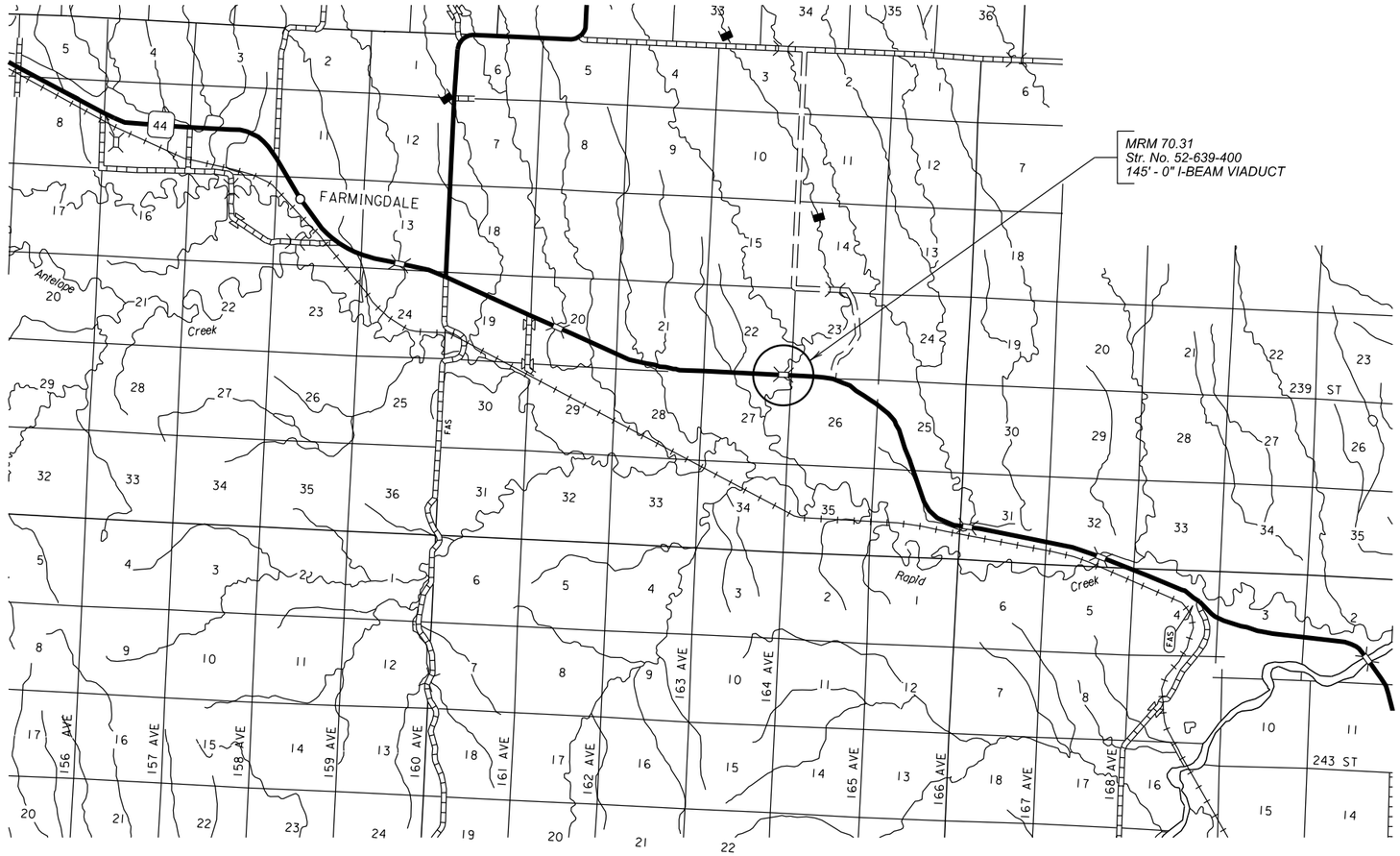
Section E: Structure Plans

INDEX OF SHEETS -

Sheet E1	Layout Map and Index
Sheet E2	Estimate of Structure Quantities
Sheet E3 to E12	Str. No. 52-639-400 145' - 0" I-BEAM VIADUCT

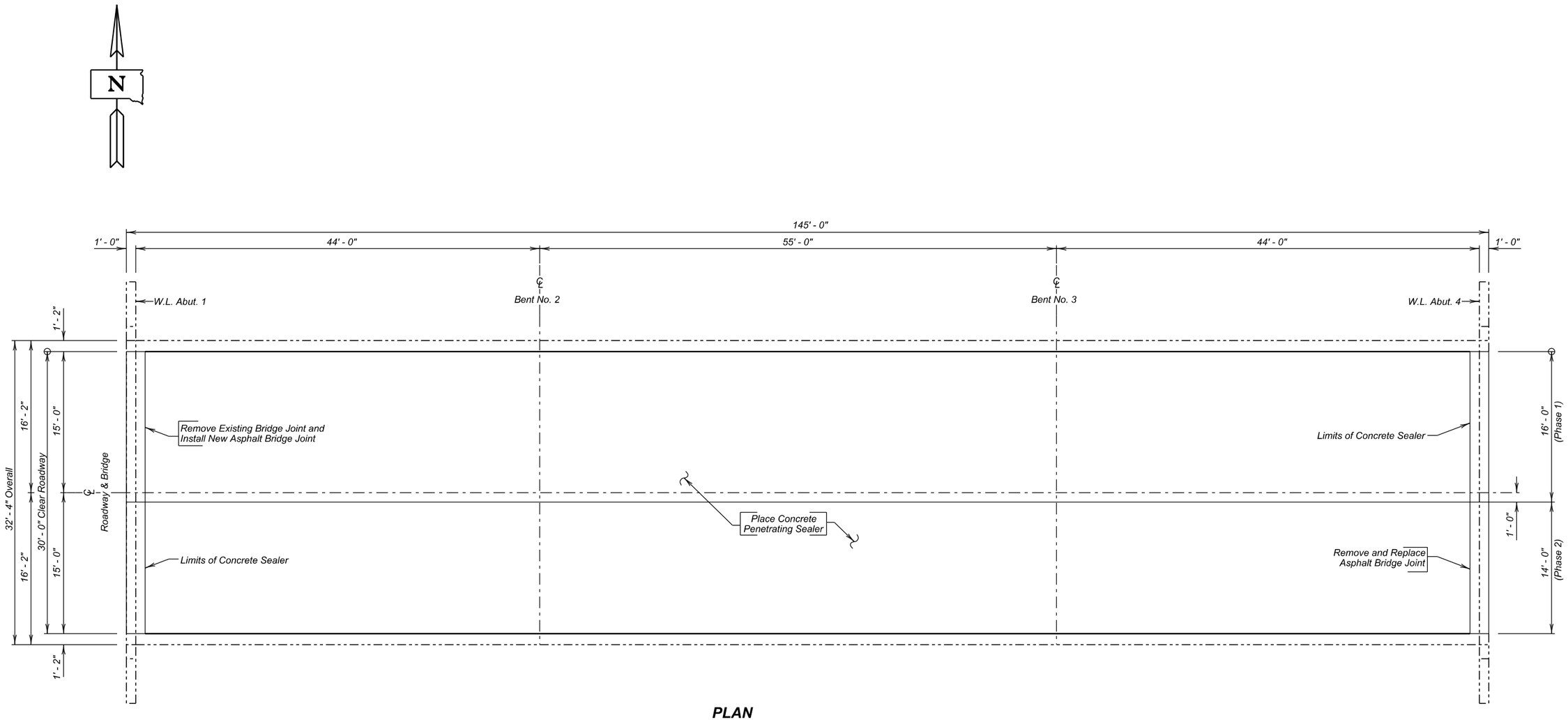


SECTION E – ESTIMATE OF STRUCTURE QUANTITIES

Str. No. 52-639-400

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
320E7510	Asphalt Bridge Joint	60	Ft
460E0230	Concrete Penetrating Sealer	470.0	SqYd

SD DOT	PROJECT	SECTION	SHEET
	P 0044(243)70	E	3/12



PLAN

-X071-
INDEX OF BRIDGE SHEETS -

Sheet No. 1 - Layout for Upgrade
Sheet No. 2 to 3 - Estimate of Structure Quantities and Notes
Sheet No. 4 - Joint Replacement at Abutment No. 1
Sheet No. 5 - Joint Replacement at Abutment No. 4
Sheet No. 6 to 10 - Original Construction Plans

ESTIMATED QUANTITIES

ITEM	*UNIT*	*QUANTITY*	
		Phase I	*Phase 2*
Concrete Penetrating Sealer	*SqYd*	*250.7*	*219.3*

LAYOUT FOR UPGRADE
FOR
145' - 0" I-BEAM VIADUCT

30' - 0" ROADWAY — 0° SKEW
OVER CREEK — SEC. 22/27-T1S-R11E
STR. NO. 52-639-400 — P 0044(243)70
PCN 09DX

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2026

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CMM	PII	CMM	Steve A Johnson BRIDGE ENGINEER
PENN09DX	09DXMA01		

ESTIMATE OF STRUCTURE QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
320E7510	Asphalt Bridge Joint	60	Ft
460E0230	Concrete Penetrating Sealer	470.0	SqYd

SPECIFICATIONS

Construction Specifications: Standard Specifications for Roads and Bridges, 10-7-26 Version; Required Provisions; and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges is available for download and viewing at https://dot.sd.gov/doing-business/contractors/standard-specifications.

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 and are provided as information only. 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.

SCOPE OF BRIDGE WORK & SEQUENCE OF OPERATIONS

All work on this structure will be accomplished with the traffic control shown in the plans. Alternate sequence of operations may be submitted by the Contractor for approval by the Engineer two weeks prior to the pre-construction meeting.

1. Remove the existing joint seal on abutment 1 and breakout concrete to accommodate new Asphalt Bridge Joint for first phase of construction.
2. Install new Asphalt Bridge Joint including backrod with joint seal and bridge plate for first phase of construction.
3. Remove and replace existing Asphalt Bridge Joint on abutment 4 for first phase of construction.
4. Place Concrete Penetration Sealer on Bridge Deck.
5. Switch traffic and repeat steps 1 through 4 for the second phase of construction.

ASPHALT BRIDGE JOINT

1. An asphalt bridge joint will be removed and replaced at Abutment Number 4 and installed at Abutment Number 1. The asphalt bridge joint system will be one of the asphalt bridge growth joints from the Department's Approved Products List.
2. All broken out concrete and discarded reinforcing steel will become the property of the Contractor and will be disposed of at a site obtained by the Contractor and approved by the Engineer. An appropriate site will be as described in the Environmental Commitment Notes in the plans.
3. During concrete removal operations, no concrete will be allowed to fall into the creek.
4. Care will be taken during the removal of the existing joint seal system and asphalt joint system as to not damage the adjacent concrete surfaces. Any concrete that is damaged during the existing joint materials will be repaired as approved by the Engineer at no additional cost to the Department.
5. The asphalt bridge joint will be installed in accordance with the manufacturer's recommendations. The Contractor will submit the installation instructions in writing to the Engineer a minimum of 7 days prior to joint installation.
6. The asphalt bridge joint will not be installed when the bridge deck surface temperature is below 40° F or at the manufacturer's minimum temperature requirement if more stringent. The joint will not be installed when rain is expected for the duration of the period of time required for joint installation.
7. The cost of furnishing and placing all material for the joint system including removal of existing joint material, all labor, equipment, tools, materials and any incidentals necessary to complete the work satisfactorily will be paid for at the contract unit price per foot for Asphalt Bridge Joint.

CONCRETE PENETRATING SEALER

1. This work consists of furnishing and applying a concrete penetrating sealer to a prepared deck surface.
2. The sealers will be per the Department's Approved Products List for Concrete Penetrating Sealer. The Contractor will furnish the Engineer the manufacturer's technical data sheets, materials safety data sheet (MSDS), and sufficient evidence that the material to be used has not exceeded the manufacturer's specified shelf life. This documentation will be furnished to the Engineer a minimum of 5 days prior to application of the sealer.
3. Concrete surfaces will be cleaned by power washing such that all traces of laitance, dirt, dust, salt, and foreign materials, and deleterious substances are removed. Oil, grease, or other contaminants on the concrete surface will require removal with detergent cleaning and abrasive blast on the affected areas. If necessary, solvents and hand tools will be used to remove bonded materials detrimental to the treatment of the concrete surface. The cleaning process will not cause undue damage to the concrete surface, remove or alter the existing surface finish, or expose the coarse aggregate of the concrete. The method of cleaning will be performed in such a manner as to provide a reasonably uniform appearing surface color and texture. Surface preparation will at a minimum as listed above, additional preparation maybe be required by the Manufacturer. Other methods and equipment for surface preparation may be used if prior approval is obtained from the Engineer.
4. Once the deck surface has been cleaned, the deck will be protected from contamination from traffic and construction operations. The concrete surfaces will be allowed to dry a minimum of 3 days after power washing or precipitation. The Engineer will determine when the surface is sufficiently dry.
5. The sealer may be harmful to materials such as rubber, asphalt, and joint compounds; therefore, the Contractor will be required to mask off all joints, strip seals, etc. prior to applying the sealer. The Engineer will approve the prepared surface prior to application of the penetrating sealer.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES
FOR
145' - 0" I-BEAM VIADUCT

STR. NO. 52-639-400
APRIL 2026

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CMM	PII	CMM	Steve A. Johnson BRIDGE ENGINEER
PENN09DX	09DXMA02		

CONCRETE PENETRATING SEALER (CONTINUE)

6. The Contractor will have enough sealer on the project prior to the start of application such that the Manufacturer's maximum rate of coverage (minimum ft^2 /gal) can be attained. Sealer application will conform to the Manufacturer's recommendations and the following:

   a. The penetrating sealer will only be applied when the ambient air and concrete surface temperatures are between 40 ºF and 100 ºF unless otherwise recommended by the Manufacturer.
   b. The treatment solution will not be sprayed when blowing winds or other conditions prevent proper application. The sealer will not be applied during inclement weather or rain, or if inclement weather or rain is anticipated within 24 hours.

   c. Spray equipment for the application of the treatment solution will be a low-pressure airless sprayer with a maximum application pressure of 15 psi.

   d. All surfaces will be dry prior to application of the sealer. The concrete surfaces will be allowed to dry for 3 days after power washing or precipitation. The Engineer will determine when the surface is sufficiently dry.

   e. All loose dust and debris will be blown off of the concrete surface with compressed air immediately prior to application of the sealer.

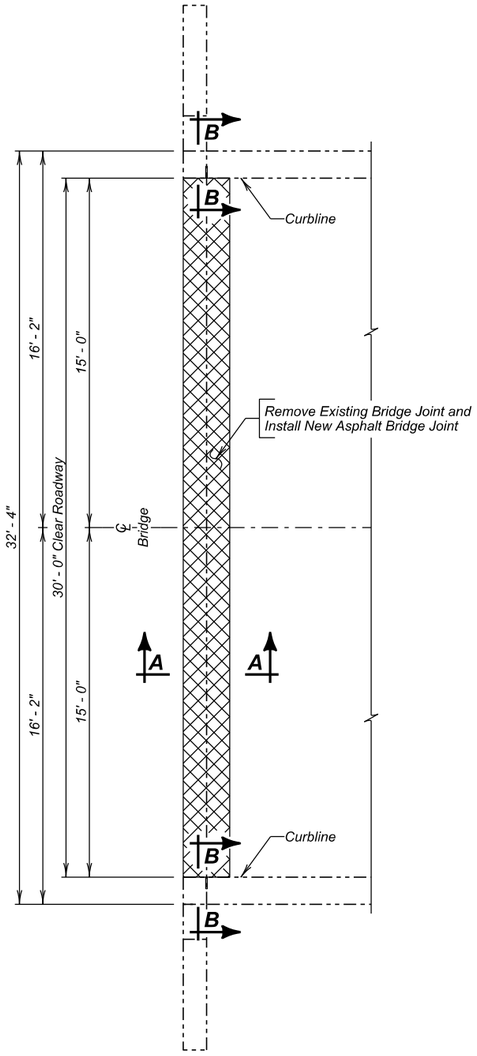
   f. The sealer will be used as supplied by the manufacturer and will not be diluted or altered in any way. The solution will be sprayed on to the concrete surfaces at the manufacturer's recommended maximum rate of coverage (minimum ft^2/gal) or to refusal, whichever is achieved first. Refusal is defined such that additional spray applications remain on the concrete surface and do not soak in, as determined by the Engineer.

   g. Traffic will not be permitted on treated surfaces until the solution has completely penetrated and the treated surface is dry. The Engineer will determine when the treated surface is sufficiently dry.

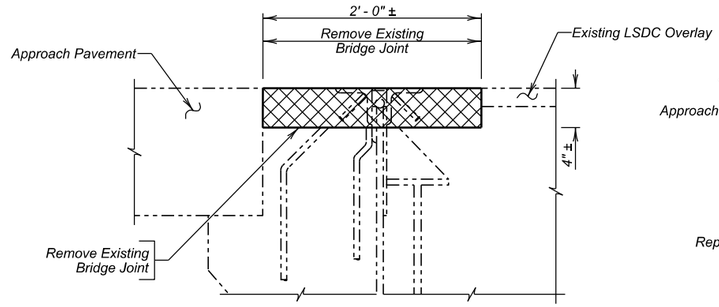
7. Concrete Penetrating Sealer will be measured to the nearest 0.1 square yard.

8. Concrete Penetrating Sealer will be paid for at the contract unit price per square yard. Payment will be full compensation for equipment, labor, materials, concrete surface preparation and cleaning, and all other incidental items required to furnish and apply the Concrete Penetrating Sealer.

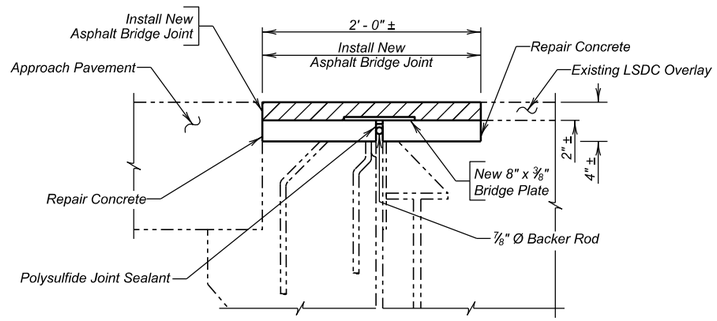
SD DOT	PROJECT	SECTION	SHEET
	P 0044(243)70	E	6/12



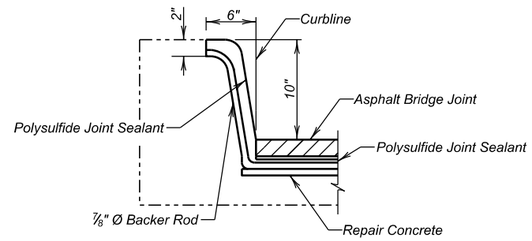
PLAN
(Abutment No. 1)



SECTION A - A
(Concrete shading and reinforcing steel not shown for clarity)



SECTION A - A
(Concrete shading and reinforcing steel not shown for clarity)



SECTION B - B
(Concrete shading and reinforcing steel not shown for clarity)

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY	
		Phase I	Phase 2
Asphalt Bridge Joint	Ft	15.0	15.0

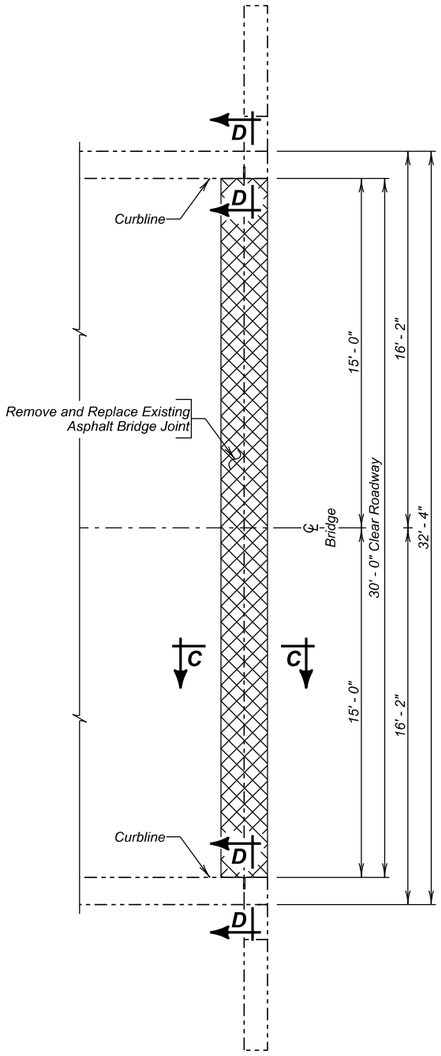
JOINT REPLACEMENT AT ABUTMENT NO. 1
FOR
145' - 0" I-BEAM VIADUCT

30' - 0" ROADWAY
OVER CREEK
STR. NO. 52-639-400

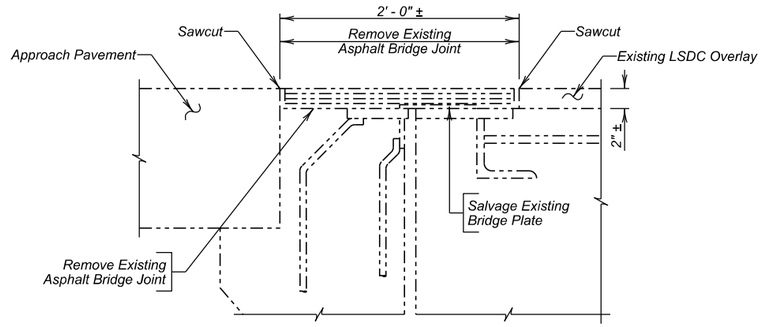
0°SKEW
SEC. 22/27 -T1S-R11E
P 0044(243)70

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2026

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CMM	PII	CMM	Steve A Johnson BRIDGE ENGINEER
PENN09DX	09DXMA04		

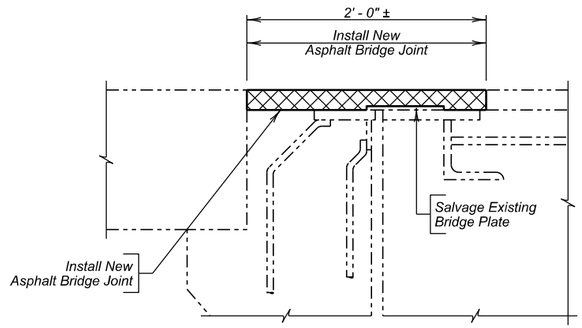


PLAN
(Abutment No. 4)



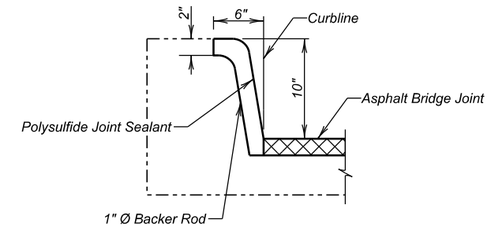
SECTION C - C

(Concrete shading and reinforcing steel not shown for clarity)
(Existing Section Showing Removal Limits)



SECTION C - C

(Concrete shading and reinforcing steel not shown for clarity)
(New Construction Shown)



SECTION D - D

(Concrete shading and reinforcing steel not shown for clarity)

ESTIMATED QUANTITIES			
ITEM	UNIT	QUANTITY	
		Phase I	Phase 2
Asphalt Bridge Joint	Ft	15.0	15.0

JOINT REPLACEMENT AT ABUTMENT NO. 4
FOR
145' - 0" I-BEAM VIADUCT

30' - 0" ROADWAY
OVER CREEK
STR. NO. 52-639-400

0°SKEW
SEC. 22/27 -T1S-R11E
P 0044(243)70

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2026

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CMM	PII	CMM	Steve A Johnson BRIDGE ENGINEER
PENN09DX	09DXMA05		

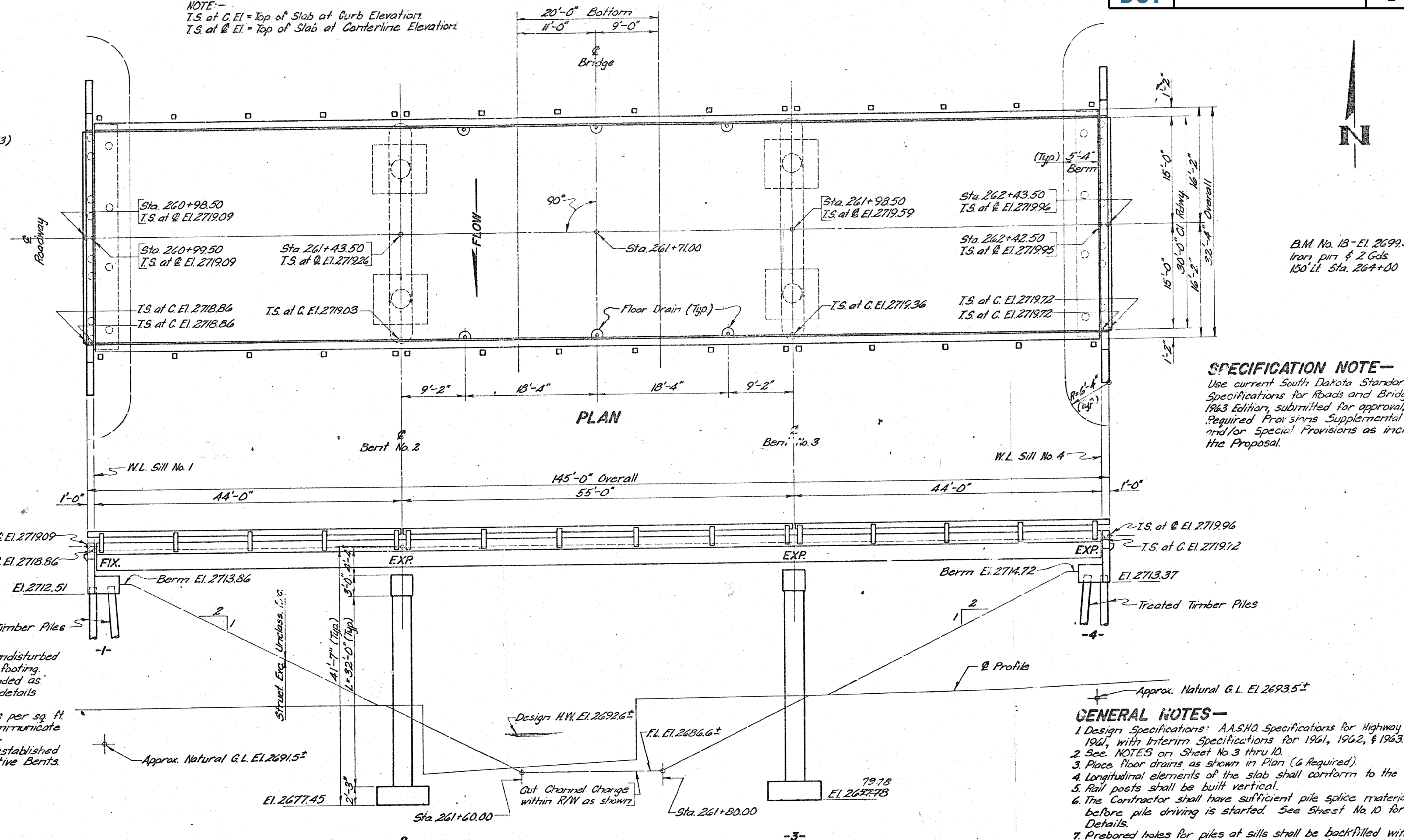
-X071-

INDEX OF BRIDGE SHEETS—

Sheet No. 1 - General Drawing and Quantities
Sheet No. 2 - Subsurface Investigations
Sheet No. 3 - Details of Sill No. 1 and No. 4
Sheet No. 4 - Bent Details
Sheet No. 5 - Details of Superstructure
Sheet No. 6 - Details of Superstructure
Sheet No. 7 - Joint Details
Sheet No. 8 - Erection Data
Sheet No. 9 - Standard Railing and Drain Details RRA-1 (5-3-63)
Sheet No. 10 - Pile Splice and Shoe Details.

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

Q	1000 c.f.s.
A	192 sq. ft.
V	5.2 f.p.s.



SPECIFICATION NOTE—

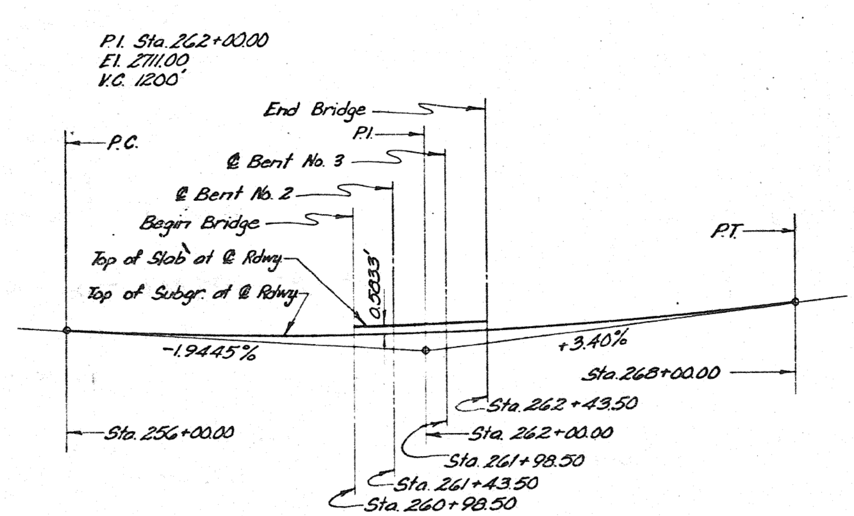
Use current South Dakota Standard Specifications for Roads and Bridges 1963 Edition, submitted for approval, and Required Provisions Supplemental Specifications and/or Special Provisions as included in the Proposal.

EXCAVATION NOTES—

1. Footings for Bents No. 2 and 3 shall be cast against solid undisturbed Shale and carried into same approximately the depth of footing. 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. 2 and 3 on Sheet No. 4 of 10.
2. Shale shall develop a minimum bearing value of 3.50 tons per sq. ft. If the bearing value is less than 3.50 tons per sq. ft., communicate with the BRIDGE SECTION.
3. Final footing elevations for Bents No. 2 and 3 shall be established before ordering column reinforcing steel for the respective Bents.

GENERAL NOTES—

1. Design Specifications: A.A.S.H.O. Specifications for Highway Bridges, 1961, with Interim Specifications for 1961, 1962, & 1963.
2. See NOTES on Sheet No. 3 thru 10.
3. Place floor drains as shown in Plan (6 Required).
4. Longitudinal elements of the slab shall conform to the vertical curve.
5. Rail posts shall be built vertical.
6. The Contractor shall have sufficient pile splice material on hand before pile driving is started. See Sheet No. 10 for Pile Splice Details.
7. Prebored holes for piles at sills 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 the piles.



SUBGRADE CURVE DATA

* Columns shortened 2' Bent #3

ESTIMATED QUANTITIES

ITEM	Cl. "A" Conc. Cu. Yds.	Steel - Lbs. Reinf.	Steel - Lbs. Struct.	Type "A" Steel Railing - Lin. Ft.	Timber Piles - Lin. Ft. Treated Timber	Timber Piles - Lin. Ft. ϕ Test	Excavation - Cu. Yds. Struct.	Excavation - Cu. Yds. ΔUnclass.	Pile Shoes *No.	‡INCIDENTAL WORK
Superstructure	108.2	33,384	75,880	292.3						
Sill No. 1	21.4	2,050	480		11 @ 35' = 385	1 @ 40' = 40	16		12	
Sill No. 4	21.4	2,050	1,215		11 @ 35' = 385	1 @ 40' = 40	16		12	
Bent No. 2	35.8	9,963					16½			
Bent No. 3	*33.92 35.8	9421 9,963	77,128				170			
Totals	222.6 220.72	57,410	77,575	292.3	770	ϕ 80	365	Δ 21,472	*24	

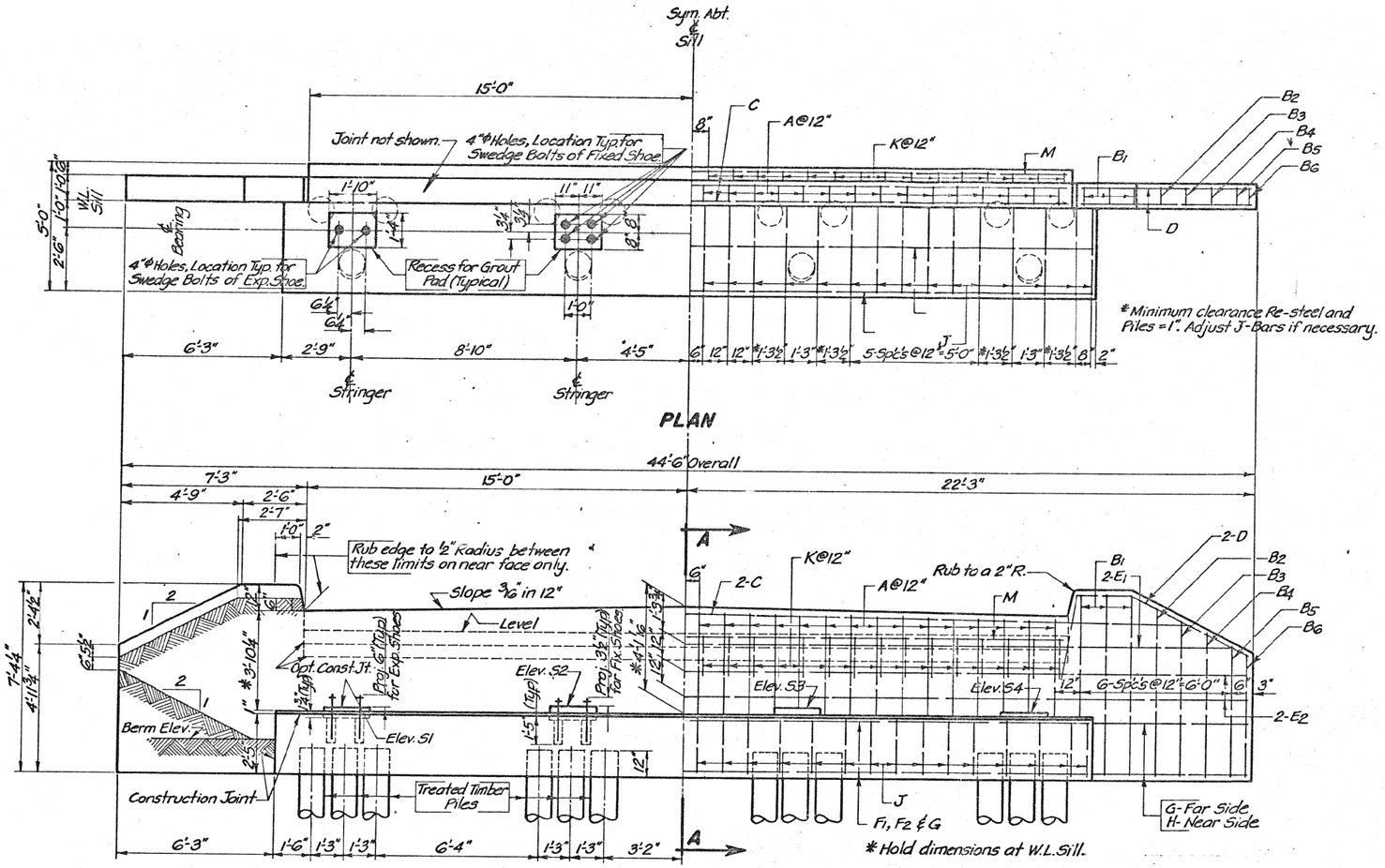
Δ See Grading Plan for Unclassified Excavation.
ϕ One Treated Timber Test Pile shall be driven at Sills No. 1 and No. 4 before remaining piles are ordered. (NEW) F.E. 4-4-66
\# All Steel Pile Shoes as approved by the ENGINEER shall be used.
‡ INCIDENTAL WORK: In place, on ℄ Sta. 261+60 old single span 30'x24' Roadway Timber Bridge. Remove railing and posts, plank flooring, stringers, abutment cap and backing. Care shall be taken not to injure the structural properties of salvaged materials. Remove all old piling to 1'± below finished ground line or as necessary to facilitate construction of new footings at Bent No. 2. All spikes, nails, bolts and screws shall be removed from salvaged material. All salvable material shall be placed neatly within the right-of-way as directed by the ENGINEER, to be picked up by County forces for maintenance work. All other materials shall be disposed of as directed by the ENGINEER.

ORIGINAL CONSTRUCTION PLANS

GENERAL DRAWING AND QUANTITIES
FOR
145'-0" I-BEAM VIADUCT
30'-0" ROADWAY

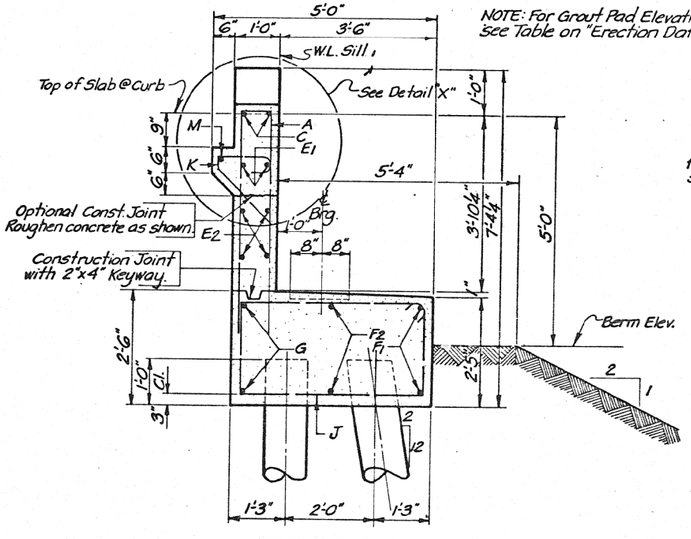
OVER CREEK — SEC. 22/27-T1S-R11E
STA. 260+98.50 TO 262+43.50 — S 1041(5)
PENNINGTON COUNTY
SOUTH DAKOTA — HS20-44
7+ 954.823
7+ 999.019
DEPARTMENT OF HIGHWAYS
STR. NO. 52-639-400 — MAY 1964 — 6 OF 10
-X071-

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	L.G.	O.M.C.	BRIDGE ENGINEER

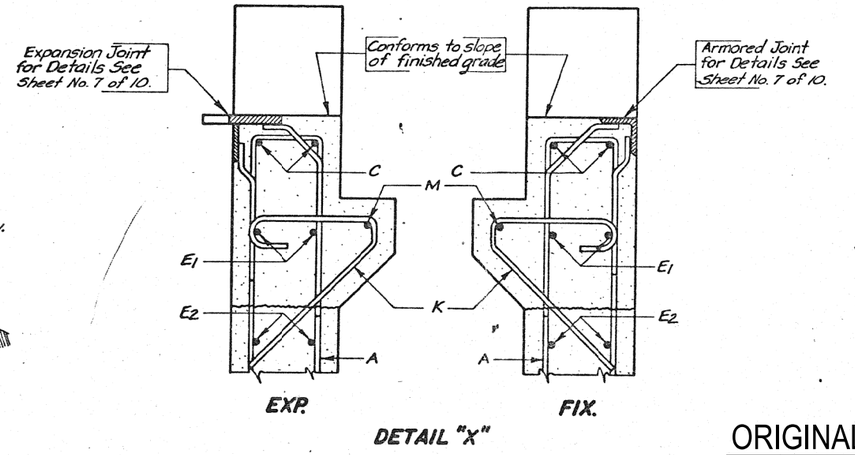


NOTE: For Grout Pad Elevations S1, S2, S3 & S4 see Table on "Erection Data."

ELEVATION



SECTION A-A

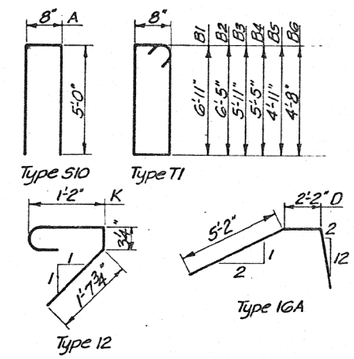


DETAIL "X"

REINFORCING SCHEDULE

MK.	No.	Size	Length	Type
A	30	4	10'-9"	S10
B1	6	4	16'-0"	T1
B2	2	4	15'-0"	T1
B3	2	4	14'-0"	T1
B4	2	4	13'-0"	T1
B5	2	4	12'-0"	T1
B6	2	4	11'-6"	T1
C	2	6	39'-6"	Str.
D	4	5	9'-9"	16A
E1	2	4	43'-0"	Str.
E2	4	4	44'-0"	Str.
F1	2	11	31'-9"	Str.
F2	2	8	31'-9"	Str.
G	2	11	44'-0"	Str.
H	4	4	7'-3"	Str.
J	30	4	13'-3"	T1
K	30	4	3'-6"	12
M	1	4	29'-6"	Str.

Bending Details



Note: All dimensions are out to out of bars.

ESTIMATED QUANTITIES

Item	Unit	Quantity
Class 'A' Concrete	Cu.Yds.	ϕ21.4
Reinforcing Steel	Lbs.	2050
Structural Steel	Lbs.	+
Structure Excavation	Cu.Yds.	16
Treated Timber Piles	No.	12

ϕ Includes 0.1 Cu.Yds. for grout.
+ For Struct. Steel Quantity see Sheet No. 7 of 10.

GENERAL NOTES.—

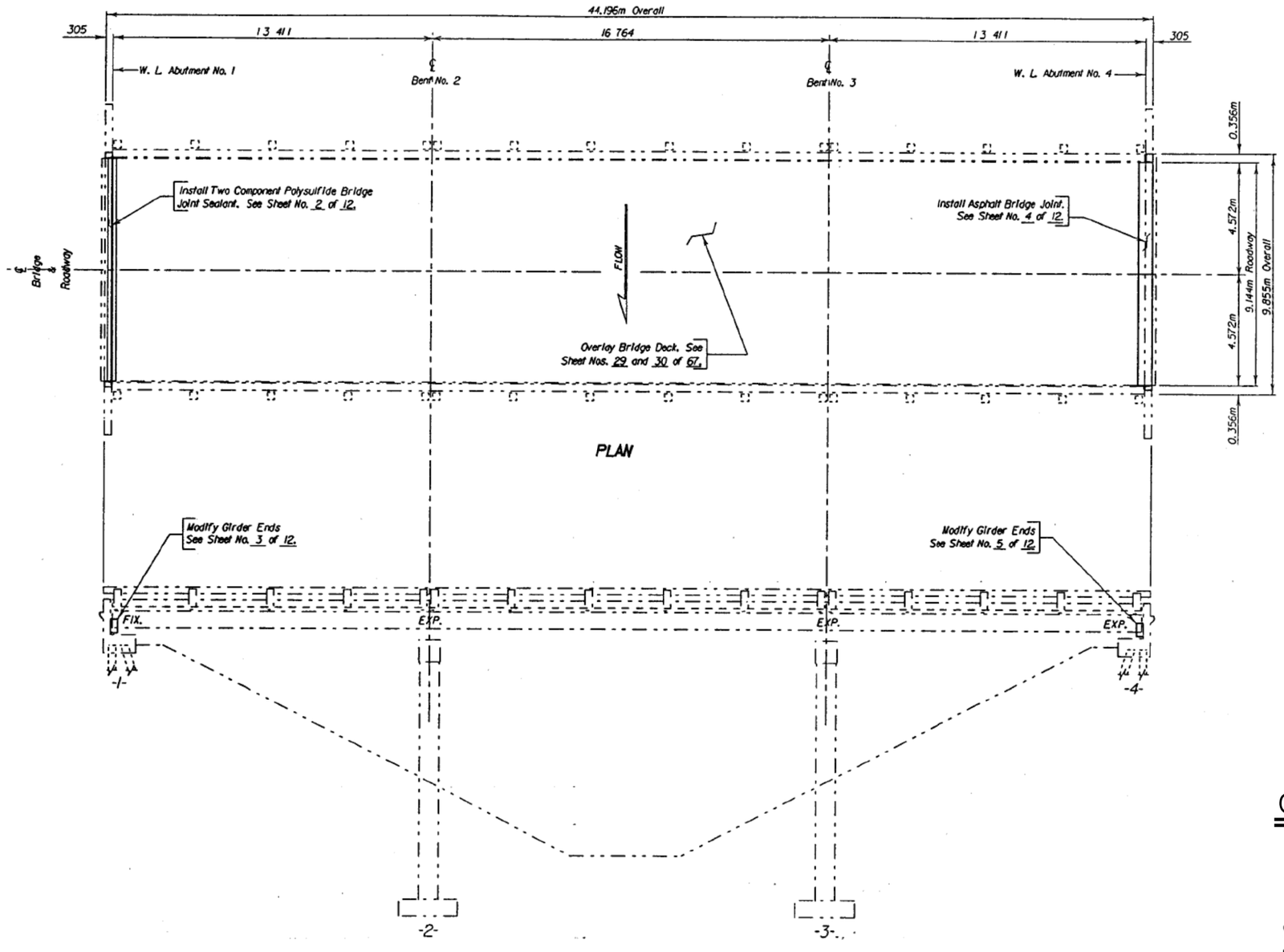
1. Design Specifications: A.A.S.H.O. Specifications for Highway Bridges, 1961; with Interim Specifications for 1961, 1962, & 1963.
2. All exposed edges shall be chamfered one inch except as shown.
3. Chamfer grout pads ¾".
4. Use 2" clear cover on all reinforcing steel except as shown.
5. Specifications for grout shall be the same as for Class 'A' Concrete except that maximum size of aggregate shall be reduced to ¼". The quantity of Portland Cement Grout is included in and shall be paid for as Class 'A' Concrete.
6. Piling shall develop a minimum bearing value of 24 Tons per pile.
7. See General Drawing for lengths of Treated Timber Piles.
8. Design Loading: H 20-44 A.A.S.H.O.
9. Unit Stresses: Re-steel fs = 20,000 p.s.i.
   Concrete fc = 1600 p.s.i.
10. All reinforcing steel bars shall conform to A.S.T.M. Specifications A305 and A15 Intermediate Grade.
11. All Swedge Bolts shall be 1¼"ϕ with Heavy Hex Nut and Cut washer. Length = 1'-9" for Expansion Shoes and 1'-6" for Fixed Shoes. (Listed as structural steel in Superstructure.)

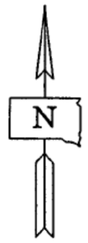
DETAILS OF SILL NO. 1 AND NO. 4
FOR
145'-0" I-BEAM VIADUCT
30'-0" ROADWAY
OVER CREEK SEC. 22/27-T1S-R11E
STA. 260+98.50 TO 262+43.50 S 1041(5)
PENNINGTON COUNTY
SOUTH DAKOTA HS20-44
DEPARTMENT OF HIGHWAYS
STR. NO. 52-639-400 MAY 1964 (7) OF (10)

ORIGINAL CONSTRUCTION PLANS

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	R.C.M.	C.H.J.	BRIDGE ENGINEER

SD DOT	PROJECT	SECTION	SHEET
	P 0044(243)70	E	10/12





ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE

ORIGINAL CONSTRUCTION PLANS

LAYOUT FOR

44.196m CONTINUOUS COMPOSITE STEEL GIRDER BRIDGE

9.144m ROADWAY — SEC. 22/27-T1S-R11E

OVER CREEK — P 0044(103)65

STR. NO. 52-639-400 — PCEMS 3357

STA. 7+954.823 TO STA. 7+999.019

PENNINGTON COUNTY

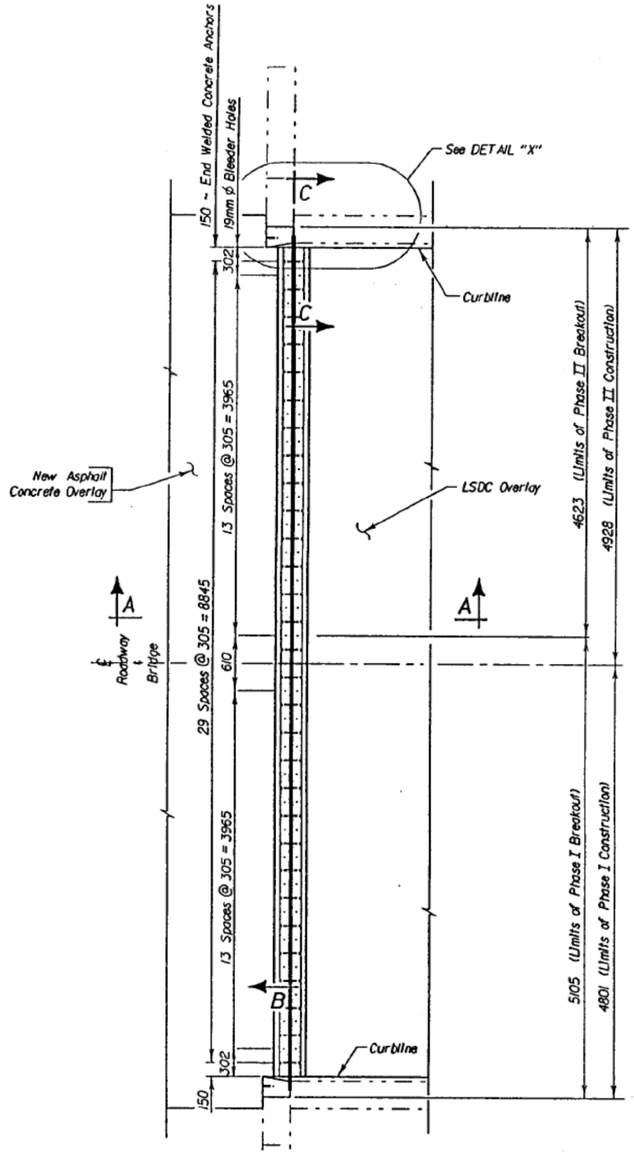
S. D. DEPT. OF TRANSPORTATION

OCTOBER 1995

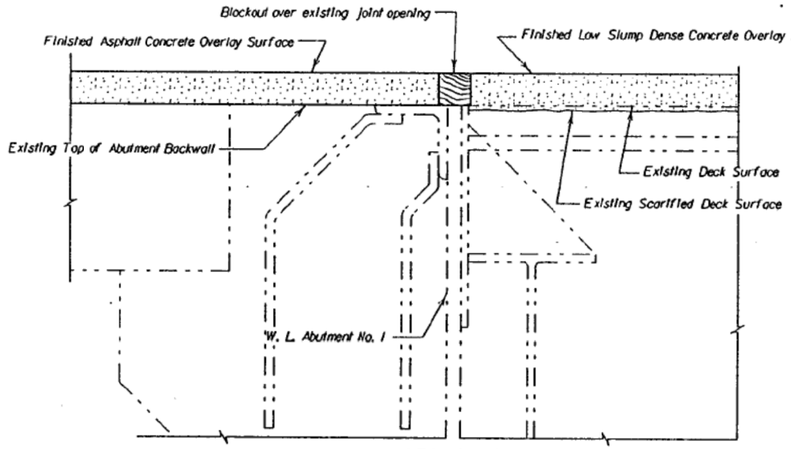
8 OF 10

PLANS BY:
SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

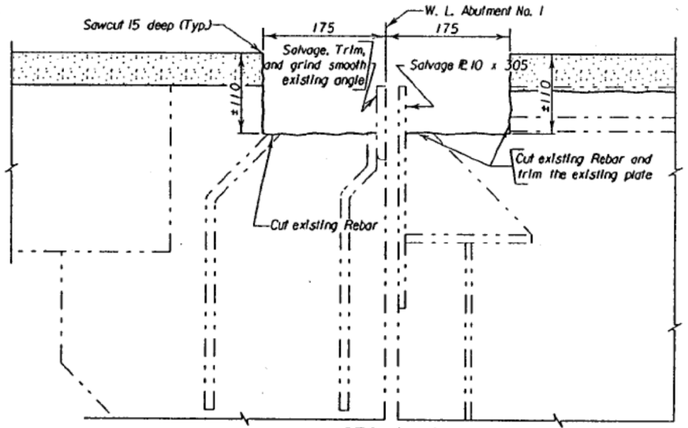
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
CWM PENN3357	W.C.P. 3357PB01	EJA	BRIDGE ENGINEER



PLAN VIEW - ABUTMENT NO. 1

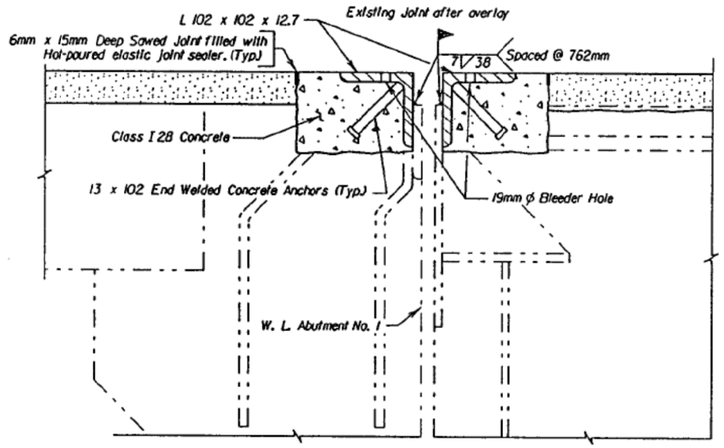


SEC. A - A



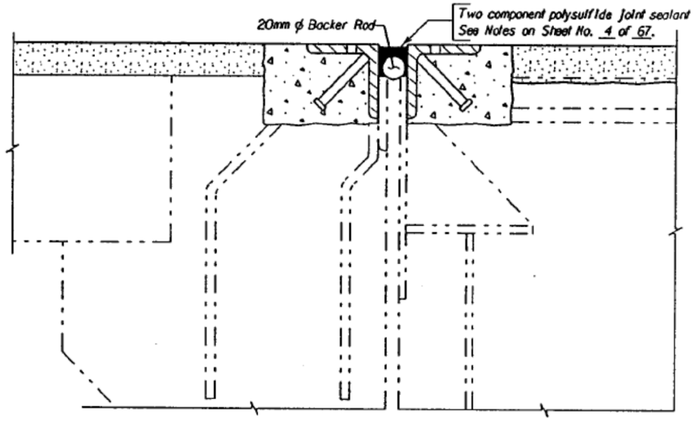
SEC. A - A

Limits of Removal for Joint Replacement



SEC. A - A

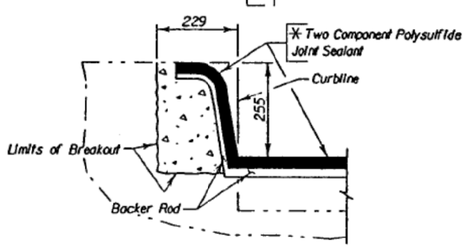
Nosing Assembly Complete



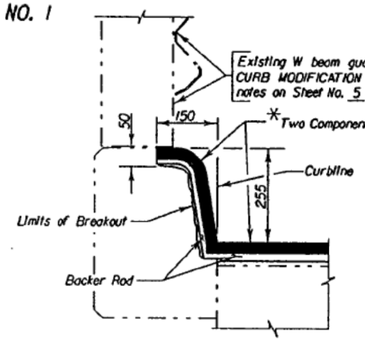
SEC. A - A

Joint Replacement Complete

ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.

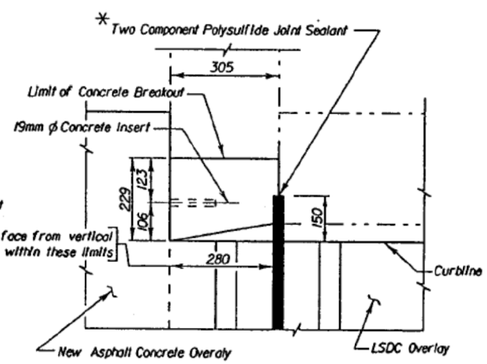


SEC. B - B



SEC. C - C

* See POLYSULFIDE BRIDGE JOINT notes on Sheet No. 4 of 67.



DETAIL "X"

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
△ Bridge Joint Sealant	mm	8144

△ For informational purposes, the estimated quantity for Phase I is 4572 and Phase II is 4572.

JOINT REPLACEMENT AT ABUTMENT NO. 1 FOR 44.196m CONTINUOUS COMPOSITE STEEL GIRDER BRIDGE

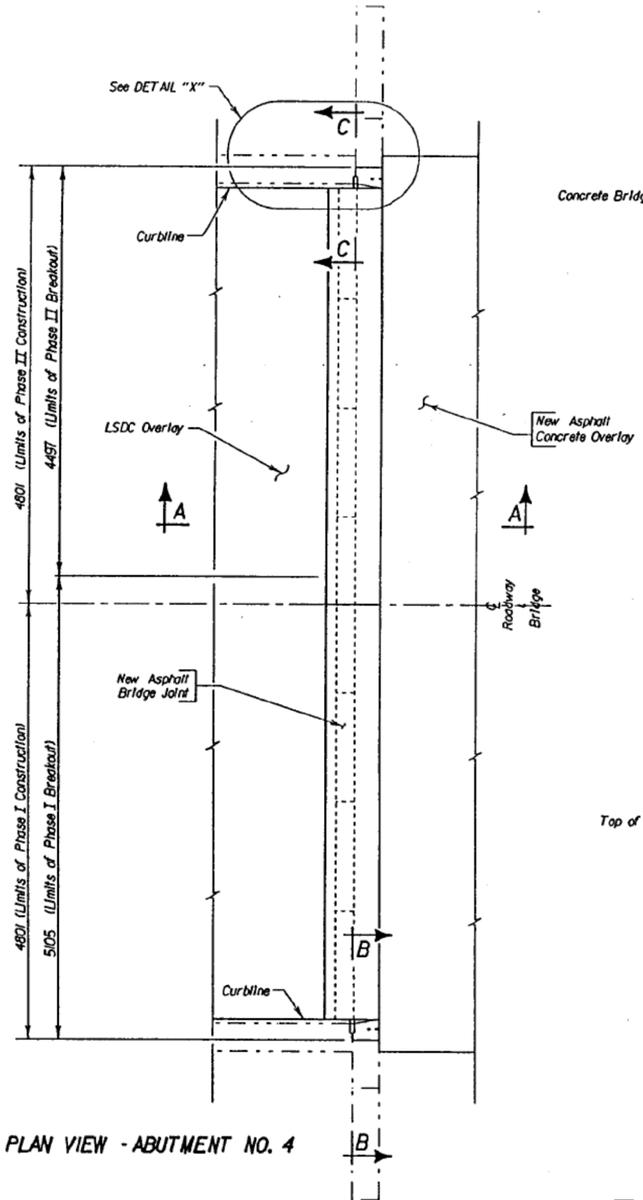
9.144m ROADWAY OVER CREEK
STR. NO. 52-639-400

SEC. 22/27-T1S-R11E
P 0044(103)65

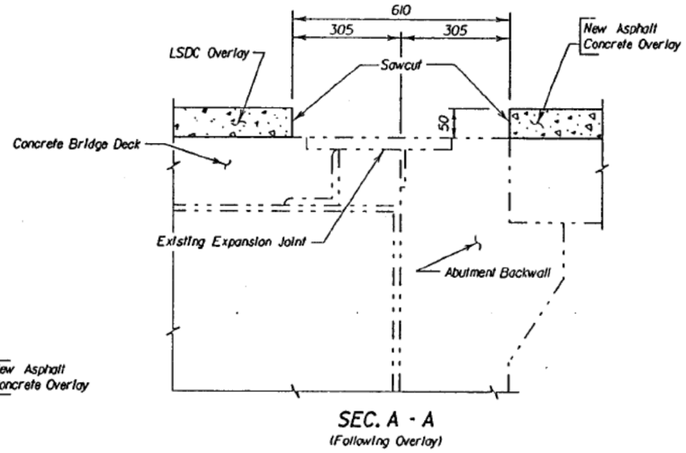
PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 1995

ORIGINAL CONSTRUCTION PLANS

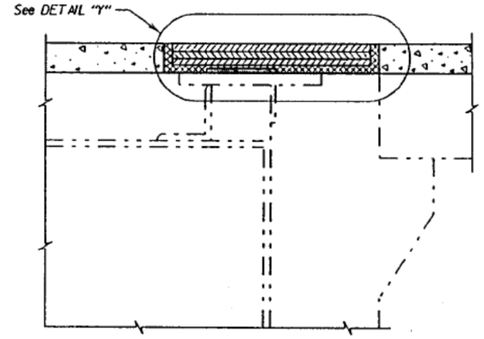
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
CWM	CWM	EJA	BRIDGE ENGINEER
PENN3357	3357PB02		



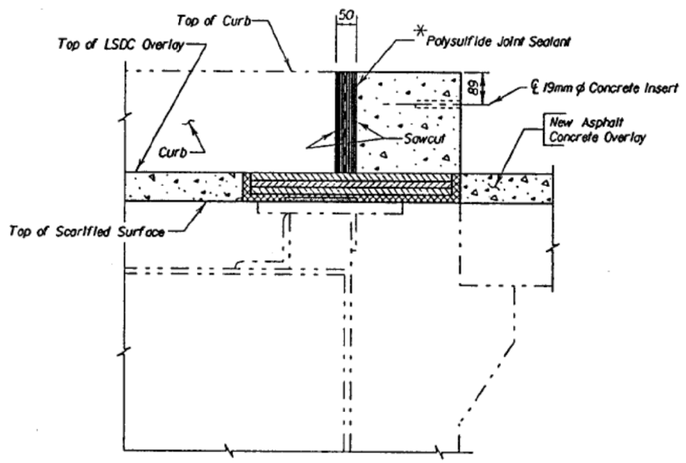
PLAN VIEW - ABUTMENT NO. 4



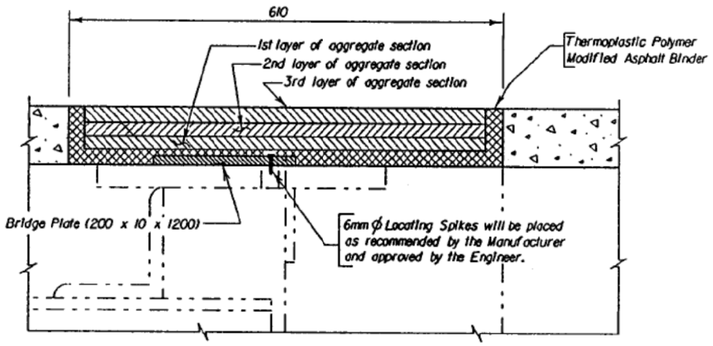
SEC. A - A
(Following Overlay)



SEC. A - A
(Joint Completed)



SEC. D - D

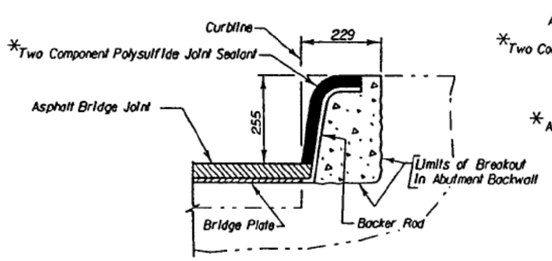


DETAIL Y

ESTIMATED QUANTITIES (For Two Abutments)		
ITEM	UNIT	QUANTITY
△ Asphalt Bridge Joint	mm	9144

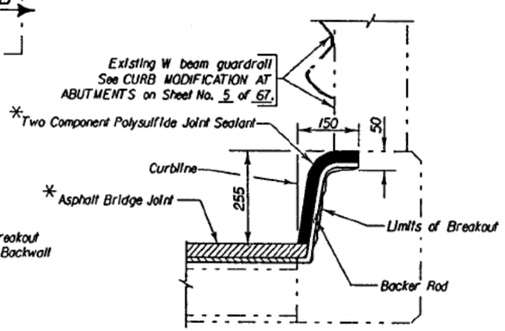
△For Informational purposes, the estimated quantity for Phase I is 4572 and Phase II is 4572.

ALL DIMENSIONS ARE MILLIMETERS UNLESS NOTED OTHERWISE.

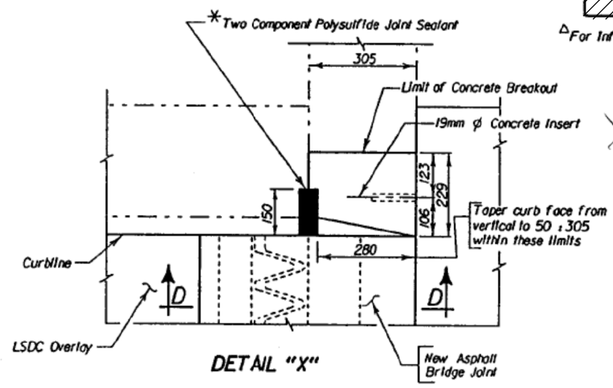


SEC. B - B

*See ASPHALT BRIDGE JOINT notes on Sheet No. 4 of 67.



SEC. C - C



DETAIL "X"

ORIGINAL CONSTRUCTION PLANS

JOINT REPLACEMENT AT ABUTMENT NO. 4 FOR
44.196m CONTINUOUS COMPOSITE STEEL GIRDER BRIDGE

9.144m ROADWAY OVER CREEK
STR. NO. 52-639-400

SEC. 22/27-TIS-RIIE
P 0044(103)65

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 1995

10 OF 10

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
CWM	CWM	EJA	BRIDGE ENGINEER
PENN3357	3357PB04		