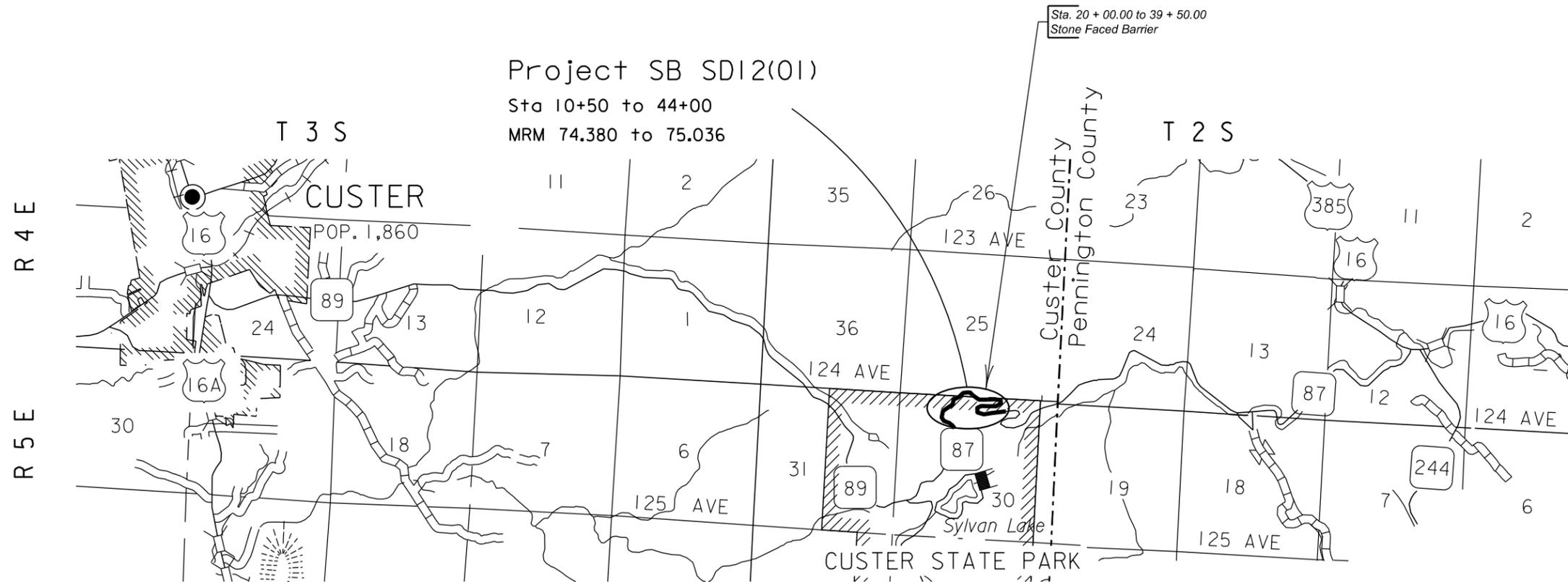
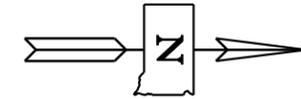


STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	SB SD12(01)	E1	E10

# Section E: Structure Plans

## INDEX OF SHEETS -

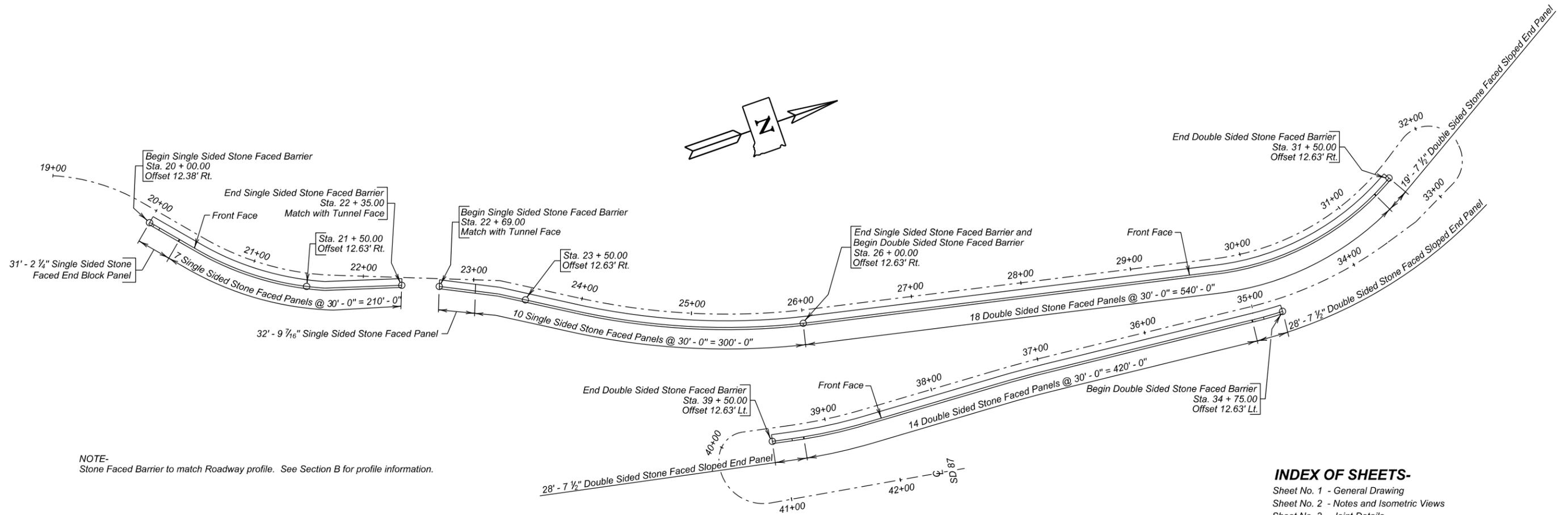
Sheet E1            Layout Map and Index  
Sheet E2            Estimate of Structure Quantities  
Sheet E3 to E10    Stone Faced Barrier



STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	SB SD12(01)	E2	E10

**SECTION E – ESTIMATE OF STRUCTURE QUANTITIES**

Bid Item Number	Item	Quantity	Unit
460E0100	Class A45 Concrete, Miscellaneous	520.7	CuYd
460E0205	Architectural Surface Finish	731.0	SqFt
480E0100	Reinforcing Steel	54,527	Lb
900E0100	Stone Facing	6,435	SqFt

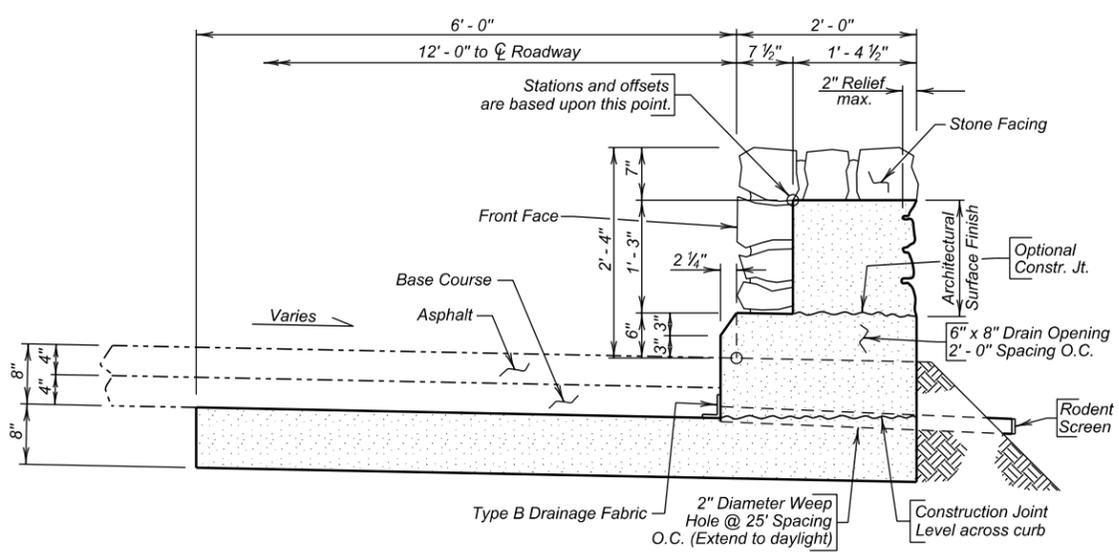


NOTE- Stone Faced Barrier to match Roadway profile. See Section B for profile information.

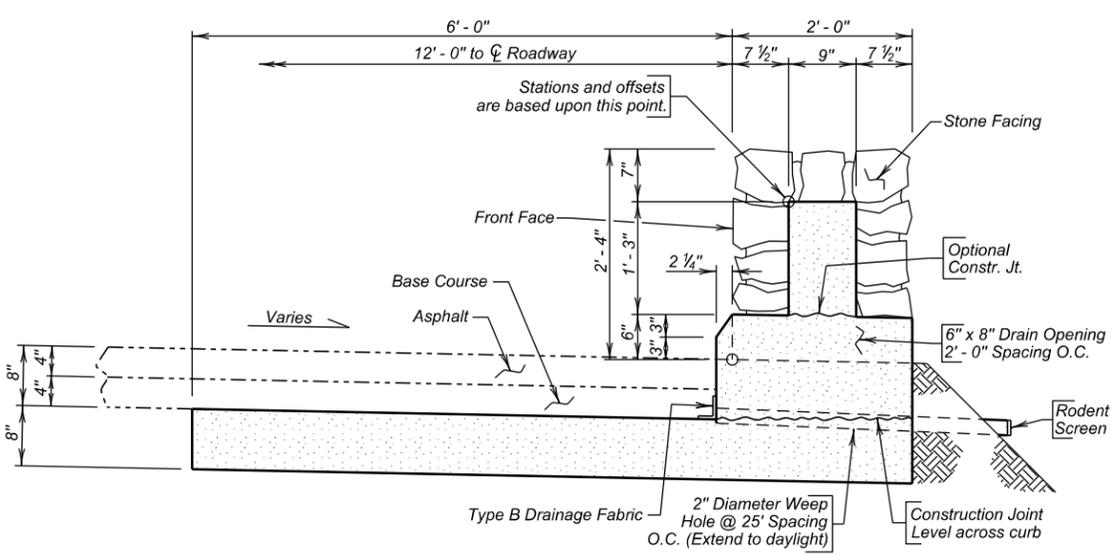
PLAN

**INDEX OF SHEETS-**

- Sheet No. 1 - General Drawing
- Sheet No. 2 - Notes and Isometric Views
- Sheet No. 3 - Joint Details
- Sheet No. 4 - Single Sided Stone Faced End Block Panel Details (31' - 2 1/4")
- Sheet No. 5 - Double Sided Stone Faced Sloped End Panel (19' - 7 1/2") and Single Sided Stone Faced Panel Details (32' - 9 7/16")
- Sheet No. 6 - Double Sided Stone Faced Sloped End Panel Details (28' - 7 1/2")
- Sheet No. 7 - Single and Double Sided Stone Faced Panel Details (30' - 0")
- Sheet No. 8 - 5 Bolt Insert Plate Assembly Details



TYPICAL SECTION SINGLE SIDED STONE FACED BARRIER



TYPICAL SECTION DOUBLE SIDED STONE FACED BARRIER

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Class A45 Concrete, Miscellaneous	Cu. Yd.	520.7
Reinforcing Steel	Lb.	54527
Architectural Surface Finish	Sq. Ft.	731
Stone Facing	Sq. Ft.	6435

⌀ Rounded to the nearest sq. foot.

**GENERAL DRAWING FOR STONE FACED BARRIER**  
 ADJACENT TO SD 87 SEC. 25-T2S-R4E  
 STA. 20 + 00.00 TO SB SD12(01)  
 STA. 39 + 50.00 TL-2  
 PCN 044U

CUSTER COUNTY  
 S. D. DEPT. OF TRANSPORTATION  
 MARCH 2014

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	SB SD12(01)	E4	E10

## SPECIFICATIONS

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 2012 Edition with 2013 interims.

2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2004 Edition and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

## GENERAL NOTES

- All concrete shall be Class A45 conforming to Section 460, concrete will have a minimum 28 day compressive strength of 4500 p.s.i.
- All reinforcing steel shall conform to ASTM A 615, Grade 60.
- All exposed edges shall be chamfered  $\frac{3}{8}$  inch.
- Use 2 inch clear cover on all reinforcing steel EXCEPT as shown.

## STONE FACING

- Furnish stone that matches the native stone at the project site. Native stone will have a fractured face and smooth, round stones shall be avoided. Submit stone samples representing the range of colors, surface textures, and sizes to be used on the project to the Area Engineer a minimum of 14 days before beginning work.
- Keep an adequate inventory of the stone on the site to provide an ample variety of stones for the masons. When additional stone is added, mix the new stone with the existing stone in a uniform pattern and color.
- Place all stones randomly to avoid a pattern. Lay the stones to reflect the width of the expansion joints. Do not leave a mortar edge at the expansion joint. Do not cover contraction joint with stone. Use various size stones to coin or key the corners of the barrier.
- The maximum expansion joint spacing shall be 90 feet and the maximum contraction joint spacing shall be 30 feet, excluding end panels.
- Before setting, stone shall be brushed free of dust or other foreign matter and wetted sufficiently to take up surface absorption. No stone shall be set with a film of water or frost on the surface. If necessary to prevent displacement of mortar, plastic spacers may be used.
- Do not jar or displace the stones already set. If a stone is loosened after the mortar has taken initial set, remove it, clean off the mortar, and re-lay the stone with fresh mortar.
- Stone work shall be kept as clean as possible as work progresses. Upon completion, any foreign material and mortar shall be removed from the stone. Cleaning shall be performed with scrub brushes using soap and water. Fine white sand may be added to the water to facilitate cleaning. The stone shall be thoroughly rinsed with clean water immediately after scrubbing. The use of wire brushes or acid solutions shall not be used.
- Carefully brush out joints before pointing. After wetting stone to take up surface absorption, work pointing mortar into joints, compacting thoroughly. Tool the joints to slightly concave on sides and crown the mortar slightly on the top surfaces at the center of the masonry to provide drainage.
- Masonry work shall not be laid when the ambient temperature is below 40° F or is likely to fall below 40° F in the 24 hour period after laying. Temperature of the masonry materials, including water, shall not exceed 140° F. When mortar or grout is being used, it shall have a temperature of between 50° F and 90° F at the time of placement. All finished work shall be maintained between 50° F and 100° F for a period not less than 48 hours after placement.
- All metal fasteners connecting the stone to the concrete shall be galvanized. Shop plans and construction procedures, including anchor type and spacing, shall be submitted a minimum of 14 days to the Area Engineer for approval before beginning work.
- Construct a 20 foot sample of the stone faced barrier 10 foot each side of the single and double faced panel joint (Sta. 26 + 00). Do not construct additional stone facing before the sample is approved by the Area Engineer.
- Construct the barrier true and uniform along its length with no stone projecting more than 1 1/2 inches beyond the neat line dimension, shown on plans. Rake the joints and beds to a depth of 2 inches on the front and top sides and to 1 1/2 inches on the back.
- At drain opening locations a stone, 10" minimum in length, shall be used to span the drain opening.
- Stone Facing is measured in accordance with the neat line dimension shown on the plans of the concrete on which the Stone Facing is applied. Stone Facing is computed to the nearest square foot.
- The quantity of Stone Facing will be paid for at the contract unit price per square foot. Payment will be full compensation for all labor, materials, equipment, and all other items incidental to the work required. Payment will be for plans quantity.

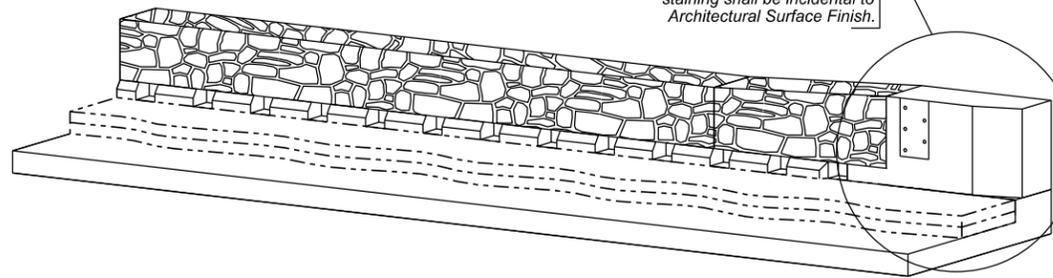
## ARCHITECTURAL SURFACE FINISH

- An Architectural Surface Finish shall be constructed on the back face of the single sided stone face barrier. This finish shall be in accordance with the Special Provision for Architectural Surface Finish.
- Surfaces having a stained or Architectural Surface Finish shall be sealed according to the finish manufacturer's specifications.
- The Architectural Surface Finish shall be paid for at the contract unit price bid per square foot. This payment shall be full compensation for furnishing all materials, labor, and equipment necessary or incidental to the application of this finish.

## WEEP HOLES

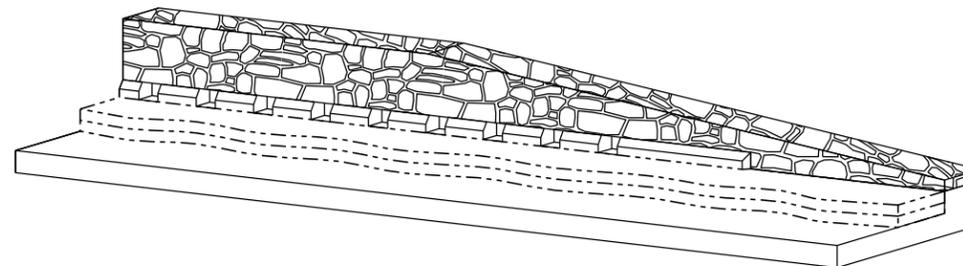
- Weep Holes shall be 2" diameter schedule 40 Polyvinyl Chloride (PVC) Plastic Pipe conforming to requirements of ASTM D1785.
- Payment for Weep Holes shall be incidental to Class A45 Concrete, Miscellaneous and shall be full compensation for furnishing, and installing the Weep Holes, Type B Drainage Fabric, and Rodent Screen in accordance with the plans and specifications.
- Weep Holes shall be spaced at 25 foot on center with a 1/2" per foot slope. The inlet flowline shall be lowered 1/2" and covered with Type B Drainage Fabric installed with a construction adhesive and the outlet shall be covered with a Rodent Screen.

Exposed concrete surfaces shall be stained a color similar to adjacent stone facing as approved by the Engineer. All costs for staining shall be incidental to Architectural Surface Finish.



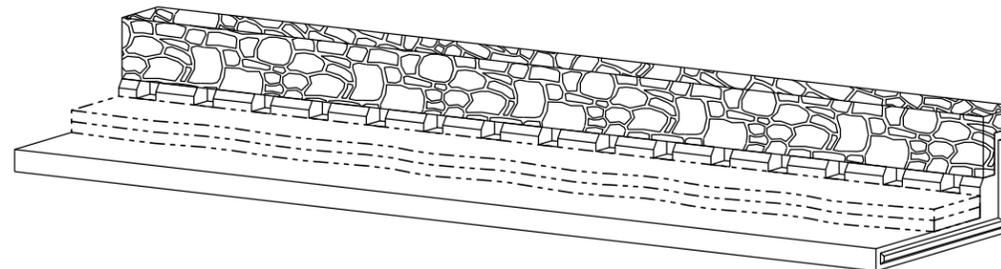
### ISOMETRIC VIEW

(Single Sided Stone Faced End Block Panel)



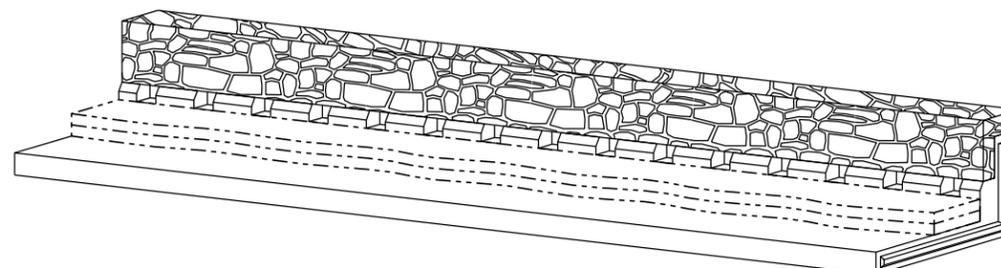
### ISOMETRIC VIEW

(Double Sided Stone Faced Sloped End Panel)



### ISOMETRIC VIEW

(Double Sided Stone Faced Panel)



### ISOMETRIC VIEW

(Single Sided Stone Faced Panel)

## MORTAR

- Portland Cement shall be Type I conforming to Section 750. Hydrated Lime shall be Type S conforming to ASTM C207.
- Aggregate for mortar shall conform to Section 810 except that the gradation shall conform to the following:

Sieve Size	Percent Passing
No. 4	100
No. 8	95 to 100
No. 16	60 to 100
No. 30	35 to 70
No. 50	15 to 35
No. 100	2 to 15
No. 200	0 to 2

- No air-entraining admixtures or cementitious materials containing air-entraining admixtures or agents shall be used in the mortar.
- No antifreeze compounds, accelerators, retarders, water repellent agents, calcium, or admixtures containing calcium chloride, or other admixtures shall be used in the mortar.
- Water used in mortar shall conform to Section 790.
- All mortar shall comply with the requirements of ASTM C270 and the Brick Industry Association Technical Notes 8A.
- Proportioning of mortar materials shall be with a container such as a bucket or other similar container. Proportioning with a shovel will not be allowed.
- Mortar shall be Type 'M', shall be by volume, and shall consist of (1) part Portland Cement, (1/4) part Hydrated Lime, and not less than (3) nor more than (3 3/4) parts aggregate measured in a damp, loose condition.
- Mixing: Materials for mortar shall be mixed in the following order:  
  
Place approximately half of the required water and sand into the mixer while the mixer is running. Then add lime, cement, and the remainder of the water and sand.  
  
Mixing shall be for not less than 3 minutes after all ingredients are added and not more than 5 minutes with the maximum amount of water to produce a workable consistency.
- Mortars that have stiffened because of evaporation of water from the mortar shall be re-tempered by adding water as frequently as needed to restore the required consistency. Mortars shall be used and placed in the final position within 1/2 hours of initial mixing.
- When the ambient air temperature exceeds 90° F, mortar beds shall not be spread more than 4 ft. ahead of masonry units. Units shall be laid within 1 minute of spreading mortar. Attention should be given to proper curing of mortar and grout.
- Curing shall be accomplished by continuous dampening with a light fog-spray for a period of three days. In lieu of the light fog spray, curing may be achieved by covering with wet burlap and polyethylene sheeting, provided that the burlap is kept continuously wet for the full three day curing period.

## NOTES AND ISOMETRIC VIEWS

FOR

## STONE FACED BARRIER

ADJACENT TO SD 87

SEC. 25-T2S-R4E

STA. 20 + 00.00 TO

SB SD12(01)

STA. 39 + 50.00

TL-2

CUSTER COUNTY

S. D. DEPT. OF TRANSPORTATION

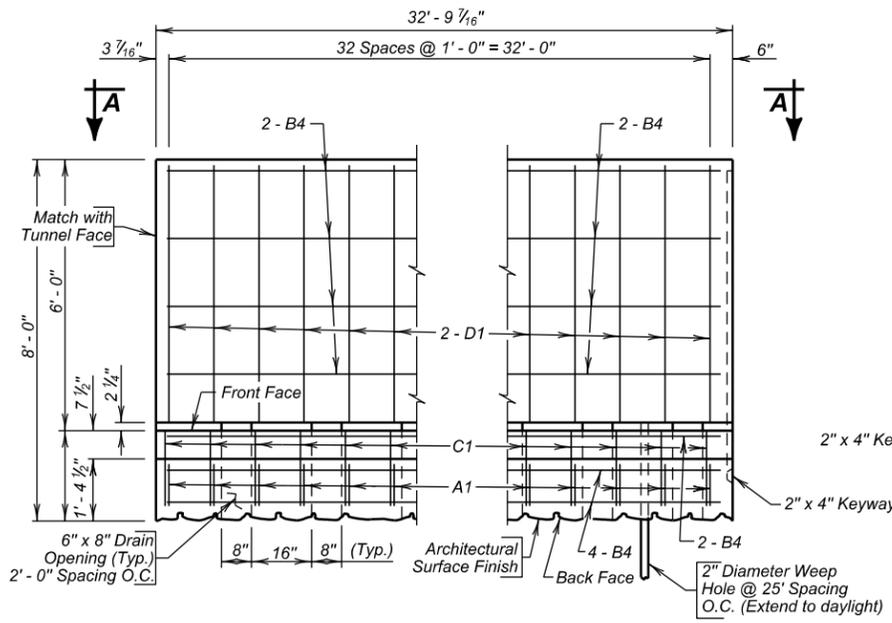
MARCH 2014

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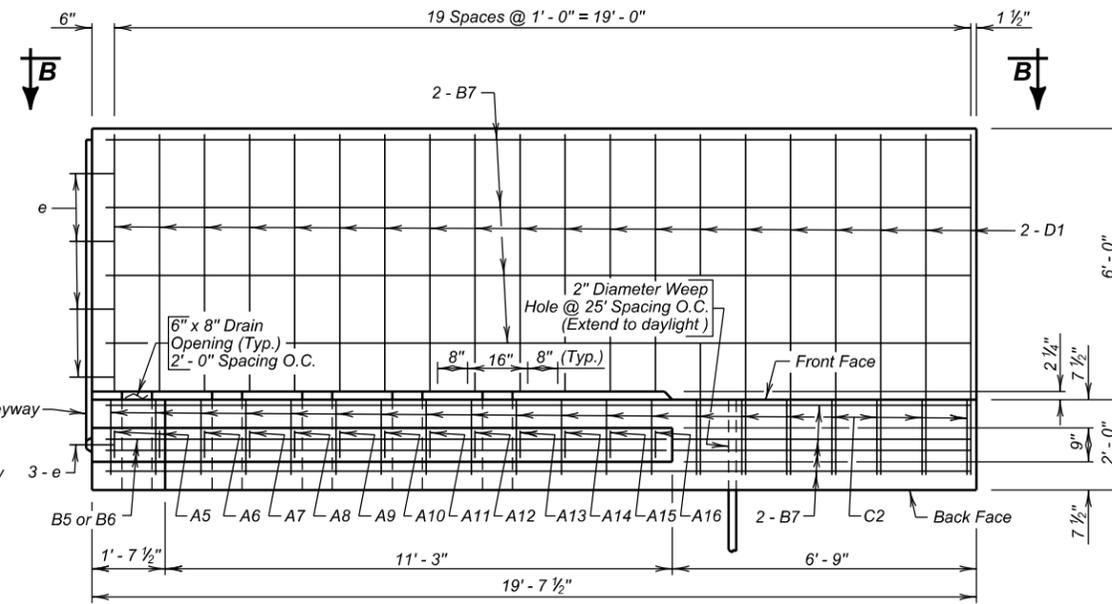
DESIGNED BY MM	CK. DES. BY SK	DRAFTED BY BT	Kevin N. Goeden BRIDGE ENGINEER
CUST044U	044UTA02		



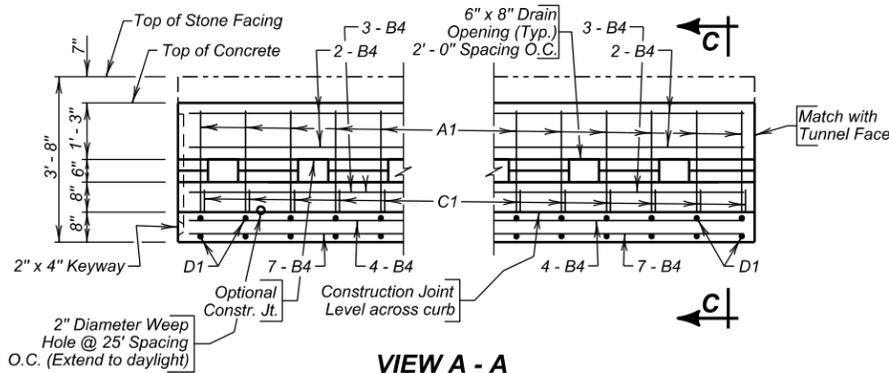




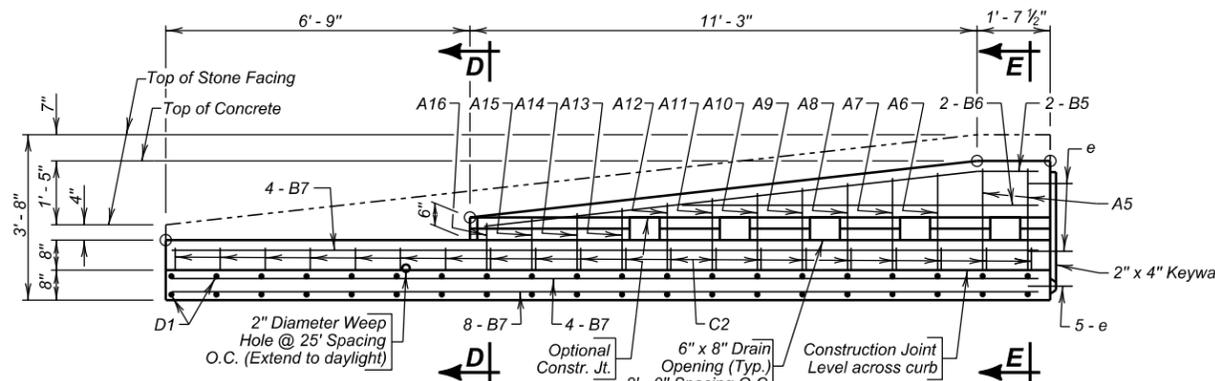
**φ PLAN**  
**32' - 9 7/16" SINGLE SIDED STONE FACED PANEL**  
 (Stone not shown.)  
 φ Horizontal curve not shown.



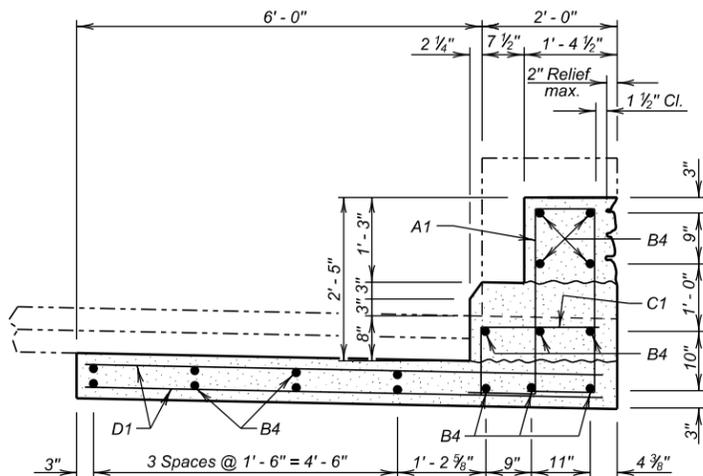
**φ PLAN**  
**DOUBLE SIDED STONE FACED SLOPED END PANEL**  
 (Stone not shown.)  
 φ Horizontal curve not shown.



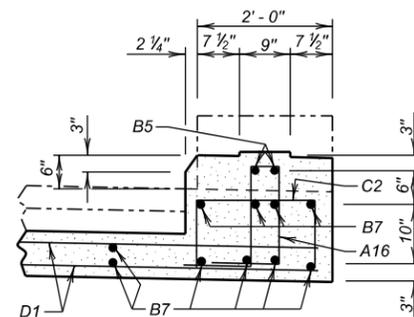
**VIEW A - A**



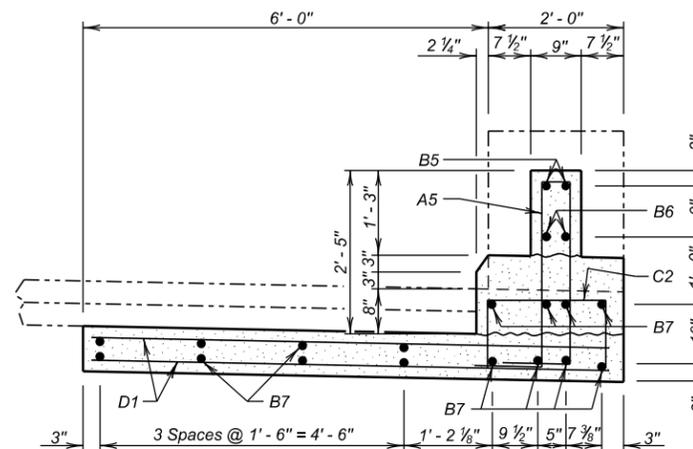
**VIEW B - B**



**SEC. C - C**  
 (Weep Holes not shown.)



**SEC. D - D**

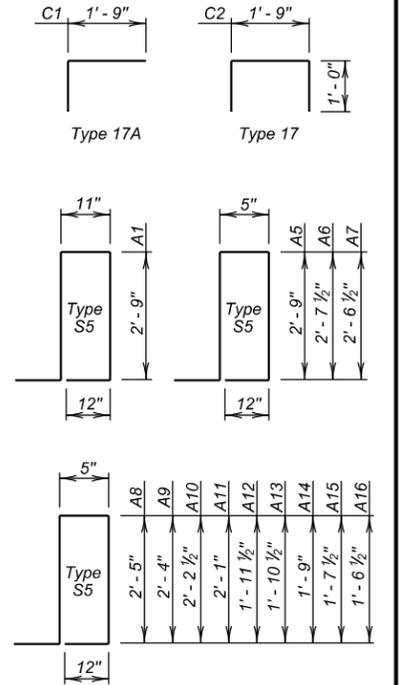


**SEC. E - E**  
 (Weep Holes not shown.)

**REINFORCING SCHEDULE**

Mk.	No.	Size	Length	Type
A1	33	5	8' - 6"	S5
B4	18	4	32' - 3"	Str.
C1	33	4	2' - 9"	17A
D1	66	4	7' - 8"	Str.
Δe	7	5	1' - 0"	Str.

**Bending Details**



A5	2	5	8' - 0"	S5
A6	1	5	7' - 9"	S5
A7	1	5	7' - 7"	S5
A8	1	5	7' - 4"	S5
A9	1	5	7' - 2"	S5
A10	1	5	6' - 11"	S5
A11	1	5	6' - 8"	S5
A12	1	5	6' - 5"	S5
A13	1	5	6' - 3"	S5
A14	1	5	6' - 0"	S5
A15	1	5	5' - 9"	S5
A16	1	5	5' - 7"	S5
B5	2	4	10' - 9"	Str.
B6	2	4	7' - 6"	Str.
B7	16	4	19' - 1"	Str.
C2	20	4	3' - 9"	17
D1	40	4	7' - 8"	Str.
Δe	7	5	1' - 0"	Str.

NOTES:  
 All dimensions are out to out of bars.  
 Δ Bars shall be smooth.  
 \* Bend in field as necessary to fit.

**ESTIMATED QUANTITIES**

ITEM	Class A45 Concrete, Miscellaneous	Reinforcing Steel	Stone Facing	Architectural Surface Finish
UNIT	Cu. Yd.	Lb.	Sq. Ft.	Sq. Ft.
1 - 19' - 7 1/2" Double Sided Stone Faced Sloped End Panel	5.6	584	58	—
1 - 32' - 9 7/16" Single Sided Stone Faced Panel	11.2	1086	107	41

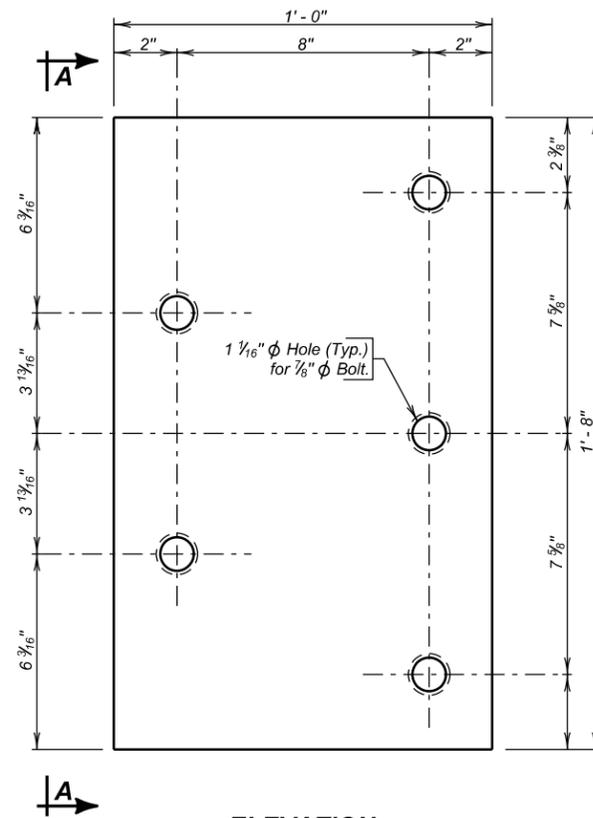
**DOUBLE SIDED STONE FACED SLOPED END PANEL (19' - 7 1/2") AND SINGLE SIDED STONE FACED PANEL DETAILS (32' - 9 7/16")**

FOR  
**STONE FACED BARRIER**  
 ADJACENT TO SD 87  
 STA. 20 + 00.00 TO  
 STA. 39 + 50.00  
 SEC. 25-T2S-R4E  
 SB SD12(01)  
 TL-2

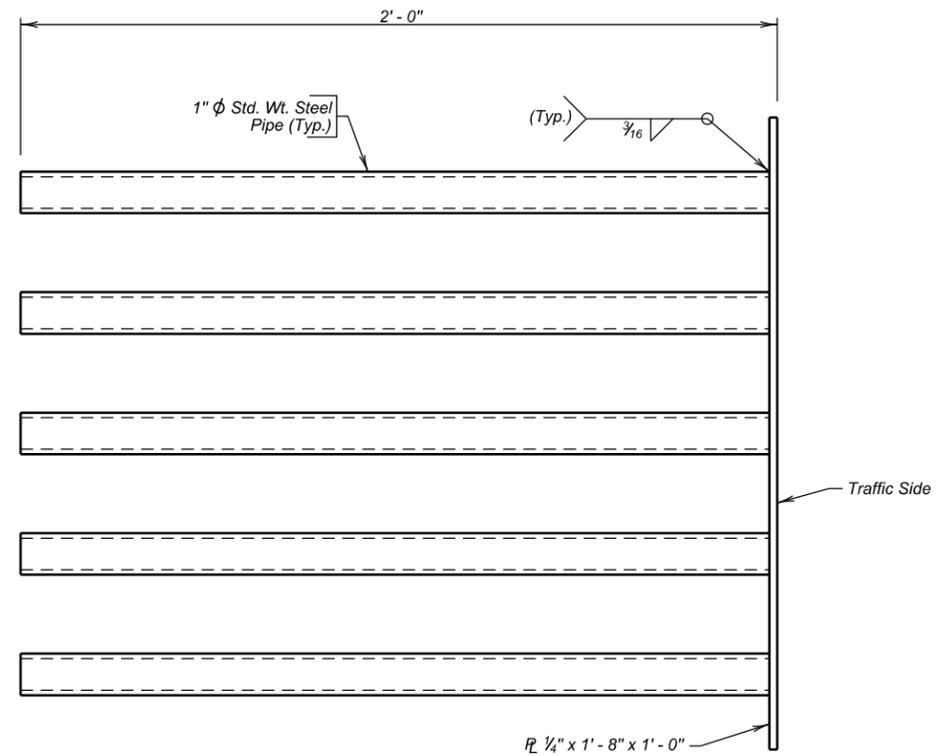
CUSTER COUNTY  
 S. D. DEPT. OF TRANSPORTATION  
 MARCH 2014







**ELEVATION**



**VIEW A - A**

**5 - BOLT INSERT PLATE ASSEMBLY**

1. Steel plate for the insert assembly shall conform to ASTM A709 Grade 36. The steel pipes shall conform to ASTM A53 or ASTM A500 Grade B.
2. Welding and weld inspection shall be in conformance with AWS D1.1 - (Current Year) Structural Welding Code - Steel.
3. After fabrication, galvanize in accordance with AASHTO M11 (ASTM A123). Clean and powder coat the finished exposed surface the same color as the adjacent weathering steel rails as approved by the Engineer.
4. Bolts, nuts, and washers shall be provided with each assembly. Bolts shall be galvanized and conform to the requirements of ASTM A307, A325, or A449. Plain washers shall be galvanized and conform to ASTM F844. Hardware shall be powder coated the same color as the adjacent weathering steel rails as approved by the Engineer.
5. Bolt heads shall be placed on the traffic side of the endblock. Bolt projection at the back side of the insert shall not exceed 1 inch beyond the nut.
6. The cost of the 5 bolt insert plate assembly complete in place including welding and galvanizing shall be incidental to the contract unit price per Cubic Yard for Class A45 Concrete, Miscellaneous.

**5 BOLT INSERT PLATE ASSEMBLY DETAILS**

FOR

**STONE FACED BARRIER**

ADJACENT TO SD 87  
STA. 20 + 00.00 TO  
STA. 39 + 50.00

SEC. 25-T2S-R4E  
SB SD12(01)  
TL-2

CUSTER COUNTY

S. D. DEPT. OF TRANSPORTATION

MARCH 2014

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DESIGNED BY MM CUST044U	CK. DES. BY SK 044UTA08	DRAFTED BY BT	Kevin N. Coeden BRIDGE ENGINEER
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