STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	1	36
Plotting Date: 24-APR-2007			

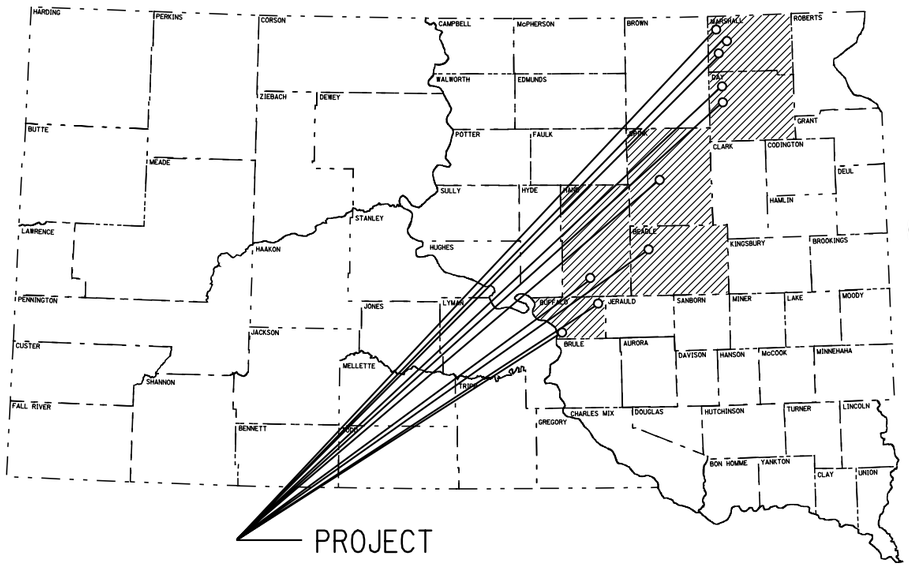
STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

PROJECTS 014–168, 034–168, 045–168, 212–168, 027–168 & 010–168

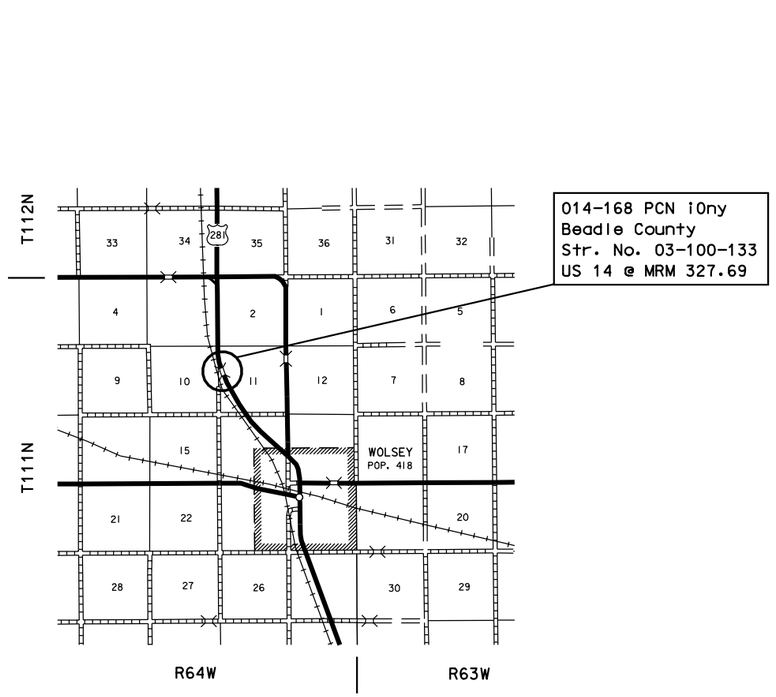
BEADLE, BUFFALO, DAY, HAND, MARSHALL & SPINK COUNTIES

PCN i0ny, i0nz, i0p0, i0p1, i0p2, i0p3, i0p4, i0p5, i0p6 & i0p7

Bridge Deck Epoxy Chip Seal & Bent Cap Riser Repair

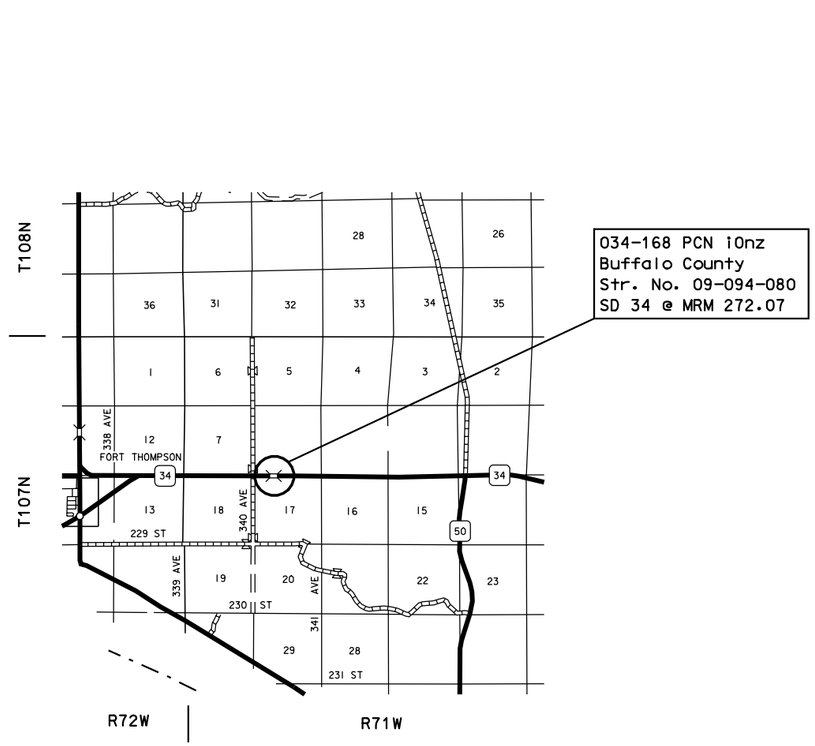


INDEX OF SHEETS



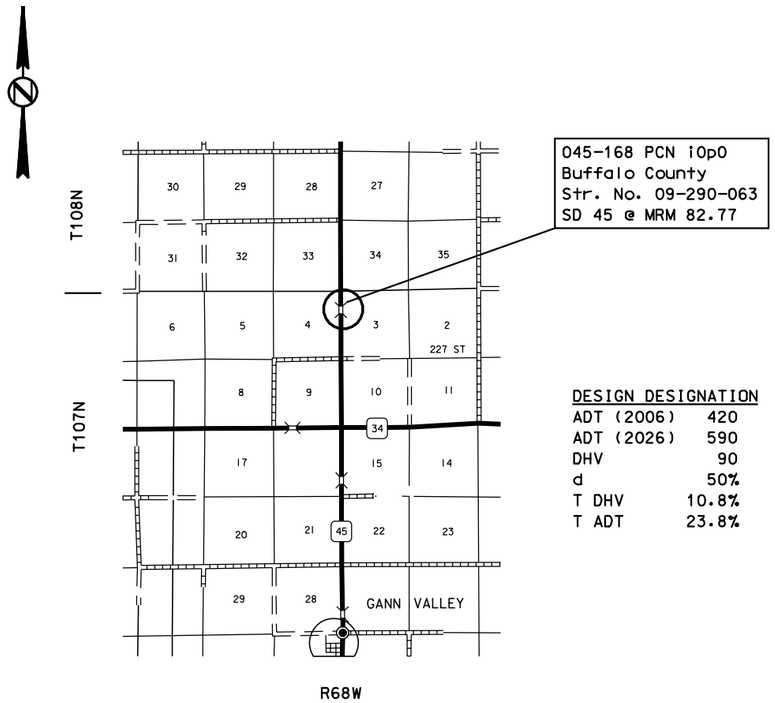
DESIGN DESIGNATION

ADT (2006)	1800
ADT (2026)	2580
DHV	400
d	50%
T DHV	8.7%
T ADT	19.1%



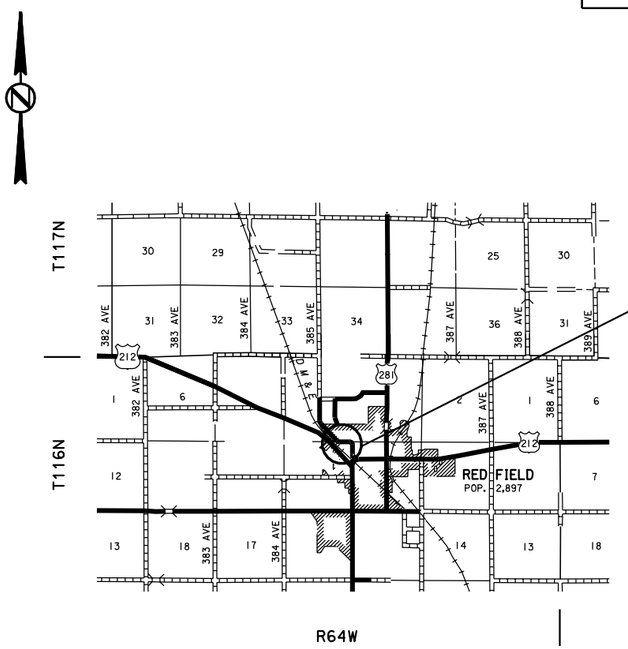
DESIGN DESIGNATION

ADT (2006)	575
ADT (2026)	780
DHV	120
d	50%
T DHV	10.0%
T ADT	21.9%



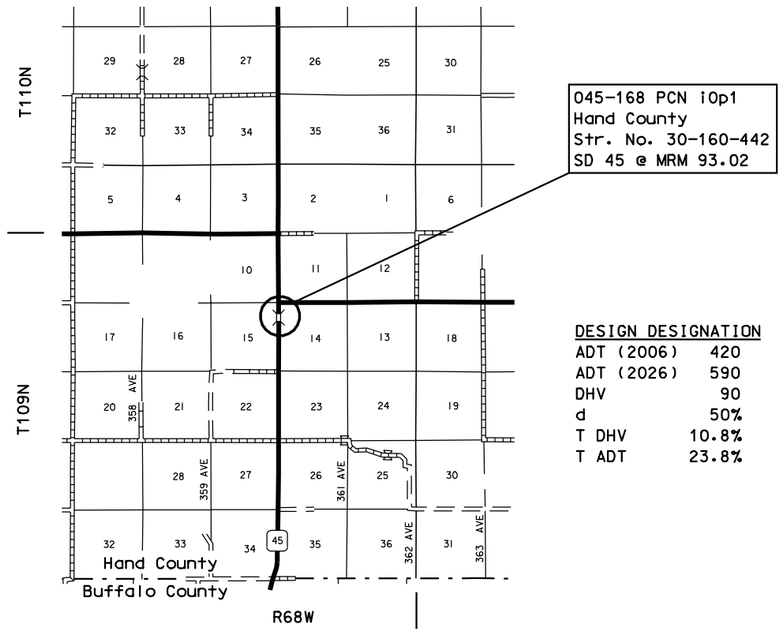
045-168 PCN i0p0
Buffalo County
Str. No. 09-290-063
SD 45 @ MRM 82.77

DESIGN DESIGNATION	
ADT (2006)	420
ADT (2026)	590
DHV	90
d	50%
T DHV	10.8%
T ADT	23.8%



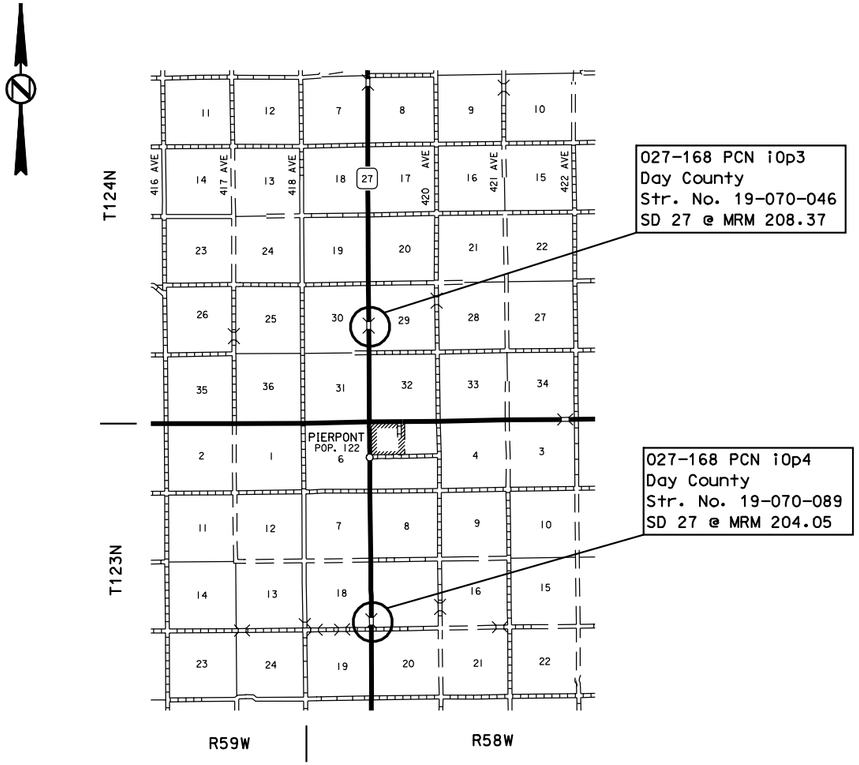
212-168 PCN i0p2
Spink County
Str. No. 58-086-251
US 212 @ MRM 306.15

DESIGN DESIGNATION	
ADT (2006)	1680
ADT (2026)	2095
DHV	325
d	50%
T DHV	5.7%
T ADT	12.5%



045-168 PCN i0p1
Hand County
Str. No. 30-160-442
SD 45 @ MRM 93.02

DESIGN DESIGNATION	
ADT (2006)	420
ADT (2026)	590
DHV	90
d	50%
T DHV	10.8%
T ADT	23.8%



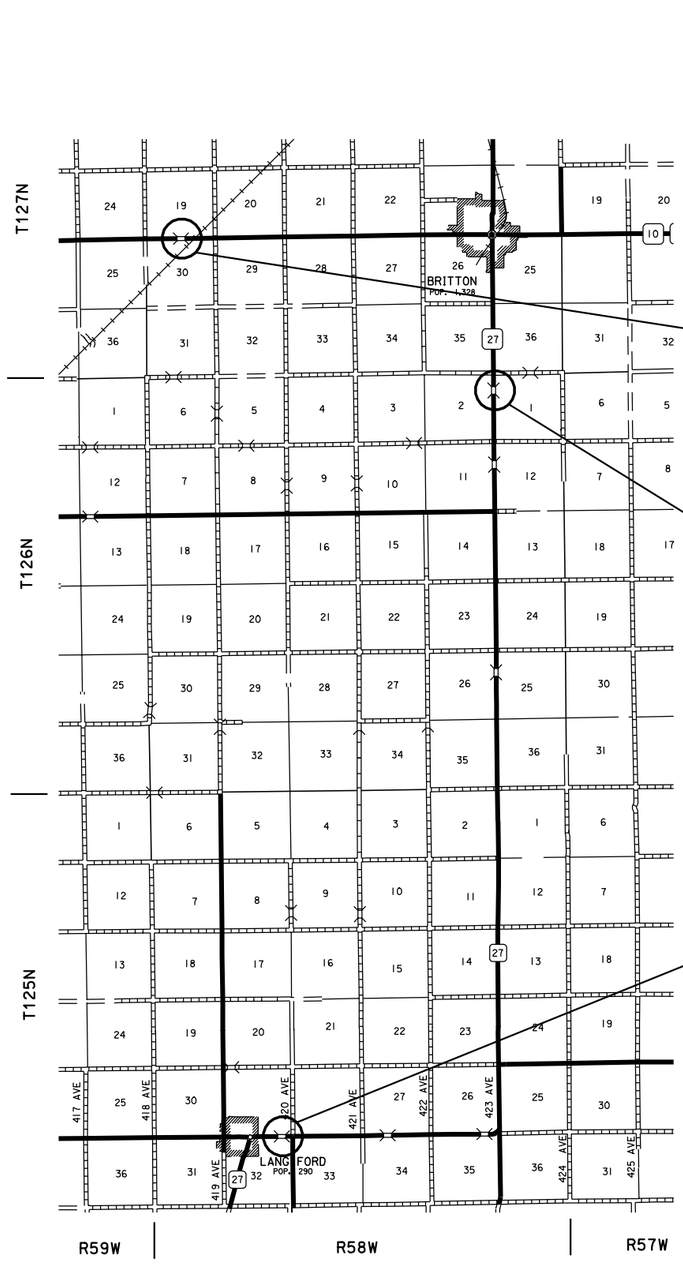
027-168 PCN i0p3
Day County
Str. No. 19-070-046
SD 27 @ MRM 208.37

DESIGN DESIGNATION	
ADT (2006)	490
ADT (2026)	730
DHV	115
d	50%
T DHV	8.1%
T ADT	17.8%

027-168 PCN i0p4
Day County
Str. No. 19-070-089
SD 27 @ MRM 204.05

DESIGN DESIGNATION	
ADT (2006)	435
ADT (2026)	610
DHV	95
d	50%
T DHV	8.1%
T ADT	17.8%

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	3	36
Plotting Date: 24-APR-2007			



DESIGN DESIGNATION	
ADT (2006)	1200
ADT (2026)	1800
DHV	280
d	50%
T DHV	5.3%
T ADT	11.6%

DESIGN DESIGNATION	
ADT (2006)	665
ADT (2026)	830
DHV	130
d	50%
T DHV	5.8%
T ADT	12.8%

DESIGN DESIGNATION	
ADT (2006)	1000
ADT (2026)	1475
DHV	230
d	50%
T DHV	4.2%
T ADT	9.2%

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	4	36

Printing Data: 26-Apr-07 Revised By: Date:

ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	PCN i0ny Structure No. 03-100-133 US 14 MRM 327.69	PCN i0nz Structure No. 09-094-080 SD 34 MRM 272.07	PCN i0p0 Structure No. 09-290-063 SD 45 MRM 82.77	PCN i0p1 Structure No. 30-160-442 SD 45 MRM 93.02	PCN i0p2 Structure No. 58-086-251 US 212 MRM 306.15	PCN i0p3 Structure No. 19-070-046 SD 27 MRM 208.37	PCN i0p4 Structure No. 19-070-089 SD 27 MRM 204.05	PCN i0p5 Structure No. 46-065-100 SD 10 MRM 316.70	PCN i0p6 Structure No. 46-110-123 SD 27 MRM 228.45	PCN i0p7 Structure No. 46-079-230 SD 27 MRM 214.54	TOTAL	UNIT
009E0010	Mobilization	Lump Sum	Lump Sum	Lump Sum	Lump Sum	Lump Sum	Lump Sum	Lump Sum	Lump Sum	Lump Sum	Lump Sum	Lump Sum	LS
410E0550	Jack Superstructure, Steel Girder Bridge	-	-	-	-	Lump Sum	-	-	-	-	-	Lump Sum	LS
460E0170	Concrete Patching Material	7.5	-	-	-	130.2	-	-	-	-	-	137.7	CuFt
460E0300	Breakout Structural Concrete	-	-	-	-	0.1	-	-	-	-	-	0.1	CuYd
460E0380	Install Dowel in Concrete	-	-	-	-	2	-	-	-	-	-	2	Each
491E0010	Bridge Deck Epoxy Chip Seal	626.8	206.7	180.0	325.0	1051.0	652.0	372.0	178.9	365.2	376.4	4334.0	SqYd
491E0110	Abrasive Blasting of Bridge Deck	626.8	206.7	180.0	325.0	1051.0	652.0	372.0	178.9	365.2	376.4	4334.0	SqYd
491E0130	Concrete Removal, Class A	1	-	-	-	13.9	-	-	-	-	-	14.9	SqYd
491E0140	Concrete Removal, Class B	0.5	-	-	-	8.5	-	-	-	-	-	9.0	SqYd
633E1400	Pavement Marking Paint, 4” White	256	124	108	196	631	326	186	108	173	188	2296	Ft
633E1405	Pavement Marking Paint, 4” Yellow	40	20	10	20	631	40	20	20	40	60	901	Ft
634E0010	Flagging	68	44	44	44	-	68	44	44	44	44	444	Hour
634E0100	Traffic Control	306	238	238	238	312	238	238	238	238	238	2522	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	Lump Sum	Lump Sum	Lump Sum	Lump Sum	Lump Sum	Lump Sum	Lump Sum	Lump Sum	Lump Sum	Lump Sum	LS
634E0610	4” Temporary Pavement Marking Tape Type 2 *(White 1518’ Yellow –2,400’)*	-	-	-	-	3918	-	-	-	-	-	3918	Ft
634E0896	Temporary Traffic Signal System	-	-	-	-	1	-	-	-	-	-	1	Each

SPECIFICATIONS

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

Design Specifications: AASHTO Standard Specifications for Highway Bridges 2002 Edition using Working Stress Design.

SCOPE OF WORK

Work on this project involves Bridge Deck Epoxy Chip Seal on all bridge decks and the removal and replacement of a portion of the Bent Cap Riser on Bent 2 under Girder G8 on Str. No. 58-086-251 which is located on US 212 at MRM 306.15.

SEQUENCE OF OPERATIONS

The sequence of operations for the bridge deck epoxy chip seal and related structure work shall be followed unless an alternate sequence is submitted in writing by the Contractor a minimum of two weeks prior to the preconstruction meeting and approved.

DETAILS AND DIMENSIONS OF EXISTING BRIDGE

All details and dimensions of the existing bridge, contained in these plans, are based on the original construction plans and shop plans. It is the Contractor's responsibility to inspect and verify the actual field conditions and any necessary as-built dimensions affecting the satisfactory completion of the work required for this project.

NOTICE – LEAD BASED PAINT

Be advised that the paint on the steel surfaces of the existing structure is a paint containing lead. The Contractor should plan his/her operations accordingly, and inform his/her employees of the hazards of lead exposure.

TRAFFIC CONTROL

Traffic shall be maintained through the project per Standard Plate 634.26 on Structure No. 58-086-251 and Standard Plate 634.23 on all remaining structures.

The Contractor shall plan the concrete repair, blasting, cleaning, and epoxy chip seal operations so as to cause the least amount of inconvenience to the traveling public.

Flagging stations shall be lighted during nighttime operations. The lights for this purpose shall be a flood type, shielded to prevent glare and provide a minimum of 5,000 lumens (250 watt incandescent lamp). The flood lights shall be installed at a minimum height of 8 feet. All costs associated with the flagging station flood lights shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.

A minimum of 2 flaggers shall be provided at all times. On some routes, flaggers may be reduced to one person after 10:00 PM as directed by the Engineer.

TRAFFIC CONTROL (CONTINUED)

Removing, relocating, covering, salvaging and resetting of existing traffic control devices, including delineation, shall be the responsibility of the Contractor. Cost of this work shall be incidental to the various contract bid items unless otherwise specified in the plans. Delineators and signs damaged or lost shall be replaced by the Contractor at no cost to the State.

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 to 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.

Work activities during non-daylight hours are subject to prior approval.

The bottom of signs on portable or temporary supports shall not be less than seven feet above the pavement in urban areas and one foot above the pavement in rural areas. Portable sign supports may be used as long as the duration is less than 3 days. If the duration is more than 3 days the signs shall be on fixed supports.

All breakaway sign supports shall comply with FHWA NCHRP 350 crash-worthy requirements. The Contractor shall provide post installation details at the preconstruction meeting for all steel post breakaway sign support assemblies.

The plan shown quantity of 1 each for Portable Traffic Signal System shall include both signals necessary for the required site.

4" TEMPORARY PAVEMENT MARKING TAPE TYPE 2

Temporary pavement marking shall consist of 4" Temporary Pavement Marking Tape Type 2 applied and maintained during work at Structure No. 58-086-251 per Standard Plate 634.26.

Temporary road markers may be used in place of the temporary pavement marking tape per the approval of the Engineer with the exception of the 24" Stop Bars.

The temporary pavement marking tape shall be kept clean and visible at all times.

The temporary pavement marking tape will be paid for one time only at each location.

REMOVE EXISTING PAVEMENT MARKINGS

Prior to application of the epoxy chip seals, the Contractor shall completely remove the existing pavement marking paint from the bridge decks. The existing pavement marking consists of 4" yellow pavement marking paint for the centerline skips and 4" white pavement marking paint for the edge lines.

The removal of the existing pavement marking shall be performed in conjunction with the surface preparation operations required per the Special Provision For Epoxy Chip Seal. The pavement marking shall be removed by scraping, shot blasting, abrasive blasting, light grinding, compressed air, or other methods approved by the Engineer.

All costs associated with removing the existing pavement marking paint shall be incidental to the contract unit price per square yard for ABRASIVE BLASTING OF BRIDGE DECK. Separate payment will not be made for removal of the existing pavement marking.

PERMANENT PAVEMENT MARKING

Upon completion of the epoxy chip seals, the Contractor shall install white/yellow pavement marking paint across the bridge decks in a manner which aligns with the pavement marking on the roadway and to the satisfaction of the Engineer. The centerline skips shall consist of a 10 foot long 4" yellow line placed every 40 feet, the outside edge lines shall be 4" white solid line.

The pavement marking paint shall be applied at a minimum rate of 1 gallon per 200 feet of 4 inch wide line. The glass beads shall be applied on the wet paint lines at a minimum rate of 8 pounds of glass beads per gallon of paint.

Immediately prior to applying the pavement marking paint, any debris or loose aggregate shall be removed by brooming, high pressure air, vacuuming, or other methods approved by the Engineer.

The application of pavement marking paint may not begin until 2 calendar days following completion of the epoxy chip seal and shall be completed within 12 calendar days following completion of the epoxy chip seal. For each working day the application of pavement marking paint remains uncompleted after the 10 calendar days, the Contractor will be assessed liquidated damages at the rate of $250.00 per day. This liquidated damage provision applies up to the Contract Completion Date, as extended. After the completion date, liquidated damages will be assessed in accordance with Section 8.7 of the Standard Specifications, until the permanent pavement marking is completed, even though the project may be open to traffic.

All costs associated with furnishing/installing the pavement marking paint and preparing the bridge deck surfaces for painting shall be incidental to the contract unit price per foot for PAVEMENT MARKING PAINT, 4" WHITE and PAVEMENT MARKING PAINT, 4" YELLOW.

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.

BENT CAP RISER REPAIR (Str. No. 58-086-251)

Girder G8 (2nd girder in from the south side of the bridge deck) at Bent No 2 shall be supported by temporary supports during the entire time the Bent Cap Riser is being repaired. The nuts on the anchor bolts at locations not being repaired must be loosened to allow for movement due to girder jacking at adjacent locations. The temporary supports shall be capable of supporting a reaction of 22 kips without settlement for the period of construction and shall be able to support the girder while allowing for the longitudinal girder movements due to temperature induced expansion and contraction. Any jacking shall be limited to the absolute minimum amount required, as approved by the Engineer, to transfer girder reactions from the existing bearings to the temporary girder supports. Caution shall be exercised when transferring the girder reaction from the existing bearings to the temporary girder supports to insure that no deck concrete, steel girder or concrete diaphragm damage will occur due to the jacking procedure. The temporary girder supports shall be a solid support system that does not rely on hydraulics to support the load the entire time that the girders need to be supported. A steel bearing plate shall be placed between the jack and bottom flange and shall have a minimum surface area of 144 square inches and a thickness of 1 inch. Any girder supported by jacking shall not be allowed to transfer any portion of it’s load to the newly constructed Bent Cap Riser until the newly constructed Bent Cap Riser has attained a minimum compressive strength of 3500 psi. The Contractor shall be required to submit a detailed set of plans for his temporary girder supports, including the location of all supports, to the Office of Bridge Design through the proper channels for approval.

The points of girder support shall be kept as close to the end of the girder as is possible to still adequately perform the construction required.

After the temporary girder supports have been established, the existing Bent Cap Riser shall be removed and rebuilt to the dimensions detailed on Sheet No 11 of 36.

A new steel bearing plate 0’-6” x 1’-9” x ¾” shall be furnished and installed as detailed on sheet 11 of 36. The plate shall conform to the requirements of ASTM A709, Grade 36. The plate shall be shop painted in accordance with Section 411 of the Construction Specifications. The color of the top coat shall match the existing structure and be approved by the Engineer.

Anchor bolts 3/4 inch in diameter x 1'-7" long shall be installed in the new bent cap riser and drilled into the existing bent cap as detailed on sheet 11 of 36 to attach the new steel plate to the bent cap riser. Threaded rods shall be used for this purpose. 3/4 inch diameter x 4” threaded rods shall be utilized to attach the new steel plate to the girder. A thread locking compound shall be utilized on the portion of the threaded rod which penetrates into the new steel plate. The rods shall be fully threaded. Both sets of threaded rods shall conform to the requirements of ASTM A307 or an approved equal. Each threaded rod shall be furnished with a hardened washer and lock nut. The threaded rods shall be galvanized in accordance with Section 972 of the Construction Specifications.

The elevation of the new Bent Cap Riser shall be such that the existing elevations at the top of the deck slab are maintained after all Bent Cap Riser repair work is completed.

BENT CAP RISER REPAIR (Str. No. 58-086-251) (CONTINUED)

Before the bearing device is lowered onto the new Bent Cap Riser a 15/64 inch thick layer of preformed fabric pad shall be placed between the Bent Cap Riser and the bearing device. The material shall be composed of multiple layers of 8-ounce cotton duck impregnated and bound with high-quality natural rubber or of equivalent and equally suitable materials compressed into resilient pads of uniform thickness. The number of plies shall be such as to produce the specified thickness, after compression and vulcanizing. The finished pads shall withstand compression loads perpendicular to the plane of the laminations of not less than 10,000 pounds per square inch without detrimental reduction in thickness or extrusion.

The cost of furnishing and installing the temporary girder support, including jacking the girders and eventual removal of the support system shall be incidental to the contract lump sum price for “Jack Superstructure, Steel Girder Bridge”.

All costs associated with furnishing and installing the 0’-6” x 1’-9” x ¾” plate, the ¾” diameter x 4” threaded rods and the fabric pads shall be incidental to the contract lump sum price for “Jack Superstructure, Steel Girder Bridge”.

CONCRETE BREAKOUT (Str. No.58-086-251)

Remove all loose or broken concrete and breakout to sound concrete to the limits shown by the plans, as approved by the Engineer. Breakout limits shall be defined with a 3/4” deep sawcut where practical, as approved by the Engineer. Reinforcing steel that is exposed and is scheduled for use in the new construction shall be cleaned and straightened to the satisfaction of the Engineer. Use chipping hammers not heavier than 15 pound class for concrete removal around rebar. Care shall be taken not to damage the existing reinforcing steel during concrete breakout. Any reinforcing steel that is damaged during concrete breakout shall be replaced or repaired, as approved by the Engineer, by the Contractor at no cost to the Department. The existing reinforcing steel that is exposed during concrete breakout shall be epoxy coated in accordance with the “Epoxy Coating Existing Reinforcing Steel” notes.

The bent cap riser under girder 9 has been replaced previously. Breakout limits as shown in the plans may need to be adjusted/extended to avoid leaving a small section of the original concrete riser between the previous repair under girder 9 and the new repair under girder 8.

All broken out concrete shall be disposed of by the Contractor at a site approved by the Engineer.

During concrete removal operations, no broken out concrete shall be allowed to fall into the river.

All costs associated with breaking out and removal of concrete, and any incidentals including labor, equipment and materials necessary to complete the construction outlined by these plans shall be incidental to the contract unit price per cubic yard for “Breakout Structural Concrete”.

EPOXY COATING EXISTING REINFORCING STEEL (Str. No. 58-086-251)

The existing resteel in the Bent Cap Riser that is exposed during concrete breakout shall be epoxy coated in the field.

The reinforcing steel shall be abrasive blasted clean and then epoxy coated. The epoxy coating shall be inert in concrete and compatible with the coating applied to the new epoxy coated reinforcing steel. This coating shall be the epoxy touch up coating material supplied by an epoxy coating manufacturer who supplies coating material for new epoxy coated reinforcing steel. The abrasive blasted reinforcing steel shall be coated promptly and before detrimental oxidation occurs. The coating shall be allowed to cure for 24 hours or as per the manufacturer's recommendations, whichever is more stringent, before concrete can be placed. These bars shall be clean and free from all surface contaminants before coating.

The cost of cleaning and epoxy coating the existing reinforcing steel shall be incidental to the various bid items.

INSTALL DOWEL IN CONCRETE

The ¾" diameter x 1'-7" long anchor bolts used to attach the new steel plate to the bent cap riser shall be drilled into the bent cap and epoxied in accordance with these notes.

Holes drilled in the existing concrete shall be true and normal or as shown in the plans. Care shall be taken not to damage the existing reinforcing steel. The Contractor can expect to encounter and have to drill through reinforcing steel when installing the dowels.

The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV, (Equivalent to ASTM C881, Type IV).

The diameter of the drilled holes shall not be less than 1/8 inch greater, nor more than 3/8 inch greater than the diameter of the anchor bolts or as per the Manufacturer's recommendations. The drilled holes shall be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to epoxy injection.

Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes 1/3 to 1/2 full of epoxy, or as recommended by the Manufacturer, prior to insertion of the steel bar. Rotate the steel bar during installation to eliminate voids and ensure complete bonding of the bar. Insertion of the bars by the dipping or painting method will not be allowed.

No loads shall be applied to the epoxy grouted anchor bolts until the epoxy resin has had sufficient time to cure as specified by the epoxy resin manufacturer.

The cost of epoxy resin, the 3/4" diameter x 1'-7" anchor bolts, installation and other incidental items shall be incidental to the contract unit price per each for "Install Dowel in Concrete".

QUICK SET CONCRETE FOR BENT CAP RISER REPAIR (Str. No.58-086-251)

1. The concrete patching material shall be an approved product and shall attain a minimum 28 day compressive strength of 5000 psi. The concrete patching material shall be extended with aggregate of the quality, size and gradation specified in the manufacturer's technical literature. Two types of approved patching material are:

   Speed Crete ® Red Line
   Tamms Industries
   3835 State Route 72
   Kirkland, IL 60146
   Phone: 800-862-2667
   Fax: 815-522-2323
   Web site: www.tamms.com

   Thorite ® Rapid Vertical
   ChemRex Inc.
   889 Valley Park Drive
   Shakopee, MN 55379
   Phone: 800-433-9517
   Web site: www.chemrex.com

   Use one of the above patching products, or equal as approved by the Office of Bridge Design. Whichever concrete patching product is chosen the Contractor shall provide technical literature to the Engineer prior to its use.

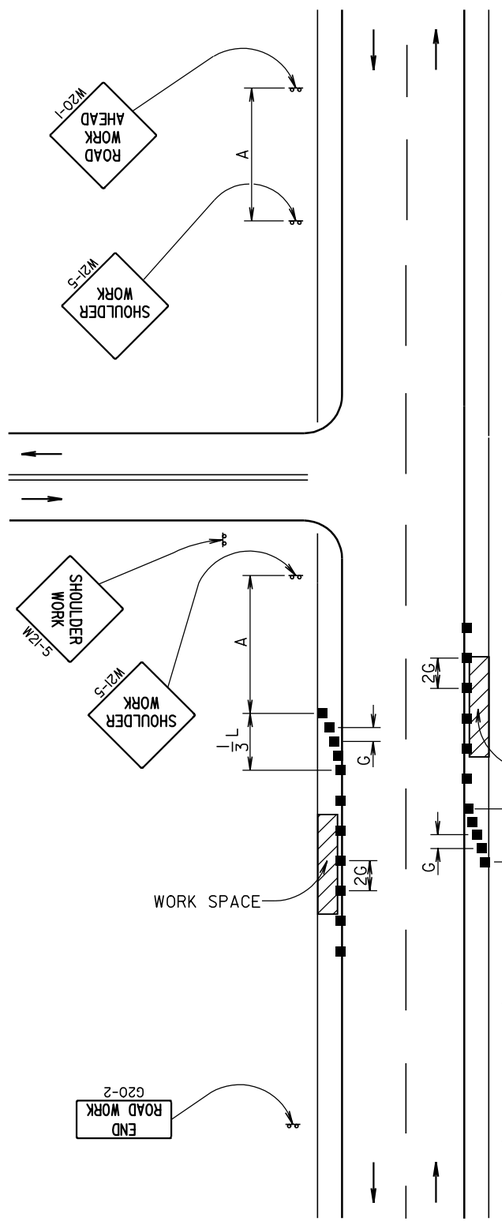
2. All of the manufacturers specifications will be followed for the final surface preparation, addition of aggregate, mixing, placement, curing, and temperature limits of the surrounding material and the concrete patch material. Curing shall be in accordance with note number 3 unless the manufacturer's requirements are more stringent.

3. Concrete repairs shall be cured by the wet cure method for a minimum of 7 days or until 70% of the 28 day compressive strength has been reached, whichever is less. The 28 day compressive strength shall be that listed in the manufacturer's technical literature. The Contractor shall submit a plan for application of curing materials and cold weather concrete protection, for approval, to the Engineer with a copy to the Bridge Construction Engineer.

4. Areas to be patched must be abrasive blasted and cleaned immediately prior to priming and patching. All loose materials must be removed by sweeping and blowing out with clean, dry, oil free compressed air at 90 psi. When the clean and dry areas have been approved by the Engineer, they must be prepared in accordance with the concrete patching material manufacturers recommendations.

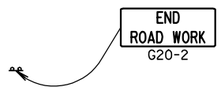
5. Due to the size of the repair area additional aggregate will be required in the patching material. Care shall be taken to follow the manufacturers specifications.

6. The cost for concrete, cleaning, curing, cold weather protection and any other incidental items required to complete the work shall incidental to the contract unit price per cubic foot for "Concrete Patching Material".



Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Taper Length (Feet) (L)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	180	25
35 - 40	350	320	25
45 - 50	500	600	50
55	750	660	50
60 - 65	1000	780	50

■ Channelizing Device



The channelizing devices shall be drums or type II barricades if traffic control must remain overnight or longer.

For short duration operations (1 hour or less) all signs and channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.

Worker signs (W21-1 or W21-1a) may be used instead of SHOULDER WORK signs.

A SHOULDER WORK sign should be placed on the left side of a divided or one-way roadway only if the left shoulder is affected.

The SHOULDER WORK sign on an intersecting roadway is not required if drivers emerging from that roadway will encounter another advance warning sign before they reach a work activity area.

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

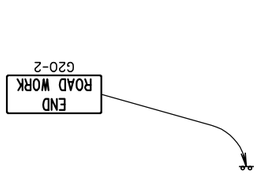
For low-volume traffic situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger may be used.

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.

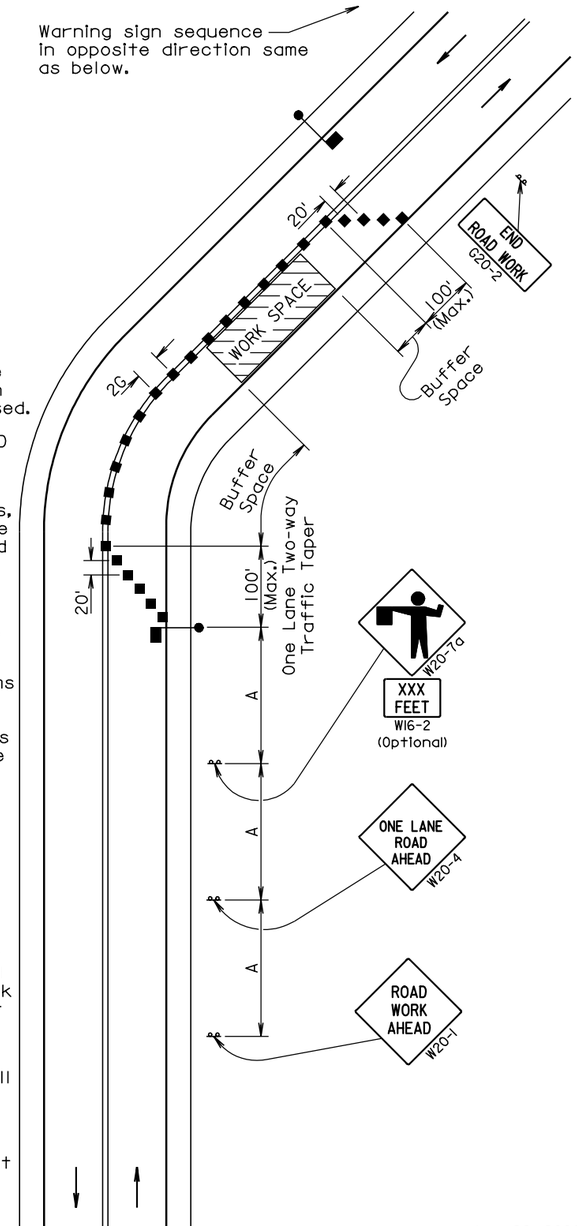
The channelizing devices shall be drums or type II barricades if traffic control must remain overnight or longer. During daylight hours, 42" cones may be used in lieu of drums or type II barricades along the centerline.

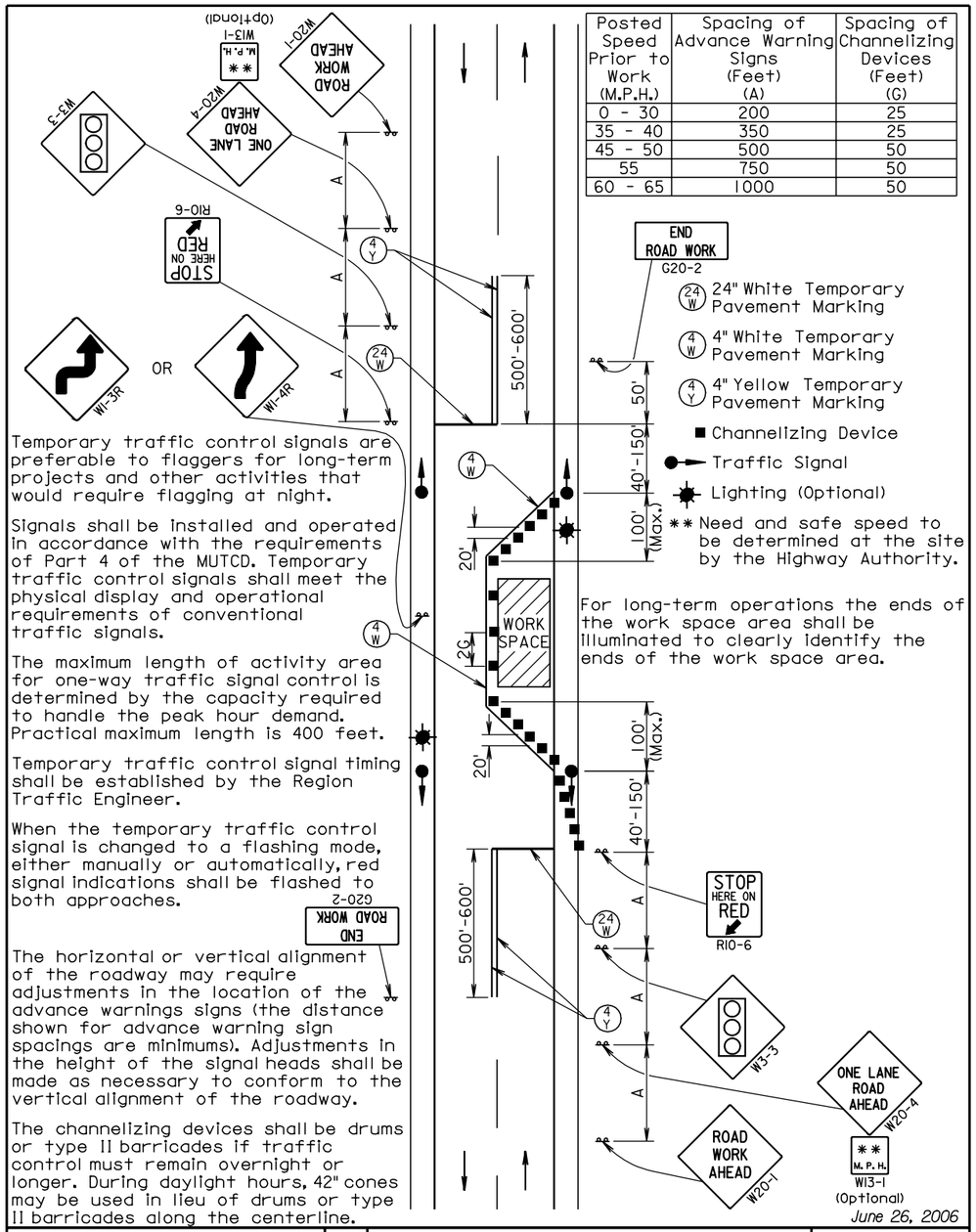


Channelizing devices are not required along the centerline adjacent to work area when pilot cars are utilized for escorting traffic through the work area.

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

The buffer space shall be a sufficient length so that the channelizing devices are visible to approaching traffic.





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

Temporary traffic control signals are preferable to flaggers for long-term projects and other activities that would require flagging at night.

Signals shall be installed and operated in accordance with the requirements of Part 4 of the MUTCD. Temporary traffic control signals shall meet the physical display and operational requirements of conventional traffic signals.

The maximum length of activity area for one-way traffic signal control is determined by the capacity required to handle the peak hour demand. Practical maximum length is 400 feet.

Temporary traffic control signal timing shall be established by the Region Traffic Engineer.

When the temporary traffic control signal is changed to a flashing mode, either manually or automatically, red signal indications shall be flashed to both approaches.

The horizontal or vertical alignment of the roadway may require adjustments in the location of the advance warnings signs (the distance shown for advance warning sign spacings are minimums). Adjustments in the height of the signal heads shall be made as necessary to conform to the vertical alignment of the roadway.

The channelizing devices shall be drums or type II barricades if traffic control must remain overnight or longer. During daylight hours, 42" cones may be used in lieu of drums or type II barricades along the centerline.

June 26, 2006

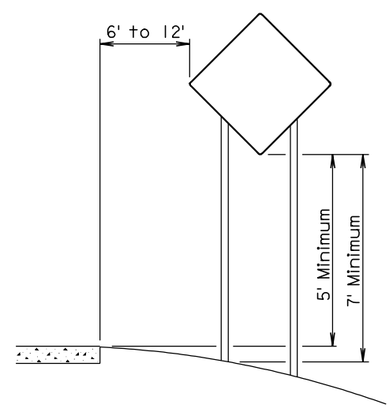
Published Date: 2nd Qtr. 2007

SDDOT

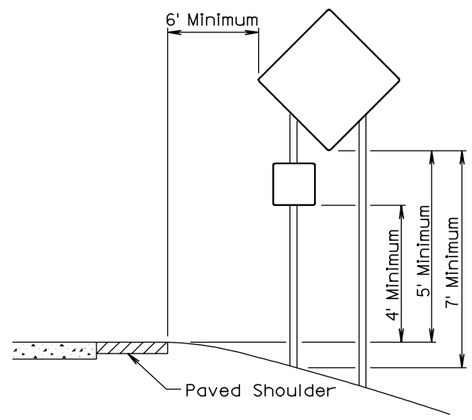
GUIDES FOR TRAFFIC CONTROL DEVICES
LANE CLOSURE USING TRAFFIC SIGNALS

PLATE NUMBER 634.26

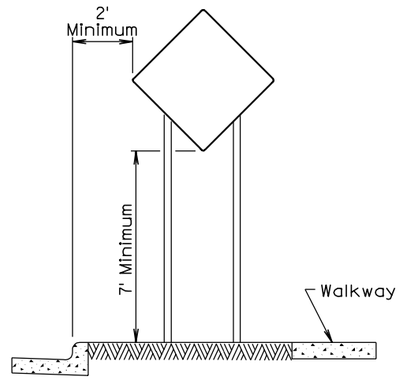
Sheet 1 of 1



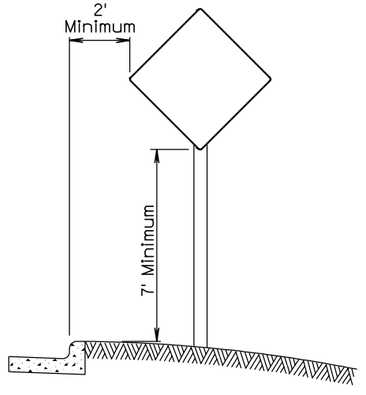
RURAL DISTRICT



RURAL DISTRICT WITH SUPPLEMENTAL PLATE



URBAN DISTRICT



URBAN DISTRICT

December 23, 2003

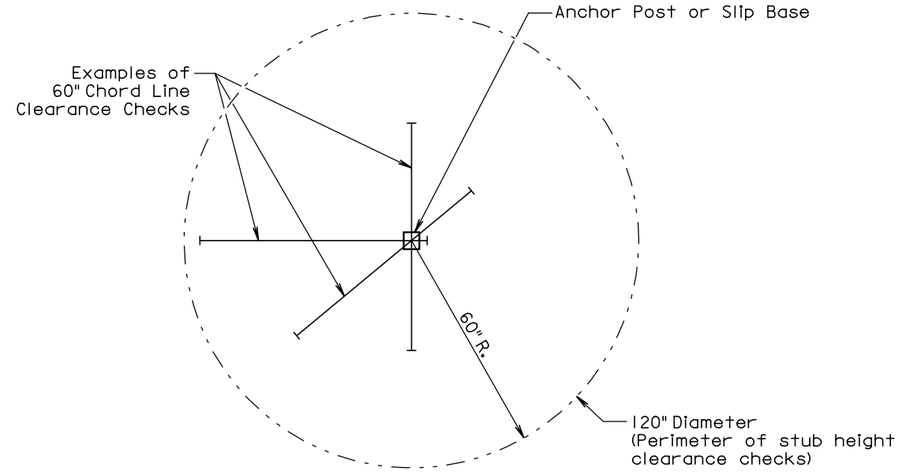
Published Date: 2nd Qtr. 2007

SDDOT

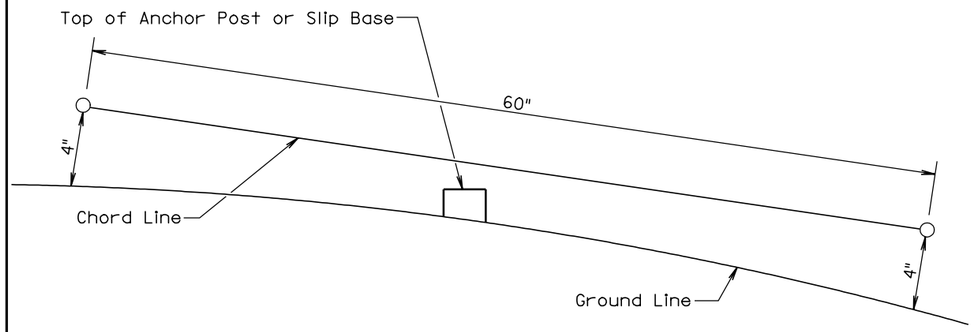
BREAKAWAY SIGN SUPPORTS
(Typical Construction Signing)

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. 2007	SDDOT	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99 Sheet 1 of 1

ITEMIZED LIST FOR TRAFFIC CONTROL
PCN i0p1

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	2	17	34
R10-6	24" x 36"	STOP HERE ON RED	2	20	40
W1-4	48" x 48"	REVERSE CURVE SIGN (LEFT OR RIGHT)	1	34	34
W3-3	48" x 48"	SIGNAL AHEAD (SYMBOL)	2	34	68
W20-1	48" x 48"	ROAD WORK #### FT. OR AHEAD	2	34	68
W20-4	48" x 48"	ONE LANE ROAD #### FT. OR AHEAD	2	34	68
				TOTAL UNITS	**312**

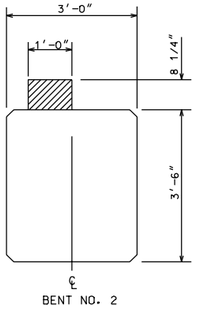
ITEMIZED LIST FOR TRAFFIC CONTROL
PCN i0ny

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	2	17	34
W20-1	48" x 48"	ROAD WORK #### FT. OR AHEAD	2	34	68
W20-4	48" x 48"	ONE LANE ROAD #### FT. OR AHEAD	2	34	68
W20-7a	48" x 48"	FLAGGER	2	34	68
W21-5	48" x 48"	SHOULDER WORK	2	34	68
				TOTAL UNITS	**306**

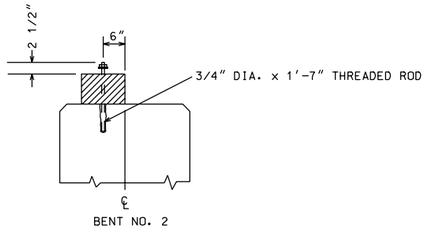
ITEMIZED LIST FOR TRAFFIC CONTROL
PCN i0nz, i0p0, i0p2, i0p3, i0p4, i0p5, i0p6 & i0p7

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	16	17	272
W20-1	48" x 48"	ROAD WORK #### FT. OR AHEAD	16	34	544
W20-4	48" x 48"	ONE LANE ROAD #### FT. OR AHEAD	16	34	544
W20-7a	48" x 48"	FLAGGER	16	34	544
				TOTAL UNITS	**1904**

If a sign is required on a project and not listed in the above inventory, the units per sign will be determined as follows:
Signs 36" x 36" will be measured at 27 units each and signs 48" x 48" will be measured at 34 units each, otherwise:
If a sign measures less than 25" high and 25" wide the units per sign will be computed as sign size (sq ft) x 3.
If a sign measures between 23H" and 37H" the units per sign will be computed as sign size (sq ft) x 1.2 +15.

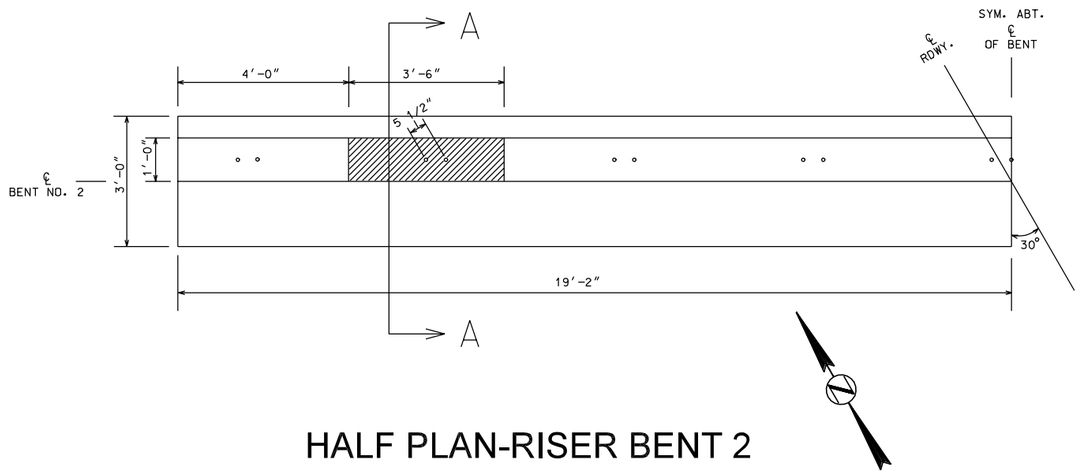


LONGITUDINAL VIEW



SEC A-A

NOTE: BEARING PLATES NOT SHOWN.

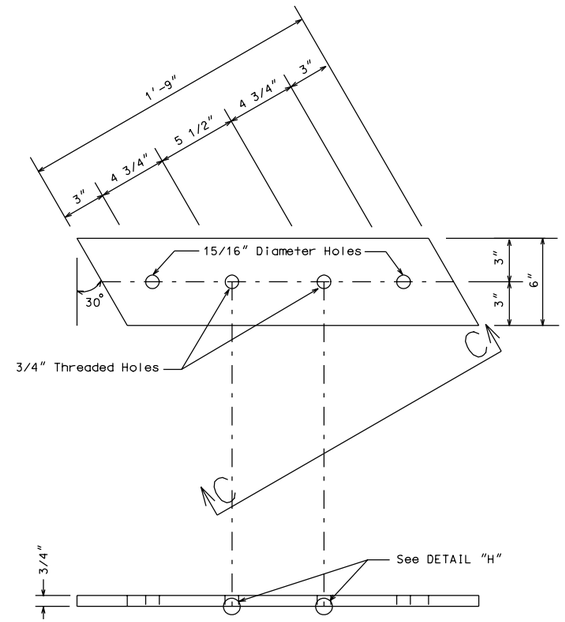


HALF PLAN-RISER BENT 2

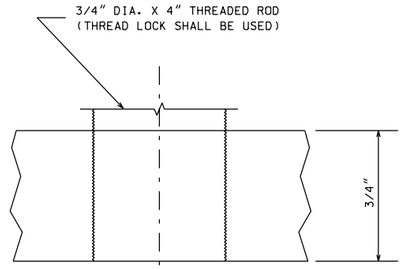
Crosshatched area represents concrete removal area.

NOTE: STEEL REINFORCEMENT NOT SHOWN.
SEE ORIGINAL CONSTRUCTION PLANS FOR
STEEL REINFORCEMENT DETAIL.

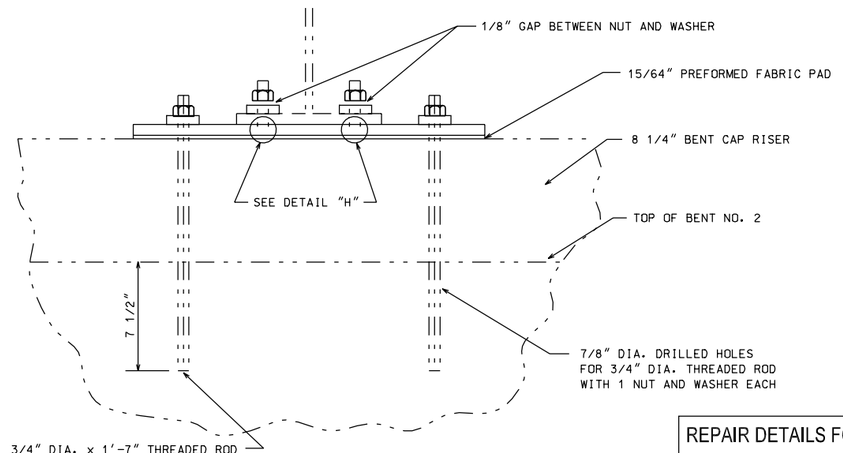
REPAIR DETAILS FOR BENT CAP RISER
STR. NO. 58-086-251
US 212
OVER TURTLE CREEK
SPINK COUNTY



NEW STEEL PLATE - BENT 2



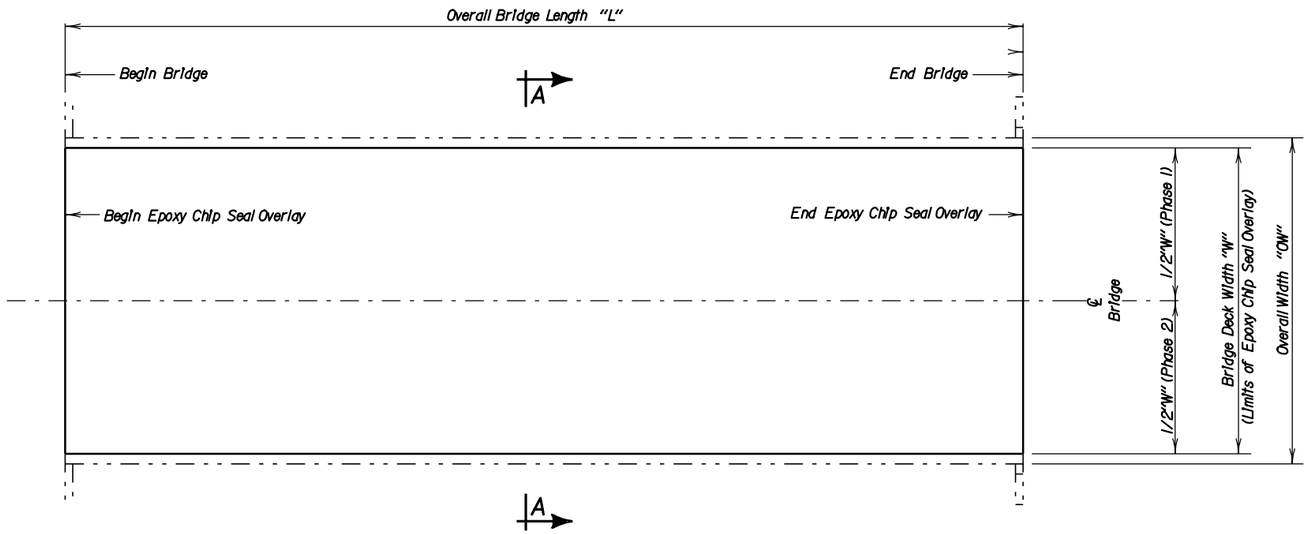
DETAIL "H"



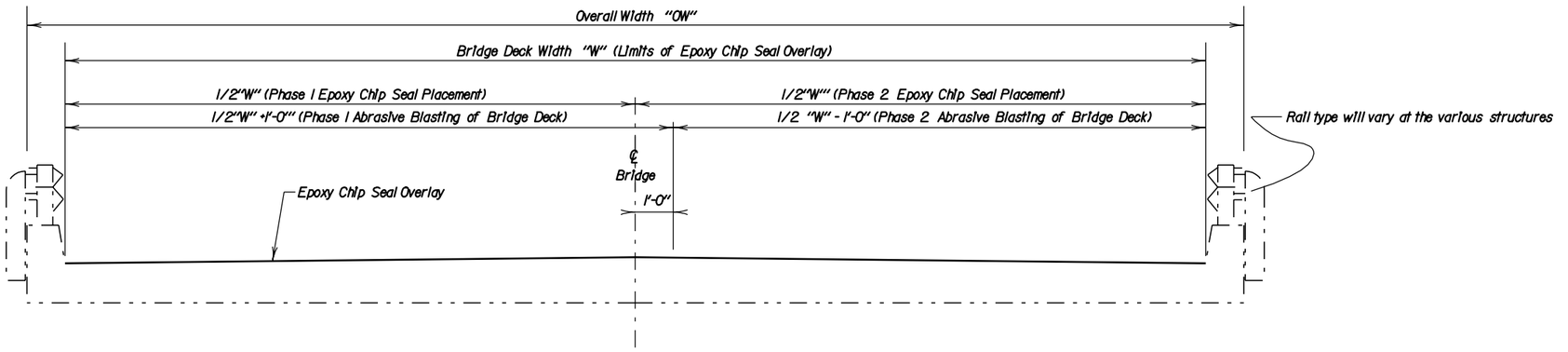
SEC C-C

NOTE: STEEL REINFORCEMENT NOT SHOWN.
SEE ORIGINAL CONSTRUCTION PLANS FOR
STEEL REINFORCEMENT DETAIL.

REPAIR DETAILS FOR BENT CAP RISER
STR. NO. 58-086-251
US 212
OVER TURTLE CREEK
SPINK COUNTY



PLAN



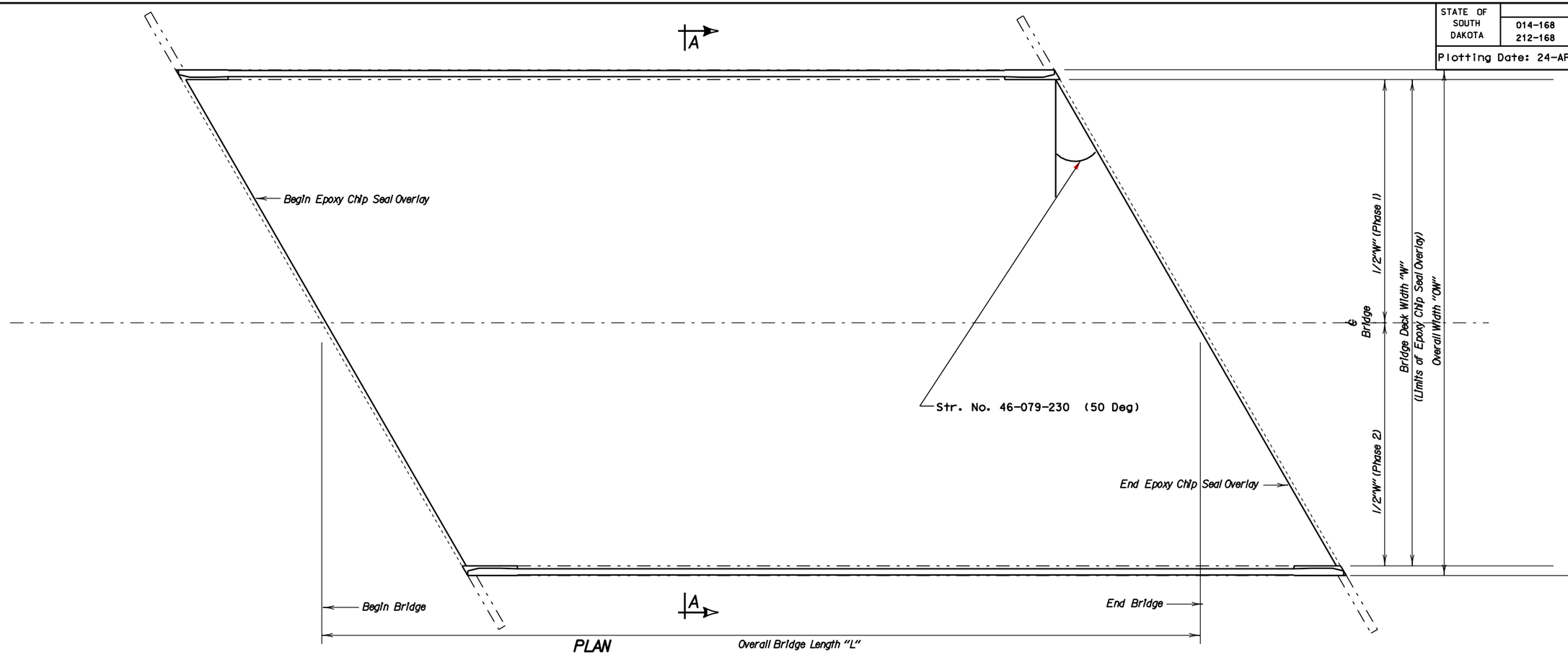
SECTION A - A

Str. No.	Route	MRM	Bridge Deck Width ''W''	Overall Width ''OW''	Overall Bridge Length ''L''	Abrasive Blasting of Bridge Deck (SqYd)	Bridge Deck Epoxy Chip Seal (SqYd)	Concrete Patching Material (CuFt)	Concrete Removal, Class A (SqYd)	Concrete Removal, Class B (SqYd)	Remove and Replace Deteriorated Concrete Location & Comments
09-094-080	SD 34	272.07	30' - 0''	33' - 2''	62' - 0''	206.7	206.7	0	0	0	
09-290-063	SD 45	82.77	30' - 0''	34' - 0''	54' - 0''	180.0	180.0	0	0	0	
30-160-442	SD 45	93.02	30' - 0''	32' - 4''	97' - 6''	325.0	325.0	0	0	0	
19-070-046	SD 27	208.37	36' - 0''	38' - 8''	163' - 0''	652.0	652.0	0	0	0	
19-070-089	SD 27	204.05	36' - 0''	38' - 8''	93' - 0''	372.0	372.0	0	0	0	
46-065-100	SD 10	316.70	30' - 0''	33' - 2''	53' - 8''	178.9	178.9	0	0	0	
46-110-123	SD 27	228.45	38' - 0''	40' - 8''	86' - 6''	365.2	365.2	0	0	0	

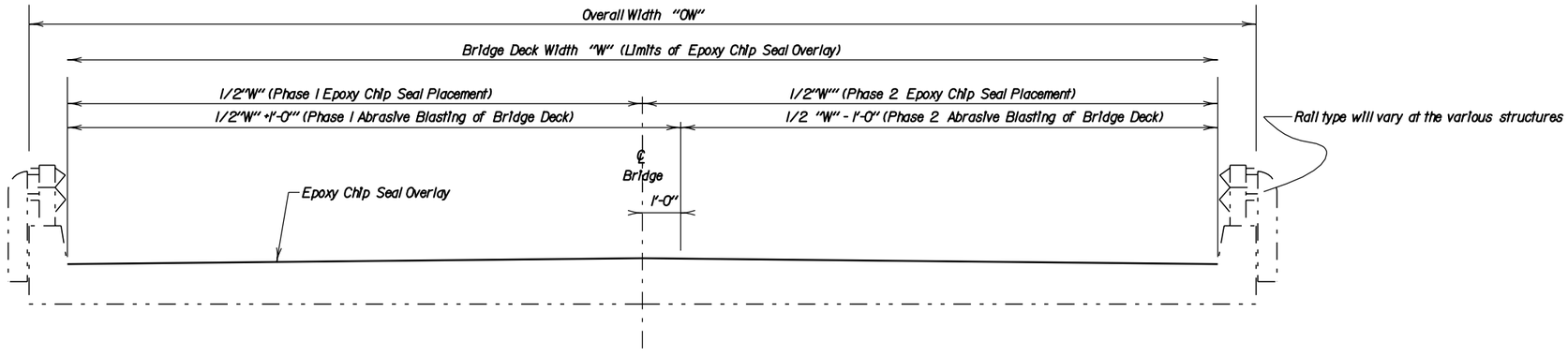
PLOT SCALE - 0.154528:1.000000
PLOT NAME - DECKOVERLAYLAYOUT
FILE - H:\PLANS\2007 EPOXY CHIP SEALS\DECKOVERLAYLAYOUT.DGN
PLOTTED FROM - TRBR1NT12

STATE OF SOUTH DAKOTA	PROJECT			SHEET NO.	TOTAL SHEETS
	014-168	034-168	045-168	13	36
	212-168	027-168	010-168		

Plotting Date: 24-APR-2007

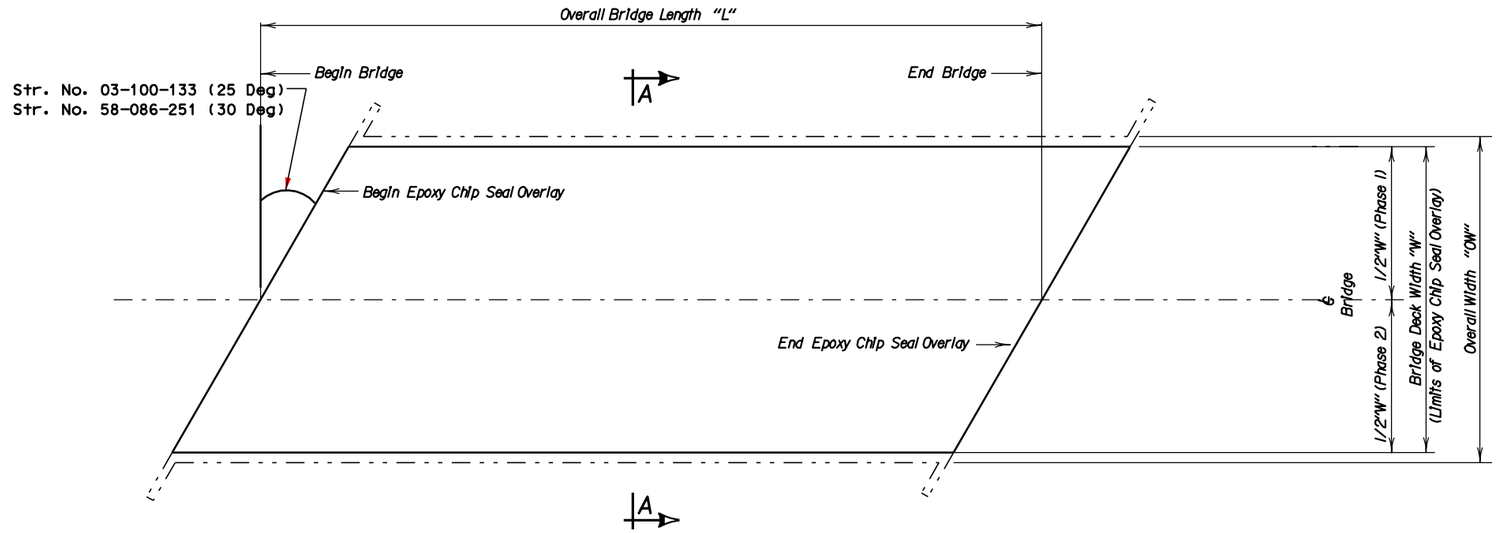


PLAN

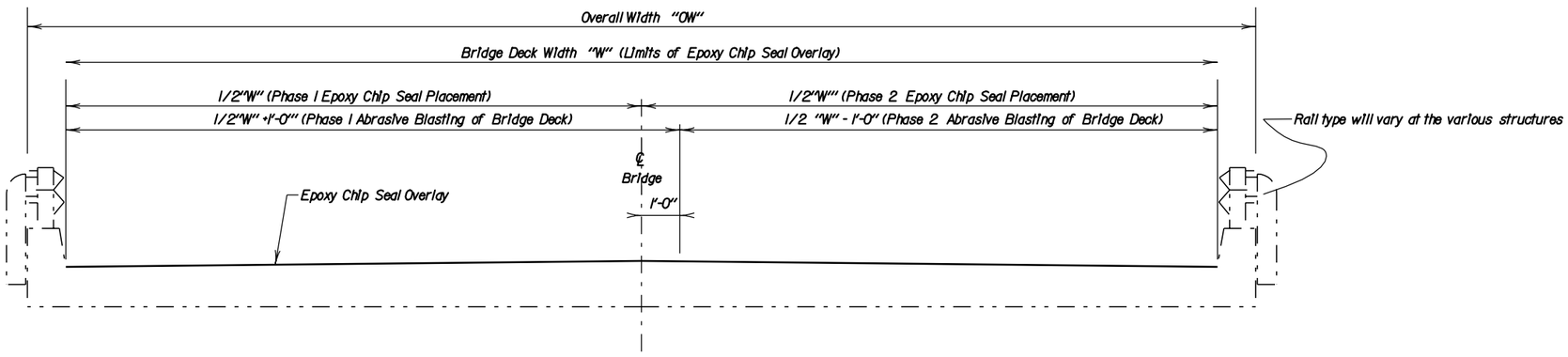


SECTION A - A

Str. No.	Route	MRM	Bridge Deck Width ''W''	Overall Width ''OW''	Overall Bridge Length ''L''	Abrasive Blasting of Bridge Deck (SqYd)	Bridge Deck Epoxy Chip Seal (SqYd)	Concrete Patching Material (CuFt)	Concrete Removal, Class A (SqYd)	Concrete Removal, Class B (SqYd)	Remove and Replace Deteriorated Concrete Location & Comments
46-079-230	SD 27	214.54	36' - 0''	38' - 8''	94' - 1 3/8''	376.4	376.4	0	0	0	



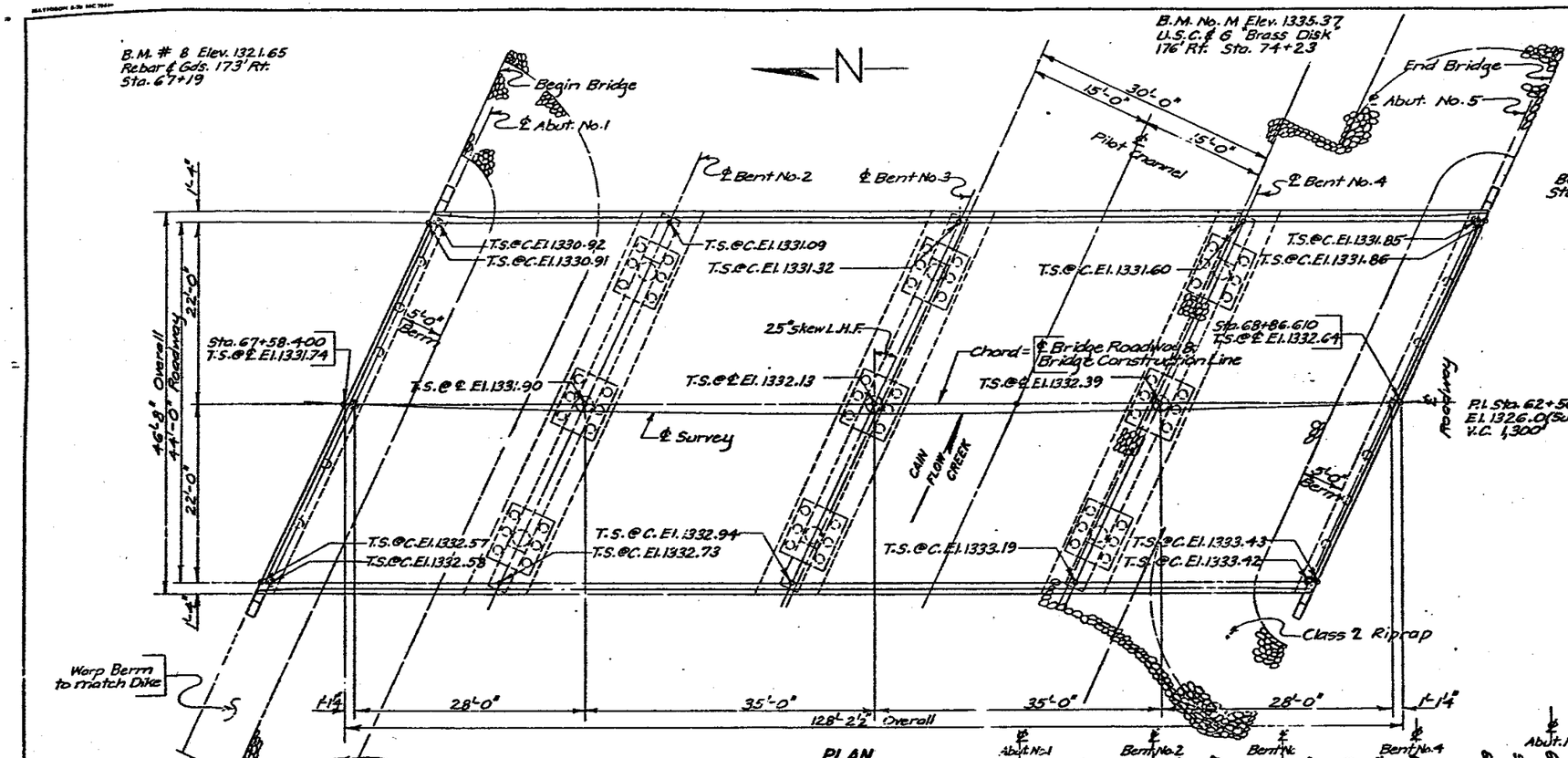
PLAN



SECTION A - A

Str. No.	Route	MRM	Bridge Deck Width ''W''	Overall Width ''OW''	Overall Bridge Length ''L''	Abrasive Blasting of Bridge Deck (SqYd)	Bridge Deck Epoxy Chip Seal (SqYd)	Concrete Patching Material (CuFt)	Concrete Removal, Class A (SqYd)	Concrete Removal, Class B (SqYd)	Remove and Replace Deteriorated Concrete Location & Comments
03-100-133	US 14	327.69	44' - 0''	46' - 7''	128' - 2 1/2''	626.8	626.8	7.5	1.0	0.5	Delamination found on bridge deck during last inspection. 2 SqFt at NE corner and 2 SqFt at SW corner
58-086-251	US 212	306.15	30' - 0''	33' - 2''	315' - 3 3/4"	1051.0	1051.0	130.2	13.9	8.5	Delamination found on bridge deck during last inspection. 30 SqFt at West end of bridge deck in EBL, 20 SqFt at East end of bridge deck in EBL, and 75 SqFt on edges by bents.

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	15	36

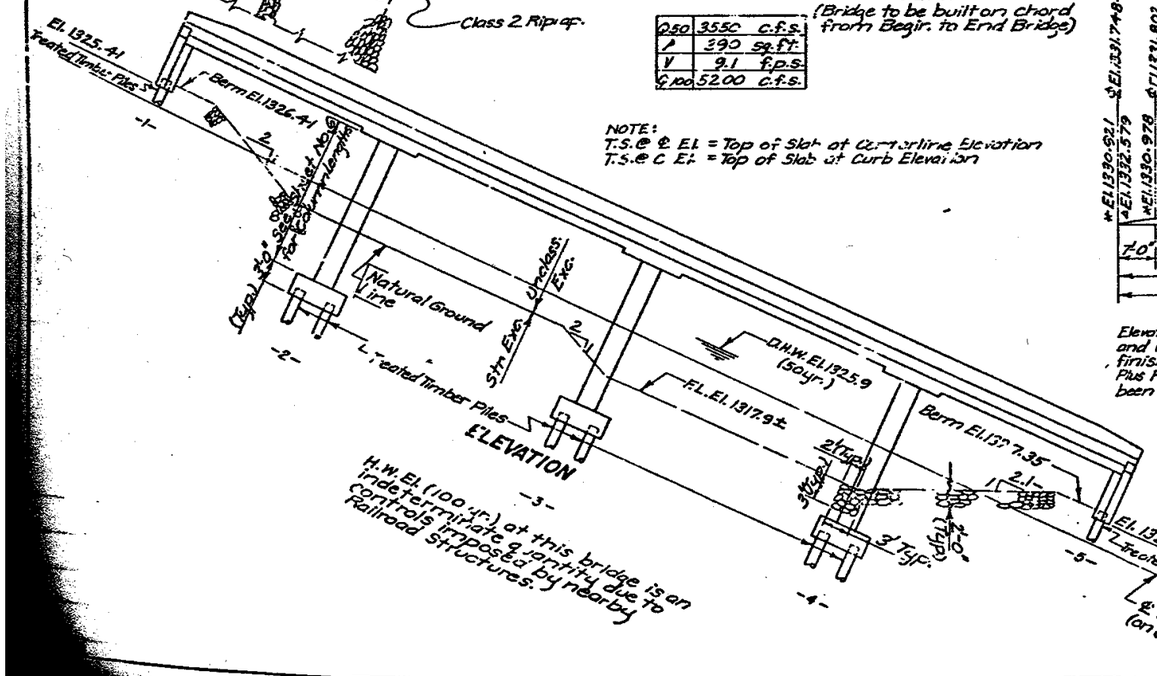


PLAN

(Bridge to be built on chord from Begin. to End Bridge)

Q50	3550	c.f.s.
A	390	sq.ft.
V	9.1	f.p.s.
Q100	5200	c.f.s.

NOTE:
T.S.@℄ El. = Top of Slab at Centerline Elevation
T.S.@C El. = Top of Slab at Curb Elevation



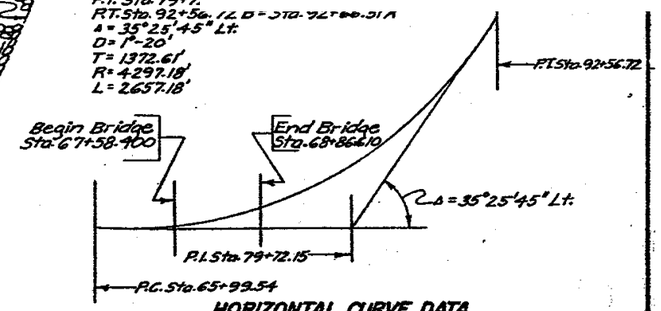
ELEVATION

H.W. El. (100 yr.) at this bridge is an indeterminate quantity due to controls imposed by nearby Railroad structures.

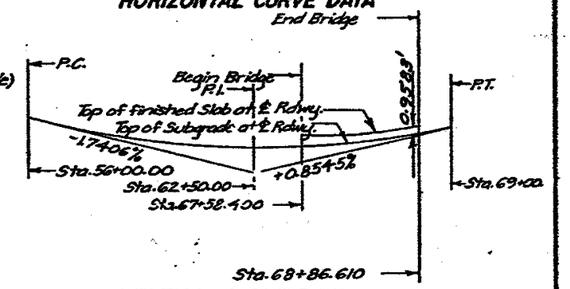
CURB & ℄ ELEVATIONS

Elevations indicated with * are top of finished slab at left curb, and with ℄ are top of slab at centerline and with Δ are top of finished slab at right curb. Camber for Dead Load Deflection Plus Plastic Flow shown on Sheet 7 of 40 of Bridge Plans have been included in the elevations shown above.

Construction
P.C. Sta. 65+9
P.I. Sta. 79+7
RT. Sta. 92+5
Δ = 35°25'45" Lt.
D = 1°-20'
T = 1372.61'
R = 4297.18'
L = 2657.18'



HORIZONTAL CURVE DATA



VERTICAL CURVE DATA

-X020-

INDEX OF BRIDGE SHEETS—

ORIGINAL CONSTRUCTION PLANS

GENERAL DRAWING
FOR
128'-2 1/2" CONTINUOUS CONCRETE BRIDGE

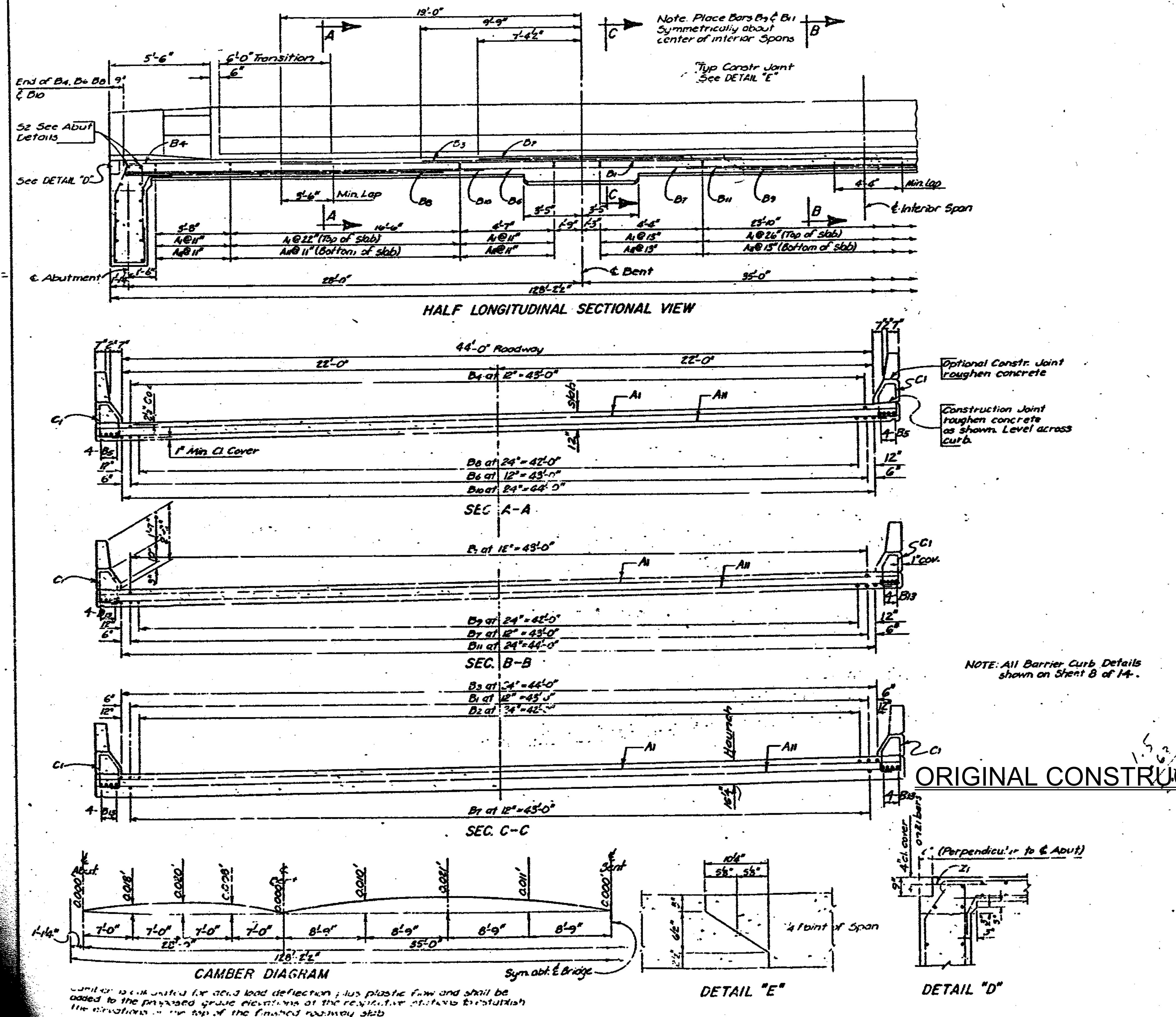
44'-0" ROADWAY — 25° SKEW L.H.F.
OVER CAIN CREEK — SEC. 10/11-T111N-R64W
STA. 67+58.400 TO 68+86.810 — F0014(3)326
STR. NO. 03-100-133 — HS20-44 (8 ALT.)
BEADLE COUNTY

S. D. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
MARCH 1979 (1) OF (14)

-X020-

PLANS BY:
BRIDGE PROGRAM, S.DAK. DIV. OF HWYS.

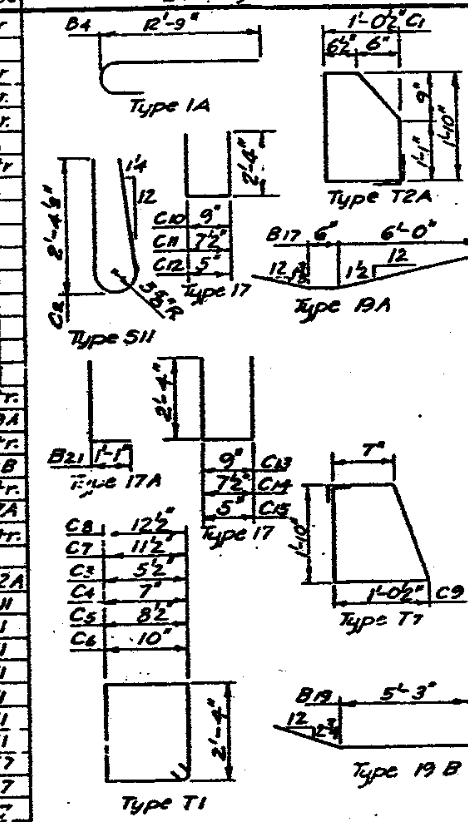
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	W.C.P.	L.W.	B.C. Wilson, BRIDGE ENGINEER



Camber is calculated for dead load deflection plus plastic flow and shall be added to the proposed grade elevations at the respective stations to establish the elevations of the top of the finished roadway slab

REINFORCING SCHEDULE

	Mk	No	Size	Length	Type
ϕ	A1	78	5	51'-0"	Str
	A2	(See Bent Details)			
ϕ	B1	132	9	39'-6"	Str
ϕ	B2	66	9	14'-9"	Str.
ϕ	B3	69	8	19'-6"	Str.
ϕ	B4	88	8	13'-8"	1A
	B5	16	5	29'-0"	Str
	B6	88	9	28'-5"	
	B7	88	9	35'-0"	
	B8	44	9	19'-0"	
	B9	44	9	17'-6"	
	B10	46	10	22'-5"	
	B11	46	9	22'-6"	
	B12	36	5	36'-0"	
	B13	16	5	35'-0"	
	B15	12	5	14'-3"	
	B16	8	4	30'-5"	Str.
	B17	8	4	7'-7"	19A
	B18	8	4	2'-6"	Str.
	B19	12	8	8'-1"	19B
	ΔB20	16	4	32'-9"	Str.
	B21	12	6	3'-5"	17A
	B22	12	5	2'-3"	Str.
ϕ	C1	240	5	6'-5"	T2A
	C2	208		5'-1"	S11
	C3	4		6'-7"	T1
	C4	4		6'-10"	T1
	C5	12		7'-1"	T1
	C6	4		7'-4"	T1
	C7	4		7'-7"	T1
	C8	4	5	7'-[illegible]"	T1
ϕ	C9	4	6	6'-[illegible]"	T7
ϕ	C10	4	6	5'-[illegible]"	17
ϕ	C11	4	6	5'-4"	17
ϕ	C12	4	6	5'-1"	17
	C13	4	5	5'-5"	17
	C14	4	5	5'-4"	17
	C15	4	5	5'-1"	17
	*Z1	118	7	4'-[illegible]"	Str.
	A11	118	[illegible]	51'-0"	[illegible]



ΔBend in field where necessary to fit.
*See Sheet 12 of 14 for location of Z1 bars.
NOTE: All dimensions are out to out of bars.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Class "A" Concrete, Bridge Deck	Cu. Yd.	259.3
Reinforcement Conc. Masonry	Lb.	49,470
Epoxy Coated Reinforcing Steel	Lb.	33,688

ϕ All A1, B1, B2, B3, B4, C1, C9, C10, C11, & C12 are to be Epoxy Coated

SUPERSTRUCTURE DETAILS
FOR
128'-2½" CONTINUOUS CONCRETE BRIDGE

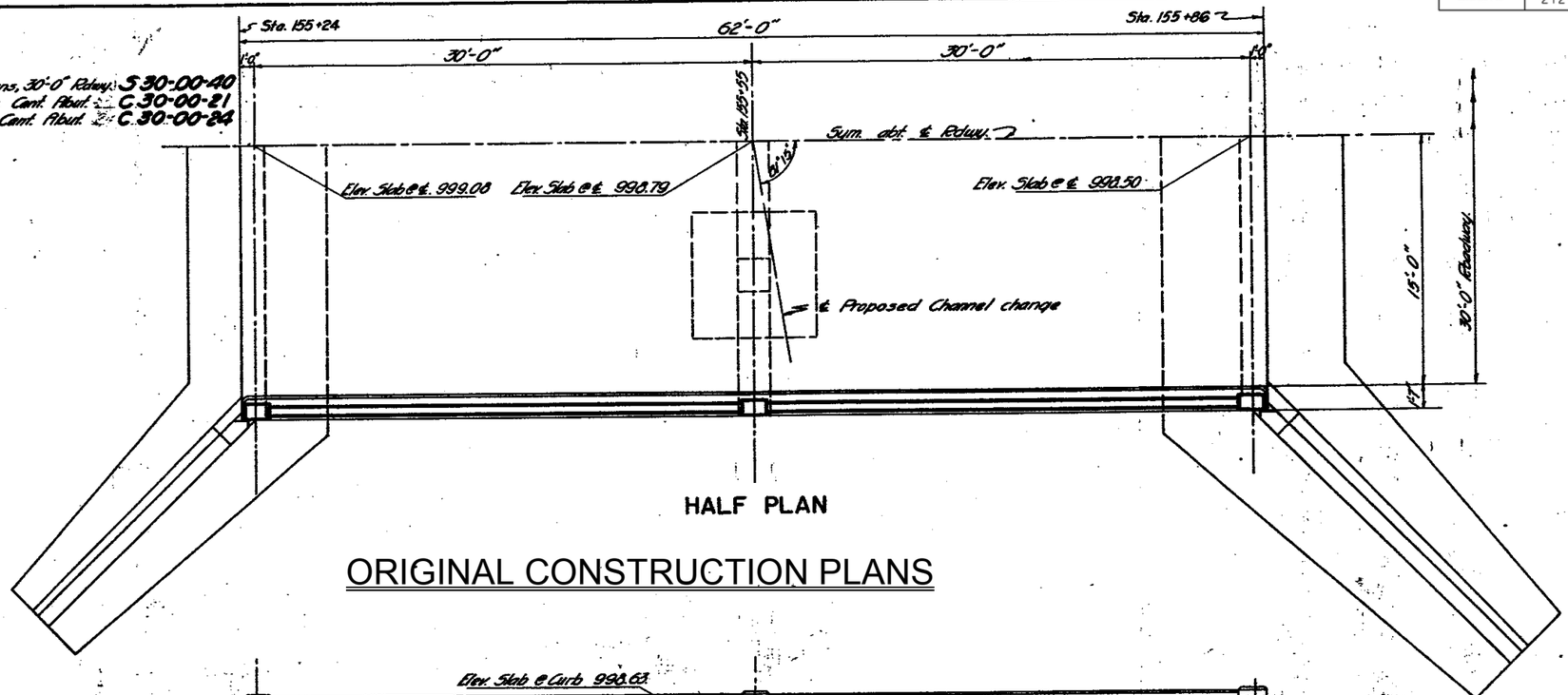
44'-0" ROADWAY — 25° SKEW L.H.F.
OVER CAIN CREEK — SEC.10/11-T111N-R64W
STA.67+58.400 TO 69+86.610 — F0014(3)326
STR. NO. 03-100-125 — HS20-44 (& ALT.)
BEADLE COUNTY

S. D. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
FEB. 1979 — 7 OF 14

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	AJR, RLB	OCB, W.G.R.	K.C. Wilson, BRIDGE ENGINEER

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	17	36

Index of Bridge Sheets:
Sheet 1 - General Drawing.
Sheet 2 - Std I-Beam Viaduct, 20'-40' Spans, 30'-0" Rdwy. S 30-00-40
Sheet 3 - Details of Reinforced Conc. Cant. Abut. C 30-00-21
Sheet 4 - Details of Reinforced Conc. Cant. Abut. C 30-00-24

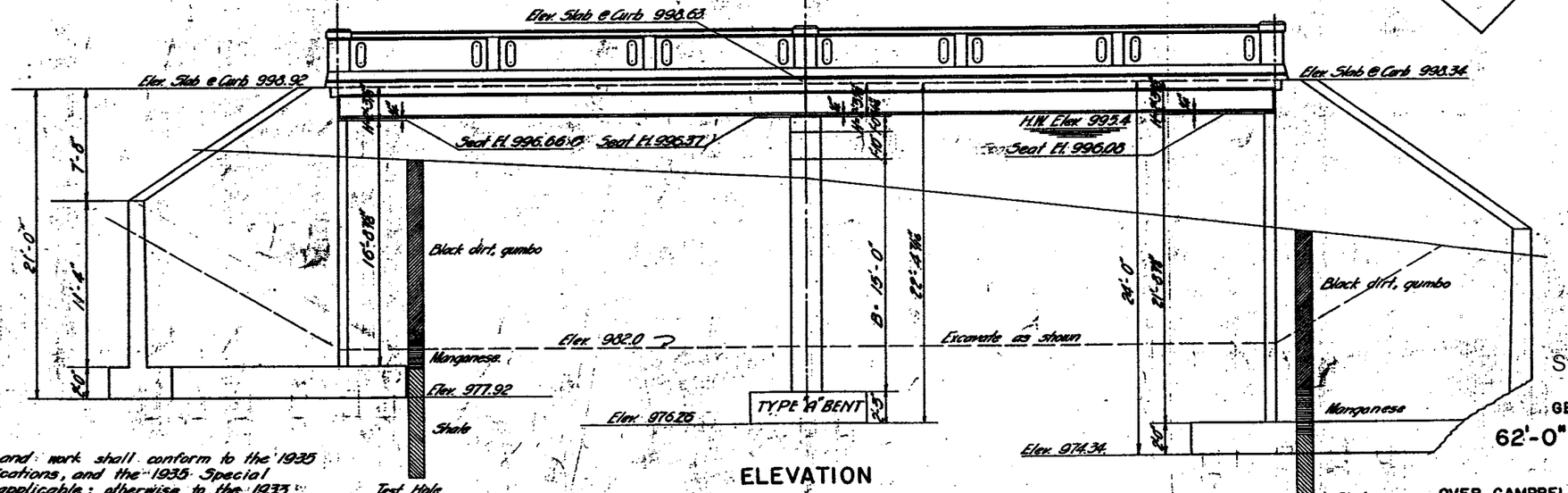


HALF PLAN

B.M. No. 12 Elev. 998.51
2"-2" Hub 50' Left
Sta. 153+00

B.M. No. 12 A Elev. 992.94
Spike in tree 50' Rt.
Sta. 153+20

ORIGINAL CONSTRUCTION PLANS



ELEVATION

All materials and work shall conform to the 1935 A.A.S.H.O. Specifications, and the 1935 Special Provisions where applicable; otherwise to the 1933 South Dakota Standard Specifications.

QUANTITIES

	Concrete Cu Yds.		Reinf. Steel	Struc. Steel	Excavation		Lead
	Class A	H.P.	Lbs.	Lbs.	Com. Cu Yds.	Str. Cu Yds.	Lbs.
Superstr.	51.6	4.44	7620	31600			150
21' Abut.	101.4	0.15	13570	368		200.0	
24' Abut.	134.1	0.15	19400	360		300.0	
1 Bent	22.9		4975	1715		335.0	
Total	310.0	4.74	45565	34051	1390	535.0	150

Rev. 8-30-35
Lgth. Rev. 9-6-35
Rev. 8-14-35

Structure No. 09-094-080

GENERAL DRAWING

62'-0" I-BEAM VIADUCT

30'-0" ROADWAY

OVER CAMPBELL CREEK SEC. 8-17 T107N R71W

STA. 155+24 TO STA. 155+86 F.A.P. 182 B

BUFFALO COUNTY

SOUTH DAKOTA

STATE HIGHWAY COMMISSION

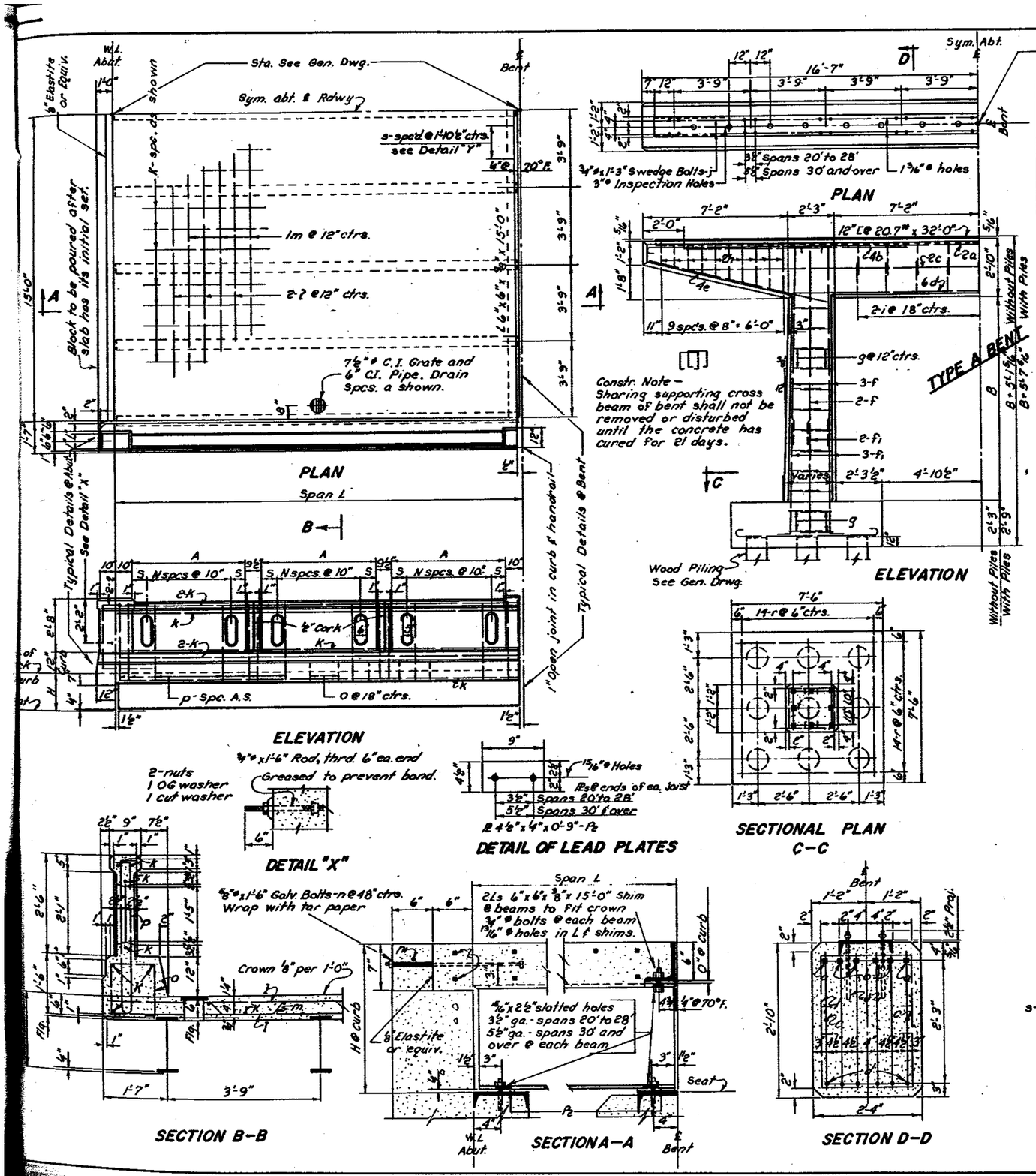
1935

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	MP	W.G.P.	BRIDGE ENGINEER

09-094-080

09-311

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	18	36



TABULAR

Span L	20'-0"	22'-0"	24'-0"	26'-0"	28'-0"	30'-0"	32'-0"	34'-0"	36'-0"	38'-0"	40'-0"
7 Interior Joists	16" WF 40#	16" WF 45#	18" WF 47#	18" WF 50#	18" WF 55#	21" WF 59#	21" WF 59#	21" WF 63#	21" WF 68#	24" WF 74#	24" WF 74#
2 Exterior Joists	16" WF 40#	16" WF 45#	18" WF 47#	18" WF 50#	18" WF 55#	21" WF 55#	21" WF 59#	21" WF 68#	21" WF 73#	24" WF 74#	24" WF 80#
Joist-Length	19'-9"	21'-9"	23'-9"	25'-9"	27'-9"	29'-9"	31'-9"	33'-9"	35'-9"	37'-9"	39'-9"
A	3'-7"	4'-3"	4'-11"	7'-7"	8'-3"	8'-11"	9'-7"	10'-3"	10'-11"	11'-7"	12'-3"
S	8½"	7½"	6½"	5½"	9½"	8½"	7½"	6½"	5½"	9½"	8½"
N	5	6	7	8	8	9	10	11	12	12	13
H	1'-10¾"	1'-10⅜"	2'-0⅜"	2'-0¾"	2'-0⅜"	2'-3⅜"	2'-3⅜"	2'-3⅜"	2'-3½"	2'-4⅜"	2'-4⅜"
M	19	21	23	25	27	29	31	33	35	37	39
Q	14	15	16	18	19	20	22	23	24	26	27

ROD LIST FOR ONE SPAN

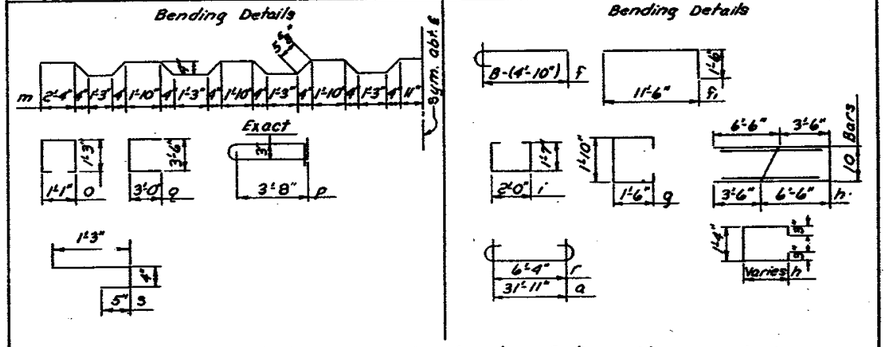
Mk.	No.	Sz.	Length	Remarks
K	38	½" ø	1'-3"	
l	2M+2	½" ø	32'-9"	Add 2 @ each Abut.
m	M	½" ø	35'-0"	
n	8	⅝" ø	1'-6"	Bolts @ each Abut.
n1	1	½" ø	29'-9"	@ each Abut.
o	2Q	½" ø	4'-3"	
p	6N+16	½" ø	8'-6"	
q	4	½" ø	9'-6"	@ each Abut.
s	32	⅝" ø	2'-0"	Anchor Rods @ each Bent

*Welded to 6"x6"x⅜" ℓs - See Detail "Y"
*Galvanized

ROD LIST FOR ONE BENT

Mk.	No.	Sz.	Length	Remarks
a	2	1¼" □	35'-3"	
b	8	1¼" □	12'-0"	
c	2	¾" ø	29'-0"	
d	6	¾" ø	18'-6"	
e	8	½" □	9'-3"	
f	16	1" □	B-(3'-6")	
f1	16	1⅛" □	13'-0"	
g	8	⅜" ø	5'-6"	Add 4 per Ft. of B
h	20	½" □	10'-0"	Cut Bars
i	18	½" ø	6'-0"	
j	36	¾" ø	1'-3"	Swedge Bolts
r	56	1" □	9'-0"	

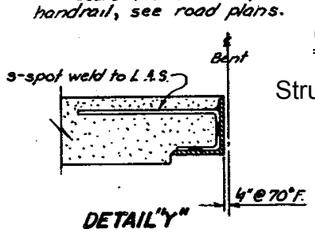
Bending Details



All dimensions are to ℄ of bars. Hooks shall have 5 diams. clear openings.

NOTES:

Cost of Exp. Mtl., G.R. Anchors and drains shall be absorbed in the unit price bid for Cl. A concrete.
Seat channels shall be painted two field coats of black graphite paint before joists are set.
Wood piling shall develop 18 tons per pile and if piling are not used, (See Gen. Dwg.), the foundation material shall develop 3 tons per sq. ft. If the above bearing capacities are not obtainable, the Engineer in charge shall communicate with the OFFICE.
All exposed steel surfaces except seat channels shall be painted one shop coat of red lead paint and two field coats of Aluminum paint.
Guard rail anchors, see Detail "X", shall be located where cable guard rail joins bridge handrail, see road plans.



ORIGINAL CONSTRUCTION PLANS

Structure No. 09-094-080

DETAILS OF

STANDARD I-BEAM VIADUCT

30'-0" ROADWAY

SOUTH DAKOTA

STATE HIGHWAY COMMISSION

1935

L.L. = 111.

Rev 8-4-36
Rev 3-17-36
Rev 3-11-36
Rev 2-28-36
Rev 1-18-36

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	E.E.	C.E.L.	BRIDGE ENGINEER

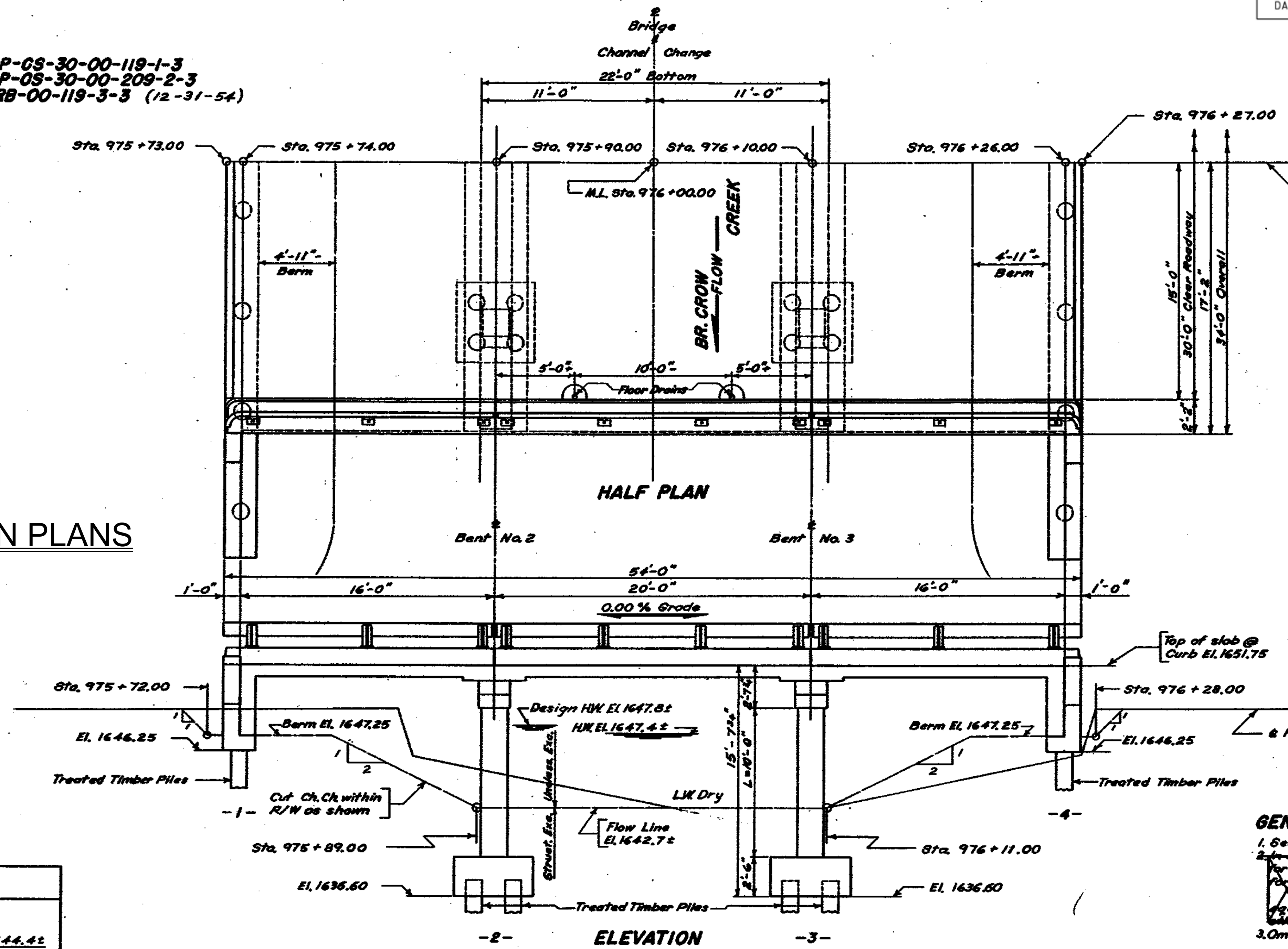
Traced from Original Linen-1975

S-30-00-40

— X020 —

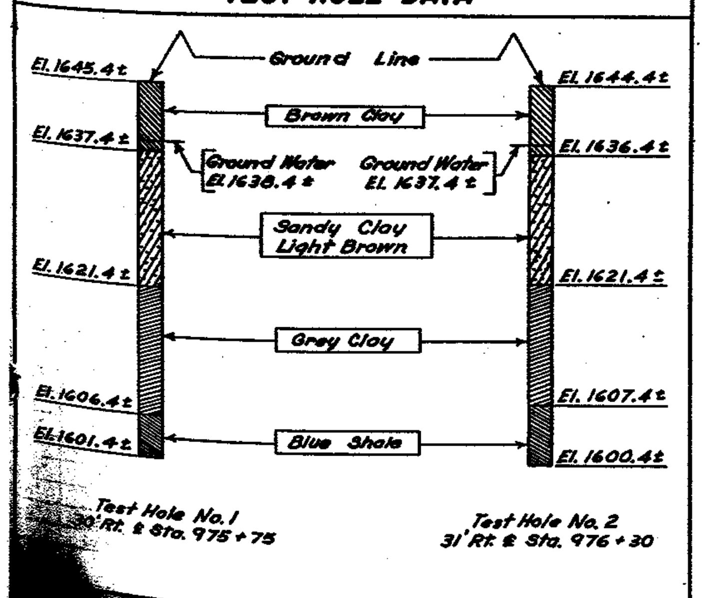
INDEX OF BRIDGE SHEETS —

ORIGINAL CONSTRUCTION PLANS



Q	1250 cfs
A	150 sq. ft.
V	8.3 ft./sec.

TEST HOLE DATA



ESTIMATED QUANTITIES

ITEM	Cl. "A" Conc. Cu. Yds.	Steel-Lbs. Reinf.	Steel-Lbs. Struct.	Railing Lin. Ft.	Treated Timber Piles ∮ Lin. Ft.	Excavation-Cu. Yds. Struct.	Excavation-Cu. Yds. Δ Unclass.	★ INCIDENTAL WORK
Superstructure	54.9	13,735	75	110.3				
Abutments No. 1 & No. 4	35.6	3,630	760		16 @ 35' = 560	15		
Bents No. 2 & No. 3	21.4	2,875			16 @ 30' = 480	45		
Totals	111.9	20,240	835	110.3	∮ 1040	60	Δ 640	★

∮ One Treated Timber Test Pile shall be driven at Abut's. No. 1 & No. 4 and at Bent No. 2 before remaining piles are ordered.
Δ See Grading Plans for Unclassified Excavation.
★ INCIDENTAL WORK— In place, at Sta. 976+06±, old 45' x 18' Rdwy. Reinf. Conc. Bridge. Remove pipe railing, being careful not to injure the structural properties of the pipe. Break down old concrete superstructure and sub-structure to 1'± below finished ground line, except at Bent No. 3 and Abut No. 4 where old footings shall be removed as necessary for construction of new footings. Salvaged pipe railing shall be placed neatly within the right-of-way as directed by the ENGINEER. Satisfactory broken concrete shall be used as slope protection on the upstream side of new embankments around wings of Abuts. No. 1 & No. 4. All other broken concrete and materials shall be disposed of as directed by the ENGINEER.

GENERAL NOTES —

1. See Notes on Sheet No. 2.
2. ~~In Section 5.3 (m) of South Dakota Standard Specifications for Roads and Bridges, change the bearing value formula for gravity hammers to ...~~ [crossed out]
3. Omit floor drains in end spans.

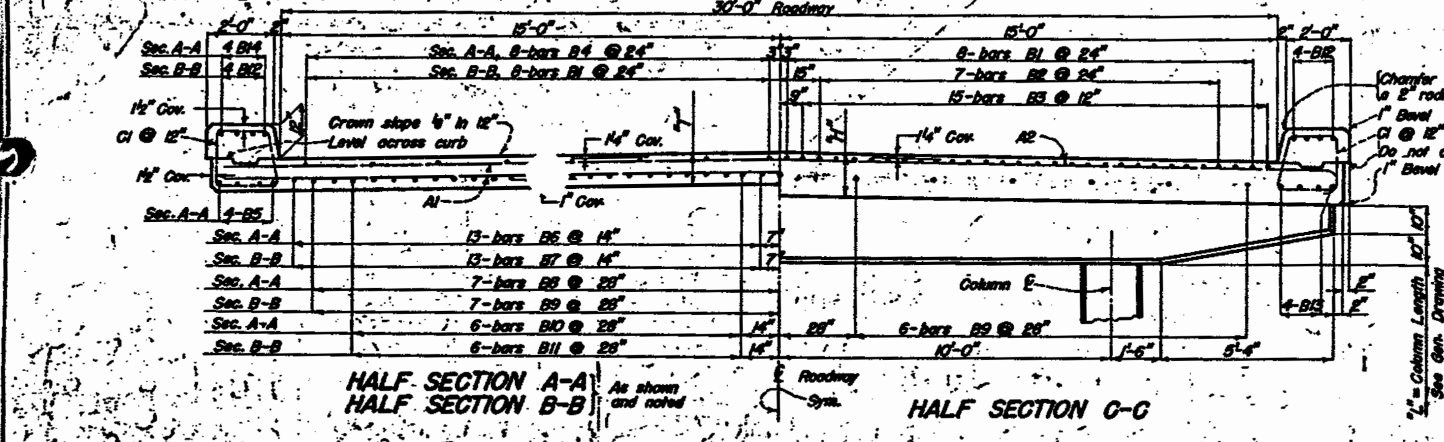
Structure No. 09-290-063

GENERAL DRAWING AND QUANTITIES
FOR
54'-0" CONTINUOUS CONCRETE BRIDGE
30'-0" ROADWAY
OVER BR. CROW CREEK — SEC. 3/4-T107N-R68W
STA. 975+73.00 TO 976+27.00 — F 043-3(1
BUFFALO COUNTY
SOUTH DAKOTA — H20-4
STATE HIGHWAY COMMISSION
OCT. 1955 — (1) OF (4)

— X020 —

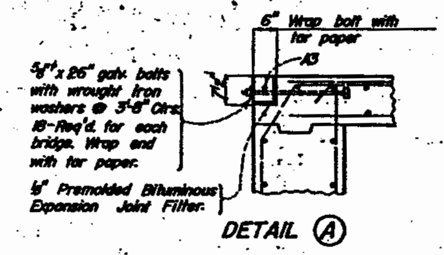
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	[signature]	[signature]	[signature]

09-290-063

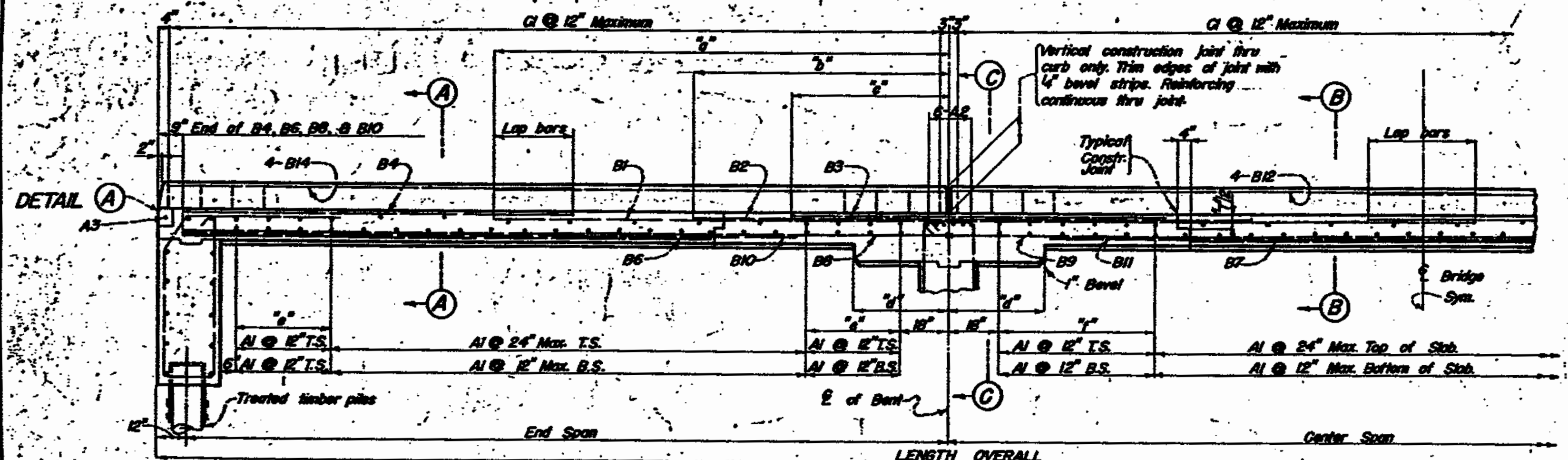


HALF SECTION A-A
HALF SECTION B-B
As shown and noted

HALF SECTION C-C



DETAIL Ⓐ



HALF LONGITUDINAL SECTIONAL VIEW
(Railing not shown)

NOTES

These notes cover substructure, superstructure, and railing details. The General Plan for each structure will show spans, elevations, and other necessary notes and details.

CONSTRUCTION SPECIFICATIONS: South Dakota Highway Commission's "Standard Specifications for Roads & Bridges," current issue, shall govern unless noted otherwise herein, on plans, or in Special Provisions.

PILING: All piles shall be treated timber. Piles will not be necessary under footings if the soil bearing pressure exceeds 3¼ Tons/sq.ft. If piles are not used on interior bents, decrease footing thickness to two feet, change quantity of Class A Concrete accordingly, and relocate footing reinforcing steel to allow 4" cover from bottom of footing.

STRUCTURAL STEEL: All 5/8"ϕ and 1"ϕ bolts including washers, 4"x5/8" bent bars, and floor drains shall be paid for as Structural Steel.

CONCRETE: Class A Concrete shall develop a minimum allowable compressive strength of 4000 p.s.i. at 28 days. All exposed concrete corners and edges shall be chamfered to a ¾" bevel unless noted otherwise. If necessary to facilitate construction, transverse construction joints may be made at the quarter points of each or any span, adjacent to interior bents. A ¼" wearing surface placed integral with the slab has been allowed for and is included in the slab thicknesses tabulated. All costs for expansion joint filler and tar paper shall be included in the unit price bid per cu. yd. for Class A Concrete.

DESIGN DATA: Design loading: H20-44 (T-3-45) A.A.S.H.O. Unit stresses: Concrete, f = 1,350 p.s.i., n = 8; Reinforcing, f = 20,000 p.s.i. (Int. Grade Steel). Column design: American Concrete Institute Requirements (ACI 318-47). Equivalent fluid pressure of earth at 40#/sq.ft. Minimum pile loading = 20 Tons per pile.

ORIGINAL CONSTRUCTION PLANS
Structure No. 09-290-063

SLAB DATA

REINFORCING SCHEDULE

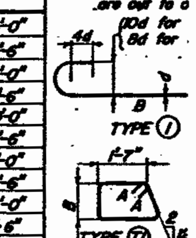
LENGTH OVERALL	END SPAN	CENTER SPAN	A1 No.	A1 Size	A1 Length	A2 No.	A2 Size	A2 Length	A2 Type	A2 B	A3 No.	A3 Size	A3 Length	B1 No.	B1 Size	B1 Length	B2 No.	B2 Size	B2 Length
54'-0"	16'	20'	79	5/8	33'-6"	12	7/8	35'-3"	1	33'-7"	2	5/8	29'-9"	32	7/8	22'-6"	28	7/8	13'-0"
60'-6"	18'	22'-6"	89	↓	↓	↓	7/8	35'-3"	↓	↓	↓	↓	↓	↓	7/8	24'-0"	↓	7/8	13'-6"
67'-0"	20'	25'	101	↓	↓	↓	1♦	35'-9"	↓	↓	↓	↓	↓	↓	7/8	26'-0"	↓	7/8	16'-6"
73'-6"	22'	27'-6"	112	↓	↓	↓	1♦	↓	↓	↓	↓	↓	↓	↓	1♦	28'-0"	↓	1♦	16'-6"
80'-0"	24'	30'	122	↓	↓	↓	1♦	↓	↓	↓	↓	↓	↓	↓	1"	31'-0"	↓	1"	16'-0"
86'-6"	26'	32'-6"	134	↓	↓	↓	1♦	↓	↓	↓	↓	↓	↓	↓	1♦	32'-0"	↓	1♦	20'-0"
93'-0"	28'	35'	144	↓	↓	↓	1♦	↓	↓	↓	↓	↓	↓	↓	1♦	35'-0"	↓	1♦	21'-0"
99'-6"	30'	37'-6"	157	↓	↓	↓	1"	↓	↓	↓	↓	↓	↓	↓	1"	36'-6"	↓	1"	21'-0"
106'-0"	32'	40'	167	↓	↓	↓	1"	↓	↓	↓	↓	↓	↓	↓	1"	39'-0"	↓	1"	23'-0"
112'-6"	34'	42'-6"	177	↓	↓	↓	1"	↓	↓	↓	↓	↓	↓	↓	1 1/8	40'-0"	↓	1 1/8	19'-0"
119'-0"	36'	45'	189	5/8	33'-6"	12	1"	35'-9"	1	33'-7"	2	5/8	29'-9"	32	1 1/8	42'-6"	28	1 1/8	20'-6"

LENGTH OVERALL	B3 No.	B3 Size	B3 Length	B4 No.	B4 Size	B4 Length	B5 No.	B5 Size	B5 Length	B6 No.	B6 Size	B6 Length	B7 No.	B7 Size	B7 Length	B8 No.	B8 Size	B8 Length
54'-0"	60	3/4	9'-0"	32	3/4	8'-0"	16	3/4	16'-9"	52	7/8	13'-6"	26	7/8	14'-0"	26	7/8	16'-3"
60'-6"	↓	3/4	9'-0"	↓	↓	9'-6"	↓	3/4	16'-9"	↓	7/8	14'-6"	↓	7/8	14'-6"	↓	7/8	18'-3"
67'-0"	↓	7/8	11'-6"	↓	↓	11'-0"	↓	7/8	20'-9"	↓	7/8	15'-6"	↓	7/8	15'-0"	↓	1♦	20'-3"
73'-6"	↓	7/8	11'-0"	↓	↓	12'-6"	↓	1♦	22'-9"	↓	7/8	17'-0"	↓	7/8	16'-0"	↓	1♦	22'-3"
80'-0"	↓	3/4	11'-0"	↓	↓	12'-6"	↓	1♦	24'-9"	↓	1♦	19'-0"	↓	1♦	19'-0"	↓	1♦	24'-3"
86'-6"	↓	1♦	13'-6"	↓	↓	15'-0"	↓	1♦	26'-9"	↓	7/8	19'-6"	↓	7/8	17'-0"	↓	1"	26'-3"
93'-0"	↓	1"	15'-0"	↓	↓	15'-0"	↓	1"	28'-9"	↓	1♦	21'-0"	↓	1♦	19'-0"	↓	1"	28'-3"
99'-6"	↓	1"	14'-6"	↓	↓	17'-0"	↓	1"	30'-9"	↓	1"	22'-6"	↓	1"	21'-6"	↓	1"	30'-3"
106'-0"	↓	1"	17'-0"	↓	↓	17'-6"	↓	1"	32'-9"	↓	1"	24'-0"	↓	1"	24'-0"	↓	1"	32'-3"
112'-6"	↓	1"	12'-0"	↓	↓	19'-6"	↓	1 1/8	34'-9"	↓	1♦	24'-6"	↓	1♦	22'-6"	↓	1 1/8	34'-3"
119'-0"	60	1 1/8	13'-6"	32	3/4	21'-0"	16	1 1/8	36'-9"	52	1"	26'-6"	26	1"	25'-0"	26	1 1/8	36'-3"

LENGTH OVERALL	B9 No.	B9 Size	B9 Length	B10 No.	B10 Size	B10 Length	B11 No.	B11 Size	B11 Length	B12 No.	B12 Size	B12 Length	B13 No.	B13 Size	B13 Length	B14 No.	B14 Size	B14 Length
54'-0"	13	7/8	20'-0"	24	7/8	14'-6"	12	7/8	16'-0"	16	3/4	22'-6"	8	3/4	20'-0"	16	3/4	8'-6"
60'-6"	↓	7/8	22'-6"	↓	7/8	16'-0"	↓	7/8	17'-6"	↓	3/4	24'-0"	↓	3/4	22'-6"	↓	↓	10'-0"
67'-0"	↓	1♦	25'-0"	↓	1♦	17'-6"	↓	1♦	19'-0"	↓	7/8	26'-0"	↓	7/8	25'-0"	↓	↓	11'-6"
73'-6"	↓	1♦	27'-6"	↓	1♦	19'-0"	↓	1♦	20'-0"	↓	1♦	28'-0"	↓	1♦	27'-6"	↓	↓	13'-0"
80'-0"	↓	1♦	30'-0"	↓	1♦	20'-6"	↓	1♦	23'-0"	↓	1♦	31'-0"	↓	1♦	30'-0"	↓	↓	13'-0"
86'-6"	↓	1"	32'-6"	↓	1"	21'-6"	↓	1"	22'-6"	↓	1♦	32'-0"	↓	1♦	32'-6"	↓	↓	15'-6"
93'-0"	↓	1"	35'-0"	↓	1"	23'-6"	↓	1"	25'-0"	↓	1"	35'-0"	↓	1"	35'-0"	↓	↓	15'-6"
99'-6"	↓	1"	37'-6"	↓	1"	25'-0"	↓	1"	27'-0"	↓	1"	36'-6"	↓	1"	37'-6"	↓	↓	17'-6"
106'-0"	↓	1"	40'-0"	↓	1"	25'-6"	↓	1"	28'-0"	↓	1"	39'-0"	↓	1"	40'-0"	↓	↓	18'-0"
112'-6"	↓	1 1/8	42'-6"	↓	1 1/8	27'-6"	↓	1 1/8	28'-6"	↓	1 1/8	40'-6"	↓	1 1/8	42'-6"	↓	↓	20'-0"
119'-0"	13	1 1/8	45'-0"	24	1 1/8	29'-0"	12	1 1/8	31'-0"	16	1 1/8	42'-6"	8	1 1/8	45'-0"	16	3/4	21'-6"

LENGTH OVERALL	C1 No.	C1 Size	C1 Length	C1 Type	C1 A	C1 B	DIMENSIONS "T"	"H"	"a"	"b"	"c"	"d"	"e"	"f"	LENGTH OVERALL
54'-0"	114	1/2	7'-6"	T1	7"	1'-5 5/8"	8 1/2"	11 1/2"	11'-0"	6'-6"	4'-6"	24"	2'-0"	3'-0"	54'-0"
60'-6"	126	↓	7'-9"	↓	↓	1'-6 1/4"	9 1/4"	12 1/2"	11'-3"	6'-9"	4'-6"	27"	2'-0"	3'-0"	60'-6"
67'-0"	140	↓	7'-9"	↓	↓	1'-6 3/4"	9 3/4"	13 1/4"	12'-0"	8'-3"	5'-6"	30"	3'-0"	4'-0"	67'-0"
73'-6"	152	↓	8'-0"	↓	↓	1'-7 1/2"	10 1/2"	14 1/4"	12'-7"	8'-3"	5'-0"	33"	3'-0"	4'-0"	73'-6"
80'-0"	166	↓	8'-0"	↓	↓	1'-8"	11"	15"	14'-4"	8'-0"	5'-0"	36"	3'-0"	5'-0"	80'-0"
86'-6"	178	↓	8'-3"	↓	↓	1'-8 3/4"	11 3/4"	16"	14'-1"	10'-0"	6'-6"	39"	4'-0"	5'-0"	86'-6"
93'-0"	192	↓	8'-3"	↓	↓	1'-9 1/2"	12 1/2"	17"	15'-10"	10'-6"	7'-0"	42"	4'-0"	6'-0"	93'-0"
99'-6"	204	↓	8'-6"	↓	↓	1'-10 1/4"	13 1/4"	18"	16'-1"	10'-6"	7'-0"	45"	5'-0"	6'-0"	99'-6"
106'-0"	218	↓	8'-6"	↓	↓	1'-11"	14"	19"	17'-4"	11'-6"	7'-9"	48"	5'-0"	7'-0"	106'-0"
112'-6"	230	↓	8'-9"	↓	↓	1'-11 3/4"	14 3/4"	20"	17'-4"	9'-3"	6'-0"	51"	5'-0"	7'-0"	112'-6"
119'-0"	244	1/2	8'-9"	T1	7"	2'-0 1/2"	15 1/2"	21"	18'-0"	10'-3"	6'-9"	54"	6'-0"	8'-0"	119'-0"

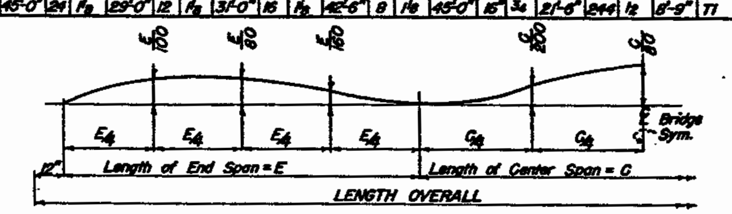
BAR BEND
Note: All details ... are out to o...



ESTIMATED QUANTITIES

LENGTH OVERALL	TWO ABUTMENTS: Class A Concrete Cu.Yds.☐	Reinforcing Steel Lbs.	Number of Piles	Structural Steel Lbs.	TWO INTERIOR BENTS: Class A Concrete-Cu.Yds. Constant Quantity	Cu.Yds./lin.ft. for 4 Columns="Q"	Reinforcing Steel — Lbs. Constant Quantity	Lbs./lin.ft. for 4 Columns="R"	Number of Piles	SLABS & CURBS: Class A Concrete Cu.Yds.	Reinforcing Steel Lbs.	5/8"ϕ Bolts	Number of Floor Drains	Structural Steel Lbs.	TOTALS, Exclusive of railing & Excavation: ⊕ Class A Concrete Cu.Yds.	⊕ Reinforcing Steel Lbs.	⊕ Structural Steel Lbs.	⊕ Number of Piles
54'-0"	35.6	3630	16	760	17.3	0.412	2235	64.2	16	54.9	13,735	18	12	140	107.8+("Q"X"L")	19,600+("R"X"L")	900	32
60'-6"	↓	↓	16	760	17.3	0.412	2250	64.2	16	66.7	14,930	↓	14	165	119.6+(")	20,810+(")	925	32
67'-0"	↓	↓	16	760	17.3	0.412	2250	64.2	16	77.9	18,710	↓	14	170	130.8+(")	24,590+(")	930	32
73'-6"	↓	↓	16	760	22.6	0.412	2330	64.2	20	91.7	21,590	↓	18	210	149.9+(")	27,550+(")	970	36
80'-0"	↓	↓	18	855	23.2	0.498	2555	79.8	20	104.6	24,915	↓	18	220	163.4+(")	31,100+(")	1,075	38
86'-6"	↓	↓	18	855	23.2	0.498	2735	79.8	20	120.4	26,965	↓	20	245	179.2+(")	33,330+(")	1,100	38
93'-0"	↓	↓	18	858	23.3	0.593	3155	96.7	24	137.2	31,645	↓	20	255	196.1+(")	38,430+(")	1,110	42
99'-6"	↓	↓	20	950	23.3	0.593	3175	96.7	24	155.1	36,360	↓	20	265	214.0+(")	43,165+(")	1,215	44
106'-0"	↓	↓	20	950	31.0	0.695	5105	125.7	32	174.1	39,050	↓	24	320	240.7+(")	47,785+(")	1,270	52
112'-6"	↓	↓	20	950	31.6	0.807	5140	127.1	32	194.2	42,910	↓	26	355	261.4+(")	51,680+(")	1,305	52
119'-0"	35.6	3630	20	950	34.4	0.807	5295	127.1	32	215.4	47,955	18	26	370	285.4+(")	56,880+(")	1,320	52

☐ Includes slabs and curbs directly over abutment.
⊕ Bid items



CAMBER DIAGRAM

Camber is calculated for dead load plus plastic flow. Camber is calculated thus using the 106'-0" Bridge as an illustration: E = 32' and C = 40', C/80 = 40/80 = 1/2, provide 1/2" camber at center of center span. The values obtained for camber shall be added to the proposed grade elevations at the respective stations to establish the elevations of the top of the finished roadway slab.
The slab shall also be raised 5/8" additional over the interior bents at Roadway ℄ to provide for dead load deflections and plastic flow at the ℄ of the bents as noted on details thereof.

Spec. Note Rev. 10-10-57

DETAILS OF STANDARD SUPERSTRUCTURE FO[R]

3-SPAN CONTINUOUS CONCRETE SLAB BRIDGES

WITH

INTERIOR FRAMED BENTS ON PILES

30'-0" ROADWAY 54'-0" TO 119'-0" OVERALL

SOUTH DAKOTA
STATE HIGHWAY COMMISSION

1948

H20 (T-3...)

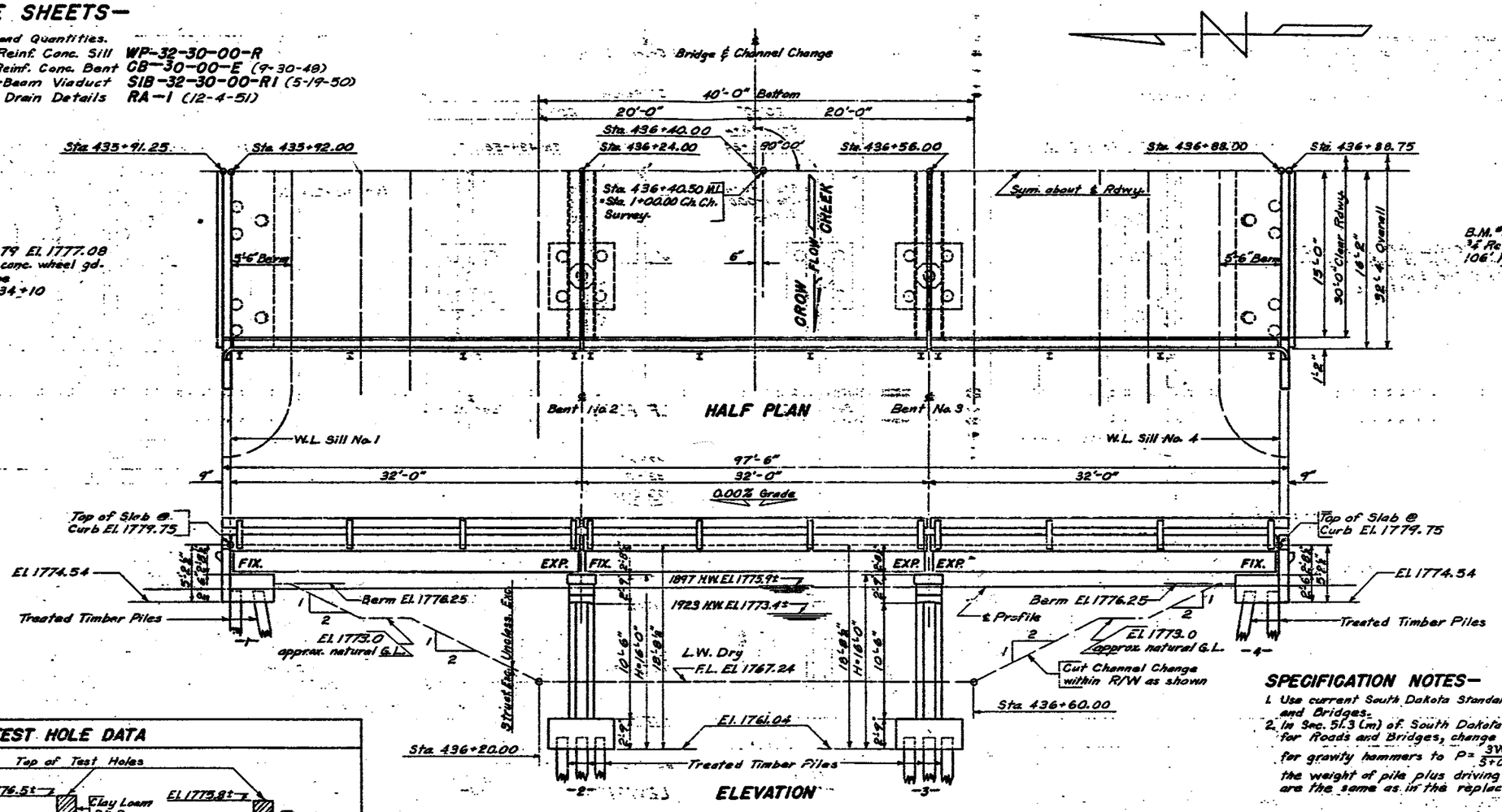
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
H.O.T.	H.O.T. Traced by R.W.J.	R.W.J.	[signature] BRIDGE E[NGINEER]

FBOP-CS-30-00-119-1-3

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	21	36

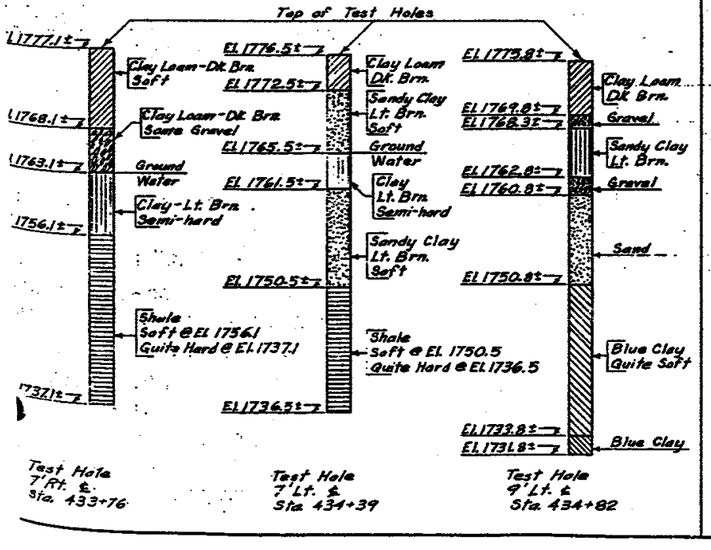
-X031-

INDEX OF BRIDGE SHEETS-



ELEVATION

TEST HOLE DATA



ESTIMATED QUANTITIES

ITEM	Conc. C.Y.	Steel - Lbs.		Railing Lin. Ft.	Treated Timber Piles - # Lin. Ft.	Excavation - Cu. Yds.	
	Cu. Yds.	Struct.	Reinf.			Struct.	Unclass.
Superstructure - 3-32' Comp. Spans	66.0	10,860	14,595	197.2			
Substructure - Sills No. 1 & No. 4	36.4		3,680		24 @ 35'- 840	30	
Substructure - Bents No. 2 & No. 3	34.6		5,780		20 @ 25'- 500	60	
Totals	137.0	10,860	24,055	197.2	#1340	90	△1272

One Treated Timber Test Pile shall be driven at Sills No. 1 & No. 4 and at Bent No. 3 before remaining piles are ordered.
△ See Grading Plans for Unclassified Excavation.

ORIGINAL CONSTRUCTION PLANS

SPECIFICATION NOTES-

1. Use current South Dakota Standard Specifications for Roads and Bridges.
2. In Sec. 5.1.3 (m) of South Dakota Standard Specifications for Roads and Bridges, change the bearing value formula for gravity hammers to $P = \frac{3WH}{S+0.35} \times \frac{W}{W+M}$; where M equals the weight of pile plus driving head, and all other values are the same as in the replaced formula.

Structure No. 30-160-442

GENERAL DRAWING AND QUANTITIES FOR

97'-6" I-BEAM VIADUCT

30'-0" ROADWAY

OVER CROW FLOW CREEK SEC. 14/15-T109N-R68W

STA. 435+91.25 TO 436+88.75 S194 (10)

HAND COUNTY

SOUTH DAKOTA H20-44

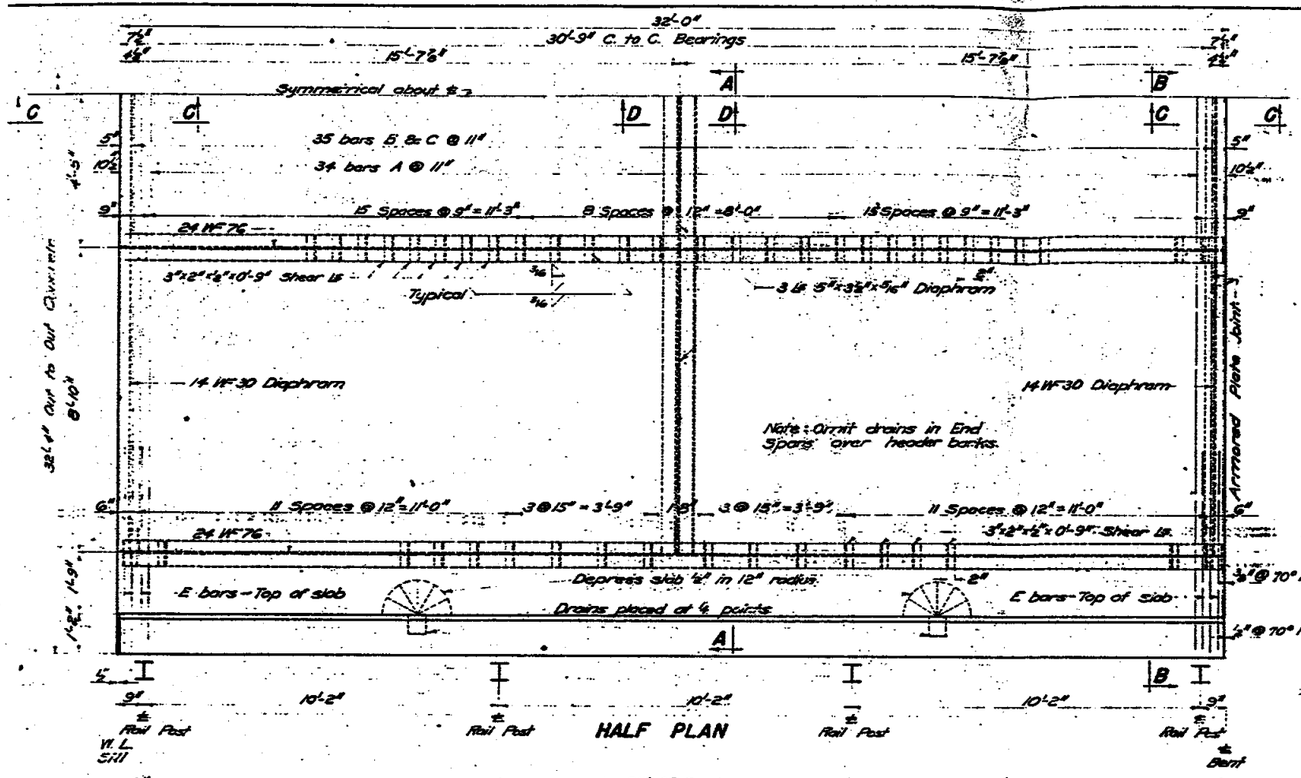
STATE HIGHWAY COMMISSION

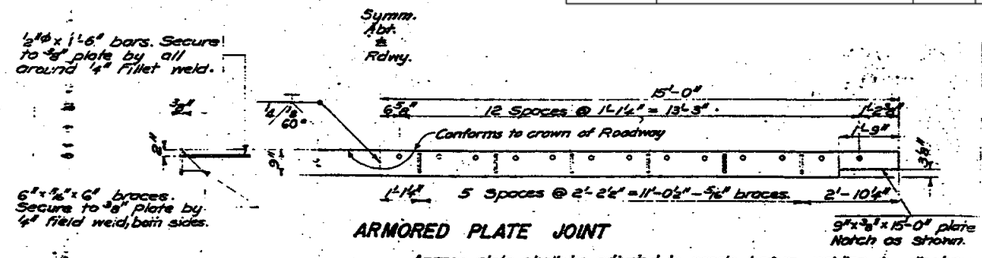
MARCH 1955 (1) OF (5)

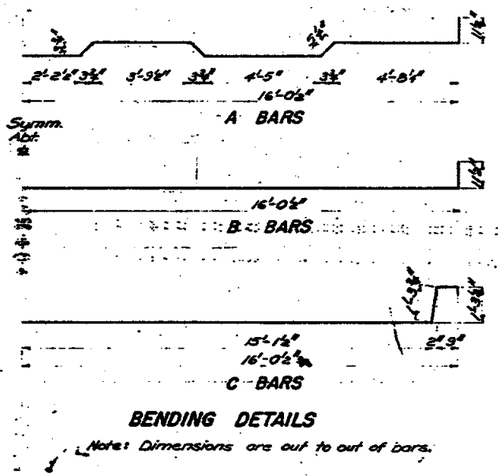
-X031-

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	22	36





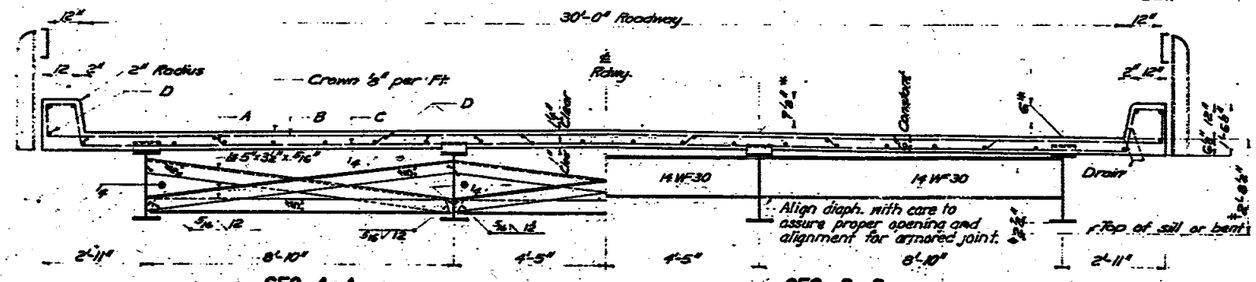


REINF. STEEL

MARK	No.	SIZE	LENGTH
A	34	⅝"ø	34'-9"
B	35	⅝"ø	34'-0"
C	35	⅝"ø	34'-9"
D	32	⅝"ø	31'-6"
E	8	¾"ø	6'-0"

ESTIMATED QUANTITIES

ITEM		1 ABUT. 1 SPAN	1 INTERMED. SPAN
Concrete, Cl. "A"	Cu. Yds.	22.0	22.0
Steel, Reinforcing	Lbs.	4,865	4,865
Steel, Structural	Lbs.	13,490	13,880
Railing	Lin. Ft.	66.6	64.0



* See sheet of "Special Details" for these dimensions if bridge is on other than level grade.
♦ Vary this dimension in accordance with variation of dimensions marked *.

GENERAL NOTES:

Cost of welding shall be absorbed in the unit price bid for structural steel.

Lead plates and lead washers shall be paid for under the item of structural steel.

All exposed steel surfaces shall be painted one shop coat of red lead paint and two field coats of aluminum or other approved paint.

Beams do not require mill cambering.

Cost of canvas and red lead under bearing plates shall be absorbed in the unit price bid for Cl. "A" Concrete.

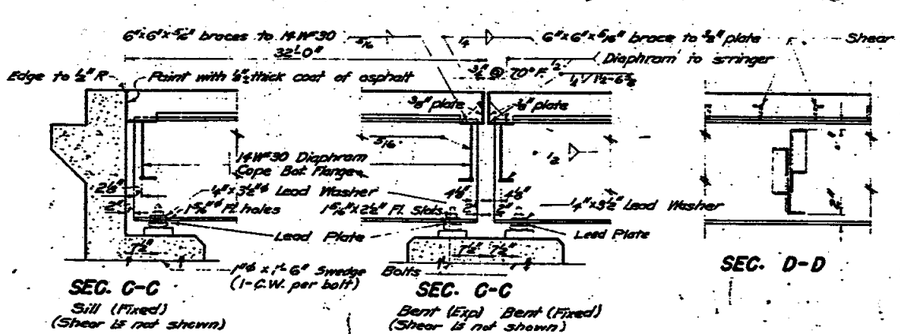
All exposed concrete edges shall be chamfered 1" unless otherwise noted.

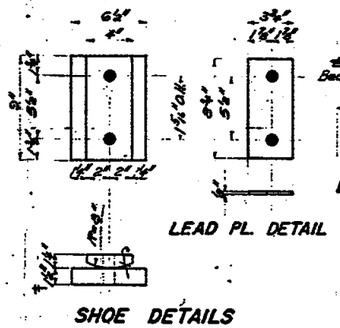
See Standard Railing Sheet for details of handrails and drains.

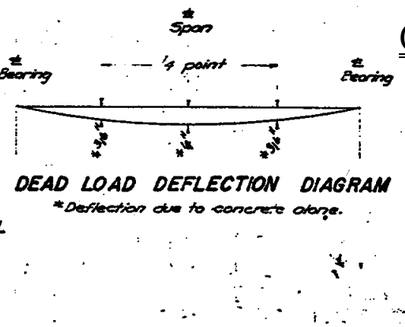
Design Loading: H20-44 (T-3-43) A.A.S.H.O.

Unit Stresses: Re-steel fs = 20,000 psi. (Intermed. Gr. steel. Concrete fc = 1350 p.s.i.

Class "A" Concrete shall develop a minimum allowable compressive strength of 4000 p.s.i. at 28 days.







DETAILS FOR

STANDARD I-BEAM VIADUCT

COMPOSITE SECTION

30'-0" ROADWAY 32'-0" SPAN.

SOUTH DAKOTA

STATE HIGHWAY COMMISSION

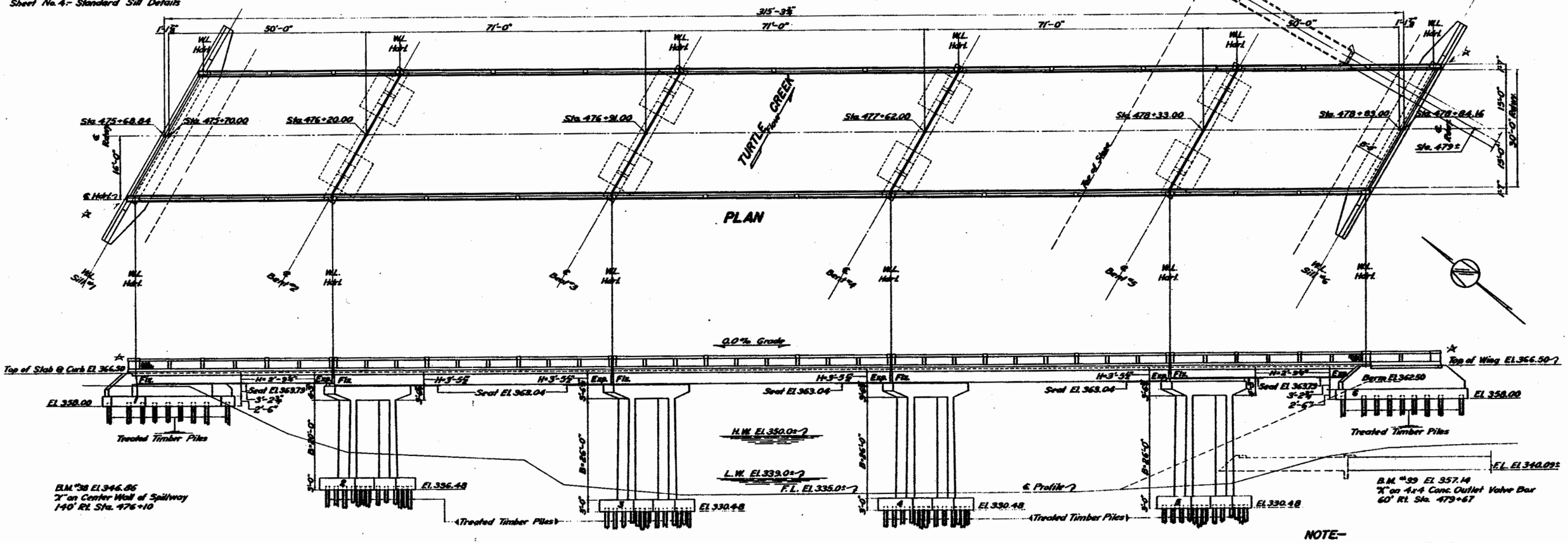
1947

Rev. 5-19-50 Rev. 10-21-49 Rev. 9-29-48 Rev. 9-23-48 Orig. 7-21-48	DESIGNED BY J.S.H. & R.W.S.	DRAWN BY R.W.S.	CHECKED BY K.C.	APPROVED

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	23	36

TOTAL 21

INDEX OF BRIDGE SHEETS:—

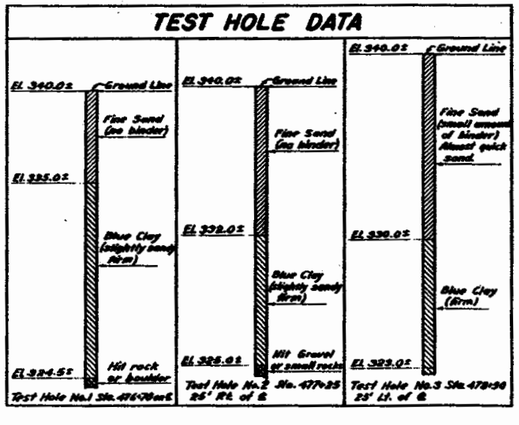


ELEVATION

NOTE:—
Contractor to drive piling to clear box spillway at sill No. 6 as directed by the Engineer.

SPECIFICATION NOTE:—
Use current South Dakota Standard Specifications for Roads and Bridges.

TEST HOLE DATA



QUANTITIES

ITEM	Concrete—Cu. Yds. Class "A"	Cl. "A" P.	Steel—Lbs. Reinforcing	Structural	Lead* Lbs.	Copper* Lbs.	Treated Timber Piles Test ea.*	Lin. Ft.	Excavation—Cu. Yds. Structural	Unclassified
Superstructure 2-30' Spans	93.4	8.14	16,120	84,540	248	87				
Superstructure 3-71' Spans	209.1	15.24	33,600	281,685	372	131				
Sill #1	46.0		1,665	170			1 @ 40'	21 @ 30'-630	75	
Sill #6	46.0		1,665	170			1 @ 40'	21 @ 30'-630	100	
Bent #2	51.6		8,425	345			1 @ 36'	31 @ 24'-744	100	
Bent #3	55.5		8,775	515			1 @ 36'	31 @ 24'-744	60	
Bent #4	55.5		8,775	515			1 @ 36'	31 @ 24'-744	50	
Bent #5	56.5		8900	345			1 @ 36'	31 @ 24'-744	70	
Totals	619.6	23.38	87,925	368,285	—*	—*	6	4,236	455	

*Cost of Lead and Copper plates shall be absorbed in the unit price bid for structural steel.
*One 40' Treated Timber Test Pile shall be driven at Sill #1 and Sill #6 before remaining piles are ordered.
*One 36' Treated Timber Test Pile shall be driven at each Bent before remaining piles are ordered.

ORIGINAL CONSTRUCTION PLANS

Structure No. 58-086-251

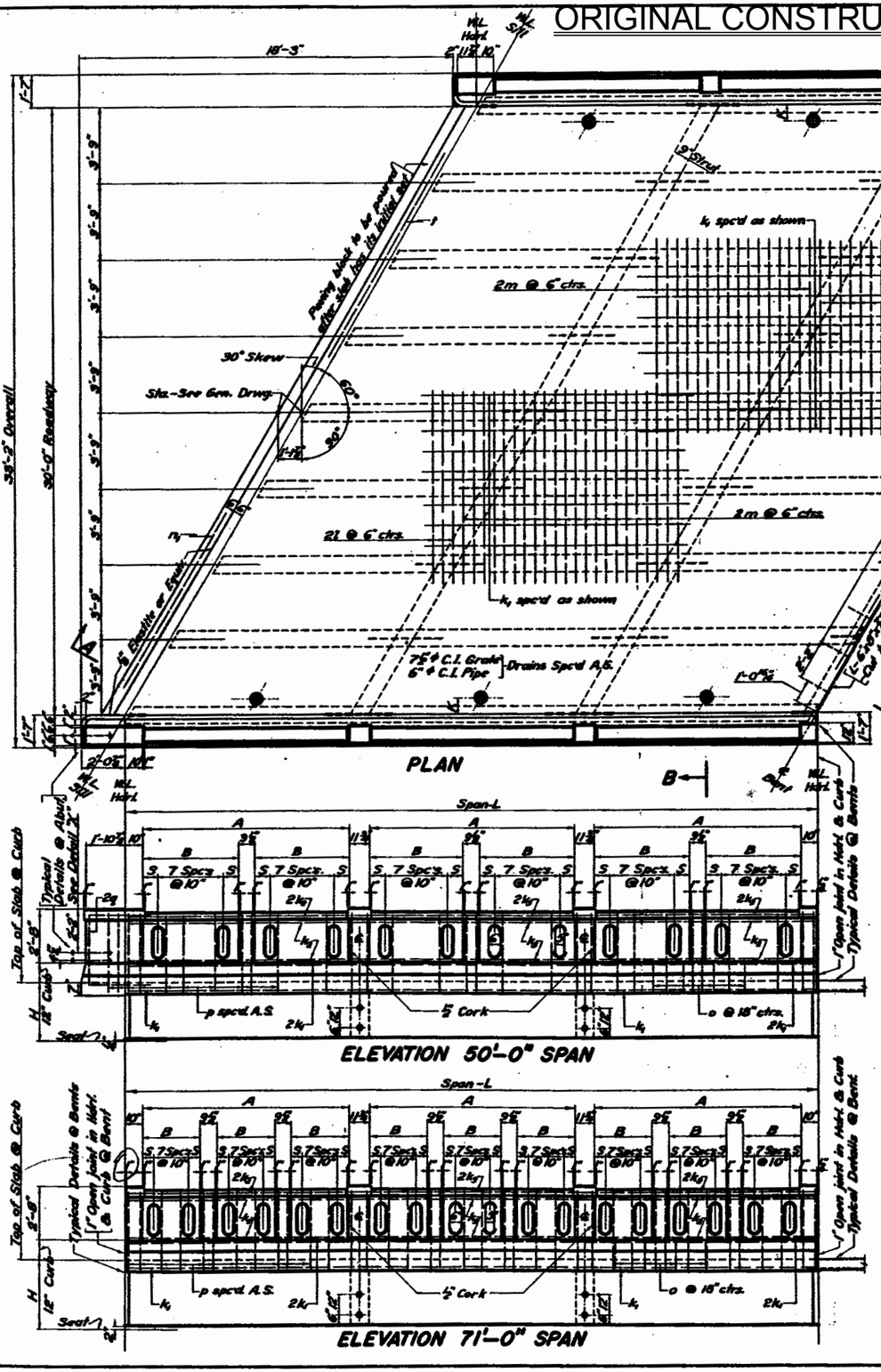
GENERAL DRAWING AND QUANTITIES
FOR
315'-3¾" I-BEAM VIADUCT
30'-0" RDWY. 50'-0" & 71'-0" SPANS 30° SKEW L.H.F.
OVER TURTLE CREEK SEC. 9—T. 116 N.—R. 64 W.
STA. 475+68.84 TO 478+84.16 F.A.S.M. 95F(1)
SPINK COUNTY
SOUTH DAKOTA
STATE HIGHWAY COMMISSION
MAY 1941 (1) of (4)

P.R.A. CODE NO. 924

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	RJD	RWC	BRIDGE ENGINEER

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	24	36

ORIGINAL CONSTRUCTION PLANS

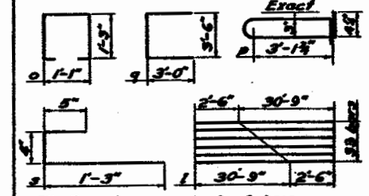


ROD LIST FOR ONE SPAN

Mk.	No.	Sz.	Length	Remarks
k_1	60	⅝"ϕ	L/2+1'-0"	
k_2	16	⅝"ϕ	A+6½"	
k_3	8	⅝"ϕ	A+(1'-6½")	
l	70	⅝"□	33'-3"	See Cutting Diag.
m	2M	⅝"□	32'-9"	
*n	8	¾"ϕ	2'-0"	Bolts @ ea. Abut.
n_1	1	⅝"ϕ	34'-0"	@ each Abut.
o	Q	⅝"ϕ	4'-3"	
p	N	⅝"ϕ	7'-5"	
q	4	⅝"ϕ	3'-6"	@ each Abut.
r	2	⅝"ϕ	37'-6"	
□s	32	⅜"ϕ	2'-0"	@ each Bent

* Galvanized
□ Welded to 9'-6"x8"x⅜"

BENDING DETAILS



All dimensions are to ℄ of bars.

TABULAR DATA

Span Length	50'-0"	71'-0"
7 Interior Joists	27" WF 91#	33" WF 141#
2 Exterior Joists	27" WF 98#	33" WF 152#
Joist Length	50'-1"	71'-1¾"
* Camber	1"	8"
A	15'-5½"	22'-5½"
B	7'-4"	6'-11¾"
S	9"	6¾"
N	18 x 7+30	18 x 7+40
H	2'-9¾"	3'-5½"
M	69	109
Q	68	96
R	92"	12"

* Camber to be put in at the Mill.

GENERAL NOTES:-

Cost of Expansion Materials, G.R. Anchors, Canvas, Red Lead and floor drains shall be absorbed in the unit price bid for Class "A" Concrete.

All exposed steel surfaces shall be painted one shop coat of Red Lead Paint and two field coats of Aluminum Paint.

Guard rail anchors, see Detail "Y" shall be located where cable guard rail joins bridge handrail. See Road Plans.

Structure No. 58-086-251

SUPERSTRUCTURE DETAILS

FOR

315'-3¾" I-BEAM VIADUCT

30'-0" RDWY. 50'-0" & 71'-0" SPANS 30° SKEW L.H.F.

OVER TURTLE CREEK SEC. 9-T. 116 N.-R. 64 W.

STA. 475+68.84 TO 478+84.16 F.A.S.M. 95F(1)

SPINK COUNTY

SOUTH DAKOTA

STATE HIGHWAY COMMISSION

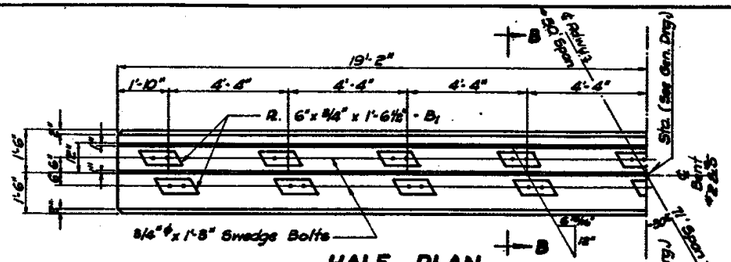
APRIL 1941 (2) of (O)

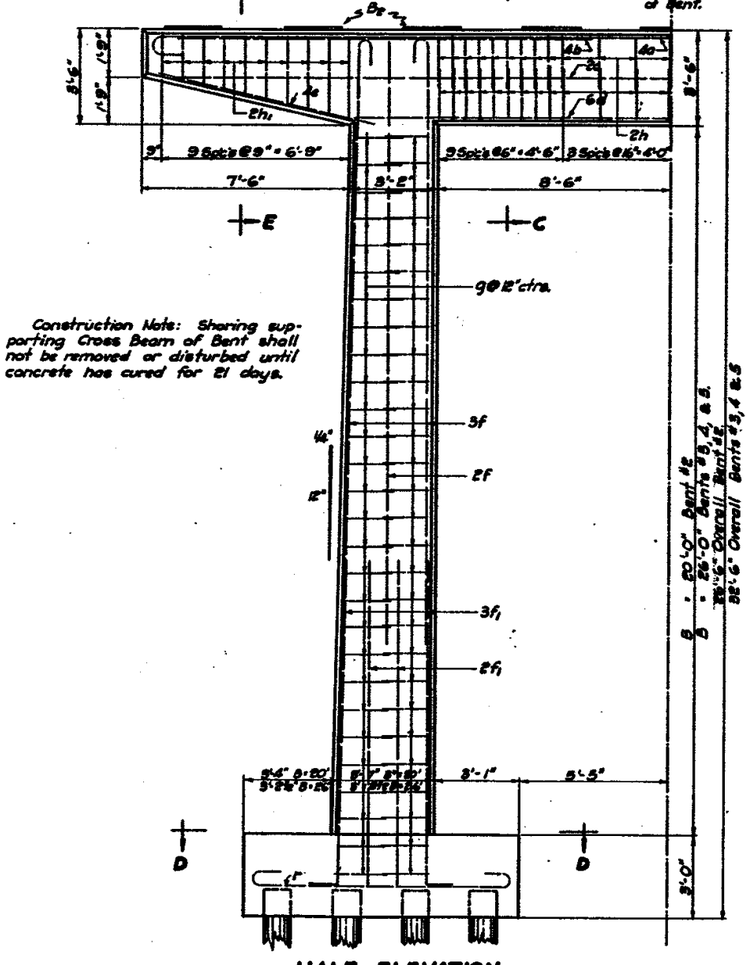
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	R.I.B.	R.W.C. + R.W.F.	Chief BRIDGE ENGINEER

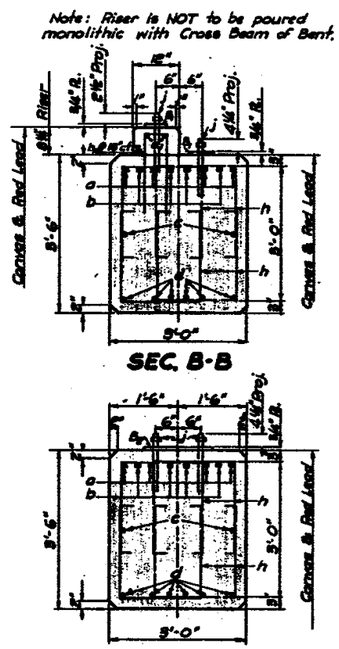
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	25	36

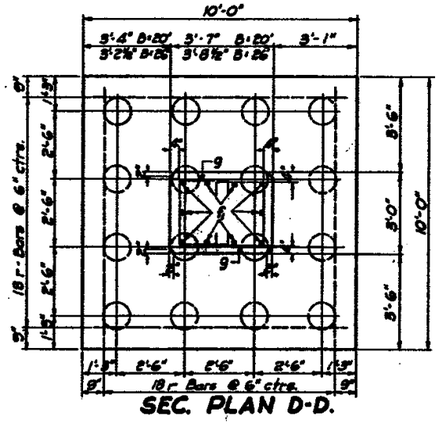
27

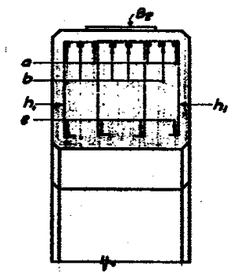
ORIGINAL CONSTRUCTION PLANS

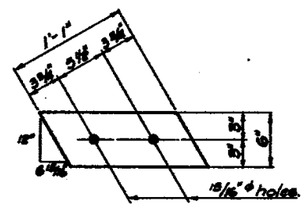


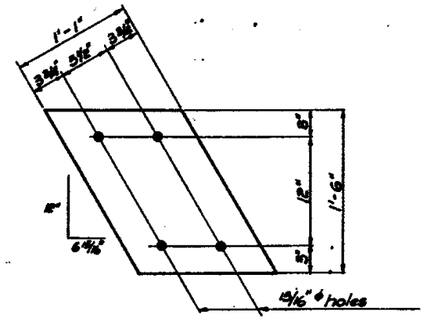










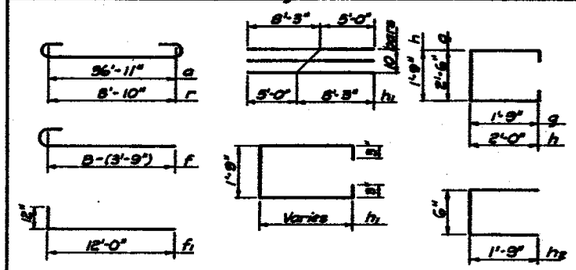


REINFORCING SCHEDULE FOR ONE BENT.

Mk.	No.	Size	Length	Remarks
a	4	1½"□	40'-3"	
a1	2	½" ϕ	38'-0"	On each of Bents #2 & #5 only.
b	8	1¼"□	15'-0"	
c	2	7/8" ϕ	36'-0"	
d	6	7/8" ϕ	23'-0"	
e	8	7/8" ϕ	8'-0"	
f	16	1⅛"□	B-(2'-3")	
f1	20	1⅛"□	13'-0"	
g	4 (B+2)	⅝" ϕ	6'-6"	
h	100	½"□	6'-3"	
h1	20	½" ϕ	13'-3"	
h2	26	½" ϕ	4'-0"	On each of Bents #2 & #5 only
j	36	¾" ϕ	1'-3"	Swedge Bolts.
r	72	1"□	11'-6"	

Dimensions are to ℄ of bars. Hooks shall have 5 dias. clear opening.

Bending Details



GENERAL NOTES:

Cost of Canvas and Red Lead shall be absorbed in the unit price bid for Class "A" Concrete.

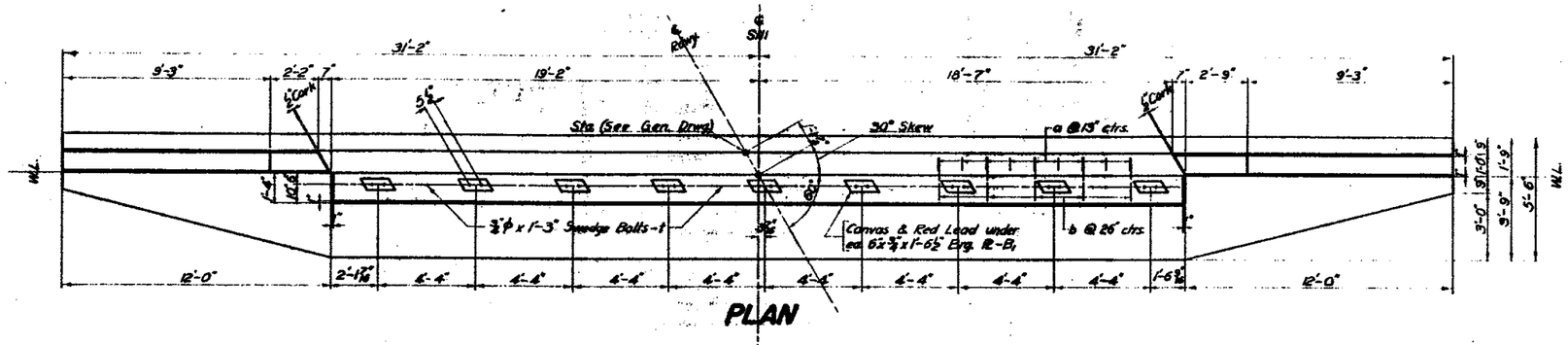
Wood Piling shall develop 18 tons per pile. If this bearing capacity is not obtainable the ENGINEER in charge shall communicate with the OFFICE.

Structure No. 58-086-251

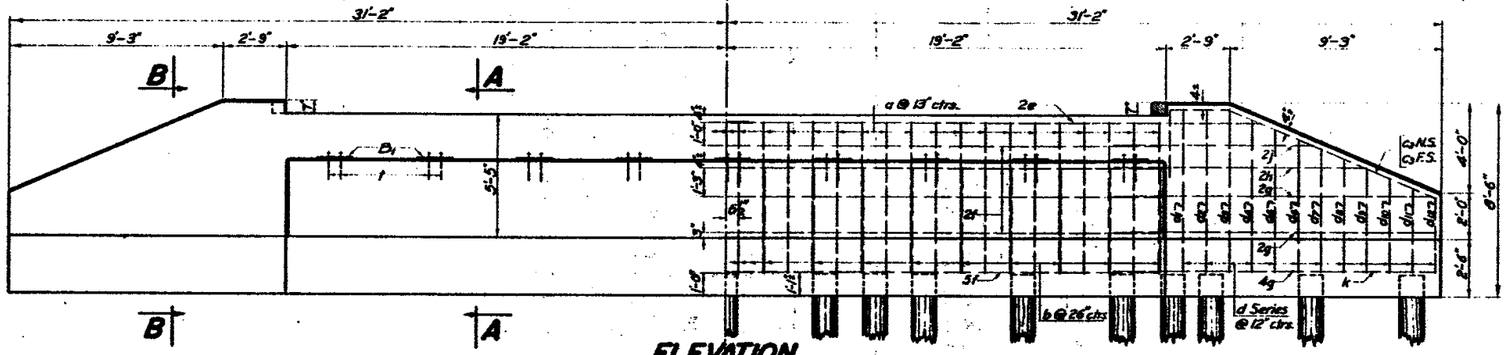
BENT DETAILS
FOR
315'-3¾" I-BEAM VIADUCT.
30'-0" RDWY. 50'-0" & 71'-0" SPANS. 30° SKEW LHF.
OVER TURTLE CREEK SEC. 9 - T116N - R64W
STA. 475+68.84 TO 478+84.16 FAGM 95 F(1)
SPINK COUNTY
SOUTH DAKOTA
STATE HIGHWAY COMMISSION
APRIL 1941. (3) OF (4)

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	P. Craig	RLO	BRIDGE ENGINEER

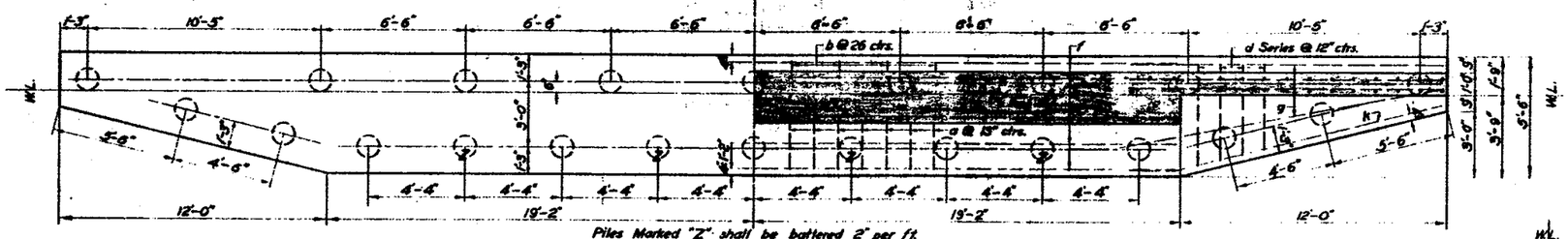
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	26	36



PLAN



ELEVATION



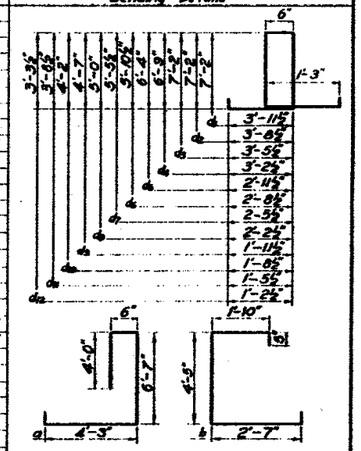
Piles Marked "Z" shall be battered 2" per ft.

FOOTING PLAN

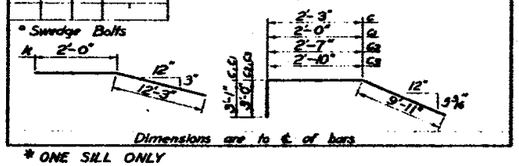
REINF. SCHEDULE *

Mk.	No.	Sz.	Lgth.
a	36	4 ϕ	15'-9"
b	18	5 ϕ	9'-9"
c	1	5 ϕ	15'-9"
c1	1	5 ϕ	15'-0"
c2	1	5 ϕ	15'-6"
c3	1	5 ϕ	15'-9"
d1	2	5 ϕ	20'-9"
d2	2	5 ϕ	20'-6"
d3	2	5 ϕ	20'-3"
d4	2	5 ϕ	19'-9"
d5	2	5 ϕ	18'-3"
d6	2	5 ϕ	17'-0"
d7	2	5 ϕ	16'-0"
d8	2	5 ϕ	14'-9"
d9	2	5 ϕ	13'-9"
d10	2	5 ϕ	12'-6"
d11	2	5 ϕ	11'-6"
d12	2	5 ϕ	10'-3"
e	4	5 ϕ	24'-6"
f	13	5 ϕ	38'-0"
g	16	5 ϕ	14'-0"
h	4	5 ϕ	11'-0"
j	4	5 ϕ	9'-6"
k	2	5 ϕ	14'-3"
y	18	3/4 ϕ	1'-3"

Bending Details



* Swedge Bolts

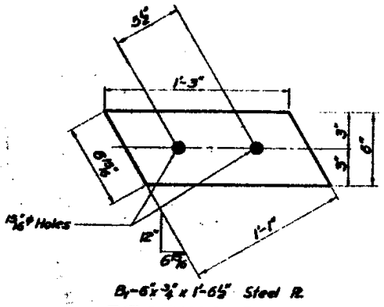


Dimensions are to ℄ of bars

* ONE SILL ONLY

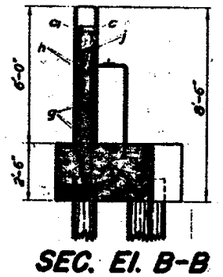
QUANTITIES

Class "A" Concrete	Cu. Yds.	46.0
Reinf. Steel	Lbs.	1665
Str. Steel	Lbs.	170
Wood Piling - 22 @ (See Gen. Drwg)		



B_1-6"x 3/8" x 1'-6 1/2" Steel PL

BEARING PL DETAIL



SEC. El. B-B

GENERAL NOTES

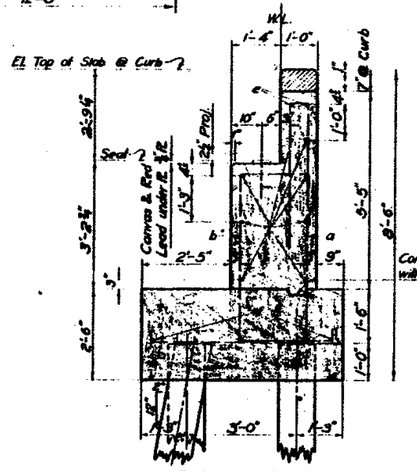
Top of backwall shall have a troweled finish and nosed or chamfered edges.

All exposed edges shall be chamfered 1" as shown.

Cost of Cork, Canvas, and Red Lead shall be absorbed in the unit price bid for Class "A" Concrete.

Wood Piling shall develop 18 tons unless otherwise stated on the General Drawing.

Details are either as shown or opposite hand as shown on the General Drawing.



ENLARGED SEC. A-A

ORIGINAL CONSTRUCTION PLANS

Structure No. 58-086-251

DETAILS OF

STANDARD SILL

30'-0" ROADWAY 30° SKEW

SOUTH DAKOTA

STATE HIGHWAY COMMISSION

DEC. 1940 (4) of (4)*

Sta. 477+26±

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	PLB	R.J.T.	BRIDGE ENGINEER

SPINK COUNTY—FAGM 955 (1)

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	27	36

ORIGINAL CONSTRUCTION PLANS

-X020-

INDEX OF BRIDGE SHEETS.-

B.M. No.13-El.1469.54
Spike in R.E.A. Pole
79' Rt. Sta. 238+45

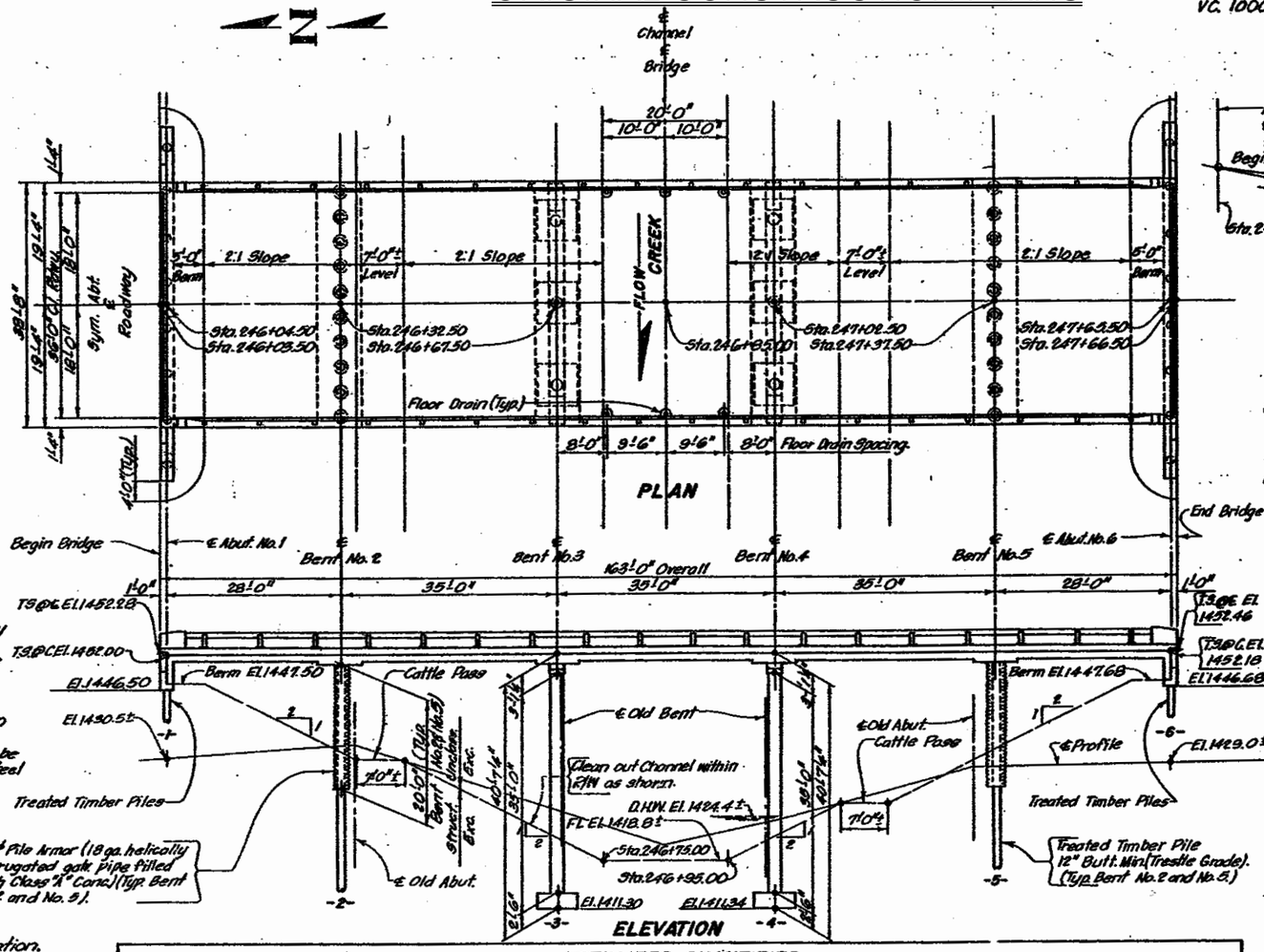
B.M. No.14-El.1438.95
Iron Pin.
130' Lt. Sta. 250+00

NOTE:- For Bridge End Backfill see Sheet No.9 of 11.

Q@0	1080 c.f.s.
A	148.1 sq. Ft.
V	7.3 f.p.s.

EXCAVATION NOTES.-

1. Footings for Bents No.3 and 4 shall be cast upon undisturbed Shale and carried into same approximately the depth of footings. Limits of Shale excavation for these footings shall be bounded as nearly as practicable by the neat lines as shown in the details of footings for Bents No.3 and 4 on Sheet No.5 of 11.
2. Shale shall develop a minimum bearing value of 4.00 tons per sq.Ft. If the bearing value is less than 4.0 tons per sq.ft communicate with BRIDGE SECTION.
3. Final Footing elevations for Bents No.3 and 4 shall be established before ordering column reinforcing steel for the respective Bents.

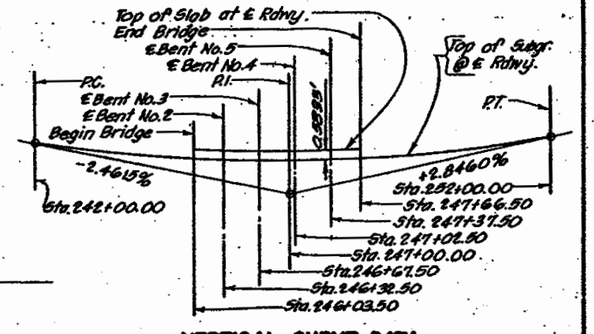


NOTE:-
T.S.@ ℄ Rdwy El = Top of Slab at Centerline Roadway Elevation.
T.S.@ C. El. = Top of Slab at Curb Elevation.

TABLE OF CURB & ℄ ELEVATIONS

Location	T.S.@ ℄ Rdwy. El.	T.S.@ C. El.	Location	T.S.@ ℄ Rdwy. El.	T.S.@ C. El.
Begin Bridge	1452.279	1451.999	¼ Span	1452.221	1451.941
℄ Abut. No.1	1452.676	1451.995	℄ Bent No.4	1452.223	1451.942
⅛ Span	1452.219	1451.998	¼ Span	1452.297	1451.977
1/16 Span	1452.267	1451.986	⅛ Span	1452.303	1452.022
¾ Span	1452.296	1451.956	¾ Span	1452.310	1452.029
℄ Bent No.2	1452.309	1451.928	℄ Bent No.5	1452.327	1452.046
¼ Span	1452.211	1451.930	¼ Span	1452.370	1452.090
½ Span	1452.264	1451.944	½ Span	1452.416	1452.136
⅜ Span	1452.198	1451.917	⅜ Span	1452.444	1452.164
℄ Bent No.3	1452.189	1451.908	℄ Abut. No.6	1452.458	1452.177
¼ Span	1452.202	1451.921	End Bridge	1452.463	1452.182
⅛ Span	1452.231	1451.951			

NOTES:-
1. Camber for Dead Load Deflection PLUS Plastic Flow, shown on Sheet No.3 of Bridge Plans, have been included in the elevations shown above.
2. T.S.@ ℄ Rdwy. El. = Top of Slab @ Centerline Roadway Elevation.
3. T.S.@ C.El. = Top of Slab @ Curb Elevation.



VERTICAL CURVE DATA

SPECIFICATION NOTE:-

Use South Dakota Standard Specifications for Roads and Bridges 1969 Edition, and Required provisions, Supplemental Specifications and/or Special Provisions as included in the proposal.

GENERAL NOTES:-

1. Design Specifications: A.A.S.H.O. Specifications for Highway Bridges, 1965, with Interim Specifications for 1966 & 1967.
2. See NOTES on Sheets No.1 thru No.11.
3. Place floor drains as shown in PLAN. (6 Req'd).
4. Longitudinal elements of the slab shall conform to the vertical curve.
5. The contractor shall have sufficient pile splice material on hand before pile driving is started. For details see Standard Plate No.303.1
6. Bridge contractor shall furnish and install inserts and Eyebolts as shown on Standard Plate No.303.
7. See Standard Plate No.301 for pile shoe details.
8. Prebored holes for piles at Abutments No.1 and No.6 shall be backfilled with granular material acceptable to the ENGINEER and compacted as specified by the ENGINEER. The cost of the granular material in place shall be included in the unit price bid for the piles.
9. Standard Plates referred to in these Plans are the plates printed on Sheet No's. 10 & 11 of 11 of these plans and are not intended to be referred to the Standard Plates Manual.
10. Rail Posts and End Blocks shall be built normal to the vertical curve.
11. Design Loading: H520-44.

ESTIMATED QUANTITIES

BID ITEM NO.	40005	40505	40555	40166	40705	40710	40702	40905	10410	10405	10105	10721
ITEM	Cl."A" Conc. Cu.Yds.	Steel-Lbs. Reinforc.	Struct.	Type PT-3A Steel Railing-Lin.Ft.	Treated Timber Treated Timber	Piles-Lin.Ft. # Test	Timber Pile Armor Lin.Ft.	Pile Shoes * No.	Excavation-Cu.Yds. Struct.	^ Unclass.	*INCIDENTAL WORK	℄ Bridge End Backfill-Lumpsum
Superstructure	° 268.3	° 17,550	° 215	312.7								
Abutment No.1	20.1	2,290	380		7@35'-2.45	1@40'-40			11			
Bent No.2		1,960			9@40'-360	1@45'-45	200'					
Bents No.3 and No.4	58.8	9,590							22.3			
Bent No.5		1,960			9@40'-360	1@45'-45	200'	10				
Abutment No.6	20.1	2,290	380		7@40'-280	1@45'-45		8	11			
Totals	367.3	35,640	975	312.7	1245'	# 175'	400'	* 18	245	^ ——	——	# L.S.

One Treated Timber Test Pile shall be driven at Abutments No.1 & No.6, and Bents No.2 & No.5 before remaining piles are ordered.
^ Unclassified Excavation to be done by Grading Contractor.
* For information only. The approximate volume of Granular Backfill will be 80 cu.Yds. in place, and the length of 6"ϕ perforated metal pipe will be 152'.
* All Steel Pile shoes shall be as shown on Standard Plate No.301.
° Includes End Block Quantities.
*INCIDENTAL WORK:- In place, on ℄ Sta.246+35± to Sta.247+37± old 102'x24' Roadway (3 Span) I-Beam Bridge: Dismantle and salvage timber handrails, planks and timbers, hardware and I-Beam Stringers. All spikes, nails, bolts and screws not salvaged shall be removed from salvaged plank and timber materials. Care shall be taken not to injure the structural properties of planks, timbers, hardware items or I-Beam stringers. Salvaged materials shall be placed neatly within the right-of-way as directed by the ENGINEER, to be picked up by State Forces for maintenance work. Pull and remove timber piling as directed by the ENGINEER. If piling cannot be pulled they shall be cut off 1'± below finished ground line. All materials not salvaged shall be disposed of as directed by the ENGINEER.

PLANS BY
BRIDGE SEC., S.DAK. DEPT. HWYS.

19-070-046

Structure No. 19-070-046

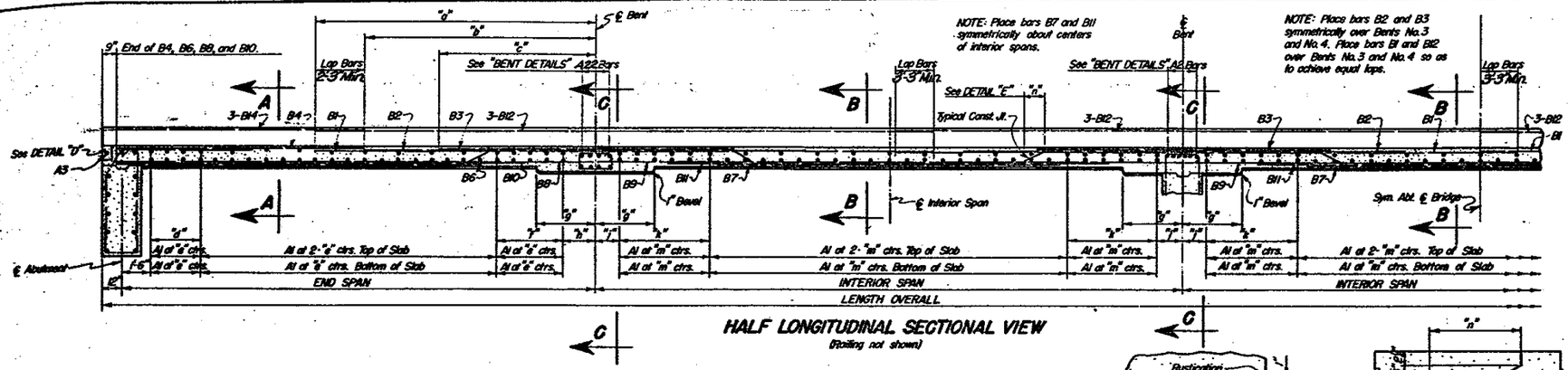
GENERAL DRAWING AND QUANTITIES
FOR
163'-0" CONTINUOUS CONCRETE BRIDGE
36'-0" ROADWAY

OVER CREEK — SEC. 30/29-T124N-R58W
STA. 246+03.50 TO 247+66.50 — F051-7(1)
DAY COUNTY
SOUTH DAKOTA — HS20-44
DEPARTMENT OF HIGHWAYS
APRIL 1969 (1) OF (11)

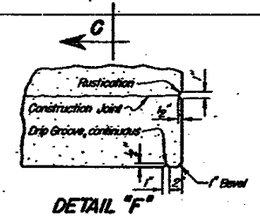
-X020-

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	M.K.W.	G.A.	BRIDGE ENGINEER

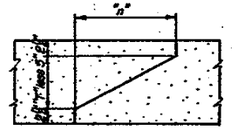
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	28	36



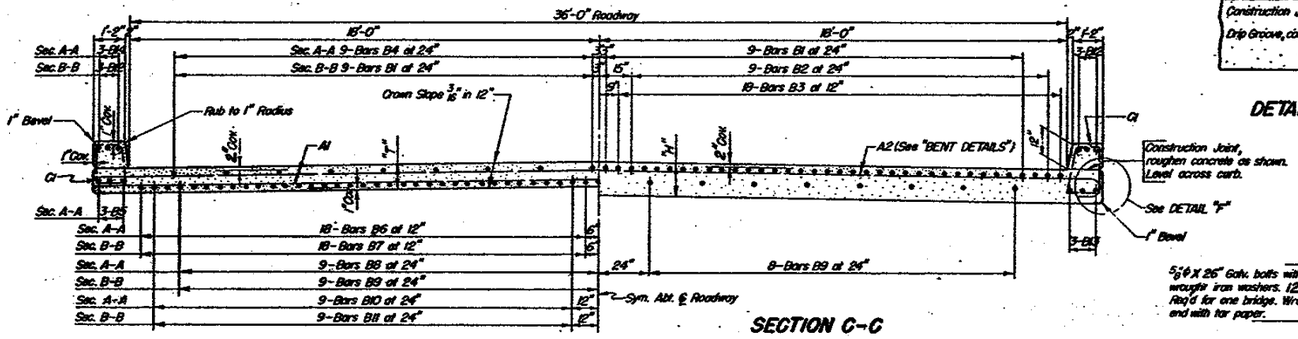
HALF LONGITUDINAL SECTIONAL VIEW
(Railing not shown)



DETAIL "F"

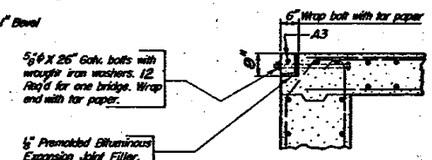


DETAIL "E"
(TYPICAL CONSTRUCTION JOINT)



SECTION C-C

SECTION A-A
SECTION B-B — As shown and noted.



DETAIL "D"

— NOTES —

These notes cover Abutment, Superstructure, and Railing Details. The General Drawing for each structure will show spans, elevations, and other necessary notes and details.

DESIGN SPECIFICATIONS: A.A.S.H.O. Specifications for Highway Bridges, 1965, with Interim Specifications for 1966-67.

PILING: See General Drawing for type and length of Abutment piling.

STRUCTURAL STEEL: All ⅝"ϕ bolts including washers, and all pile connections in Abutments, and all floor drains shall be paid for as Structural Steel.

REINFORCING STEEL: All Reinforcing Steel shall conform to A.S.T.M. Specifications A305 and A15 (Intermediate Grade).

CONCRETE: All Concrete shall be Class "A".
All exposed concrete corners and edges shall be chamfered to a ¾" bevel unless noted otherwise. If necessary to facilitate construction, transverse construction joints may be made at the quarter points of each end any span, adjacent to interior bents. All costs for expansion joint filler and tar paper shall be included in the unit price bid per cu.yd. for Class "A" Concrete.

DESIGN DATA: Design Loading: HS20-44 A.A.S.H.O. Unit stresses: Concrete f_c=1600 p.s.i., n=8; Reinforcing Steel f_s=20,000 p.s.i. Bnt. Grade Steel. Equivalent fluid pressure of earth of 40 #/sq.ft. Minimum Pile Loading=32 tons for Timber Piling.

ORIGINAL CONSTRUCTION PLANS

SLAB DATA

REINFORCING SCHEDULE

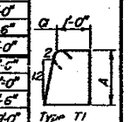
LENGTH OVERALL	END SPAN	INTERIOR SPAN	A1 No.	A1 Size	A1 Length	A2 & A22	A3 No.	A3 Size	A3 Length	B1 No.	B1 Size	B1 Length	B2 No.	B2 Size	B2 Length	B3 No.	B3 Size	B3 Length	B4 No.	B4 Size	B4 Length	B5 No.	B5 Size	B5 Length	B6 No.	B6 Size	B6 Length	B7 No.	B7 Size	B7 Length	B8 No.	B8 Size	B8 Length	B9 No.	B9 Size	B9 Length	B10 No.	B10 Size	B10 Length	B11 No.	B11 Size	B11 Length	B12 No.	B12 Size	B12 Length	B13 No.	B13 Size	B13 Length	B14 No.	B14 Size	B14 Length	C1 No.	C1 Size	C1 Length	C1 Type	C1 A
94'-0"	16'	20'	152	5	39'-3"	See "BENT DETAILS" for Number, Length, Size and Quantity.	2	5	35'-9"	72	8	22'-6"	72	8	17'-0"	144	7	10'-0"	36	7	6'-0"	12	6	16'-9"	72	8	14'-0"	108	8	13'-9"	34	8	16'-3"	51	8	20'-0"	36	7	15'-3"	54	7	17'-0"	24	6	22'-6"	18	6	20'-0"	12	6	8'-6"	188	4	6'-3"	71	1'-6½"
105'-6"	18'	22'-6"	176								8	24'-0"		8	18'-0"		8	11'-9"		7	9'-6"		7	18'-9"		8	15'-6"		8	15'-0"		8	16'-3"		8	22'-6"		7	16'-9"		7	19'-0"		7	24'-0"		7	22'-6"		7	10'-0"	214		6'-3"		1'-6⅝"
117'-0"	20'	25'	196								8	26'-3"		8	19'-6"		8	13'-6"		7	11'-0"		7	20'-9"		8	16'-6"		8	16'-0"		8	18'-3"		8	25'-0"		7	18'-3"		7	22'-0"		7	26'-3"		7	22'-6"		7	12'-0"	240		6'-6"		1'-7½"
128'-6"	22'	27'-6"	216								9	28'-6"		8	20'-0"		8	14'-6"		8	12'-6"		8	22'-9"		8	17'-6"		8	17'-0"		9	22'-3"		9	27'-6"		8	19'-0"		8	23'-0"		8	28'-6"		8	27'-6"		8	13'-0"	276		6'-6"		1'-7½"
140'-0"	24'	30'	240								9	31'-6"		9	22'-6"		8	15'-0"		8	12'-6"		8	24'-9"		8	18'-6"		8	17'-6"		9	24'-3"		9	30'-0"		9	20'-9"		9	22'-6"		8	31'-6"		8	30'-0"		8	13'-0"	288		6'-6"		1'-7¾"
151'-6"	26'	32'-6"	268								9	33'-0"		9	24'-6"		9	17'-0"		8	15'-0"		9	26'-9"		9	20'-6"		9	20'-0"		9	26'-3"		9	32'-6"		8	21'-6"		9	23'-0"		9	33'-0"		9	32'-6"		8	15'-6"	312		6'-6"		1'-8½"
163'-0"	28'	35'	288	5	38'-3"		2	5	35'-9"	72	10	36'-0"	72	9	24'-6"	144	9	18'-0"	36	9	15'-0"	12	9	26'-9"	72	9	21'-6"	108	9	20'-6"	34	9	28'-3"	51	9	35'-0"	36	9	23'-6"	54	9	24'-6"	24	9	36'-0"	18	9	35'-0"	12	8	15'-6"	338	4	6'-9"	71	1'-9⅝"
174'-6"	30'	37'-6"	340								10	39'-0"		10	26'-0"		9	18'-0"		9	17'-0"		9	30'-9"		9	23'-0"		9	20'-6"		10	30'-3"		10	37'-6"		9	24'-6"		9	25'-0"		9	38'-0"		9	37'-6"		8	17'-6"	346		6'-9"		1'-9⅞"
186'-0"	32'	40'	362								10	40'-6"		10	27'-6"		9	19'-6"		9	17'-6"		10	32'-9"		9	23'-6"		9	20'-0"		10	32'-3"		10	40'-0"		10	26'-0"		10	40'-6"		10	40'-0"		8	18'-0"	392		7'-0"		1'-10¼"
197'-6"	34'	42'-6"	386								10	42'-6"		10	30'-0"		10	23'-0"		9	18'-6"		10	34'-9"		9	25'-0"		9	21'-6"		10	34'-3"		10	42'-6"		10	27'-6"		10	27'-0"		10	42'-6"		10	42'-6"		8	20'-0"	392		7'-0"		1'-11"
209'-0"	36'	45'	410	5	38'-3"		2	5	35'-9"	72	10	44'-9"	72	10	30'-0"	144	10	23'-0"	36	9	21'-0"	12	11	36'-9"	72	10	27'-0"	108	10	24'-6"	34	10	36'-3"	51	10	45'-0"	36	9	29'-0"	54	9	28'-6"	24	11	44'-9"	18	11	45'-0"	12	8	21'-6"	416	4	7'-3"	71	1'-11⅝"

DIMENSIONS

LENGTH OVERALL	"r"	"s"	"t"	"u"	"v"	"w"	"x"	"y"	"z"	"a"	"b"	"c"	"m"	"n"
94'-0"	9⅝"	12⅝"	1'-0"	8'-3"	4'-9"	1'-8"	10"	1'-8"	2'-0"	1'-2"	1'-9"	2'-9"	11"	7⅛"
105'-6"	9⅝"	13⅜"	1'-3"	9'-9"	6'-3"	1'-8"	10"	1'-8"	2'-3"	1'-6"	1'-2"	2'-9"	11"	8½"
117'-0"	10⅛"	14"	1'-6"	10'-6"	7'-0"	2'-6"	10"	2'-6"	2'-6"	1'-10"	1'-6"	3'-8"	11"	9⅝"
128'-6"	10⅝"	14⅝"	1'-6"	11'-0"	7'-6"	2'-6"	10"	3'-4"	2'-9"	1'-4"	1'-10"	3'-8"	11"	10⅛"
140'-0"	11"	15"	1'-3"	11'-9"	8'-0"	2'-6"	10"	3'-6"	3'-0"	1'-8"	1'-3"	4'-7"	11"	10⅞"
151'-6"	11½"	15⅝"	1'-6"	12'-9"	8'-6"	3'-4"	10"	3'-4"	3'-3"	1'-8"	1'-7"	4'-7"	11"	11⅝"
163'-0"	11⅞"	16"	1'-6"	13'-6"	9'-0"	3'-4"	10"	3'-4"	3'-6"	1'-8"	1'-8"	5'-6"	11"	1'-½"
174'-6"	12⅜"	16⅝"	1'-9"	14'-6"	9'-6"	4'-2"	10"	4'-2"	3'-9"	1'-8"	1'-11"	5'-6"	10"	1'-1⅛"
186'-0"	12¾"	17"	1'-9"	15'-3"	10'-0"	4'-2"	9"	4'-0"	3'-9"	1'-8"	1'-11"	5'-10"	10"	1'-1⅝"
197'-6"	13⅛"	17⅜"	1'-9"	16'-0"	10'-3"	4'-6"	9"	4'-3"	4'-0"	1'-8"	2'-0"	6'-2"	10"	1'-2⅛"
209'-0"	13⅝"	17¾"	1'-9"	16'-9"	10'-6"	4'-6"	9"	4'-6"	4'-0"	1'-8"	2'-0"	6'-2"	10"	1'-2⅝"

BAR BENDS

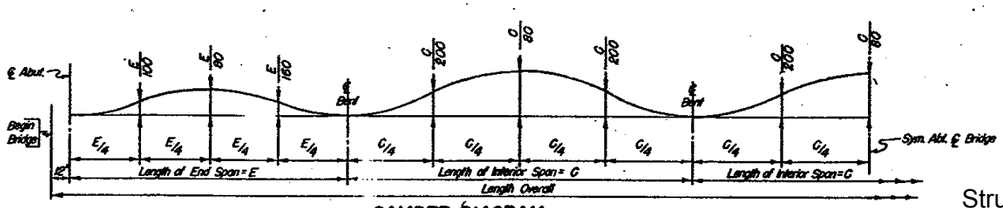
NOTE: All dimensions are out to out of bars.



ESTIMATED QUANTITIES

LENGTH OVERALL	TWO ABUTMENTS Class "A" Concrete *Cu.Yds.	TWO ABUTMENTS Reinforcing Steel Lbs.	TIMBER PILES Number of Piles	TIMBER PILES Struct Steel Lbs.	STEEL PILES Number of Piles	STEEL PILES Struct. Steel Lbs.	SLABS & CURBS Class "A" Concrete Cu. Yds.	SLABS & CURBS Reinforcing Steel Lbs.	⅝"ϕ Bolts	Number of floor drains	Structural Steel Lbs.
94'-0"	40.2	4690	16	760	12	300	114.0	33,710	22	20	225
105'-6"			16	760	12	300	135.1	39,635		26	285
117'-0"			16	760	12	300	157.8	44,490		26	295
128'-6"			18	860	12	300	181.9	52,205		30	340
140'-0"			18	860	12	300	202.7	59,185		30	345
151'-6"			18	860	12	300	233.9	68,370		36	420
163'-0"	40.2	4,580	16	760			267.1	76,770	12	6	95
174'-6"			20	950	14	350	297.5	86,535		36	450
186'-0"			22	1050	14	350	328.4	97,650		40	505
197'-6"			22	1050	14	350	367.5	105,410		46	595
209'-0"	40.2	4690	22	1050	14	350	408.8	115,180	22	46	615

* Includes slabs and curbs directly over abutments.



CAMBER DIAGRAM

Camber is calculated for dead load plus plastic flow. Camber is calculated thus using the 186'-0" Bridge as an illustration: E = 32' and G = 40'; G/80 = 40/80 = 1/2, provide 1/2" camber at center of Interior spans. The values obtained for camber shall be added to the proposed grade elevations of the respective stations to establish the elevations of the top of the finished roadway slab.

SUPERSTRUCTURE DETAILS
FOR
163'-0" CONTINUOUS CONCRETE [illegible]
36'-0" ROADWAY
OVER CREEK — SEC. 30/29-T124N-R5[illegible]
STA. 246+03.50 TO 247+66.50 — 051-7(1)
DAY COUNTY
SOUTH DAKOTA — HS20-44
DEPARTMENT OF HIGHWAYS
APRIL 1969 — (3) OF (11)

Structure No. 19-070-046

DESIGNED BY	DRAWN BY	CHECKED BY	
	M.V.W.	C.H.J.	BRIDGE ENGINEER

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	29	36

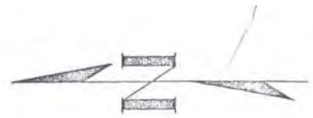
-X020-

INDEX OF BRIDGE SHEETS—

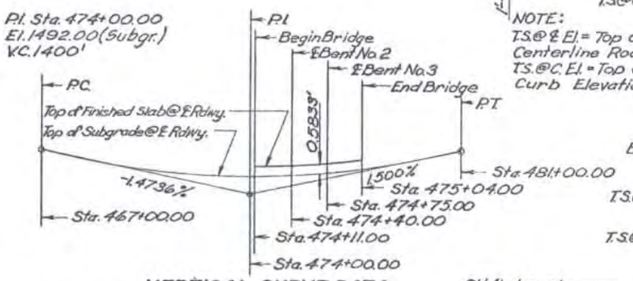
B.M. No. 23-El. 1494.27
Iron Pin along Fence Line
151' Rt. Sta. 477+79

B.M. No. 22-El. 1502.63
Iron Pin along Fence Line West of Track
117' Rt. Sta. 455+00

B.M. No. 24-El. 1498.
Spk. in P.P.
145' Rt. Sta. 479+80



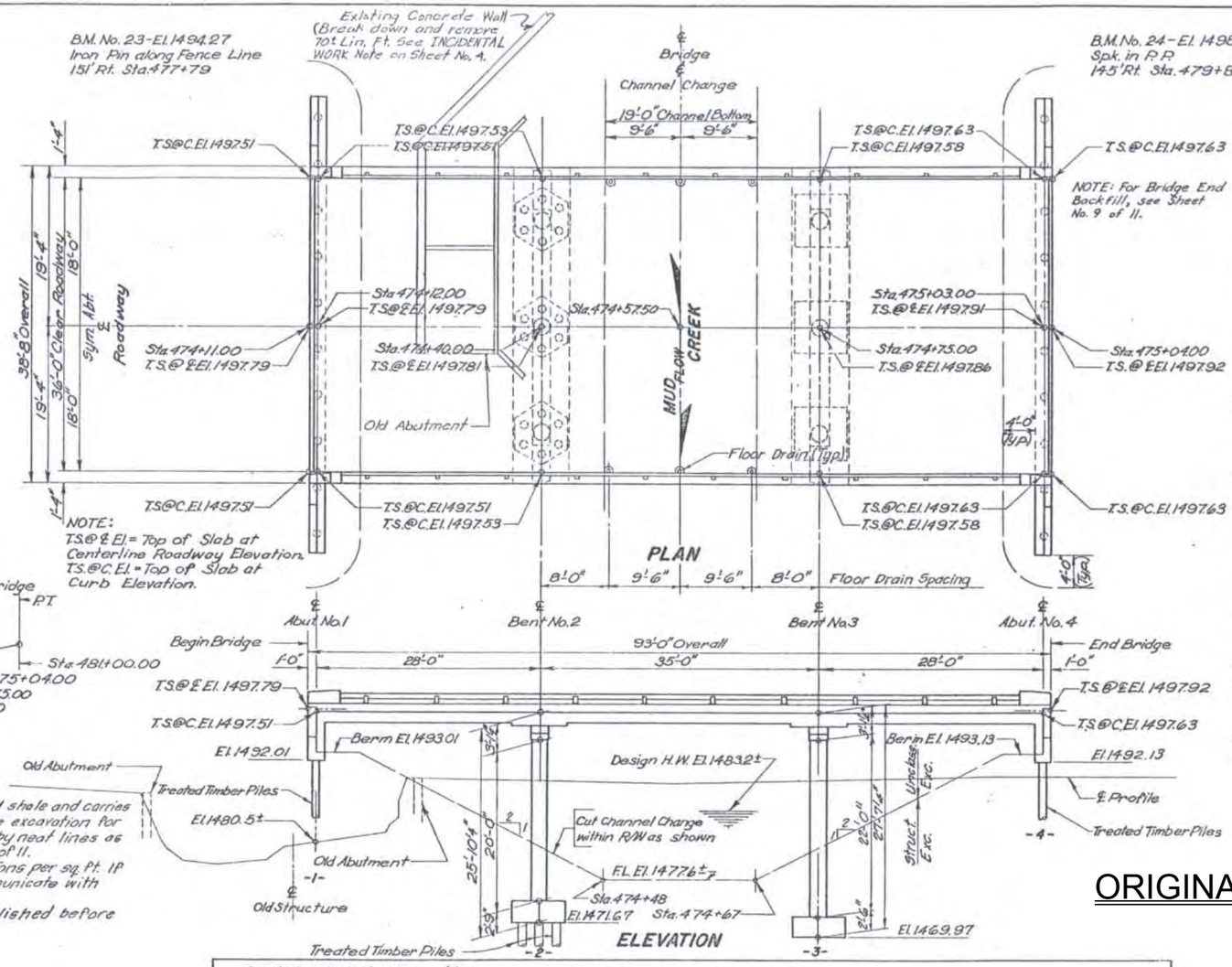
Q_{100}	960 c.f.s.
A	174.7 sq. ft.
V	5.5 f.p.s.



VERTICAL CURVE DATA

EXCAVATION NOTES.–

1. Footings for Bent No. 3 shall be cast upon undisturbed shale and carries into same approximately the depth of footings. Limits of shale excavation for these footings shall be bounded as nearly as practicable by neat lines as shown on details of footings for Bent No. 3 on Sheet No. 6 of 11.
2. Shale shall develop a minimum bearing value of 4.0 Tons per sq. ft. If the bearing value is less than 4.0 Tons per sq. ft. communicate with BRIDGE SECTION.
3. Final Footing elevation for Bent No. 3 shall be established before ordering column reinforcing steel.

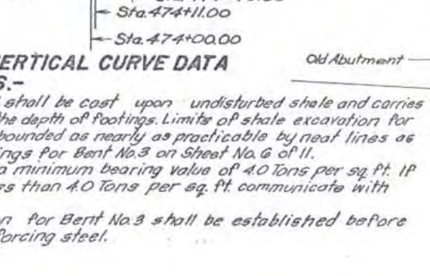


SPECIFICATION NOTE–

Use South Dakota Standard Specifications for Roads and Bridges, 1969 Edition, and Required Provisions, Supplemental Specifications and/or Special Provisions as included in the proposal.

GENERAL NOTES–

1. Design Specifications: AASHO Specifications for Highway Bridges, 1965, with Interim Specifications for 1966-67.
2. See NOTES on Sheets No. 1 thru 11.
3. Longitudinal elements of the slab shall be uniform to the vertical curve.
4. Rail posts and End Blocks shall be built normal to grade.
5. All Reinforcing steel shall conform to A.S.T.M. Specifications A305 and A15 Intermediate Grade.
6. Design Loading: H S 20-44 AA.S.H.O.
7. Furnish and install Inserts and Eyebolts as shown on Standard Plate No. 305.
8. The contractor shall have sufficient pile splice material on hand before pile driving is started. See Standard Plate No. 303.1 for splice details.
9. Prebored holes for piles at Abutments shall be backfilled with granular material acceptable to the ENGINEER and compacted as specified by the ENGINEER. The cost of granular material in place shall be included in the unit price bid for piles.
10. Place floor drains as show on plan, (6 Req'd).
11. Standard Plates referred to in these plans are the plates printed on Sheet No's. 10℄ 11 of 11 of these plans and not intended to be referred to the Standard Plates Manual.
12. All exposed edges shall be chamfered 1" except as shown.



CURB AND ℄ ELEVATIONS

Elevations indicated with * are top of Finished Slab at Curb and with ℄ are Top of Finished Slab at Centerline of Roadway. Chamber for Dead Load Deflection PLUS Plastic Flow, shown on Sheet No. 3 of Bridge Plans, have been included in the elevations shown above.

ESTIMATED QUANTITIES

*Includes End Block Quantities.

BID ITEM NUMBER	40005	40505	40555	40166	40705	40710	10410	10405	10721	10105
ITEM	Cl. "A" Conc. Cu. Yds.	Steel-Lbs. Reinf.	Steel-Lbs. Struct.	Type RT-3A Steel Railing-Lin. Ft.	Treated Timber Piles-Lin. Ft. Treated Timber	Treated Timber Piles-Lin. Ft. #Test	Excavation-Cu. Yds. Struct.	Excavation-Cu. Yds. ΔUnclass.	Bridge End Backfill ft Lump Sum	*INCIDENTAL WORK
Superstructure	*149.8	*44,120	*215	172.7						
Abutment No. 1	20.1	2,320	475		9@35'=315'	1@40'=40'	11			
Bent No. 2	24.7	4,650			17@12'=204'	1@16'=16'	92			
Bent No. 3	24.9	3,935					116			
Abutment No. 4	20.1	2,320	475		9@25'=225'	1@30'=30'	11			
Totals	239.6	57,345	1165	172.7	744'	# 86'	230	'	*Lump Sum	

#One Treated Timber Pile shall be driven at Sills No. 1 and No. 4 and at Bent No. 2 before the remaining piles are ordered.
ΔUnclassified Excavation to be done by Grading Contractor.
#For information only, the approximate volume of Granular Backfill will be 80 Cu. Yds. in place, and the length of 6" ϕ perforated Metal Pipe will be 152'-0" long.
*INCIDENTAL WORK: In place on ℄ Sta. 473+79.4 to Sta. 474+38.3, old 58'-6"± x 24' Roadway, single span, Reinforced Concrete Viaduct with timber widening. Original structure was single span 34'-0" x 18' Roadway I-Beam Bridge with open abutments. Dismantle and salvage all timber handrails, plank and timber widening, galvanized hardware, and steel beams. All spikes, nails, bolts, and screws not salvaged as hardware shall be removed from plank and timber materials. Break down old concrete slab and remove I Beam stringers. Care shall be taken not to injure the structural properties of planks, timbers hardware items and I-Beam stringers. Break down substructure and pull all steel piles. Old substructure shall be removed to 1'± below Finished ground line or as necessary to facilitate new construction, as directed by the ENGINEER. All salvaged materials, including steel piles, shall be placed neatly within the right-of-way as directed by the ENGINEER, to be picked up by State Forces for maintence work. All broken concrete and other materials not salvaged shall be disposed of as directed by the ENGINEER. INCIDENTAL WORK: Continued on Sheet No. 4

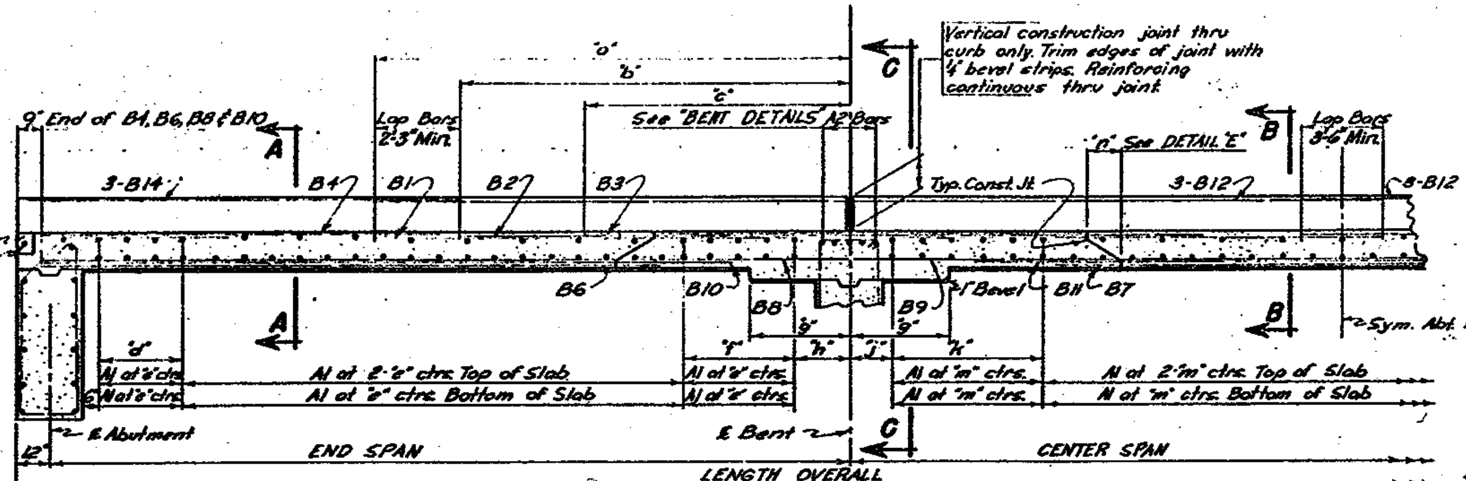
ORIGINAL CONSTRUCTION PLANS

19-070-089
Structure No. 19-070-089
PLANS BY
BRIDGE SEC., S. DAK. DEPT. HWYS.

GENERAL DRAWING AND QUANTITIES
FOR
93'-0" CONT. CONC. BRIDGE
36'-0" ROADWAY
OVER MUD CREEK SEC. 18/17-T123N-R58W.
STA. 474+11.00 TO 475+04.00 F 051-7(11)
DAY COUNTY
SOUTH DAKOTA HS20-44
DEPARTMENT OF HIGHWAYS
APRIL 1969 (1) OF (11)

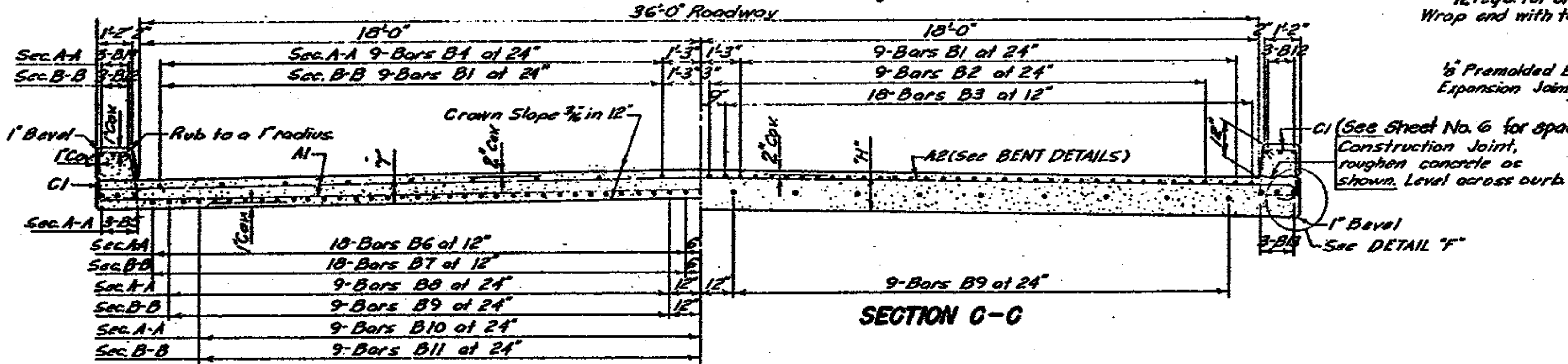
-X020-

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	ROY.	GA.	BRIDGE ENGINEER



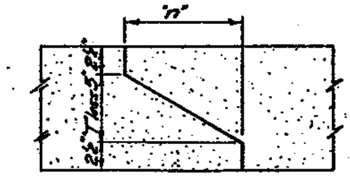
HALF LONGITUDINAL SECTIONAL VIEW

(Railing not shown)

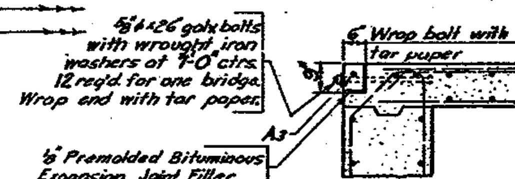


SECTION A-A
SECTION B-B — As shown and noted

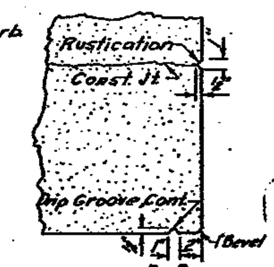
SECTION C-C



DETAIL "E"
(Typical Construction Joint)



DETAIL "D"



DETAIL "F"

—NOTES—

These notes cover Abutment, Superstructure and Railing Details. The General Drawing for each structure will show spans, elevations, and other necessary notes and details.

DESIGN SPECIFICATIONS: A.A.S.H.O. Specifications for Highway Bridges, 1965. With Interim Specifications for 1966-67.

PILING: See General Drawing for type and length of Abutment piling.

STRUCTURAL STEEL: All ⅝"⌀ bolts including washers, and all pile connections in Abutments, and all floor drains shall be paid for as Structural Steel.

REINFORCING STEEL: All Reinforcing Steel shall conform to A.S.T.M. Specifications A305 and A15 (Intermediate Grade).

CONCRETE:
All Concrete shall be Class "A". All exposed concrete corners and edges shall be chamfered to a ¾" bevel unless noted otherwise. If necessary to facilitate construction, transverse construction joints may be made at the quarter points of each end any span, adjacent to interior bents. All costs for expansion joint filler and for paper shall be included in the unit price bid per cu. yd. for Class "A" Concrete.

DESIGN DATA: Design Loading: HS20-44 AASHO. Unit Stresses: Concrete fc=1600 p.s.i., n=8; Reinforcing Steel: fs=20,000 p.s.i. (Int. Grade Steel). Equivalent fluid pressure of earth at 40#/sq.ft. Minimum Pile Loading=24 tons for Timber Piling and

ORIGINAL CONSTRUCTION PLANS

SLAB DATA

REINFORCING SCHEDULE

LENGTH OVERALL	END SPAN	CENTER SPAN	A1 No.	A1 Size	A1 Length	A2	A3 No.	A3 Size	A3 Length	B1 No.	B1 Size	B1 Length	B2 No.	B2 Size	B2 Length	B3 No.	B3 Size	B3 Length	B4 No.	B4 Size	B4 Length
51'-0"	16'	20'	88	5	38'-3"	See "BENT DETAILS" for Number, Size, Length and Quantity.	2	5	35'-9"	36	8	22'-6"	36	8	17'-0"	72	7	10'-0"	36	7	8'-0"
60'-6"	18'	22'-6"	100	↕	↕		↕	↕	↕	↕	8	24'-0"	↕	8	18'-0"	↕	8	11'-9"	↕	7	9'-6"
67'-0"	20'	25'	112								8	26'-0"		8	19'-6"		8	13'-6"		7	11'-0"
73'-6"	22'	27'-6"	125								9	28'-0"		8	20'-0"		8	14'-6"		8	12'-6"
80'-0"	24'	30'	138								9	31'-0"		9	22'-6"		8	15'-0"		8	12'-6"
86'-6"	26'	32'-6"	151								9	34'-0"		9	24'-6"		9	17'-0"		8	15'-0"
93'-0"	28'	35'	163	5	38'-3"		2	5	35'-9"	36	10	35'-0"	36	9	24'-6"	72	9	18'-0"	36	9	15'-0"
99'-6"	30'	37'-6"	196								10	36'-6"		10	26'-0"		9	18'-0"		9	17'-0"
106'-0"	32'	40'	210								10	39'-0"		10	27'-6"		10	19'-6"		9	17'-6"
112'-6"	34'	42'-6"	222	↕	↕		↕	↕	↕	↕	10	40'-0"	↕	10	30'-0"	↕	10	23'-0"	↕	9	19'-6"
119'-0"	36'	45'	238	5	38'-3"		2	5	35'-9"	36	10	42'-6"	36	10	30'-0"	72	10	23'-0"	36	9	21'-0"

LENGTH OVERALL	B5 No.	B5 Size	B5 Length	B6 No.	B6 Size	B6 Length	B7 No.	B7 Size	B7 Length	B8 No.	B8 Size	B8 Length	B9 No.	B9 Size	B9 Length	B10 No.	B10 Size	B10 Length
51'-0"	12	7	16'-9"	72	8	14'-0"	36	8	13'-9"	36	8	16'-3"	18	8	20'-0"	34	7	15'-3"
60'-6"	↕	7	18'-9"	↕	8	15'-6"	↕	8	16'-0"	↕	8	18'-3"	↕	8	22'-6"	↕	7	16'-9"
67'-0"		8	20'-9"		8	16'-6"		8	16'-0"		8	20'-3"		8	25'-0"		8	18'-6"
73'-6"		8	22'-9"		8	17'-6"		8	17'-0"		9	22'-3"		9	27'-6"		8	19'-0"
80'-0"		8	24'-9"		8	18'-6"		8	17'-6"		9	24'-3"		9	30'-0"		9	20'-9"
86'-6"		9	26'-9"		9	20'-6"		9	20'-0"		9	26'-3"		9	32'-6"		8	21'-6"
93'-0"	12	9	28'-9"	72	9	21'-6"	36	9	20'-6"	36	9	28'-3"	18	9	35'-0"	34	9	23'-6"
99'-6"		10	30'-9"		9	23'-0"		9	20'-6"		10	30'-3"		10	37'-6"		9	24'-6"
106'-0"		10	32'-9"		9	23'-6"		9	20'-0"		10	32'-3"		10	40'-0"		10	26'-0"
112'-6"	↕	11	34'-9"	↕	9	25'-0"	↕	9	21'-6"	↕	10	34'-3"	↕	10	42'-6"	↕	10	27'-6"
119'-0"	12	11	36'-9"	72	10	27'-0"	36	10	24'-6"	36	10	36'-3"	18	10	45'-0"	34	9	29'-0"

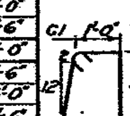
LENGTH OVERALL	B11 No.	B11 Size	B11 Length	B12 No.	B12 Size	B12 Length	B13 No.	B13 Size	B13 Length	B14 No.	B14 Size	B14 Length	C1 No.	C1 Size	C1 Length	C1 Type	C1 A
51'-0"	17	7	17'-0"	12	7	22'-6"	6	7	20'-0"	12	6	8'-6"	108	4	6'-3"	T1	1'-6¾"
60'-6"	↕	7	19'-0"	↕	7	24'-0"	↕	7	22'-6"	↕	7	10'-0"	122	↕	6'-3"	↕	1'-6¾"
67'-0"		8	20'-6"		8	26'-0"		8	25'-0"		7	11'-6"	136		6'-6"		1'-7¼"
73'-6"		8	21'-0"		8	28'-0"		8	27'-6"		8	13'-0"	156		6'-6"		1'-7½"
80'-0"		9	22'-6"		8	31'-0"		8	30'-0"		8	13'-0"	168		6'-6"		1'-7¾"
86'-6"		8	23'-0"		9	32'-0"		9	32'-6"		8	15'-6"	176		6'-6"		1'-8½"
93'-0"	17	9	21'-6"	12	9	35'-0"	6	9	35'-0"	12	8	15'-6"	174	4	6'-9"	T1	1'-9¼"
99'-6"		9	25'-0"		10	36'-6"		10	37'-6"		8	17'-6"	198		6'-9"		1'-9⅝"
106'-0"		10	26'-0"		10	39'-0"		10	40'-0"		8	18'-0"	224		7'-0"		1'-10¼"
112'-6"	↕	10	27'-0"	↕	11	40'-6"	↕	11	42'-6"	↕	8	20'-0"	224	↕	7'-0"	↕	1'-11"
119'-0"	17	9	28'-6"	12	11	42'-6"	6	11	45'-0"	12	8	21'-6"	240	4	7'-3"	T1	1'-11¾"

DIMENSIONS

"T"	"H"	"a"	"b"	"c"	"d"	"e"	"f"	"g"	"h"	"j"	"k"	"m"	"n"	LENGTH OVERALL
9¼"	12½"	11'-0"	8'-3"	4'-9"	1'-8"	10"	1'-8"	2'-0"	1'-2"	1'-9"	2'-9"	11"	7¾"	54'-6"
9¾"	13¼"	11'-3"	9'-9"	6'-3"	1'-8"	10"	1'-8"	2'-3"	1'-6"	1'-2"	2'-9"	11"	8½"	60'-6"
10¼"	14"	12'-0"	10'-6"	7'-0"	2'-6"	10"	2'-6"	2'-6"	1'-10"	1'-6"	3'-8"	11"	9½"	67'-0"
10¾"	14⅝"	12'-6"	11'-0"	7'-6"	2'-6"	10"	3'-4"	2'-9"	1'-4"	1'-10"	3'-8"	11"	10½"	73'-6"
11"	15"	14'-5"	11'-9"	8'-0"	2'-6"	10"	3'-4"	3'-0"	1'-8"	1'-3"	4'-7"	11"	10¾"	80'-0"
11¾"	16"	16'-0"	12'-9"	9'-0"	3'-4"	10"	3'-4"	3'-3"	1'-2"	1'-7"	4'-7"	11"	1'-0¼"	86'-6"
12½"	17"	15'-9"	12'-9"	9'-3"	4'-2"	10"	4'-2"	3'-6"	1'-6"	1'-11"	5'-6"	11"	1'-1½"	93'-0"
13"	17¾"	16'-0"	13'-6"	9'-6"	4'-6"	9"	4'-6"	3'-9"	1'-6"	1'-3"	5'-10"	10"	1'-2½"	99'-6"
13½"	18¼"	17'-3"	14'-3"	10'-3"	4'-6"	9"	5'-3"	4'-0"	1'-3"	1'-8"	6'-8"	10"	1'-3¼"	106'-0"
14¼"	19¼"	17'-6"	15'-0"	11'-9"	4'-6"	9"	5'-3"	4'-3"	1'-9"	1'-3"	6'-8"	10"	1'-4¾"	112'-6"
15"	20¼"	18'-0"	15'-3"	11'-9"	6'-0"	9"	6'-0"	4'-6"	1'-6"	1'-8"	7'-6"	10"	1'-6"	119'-0"

BAR BENDS

NOTE: All dimensions are out to out of bars.

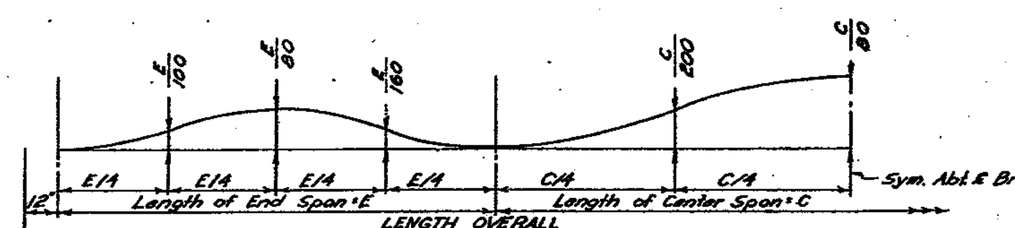


Type T1

ESTIMATED QUANTITIES

LENGTH OVERALL	TWO ABUTMENTS: Class "A" Concrete Cu. Yds.*	TWO ABUTMENTS: Reinforcing Steel Lbs.	TIMBER PILES: Number of Piles	TIMBER PILES: Struct. Steel-Lbs.	STEEL PILES: Number of Piles	STEEL PILES: Struct. Steel-Lbs.	SLABS & CURBS: Class "A" Concrete Cu. Yds.	SLABS & CURBS: Reinforcing Steel Lbs.	SLABS & CURBS: ⅝"⌀ Bolts	SLABS & CURBS: Number of Floor Drains	SLABS & CURBS: Structural Steel Lbs.
51'-0"	40.2	4690	16	760	12	300	63.0	19,440	22	12	160
60'-6"	↕	↕	16	760	12	300	74.8	22,315	↕	14	180
67'-0"			16	760	12	300	87.4	25,560		14	185
73'-6"			18	860	12	300	100.9	29,645		18	225
80'-0"			18	860	12	300	112.6	33,370		18	230
86'-6"			18	860	12	300	130.0	38,845		20	260
93'-0"	40.2	4,640	20	950			148.6	43,340	12	6	95
99'-6"			20	950	14	350	165.6	49,965		20	275
106'-0"			22	1050	14	350	182.9	55,300		24	325
112'-6"	↕	↕	22	1050	14	350	204.8	60,475	↕	26	360
119'-0"	40.2	4690	22	1050	14	350	227.9	65,095	22	26	370

*Includes slabs and curbs directly over abutment.



CAMBER DIAGRAM

Camber is calculated for dead load plus plastic flow. Camber is calculated thus using the 106'-0" Bridge as an illustration: E=32' and C=40'; C/80=40/80=1/2, provide 1/2" camber at center of center span. The values obtained for camber shall be added to the proposed grade elevations at the respective stations to establish the elevations of the top of the finished roadway slab.

Structure No. 19-070-089

SUPERSTRUCTURE DETAILS
FOR
93'-0" CONTINUOS CONCRETE BRIDGE
36'-0" ROADWAY

OVER MUD CREEK — SEC.18/17-123N-R58W
STA. 474+11.00 TO 475+04.00 — F051-7(1)
DAY COUNTY
SOUTH DAKOTA — HS20-44
DEPARTMENT OF HIGHWAYS
APR. 1969 — 3 OF 11

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
CHU/MBS	GLS	JLH	[signature] BRIDGE ENGINEER

-X020-

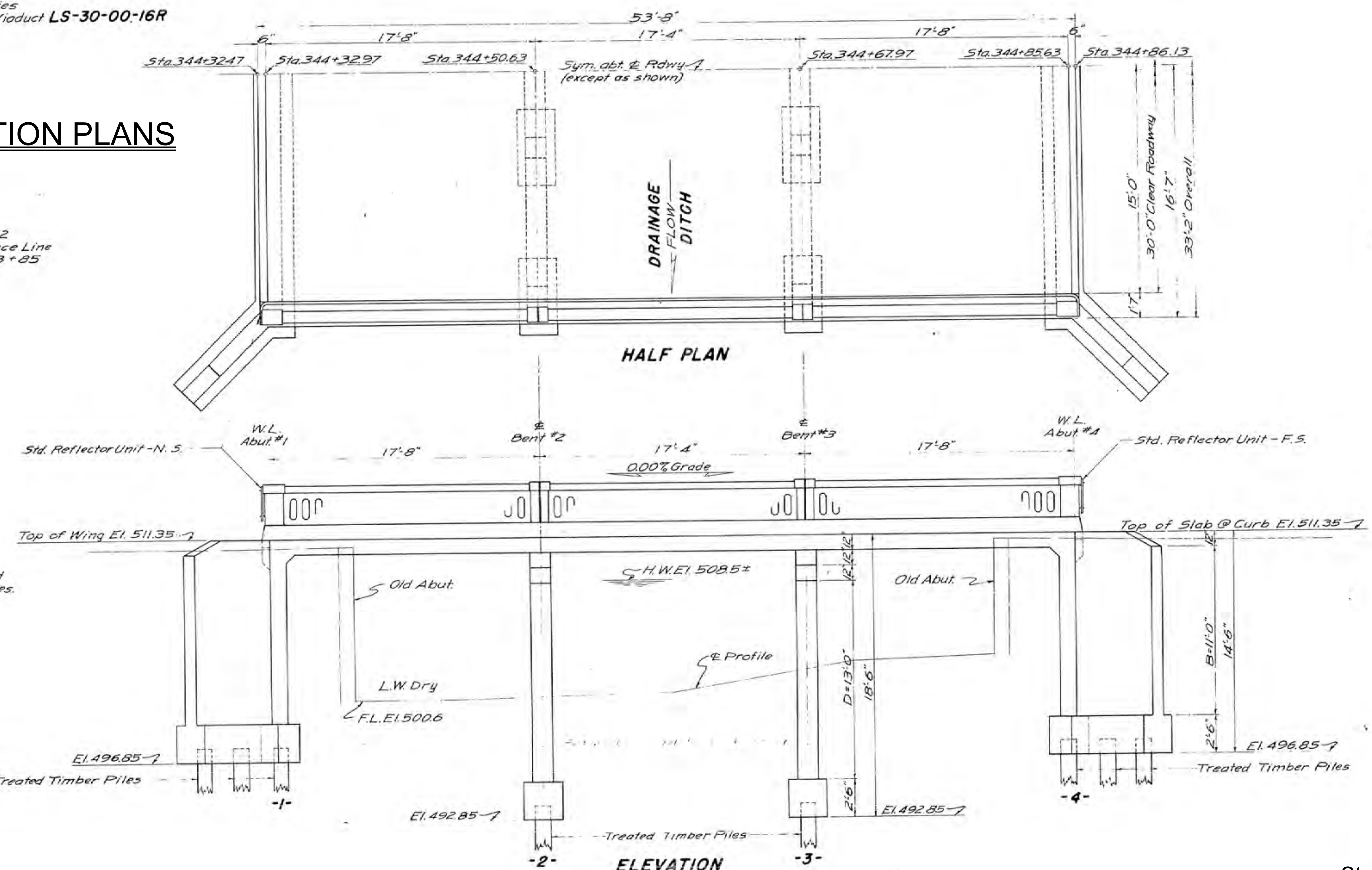
INDEX OF BRIDGE SHEETS.-

Sheet No. 1 - General Drawing and Quantities
Sheet No. 2 - Details of Reinforced Concrete Viaduct LS-30-00-16R

ORIGINAL CONSTRUCTION PLANS

B.M. #26 - El. 506.02
1" Iron Rod in Fence Line
184' Rt. Sta. 343+85

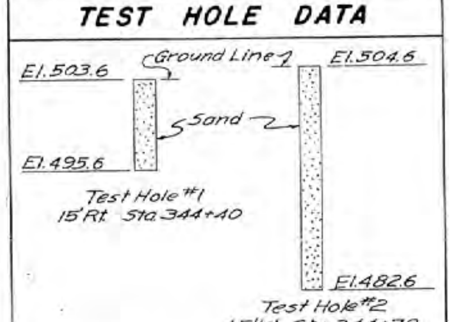
B.M. #27 - El. 511.11
Head of Bolt in R.R. Bridge
117' Rt. Sta. 355+04



SPECIFICATION NOTE.-

Use current South Dakota Standard Specifications for Roads and Bridges.

TEST HOLE DATA



Both Test Holes found fine gray sand the entire depth. Co d not go deeper because of cave-ins.

QUANTITIES

ITEM	Concrete - Cu. Yds. Class "A"	Concrete - Cu. Yds. Class "H.R."	Reinf. Steel Lbs.	Treated Timber Piles ϕ Test - ea.	Treated Timber Piles Lin. Ft.	Excavation - Cu. Yds. Struct.	Excavation - Cu. Yds. Unclass.
Superstr. - 3 Spans	68.1	3.03	6,125				* Incidental Work
Substr. - 2 Abuts. - #1 & #4	67.6	.46	5,890	1 @ 30	33 @ 25' = 825	200	
Substr. - 2 Bents - #2 & #3	26.2	.44	4,890	1 @ 30	15 @ 25' = 375	80	
Totals	161.9	3.93	16,905	ϕ 2	1200	280	

ϕ One 30'-0" Treated Timber Test Pile shall be driven at Bent #2 and Abut. #4 before remaining piles are ordered.

* INCIDENTAL WORK.- In place, at Sta. 344+59.3± on ℄, old 44'-0" Span, 18'-0" Roadway, Reinforced Concrete I-Beam Viaduct. Break down old superstructure being careful not to injure I-Beams and Gas Pipe Handrail structurally. Salvaged I-Beams and Gas Pipe Handrail shall be placed neatly on Right-of-Way as directed by the Engineer. Eradicate old substructure to 1'± below ground line except at Abut. #1 and Abut. #4, where old wing walls shall be removed as necessary for placing new footings. Satisfactory broken concrete shall be used as riprap around wings of new Abutments. All other broken concrete and materials shall be disposed of as directed by the Engineer.

Structure No. 46-065-100

GENERAL DRAWING AND QUANTITIES
FOR
53'-8" REINF. CONCRETE VIADUCT
30'-0" ROADWAY
OVER DRAINAGE DITCH SEC. 19/30-T127N-R58W
STA. 344+32.47 TO 344+86.13 F143(3)
MARSHALL COUNTY
SOUTH DAKOTA H15-35
STATE HIGHWAY COMMISSION
APRIL 1947 (1) of (2)

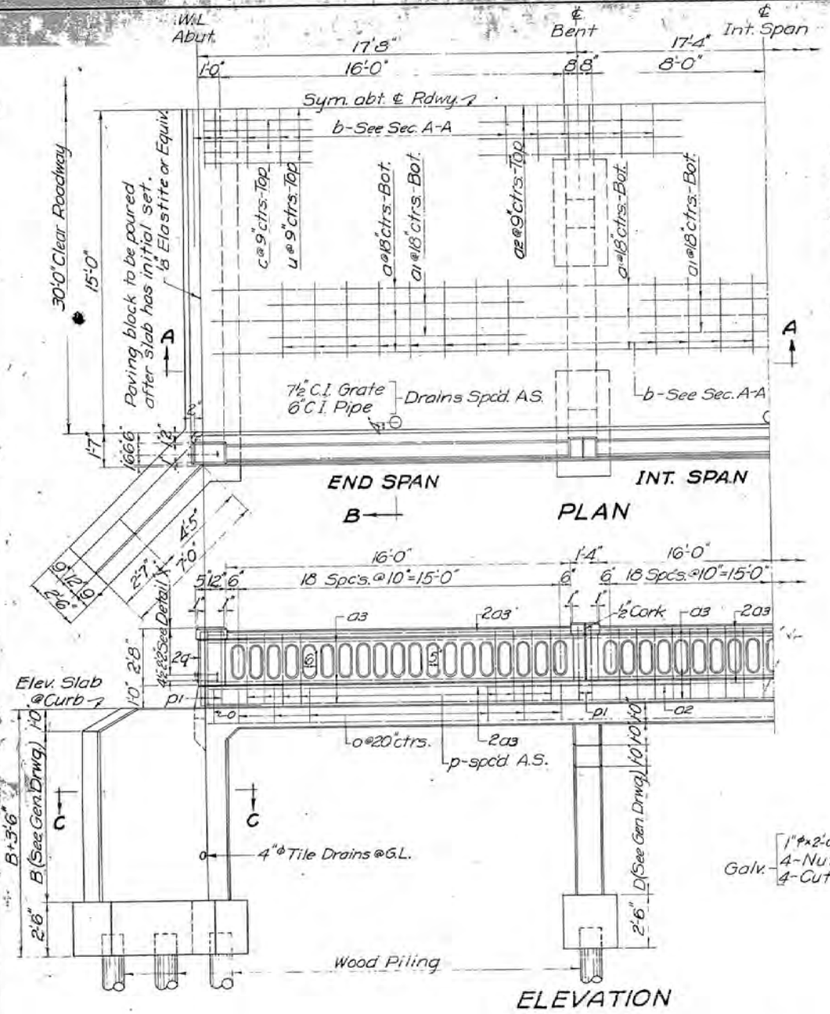
-X020-

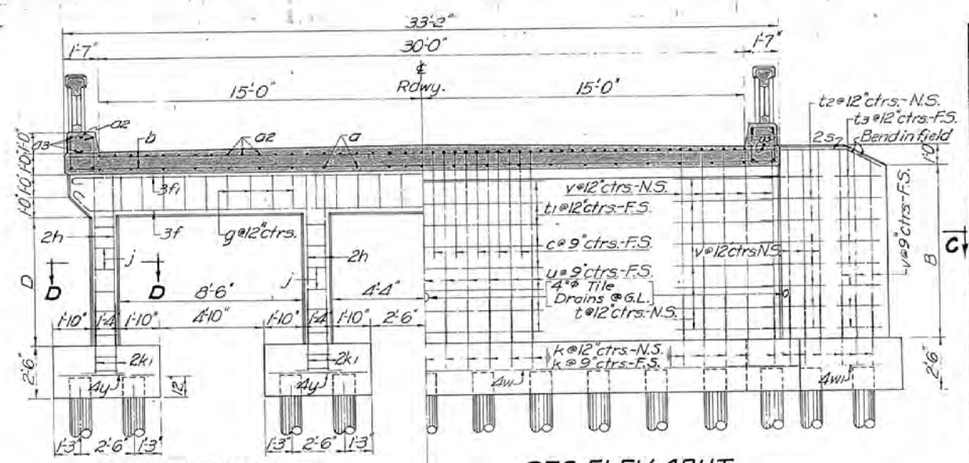
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	S.V.H.	C.R.S.	BRIDGE ENGINEER

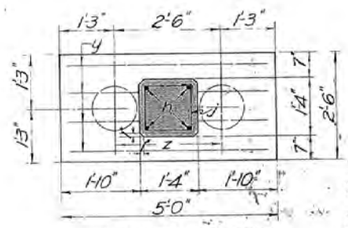
Re-Steel Rev. 6-16-47

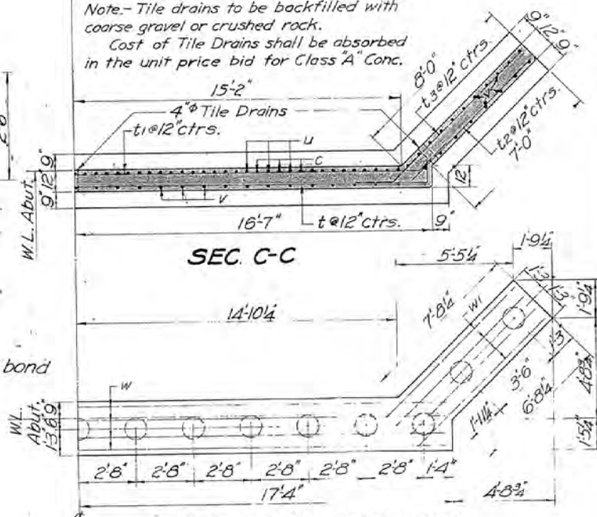
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	32	36

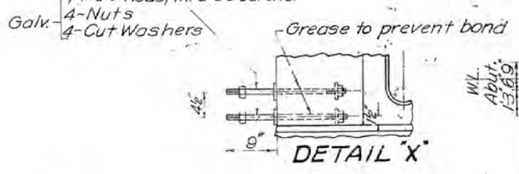
ORIGINAL CONSTRUCTION PLANS











REINF. SCHEDULE

ONE SPAN

Mk.	No.	Sz	Lgth.	Bending Details
o	25	7/8"ϕ	17'-3"	
o1	20	7/8"ϕ	12'-0"	
b	12	1/2"ϕ	32'-9"	
p	36	1/2"ϕ	7'-5"	
o	20	1/2"ϕ	5'-0"	
o3	14	1/2"ϕ	17'-3"	

ONE BENT

a2	43	7/8"ϕ	9'-6"	
b	2	1/2"ϕ	32'-9"	
f	3	1"ϕ	35'-3"	
f1	3	1"ϕ	34'-6"	
g	29	1/2"ϕ	8'-0"	
h	16	7/8"ϕ	D+1'-9"	
*j	8	3/8"ϕ	4'-6"	
k1	16	7/8"ϕ	6'-0"	
p1	4	1/2"ϕ	7'-9"	
y	16	1/2"ϕ	4'-6"	
z	8	1/2"ϕ	2'-0"	

*Add 4 j bars per ft. of D.

ONE ABUTMENT

b	5	1/2"ϕ	32'-9"
c	40	5/8"ϕ	10'-0"
q	4	1/2"ϕ	8'-0"
k	112	1/2"ϕ	4'-9"
p1	4	1/2"ϕ	7'-9"
s	4	1/2"ϕ	7'-0"
*t		1/2"ϕ	34'-9"
*t1		1/2"ϕ	35'-0"
*t2		1/2"ϕ	8'-0"
*t3		1/2"ϕ	10'-0"
u	41	1/2"ϕ	B+5'-9"
v	71	1/2"ϕ	B+9"
w	4	1/2"ϕ	34'-0"
w1	8	1/2"ϕ	8'-6"
*n	8	3/8"ϕ	2'-0"
d	20	1/2"ϕ	4'-0"
o	2	1/2"ϕ	5'-0"

*Add 1 each of t & t1 and 2 each of t2 & t3 bars per ft of B.
ϕGalv. Bolts

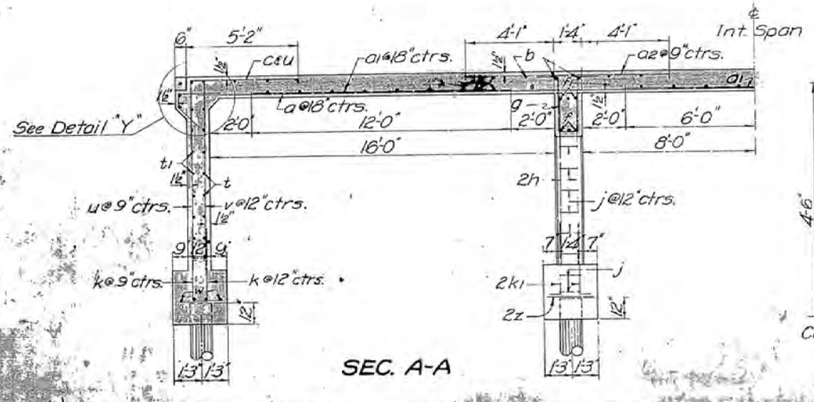
Dimensions are to ℄ of bars.
Hooks shall have 5 dia's. clear openings.

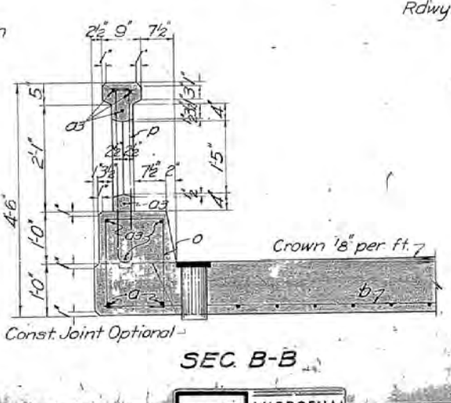
Note.-Wood piling shall develop 18 tons per pile.

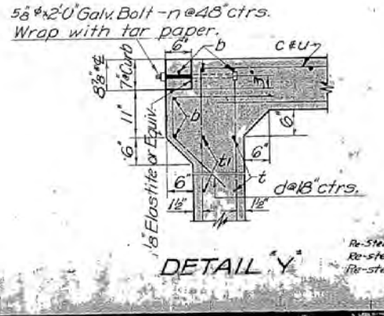
QUANTITIES

	Concrete – Cu Yds.			Reinf. Steel-lbs.		
	Class 'A' Con.	Var.	H.R.	Con.	Var.	Piling
Super. 1 Span	22.7		1.01	2041		
1 Bent	9.7	2.6	.22	1939	39	See Gen. Drwg.
1 Abutment	14.2	1.78	.25	1330	145	

Notes:- Cost of Expansion Material, G.R. Anchors, and Drains shall be absorbed in the unit price bid for Cl. 'A' Conc. Guard Rail Anchors, see Detail 'X', shall be located where cable guard rail joins bridge handrail, See Road Plans.







Structure No. 46-065-100

DETAILS OF

REINFORCED CONCRETE VIADUCT

30'-0" ROADWAY 16'-0" SPANS

SOUTH DAKOTA

STATE HIGHWAY COMMISSION

JULY 1938 H15-35

Re-Steel Rev. 5-15-47
Re-steel Rev. 6-18-46
Re-steel Rev. 2-5-46
Rev. 11-4-40
Rev. 10-16-40
Rev. 3-26-40

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	O.A.J.	O.H.	BRIDGE ENGINEER

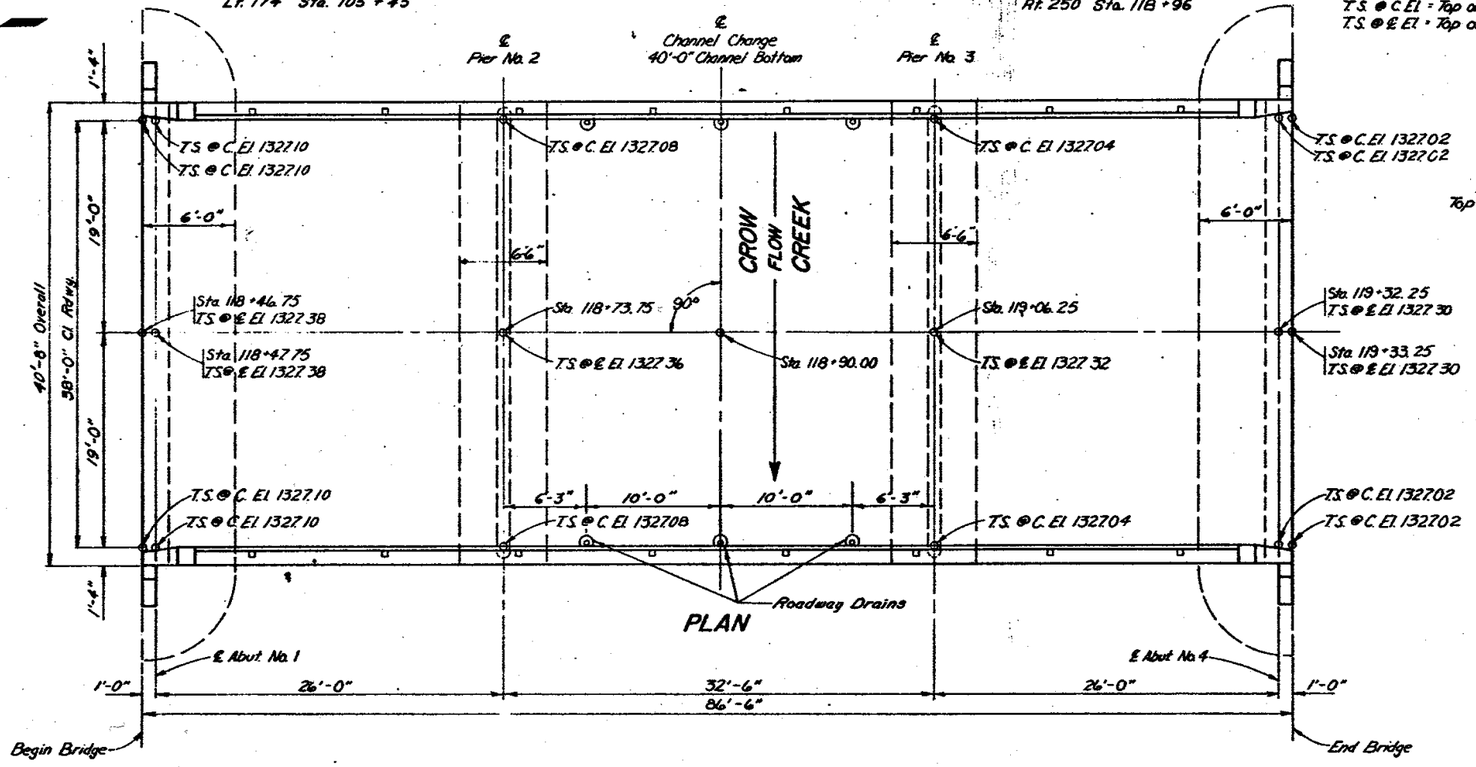
F 145 (5) 16

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	33	36

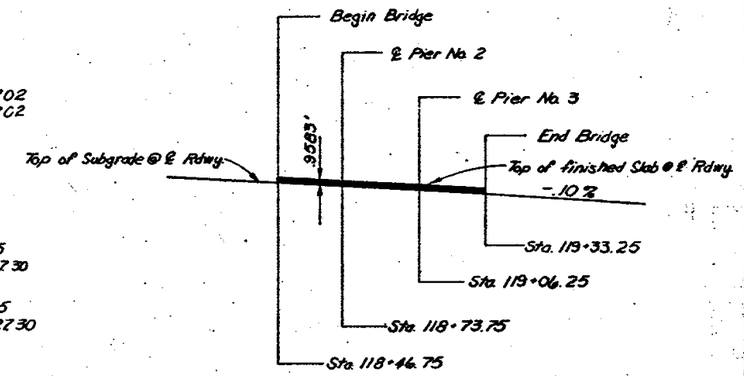
B.M. #10a Elev. 1324.67
Steel pin in Fence line
Lt. 174' Sta. 105+45

B.M. #11a Elev. 1318.50
Steel pin in Fence line
Rt. 250' Sta. 118+96

NOTE:
T.S. @ C. El = Top of Slab at Curb Elevation.
T.S. @ ℄ El = Top of Slab at Centerline Roadway Elevation.

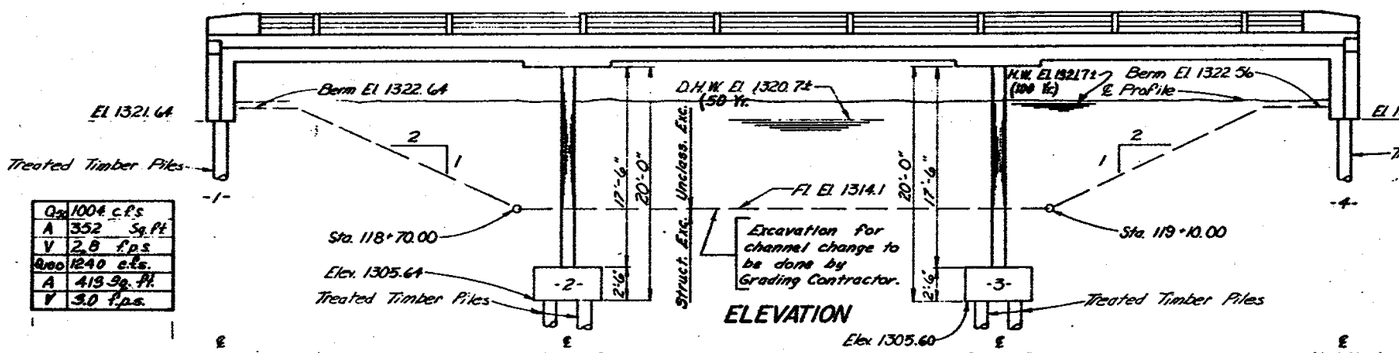


PLAN

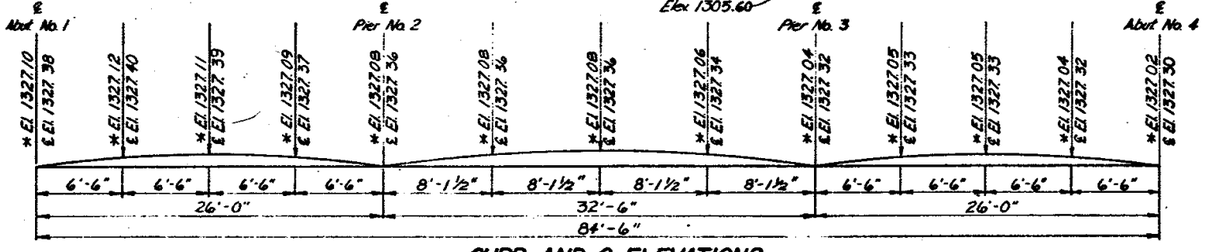


VERTICAL GRADE

INDEX OF BRIDGE SHEETS



ELEVATION



CURB AND ℄ ELEVATIONS

Elevations indicated with * are Top of Finished Slab at curb and with ℄ are Top of Finished Slab at Centerline of Roadway. Camber for Dead Load Deflection Plus Plastic Flow, shown on sheet No. 4 of Bridge Plans, have been included in the elevations shown above.

Note Regarding Incidental Work - See Sheet No. 2A of 17

ORIGINAL CONSTRUCTION PLANS

GENERAL DRAWING
FOR
86'-6" CONTINUOUS CONCRETE BRIDGE
38'-0" ROADWAY

OVER CROW CREEK
STA. 118+46.75 TO 119+33.25
STR. NO. 46-110-123
SEC. 2 - T126N - R58W
TQS 3027(1)221 & RS 3027(1)221

MARSHALL COUNTY
SOUTH DAKOTA HS20-44
DEPARTMENT OF HIGHWAYS
OCTOBER, 1973 (1) OF (17)

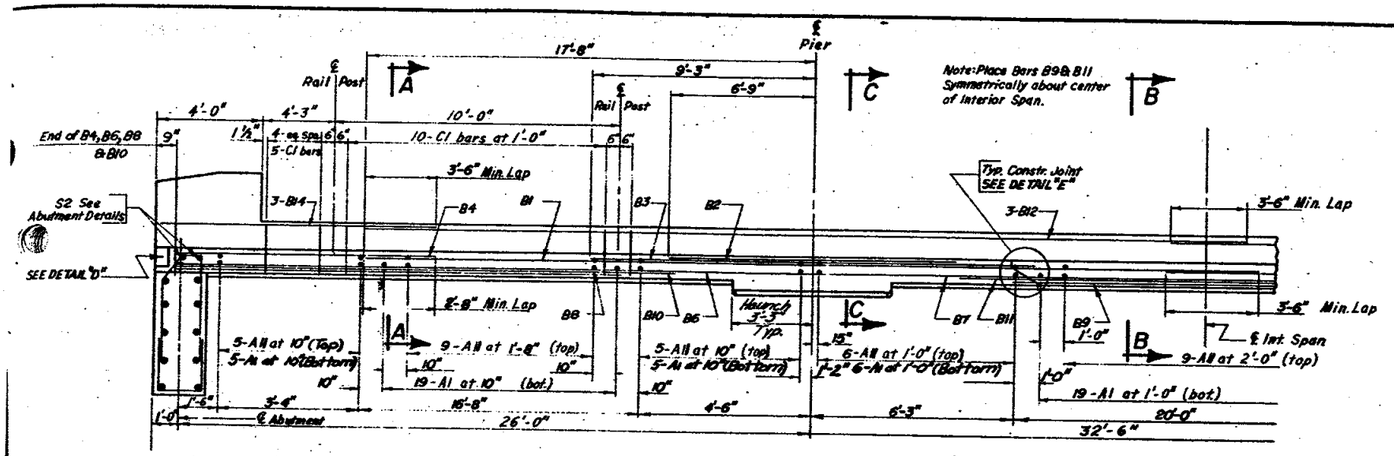
-X020-

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
M.K.S.	L.P.O.	E.J.J.	BRIDGE ENGINEER

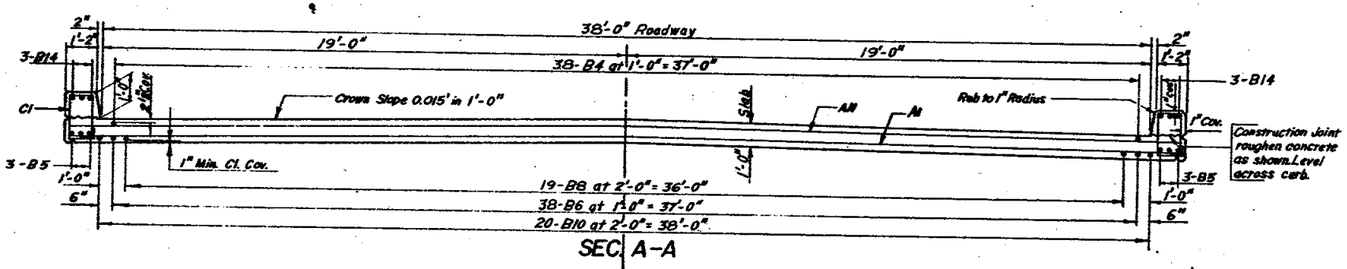
PLANS BY CLARK ENGINEERING CO.

NO. 49

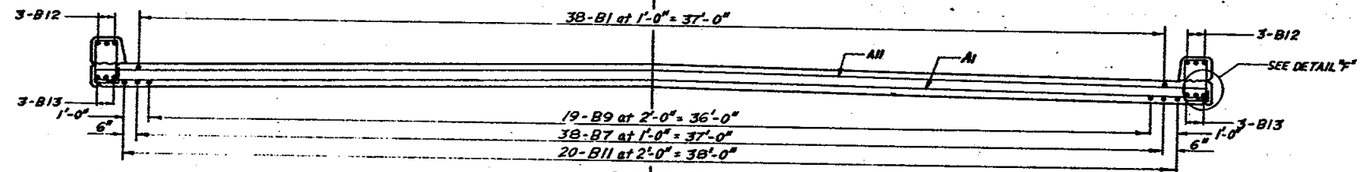
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	34	36



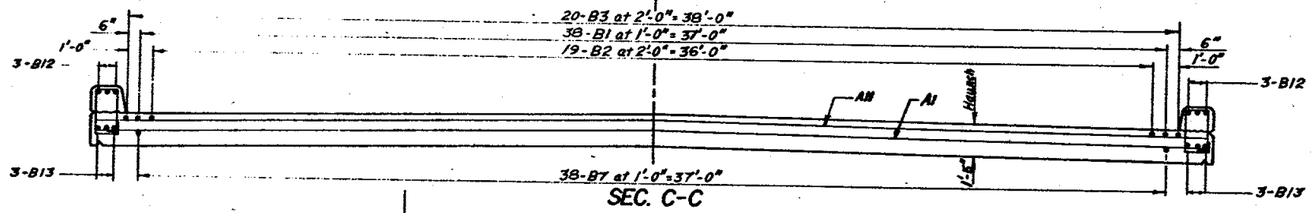
HALF LONGITUDINAL SECTIONAL VIEW



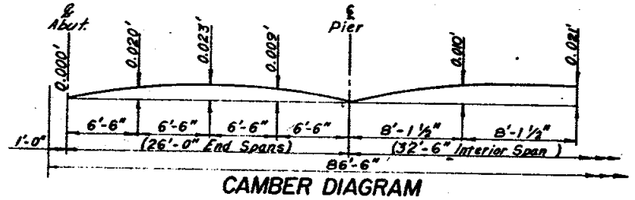
SEC. A-A



SEC. B-B

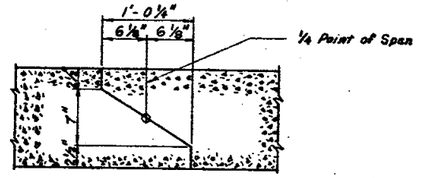


SEC. C-C

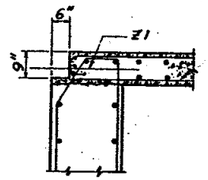


CAMBER DIAGRAM

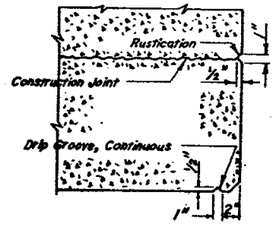
Camber is calculated for dead load deflection plus plastic flow and shall be added to the proposed grade elevations at the respective stations to establish the elevations of the top of the finished roadway slab.



DETAIL "E"



DETAIL "D"



DETAIL "F"

REINFORCING SCHEDULE

MK.	NO.	SIZE	LENGTH	TYPE	BENDING DETAILS
A1	89	5	40'-4"	Str.	
A2	(See Pier Details)				
*B1	76	8	35'-8"	Str.	
*B2	38	9	13'-6"	Str.	
*B3	40	8	18'-6"	Str.	
*B4	76	7	12'-1"	1A	
B5	12	7	26'-9"	Str.	
B6	76	9	26'-3"		
B7	38	8	32'-6"		
B8	38	8	17'-3"		
B9	19	9	15'-6"		
B10	40	8	19'-3"		
B11	20	8	21'-6"		
B12	24	8	35'-8"		
B13	6	7	32'-6		
B14	12	8	12'-7"	Str.	
*A11	59	5	40'-4"	Str.	
Cl	160	4	6'-4"	T2	
*Z1	102	7	4'-0"	Str.	

1'-0" 11½" Cl — TYPE T2

B4 11'-3" — TYPE 1A

* All A11, B1, B2, B3 & B4 Bars are to be Epoxy coated.
* See Sheet No. 12 of 17 for positioning of "Z1" bars.
NOTE: All dimensions are out to out of bars.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Class "A" Concrete, Bridge	Cu. Yd.	146.5
Reinforcement Conc. Masonry	Lb.	25034
Structural Steel	Lb.	58.7
Type RT-4 Steel Railing	Lin. Ft.	157.0
Oil treatment for Bridges	Gal.	27.0
Epoxy coated Reinforcing Steel	Lb.	15,917

ORIGINAL CONSTRUCTION PLANS

SUPERSTRUCTURE DETAILS
FOR
86'-6" CONTINUOUS CONCRETE BRIDGE
38'-0" ROADWAY

OVER CROW CREEK — SEC. 2 - T126N - R58W
STA. 118+46.75 TO 119+33.25 — TQS 3027(1)221 & RS3027(0)221
STR. NO. 46-110-123

MARSHALL COUNTY
SOUTH DAKOTA — HS20-44
DEPARTMENT OF HIGHWAYS
OCTOBER, 1973 (4) OF (17)

-X020-

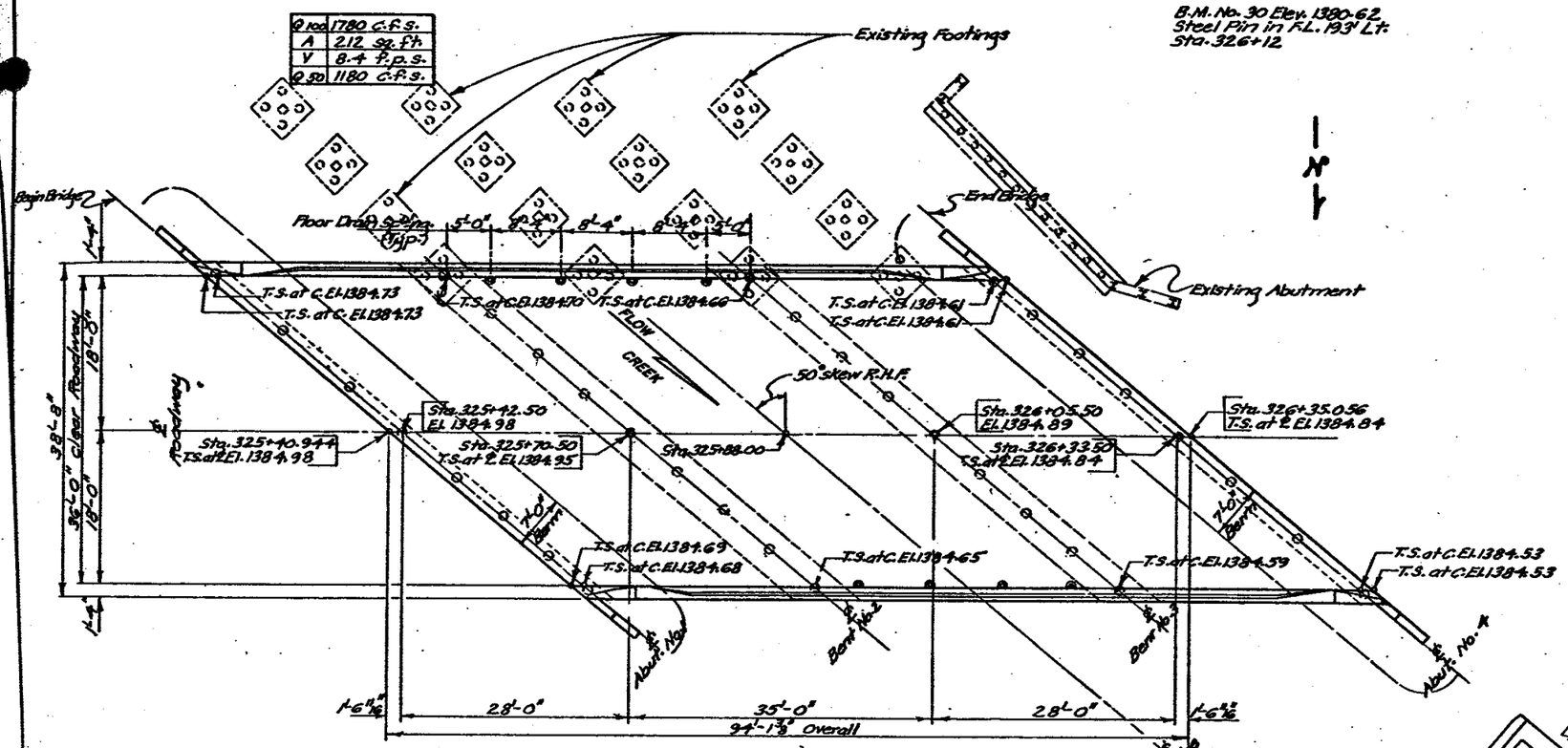
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
M.K.S.	P.B.D.	E.J.J.	BRIDGE ENGINEER

SHEET NO. 52

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	35	36

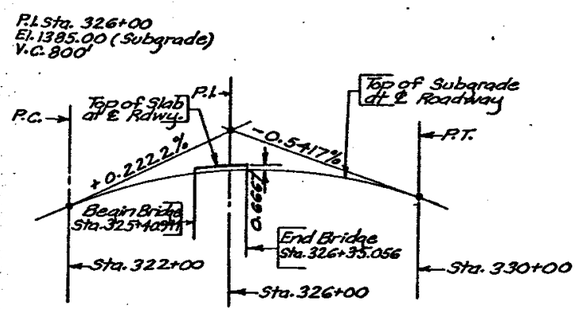
Q 100	1780 C.F.S.
A	212 Sq. Ft.
V	8.4 F.P.S.
Q 50	1180 C.F.S.

B.M. No. 30 Elev. 1380.62
Steel Pin in F.L. 193' Lt.
Sta. 326+12

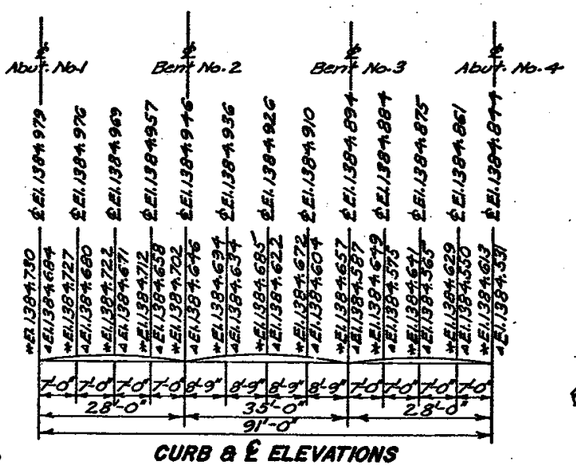


NOTE:
T.S. at ℄ El. = Top of Slab at centerline Elevation.
T.S. at C. El. = Top of Slab at Curb Elevation.

PLAN

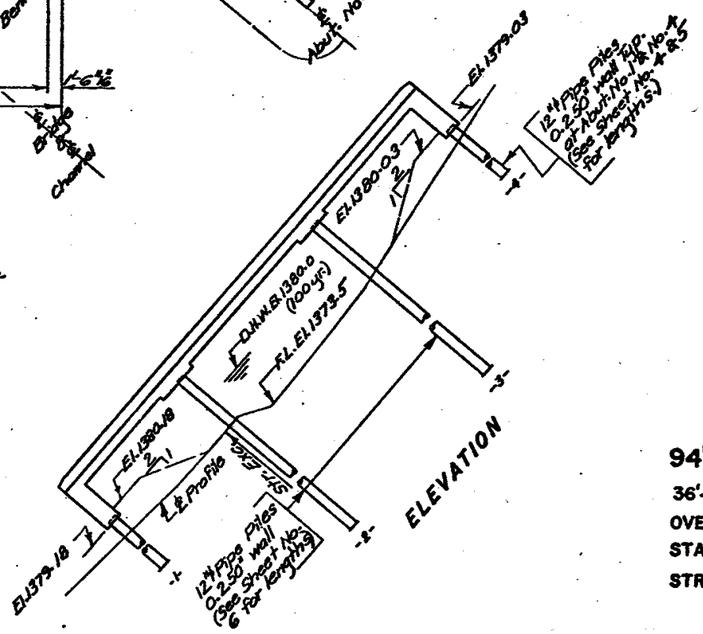


VERTICAL CURVE DATA



CURB & ℄ ELEVATIONS

Elevations indicated with * are top of finished slab at left curb, and with ℄ are top of slab at centerline, and with Δ are top of finished slab at right curb. Camber for Dead Load Deflection Plus Plastic Flow shown on sheet No. 7 of 10 of Bridge Plans have been included in the elevations shown above.



PLANS BY:
BRIDGE PROGRAM, S.DAK. DIV. OF HWYS.

-X020-

INDEX OF BRIDGE SHEETS—

ORIGINAL CONSTRUCTION PLANS

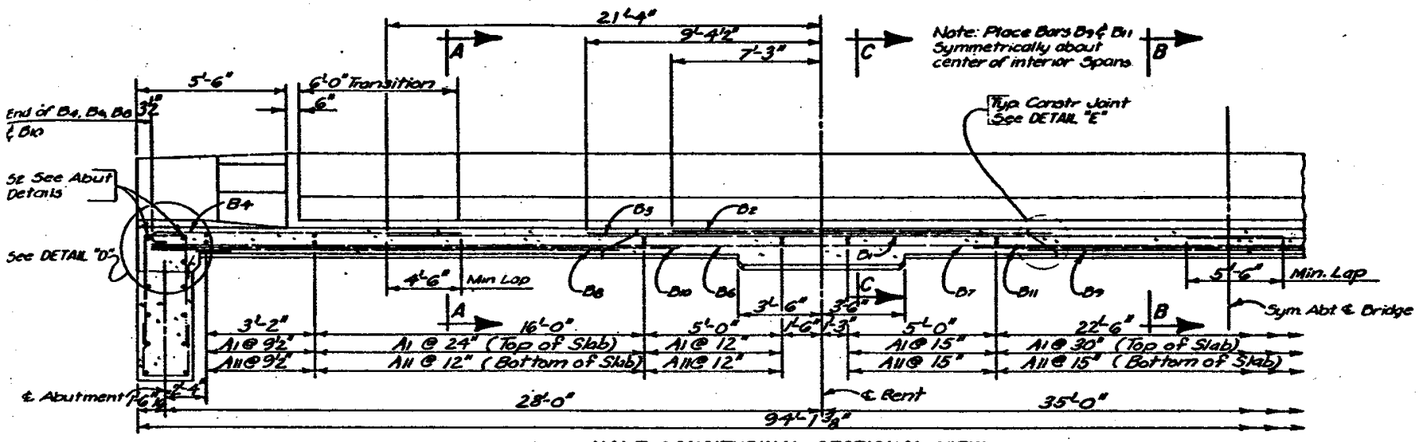
GENERAL DRAWING
FOR
94'-1⅜" CONTINUOUS CONCRETE BRIDGE

36'-0" ROADWAY — 50° SKEW R.H.F.
OVER CREEK — SEC. 29/32-T125N-R58W
STA. 325+40.944 TO 326+35.056 — RS 3027-213
STR. NO. 46-079-230 — HS 20-44 (8 ALT.)
MARSHALL COUNTY
S. D. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
FEB. 1980 (1) OF (10)
SHEET ____ OF ____ SHEETS

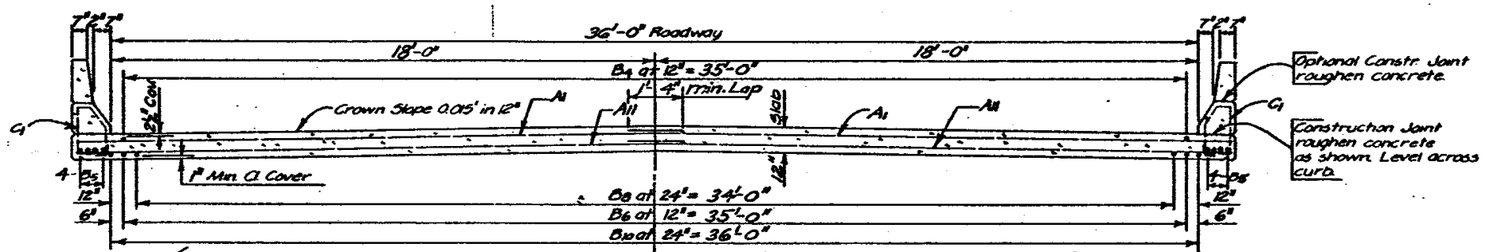
-X020-

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	W.C.B.	L.M.	Kenneth C. Wilson, BRIDGE ENGINEER

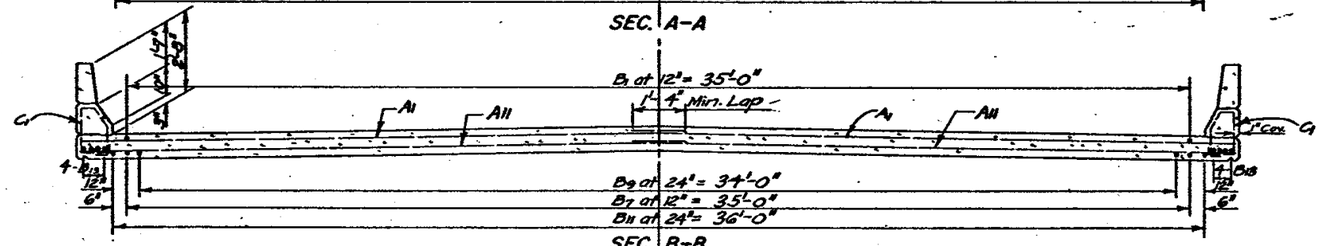
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	014-168, 034-168, 045-168, 212-168, 027-168 & 010-168	36	36



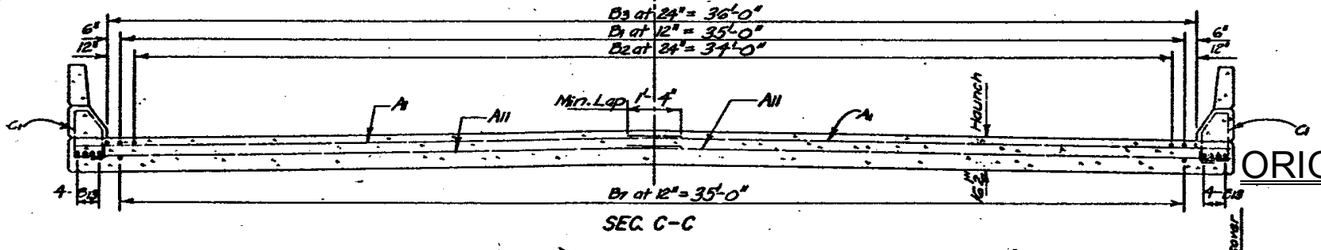
HALF LONGITUDINAL SECTIONAL VIEW



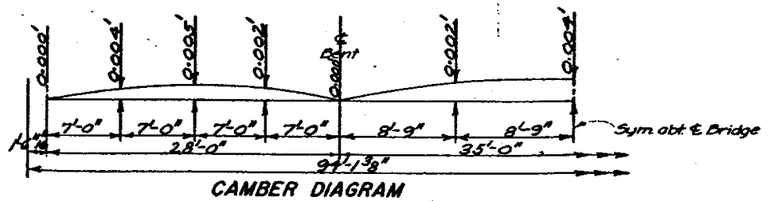
SEC. A-A



SEC. B-B

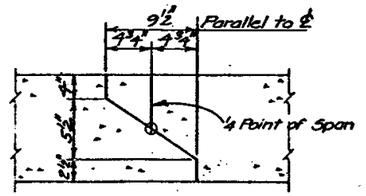


SEC. C-C

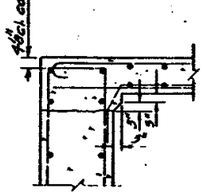


CAMBER DIAGRAM

Camber is calculated for dead load deflection plus plastic flow and shall be added to the proposed grade elevations at the respective stations to establish the elevations of the top of the finished roadway slab.



DETAIL "E"



DETAIL "D"

Dimensions perpendicular to ℄ Abutment

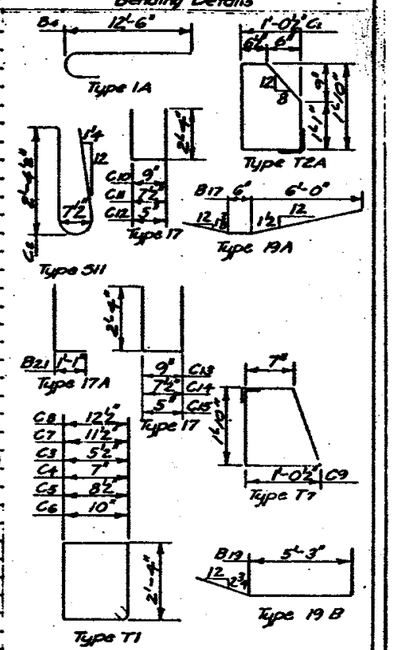
NOTE: All Barrier Curb Details shown on Sheet 8 of 10.

NOTE: G stirrups are to be placed perpendicular to the ℄ of the Roadway.

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
A1	108	5	31'-0"	Str.
A2	(See Bent Details)			
B1	72	10	41'-6"	Str.
B2	36	10	14'-6"	Str.
B3	38	9	18'-9"	Str.
B4	72	9	13'-9"	1A
B5	16	5	29'-4"	Str.
B6	72	11	29'-3"	
B7	36	11	35'-0"	
B8	36	10	20'-3"	
B9	18	10	14'-0"	
B10	38	10	21'-6"	
B11	19	10	20'-6"	
B12	24	5	35'-10"	
B13	8	5	35'-0"	
B15	12	5	14'-3"	
B16	4	4	42'-4"	Str.
B17	8	4	7'-7"	19A
B18	8	4	2'-6"	Str.
B19	12	8	8'-1"	19B
B20	8	4	47'-3"	Str.
B21	12	6	3'-5"	17A
B22	12	5	2'-3"	Str.
C1	170	5	6'-3"	T2A
C2	142	5	5'-1"	SH
C3	4		6'-7"	T1
C4	4		6'-10"	T1
C5	12		7'-1"	T1
C6	4		7'-4"	T1
C7	4		7'-7"	T1
C8	4	5	7'-9"	T1
C9	4	6	6'-5"	T7
C10	4	6	5'-5"	17
C11	4	6	5'-4"	17
C12	4	6	5'-1"	17
C13	4	5	5'-5"	17
C14	4	5	5'-4"	17
C15	4	5	5'-1"	17
A11	158	5	31'-0"	SPc.

Bending Details



▲Bend in field where necessary to fit.

NOTE: All dimensions are out to out of bars.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Class "A" Concrete, Bridge	Cu. Yd.	163.6
Reinforcement Conc. Masonry	Lb.	36,091
Epoxy coated Reinforcing Steel	Lb.	2,562.6
*Structural Steel	L.S.	LUMP SUM

ϕ All A1, B1, B2, B3, B4, C1, C9, C10, C11 & C12 bars are to be Epoxy coated.

* For informational purposes the estimated weight of the Structural Steel is 81 pounds.

SUPERSTRUCTURE DETAILS FOR

94'-1 3/8" CONTINUOUS CONCRETE BRIDGE

36'-0" ROADWAY — 50° SKEW R.H.F.

OVER CREEK — SEC. 29/32-T125N-R58W

STA. 325+40.944 TO 326+35.056 — RS3027-213

STR. NO. 46-079-230 — HS20-44 (& ALT.)

MARSHALL COUNTY

S. D. DEPT. OF TRANSPORTATION

DIVISION OF HIGHWAYS

APRIL 1980 — (7) OF (10)

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	AJR M.C.W.	OCB K.M.	Harold C. Wilson BRIDGE ENGINEER