ROW, the following additional requirements shall apply:

1. Construction/demolition debris consisting of concrete, asphalt concrete, or other similar materials shall be buried in a trench completely separate from wood debris. The final cover over the construction/demolition debris shall consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the State ROW shall be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor shall control the access to waste disposal sites not within the State ROW through the use of fences, gates, and placement of a sign or signs at the entrance to the site stating “No Dumping Allowed”.

2. Concrete and asphalt concrete debris may be stockpiled within view of the ROW for a period of time not to exceed the duration of the project. Prior to project completion, the waste shall be removed from view of the ROW or buried and the waste disposal site reclaimed as noted above.

The above requirements will not apply to waste disposal sites that are covered by an individual solid waste permit as specified in SDCL 34A-6-58, SDCL 34A-6-1.13, and ARSD 74:27:10:06.

Failure to comply with the requirements stated above may result in civil penalties in accordance with South Dakota Solid Waste Law, SDCL 34A-6-1.31.

All costs associated with furnishing waste disposal site(s), disposing of waste, maintaining control of access (fence, gates, and signs), and reclamation of the waste disposal site(s) shall be incidental to the various contract items.

SHRINKAGE FACTOR: Embankment +30%

TABLE OF EXCAVATION QUANTITIES BY BALANCES

Station to	Station	Excavation (CuYd)	Total Excavation (CuYd)	** Waste (CuYd)
0+50	12+00	869	869	621
	Totals:	869	869	621

** The quantities for these items are for information only.
Plan quantities will be used for payment, the Unclassified Excavation quantity shall be used for final payment.

INCIDENTAL WORK

Station	L/R	Remarks
1+10	L	Take out 12”-42’ CMP
4+74	L	Take out 12”-40’ Corrugated Poly Pipe
6+54	L	Take out 12”-22’ CMP
8+13		Take out 12”-32’ CMP
8+41	R	Take out 18”-46’CMP
10+45	L	Take out 18”-40’ Corrugated Poly Pipe
11+90		Take Out 18”-40’ CMP
12+28		Take out 30”-40’CMP
12+32		Take out 36”-40’CMP

The removed pipe shall become the property of the Contractor and removed from the project limits.

SAWING IN EXISTING SURFACING

Where new asphalt concrete is placed adjacent to existing asphalt concrete, the existing pavement shall be sawed full depth to a true line with a vertical face. No separate payment shall be made for sawing.

TABLE OF ASPHALT CONCRETE PAVEMENT REMOVAL

Station to	Station	Quantity (SqYd)
7+95	8+24	76.7
11+76	12+43	182.2
Intersecting Streets	(7)	440.4
Alleys	(4)	53.3
	Total:	752.6

CORRUGATED METAL PIPE

Corrugated metal pipes shall have 2 ⅔-inch X ½-inch corrugations for 42-inch and smaller round pipe and 48-inch and smaller arch pipe unless otherwise stated in the plans. Corrugated metal pipes shall have 3-inch X 1-inch or 5-inch X 1-inch corrugations for 48-inch and larger round pipe and 54-inch and larger arch pipe unless otherwise stated in the plans.

The gauge of the corrugated metal ends shall match the thickest gauge of corrugated metal pipe it is connected to.

PIPE FOR APPROACHES AND INTERSECTING ROADS,

Class II reinforced concrete pipe and high density polyethylene pipe may be substituted for corrugated metal pipe at approaches and intersecting roads at no additional cost to the State.

Acceptance of high density polyethylene pipe will be by certification.

The end sections for the high density polyethylene pipe shall be metal, conform to the type of end section as shown in the plans, and be compatible with the high density polyethylene pipe.

REINFORCED CONCRETE PIPE

High sulfate levels are likely to be encountered on this project. The type of cement used for the reinforced concrete pipes shall be either a type II with 20% class F modified fly ash substituted for cement in accordance with Standard Specifications Section 605 or a type V. The water/cementitious material ratio shall not exceed 0.45 as defined in Standard Specifications Section 460.3 C. The mix shall be as per the fabricator's design; however, minimum compressive strength shall not be less than 4500 psi at 28 days. The pipe must be marked in an acceptable way to designate meeting requirements for sulfate resistance.

TABLE OF PIPE CULVERT UNDERCUT

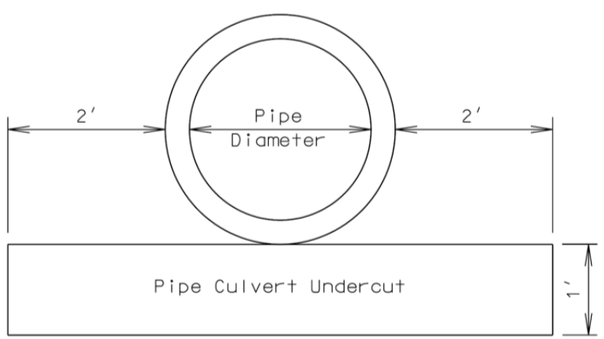
The Table of Pipe Culvert Undercut is intended to be used to establish an estimated quantity of Pipe Culvert Undercut for bidding purposes only. The depth of undercut is an estimate and the actual depth necessary shall be determined during construction. Pipes shown may or may not require undercutting and pipes not shown may require undercutting. The Engineer will determine which pipe shall be undercut in accordance with Section 421 of the Standard Specifications.

Station	Undercut Depth (Ft)	Quantity (CuYd)
8+05	1	12.3
12+28	1	17.1
12+39	1	15.1
	Total:	44.5

The table contains the rate of pipe culvert undercut per foot of pipe length and should be used as an aid in determining the actual amount of undercut to be performed during construction. The table is derived from the drawing below and conforms to the Standard Specifications. When calculating pipe culvert undercut, the length of pipe ends should be included in the overall pipe length.

Storm sewer and approach pipes do not require undercutting unless specified otherwise in these plans.

Pipe Diameter (In)	Round Pipe Undercut Rate for 1' Depth (CuYd/Ft)	Arch Pipe Undercut Rate for 1' Depth (CuYd/Ft)
24	0.2407	0.2577
30	0.2623	0.2847



BASE COURSE

Base Course shall be furnished by the Contractor.

All other requirements of the Standard Specifications for Base Course shall apply.

Water for compaction shall be incidental to contract unit price per ton for "Base Course". Compaction shall be to the satisfaction of the Engineer.

TABLE OF BASE COURSE

Station	to	Station	Quantity (Ton)
7+95		8+24	25.6
11+76		12+50	60.7
Intersecting Streets		(7)	140
Alleys		(4)	16
			242.3

ASPHALT CONCRETE COMPOSITE

Mineral aggregate for the Asphalt Concrete Composite shall conform to the requirements of the Standard Specifications for Class E, Type 1

All other requirements in the Standard Specifications for Asphalt Concrete Composite shall apply.

The asphalt binder used in the mixture shall be PG 64-22, PG 64-28 or PG 64-34 Asphalt Binder.

TABLE OF ASPHALT CONCRETE COMPOSITE

Station	to	Station	Quantity (Ton)
7+95		8+24	21.3
11+76		12+50	50.7
Intersecting Streets		(7)	140
Alleys		(4)	20
		Total:	232.0

REMOVE AND REPLACE TOPSOIL

Topsoil shall be salvaged and stockpiled prior to constructing the ditches. Limits of this work, depth of salvage, and stockpile location will be directed by the Engineer. Following completion of construction, topsoil shall be spread evenly over the disturbed areas.

The estimated amount of topsoil to be removed and replaced is 415 CuYd.

All cost associated with removing and replacing the topsoil shall be incidental to the lump sum price for "Remove and Replace Topsoil".

EROSION CONTROL

The contract lump sum price for Erosion Control shall include all material, equipment, and labor necessary to seed, fertilizer and fiber mulch all areas disturbed by construction of this project. The Engineer, at the time of construction, shall determine limits of the Erosion Control work. The estimated area to be seeded is approximately 0.77 acre.

MYCORRHIZAL INOCULUM

Mycorrhizal inoculum shall consist of mycorrhizal fungi spores and mycorrhizal fungi-infected root fragments in a solid carrier. The carrier may include organic materials, calcinated clay, or other materials consistent with application and good plant growth. The supplier shall provide certification of the fungal species claimed and the live propagule count. The inoculum shall include the following fungal species:

Glomus intraradices	25%
Glomus aggregatu	25%
Glomus mosseae	25%
Glomus etunicatum	25%

All seed shall be inoculated with a minimum of 100,000 live propagules of mycorrhizal fungi per acre. All costs of inoculating the seed shall be incidental to the contract lump sum price for Erosion Control.

FERTILIZING

The Contractor shall apply an all-natural slow release fertilizer prior to seeding or placing sod. The all-natural fertilizer shall have a minimum guaranteed analysis of 4-6-4 and be USDA Certified BioBased. It should provide a minimum of 4% (N) nitrogen with a minimum water insoluble nitrogen (WIN) fraction of 3.2%, a minimum of 6% (P2O5) available phosphate, a minimum of 4% (K2O) soluble potash, and a maximum carbon to nitrogen ratio (C:N ratio) of 5:1. The all-natural fertilizer shall be free of weed-seed and pathogens accomplished through thermophilic composting, and not mechanical or chemical sterilization, to assure presence of beneficial soil microbiology. The fertilizer shall have a near neutral pH, a low salt index, a low biological oxygen demand, contain organic humic and fulvic acids, and have high aerobic organism counts. The fertilizer shall also be stable, free of bad odors, and be unattractive as a food source for animals. It should also be in a granular form that is easily spread.

The all-natural slow release fertilizer shall be applied according to the manufacturer's application recommendations.

The application rate is 1,500 pounds per acre.

The all-natural slow release fertilizer shall be from the list below or an approved equal:

Product	Manufacturer
Sustane	Sustane Corporate Headquarters Cannon Falls, Minnesota Phone: 1-800-352-9245 http://www.sustane.com/

PERMANENT SEEDING

The areas to be seeded comprise of all newly graded areas within the project limits except for the top of roadways.

All permanent seed shall be planted in the topsoil at a depth of ¼" to ½".

All seed broadcast must be raked or dragged in (incorporated) within the top ¼" to ½" of topsoil when possible. This requirement may be waived by the Engineer during construction when raking or dragging is deemed not feasible by conventional methods.

The varieties listed for the seed mixture are preferred varieties. Native harvest seed will be allowed.

Type F Permanent Seed Mixture shall consist of the following:

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/Acre)
Western Wheatgrass	Flintlock, Rodan, Rosana	7
Green Needlegrass	Lodorm	4
Sideoats Grama	Butte, Killdeer, Pierre, Trailway	3
Blue Grama	Bad River, Willis	2
Oats or Spring Wheat: April through May; Winter Wheat: August through November		10
	Total:	26

FIBER MULCHING

Fiber mulch shall be applied in a separate operation following permanent seeding.

Fiber mulch shall be applied at the rate of 2000 pounds per acre.

The Contractor shall allow the fiber mulch to cure a minimum of 18 hours prior to watering or any storm event to ensure proper cohesion between the soil and fiber particles.

The fiber mulch provided shall be from the approved product list. The approved product list for fiber mulch may be viewed at the following internet site:

http://sddot.com/business/certification/products/Default.aspx

TABLE OF FIBER MULCHING

Station	to	Station	L/R	Quantity (Lb)
0+50		12+44	L	685
0+50		12+44	R	859
			Total:	1544

EROSION CONTROL WATTLE

Erosion control wattles for restraining the flow of runoff and sediment shall be installed at locations noted in the table and at locations determined by the Engineer during construction. Refer to Standard Plate 734.06 for details.

The Contractor shall provide certification that the erosion control wattles do not contain noxious weed seeds.

Erosion control wattles shall remain on the project until vegetation has been established.

An additional quantity of 12" Diameter Erosion Control Wattles has been added to the Estimate of Quantities for temporary erosion and sediment control in highway ditch channels.

The erosion control wattle provided shall be from the approved product list. The approved product list for erosion control wattle may be viewed at the following internet site:

http://sddot.com/business/certification/products/Default.aspx

TABLE OF EROSION CONTROL WATTLE

Station	L/R	Diameter (Inch)	Location	Quantity (Ft)
0+87	L	12	Inlet	20
0+88	R	12	Inlet	20
2+76	L	12	Inlet	20
3+00	R	12	Ditch	30
4+49	R	12	Inlet	20
4+50	L	12	Inlet	20
6+34	L	12	Inlet	20
6+36	R	12	Inlet	20
8+00	L	12	Inlet	20
8+23	R	12	Inlet	20
10+26	L	12	Inlet	20
10+35	R	12	Ditch	30
11+76	L	12	Inlet	20
12+13	R	12	Inlet	30
12+22	R	12	Inlet	30
			Additional Quantity:	300
			Total:	640

SEQUENCE OF OPERATIONS – GENERAL NOTES

1. Mainline pipe replacements shall be done half roadway width at a time and be backfilled and gravel surfaced at end of each day.
2. The Contractor may close a maximum of two side streets or two alleys at one time.
3. Requests to deviate from the sequence of operations shall be submitted in writing to the Engineer for review. Approval of an alternate sequence of operations will only be allowed when the proposed changes meet with the Department's intent for traffic control and sequencing of the work. An alternate sequence shall be submitted for review a minimum of one week prior to potential implementation.
4. Unless otherwise stated in these plans, no work will be allowed during hours of darkness. Hours of darkness are defined, as ½ hour after sunset until ½ hour before sunrise.
5. Storage of vehicles and equipment shall be as near the right-of-way as possible. Contractor's employees should mobilize at a location off the right-of-way and arrive at the work sites in a minimum number of vehicles necessary to perform the work. Indiscriminate driving and parking of vehicles within the right-of-way will not be permitted. Any damage of the vegetation, surfacing, embankment, delineators, and existing signs resulting from such indiscriminate use shall be repaired and/or restored by the Contractor, at no expense to the State, and to the satisfaction of the Engineer.
6. Existing guide, route, informational logo, regulatory, and warning signs shall be temporarily reset and maintained during construction. Removing, relocating, covering, salvaging and resetting of existing traffic control devices, including delineation, shall be the responsibility of the Contractor. Non-applicable signing shall be covered or removed during periods of inactivity. Periods of inactivity shall be defined as no work taking place for a period of more than 36 hours. The cost of removing or covering non-applicable signs shall be incidental to the contract lump sum price for, Traffic Control, Miscellaneous.
7. Construction signing mounted on portable supports shall not be used for a duration of more than 3 days, unless approved by the Engineer. Construction signing that remains in the same location for more than 3 days shall be mounted on fixed location, ground mounted, breakaway supports.
8. If inappropriate/conflicting pavement markings exist, the markings shall be removed and replaced with applicable temporary pavement markings when the work duration is more than 3 days. When the work duration is less than 3 days, the channelizing devices in the area where the pavement markings conflict shall be placed at a spacing of ½ G. Pavement marking removals shall be paid for at the contract unit price for Remove Pavement Marking, 4" or equivalent. Temporary pavement marking shall be paid for at the contract unit bid price for Temporary Pavement Marking. The additional channelizing devices shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.
9. The quantity of Signs paid for will be for the greatest number of installations per sign in place at any one time regardless of the number of set-ups on the project.

SEQUENCE OF OPERATIONS – GENERAL NOTES (Cont.)

10. Any delineators and signs damaged or lost shall be replaced by the Contractor at no cost to the State.
11. All materials and equipment shall be stored a minimum distance of 30' from the traveled way during nonworking hours.
12. The Contractor shall provide documentation that all breakaway sign supports comply with FHWA NCHRP 350 or MASH crash-worthy requirements. The Contractor shall provide installation details at the preconstruction meeting for all breakaway sign support assemblies.
13. The Contractor shall be required to have a person available 24 hour/day, 7 days/week to maintain traffic control devices. The name and cellular telephone number of this individual shall be given to the Engineer at the preconstruction meeting.
14. The Contractor or designated traffic control subcontractor shall make night inspections at the initial set up of traffic control and every week thereafter to ensure the adequacy, legibility and reflectivity of each sign and device. A written summary of each inspection shall be given to the Engineer within 24 hours after completion of the inspection. The cost for the nighttime inspection work shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.
15. Vehicles working in traffic or alongside traffic shall be equipped with a flashing amber light visible from all directions. The amber light shall be mounted on the uppermost part of the contractor's vehicle. Lights must have peak intensity within the range of 40 to 400 candelas and must flash at 75 ± 15 flashes per minute. Vehicle flasher/hazard lights are not acceptable.
16. All construction operations shall be conducted in the general direction of traffic movement.
17. If there is a discrepancy between the traffic control plans, standard plates, and the MUTCD – whichever is more stringent shall be used, as determined by the Engineer.
18. Temporary Road Markers shall be used for lane closure tapers or lane shift tapers. Temporary Road Markers used for tapers and shifts will not be measured for payment and will be incidental to the contract lump sum price for Traffic Control, Miscellaneous.
19. Drums are required in all lane closure tapers.
20. The Contractor shall place Bump signs where appropriate. Bump Signs (48"x48") shall be placed 500' in advance of the bump or as approved by the Engineer for adequate sight distance. All signs shall be orange/black on orange.

TABLE OF TRAFFIC CONTROL DEVICES

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	3	17	51
M4-8a	24" x 18"	END DETOUR	1	7	7
M4-9	24" x 30"	DETOUR WITH ARROW (LEFT OR RIGHT)	2	18	36
M4-10	48" x 18"	DETOUR ARROW (LEFT OR RIGHT)	4	22	88
R11-2	48" x 30"	ROAD CLOSED	3	27	81
R11-4	60" x 30"	ROAD CLOSED LOCAL TRAFFIC ONLY	1	30	30
W3-4	48" x 48"	BE PREPARED TO STOP	2	34	68
W8-1	48" x 48"	BUMP	2	34	68
W20-1	48" x 48"	ROAD WORK #### FT. OR AHEAD	9	34	306
W20-2	48" x 48"	DETOUR #### FT. OR AHEAD	3	34	102
W20-3	48" x 48"	ROAD CLOSED #### FT. OR AHEAD	3	34	102
W20-4	48" x 48"	ONE LANE ROAD #### FT. OR AHEAD	2	34	68
W20-7a	48" x 48"	FLAGGER	2	34	68
*****		TYPE III BARRICADE - 8 FT. DOUBLE SIDED	12	56	672
				TOTAL UNITS	**1747**

PERMANENT PAVEMENT MARKING

All materials shall be applied as per manufacturer's recommendations.

Application of permanent pavement marking shall be completed within 7 days following completion of final surfacing.

All costs involved in furnishing and application of the pavement marking paint and glass beads shall be incidental to the contract unit price per foot for Pavement Marking Paint, White and Pavement Marking Paint, Yellow.

Striper and advance and trailing warning vehicles shall be equipped with flashing amber lights or advance warning arrow panels operated in a caution mode.

RATES OF APPLICATION

Centerline striping (yellow) – 33.8 gallons per mile. *
Edgeline striping (white) – 16.9 gallons per mile. **
Glass Beads - 8 lbs per gallon

* Rate is for double yellow centerline
** Rate is for single edge line.

TABLE OF PIPE QUANTITIES

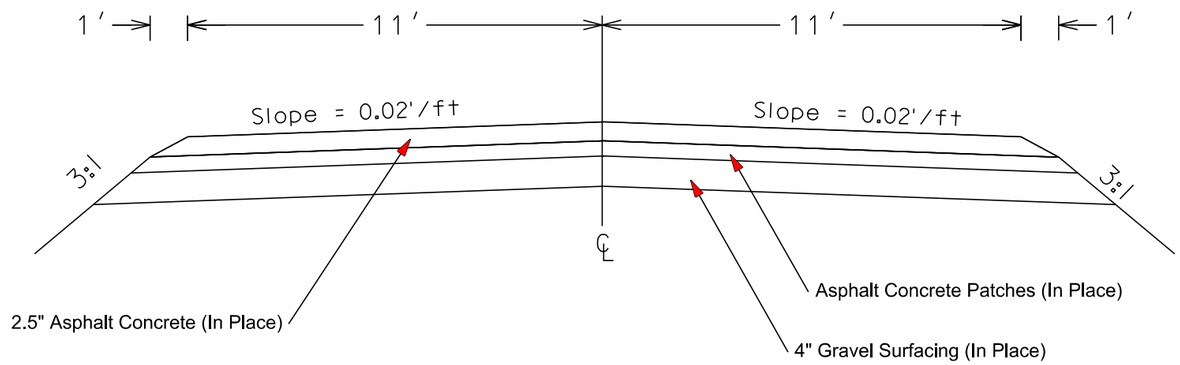
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-471	7	35

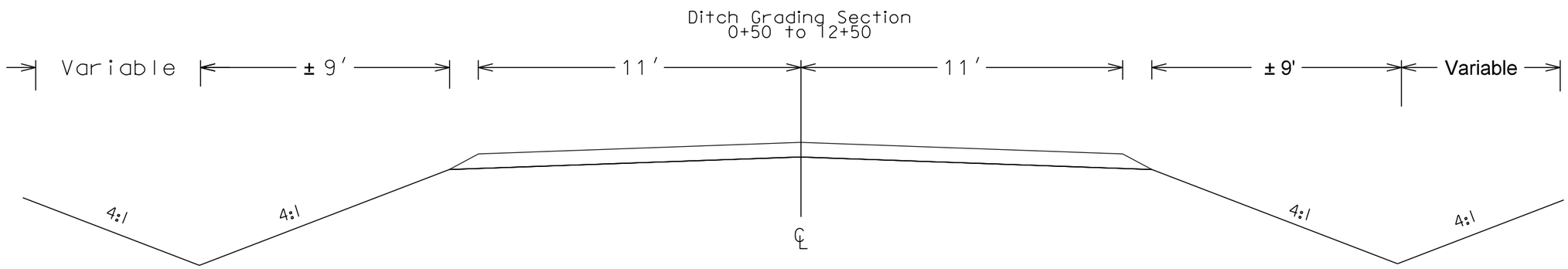
		Reinforced Concrete												Corrugated Metal																											
		Circular		Circular Sloped End				Arch		Arch Sloped End				Circular			Circular Safety End				Arch		Arch Safety End																	
		24" Cl. 2		24"				30" Cl. 2		30"				18" 16 Ga	24" 16 Ga		18"	24"			18" 16 Ga		18"																	
Station	Offset (L/R)	Ft		Each				Ft		Each				Ft	Ft		Each	Each			Ft		Each																	
1+12	23'L													46			2																							
2+96	22'L													34			2																							
4+75	22'L													44			2																							
6+52	21'L													30			2																							
10+45	21'L to 19.4'L																				34		2																	
0+52 (Park St)															58			2																						
1+12	23'R													42			2																							
4+75	22'R													46			2																							
6+57	21'R													34			2																							
8+50	24"R														42			2																							
8+05		30		2																																				
12+28								48		2																														
12+39								42		2																														
Total:		30		2				90		4				276	100		14	4			34		2																	

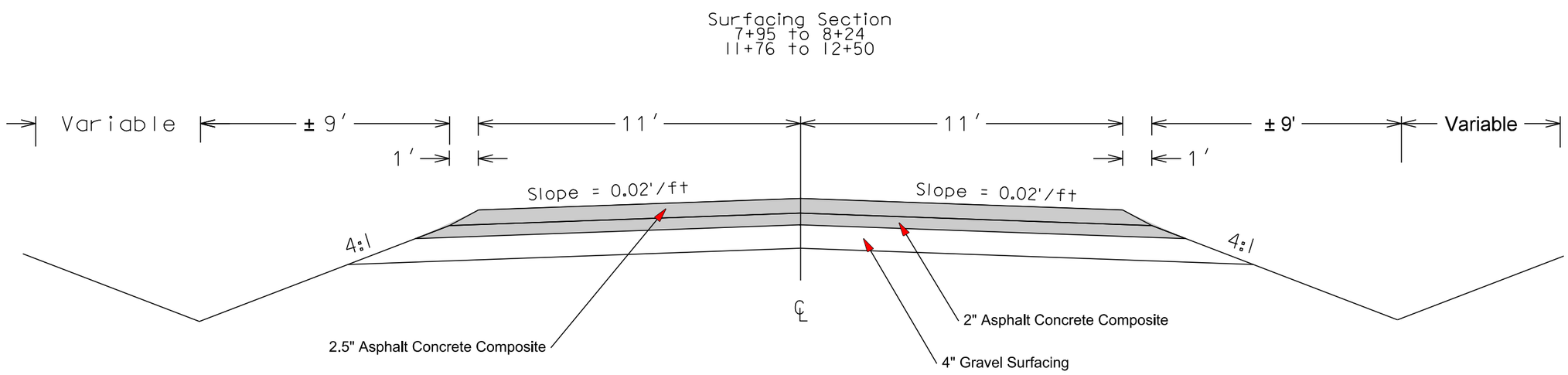
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-471	8	35

Plotting Date: 04/25/2013

TYPICAL SECTION







Plot Scale - 1:200

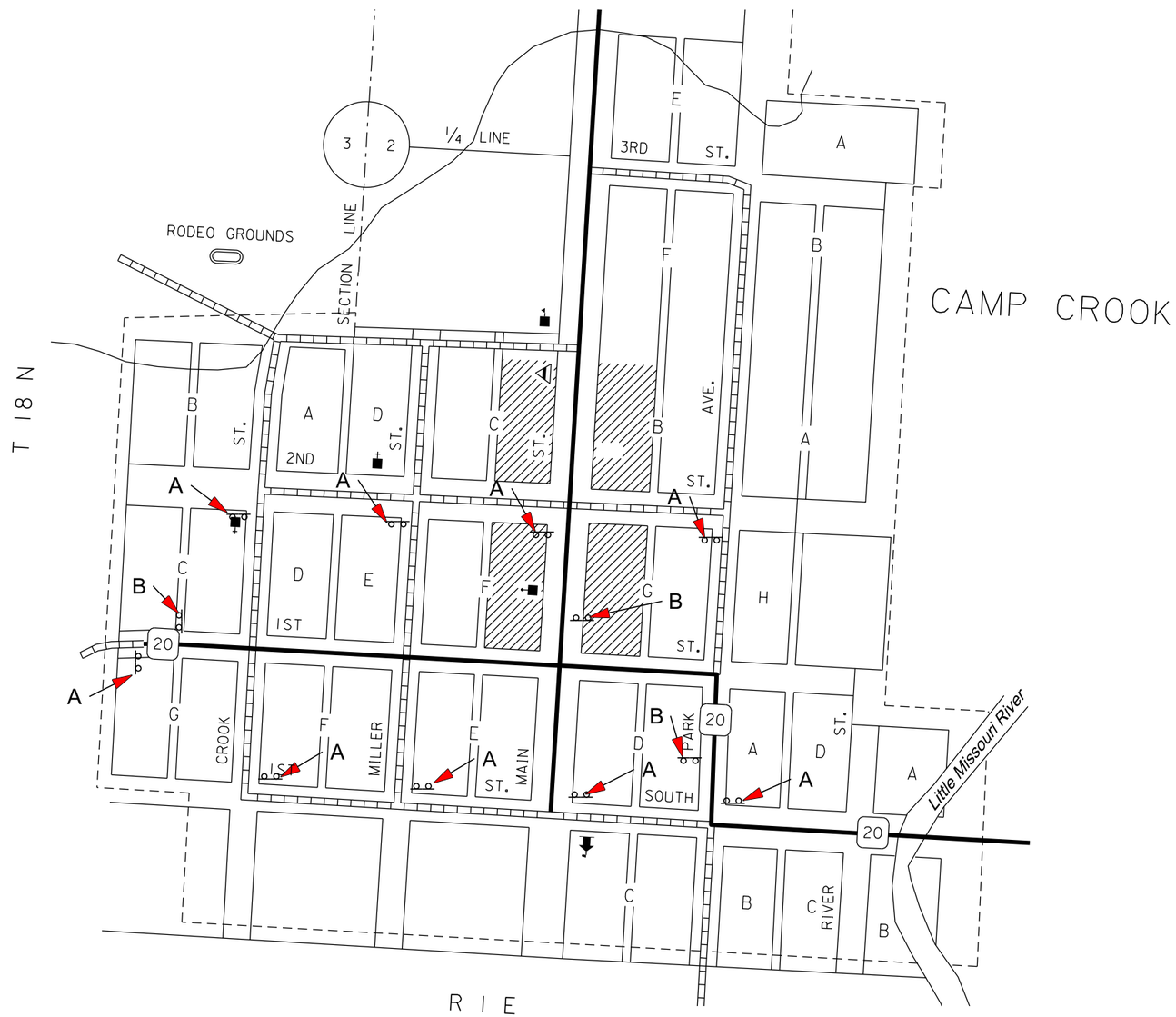
Plotted From - trrc11610

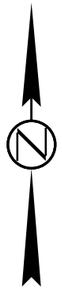
File - ...\SD20 Camp Crook\typ_12u2.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-471	9	35

Plotting Date: 04/25/2013

FIXED SIGN LOCATION





Plot Scale - 1:160

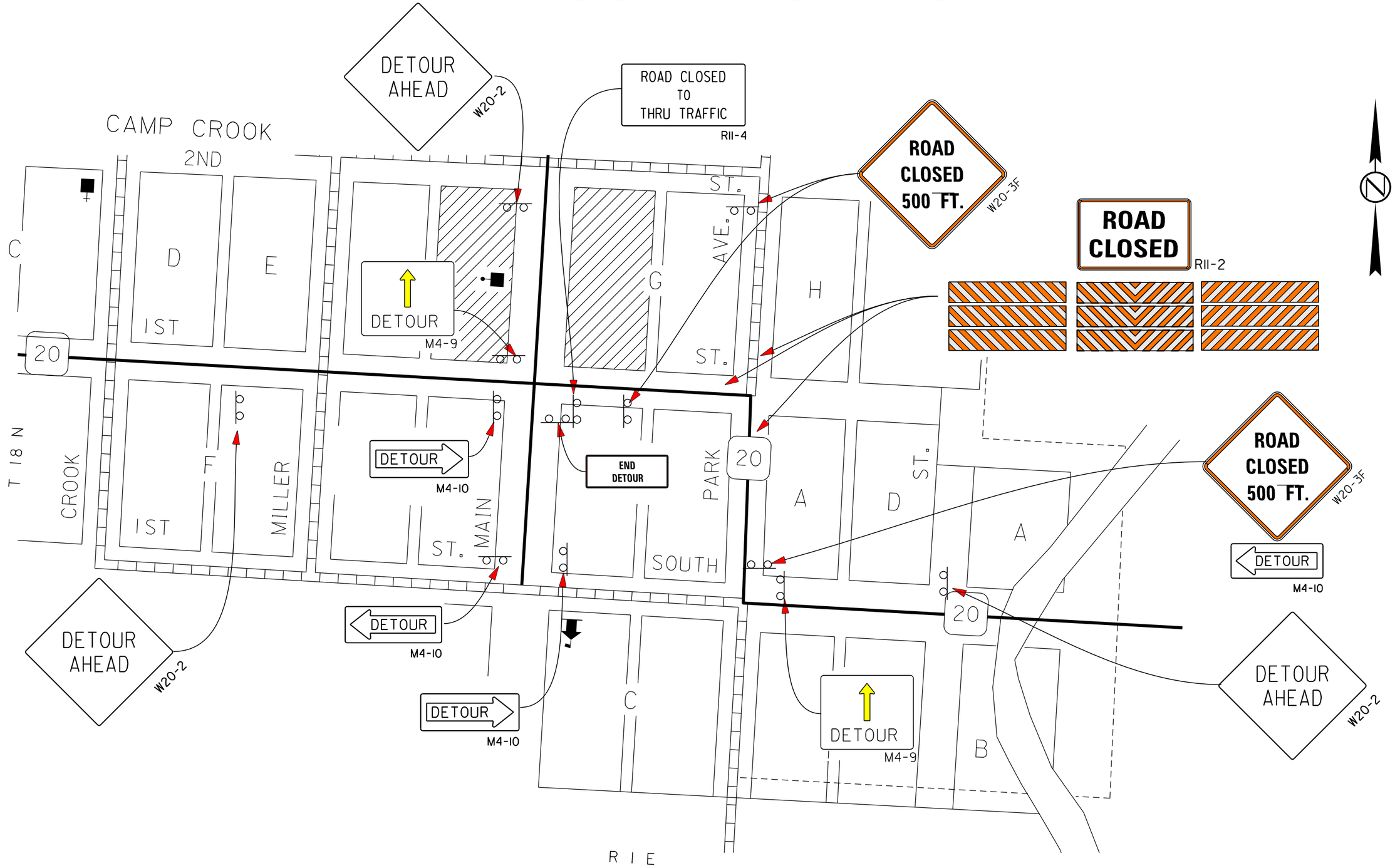
Plotted From - trrc11610

File - ...\SD20 Camp Crook\traffic.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-471	10	35

Plotting Date: 04/25/2013

DETOUR SIIGNING



Plot Scale - 1:160

Plotted From - trrc11610

File - ...\SD20 Camp Crook\traffic.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-471	11	35

Plotting Date: 04/25/2013

EXISTING TOPOGRAPHY SYMBOLOGY AND LEGEND

Anchor
Antenna
Approach
Assumed Corner
Azimuth Marker
Bbq Grill/ Fireplace
Bearing Tree
Bench Mark
Box Culvert
Bridge
Brush
Buildings
Bulk Tank
Cattle Guard
Cemetery
Centerline
Cistern
Clothes Line
Commercial Sign Double Face
Commercial Sign One Post
Commercial Sign Overhead
Commercial Sign Two Post
Concrete Symbol
Creek Edge
Curb/Gutter
Curb
Dam Grade/Dike/Levee
Ditch Block
Drainage Profile
Drop Inlet
Edge Of Asphalt
Edge Of Concrete
Edge Of Gravel
Edge Of Other
Edge Of Shoulder
Elec. Trans./Power Jct. Box
Fence Barbwire
Fence Chainlink
Fence Electric
Fence Misc.
Fence Rock
Fence Snow
Fence Wood
Fence Woven
Fire Hydrant
Flag Pole
Flower Bed
Gas Valve Or Meter
Gas Pump Island
Grain Bin
Guardrail
Gutter
Guy Pole
Haystack
Hedge
Highway R.O.W. Marker

Information Sign One Post
Information Sign Two Post
Interstate Close Gate
Iron Pin
Irrigation Ditch
Lake Edge
Lawn Sprinkler
Mailbox
Manhole Electric
Manhole Gas
Manhole Misc
Manhole Sanitary Sewer
Manhole Storm Sewer
Manhole Telephone
Manhole Water
Merry-Go-Round
Microwave Radio Tower
Misc. Property Corner
Misc. Post
Overhang Or Encroachment
Overhead Utility Line — OH —
Parking Meter
Pipe With End Section
Pipe With Headwall
Pipe Without End Section
Playground Slide
Playground Swing
Power And Light Pole
Power And Telephone Pole
Power Meter
Power Pole
Power Pole And Transformer
Power Tower Structure
Propane Tank
Property Pipe
Property Pipe With Cap
Property Stone
Public Telephone
Railroad Crossing Signal
Railroad Milepost Marker
Railroad Profile
Railroad R.O.W. Marker
Railroad Signs
Railroad Switch
Railroad Track
Railroad Trestle
Rebar
Rebar With Cap
Reference Mark
Retaining Wall
Riprap
River Edge
Rock And Wire Baskets
Rockpiles
Route Sign One Post
Route Sign Two Post

Satellite Dish
Septic Tank
Shrub Tree
Sidewalk
Sign Face
Sign Post
Slough Or Marsh
Spring
Stream Gauge
Street Marker
Telephone Fiber Optics — T/F —
Telephone Junction Box
Telephone Pole
Television Cable Jct Box
Television Tower
Test Wells/Bore Holes
Traffic Signal
Trash Barrel
Tree Belt
Tree Coniferous
Tree Deciduous
Tree Stumps
Triangulation Station
Underground Electric Line — P —
Underground Gas Line — G —
Underground Sanitary Sewer — S —
Underground Storm Sewer — S —
Underground Tank
Underground Telephone Line — T —
Underground Television Cable — TV —
Underground Water Line — W —
Warning Sign One Post
Warning Sign Two Post
Water Fountain
Water Hydrant
Water Meter
Water Tower
Water Valve
Water Well
Weir Rock
Windmill
Wingwall
Witness Corner

State and National Line
County Line
Section Line
Quarter Line
Sixteenth Line
Property Line
Construction Line
R. O. W. Line
New R. O. W. Line
Cut and Fill Limits
Control of Access
New Control of Access

Plot Scale - 1:200
Plotted From - trrc11610
File - ...\SD20 Camp Crook\toposymb.dgn

CONTROL DATA

HORIZONTAL AND VERTICAL CONTROL POINTS

Point	Station	Offset	Description	Northing	Easting	Elevation
1	15+02.25	17838.16 R	REFERENCE MARK MRM -0.017, 1’ east of west fence line	647861.967	933305.542	3255.52
2	14+91.04	17513.60 R	REFERENCE MARK MRM 0.326, 21’ east of east fence	649665.841	933479.782	3251.25
3	14+70.54	16745.97 R	REFERENCE MARK MRM 0.756, 47’ north of north fence	651329.047	934271.562	3225.28
4	14+70.01	15545.33 R	REFERENCE MARK MRM 1.008, 41’ north of north fence	651269.647	935470.847	3216.38
5	14+68.76	14351.93 R	REFERENCE MARK MRM 1.235, 50.5’ north of north fence	651224.293	936663.832	3201.03
6	14+66.83	13088.61 R	REFERENCE MARK MRM 1.473, 40’ north of north fence	651173.817	937926.622	3191.75
7	14+65.91	11741.09 R	REFERENCE MARK MRM 1.728, 42’ north of north fence	651091.624	939271.678	3199.40
8	14+64.44	10353.19 R	REFERENCE MARK MRM 1.989, 31’ north of north fence	651005.040	940656.918	3185.82
9	14+45.63	9560.07 R	REFERENCE MARK MRM 2.135, 32.5’ north of north fence	650970.283	941449.555	3186.63
10	14+24.66	8338.94 R	REFERENCE MARK MRM 2.365, 27’ north of north fence	650905.114	942669.126	3163.27
11	13+62.61	7142.58 R	REFERENCE MARK MRM 2.592, 41’ north of north fence	650882.668	943866.883	3155.78
12	13+76.84	5969.99 R	REFERENCE MARK MRM 2.812, 30’ north of north fence	650785.803	945035.558	3151.38
13	13+51.18	4775.05 R	REFERENCE MARK MRM 3.086, 28.5’ north of north fence	650727.155	946229.327	3146.48
14	13+11.31	3586.21 R	REFERENCE MARK MRM 3.311, 40.6’ north of north fence	650683.109	947418.022	3141.05
			USGS BENCH MARK S32 1934	650655.550	947637.042	3140.51
15			REFERENCE MARK MRM 3.495, 38’ north of north fence	650635.495	948397.169	3139.14
16			REFERENCE MARK MRM 3.716, 1’ south of north fence	650639.997	949544.886	3131.30
17	13+22.57	215.66 L	REFERENCE MARK MRM 4.008, 189.5’ east of east fence	650403.850	951209.641	3120.59
18			REFERENCE MARK MRM 4.359, 1’ north of south fence	650042.238	952240.713	3118.68
20-005.67	12+65.41	8323.51 L	HARN 20-005.67(AC7856)	650775.710	959315.580	3136.74
2A	14+71.94	17527.34 R	REFERENCE MARK MRM 0.617, north fence line	651324.177	933488.402	3227.91

The coordinates shown on this sheet are based on the South Dakota State Plane Coordinate System.
North Zone (NAD 83/2011) SF = 0.99982789
The elevations shown on this sheet are based on NAVD 88.

HORIZONTAL ALIGNMENT DATA

MAINLINE

Alignment Name: mainline
Alignment Description:
Alignment Style: Default

Type	Station			Northing	Easting
POB	0+00.00			650597.540	949776.020
		TL= 193.55	S 87°19'21" E		
PI	1+93.55			650588.499	949969.360
		TL= 300.49	S 87°25'34" E		
PI	4+94.05			650575.003	950269.551
		TL= 279.57	S 87°39'27" E		
PI	7+73.61			650563.577	950548.883
		TL= 234.29	S 87°49'49" E		
PI	10+07.90			650554.707	950783.005
		TL= 123.37	S 87°57'11" E		
Element: Clothoid					
TS	11+31.27			650550.301	950906.300
SPI	11+71.78			650548.854	950946.776
SC	11+91.27	650538.697	950964.533		
	Entrance Radius:	0.00			
	Exit Radius:	62.00			
	Length:	60.00			
	Angle:	27°43'26" Right			
	Constant:	60.99			
	Long Tangent:	40.50			
	Short Tangent:	20.46			
	Long Chord:	59.38			
	Xs:	58.61			
	Ys:	9.52			
	P:	2.40			
	K:	29.77			
	Tangent Direction:	S 87°57'11" E			
	Radial Direction:	S 2°02'49" W			
	Chord Direction:	S 78°43'49" E			
	Radial Direction:	S 29°46'15" W			
	Tangent Direction:	S 60°13'45" E			
SC	11+91.27			650538.697	950964.533
PI	12+09.01	R = 62.00	Delta = 31°55'39" R	650529.890	950979.928
CS	12+25.82			650514.274	950988.337
Element: Clothoid					
CS	12+25.82			650514.274	950988.337
SPI	12+49.89			650493.086	950999.747
ST	12+95.82	650445.733	950996.400		
	Entrance Radius:	62.00			
	Exit Radius:	0.00			
	Length:	70.00			
	Angle:	32°20'40" Right			
	Constant:	65.88			
	Long Tangent:	47.47			
	Short Tangent:	24.07			
	Long Chord:	69.01			
	Xs:	67.80			
	Ys:	12.88			
	P:	3.26			
	K:	34.63			
	Tangent Direction:	S 28°18'06" E			
	Radial Direction:	S 61°41'54" W			
	Chord Direction:	S 6°42'34" E			
	Radial Direction:	N 85°57'26" W			
	Tangent Direction:	S 4°02'34" W			
ST	12+95.82			650445.733	950996.400
TS	14+63.11			650278.859	950984.606
		TL= 167.29	S 4°02'34" W		
Element: Clothoid					
TS	14+63.11			650278.859	950984.606
SPI	14+96.64			650245.413	950982.242
SC	15+13.11	650229.146	950986.618		
	Entrance Radius:	0.00			
	Exit Radius:	75.00			
	Length:	50.00			
	Angle:	19°05'55" Left			
	Constant:	61.24			
	Long Tangent:	33.53			
	Short Tangent:	16.85			
	Long Chord:	49.75			
	Xs:	49.45			
	Ys:	5.51			
	P:	1.38			
	K:	24.91			
	Tangent Direction:	S 4°02'34" W			
	Radial Direction:	N 85°57'26" W			
	Chord Direction:	S 2°19'03" E			
	Radial Direction:	S 74°56'39" W			
	Tangent Direction:	S 15°03'21" E			
SC	15+13.11			650229.146	950986.618
PI	15+50.69	R = 75.00	Delta = 53°13'39" L	650192.857	950996.380

The coordinates shown on this sheet are based on the South Dakota State Plane Coordinate System. North Zone (NAD 83/2011) SF = 0.99982789

HORIZONTAL ALIGNMENT DATA

CS	15+82.79			650178.952	951031.292
Element: Clothoid					
CS	15+82.79			650178.952	951031.292
SPI	15+99.63			650172.719	951046.942
ST	16+32.79	650171.187	951080.436		
	Entrance Radius:	75.00			
	Exit Radius:	0.00			
	Length:	50.00			
	Angle:	19°05'55" Left			
	Constant:	61.24			
	Long Tangent:	33.53			
	Short Tangent:	16.85			
	Long Chord:	49.75			
	Xs:	49.45			
	Ys:	5.51			
	P:	1.38			
	K:	24.91			
	Tangent Direction:	S 68°17'00" E			
	Radial Direction:	S 21°43'00" W			
	Chord Direction:	S 81°01'18" E			
	Radial Direction:	S 2°37'05" W			
	Tangent Direction:	S 87°22'55" E			
ST	16+32.79			650171.187	951080.436
		TL= 306.07	S 87°22'55" E		
POE	19+38.86			650157.206	951386.189

The coordinates shown on this sheet are based on the South Dakota State Plane Coordinate System. North Zone (NAD 83/2011) SF = 0.99982789

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-471	15	35

Plotting Date: 04/25/2013

1+10 - 27'L
Take out 12"- 42' CMP
(Incidental Work)

4+74 - 24'L
Take out 12"- 40'
Corrugated Poly Pipe
(Incidental Work)

6+54 - 22'L
Take out 12"- 22' CMP
(Incidental Work)

8+13
Take out 12"- 32' CMP
(Incidental Work)

8+41 - 20'R
Take out 18"- 46' CMP
(Incidental Work)

10+45 - 16'L
Take out 18"- 40'
Corrugated Poly Pipe
(Incidental Work)

11+90
Take out 18"- 40' CMP
(Incidental Work)

12+28
Take out 30"- 40' CMP
(Incidental Work)

12+32
Take out 36"- 40' CMP
(Incidental Work)

1+12 - 23'L
Install 18" - 46' CMP
& 2 Safety Ends

2+96 - 22'L
Install 18" - 34' CMP
& 2 Safety Ends

4+75 - 22'L
Install 18" - 44' CMP
& 2 Safety Ends

6+52 - 21' L
Install 18" - 30' CMP
& 2 Safety Ends

10+45 - 21'L to 19.4'L
Install 18" - 34' CMP Arch
& 2 Safety Ends

0+52 (Park St) Skew 25° LHF
Install 24" - 58' CMP
& 2 Safety Ends

12+28 Skew 27° LHF
Install 30" - 48' RCP Arch
& 2 Sloped Ends

1+12 - 23' R
Install 18" - 42' CMP
& 2 Safety Ends

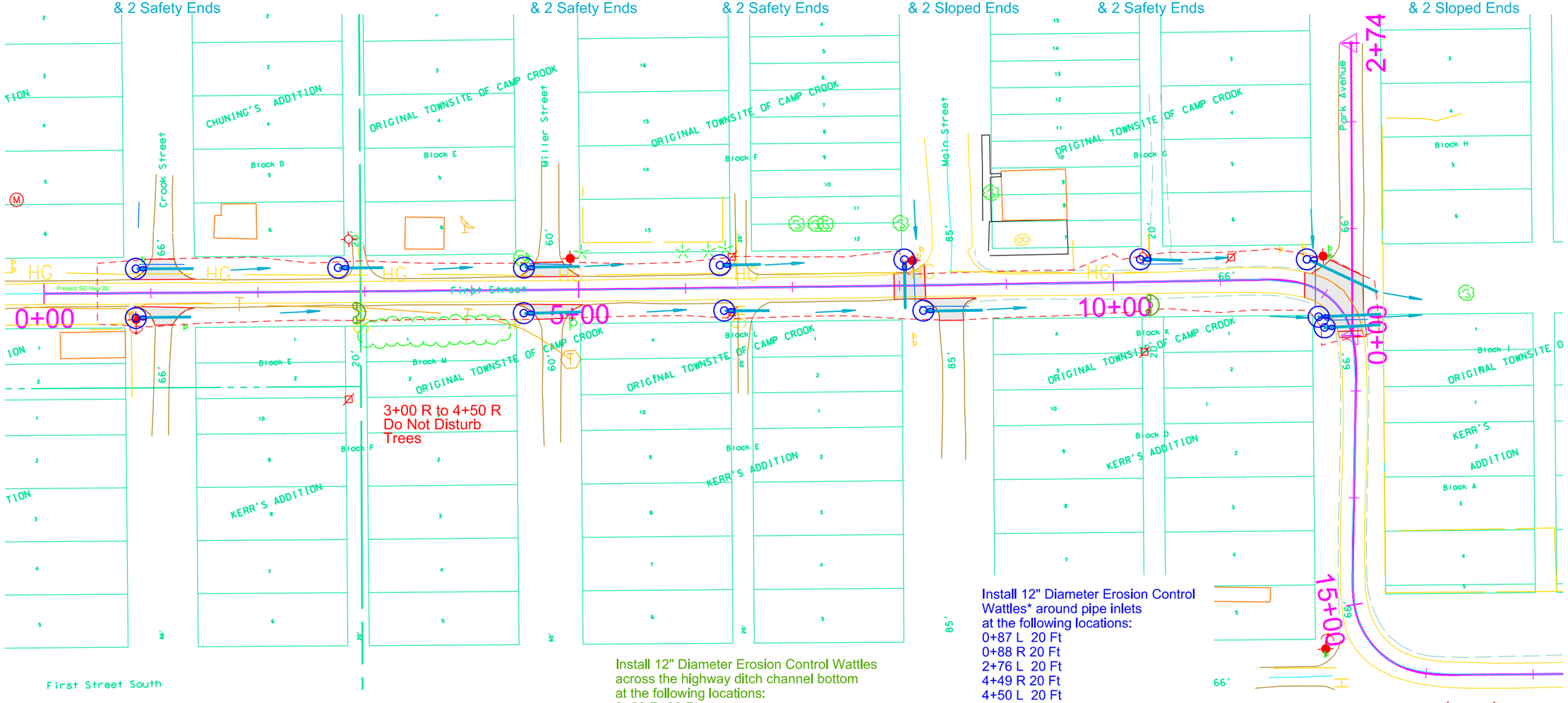
4+75 -22'R
Install 18" - 46' CMP
& 2 Safety Ends

6+57 - 21'R
Install 18" - 34' CMP
& 2 Safety Ends

8+05
Install 24" - 30' RCP
& 2 Sloped Ends

8+50 -24'R
Install 24" - 42' CMP
& 2 Safety Ends

12+39 Skew 17°30' LHF
Install 30" - 42' RCP Arch
& 2 Sloped Ends



3+00 R to 4+50 R
Do Not Disturb
Trees

Install 12" Diameter Erosion Control Wattles across the highway ditch channel bottom at the following locations:
3+00 R 30 Ft
10+35 R 30 Ft

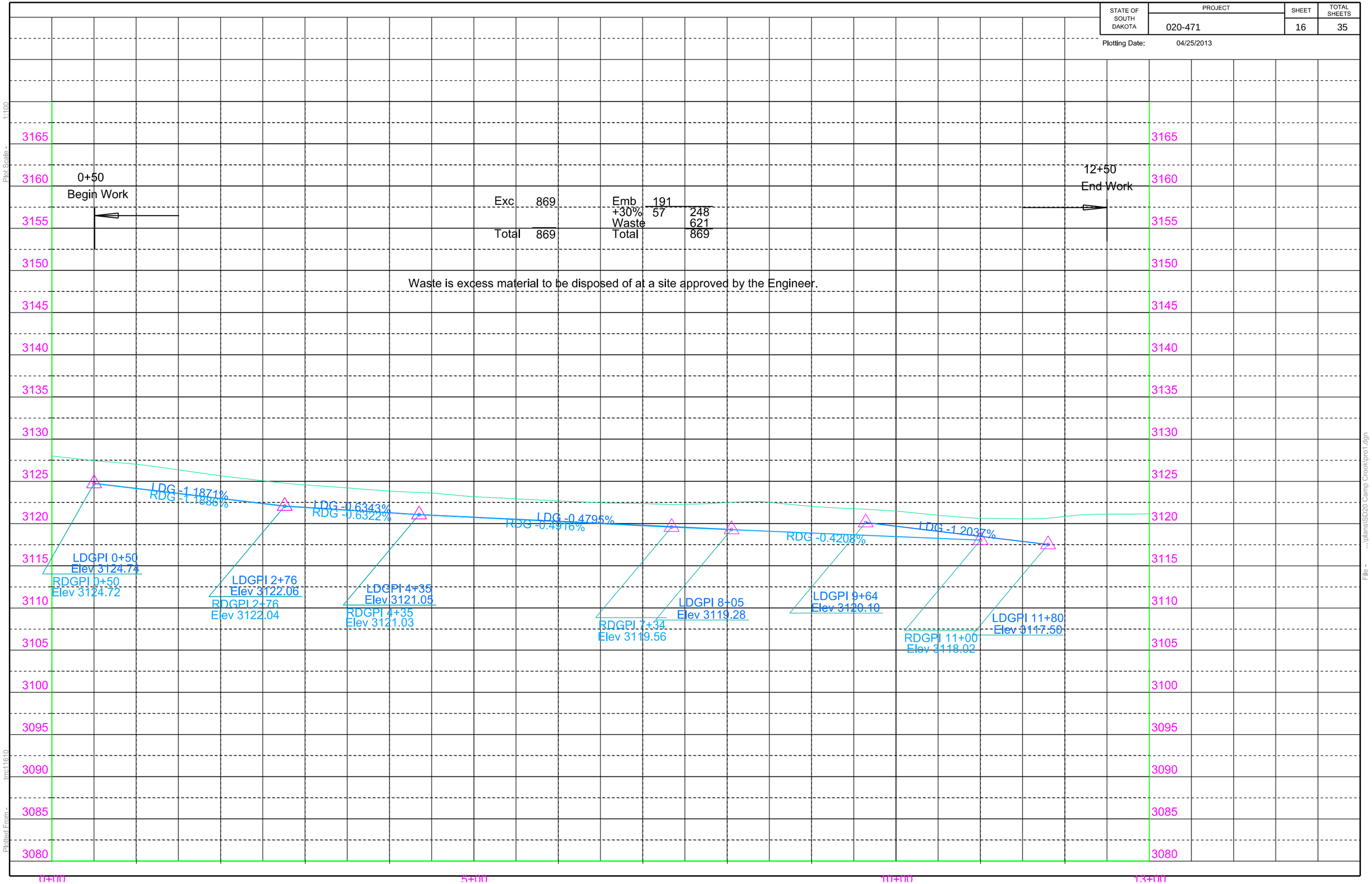
Install 12" Diameter Erosion Control Wattles* around pipe inlets at the following locations:
0+87 L 20 Ft
0+88 R 20 Ft
2+76 L 20 Ft
4+49 R 20 Ft
4+50 L 20 Ft
6+34 L 20 Ft
6+36 R 20Ft
8+00 L 20Ft
8+23 R 20 Ft
10+26 L 20 Ft
11+76 L 20 Ft
12+13 R 30 Ft
12+22 R 30 Ft
*Remove and Reset Wattles as needed.

Legend:
- Asphalt Removal
- Erosion Control Wattle Inlet
- Erosion Control Wattle Ditch

Plot Scale - 1:100
Plotted From - trrc11610
File - ...\SD20 Camp Crook\plan1.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-471	16	35

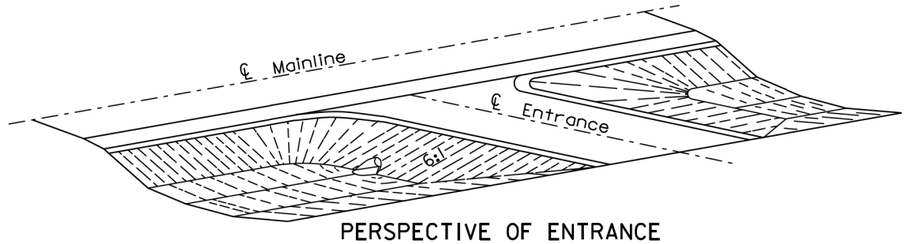
Plotting Date: 04/25/2013



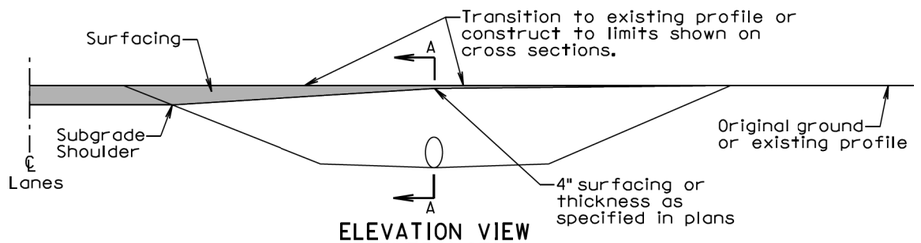
Plot Scale - 1:100

Plotted From - trc11610

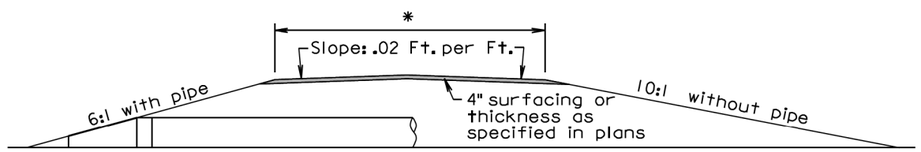
File - ...\plans\SD20 Camp Crook\prof1.dgn



PERSPECTIVE OF ENTRANCE



ELEVATION VIEW (ENTRANCE)



SECTION A-A (ENTRANCE)

*The finished surfacing width is stated elsewhere in the plans. The subgrade width is 4' wider than the finished surfacing width unless stated otherwise in the plans.

GENERAL NOTES:

The ditch section shown above in the perspective and elevation view is only for illustrative purposes.

A 6:1 inslope shall be constructed for an entrance when a pipe is required. A 10:1 inslope shall be constructed when a pipe is not required.

Pipe lengths shall be adjusted if necessary during construction to obtain the 6:1 slopes. For grading projects, the pipe lengths are estimated typically using a 4" thickness of surfacing directly over the subgrade above the pipe.

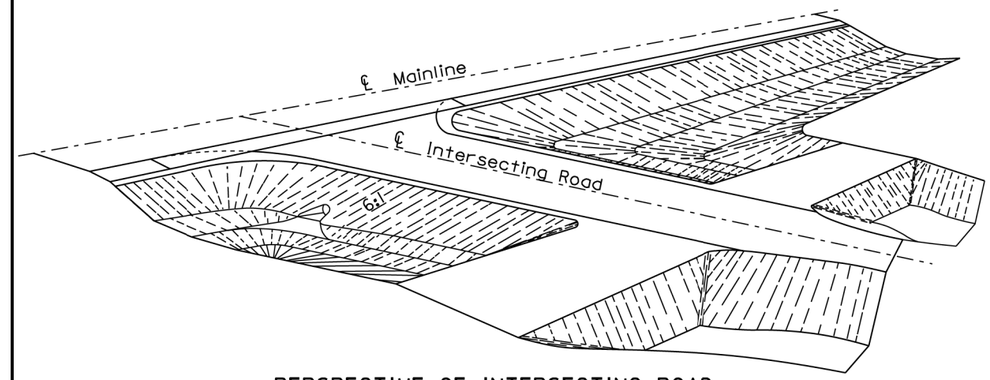
The transition area between the mainline inslope and the approach inslope for entrances shall be rounded to eliminate an abrupt transition.

For entrances other than intersecting roads, the radii shall be 15' unless stated otherwise in the plans.

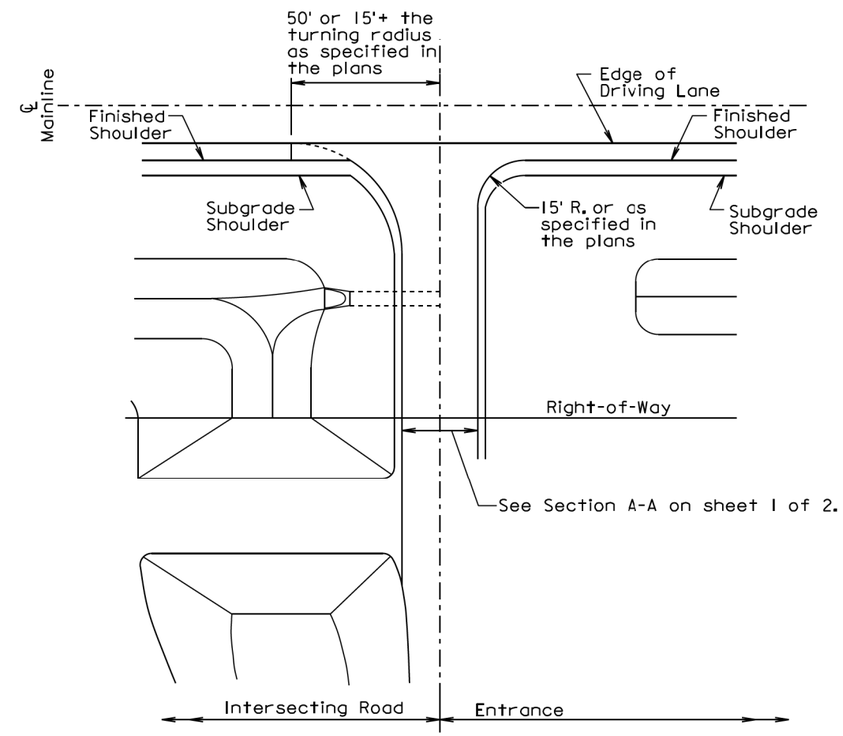
The turning radii shall be 35' for intersecting roads unless stated otherwise in the plans.

December 23, 2010

Published Date: 2nd Qtr. 2013	SDDOT	INTERSECTING ROADS AND ENTRANCES	PLATE NUMBER 120.01
			Sheet 1 of 2



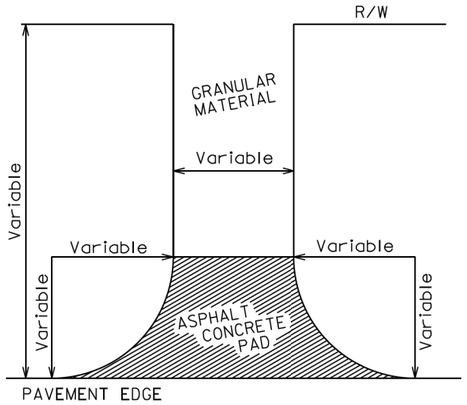
PERSPECTIVE OF INTERSECTING ROAD



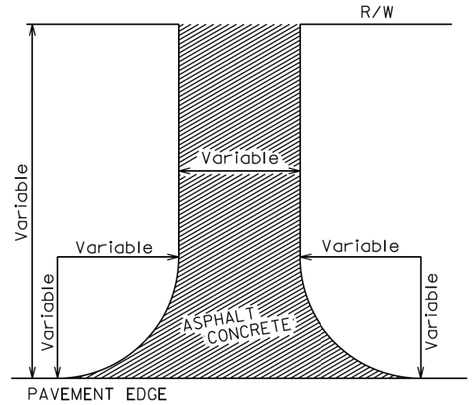
PLAN VIEW

December 23, 2010

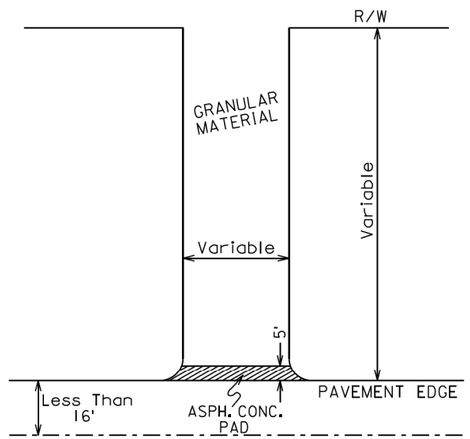
Published Date: 2nd Qtr. 2013	SDDOT	INTERSECTING ROADS AND ENTRANCES	PLATE NUMBER 120.01
			Sheet 2 of 2



INTERSECTING ROAD
NO ASPHALT CONCRETE SURFACING
BEYOND R/W



INTERSECTING ROAD
ASPHALT CONCRETE SURFACING
BEYOND R/W



ENTRANCE

The surfacing details shown on this sheet are provided as a guide for surfacing these facilities. The precise construction limits for situations other than the standards shown will be determined by the Engineer, at the time of construction.

ROADWAY WITH OR WITHOUT SHOULDER

March 31, 2000

Published Date: 2nd Qtr. 2013

SDDOT

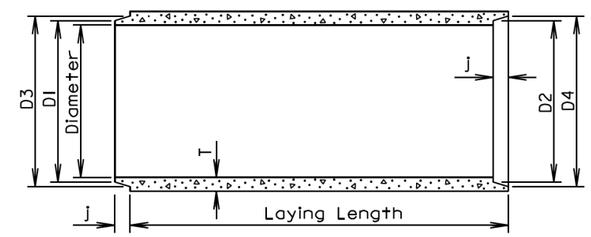
RESURFACING OF INTERSECTING ROADS AND ENTRANCES

PLATE NUMBER 320.10

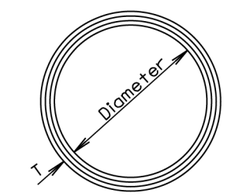
Sheet 1 of 1

TOLERANCES IN DIMENSIONS

Diameter: ±1.5% for 24" Dia. or less and ±1% or 3/8" whichever is more for 27" Dia. or greater.
Diameters at Joints: ±3/16" for 30" Dia. or less and ±1/4" for 36" or greater.
Length of joint (j): ±1/4".
Wall thickness (T): not less than design T by more than 5% or 3/16", whichever is greater.
Laying length: shall not underrun by more than 1/2".



LONGITUDINAL SECTION



END VIEW

GENERAL NOTES:

Construction of R.C.P. shall conform to the requirements of Section 990 of the Standard Specifications for Roads and Bridges.

Not more than 2 four foot sections shall be permitted near the ends of any culvert. Four foot lengths shall be used only to secure the required length of culvert.

Diam. (in.)	Approx. Wt. /Ft. (lb.)	T (in.)	J (in.)	D1 (in.)	D2 (in.)	D3 (in.)	D4 (in.)
12	92	2	1 3/4	13 1/4	13 5/8	13 7/8	14 1/4
15	127	2 1/4	2	16 1/2	16 7/8	17 1/4	17 5/8
18	168	2 1/2	2 1/4	19 5/8	20	20 3/8	20 3/4
21	214	2 3/4	2 1/2	22 7/8	23 1/4	23 3/4	24 1/8
24	265	3	2 3/4	26	26 3/8	27	27 3/8
27	322	3 1/4	3	29 1/4	29 5/8	30 1/4	30 5/8
30	384	3 1/2	3 1/4	32 3/8	32 3/4	33 1/2	33 7/8
36	524	4	3 3/4	38 3/4	39 1/4	40	40 1/2
42	685	4 1/2	4	45 1/8	45 5/8	46 1/2	47
48	867	5	4 1/2	51 1/2	52	53	53 1/2
54	1070	5 1/2	4 1/2	57 7/8	58 3/8	59 3/8	59 7/8
60	1296	6	5	64 1/4	64 3/4	66	66 1/2
66	1542	6 1/2	5 1/2	70 5/8	71 1/8	72 1/2	73
72	1810	7	6	77	77 1/2	79	79 1/2
78	2098	7 1/2	6 1/2	83 3/8	83 7/8	85 5/8	86 1/8
84	2410	8	7	89 3/4	90 1/4	92 1/8	92 5/8
90	2740	8 1/2	7	95 3/4	96 1/4	98 1/8	98 5/8
96	2950	9	7	102 1/8	102 5/8	104 1/2	105
102	3075	9 1/2	7 1/2	109	109 1/2	111 1/2	112
108	3870	10	7 1/2	115 1/2	116	118	118 1/2

March 31, 2000

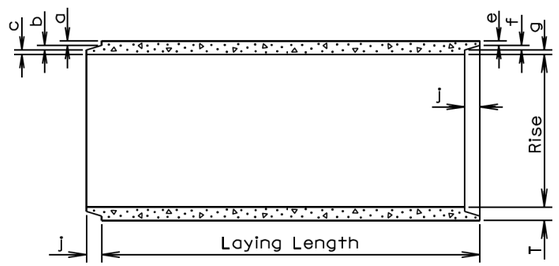
Published Date: 2nd Qtr. 2013

SDDOT

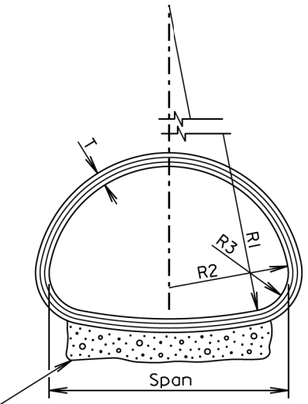
REINFORCED CONCRETE PIPE

PLATE NUMBER 450.01

Sheet 1 of 1



LONGITUDINAL SECTION



END VIEW

TOLERANCES IN DIMENSIONS

Radial dimensions at joints: ±1/8 " for 65" span or less and ±1/4 " for longer spans.
Rise and Span: ±2% of tabular values.
Length of Joint (J): ±1/4 ".
Wall thickness (T): not less than design T by more than 5% or 3/16 ", whichever is greater.
Laying length: shall not underrun by more than 1/2".

Gravel Bedding Material shall be supplied for 102" to 169" spans. It shall be placed to a thickness of 6" (min.) x 85% of the Span x Length of culvert and shall conform to the gradation requirements for gravel surfacing except material may be screened or may be plan provided material.

* Size (in.)	Approx. Wt./Ft. (lb.)	Rise (in.)	Span (in.)	T (in.)	a (in.)	b (in.)	c (in.)	j (in.)	e (in.)	f (in.)	g (in.)	R1 (in.)	R2 (in.)	R3 (in.)
18	170	13 1/2	22	2 1/2	1 3/8	3/8	3/4	2	1 1/8	3/8	1	27 1/2	13 3/4	5 1/4
24	320	18	28 1/2	3 1/2	1 5/8	1/2	1 3/8	3	1 3/8	1/2	1 5/8	40 11/16	14 3/4	4 5/8
30	450	22 1/2	36 1/4	4	1 13/16	5/8	1 9/16	3 1/2	1 9/16	5/8	1 13/16	51	18 3/4	6 1/8
36	600	26 5/8	43 3/4	4 1/2	2	3/4	1 3/4	4	1 3/4	3/4	2	62	22 1/2	6 1/2
42	740	31 5/16	51 1/8	4 1/2	2	3/4	1 3/4	4	1 3/4	3/4	2	73	26 1/4	7 3/4
48	890	36	58 1/2	5	2 1/4	3/4	2	5	2	3/4	2 1/4	84	30	8 7/8
54	1100	40	65	5 1/2	2 1/2	3/4	2 1/4	5	2 1/4	3/4	2 1/2	92 1/2	33 3/8	10
60	1400	45	73 1/2	6	3 5/16	3/4	1 15/16	5	2 3/4	3/4	2 1/2	105	37 1/2	11
72	1900	54	88	7	3 13/16	1	2 3/16	6	3 1/4	1	2 3/4	126	45	13 5/16
84	2500	62	102	8	4 1/8	1	2 7/8	6	3 1/2	1	3 1/2	162 1/2	52	14 1/2
96	3300	78	122 3/8	9	4 1/2	1	3 1/2	7	4	1	4	218	62	20
108	4200	88	138 1/2	10	5	1	4	7	4 1/2	1	4 1/2	269	70	22
120	5100	96 7/8	154	11	5 1/2	1	4 1/2	7	5	1	5	301 3/8	78	24
132	5100	106 1/2	168 3/4	10		1	4	7	4 1/2	1	4 1/2	329	85 5/8	26 7/8

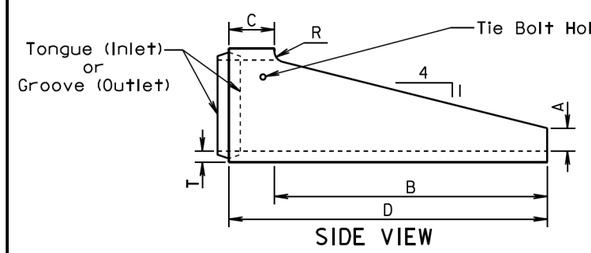
* Equivalent Diameter of Circular R. C. P.

GENERAL NOTES:

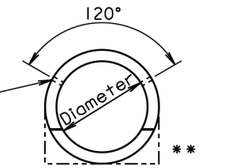
Construction of R.C.P. Arch shall conform to the requirements of Section 990 of the Standard Specifications for Roads and Bridges. Not more than 2 four foot sections shall be permitted near the ends of any culvert. Four foot lengths shall be used only to secure the required length of culvert.

March 31, 2000

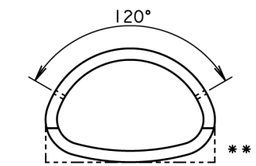
Published Date: 2nd Qtr. 2013	SDDOT	REINFORCED CONCRETE PIPE ARCH	PLATE NUMBER 450.02
			Sheet 1 of 1



SIDE VIEW



END VIEW
"CIRCULAR"



END VIEW
"ARCH"

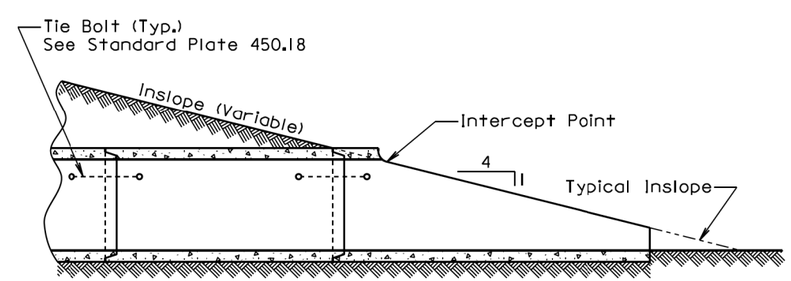
Dia. (in.)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	R (in.)
FOR CIRCULAR PIPE						
24	3	6	72	12	84	3
30	3 1/2	7 1/2	90	12	102	3 1/2
FOR ARCH PIPE						
* 24	3	6	48	12	60	3
* 30	3 1/2	7 1/2	60	12	72	3 1/2
* 36	4 1/2	8 5/8	66	30	96	0
* 42	4 1/2	10	77 1/4	18 3/4	96	0

ALTERNATE

Dia. (in.)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	R (in.)
FOR CIRCULAR PIPE						
24	3	9	72	12	84	0
30	3 1/2	11	90	12	102	0
FOR ARCH PIPE						
* 24	3	9	48	12	60	0
* 30	3 1/2	11	60	12	72	0

* Equivalent Diameter of Circular R.C.P.

** Acceptable Flat Bottom Alternate.



SECTION
(Along Centerline of Pipe)

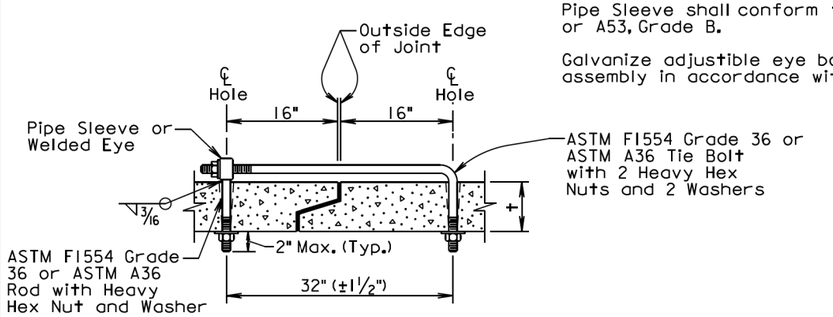
GENERAL NOTE:

The length of concrete pipe shown in the construction plans is between sloped ends.

September 22, 2006

Published Date: 2nd Qtr. 2013	SDDOT	R. C. P. SLOPED ENDS	PLATE NUMBER 450.13
			Sheet 1 of 1

Wall "t" (in.)	Rod Dia. (in.)	Pipe Sleeve Dia. (nominal)
≤ 3¼	⅝	¾
3½-6½	¾	1
≥ 7	1	1¼



ADJUSTABLE EYE BOLT TIE

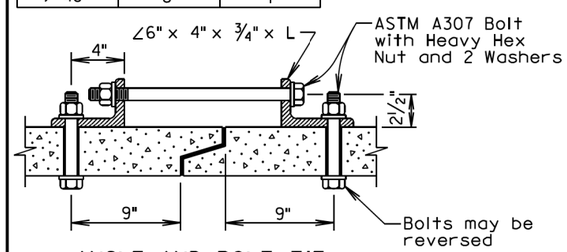
GENERAL NOTES:

Tie bolts shall conform to ASTM F1554 Grade 36 or ASTM A36. Nuts shall be heavy hex conforming to ASTM A563. Washers shall conform to ASTM F436.

Pipe Sleeve shall conform to ASTM A500 or A53, Grade B.

Galvanize adjustible eye bolt tie assembly in accordance with ASTM A153.

Pipe Dia. (in.)	"L" (in.)	Bolt Dia. (in.)
≤ 48	4	¾
> 48	6	1



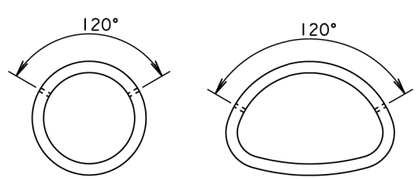
ANGLE AND BOLT TIE

GENERAL NOTES:

Angles shall conform to ASTM A36.

Bolts shall conform to ASTM A307. Nuts shall be heavy hex conforming to ASTM A563. Washers shall conform to ASTM F436.

Galvanize angles, bolts, nuts, and washers in accordance with ASTM A153.



END VIEW "CIRCULAR"

END VIEW "ARCH"

GENERAL NOTES:

In lieu of the tie bolts detailed above other types of tie bolt connections may be installed as approved by the Office of Bridge Design.

All pipe sections of R.C.P. and R.C.P. Arch shall be tied with tie bolts except for pipe located between drop inlets, manholes, and junction boxes. All pipe sections of pipes that only enter or exit drop inlets, manhole, and junction boxes shall be tied with tie bolts.

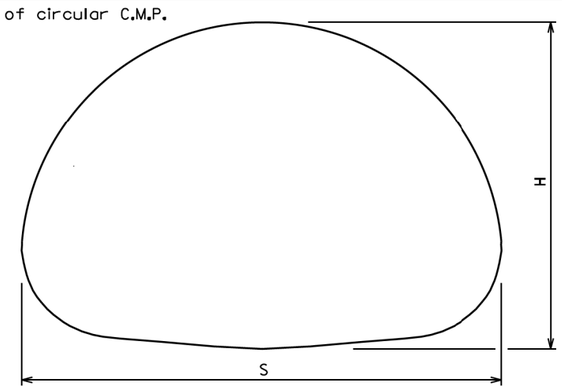
There will be no separate measurement or payment for the tie bolts. The cost for furnishing and installing the tie bolts shall be incidental to the contract unit price per foot for the corresponding bid item for R.C.P. or R.C.P. Arch.

February 28, 2013

Published Date: 2nd Qtr. 2013	SDDOT	TIE BOLTS FOR R.C.P. AND R.C.P. ARCH	PLATE NUMBER 450.18
			Sheet 1 of 1

	2⅔" x ½" CORRUGATIONS			3" X 1" CORRUGATIONS		
* Dia. (in.)	S Span (in.)	H Rise (in.)	Area (Sq. Ft.)	S Span (in.)	H Rise (in.)	Area (Sq. Ft.)
15	17	13	1.1			
18	21	15	1.6			
21	24	18	2.2			
24	28	20	2.8			
30	35	24	4.4			
36	42	29	6.4	40	31	7.0
42	49	33	8.7	46	36	9.4
48	57	38	11.4	53	41	12.3
54	64	43	14.3	60	46	15.6
60	71	47	17.6	66	51	19.3
66	77	52	21.3	73	55	23.2
72	83	57	25.3	81	59	27.4
78				87	63	32.1
84				95	67	37.0
90				103	71	42.4
96				112	75	48.0
102				117	79	54.2
108				128	83	60.8
114				137	87	67.4
120				142	91	74.5

* Equivalent diameter of circular C.M.P.

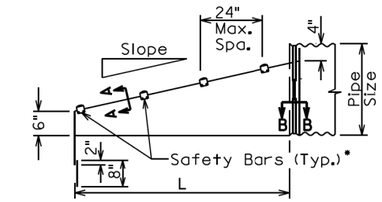


GENERAL NOTE:

All dimensions measured from inside crest.

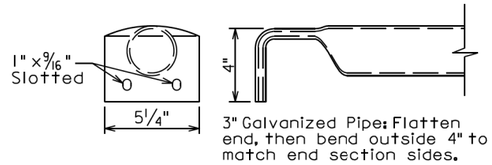
March 31, 2000

Published Date: 2nd Qtr. 2013	SDDOT	CORRUGATED METAL PIPE ARCH CULVERT	PLATE NUMBER 450.30
			Sheet 1 of 1

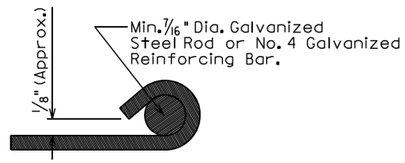


SIDE ELEVATION

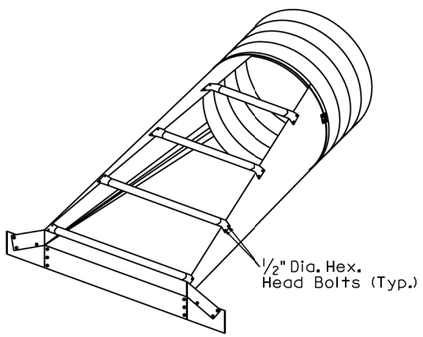
*Number of bars required will vary depending on the length of the End Section.



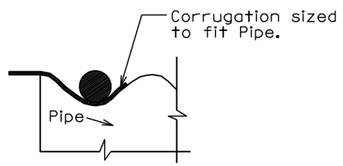
DETAIL OF SAFETY BARS



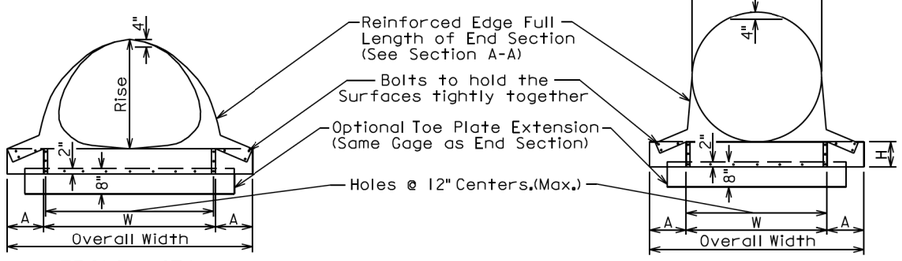
SECTION A-A



ISOMETRIC VIEW

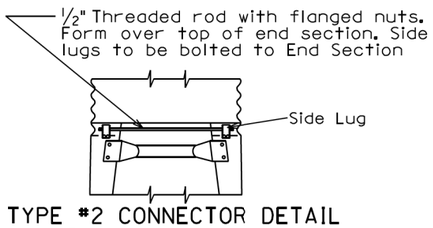


SECTION B-B

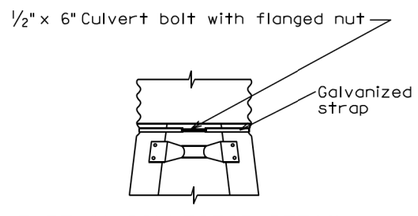


FRONT VIEW

FRONT VIEW



TYPE #2 CONNECTOR DETAIL
For 30" and Larger
21" x 15" and Larger



TYPE #1 CONNECTOR DETAIL
15" Through 24"

March 31, 2000

Published Date: 2nd Qtr. 2013	SDDOT	C. M. P. SAFETY ENDS	PLATE NUMBER 450.38
			Sheet 1 of 2

ARCH C.M.P. SAFETY ENDS

Equv. Dia. (In.)	(Inches)		Min. Thick.		Dimensions (Inches)				L Dimensions	
	Span	Rise	In.	Gage	A	H	W	Overall Width	Slope	Length (In.)
18	21	15	.064	16	8	6	27	43	6:1	30
21	24	18	.064	16	8	6	30	46	6:1	48
24	28	20	.064	16	8	6	34	50	6:1	60
30	35	24	.079	14	12	9	41	65	6:1	84
36	42	29	.109	12	12	9	48	72	6:1	114
42	49	33	.109	12	16	12	55	87	6:1	138
48	57	38	.109	12	16	12	63	95	6:1	168
54	64	43	.109	12	16	12	70	102	6:1	198
60	71	47	.109	12	16	12	77	109	6:1	222
72	83	57	.109	12	16	12	89	121	6:1	282

CIRCULAR C.M.P. SAFETY ENDS

Pipe Dia. (In.)	Min. Thick.		Dimensions (Inches)				L Dimensions	
	In.	Gage	A	H	W	Overall Width	Slope	Length (In.)
15	.064	16	8	6	21	37	6:1	30
18	.064	16	8	6	24	40	6:1	48
21	.064	16	8	6	27	43	6:1	66
24	.064	16	8	6	30	46	6:1	84
30	.109	12	12	9	36	60	6:1	120
36	.109	12	12	9	42	66	6:1	156
42	.109	12	16	12	48	80	6:1	192
48	.109	12	16	12	54	86	6:1	228
54	.109	12	16	12	60	92	6:1	264
60	.109	12	16	12	66	98	6:1	300

GENERAL NOTES:

Safety bars shall be attached to safety ends over 24" in diameter only.

Safety ends shall be fabricated from galvanized steel conforming to the requirements of the Standard Specifications.

Safety bars shall be fabricated from steel pipe conforming to the requirements of ASTM A-53 Schedule 40 Specifications.

Slotted holes for safety bar attachment shall be provided for all end sections.

Attachment to circular pipes 15" through 24" diameter shall be made with Type #1 straps. All other sizes shall be attached with Type #2 rods and lugs.

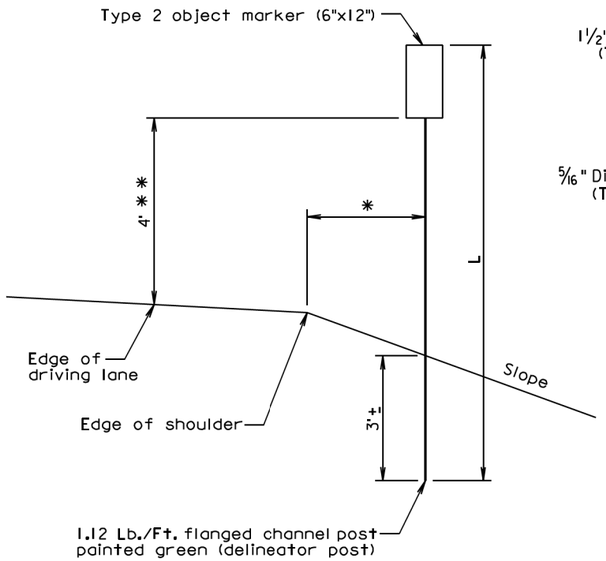
When stated in the plans, optional toe plate extension shall be punched and bolted to end section apron lip with 3/8" diameter galvanized bolts. Steel for toe plate extension shall be same gauge as end section. Dimensions shall be overall width less 6" by 8" high.

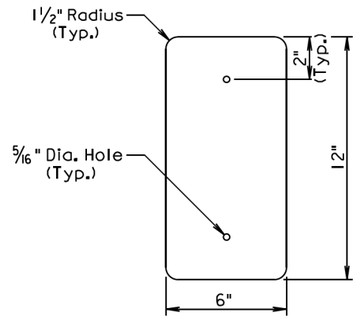
Installation shall be performed in accordance with the Standard Specifications.

All work and materials required for fabrication and installation of safety ends shall be incidental to the bid items for the various sizes of safety ends.

March 31, 2000

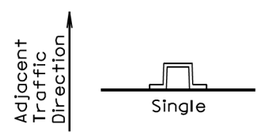
Published Date: 2nd Qtr. 2013	SDDOT	C. M. P. SAFETY ENDS	PLATE NUMBER 450.38
			Sheet 2 Of 2



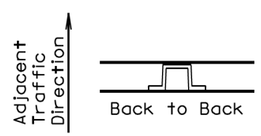


TYPE 2 OBJECT MARKER DETAIL

7/8" to 1 1/8" grip range
1/4" twin rivet (single and back to back)



DIVIDED HIGHWAYS EXCEPT MEDIANS



UNDIVIDED HIGHWAYS AND DIVIDED HIGHWAYS MEDIANS

TYPE 2 OBJECT MARKER DETAILS AND POST ORIENTATION

* Type 2 object markers to be in same line as existing delineators. If no delineators are present, place type 2 object markers 6' from the edge of shoulder.

** Type 2 object markers shall be 4' above the ground when placed more than 8' from edge of shoulder.

Distance To Marker (Ft.) *		2	3	4	5	6	7	8
		Post Length L (Ft.)						
Slope	4:1	9	9	9	9	10	10	10
	3:1	9	9	9	10	10	10	11

June 26, 2006

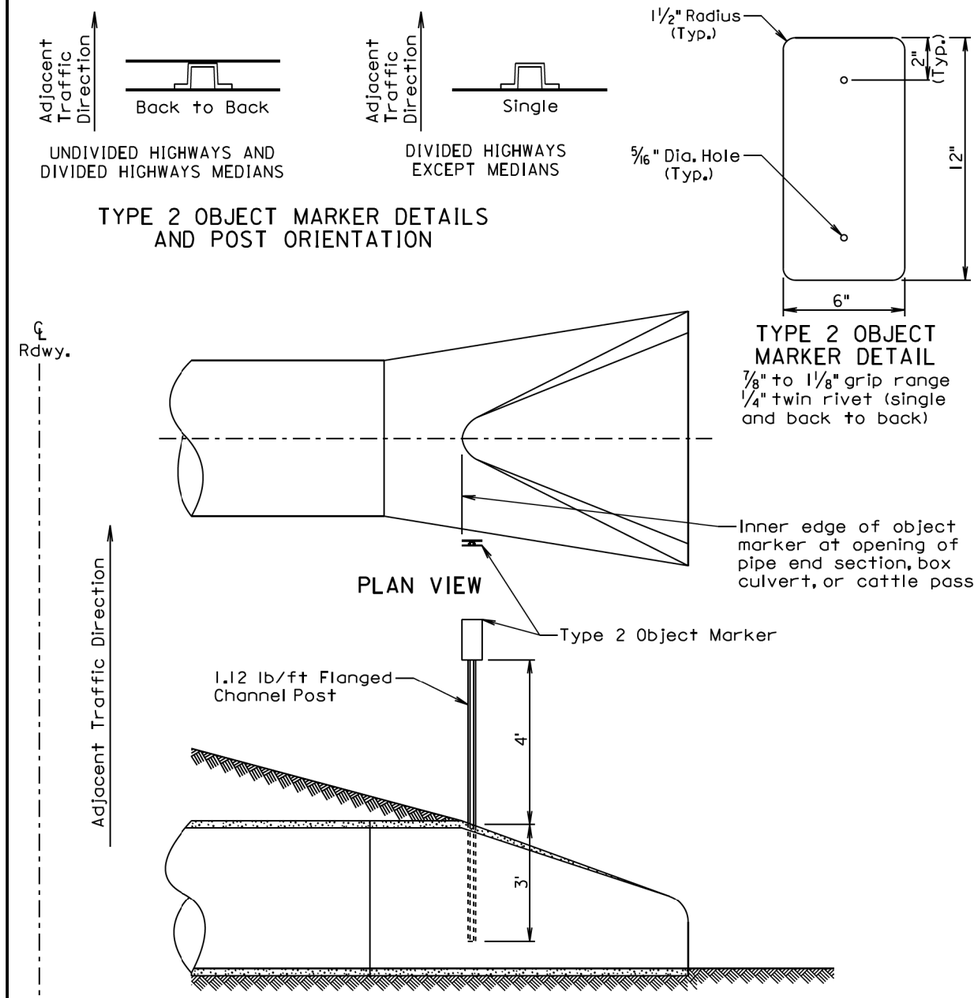
Published Date: 2nd Qtr. 2013

SDDOT

TYPE 2 OBJECT MARKER (DIRECT DRIVE)

PLATE NUMBER 632.01

Sheet 1 of 1



GENERAL NOTES:

The type 2 object markers shall conform to Standard Specifications Section 982.2 1.

The 1.12 lb/ft flanged channel post shall conform to Standard Specifications Section 982.2 1.6.

Payment for the type 2 object markers shall be in conformance with Standard Specification Section 632.5 C.

June 26, 2006

Published Date: 2nd Qtr. 2013

SDDOT

TYPE 2 OBJECT MARKER INSTALLATION AT PIPE CULVERTS, BOX CULVERTS, AND CATTLE PASSES

PLATE NUMBER 632.10

Sheet 1 of 1

The signs illustrated are not required if the work space is behind a barrier, more than 2 feet behind the curb, or 15 feet or more from the edge of any roadway.

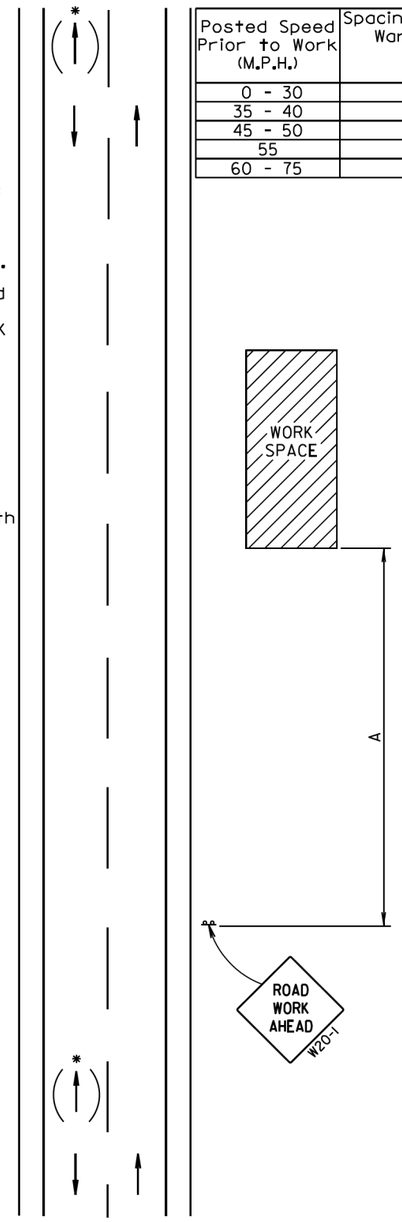
The signs illustrated shall be used where there are distracting situations; such as: vehicles parked on shoulder, vehicles accessing the work site via the highway, and equipment traveling on or crossing the roadway to perform work operations.

The ROAD WORK AHEAD sign may be replaced with other appropriate signs, such as the SHOULDER WORK sign. The SHOULDER WORK sign may be used for work adjacent to the shoulder.

* If the work space is on a divided highway, an advance warning sign should also be placed on the left side of the directional roadway.

For short term, short duration, or mobile operations, all signs and channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 75	1000



July 1, 2005

Published Date: 2nd Qtr. 2013

SDDOT

GUIDES FOR TRAFFIC CONTROL DEVICES
WORK BEYOND THE SHOULDER

PLATE NUMBER 634.01

Sheet 1 of 1

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	25
35 - 40	350	25
45 - 50	500	50
55	750	50
60 - 65	1000	50

Flagger

Channelizing Device

For low-volume traffic situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger may be used.

The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (1 hour or less).

For tack and/or flush seal operations, when flaggers are not being used, the FRESH OIL sign (W21-2) shall be displayed in advance of the liquid asphalt areas.

Flashing warning lights and/or flags may be used to call attention to the advance warning signs.

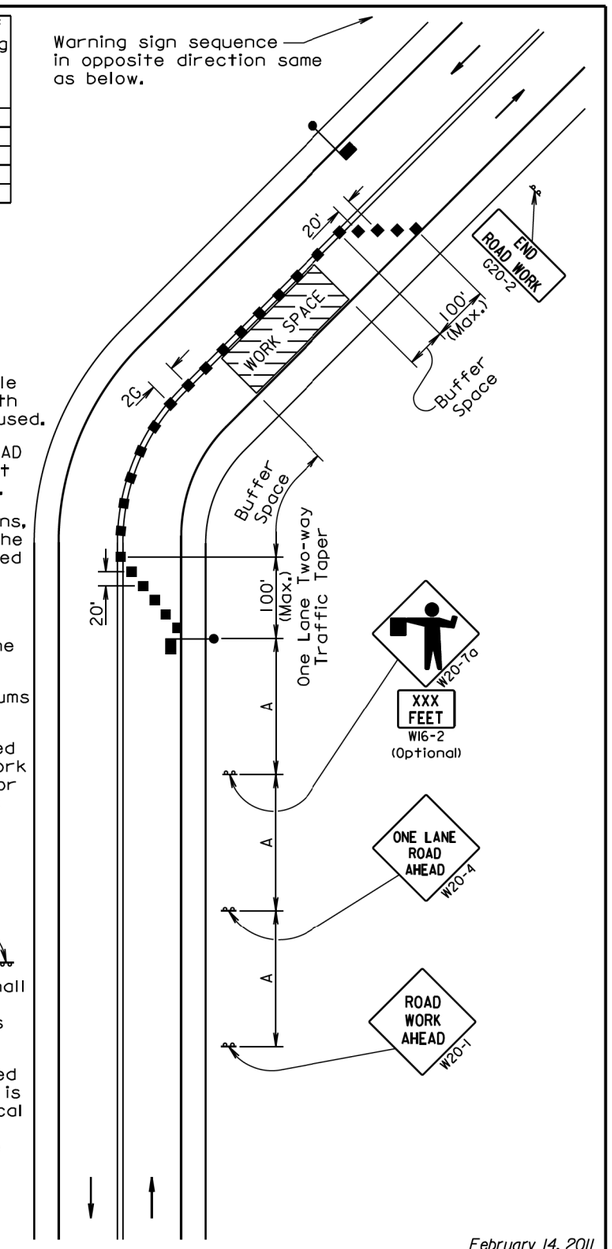
The channelizing devices shall be drums or 42" cones.

Channelizing devices are not required along the centerline adjacent to work area when pilot cars are utilized for escorting traffic through the work area.

END ROAD WORK G20-2

Channelizing devices and flaggers shall be used at intersecting roads to control intersecting road traffic as required.

The buffer space should be extended so that the two-way traffic taper is placed before a horizontal or vertical curve to provide adequate sight distance for the flagger and queue of stopped vehicles.



February 14, 2011

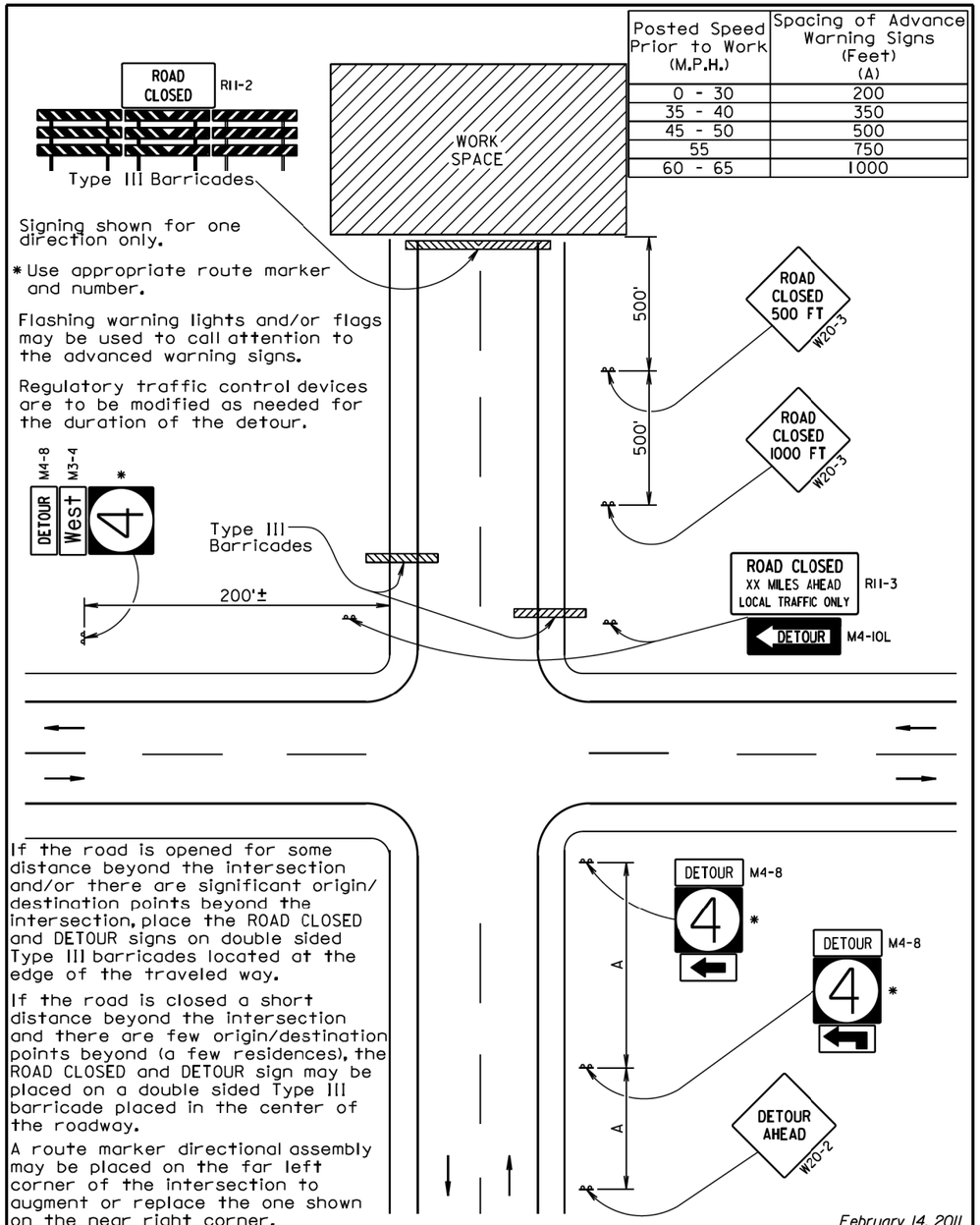
Published Date: 2nd Qtr. 2013

SDDOT

GUIDES FOR TRAFFIC CONTROL DEVICES
LANE CLOSURE WITH FLAGGER PROVIDED

PLATE NUMBER 634.23

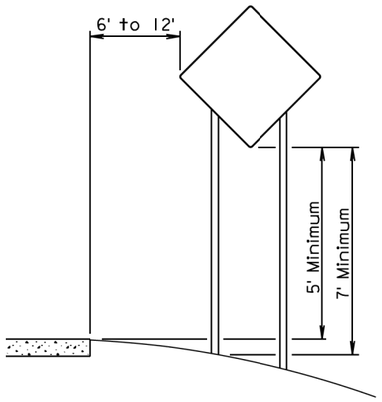
Sheet 1 of 1



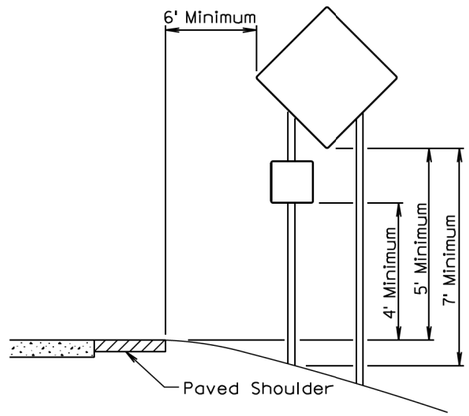
Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 65	1000

February 14, 2011

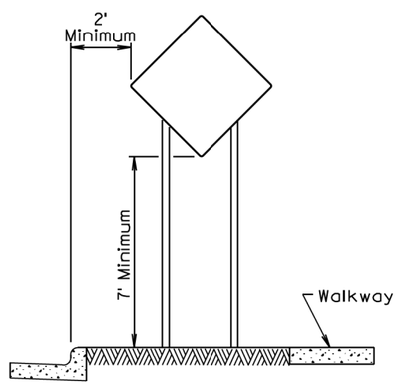
Published Date: 2nd Qtr. 2013	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES ROAD CLOSED WITH OFF-SITE DETOUR	PLATE NUMBER 634.29
			Sheet 1 of 1



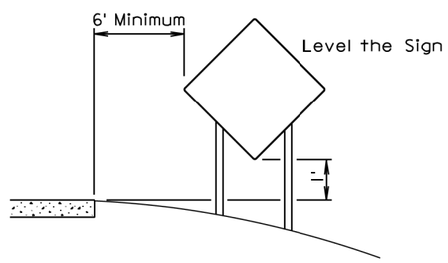
RURAL DISTRICT



RURAL DISTRICT WITH SUPPLEMENTAL PLATE



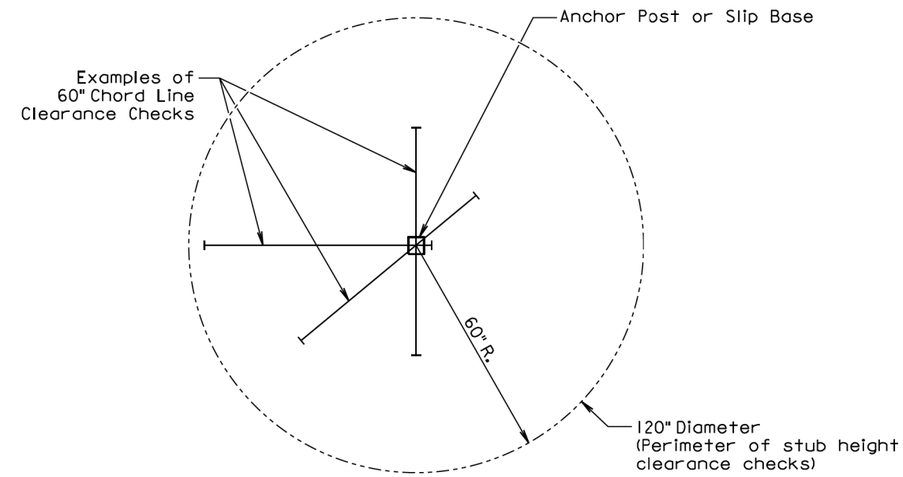
URBAN DISTRICT



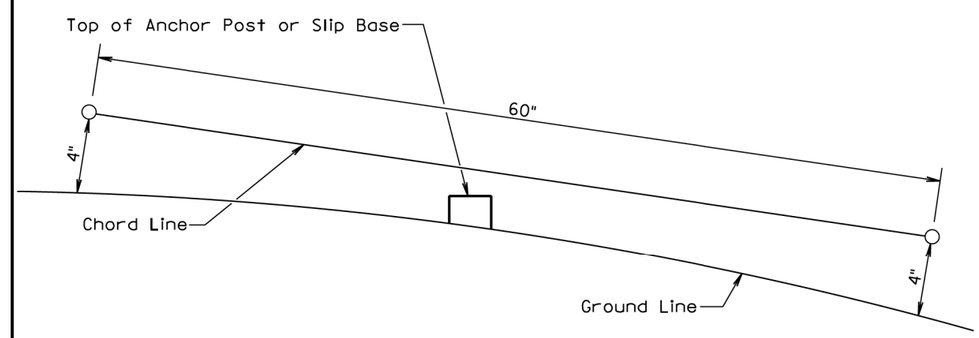
RURAL DISTRICT
3 DAY MAXIMUM

February 14, 2011

Published Date: 2nd Qtr. 2013	SDDOT	CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85 Sheet 1 of 1



PLAN VIEW
(Examples of stub height clearance checks)



ELEVATION VIEW

GENERAL NOTES:

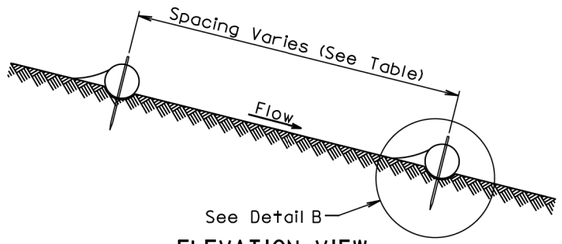
The top of anchor posts and slip bases SHALL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.

At locations where there is curb and gutter adjacent to the breakaway sign support, the stub height shall be a maximum of 4" above the ground line at the localized area adjacent to the breakaway support stub.

The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

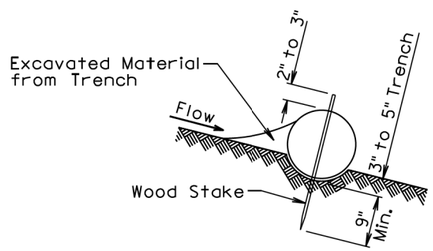
July 1, 2005

Published Date: 2nd Qtr. 2013	SDDOT	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99 Sheet 1 of 1

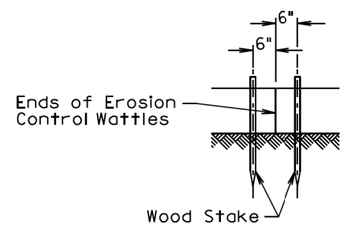


ELEVATION VIEW
CUT OR FILL SLOPE INSTALLATION

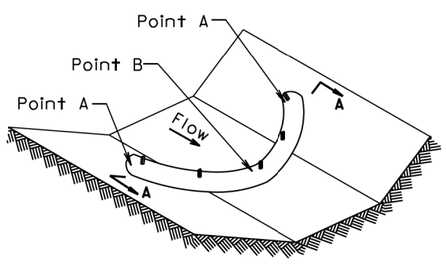
CUT OR FILL SLOPE INSTALLATION	
Slope	Spacing (Ft)
1:1	10
2:1	20
3:1	30
4:1	40



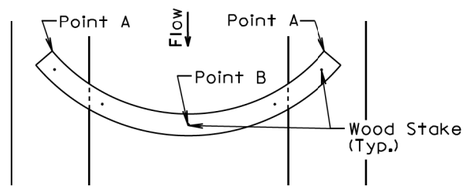
DETAIL B
(TYPICAL OF ALL INSTALLATIONS)



DETAIL C

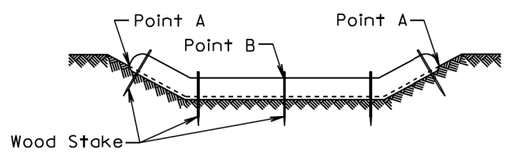


ISOMETRIC VIEW
DITCH INSTALLATION



PLAN VIEW
DITCH INSTALLATION

DITCH INSTALLATION	
Grade	Spacing (Ft)
2%	150
3%	100
4%	75
5%	50



SECTION A-A

December 23, 2004

Published Date: 2nd Qtr. 2013

SDDOT

EROSION CONTROL WATTLE

PLATE NUMBER 734.06

Sheet 1 of 2

GENERAL NOTES:

At cut or fill slope installations, wattles shall be installed along the contour and perpendicular to the water flow.

At ditch installations, point A must be higher than point B to ensure that water flows over the wattle and not around the ends.

The Contractor shall dig a 3" to 5" trench, install the wattle tightly in the trench so that daylight can not be seen under the wattle, and then compact the soil excavated from the trench against the wattle on the uphill side. See Detail B.

The stakes shall be 1"x2" or 2"x2" wood stakes, however, other types of stakes such as rebar may be used only if approved by the Engineer. The stakes shall be placed 6" from the ends of the wattles and the spacing of the stakes along the wattles shall be 3' to 4'.

Where installing running lengths of wattles, the Contractor shall butt the second wattle tightly against the first and shall not overlap the ends. See Detail C.

The Contractor and Engineer shall inspect the erosion control wattles once every week and within 24 hours after every rainfall event greater than ½". The Contractor shall remove, dispose, or reshape the accumulated sediment when necessary as determined by the Engineer.

Sediment removal, disposal, or necessary shaping shall be as directed by the Engineer. All costs for removing accumulated sediment, disposal of sediment, and necessary shaping shall be incidental to the contract unit price per cubic yard for "Remove Sediment".

All costs for furnishing and installing the erosion control wattles including labor, equipment, and materials shall be incidental to the contract unit price per foot for the corresponding erosion control wattle bid item.

All costs for removing the erosion control wattle from the project including labor, equipment, and materials shall be incidental to the contract unit price per foot for "Remove Erosion Control Wattle".

December 23, 2004

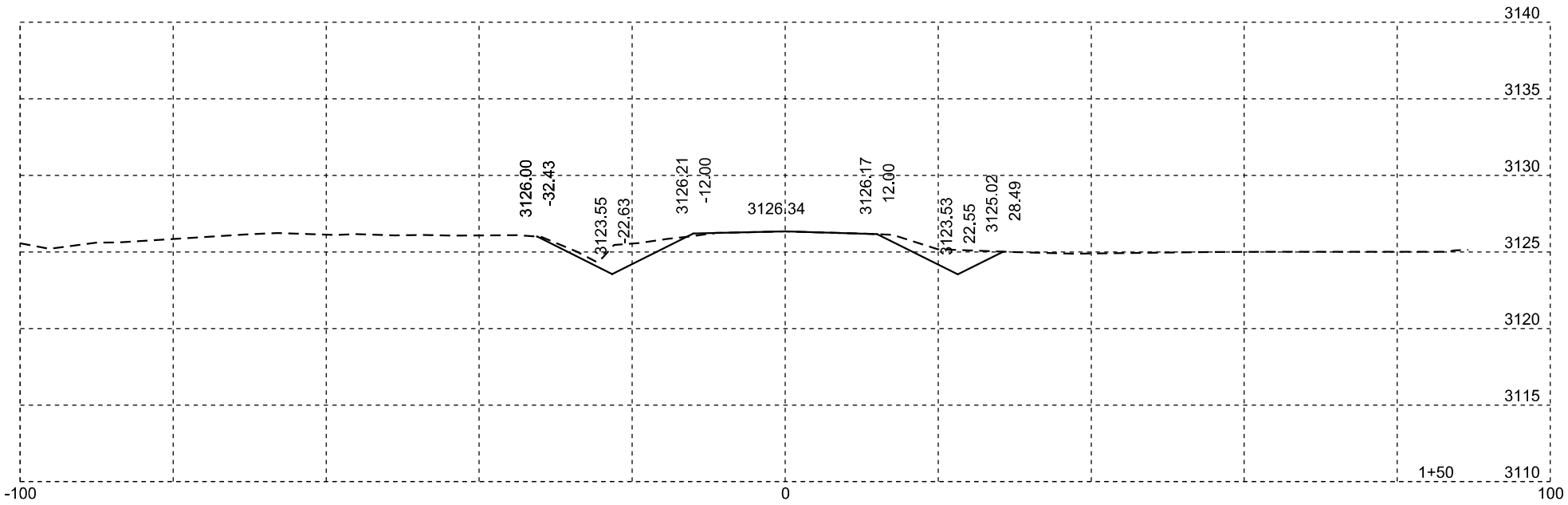
Published Date: 2nd Qtr. 2013

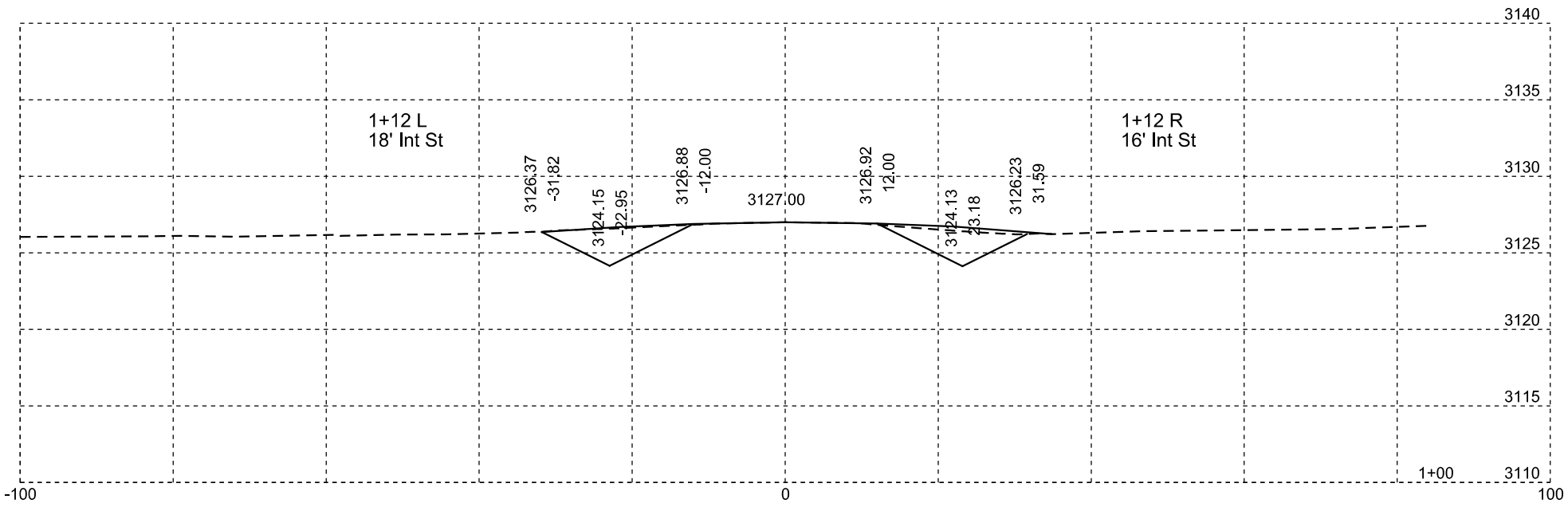
SDDOT

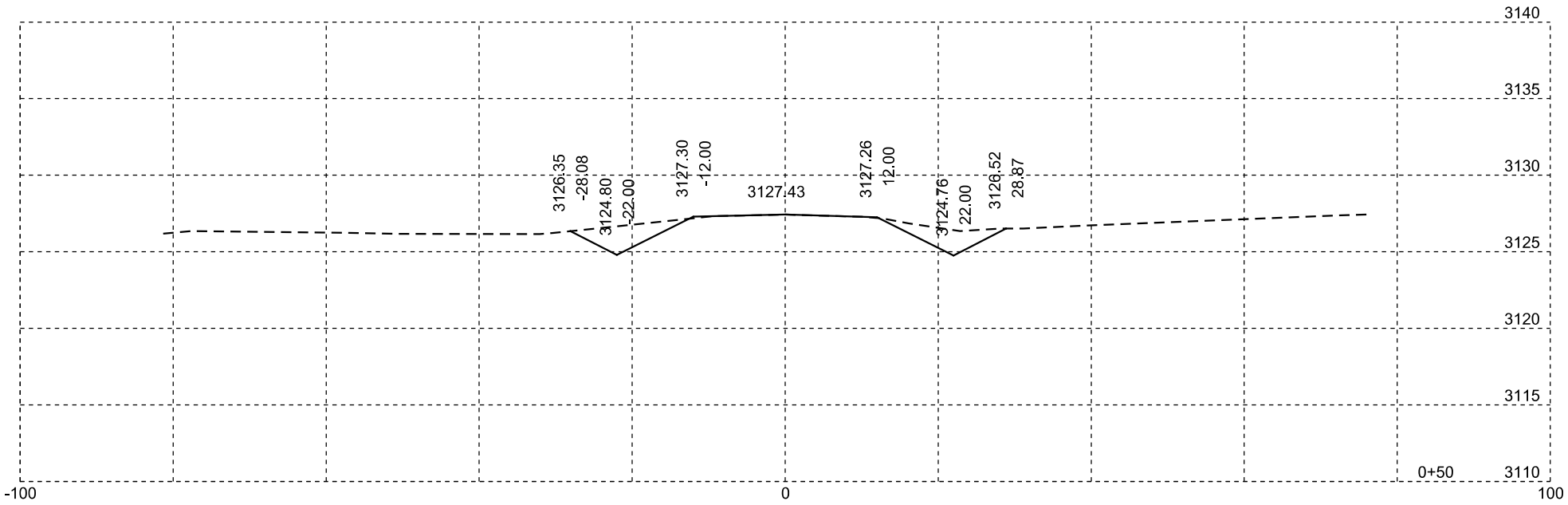
EROSION CONTROL WATTLE

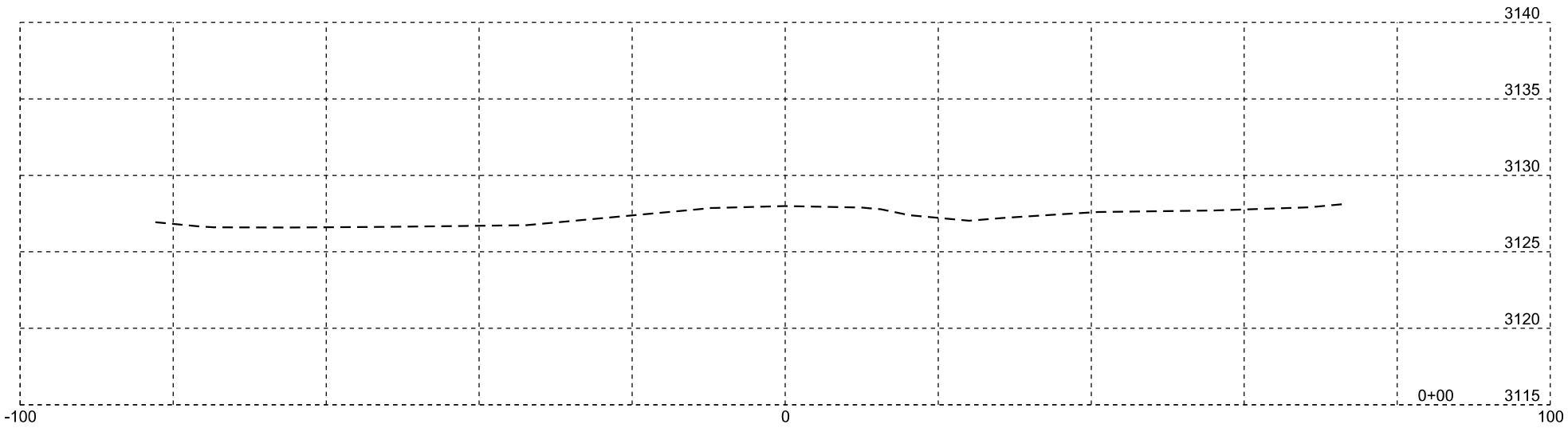
PLATE NUMBER 734.06

Sheet 2 of 2



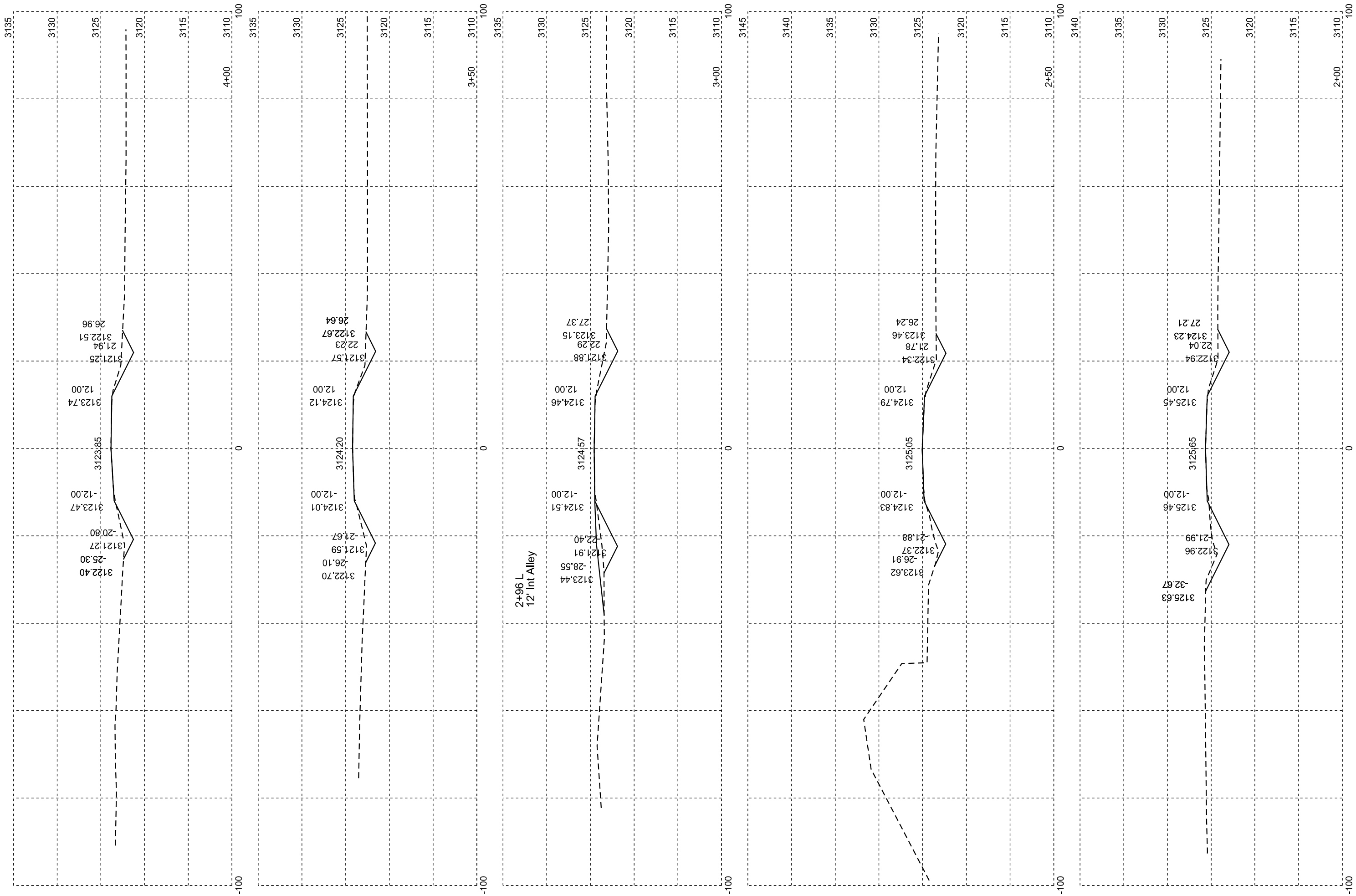


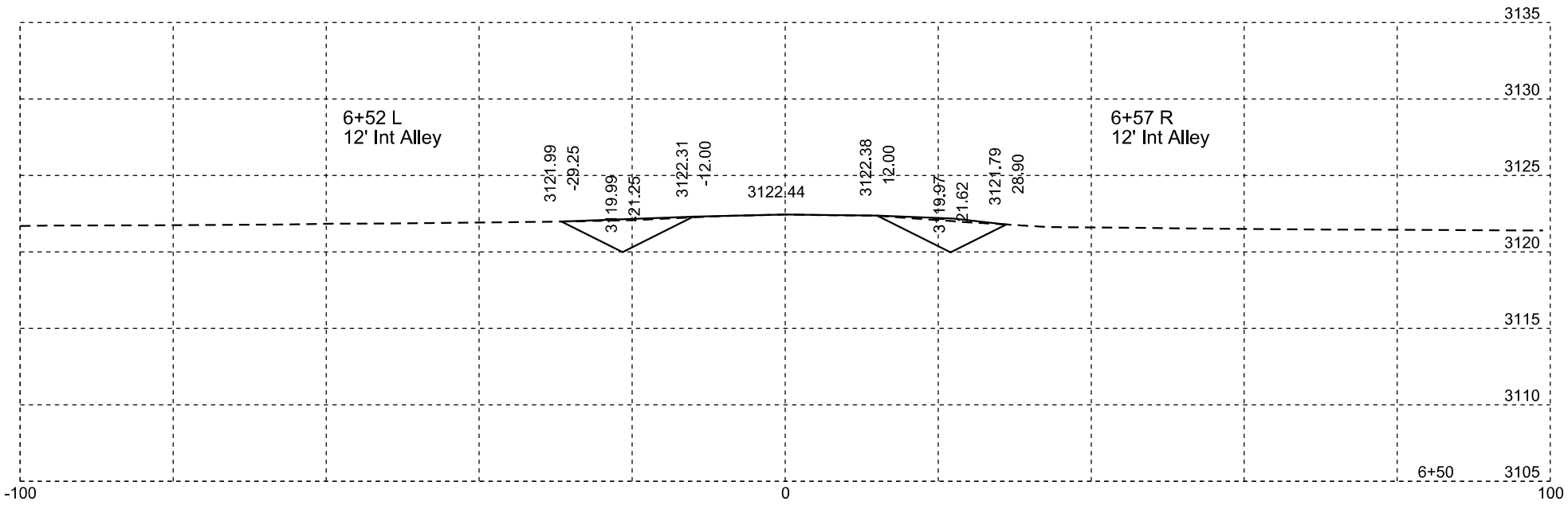


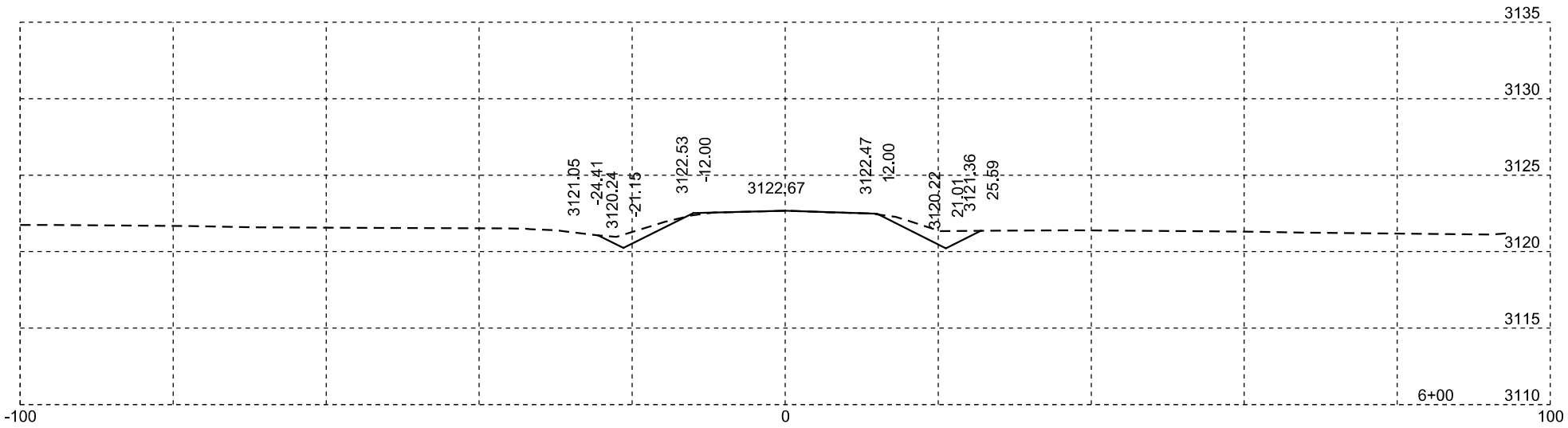


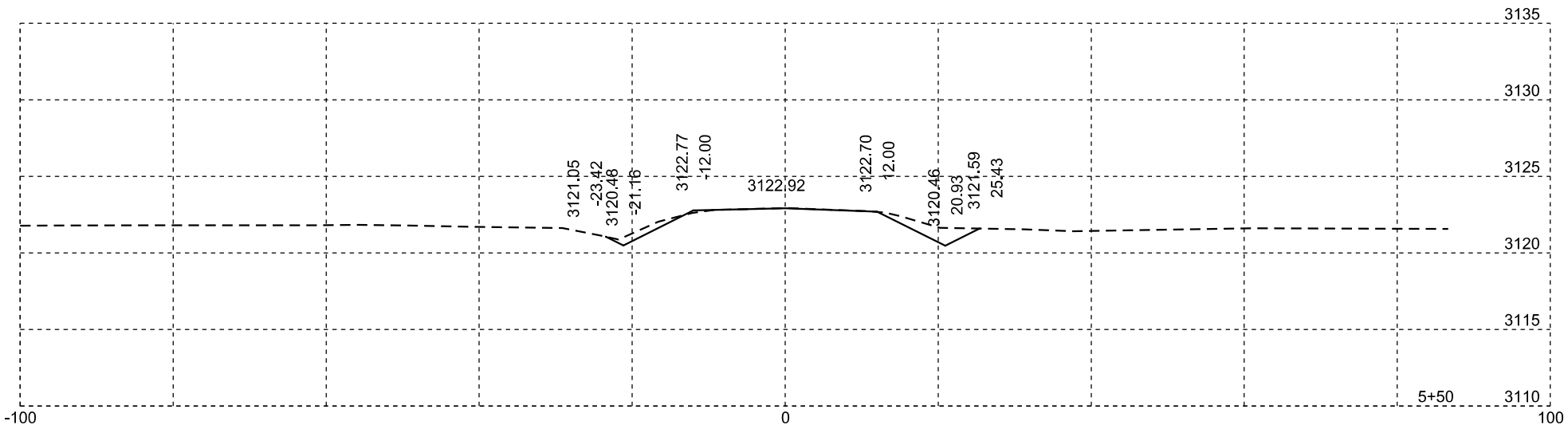
Plotting Date: 04/25/2013

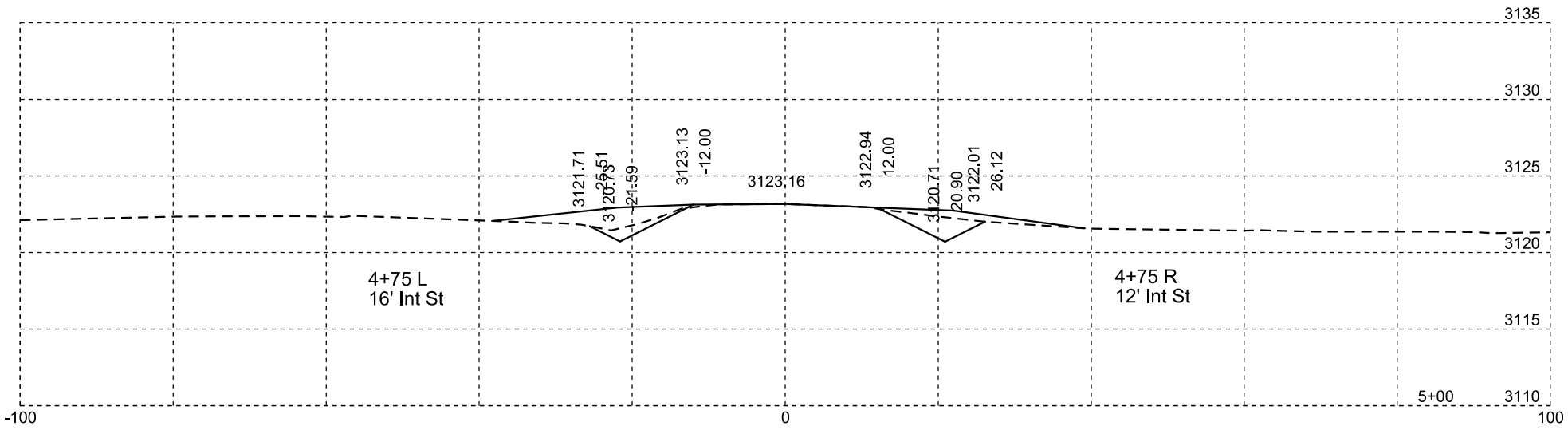
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	020-471	27	35

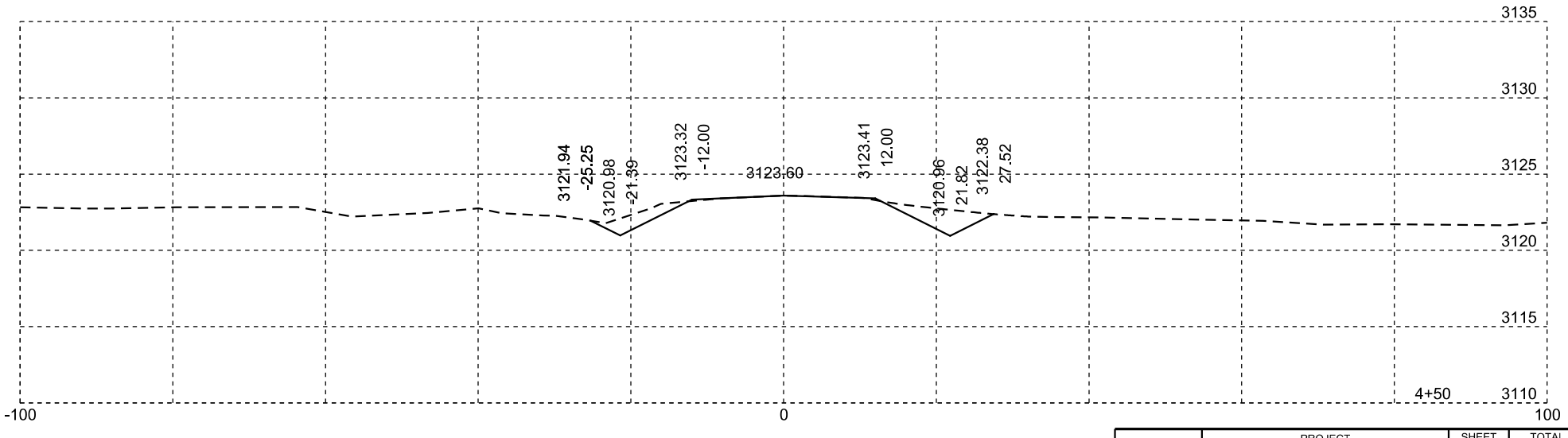

4+00
3+50
3+00
2+96 L
12' Int Alley
2+50
2+00
3122.40
-25.30
3121.27
-20.80
3123.47
-12.00
3123.85
3123.74
12.00
3122.51
21.94
26.96
3122.70
-26.10
3121.59
-21.67
3124.01
-12.00
3124.20
3124.12
12.00
3122.67
22.23
26.64
3123.44
-28.55
3121.91
-22.40
3124.51
-12.00
3124.57
3124.46
12.00
3121.88
22.29
27.37
3123.62
-26.91
3122.37
-21.88
3124.83
-12.00
3125.05
3124.79
12.00
3122.34
21.78
3123.46
26.24
3125.63
-32.67
3122.96
-21.99
3125.46
-12.00
3125.65
3125.45
12.00
3122.94
22.04
3124.23
27.21
Plotting Date: 04/25/2013
STATE OF SOUTH DAKOTA
PROJECT
020-471
SHEET NO.
28
TOTAL SHEETS
35





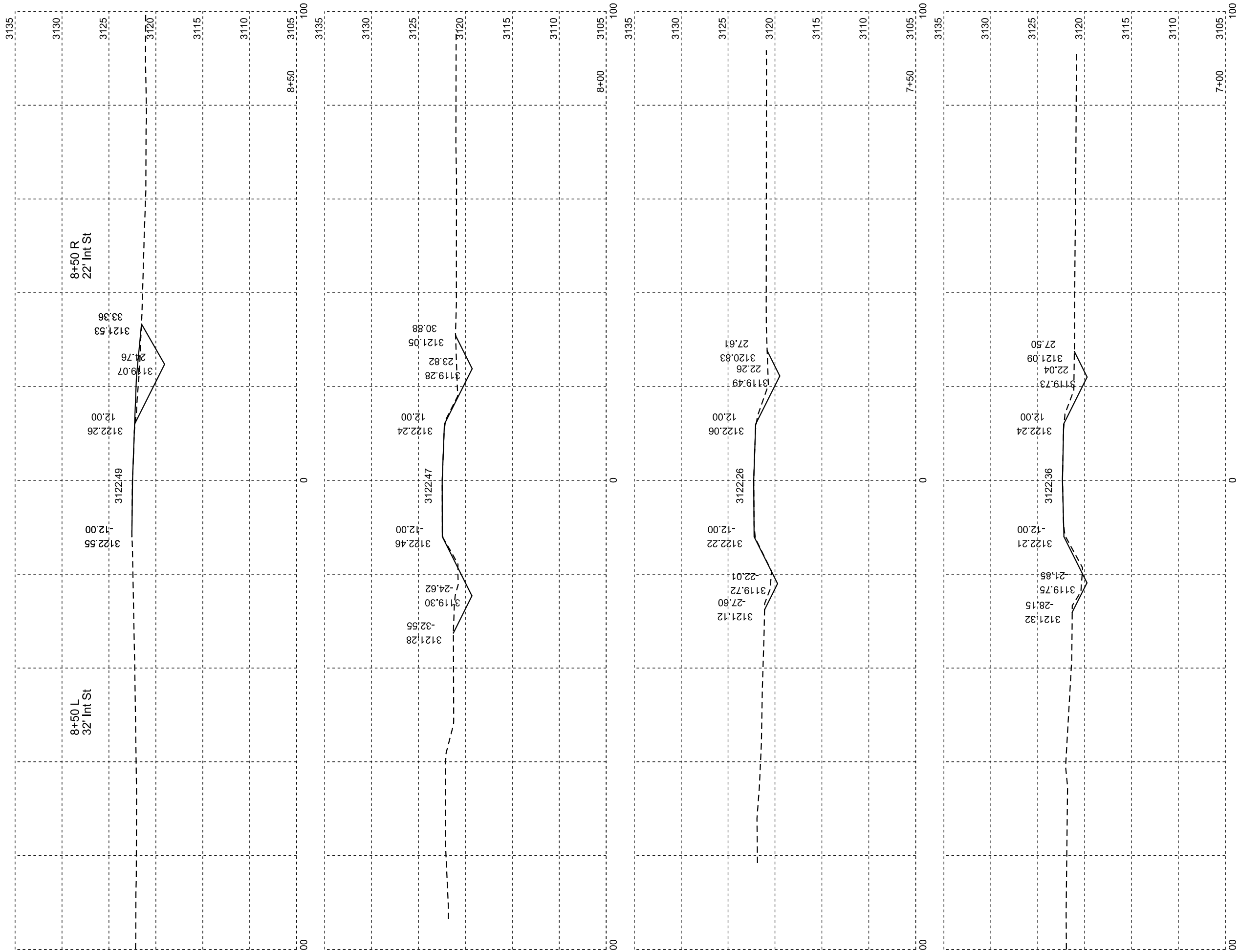






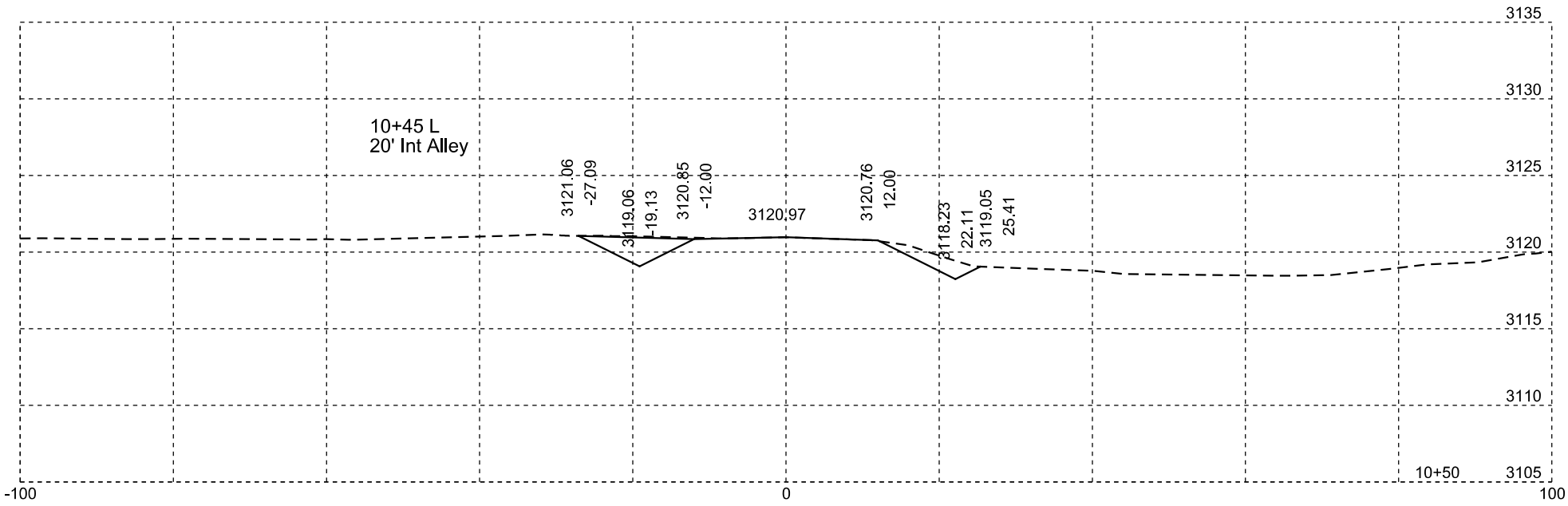
Plotting Date: 04/25/2013

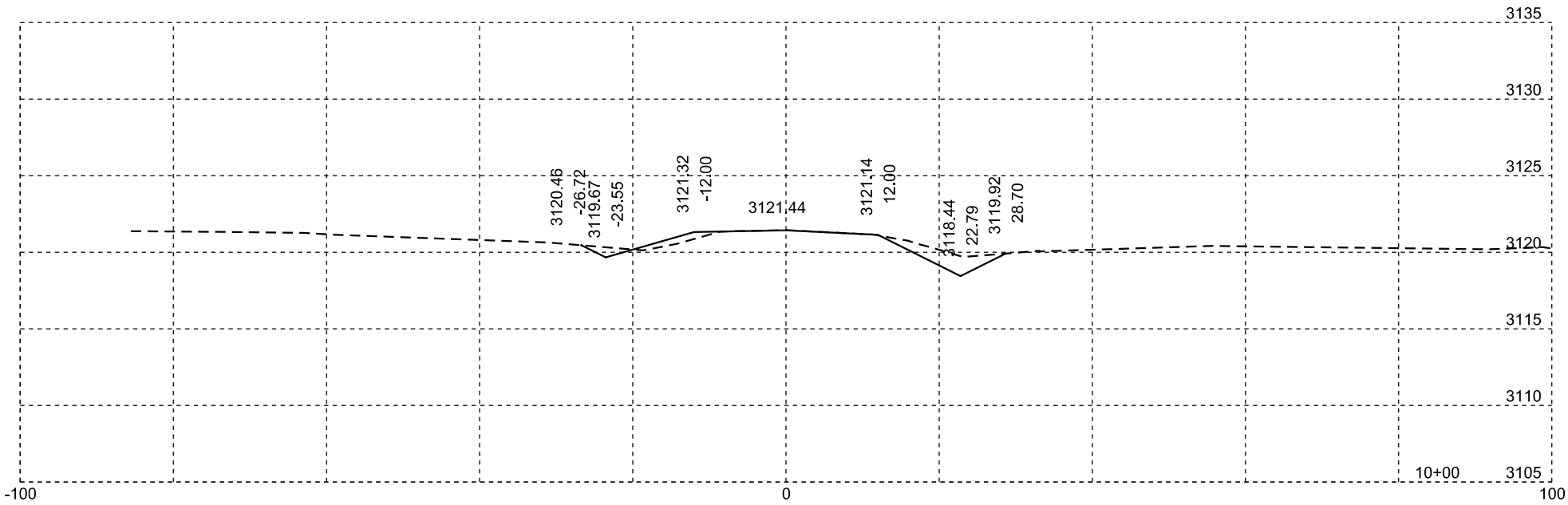
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	020-471	29	35

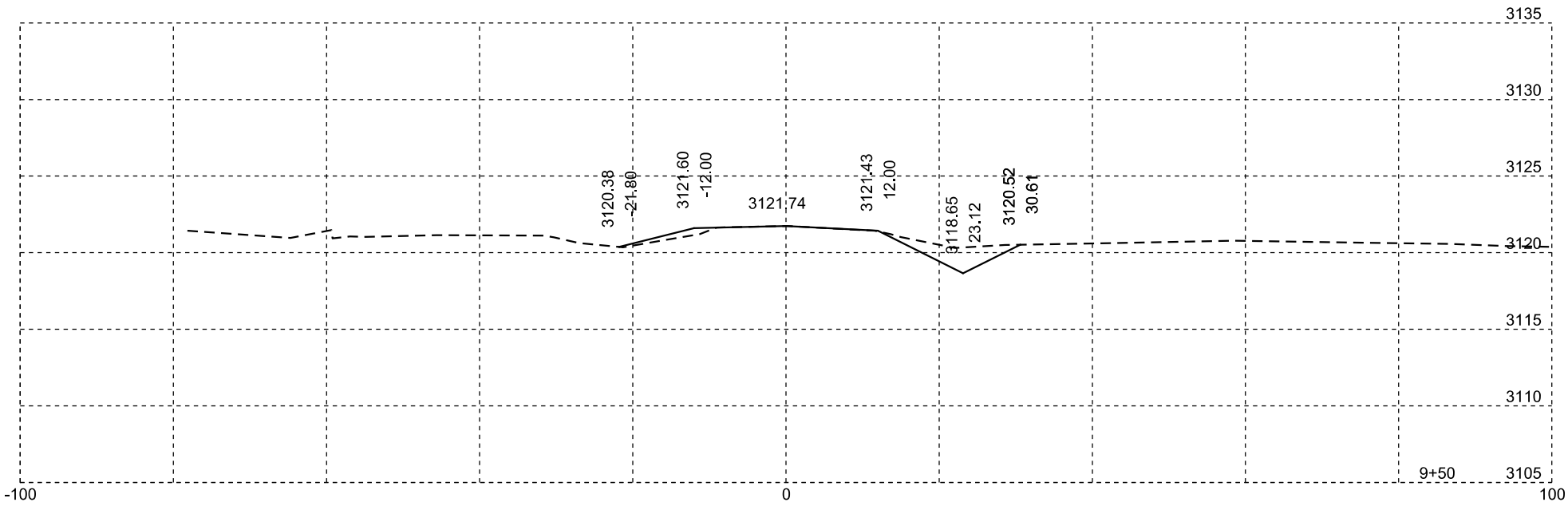


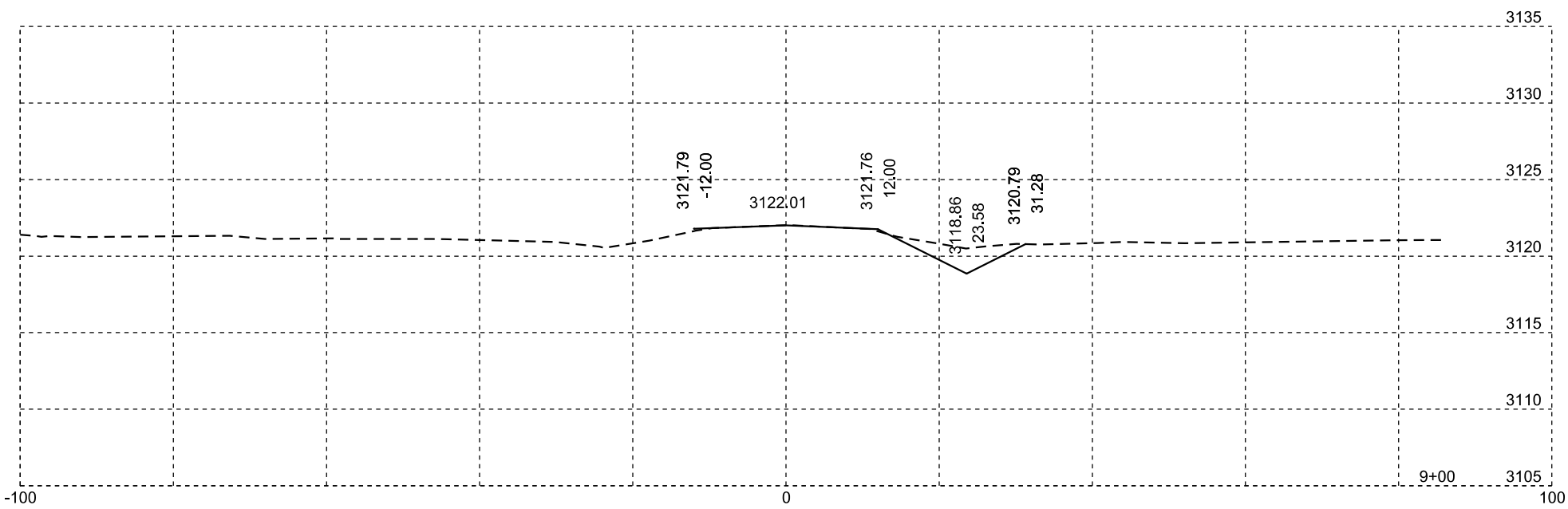
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	020-471	30	35

Plotting Date: 04/25/2013



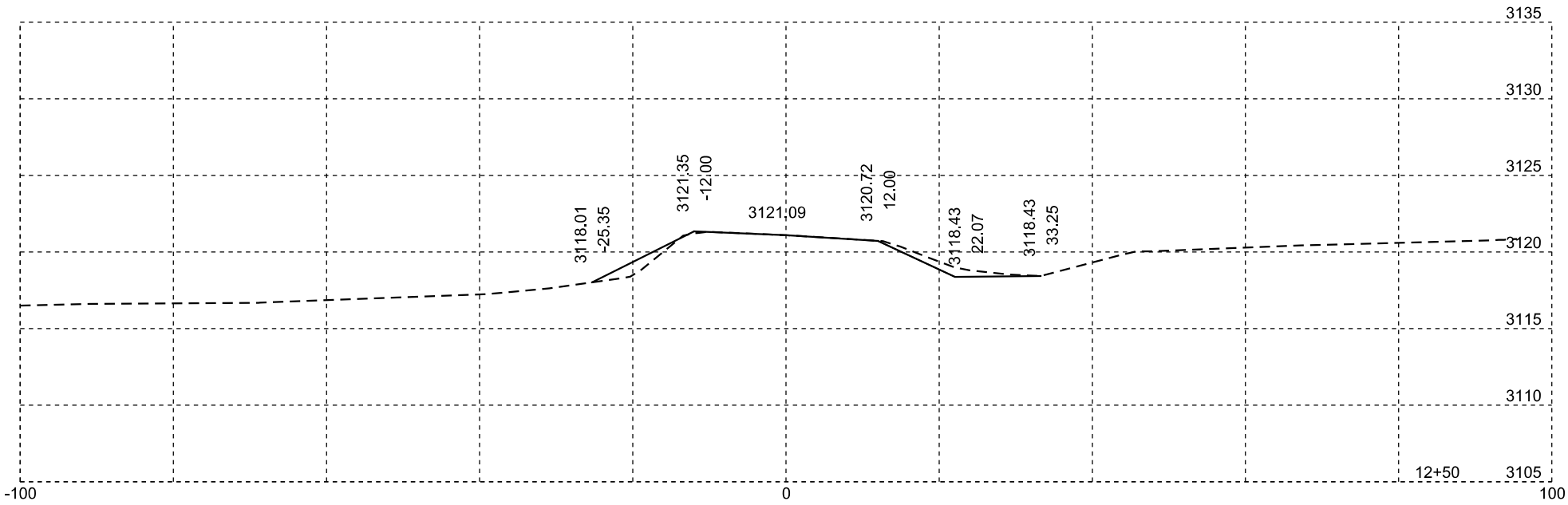


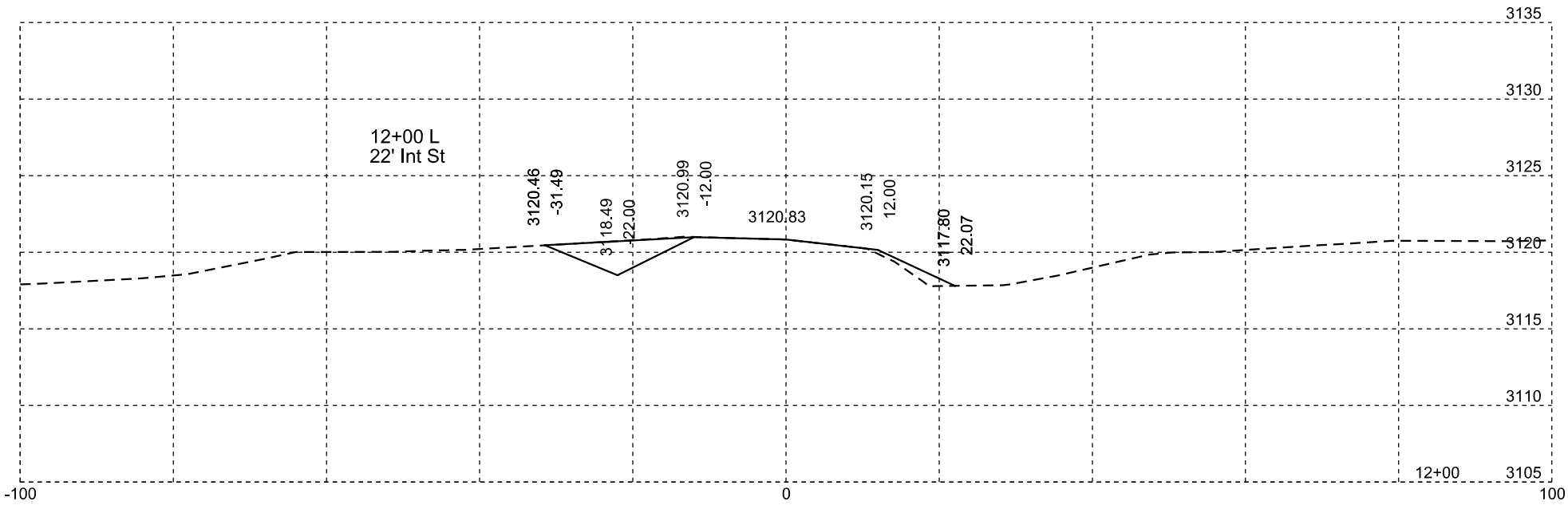


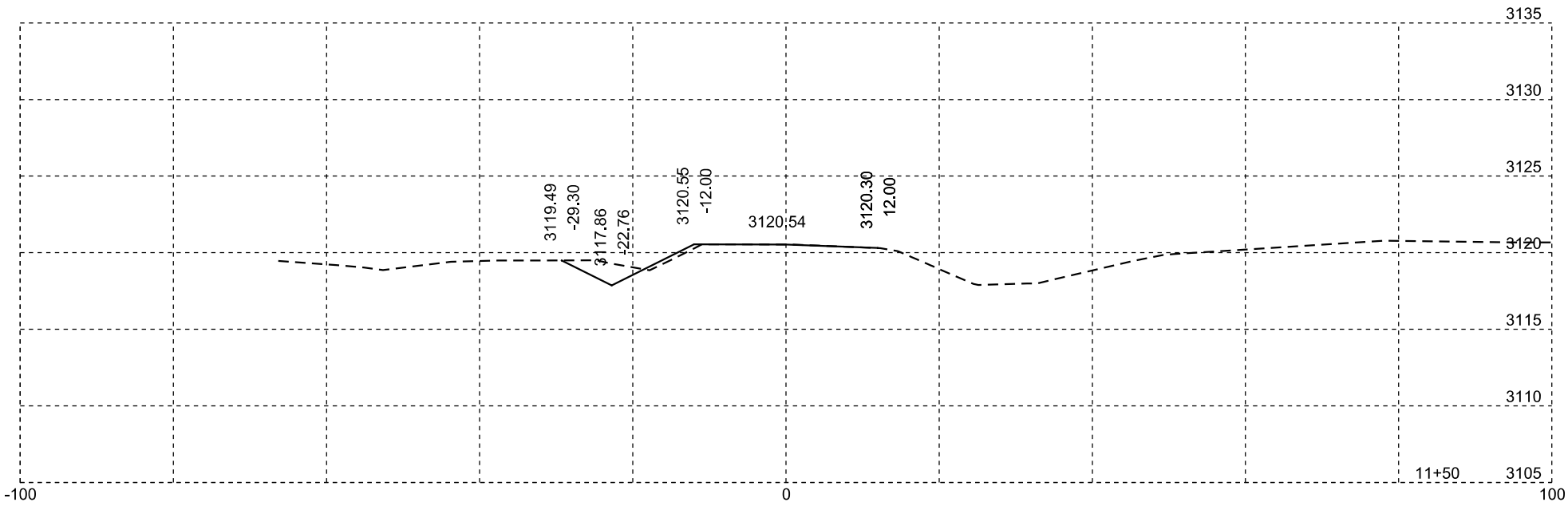


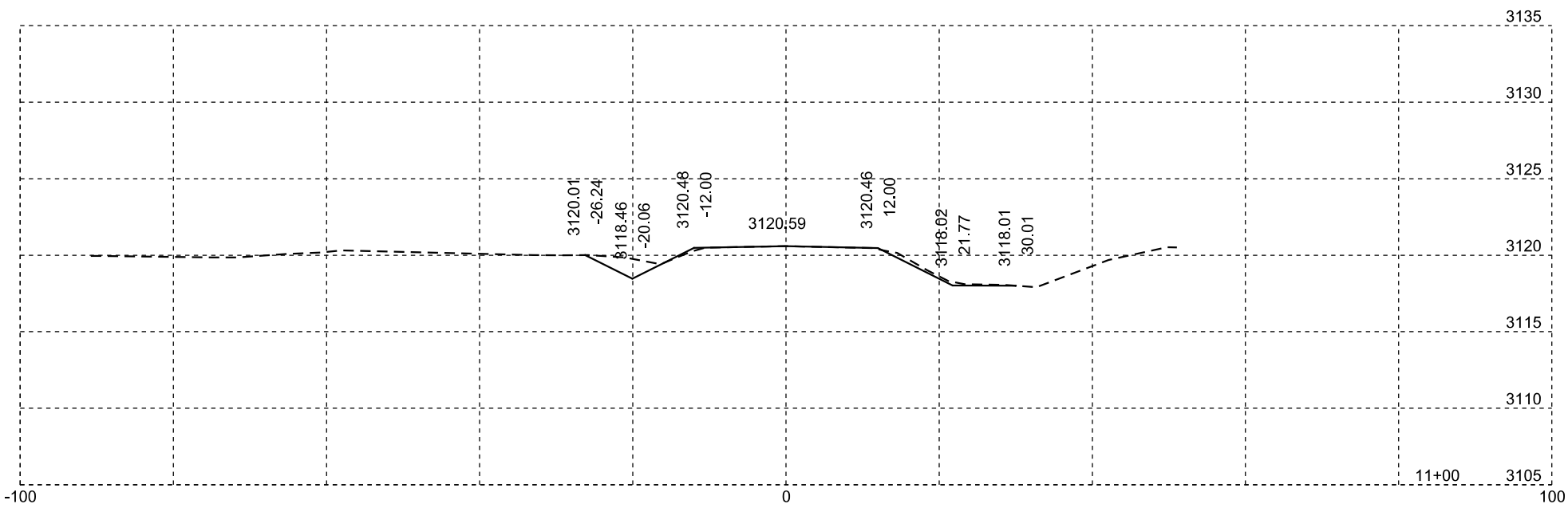
Plotting Date: 04/25/2013

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	020-471	31	35



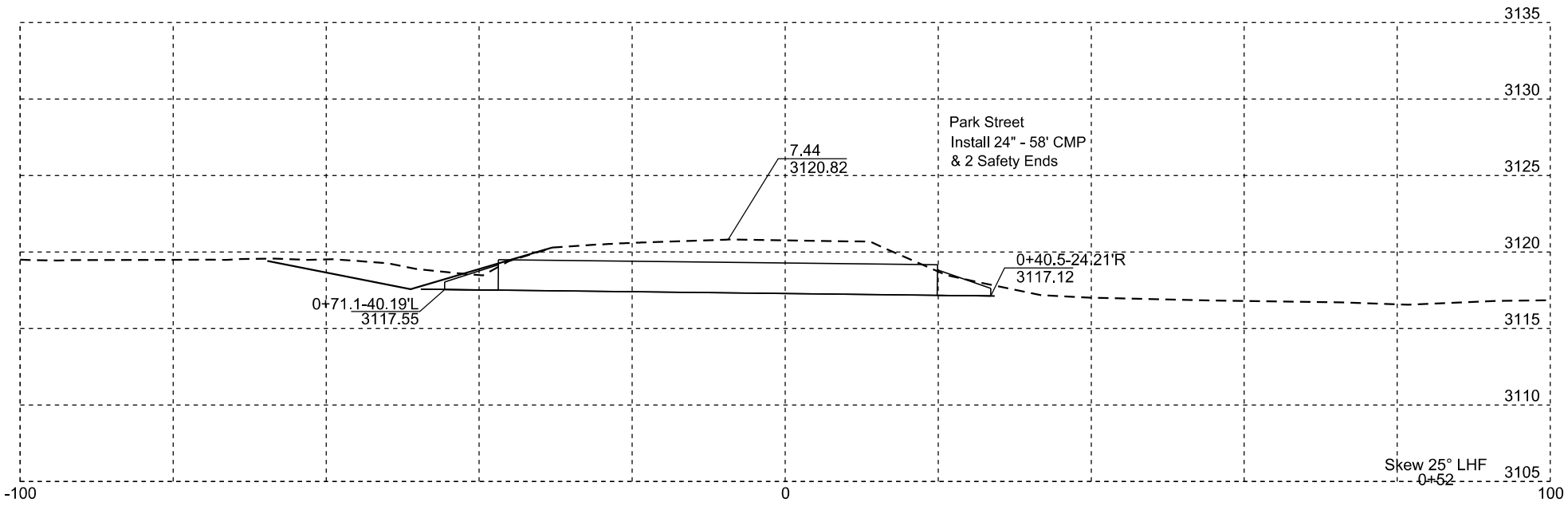


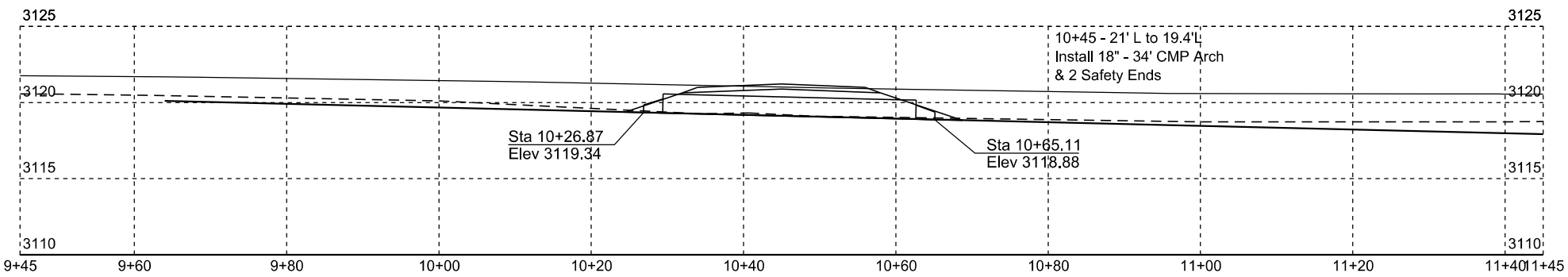


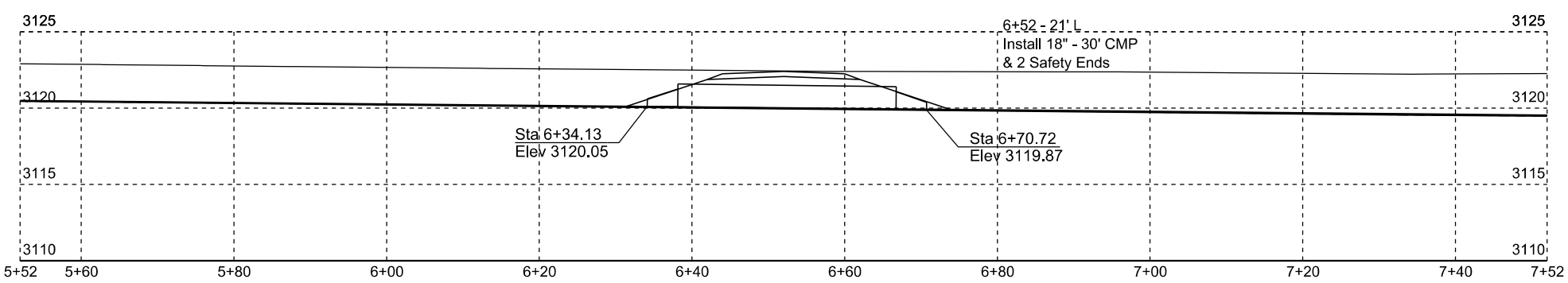


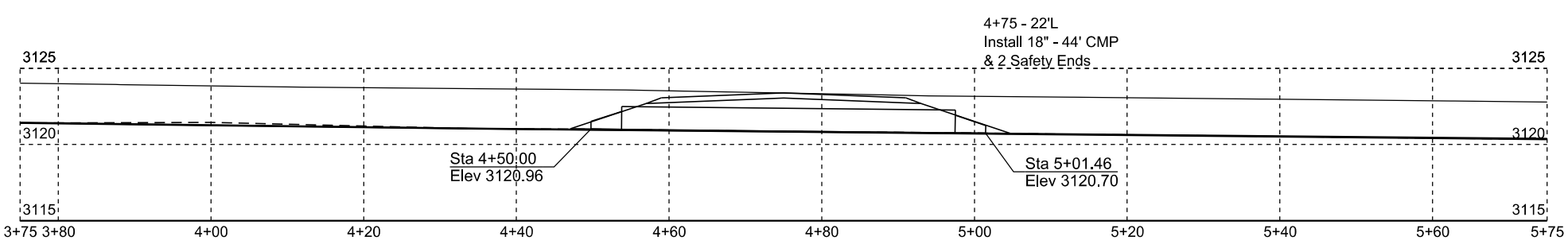
Plotting Date: 04/25/2013

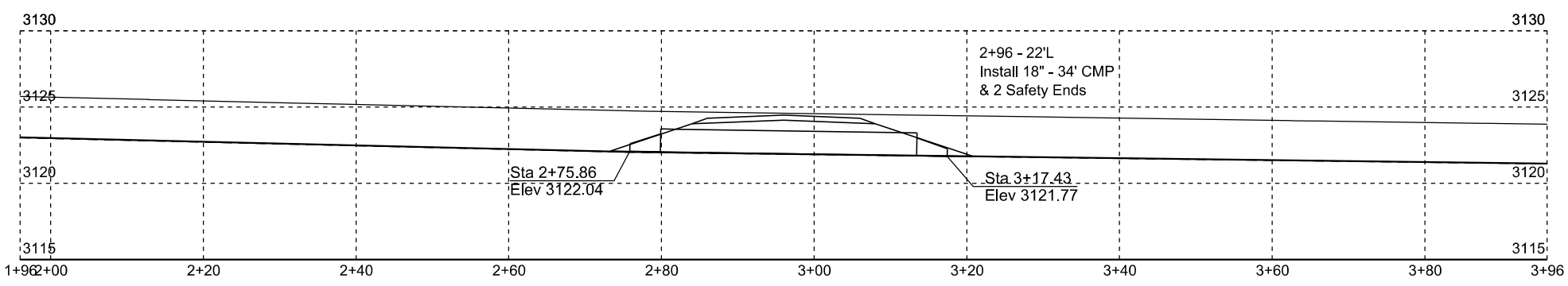
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	020-471	32	35

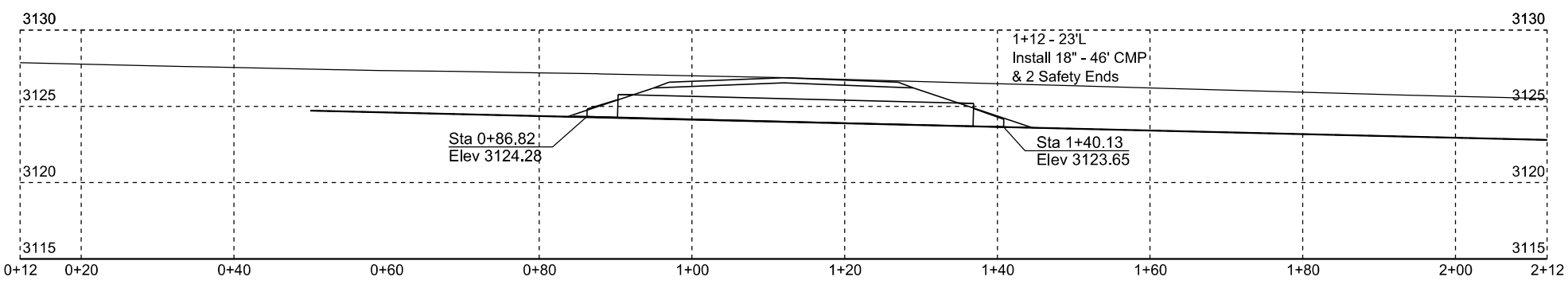






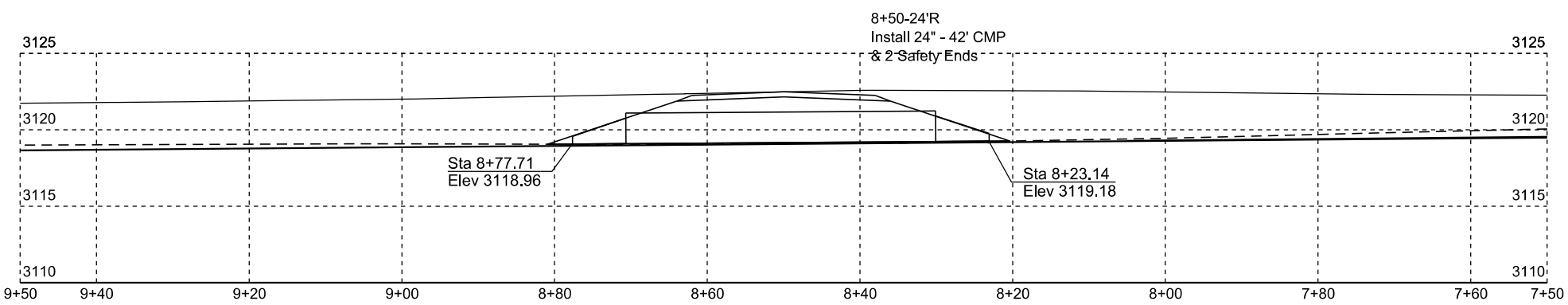


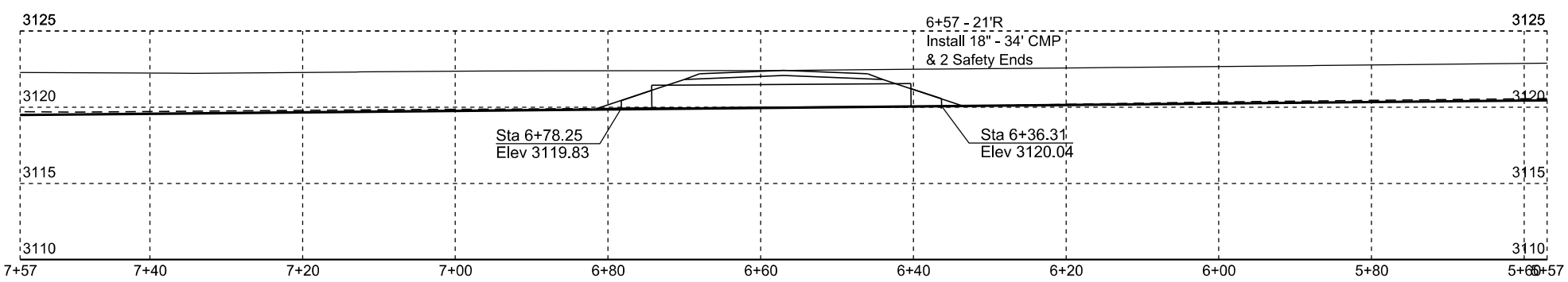


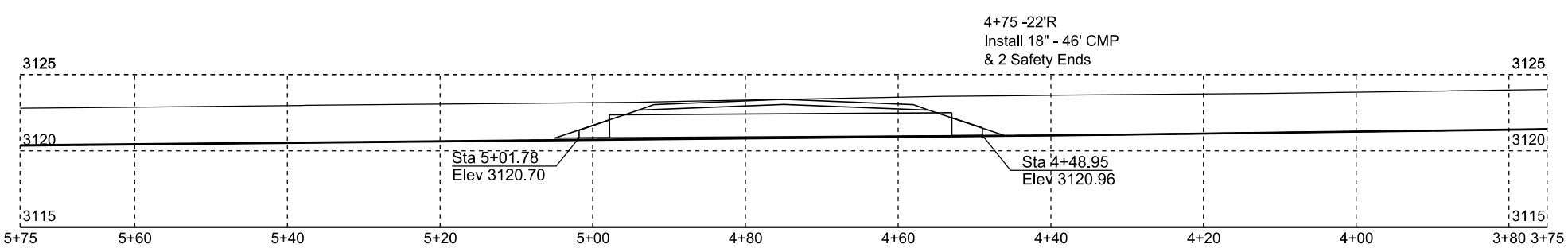


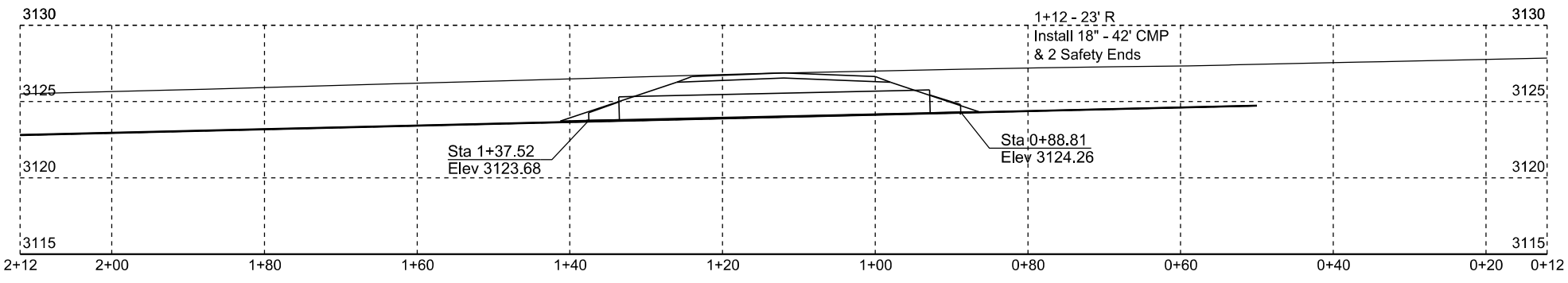
Plotting Date: 04/25/2013

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	020-471	33	35





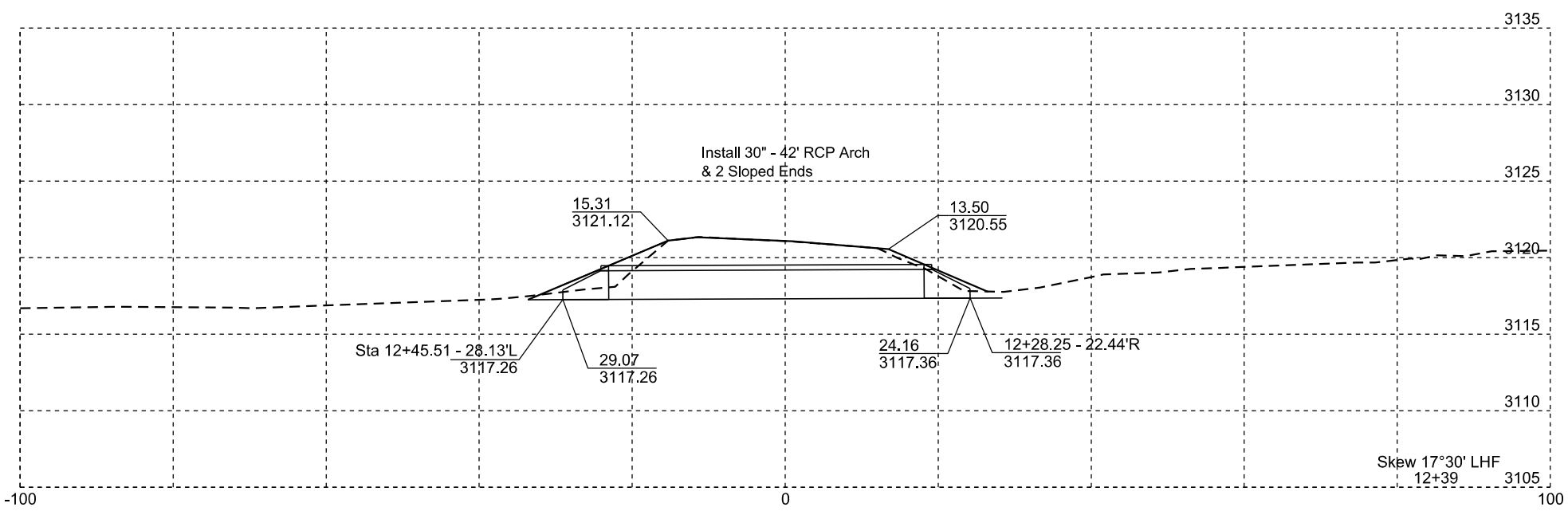


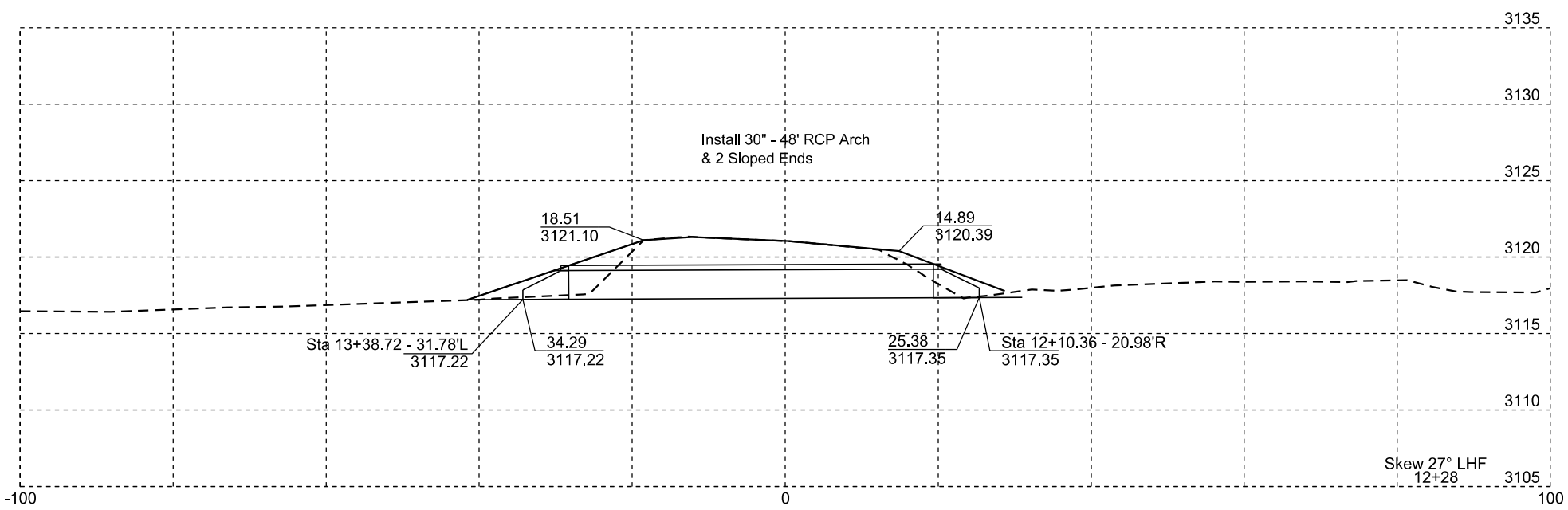


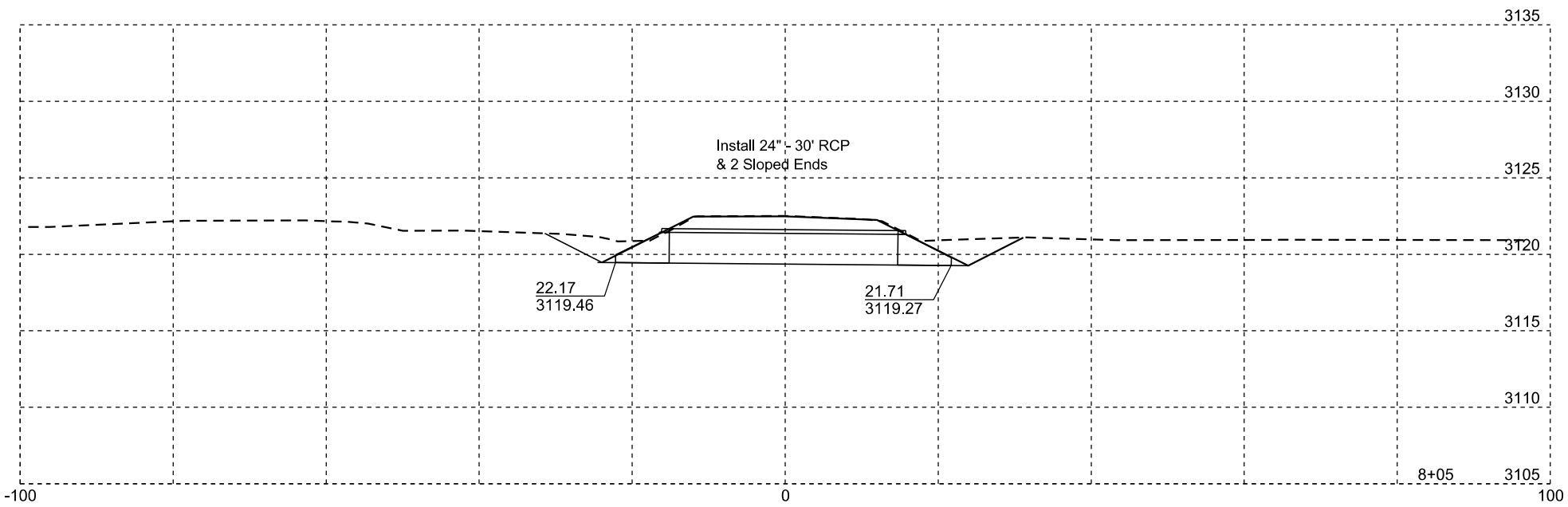
Plotting Date: 04/25/2013

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	020-471	34	35

SD Hwy 20







Plotting Date: 04/25/2013

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	020-471	35	35