

# MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION

SPENCER ST 31 (NORTH SPENCER ROAD)			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	1	46
PROJECT FILE NO.		609179	

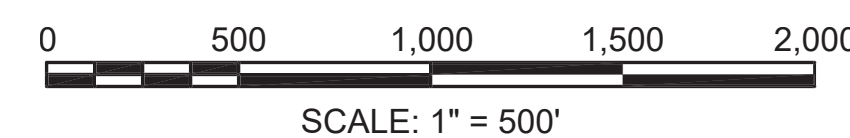
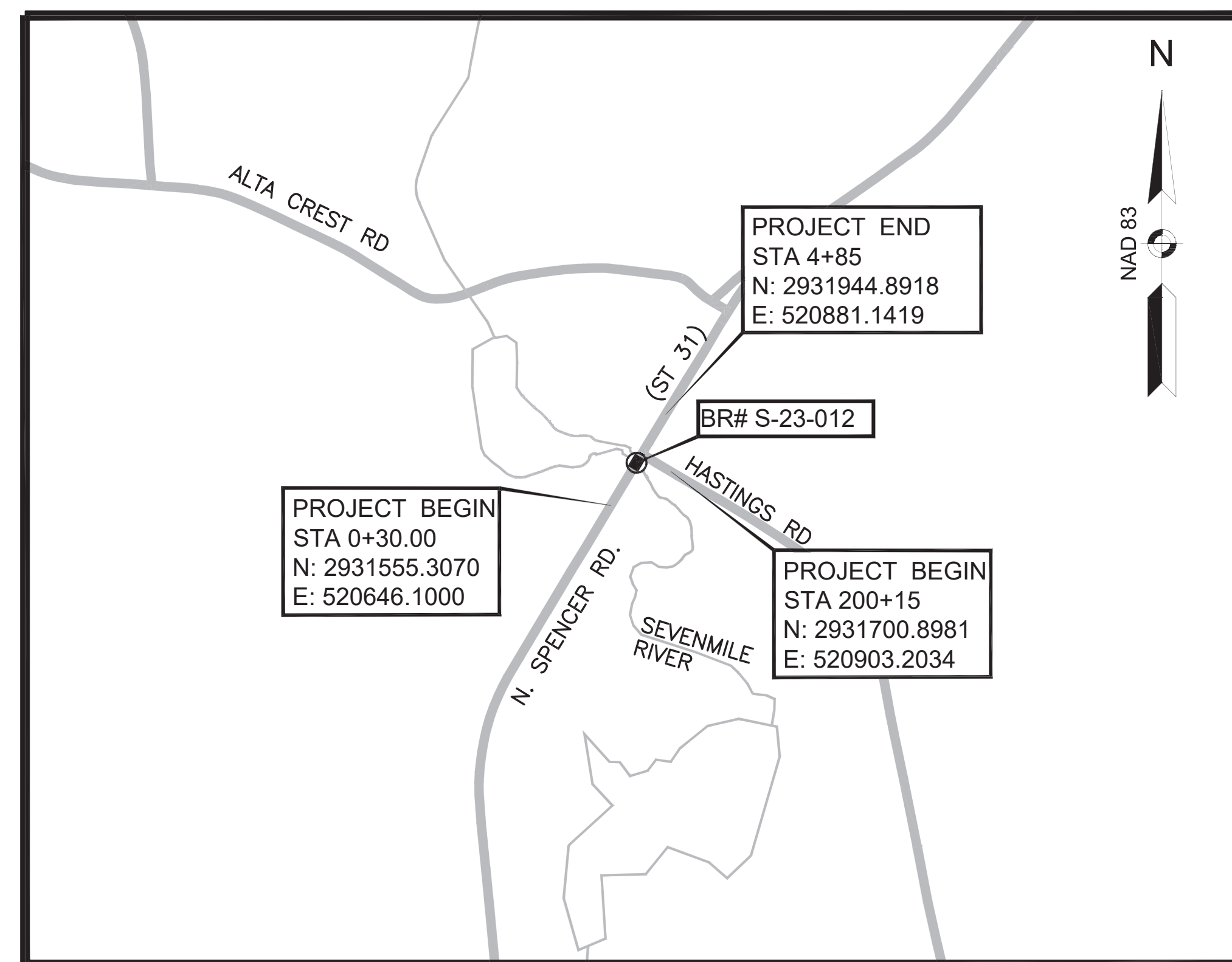
TITLE SHEET & INDEX

PLAN AND PROFILE OF  
ST 31 (NORTH SPENCER ROAD)  
(BRIDGE NO. S-23-012)

IN THE TOWN OF  
**SPENCER**  
**WORCESTER COUNTY**  
FEDERAL AID PROJECT NO. HIP(BR)-003S(723)X

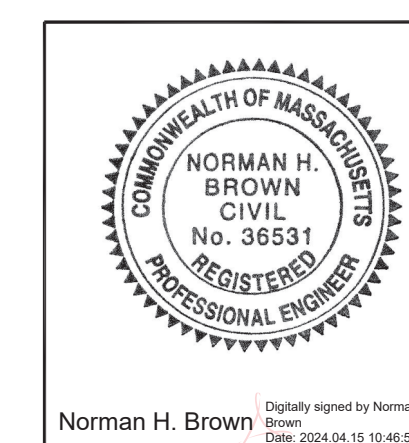
THESE PLANS ARE SUPPLEMENTED BY THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK.

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LENGTH OF PROJECT = 455 FEET = 0.09 MILES

DESIGN DESIGNATION (ST 31 (NORTH SPENCER ROAD))	
DESIGN SPEED	45 MPH
ADT (2022)	5,150
ADT (2042)	6,535
K	10%
D	50%
T (PEAK HOUR)	2%
T (AVERAGE DAY)	N/A
DHV	654
DDHV	251
FUNCTIONAL CLASSIFICATION	MAJOR COLLECTOR



Norman H. Brown  
Digitally signed by Norman H. Brown  
Date: 2024.04.16 08:44:46 -0400

DATE	DESCRIPTION	REV #
4-13-2024	ISSUED FOR CONSTRUCTION	0



**BAYSIDE ENGINEERING**  
600 Unicorn Park Drive Woburn, MA 01801  
Phone: 781.932.3201 Fax: 781.932.3413  
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APPROVED  
John Bechard  
Chief Engineer  
Date: 2024.04.16 08:44:46 -0400  
04/16/2024  
DATE

**GENERAL SYMBOLS**

EXISTING	PROPOSED	DESCRIPTION
		JERSEY BARRIER
		CATCH BASIN
		CATCH BASIN CURB INLET
		FLAG POLE
		GAS PUMP
		MAIL BOX
		POST SQUARE
		POST CIRCULAR
		WELL
		ELECTRIC HANDHOLE
		FENCE GATE POST
		GAS GATE
		BORING HOLE
		MONITORING WELL
		TEST PIT
		HYDRANT
		LIGHT POLE
		COUNTY BOUND
		GPS POINT
		CABLE MANHOLE
		DRAINAGE MANHOLE
		ELECTRIC MANHOLE
		GAS MANHOLE
		MISC MANHOLE
		SEWER MANHOLE
		TELEPHONE MANHOLE
		WATER MANHOLE
		MASSACHUSETTS HIGHWAY BOUND
		MONUMENT
		STONE BOUND
		TOWN OR CITY BOUND
		TRAVERSE OR TRIANGULATION STATION
		TROLLEY POLE OR GUY POLE
		TRANSMISSION POLE
		UTILITY POLE W/ FIREBOX
		UTILITY POLE WITH DOUBLE LIGHT
		UTILITY POLE W / 1 LIGHT
		UTILITY POLE
		BUSH
		TREE
		STUMP
		SWAMP / MARSH
		WATER GATE
		PARKING METER
		OVERHEAD CABLE/WIRE
		CURBING
		CONTOURS (ON-THE-GROUND SURVEY DATA)
		CONTOURS (PHOTOGRAMMETRIC DATA)
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
		BALANCED STONE WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
		GUARD RAIL - DOUBLE FACE - STEEL POSTS
		GUARD RAIL - DOUBLE FACE - WOOD POSTS
		CHAIN LINK OR METAL FENCE
		WOOD FENCE
		SEDIMENT CONTROL BARRIER
		TREE LINE
		SAWCUT LINE
		TOP OR BOTTOM OF SLOPE
		LIMIT OF EDGE OF PAVEMENT OR COLD PLANE AND OVERLAY
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE
		TOWN OR CITY BOUNDARY LINE
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT

**TRAFFIC SYMBOLS**

EXISTING	PROPOSED	DESCRIPTION
		CONTROLLER PHASE ACTUATED
		TRAFFIC SIGNAL HEAD (SIZE AS NOTED)
		WIRE LOOP DETECTOR (6' x 6' TYP UNLESS OTHERWISE SPECIFIED)
		VIDEO DETECTION CAMERA
		MICROWAVE DETECTOR
		PEDESTRIAN PUSH BUTTON, SIGN (DIRECTIONAL ARROW AS SHOWN) AND SADDLE
		EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT
		VEHICULAR SIGNAL HEAD
		VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED
		FLASHING BEACON
		PEDESTRIAN SIGNAL HEAD, (TYPE AS NOTED OR AS SPECIFIED)
		RAILROAD SIGNAL
		SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED)
		MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED)
		HIGH MAST POLE OR TOWER
		SIGN AND POST
		SIGN AND POST (2 POSTS)
		MAST ARM WITH LUMINAIRE
		OPTICAL PRE-EMPTION DETECTOR
		CONTROL CABINET, GROUND MOUNTED
		CONTROL CABINET, POLE MOUNTED
		FLASHING BEACON CONTROL AND METER PEDESTAL
		LOAD CENTER ASSEMBLY
		PULL BOX 12"x12" (OR AS NOTED)
		ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)
		TRAFFIC SIGNAL CONDUIT

**PAVEMENT MARKINGS SYMBOLS**

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
		LEGEND "ONLY" - WHITE
		STOP LINE
		CROSSWALK
		SOLID WHITE LINE
		SOLID YELLOW LINE
		BROKEN WHITE LINE
		BROKEN YELLOW LINE
		DOTTED WHITE LINE
		DOTTED YELLOW LINE
		DOTTED WHITE LINE EXTENSION
		DOTTED YELLOW LINE EXTENSION
		DOUBLE WHITE LINE
		DOUBLE YELLOW LINE

**GENERAL NOTES:**

- THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
- WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
- THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.
- AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.
- THE TERM "PROPOSED" (PROP) MEANS WORK TO BE CONSTRUCTED
- USING NEW MATERIALS OR, WHERE APPLICABLE, REUSING EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET" (R&R).
- JOINTS BETWEEN NEW HMA CONCRETE ROADWAY PAVEMENT AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED IN ACCORDANCE WITH ITEM 453 OF THE STANDARD SPECIFICATIONS.
- ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
- ALL PROPOSED PAVEMENT MARKINGS SHALL BE REFLECTORIZED POLYUREA RECESSED.
- DRAINAGE ELEVATIONS ARE PROVIDED FOR DESIGN PURPOSES ONLY. THE CONTRACTOR SHALL VERIFY BY TEST PIT, THE LOCATIONS OF EXISTING UTILITIES WHICH MAY CONFLICT WITH THE PROPOSED DRAINAGE DESIGN. ANY FIELD ADJUSTMENTS REQUIRED WILL BE MADE AS APPROVED OR DIRECTED BY THE ENGINEER. ONLY AFTER THE CONTRACTOR VERIFIES ELEVATIONS FOR THE CONSTRUCTABILITY OF THE DRAINAGE SYSTEM SHALL ANY STRUCTURES BE ORDERED.
- FIELD SURVEY PROVIDED BY BAYSIDE ENGINEERING, INC. BETWEEN OCTOBER TO DECEMBER 2020. HORIZONTAL DATUM IS BASED ON MASS GRID SYSTEM NAD 1983. ELEVATIONS SHOWN ON THIS PLAN REFER TO THE NAVD OF 1988.

**ABBREVIATIONS**

GENERAL	DESCRIPTION
AADT	ANNUAL AVERAGE DAILY TRAFFIC
ABAN	ABANDON
ADJ	ADJUST
APPROX.	APPROXIMATE
A.C.	ASPHALT CONCRETE
ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE
BIT.	BITUMINOUS
BC	BOTTOM OF CURB
BD.	BOUND
BL	BASELINE
BLDG	BUILDING
BM	BENCHMARK
BO	BY OTHERS
BOS	BOTTOM OF SLOPE
BR.	BRIDGE
CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CC	CEMENT CONCRETE
CCM	CEMENT CONCRETE MASONRY
CEM	CEMENT
CI	CURB INLET
CIP	CAST IRON PIPE
CLF	CHAIN LINK FENCE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CSP	CORRUGATED STEEL PIPE
CO.	COUNTY
CONC	CONCRETE
CONT	CONTINUOUS
CONST	CONSTRUCTION
CR GR	CROWN GRADE
DHV	DESIGN HOURLY VOLUME
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DW	STEADY DON'T WALK - PORTLAND ORANGE
DWY	DRIVEWAY
ELEV (or EL.)	ELEVATION
EMB	EMBANKMENT
EOP	EDGE OF PAVEMENT
EXIST (or EX)	EXISTING
EXC	EXCAVATION
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FDN.	FOUNDATION
FLDSTN	FIELDSTONE
GAR	GARAGE
GD	GROUND
GG	GAS GATE
GI	GUTTER INLET
GIP	GALVANIZED IRON PIPE
GRAN	GRANITE
GRAV	GRAVEL
GRD	GUARD
HDW	HEADWALL
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
HYD	HYDRANT
INV	INVERT
JCT	JUNCTION
L	LENGTH OF CURVE
LB	LEACH BASIN
LP	LIGHT POLE
LT	LEFT
MAX	MAXIMUM
MB	MAILBOX
MH	MANHOLE
MHB	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
NIC	NOT IN CONTRACT
NO.	NUMBER
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
P.G.L.	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
POC	POINT ON CURVE
POT	POINT ON TANGENT
PRC	POINT OF REVERSE CURVATURE
PROJ	PROJECT
PROP	PROPOSED
PSB	PLANTABLE SOIL BORROW
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
PVMT	PAVEMENT
PWW	PAVED WATER WAY

**SPENCER**  
**ST 31 (NORTH SPENCER ROAD)**

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**LEGEND & ABBREVIATIONS**

**ABBREVIATIONS (cont.)**

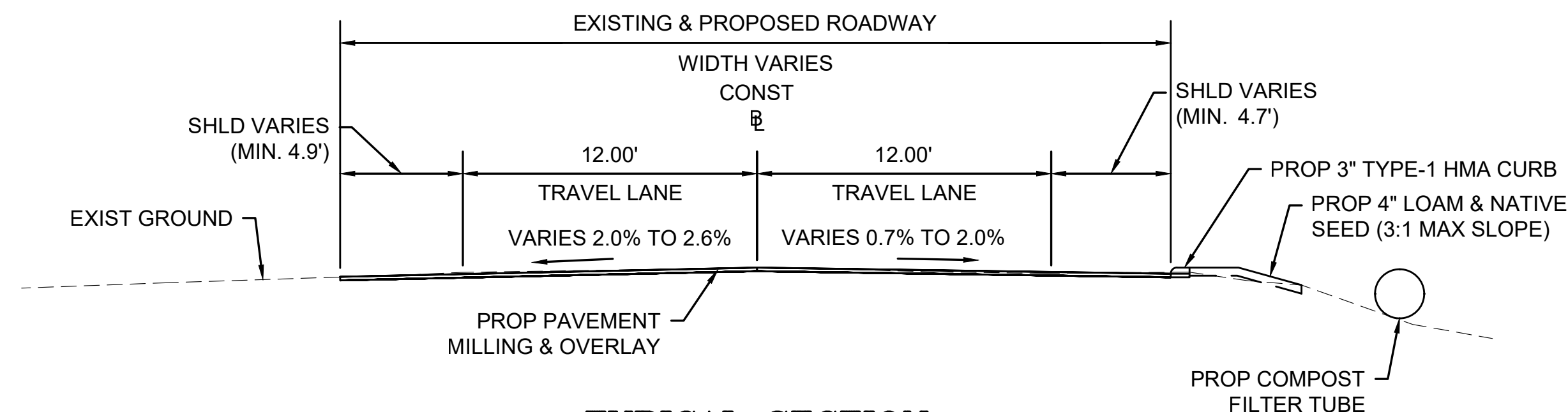
GENERAL	DESCRIPTION
R	RADIUS OF CURVATURE
R&D	REMOVE AND DISPOSE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REM	REMOVE
RET	RETAIN
RET WALL	RETAINING WALL
ROW	RIGHT OF WAY
RR	RAILROAD
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT	RIGHT
SB	STONE BOUND
SHLD	SHOULDER
SMH	SEWER MANHOLE
ST	STREET
STA	STATION
SSD	STOPPING SIGHT DISTANCE
SHLO	STATE HIGHWAY LAYOUT LINE
SW	SIDEWALK
T	TANGENT DISTANCE OF CURVE/TRUCK %
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TYP	TYPICAL
UP	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
WCR	WHEEL CHAIR RAMP
WG	WATER GATE
WIP	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN
X-SECT	CROSS SECTION

**TRAFFIC SIGNAL ABBREVIATIONS**

CAB	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY UPRAISED HAND
FDW	FLASHING UPRAISED HAND
FR	FLASHING CIRCULAR RED
FRL	FLASHING RED LEFT ARROW
FRR	FLASHING RED RIGHT ARROW
FY	FLASHING CIRCULAR YELLOW
FYL	FLASHING YELLOW LEFT ARROW
FYR	FLASHING YELLOW RIGHT ARROW
G	STEADY CIRCULAR GREEN
GL	STEADY GREEN LEFT ARROW
GR	STEADY GREEN RIGHT ARROW
GSL	STEADY GREEN SLASH LEFT ARROW
GSR	STEADY GREEN SLASH RIGHT ARROW
GV	STEADY GREEN VERTICAL ARROW
OL	OVERLAP
PED	PEDESTRIAN
PTZ	PAN, TILT, ZOOM
R	STEADY CIRCULAR RED
RL	STEADY RED LEFT ARROW
RR	STEADY RED RIGHT ARROW
TR SIG	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
W	STEADY WALKING PERSON
Y	STEADY CIRCULAR YELLOW
YL	STEADY YELLOW LEFT ARROW

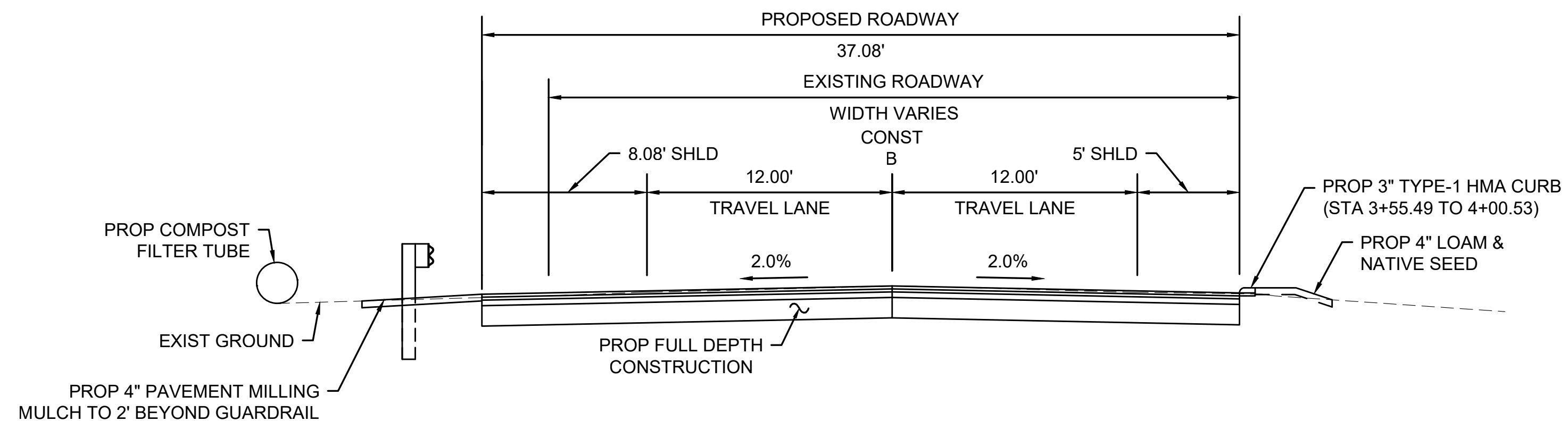
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TYPICAL SECTIONS - N SPENCER RD



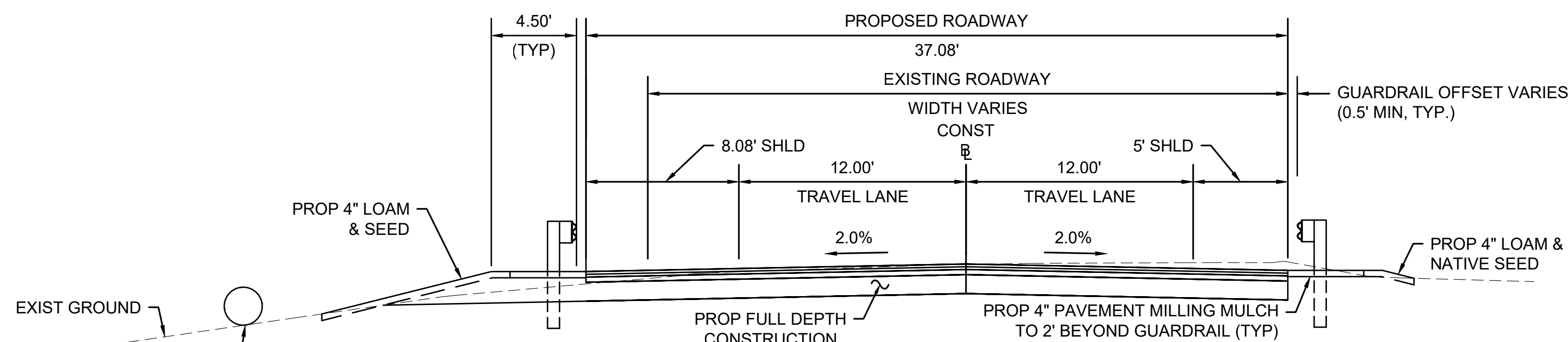
**TYPICAL SECTION  
NORTH SPENCER ROAD  
PAVEMENT MILLING AND OVERLAY**

N.T.S.  
STA. 4+00.53 TO 4+25.53



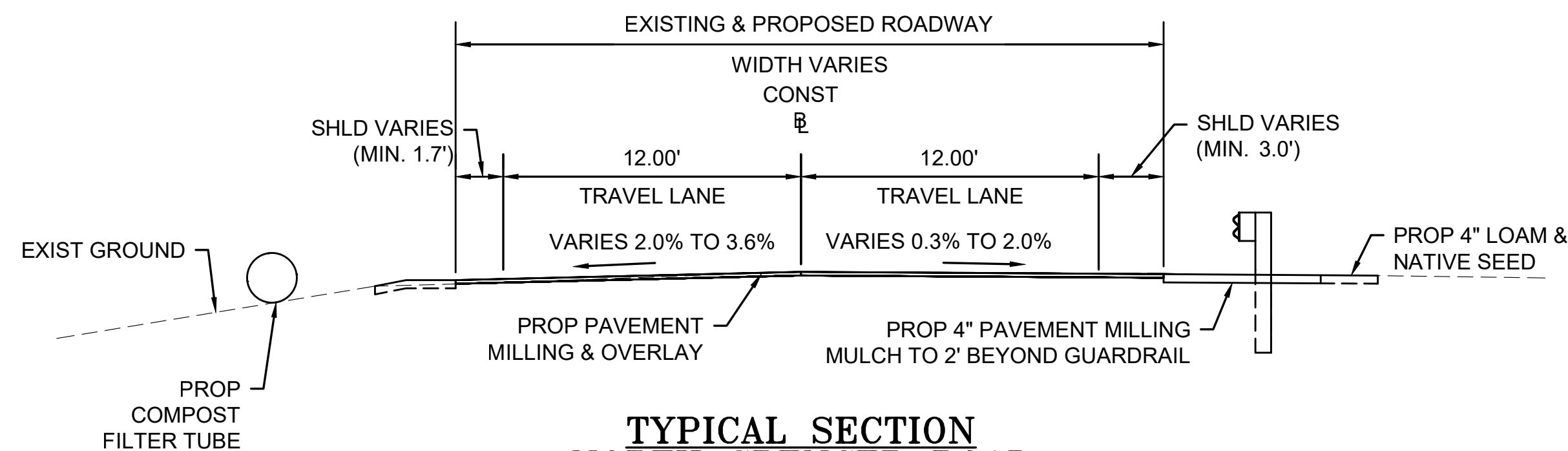
**TYPICAL SECTION  
NORTH SPENCER ROAD  
FULL DEPTH CONSTRUCTION W/ MINOR BOX WIDENING**

N.T.S.  
STA. 2+72.19 TO STA. 4+00.53  
(\*MINOR BOX WIDENING LT AND RT ALONG ENTIRE STATION RANGE)



**TYPICAL SECTION  
NORTH SPENCER ROAD  
FULL DEPTH CONSTRUCTION W/ MINOR BOX WIDENING**

N.T.S.  
STA. 1+47.80 TO STA. 2+14.96  
(\*MINOR BOX WIDENING LT AND RT ALONG ENTIRE STATION RANGE)



**TYPICAL SECTION  
NORTH SPENCER ROAD  
PAVEMENT MILLING AND OVERLAY**

N.T.S.  
STA. 1+22.80 TO 1+47.80

**PAVEMENT NOTES**

**PROPOSED FULL DEPTH PAVEMENT**

SURFACE: 1.5" SUPERPAVE BRIDGE SURFACE COURSE - 9.5 POLYMER (SSC-B-9.5-P) OVER

INTERMEDIATE: 2.0" SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC-12.5) OVER

BASE: 4.0" SUPERPAVE BASE COURSE - 37.5 (SBC-37.5) OVER

SUBBASE: 12" GRAVEL BORROW, TYPE B

**PROPOSED PAVEMENT MILLING & OVERLAY**

SURFACE: 1.5" SUPERPAVE BRIDGE SURFACE COURSE - 9.5 POLYMER (SSC-B-9.5-P) OVER

ASPHALT EMULSION FOR TACK COAT AT 0.07 TO 0.09 GAL/SY OVER EXISTING PAVEMENT

FINE MILL VARIABLE DEPTH (0-2.5") TO MEET PROPOSED GRADING

**PROPOSED HMA BRIDGE WEARING COURSE (AS PER BRIDGE ENGINEER APPROVAL)**

SURFACE: 1.5" SUPERPAVE BRIDGE SURFACE COURSE - 9.5 POLYMER (SSC-B-9.5-P) OVER

PROTECTIVE: VARIES 1.5"-8.5" SUPERPAVE BRIDGE PROTECTIVE COURSE - 9.5 POLYMER (SPC-B-9.5-P) OVER

MEMBRANE WATERPROOFING FOR BRIDGE DECKS

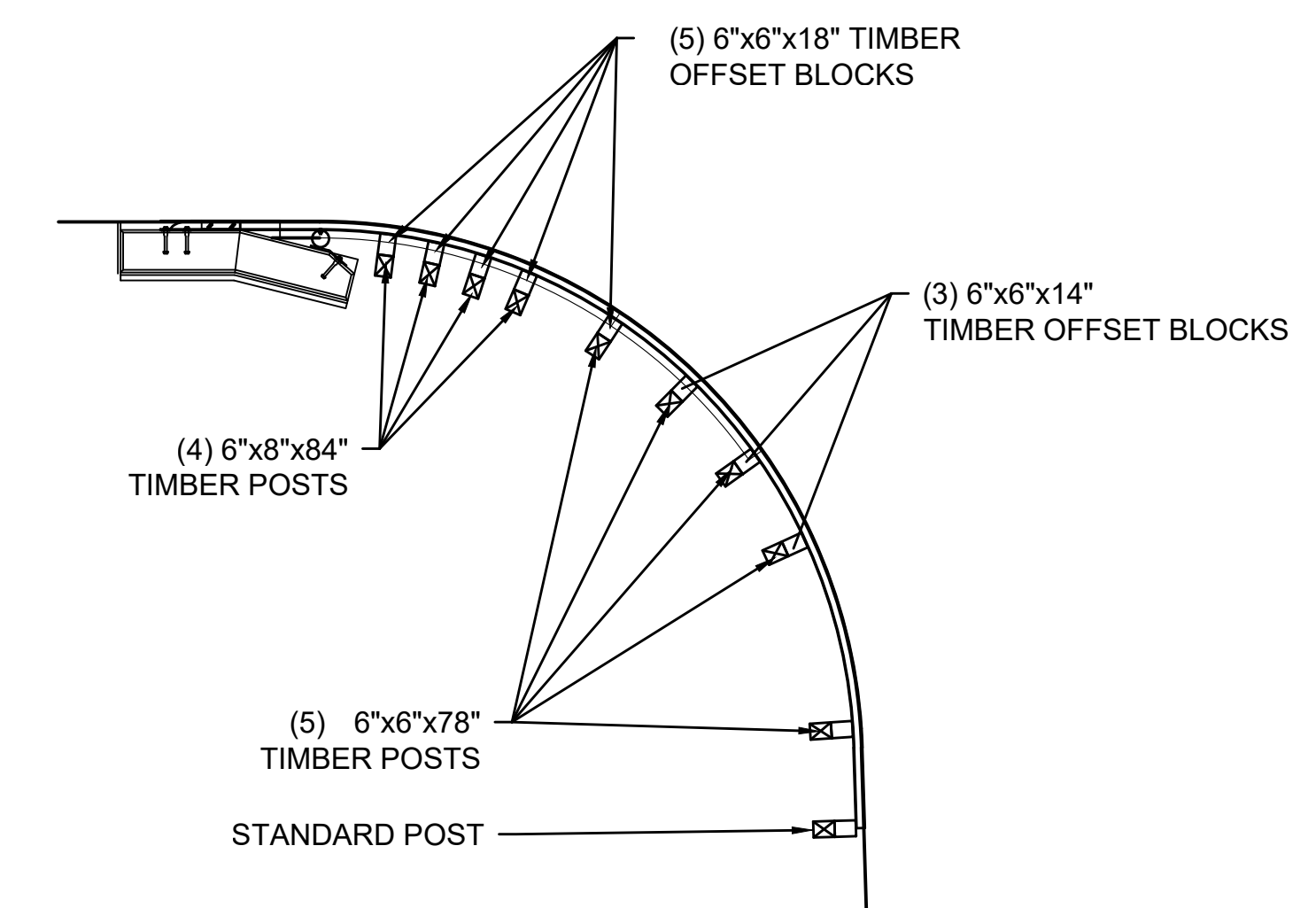
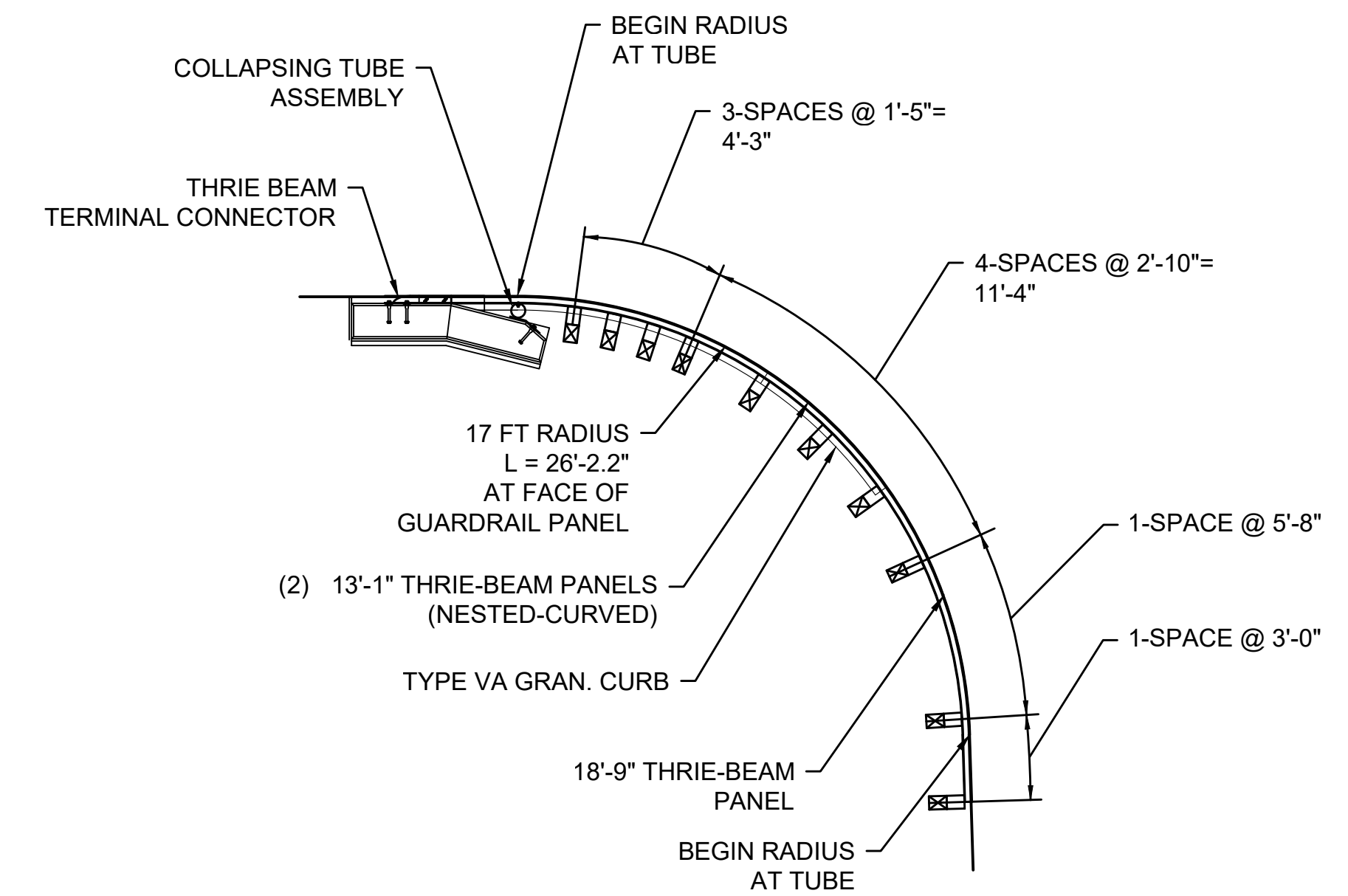
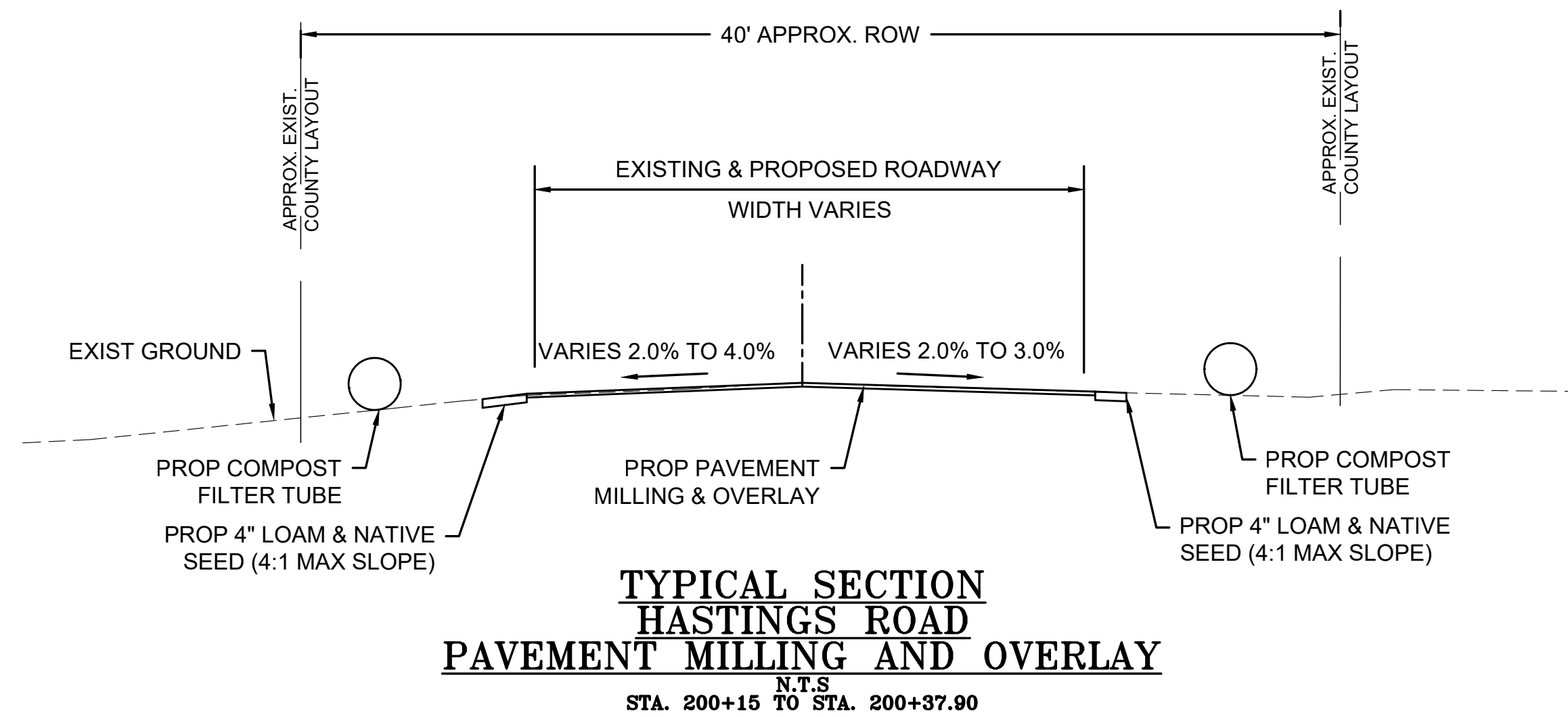
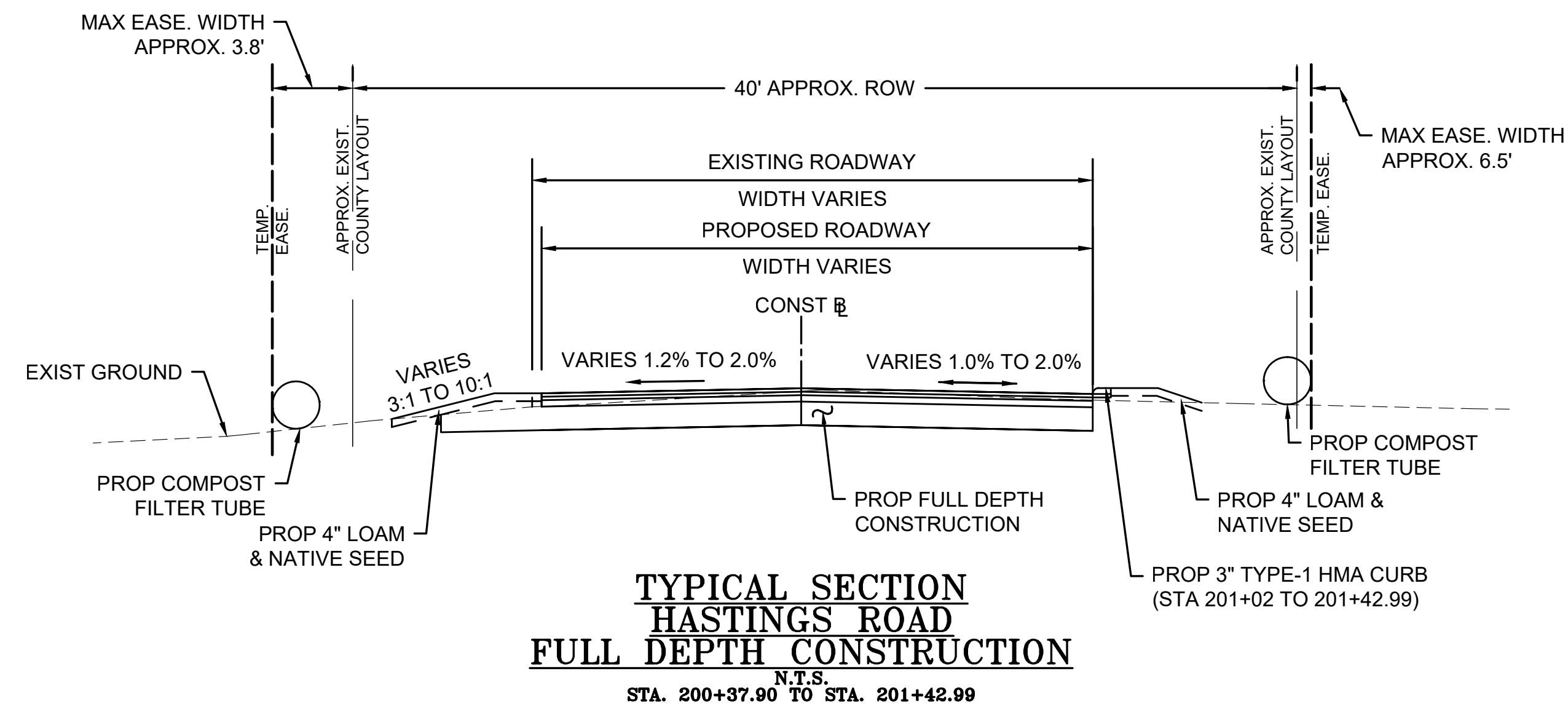
**NOTE:**

1. ASPHALT EMULSION FOR TACK COAT AT 0.07 TO 0.09 GAL/SY OVER MILLED SURFACE. ASPHALT EMULSION FOR TACK COAT AT 0.06 TO 0.08 GAL/SY OVER INTERMEDIATE AND BASE COURSE. TACK SHALL BE RS-1H.
2. PLACE SUPERPAVE BRIDGE PROTECTIVE COURSE -9.5 POLYMER (SPC-B-9.5-P) IN LIFTS NOT TO EXCEED 1.875".

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**TYPICAL SECTIONS-HASTING ROAD & NORTHEAST TRANSITION TO BRIDGEDETAILS**



HIGHWAY GUARD DETAILS

STA. 1+63.83 (BEGIN MASH TL-3 FLARED END TREATMENT, TYP) LT TO STA. 2+03.27 (END MASH TL-3 FLARED END TREATMENT, TYP, BEGIN TRANSITION TO BRIDGE RAIL) LT TO STA. 2+37.02 (END TRANSITION TO BRIDGE RAIL) LT

STA. 2+70.51 (END TRANSITION TO BRIDGE RAIL) LT TO STA. 3+04.26 (BEGIN TRANSITION TO BRIDGE RAIL, END GUARDRAIL TL-3) LT TO STA. 3+19.88 (END GUARDRAIL TL-3, BEGIN MASH TL-3 FLARED END TREATMENT, TYP) LT TO STA. 3+59.32 (END MASH TL-3 FLARED END TREATMENT, TYP) LT

STA. 1+16.85 (BEGIN MASH TL-3 FLARED END TREATMENT, TYP) RT TO STA. 1+56.31 (END MASH TL-3 FLARED END TREATMENT, TYP, BEGIN GUARDRAIL TL-3) RT TO STA. 1+84.44 (END GUARDRAIL TL-3, BEGIN TRANSITION TO BRIDGE RAIL) RT TO STA. 2+18.19 (END TRANSITION TO BRIDGE RAIL) RT

STA. 2+51.07 (END TRANSITION TO BRIDGE RAIL) RT TO STA. 201+24.32 (BEGIN TRANSITION TO BRIDGE RAIL, END MASH TL-3 FLARED END TREATMENT, TYP) LT TO STA. 200+84.69 (BEGIN MASH TL-3 FLARED END TREATMENT, TYP) LT

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

NONE

CLEARING & CRUBBING

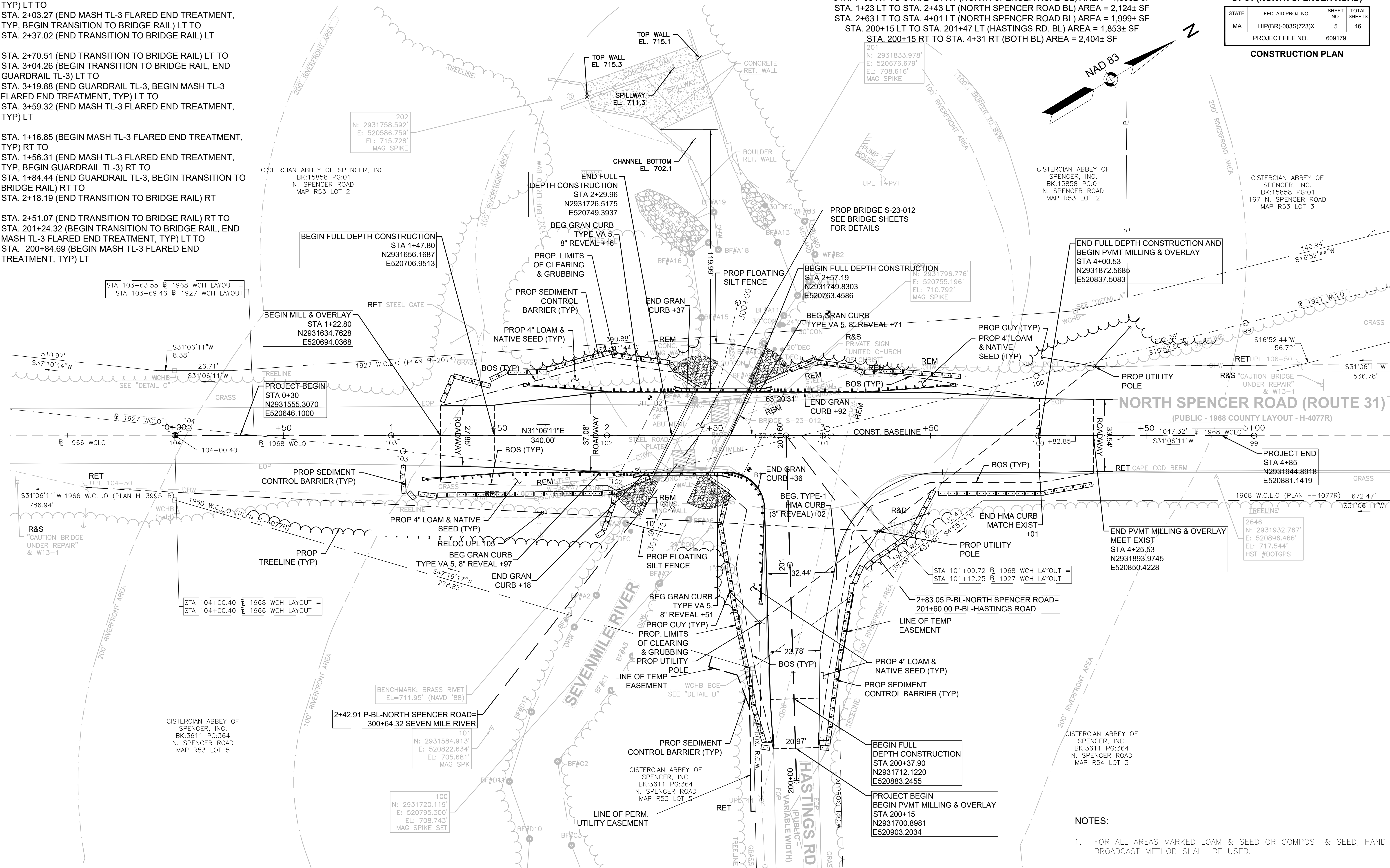
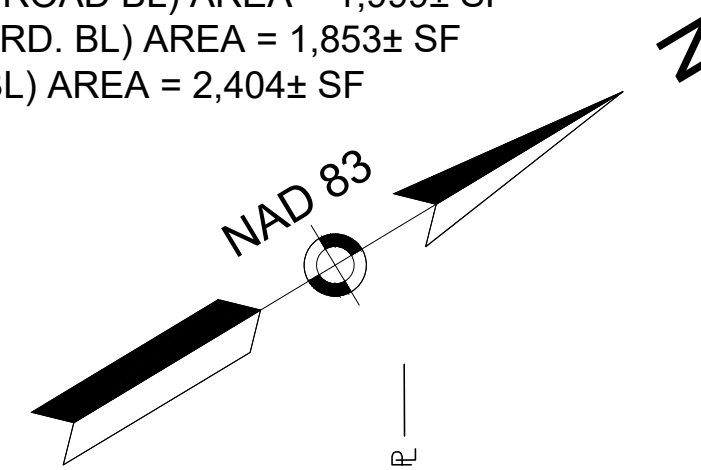
STA. 1+05 RT TO STA. 2+21 RT (NORTH SPENCER ROAD BL) AREA = 1,355± SF  
STA. 1+23 LT TO STA. 2+43 LT (NORTH SPENCER ROAD BL) AREA = 2,124± SF  
STA. 2+63 LT TO STA. 4+01 LT (NORTH SPENCER ROAD BL) AREA = 1,999± SF  
STA. 200+15 LT TO STA. 201+47 LT (HASTINGS RD. BL) AREA = 1,853± SF  
STA. 200+15 RT TO STA. 4+31 RT (BOTH BL) AREA = 2,404± SF

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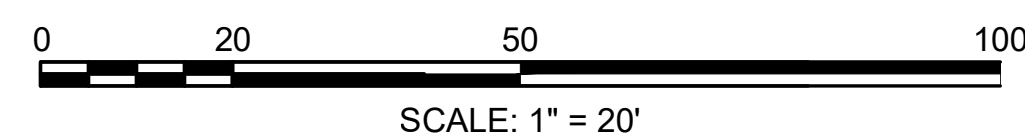
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**CONSTRUCTION PLAN**



NOTES:

- 1. FOR ALL AREAS MARKED LOAM & SEED OR COMPOST & SEED, HAND BROADCAST METHOD SHALL BE USED.



FOR PROFILES SEE SHEETS 7 & 8

HIGHWAY GUARD DETAILS

STA. 1+63.83 (BEGIN MASH TL-3 FLARED END TREATMENT, TYP) LT TO  
STA. 2+03.27 (END MASH TL-3 FLARED END TREATMENT, TYP, BEGIN TRANSITION TO BRIDGE RAIL) LT TO  
STA. 2+37.02 (END TRANSITION TO BRIDGE RAIL) LT

STA. 2+70.51 (END TRANSITION TO BRIDGE RAIL) LT TO  
STA. 3+04.26 (BEGIN TRANSITION TO BRIDGE RAIL, END GUARDRAIL TL-3) LT TO  
STA. 3+19.88 (END GUARDRAIL TL-3, BEGIN MASH TL-3 FLARED END TREATMENT, TYP) LT TO  
STA. 3+59.32 (END MASH TL-3 FLARED END TREATMENT, TYP) LT

STA. 1+16.85 (BEGIN MASH TL-3 FLARED END TREATMENT, TYP) RT TO  
STA. 1+56.31 (END MASH TL-3 FLARED END TREATMENT, TYP, BEGIN GUARDRAIL TL-3) RT TO  
STA. 1+84.44 (END GUARDRAIL TL-3, BEGIN TRANSITION TO BRIDGE RAIL) RT TO  
STA. 2+18.19 (END TRANSITION TO BRIDGE RAIL) RT

STA. 2+51.07 (END TRANSITION TO BRIDGE RAIL) RT TO  
STA. 201+24.32 (BEGIN TRANSITION TO BRIDGE RAIL, END MASH TL-3 FLARED END TREATMENT, TYP) LT TO  
STA. 200+84.69 (BEGIN MASH TL-3 FLARED END TREATMENT, TYP) LT

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

NONE

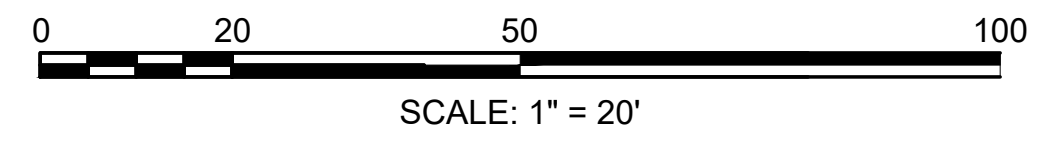
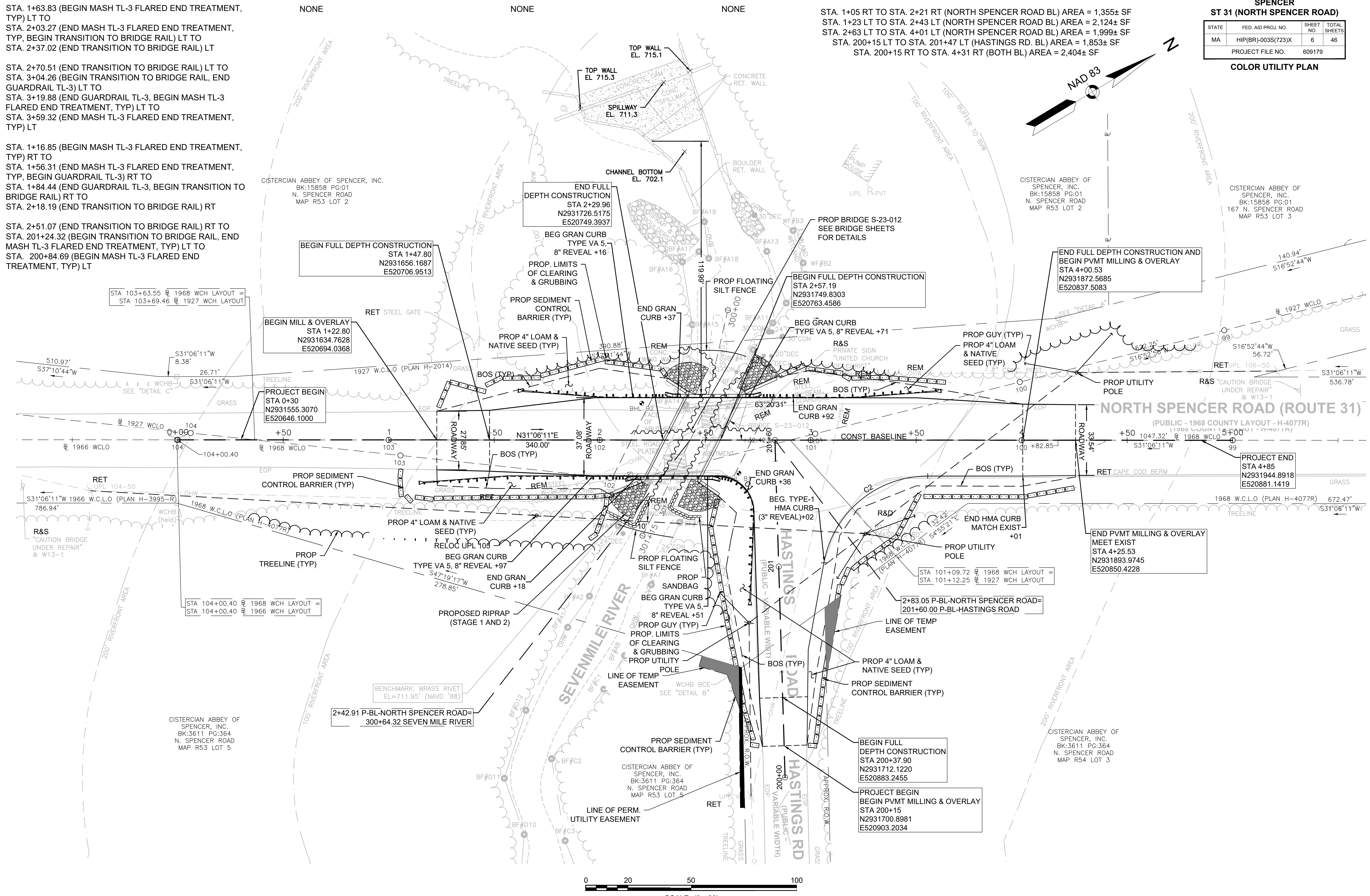
CLEARING & CRUBBING

STA. 1+05 RT TO STA. 2+21 RT (NORTH SPENCER ROAD BL) AREA = 1,355± SF  
STA. 1+23 LT TO STA. 2+43 LT (NORTH SPENCER ROAD BL) AREA = 2,124± SF  
STA. 2+63 LT TO STA. 4+01 LT (NORTH SPENCER ROAD BL) AREA = 1,999± SF  
STA. 200+15 LT TO STA. 201+47 LT (HASTINGS RD. BL) AREA = 1,853± SF  
STA. 200+15 RT TO STA. 4+31 RT (BOTH BL) AREA = 2,404± SF

SPENCER  
ST 31 (NORTH SPENCER ROAD)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	6	46
PROJECT FILE NO. 609179			

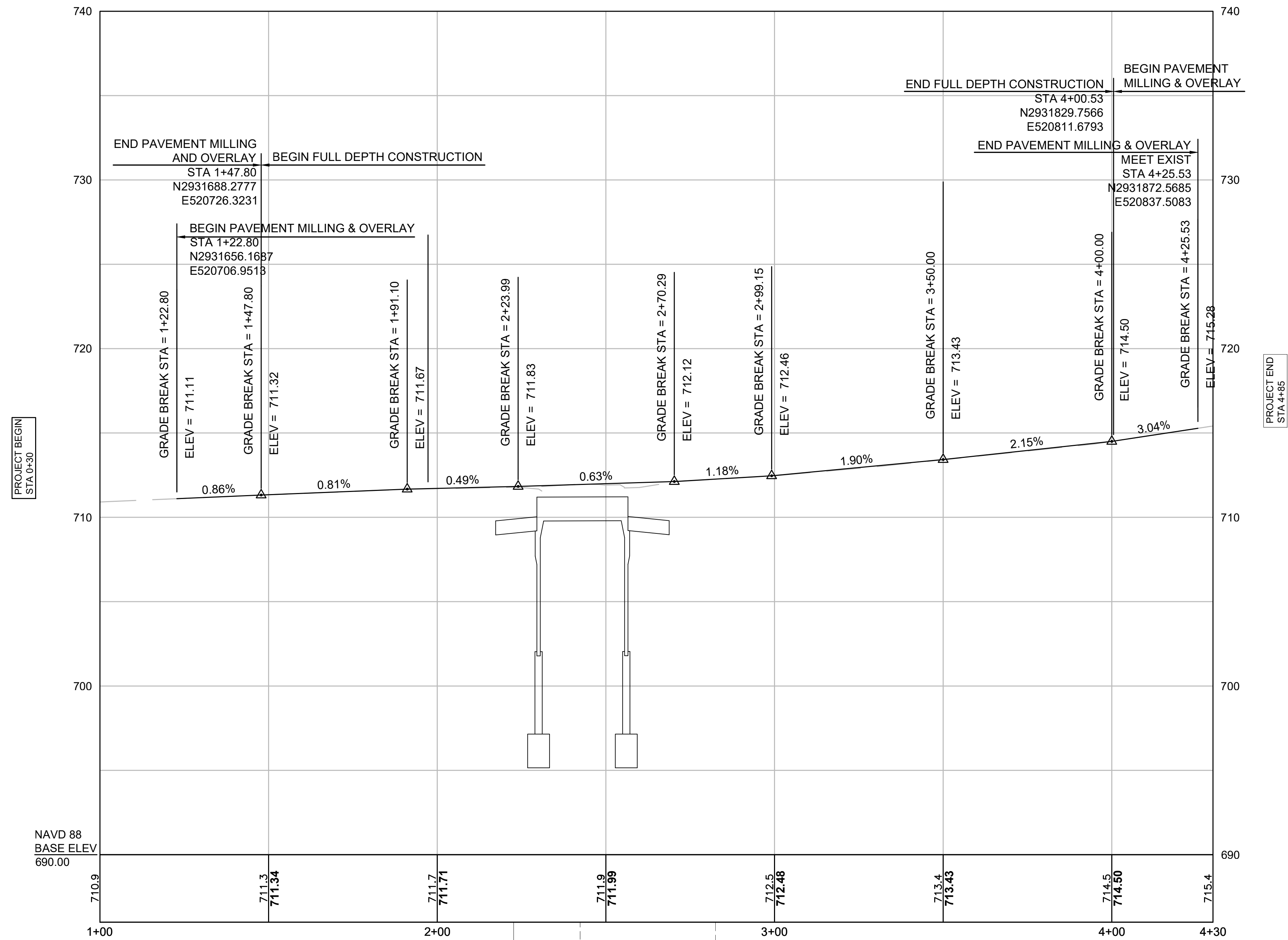
COLOR UTILITY PLAN



**SPENCER**  
**ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	7	46
PROJECT FILE NO.		609179	

**PROFILE - N SPENCER RD**



PROJECT BEGIN  
STA 0+30

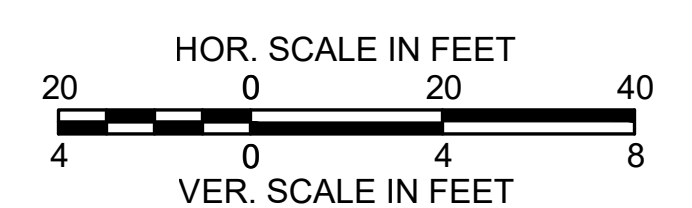
PROJECT END  
STA 4+85

NAVD 88  
BASE ELEV  
690.00

Benchmark  
Brass Rivet  
Elevation = 711.95  
Sta. 2+22.65, 19.82 RT

STA 2+42.37 N SPENCER RD @ =  
STA 300+49.32 SEVEN MILE RIVER @

STA 2+82.52 N SPENCER RD @ =  
STA 201+60 HASTINGS ROAD @

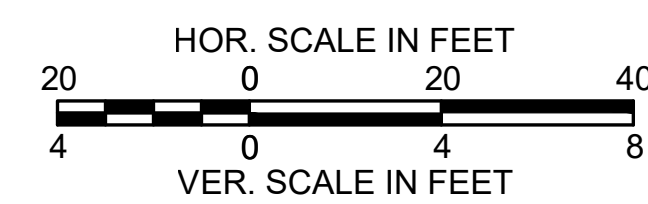
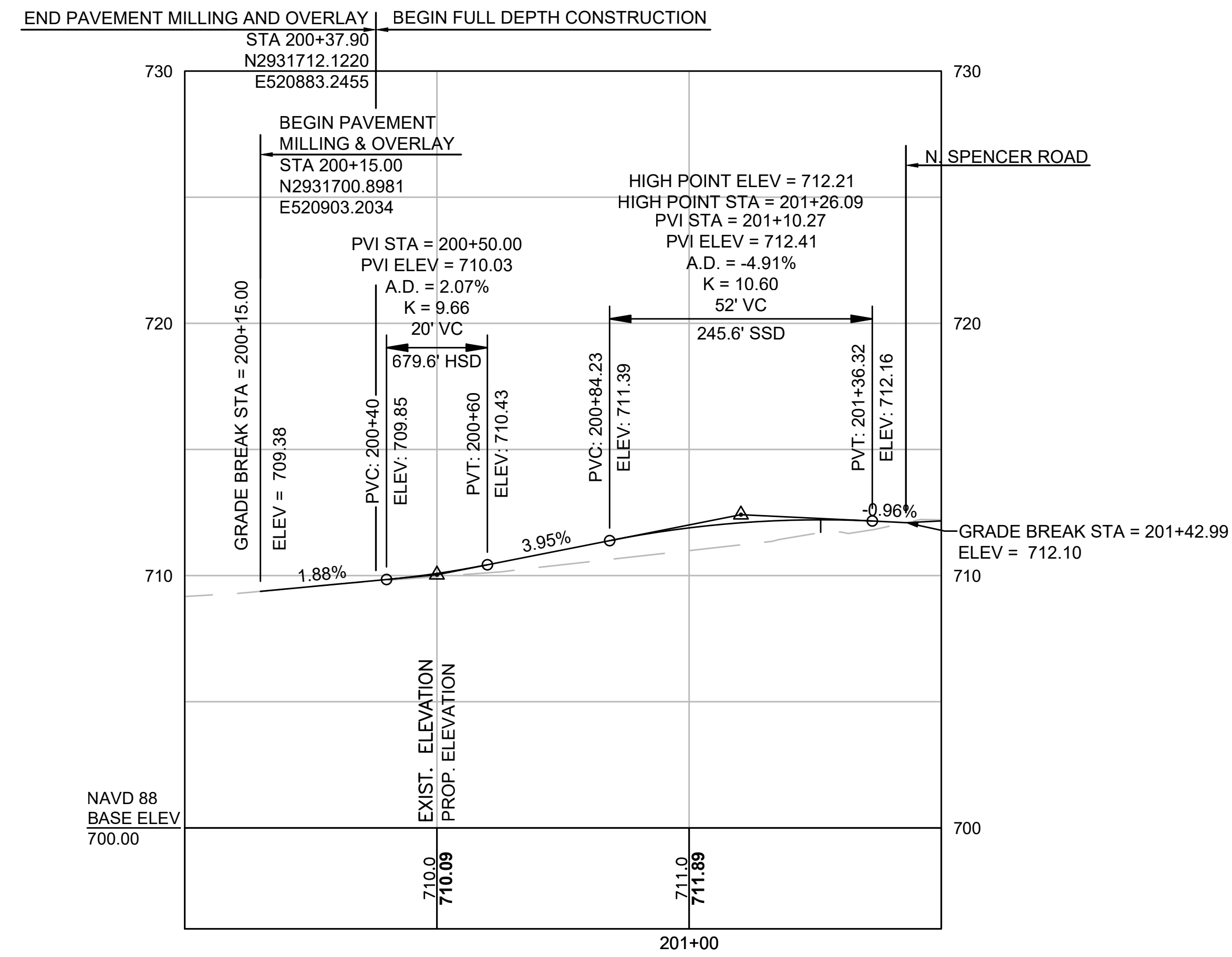


FOR CONSTRUCTION PLAN:  
SEE SHEET NO. 5

**SPENCER  
ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	8	46
PROJECT FILE NO.		609179	

**PROFILE - HASTINGS RD**



FOR CONSTRUCTION PLAN:  
SEE SHEET NO. 5

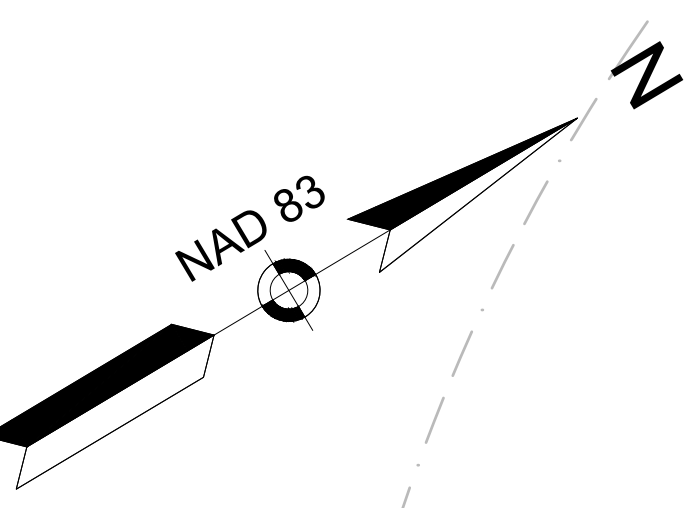
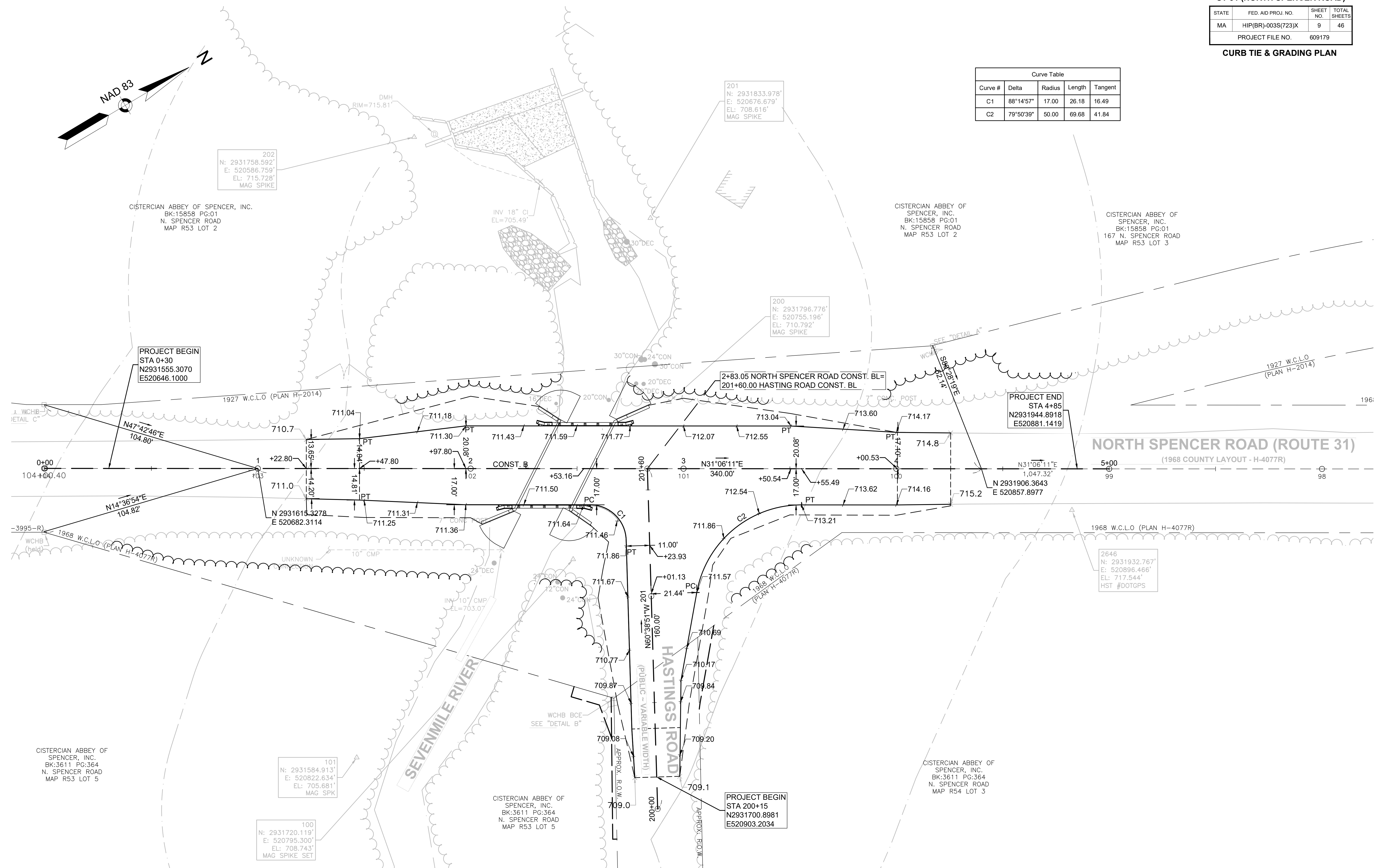


**SPENCER  
ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	9	46
PROJECT FILE NO.		609179	

**CURB TIE & GRADING PLAN**

Curve Table				
Curve #	Delta	Radius	Length	Tangent
C1	88°14'57"	17.00	26.18	16.49
C2	79°50'39"	50.00	69.68	41.84



CISTERCIAN ABBEY OF SPENCER, INC.  
BK:15858 PG:01  
N. SPENCER ROAD  
MAP R53 LOT 2

CISTERCIAN ABBEY OF SPENCER, INC.  
BK:15858 PG:01  
N. SPENCER ROAD  
MAP R53 LOT 2


CISTERCIAN ABBEY OF SPENCER, INC.  
BK:15858 PG:01  
167 N. SPENCER ROAD  
MAP R53 LOT 3

CISTERCIAN ABBEY OF SPENCER, INC.  
BK:3611 PG:364  
N. SPENCER ROAD  
MAP R53 LOT 5

CISTERCIAN ABBEY OF SPENCER, INC.  
BK:3611 PG:364  
N. SPENCER ROAD  
MAP R53 LOT 5

CISTERCIAN ABBEY OF SPENCER, INC.  
BK:3611 PG:364  
N. SPENCER ROAD  
MAP R54 LOT 3

# TRAFFIC SIGN SUMMARY

IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK-GROUND	LEGEND	BORDER			
R1-1	30	30		①	①	①	1	①	①	①	P5 (1)	6.25	6.25

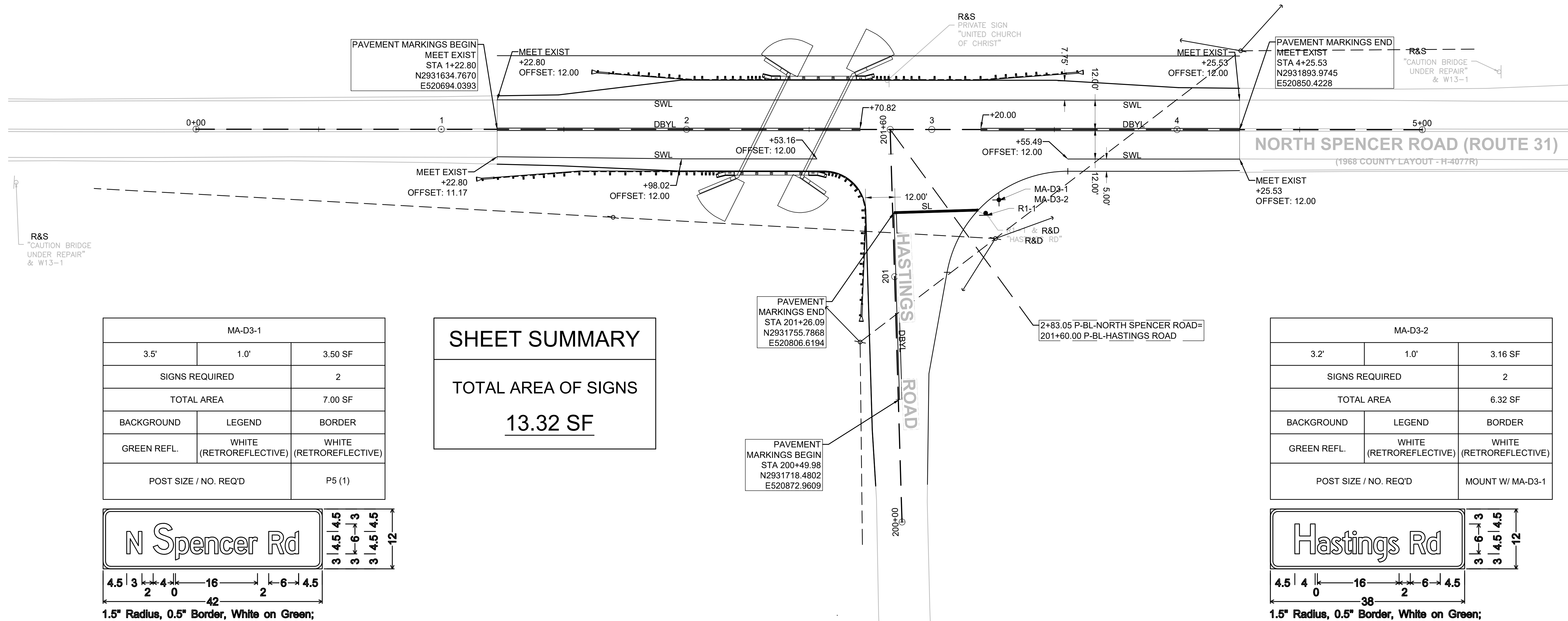
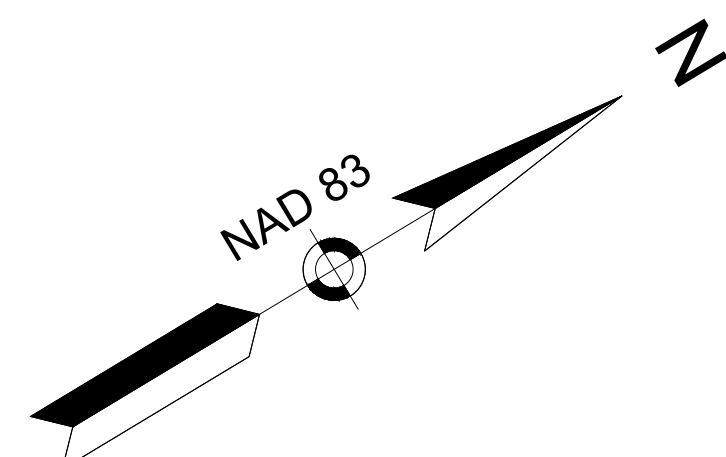
**GENERAL NOTES:**

- ALL PROPOSED PAVEMENT MARKINGS SHALL BE REFLECTORIZED POLYUREA RECESSED.

**SPENCER  
ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	10	46
PROJECT FILE NO.		609179	

**TRAFFIC SIGN & PAVEMENT MARKINGS**



MA-D3-1		
3.5'	1.0'	3.50 SF
SIGNS REQUIRED		2
TOTAL AREA		7.00 SF
BACKGROUND	LEGEND	BORDER
GREEN REFL.	WHITE (RETROREFLECTIVE)	WHITE (RETROREFLECTIVE)
POST SIZE / NO. REQ'D		P5 (1)

**SHEET SUMMARY**

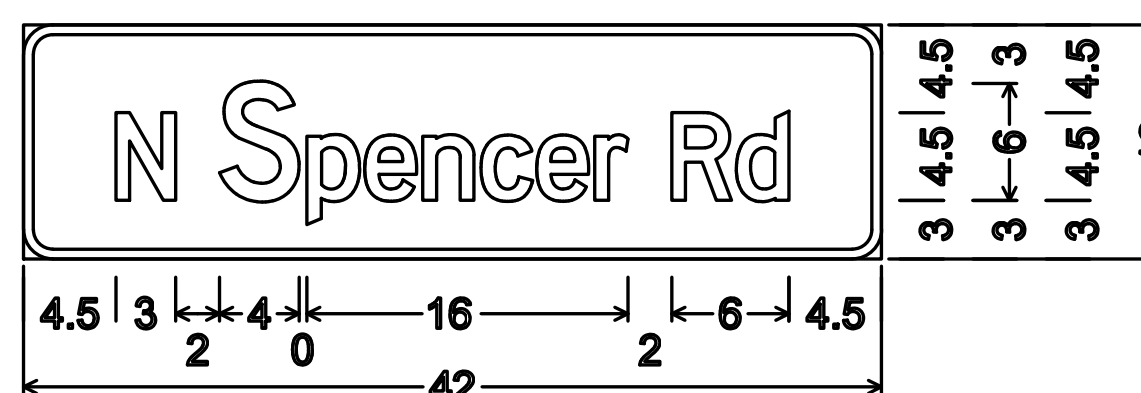
TOTAL AREA OF SIGNS

**13.32 SF**

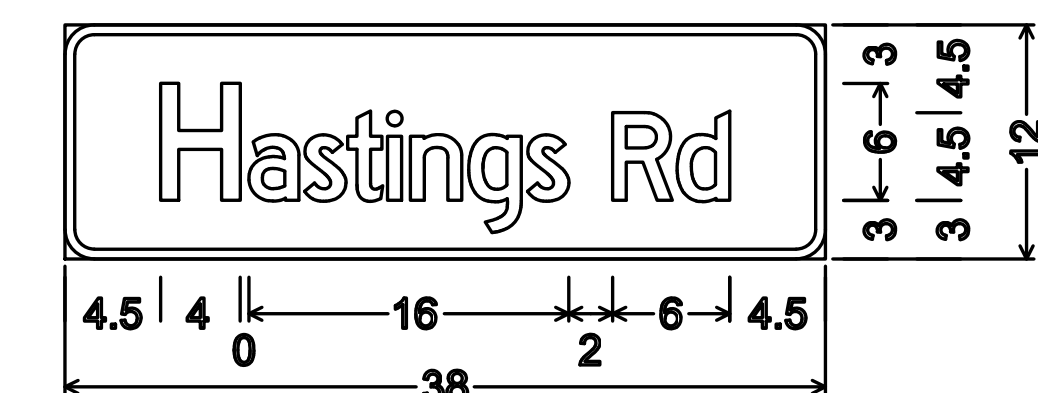
PAVEMENT MARKINGS END  
STA 201+26.09  
N2931755.7868  
E520806.6194

PAVEMENT MARKINGS BEGIN  
STA 200+49.98  
N2931718.4802  
E520872.9609

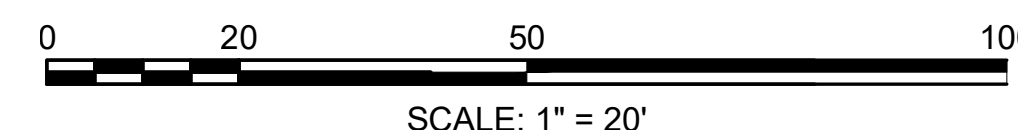
MA-D3-2		
3.2'	1.0'	3.16 SF
SIGNS REQUIRED		2
TOTAL AREA		6.32 SF
BACKGROUND	LEGEND	BORDER
GREEN REFL.	WHITE (RETROREFLECTIVE)	WHITE (RETROREFLECTIVE)
POST SIZE / NO. REQ'D		MOUNT W/ MA-D3-1



1.5" Radius, 0.5" Border, White on Green;  
"N Spencer Rd" D 2K 50% spacing;



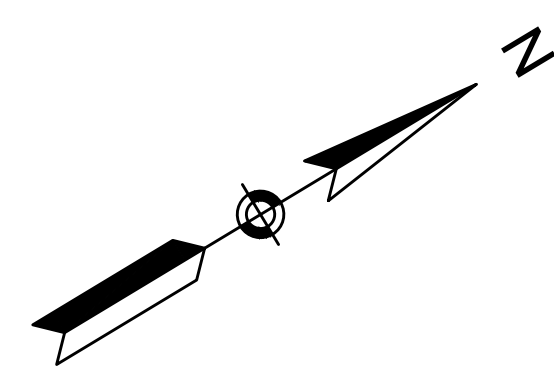
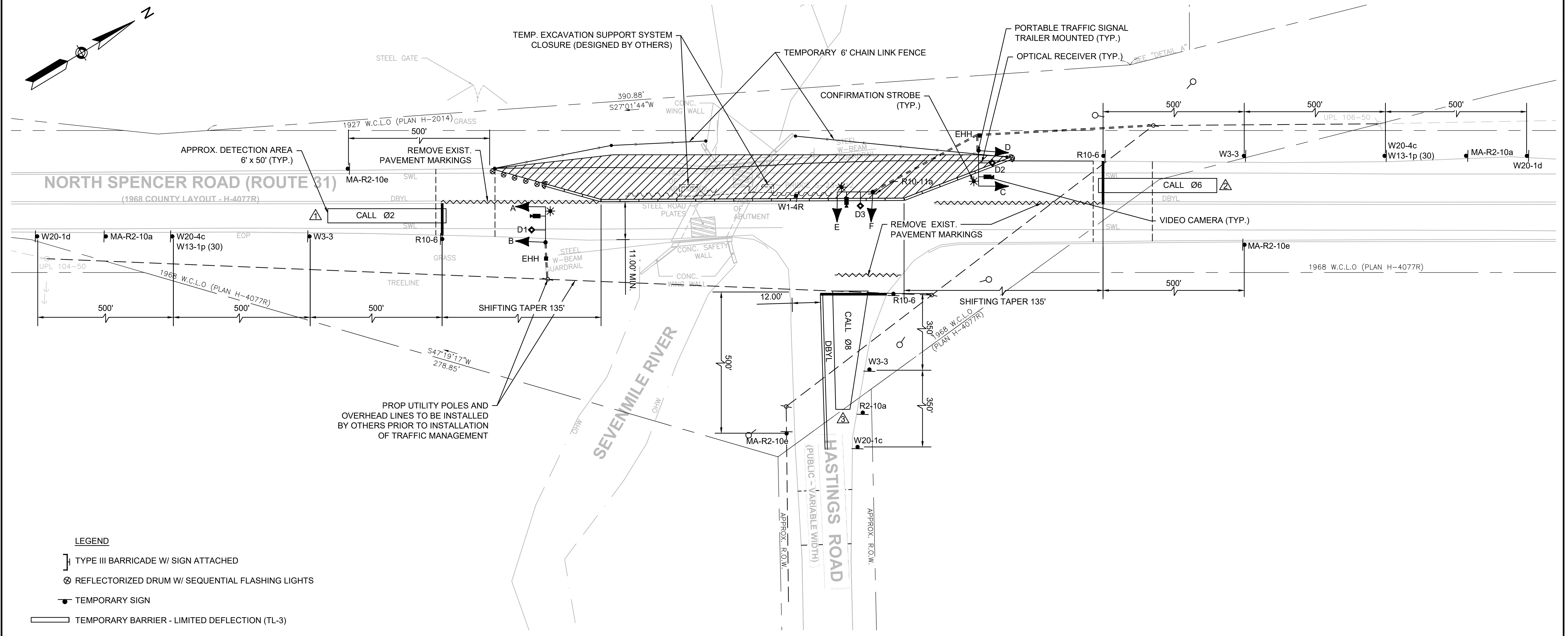
1.5" Radius, 0.5" Border, White on Green;  
"Hastings Rd" D 2K 50% spacing;



**SPENCER  
ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	11	46
PROJECT FILE NO.		609179	

**TTCP STAGE 1**



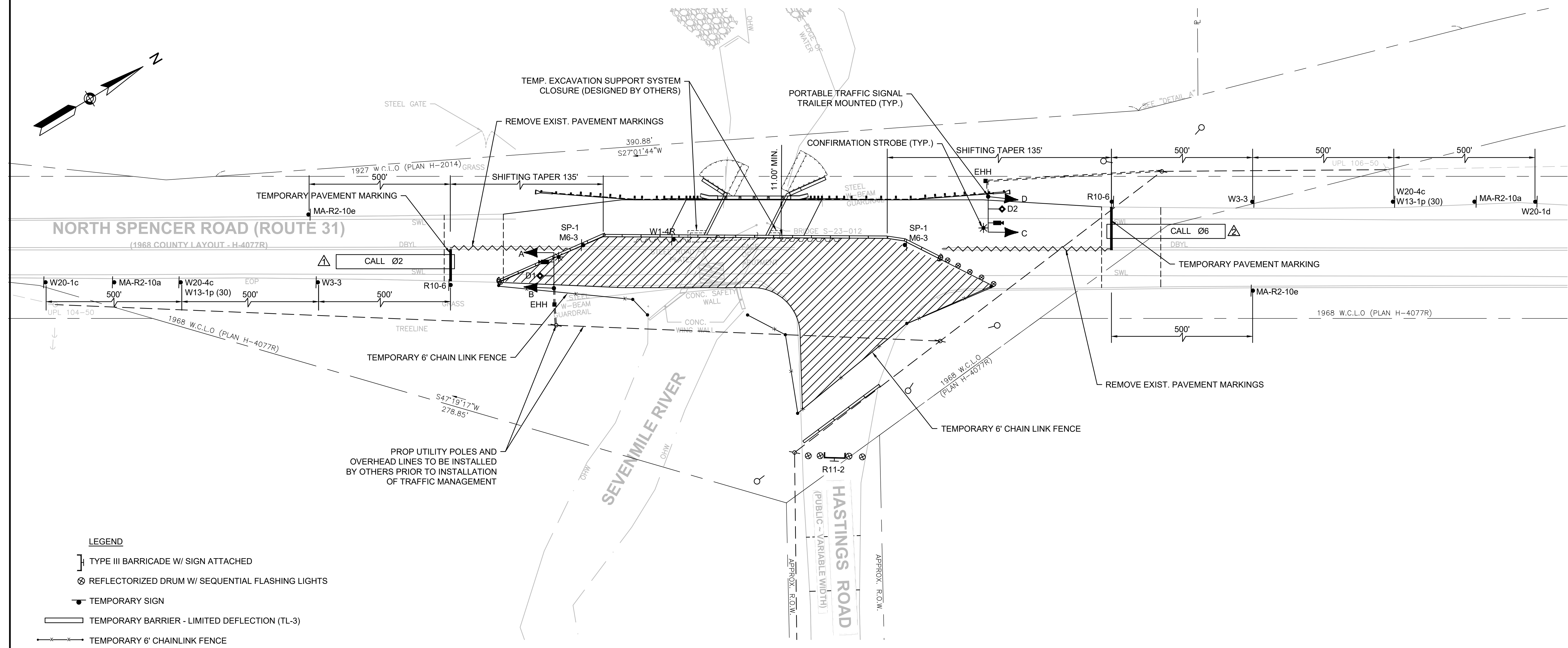
- LEGEND**
- [ ] TYPE III BARRICADE W/ SIGN ATTACHED
  - ⊗ REFLECTORIZED DRUM W/ SEQUENTIAL FLASHING LIGHTS
  - TEMPORARY SIGN
  - ▬ TEMPORARY BARRIER - LIMITED DEFLECTION (TL-3)
  - x-x- TEMPORARY 6' CHAINLINK FENCE
  - ▨ WORK ZONE
  - ← ● TEMPORARY TRAFFIC SIGNAL
  - ⊗ IMPACT ATTENUATER
  - ~ ~ ~ EXISTING PAVEMENT MARKINGS TO BE REMOVED & REPLACED

**STAGE I  
TEMPORARY TRAFFIC MANAGEMENT  
SCALE 1"=20'**

**SPENCER  
ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	12	46
PROJECT FILE NO.		609179	

**TTCP STAGE 2**

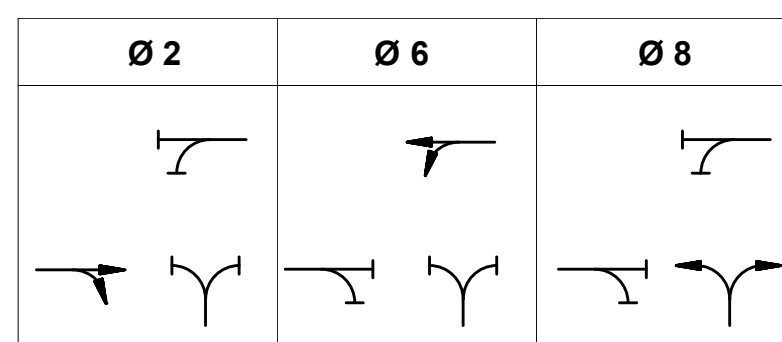


- LEGEND**
- TYPE III BARRICADE W/ SIGN ATTACHED
  - REFLECTORIZED DRUM W/ SEQUENTIAL FLASHING LIGHTS
  - TEMPORARY SIGN
  - TEMPORARY BARRIER - LIMITED DEFLECTION (TL-3)
  - TEMPORARY 6' CHAINLINK FENCE
  - WORK ZONE
  - TEMPORARY TRAFFIC SIGNAL
  - IMPACT ATTENUATER
  - EXISTING PAVEMENT MARKINGS TO BE REMOVED & REPLACED

**STAGE II  
TEMPORARY TRAFFIC MANAGEMENT  
SCALE 1"=20'**

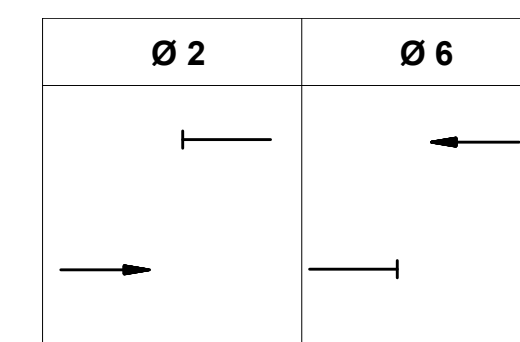
**TRAFFIC SIGNAL DATA**

**TEMPORARY TRAFFIC CONTROL  
PHASE I**



SEQUENCE AND TIMING FOR FULL ACTUATED CONTROL (ISOLATED)												
STREET	DIRECTION	HOUSINGS	1	2	3	4	5	6	7	8	9	FLASH OPER.
NORTH SPENCER ROAD (ROUTE 31)	NB	A, B	G	Y	R	R	R	R	R	R	R	FR
NORTH SPENCER ROAD (ROUTE 31)	SB	C, D	R	R	R	G	Y	R	R	R	R	FR
HASTINGS ROAD	WB	E, F	R	R	R	R	R	R	G	Y	R	FR
			<b>TIMING IN SECONDS</b>									
MINIMUM GREEN (INITIAL)			5			5			5			<b>EMERGENCY ONLY</b>
PASSAGE TIME (VEHICLE)			3			3			3			
MAXIMUM 1			15			15			10			
MAXIMUM 2												
YELLOW CLEARANCE				4			4			3		
RED CLEARANCE					7			7				
RECALL			MIN			MIN			OFF			
MEMORY			NON-LOCK			NON-LOCK			NON-LOCK			

**TEMPORARY TRAFFIC CONTROL  
PHASE II**



SEQUENCE AND TIMING FOR FULL ACTUATED CONTROL (ISOLATED)												
STREET	DIRECTION	HOUSINGS	1	2	3	4	5	6	7	8	9	FLASH OPER.
NORTH SPENCER ROAD (ROUTE 31)	NB	A, B	G	Y	R	R	R	R	R	R	R	FR
NORTH SPENCER ROAD (ROUTE 31)	SB	C, D	R	R	R	G	Y	R	R	R	R	FR
			<b>TIMING IN SECONDS</b>									
MINIMUM GREEN (INITIAL)			5			5						<b>EMERGENCY ONLY</b>
PASSAGE TIME (VEHICLE)			3			3						
MAXIMUM 1			15			15						
MAXIMUM 2												
YELLOW CLEARANCE				4			4					
RED CLEARANCE					7			7				
RECALL			MIN			MIN			MIN			
MEMORY			NON-LOCK			NON-LOCK			NON-LOCK			

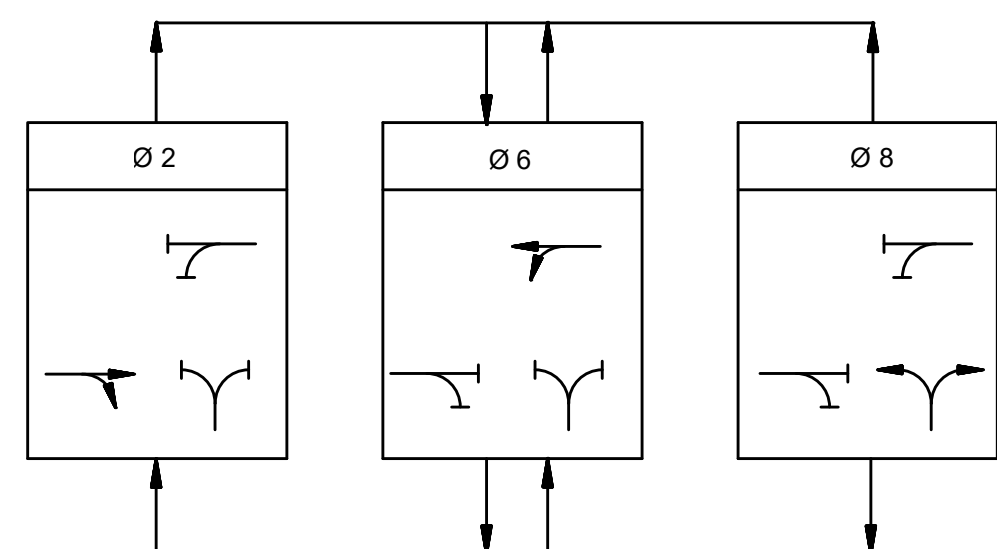
**TRAFFIC MANAGEMENT NOTES:**

- TWO PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) SHALL BE USED TO FOREWARN MOTORISTS OF IMPENDING BRIDGE REPAIRS. THE PCMS SHALL FACE NORTHBOUND AND SOUTHBOUND MOTORISTS TRAVELING ON NORTH SPENCER ROAD, LOCATED APPROXIMATELY 500 FEET FROM BRIDGE FOR A PERIOD OF 30 DAYS PRIOR TO BEGINNING OF WORK AND SHALL BE REMOVED ONCE WORK BEGINS.
- INSTALL AND/OR RELOCATE TEMPORARY SIGNS, DRUMS, CONES BARRIERS AND OTHER TRAFFIC MAINTENANCE DEVICES AS REQUIRED.
- ALL CONSTRUCTION SIGNING AND OTHER TRAFFIC MAINTENANCE DEVICES SHALL CONFORM WITH THE 2009 MUTCD AS AMENDED.
- REMOVE OR COVER ALL TEMPORARY SIGNS, DRUMS, CONES AND OTHER TRAFFIC MAINTENANCE DEVICES THAT ARE NOT REQUIRED ON THE COMPLETION OF THE WORK, EACH DAY.
- THE MATERIAL TO BE USED TO COVER SIGNS SHALL NOT IMPAIR THE REFLECTIVITY OF THE SIGN ONCE THE COVERING IS REMOVED.
- NO SIGNS SHALL BE ATTACHED TO DRUMS OR CONES. ALL TEMPORARY TRAFFIC CONTROL EQUIPMENT SHALL BE ATTACHED TO THEIR OWN INDEPENDENT SUPPORTS AND MEET NCHRP 350 STANDARDS AND/OR MASH.
- ALL TEMPORARY BARRIER SYSTEMS DEPLOYED ON THIS PROJECT SHALL MEET MASH REQUIREMENTS AND ARE INSTALLED AND MAINTAINED IN ACCORDANCE WITH ALL RELEVANT MASSDOT AND MANUFACTURERS REQUIREMENTS.
- NO SIGNS SHALL BE VISIBLE TO TRAFFIC THAT MAY CONFLICT WITH ACTUAL CONDITIONS.
- PAVEMENT MARKINGS NO LONGER APPLICABLE WHICH MIGHT CREATE CONFUSION SHALL BE OBLITERATED. TEMPORARY PAVEMENT MARKINGS SHALL BE USED AS NECESSARY AND SHALL BE IN PLACE BEFORE WORK IS COMPLETED EACH NIGHT.
- IF NECESSARY, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN AND/OR ADJUST TRAFFIC SIGNAL OPERATIONS WHILE CONSTRUCTION IS IN PROGRESS. THE CONTRACTOR SHALL OBTAIN THE WRITTEN APPROVAL OF THE ENGINEER PRIOR TO MAKING ADJUSTMENTS TO TRAFFIC SIGNAL OPERATIONS.
- THE MINIMUM RECOMMENDED LANE WIDTH SHALL BE 11'-0", USE WIDER LANES WHENEVER POSSIBLE.
- ALL DISTANCES MAY BE ADJUSTED TO FIT FIELD CONDITIONS, AS DIRECTED BY THE ENGINEER.
- ACCESS TO ABUTTERS SHALL REMAIN OPEN AT ALL TIMES. IF A SHORT TERM TEMPORARY CLOSURE OF ACCESS TO ABUTTERS BECOMES NECESSARY, THE CONTRACTOR SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE.

**EMERGENCY VEHICLE PREEMPTION OPERATION:**

- EMERGENCY VEHICLE PREEMPTION SHALL BE ACTUATED BY AN OPTICAL SIGNAL FROM AN OPTICAL EMITTER MOUNTED ON AN EMERGENCY VEHICLE AND RECEIVED BY AN OPTICAL DETECTOR LOCATED AT INTERSECTION. A SEPARATE RECEIVING DETECTOR IS REQUIRED FOR EACH DETECTED APPROACH.
- PREEMPTION SIGNALS FROM MULTIPLE APPROACHES SHALL BE SERVICED ON A FIRST DETECTED FIRST SERVED BASIS.
- IN RESPONSE TO A PREEMPTION SIGNAL RECEIVED AT AN INTERSECTION BY AN OPTICAL DETECTOR, THE CONTROLLER SHALL TIME THE CLEARANCE INTERVALS OF THE ACTIVE PHASE (IF DIFFERENT THAT TO BE SERVICED) AND ADVANCE TO AND/OR HOLD IN EMERGENCY VEHICLE PREEMPTION PHASE UNTIL PREEMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME CLEARANCES AND SIMILARLY SERVICE OTHER EMERGENCY VEHICLE PREEMPTION SEQUENCES IN THE ORDER RECEIVED (IF RECEIVED) OTHERWISE, RESUME NORMAL PREFERENTIAL PHASE SEQUENCE.
- PREEMPTION MINIMUM GREENS SHALL BE SIX SECONDS.
- NORMAL CLEARANCES SHALL BE PROVIDED ON PHASES THAT ARE TERMINATED BY PREEMPTION DEMAND.
- ACTUAL TIMING FOR PREEMPTION SHALL BE DETERMINED IN THE FIELD IN COORDINATION WITH THE FIRE DEPARTMENT AND SHALL BE APPROVED BY MHD PRIOR TO OPERATION.

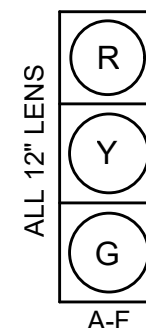
**PREFERENTIAL PHASING SEQUENCE**



DETECTOR DATA			
DET. NO.	APPROX. ZONE SIZE	CALL PHASE	OPERATION MODE
1	6' X 50'	Ø2	PRESENCE
2	6' X 50'	Ø6	PRESENCE
3	VARIABLES X 50'	Ø8	PRESENCE

**EMERGENCY PREEMPTION SCHEDULE**

DETECTOR & PRIORITY	VEHICULAR PHASE ASSIGNMENT	MOVEMENTS
D1	Ø2	→
D2	Ø6	←
D3	Ø8	↕



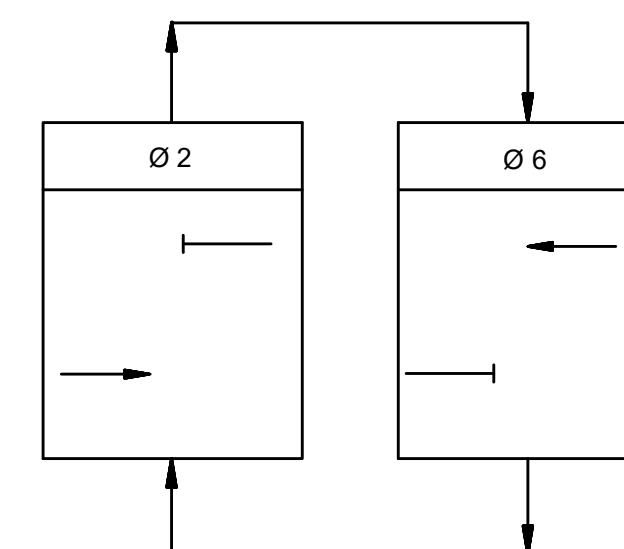
**NOTE:**  
ALL SIGNALS SHALL HAVE CUT AWAY VISORS.

**TEMPORARY TRAFFIC SIGNAL LIST OF ITEMS - STAGE 1**

QTY	ITEM DESCRIPTION
3 EA	PORTABLE TRAFFIC SIGNAL TRAILERS MOUNTED WITH SOLAR PANELS AND 2 SIGNAL HEADS PER TRAILER
3 EA	VIDEO DETECTION CAMERA (TYP.)
3 EA	OPTICAL RECEIVER (TYP.)
3 EA	EMERGENCY PREEMPTION CONFIRMATION STROBE (TYP.)
2 EA	ELECTRIC HANDHOLE 12"X24" (TYP.)
150 FT	TRAFFIC SIGNAL CONDUIT (TYP.)

\*NOTE: ALL ITEMS ASSOCIATED WITH THE TEMPORARY TRAFFIC SIGNALS SHALL BE INCIDENTAL TO ITEM 816.811 TEMPORARY TRAFFIC CONTROL SIGNAL.

**PREFERENTIAL PHASING SEQUENCE**



DETECTOR DATA			
DET. NO.	APPROX. ZONE SIZE	CALL PHASE	OPERATION MODE
1	6' X 50'	Ø2	PRESENCE
2	6' X 50'	Ø6	PRESENCE

**EMERGENCY PREEMPTION SCHEDULE**

DETECTOR & PRIORITY	VEHICULAR PHASE ASSIGNMENT	MOVEMENTS
D1	Ø2	→
D2	Ø6	←

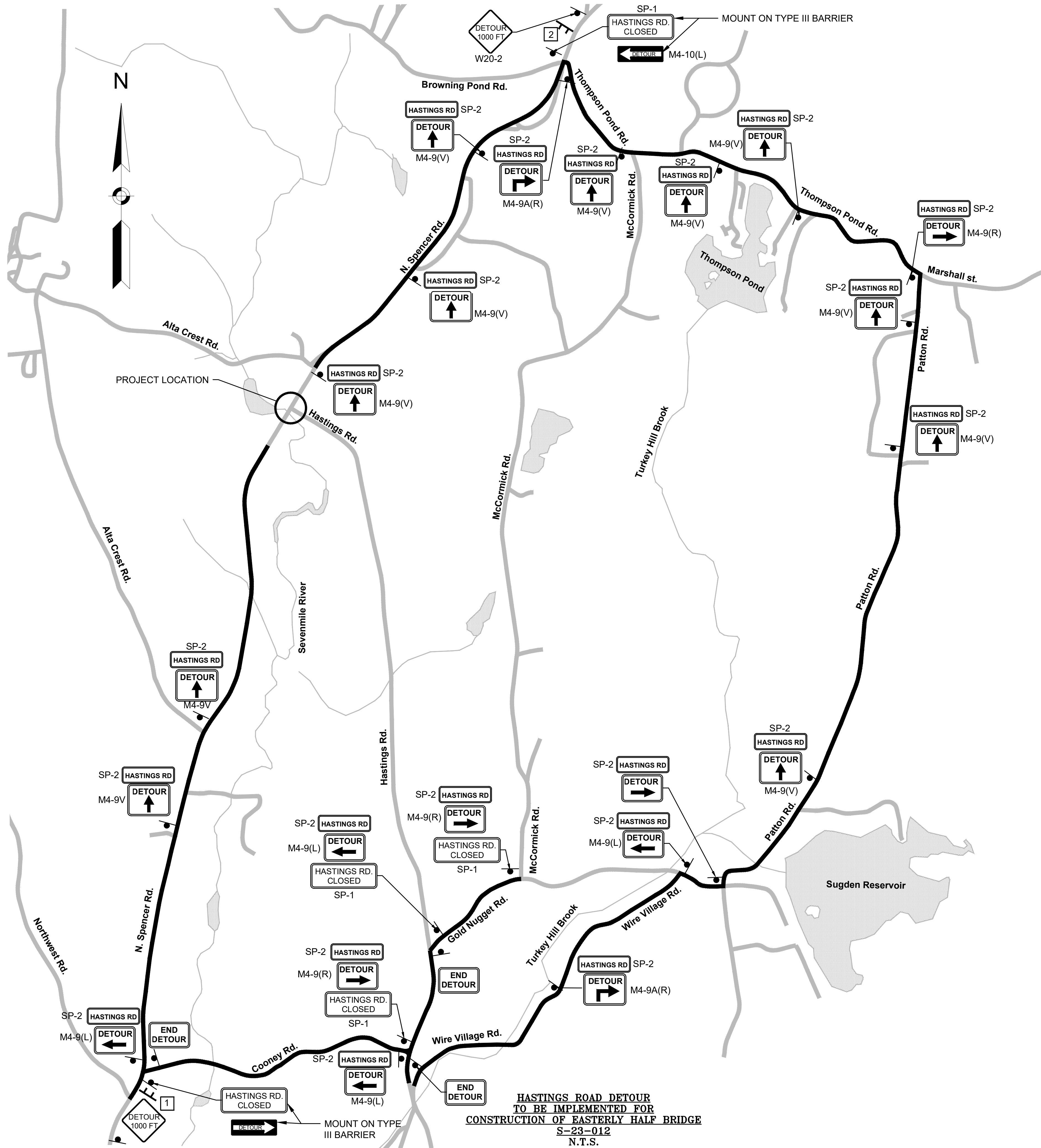


**NOTE:**  
ALL SIGNALS SHALL HAVE CUT AWAY VISORS.

**TEMPORARY TRAFFIC SIGNAL LIST OF ITEMS - STAGE 2**

QTY	ITEM DESCRIPTION
2 EA	PORTABLE TRAFFIC SIGNAL TRAILERS MOUNTED WITH SOLAR PANELS AND 2 SIGNAL HEADS PER TRAILER
2 EA	VIDEO DETECTION CAMERA (TYP.)
2 EA	OPTICAL RECEIVER (TYP.)
2 EA	EMERGENCY PREEMPTION CONFIRMATION STROBE (TYP.)
2 EA	ELECTRIC HANDHOLE 12"X24" (TYP.)
100 FT	TRAFFIC SIGNAL CONDUIT (TYP.)

\*NOTE: ALL ITEMS ASSOCIATED WITH THE TEMPORARY TRAFFIC SIGNALS SHALL BE INCIDENTAL TO ITEM 816.811 TEMPORARY TRAFFIC CONTROL SIGNAL INCLUDING THE REMOVAL OF TEMPORARY TRAFFIC SIGNAL ITEMS FROM STAGE 1.



**LEGEND**

- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- PROPOSED DETOUR ROUTE
- TEMPORARY SIGN

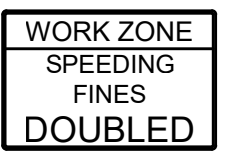

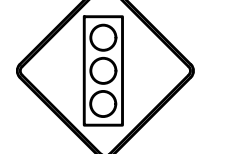

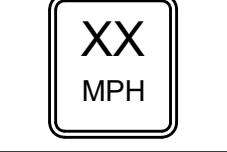

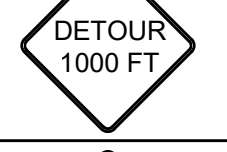


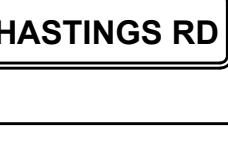
**NOTES:**

1. CMS [1] AND [2] TO BE PLACED AS SHOWN ON THIS SITE PLAN 30 DAYS IN ADVANCE OF CONSTRUCTION AND READ  
  

PAGE 1	PAGE 2
HASTINGS ROAD	STARTING MO / DAY/YR
CLOSED	
2. CMS [1] AND [2] CAN BE RELOCATED / REMOVED AFTER CLOSURE IN ADVANCE OF THE START OF THE DETOUR ROUTE.
3. ALL STREETS ALONG THE DETOUR ROUTE ARE PUBLIC. CONTRACTOR SHALL INSTALL ALL DETOUR SIGNS WITHIN THE RIGHT-OF-WAY LIMITS.




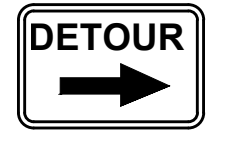

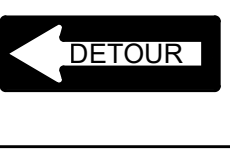
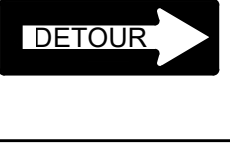

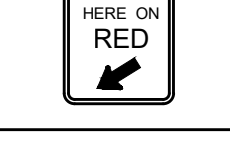
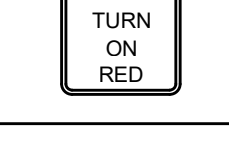
**HASTINGS ROAD DETOUR  
TO BE IMPLEMENTED FOR  
CONSTRUCTION OF EASTERLY HALF BRIDGE  
S-23-012  
N.T.S.**

**CONSTRUCTION SIGN SUMMARY**

IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK-GROUND	LEGEND	BORDER		
MA-R2-10a	48	36		②	②	②	4	FLUORESCENT ORANGE	BLACK	BLACK	12.0	48.0
MA-R2-10e	36	48		↓	↓	↓	4	FLUORESCENT ORANGE	BLACK	BLACK	12.0	48.0
W3-3	36	36		①	①	①	3	YELLOW REFLECTIVE	BLACK	BLACK	16.0	48.0
W1-4R	36	36					2	FLUORESCENT ORANGE	BLACK	BLACK	9.0	18.0
W13-1p (30)	24	30					2	YELLOW REFLECTIVE	BLACK	BLACK	5.0	10.0
W20-1d	48	48					4	FLUORESCENT ORANGE	BLACK	BLACK	16.0	48.0
W20-2	36	36					2	FLUORESCENT ORANGE	BLACK	BLACK	16.0	32.0
W20-4c	36	36					2	FLUORESCENT ORANGE	BLACK	BLACK	16.0	32.0
SP-1	60	30					7	FLUORESCENT ORANGE	BLACK	BLACK	12.5	87.5
SP-2	60	12		↓	↓	↓	18	FLUORESCENT ORANGE	BLACK	BLACK	5.0	90.0

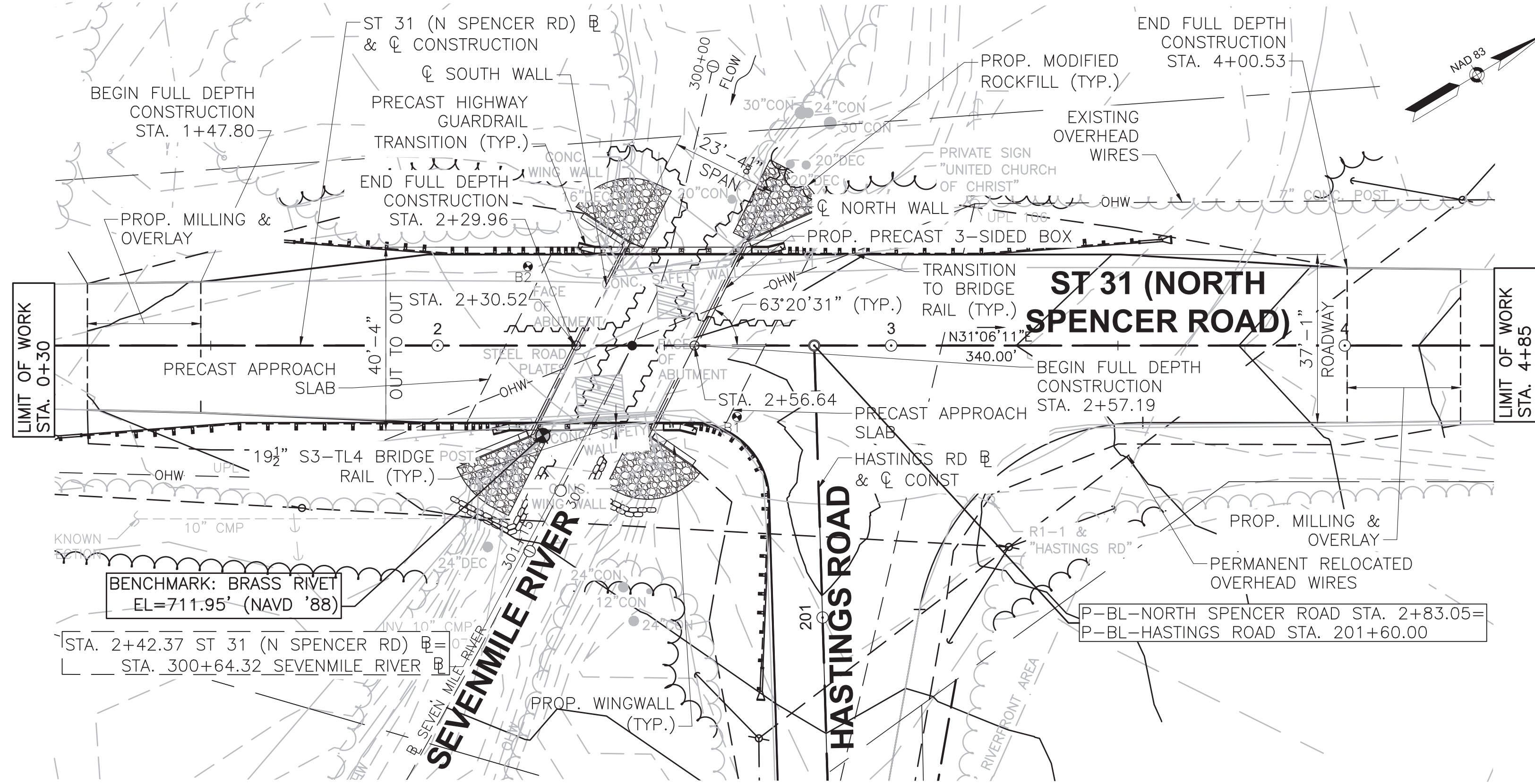
- ① SEE LATEST EDITION TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR SPECIFICATIONS ON TEXT DIMENSIONS AND COLOR (ALSO SEE SECTION M9.30.0 TYPE III MHD 2022 STANDARD SPECIFICATION).
- ② SEE MASSDOT STANDARD SIGNS DATED NOVEMBER 2016 FOR SPECIFICATIONS ON TEXT DIMENSIONS AND COLOR (A SUPPLEMENT TO FHWA'S STANDARD HIGHWAY SIGNS AND MARKINGS AND THE MASSACHUSETTS AMENDMENTS TO THE MUTCD)

**CONSTRUCTION SIGN SUMMARY**

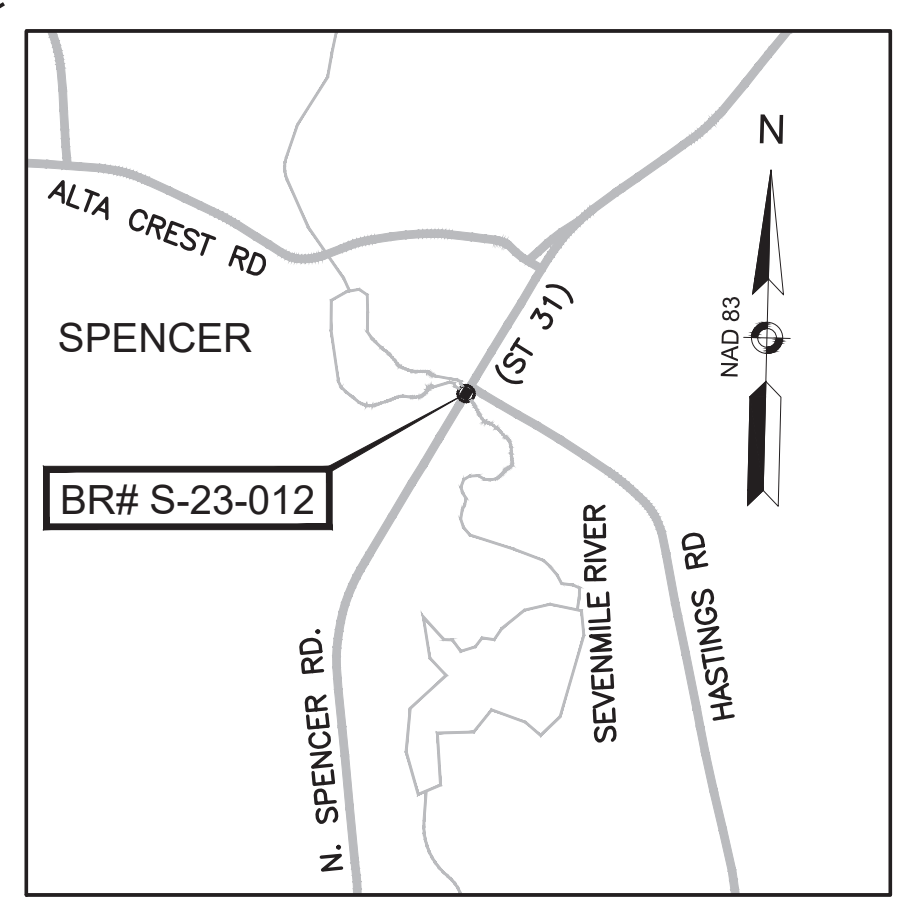
IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK-GROUND	LEGEND	BORDER		
M4-8a	24	18		①	①	①	3	FLUORESCENT ORANGE	BLACK	BLACK	3.0	9.0
M4-9A(R)	30	24					2	FLUORESCENT ORANGE	BLACK	BLACK	5.0	15.0
M4-9L	30	24					4	FLUORESCENT ORANGE	BLACK	BLACK	5.0	20.0
M4-9R	30	24					3	FLUORESCENT ORANGE	BLACK	BLACK	5.0	15.0
M4-9V	30	24					13	FLUORESCENT ORANGE	BLACK	BLACK	5.0	65.0
M4-10L	48	18					1	FLUORESCENT ORANGE	BLACK	BLACK	6.0	6.0
M4-10R	48	18					1	FLUORESCENT ORANGE	BLACK	BLACK	6.0	6.0
R11-2	48	30					1	FLUORESCENT ORANGE	BLACK	BLACK	10.0	10.0
R10-6	24	36					3	WHITE	BLACK	BLACK	6.0	18.0
R10-11a	30	36		↓	↓	↓	1	WHITE	BLACK	BLACK	5.0	5.0

- ① SEE LATEST EDITION TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR SPECIFICATIONS ON TEXT DIMENSIONS AND COLOR (ALSO SEE SECTION M9.30.0 TYPE III MHD 2022 STANDARD SPECIFICATION).
- ② SEE MASSDOT STANDARD SIGNS DATED NOVEMBER 2016 FOR SPECIFICATIONS ON TEXT DIMENSIONS AND COLOR (A SUPPLEMENT TO FHWA'S STANDARD HIGHWAY SIGNS AND MARKINGS AND THE MASSACHUSETTS AMENDMENTS TO THE MUTCD)

609179\_BR1(623012).DWG Plotted on 12-Mar-2024 1:23 PM



**KEY PLAN**  
SCALE: 1" = 20'



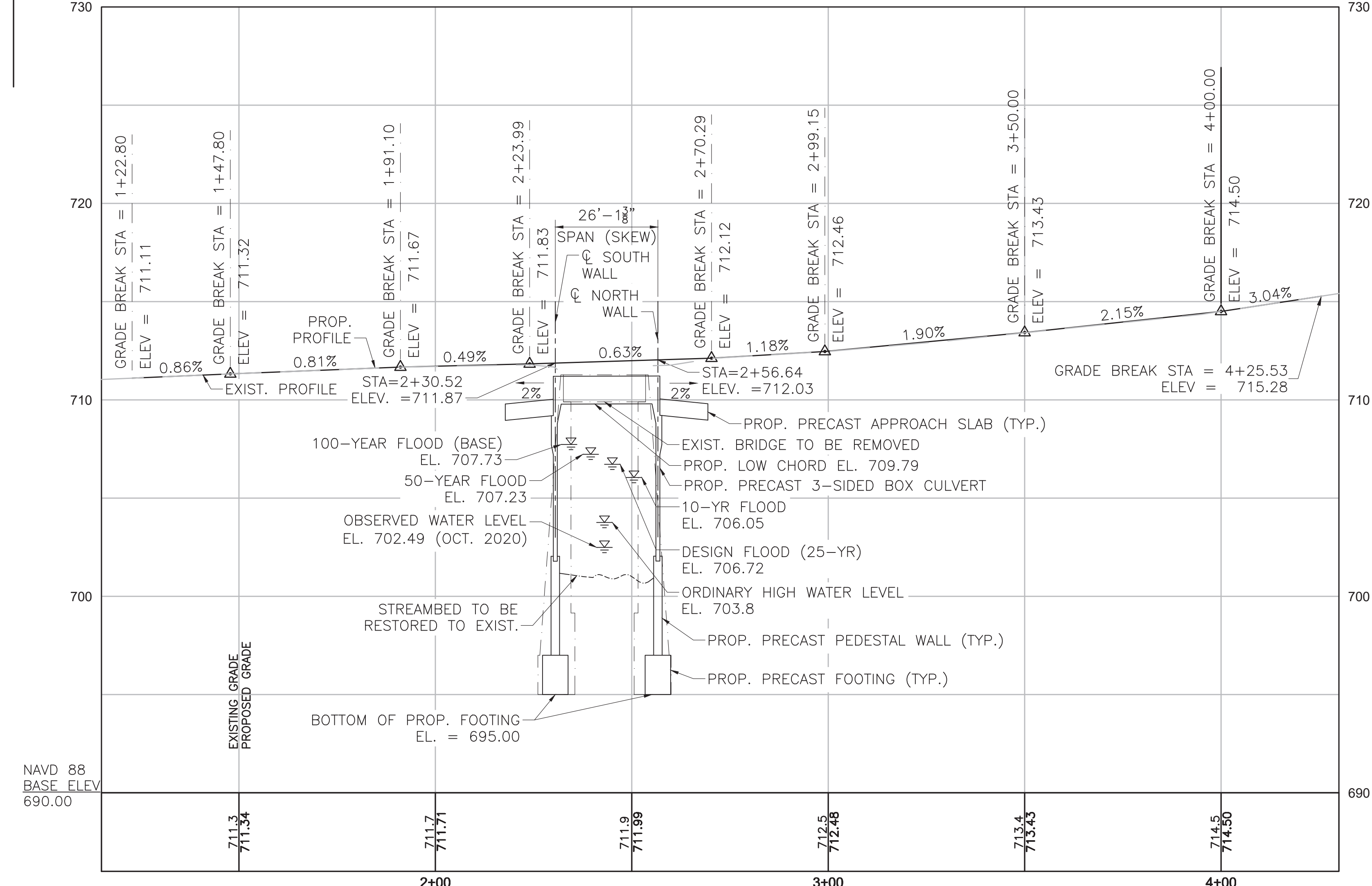
**LOCUS PLAN**  
SCALE: 1" = 1000'

**INDEX TO DRAWINGS**

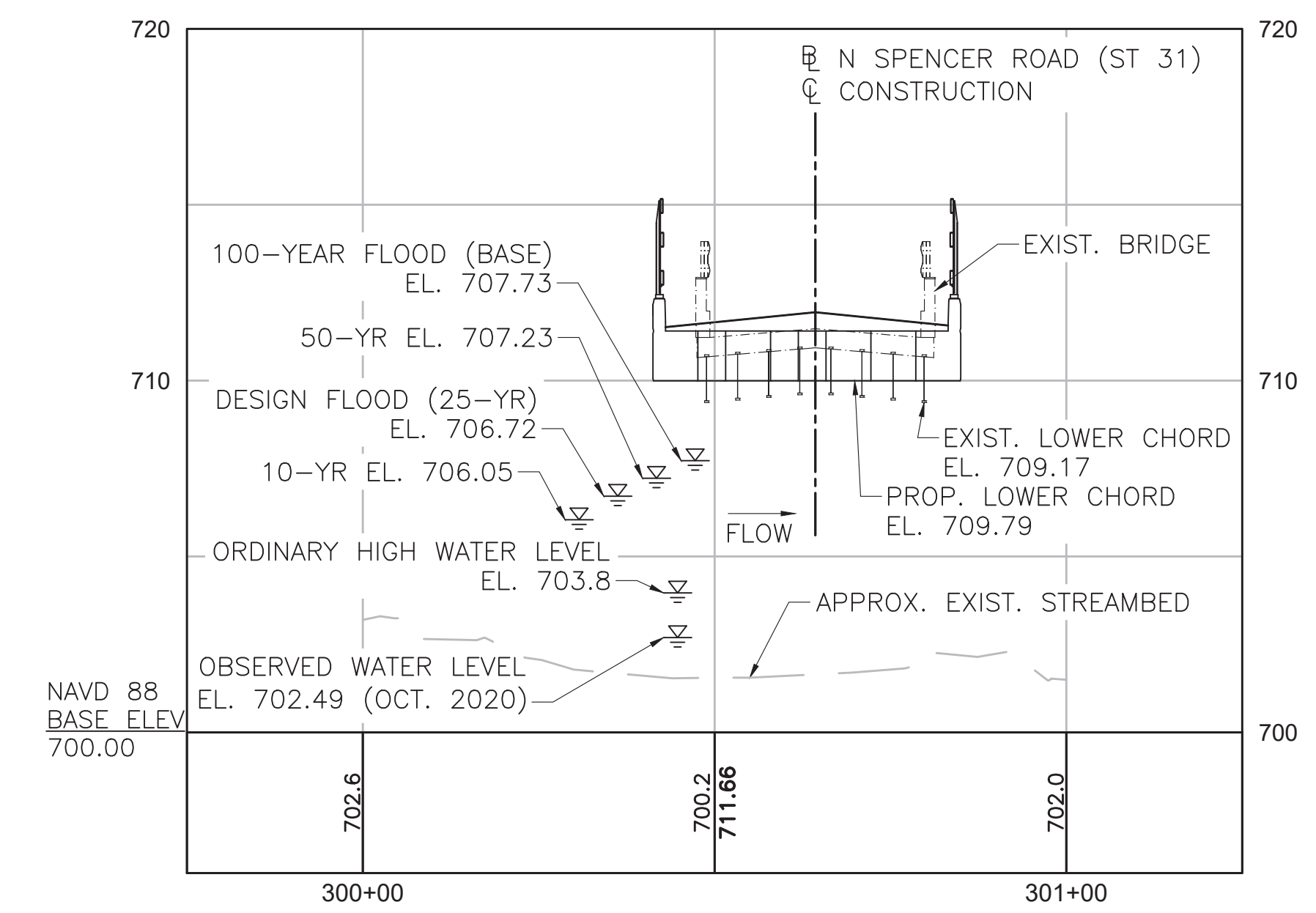
- 1 - KEY PLAN, PROFILES & LOCUS MAP
- 2 - GENERAL NOTES & ESTIMATED QUANTITIES
- 3 - BORING LOGS
- 4 - PLAN & ELEVATION
- 5 - STREAMBED RESTORATION PLAN
- 6 - STAGE I DEMOLITION
- 7 - STAGE I CONSTRUCTION
- 8 - STAGE II DEMOLITION
- 9 - STAGE II CONSTRUCTION
- 10 - FOOTING LAYOUT
- 11 - PRECAST FOOTING DETAILS I
- 12 - PRECAST FOOTING DETAILS II
- 13 - ABUTMENT PLAN & ELEVATION
- 14 - ABUTMENT & CHANNEL SECTIONS
- 15 - PRECAST PEDESTAL WALL DETAILS
- 16 - PRECAST WINGWALL ELEVATIONS
- 17 - PRECAST WINGWALL DETAILS
- 18 - PRECAST 3-SIDED BOX DETAILS
- 19 - PRECAST APPROACH SLAB DETAILS
- 20 - FRAMING PLAN & ROOF CROSS-SECTION
- 21 - PRECAST ERECTION & FABRICATION TOLERANCES
- 22 - PRECAST HIGHWAY GUARDRAIL TRANSITION I
- 23 - PRECAST HIGHWAY GUARDRAIL TRANSITION II
- 24 - BRIDGE RAIL
- 25 - STAGE I SUGGESTED ERECTION PROCEDURE
- 26 - STAGE II SUGGESTED ERECTION PROCEDURE

SPENCER			
ST 31 (NORTH SPENCER ROAD)			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	16	46
PROJECT FILE NO. 609179			

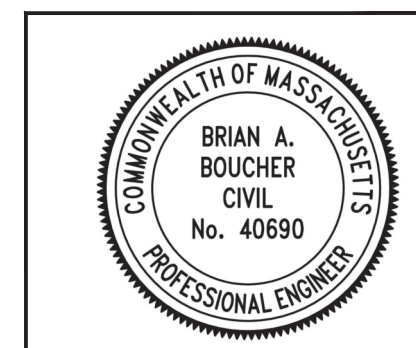
**KEY PLAN, PROFILES & LOCUS MAP**



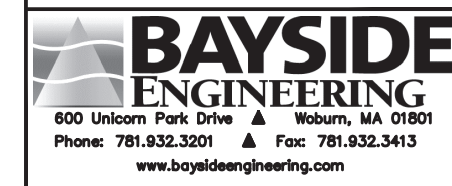
**PROFILE ALONG  $\phi$  OF CONSTRUCTION ST 31 NORTH SPENCER ROAD OVER SEVENMILE RIVER**  
SCALE: 1" = 20' HORIZONTAL  
1/4" = 1'-0" VERTICAL



**PROFILE SEVENMILE RIVER**  
SCALE: 1" = 20' HORIZONTAL  
1/4" = 1'-0" VERTICAL



Brian A. Boucher  
Digitally signed by Brian A. Boucher  
Date: 2024.04.15 08:17:20 -0400



APRIL 13, 2024 ISSUED FOR CONSTRUCTION

**massDOT**  
Highway Division

**PROPOSED BRIDGE**  
**SPENCER**  
ST 31 (NORTH SPENCER ROAD)  
OVER SEVENMILE RIVER

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION  
HIGHWAY DIVISION  
10 PARK PLAZA BOSTON, MASS

Alexander K. Bardow, P.E. Digitally signed by Alexander K. Bardow, P.E. Date: 2024.04.16 11:00:44 -0400  
John Bechard Digitally signed by John Bechard Date: 2024.04.16 12:07:16 -0400  
STATE BRIDGE ENGINEER CHIEF ENGINEER



**GENERAL NOTES:**

**DESIGN:**  
IN ACCORDANCE WITH THE 2020 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS LRFD BRIDGE DESIGN SPECIFICATIONS FOR HL-93 LOADING.

**EXISTING BRIDGE PLANS:**  
PLANS FOR THE EXISTING BRIDGE, DATED OCTOBER 1938, MAYBE SEEN AT THE OFFICE OF THE BRIDGE ENGINEER, MASSACHUSETTS HIGHWAY DEPARTMENT, 10 PARK PLAZA, BOSTON, MASSACHUSETTS.

**MASSDOT BENCH MARK:**  
THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT AND ELEVATIONS ARE BASED ON A BRASS RIVET WITH AN ELEVATION OF 711.95 LOCATED AT TOP OF THE SOUTHEAST WINGWALL.

**DATE:**  
TO BE PLACED ON THE INSIDE FACE OF THE SOUTHEASTERLY AND NORTHWESTERLY HIGHWAY GUARDRAIL TRANSITIONS. A SHEET SHOWING THE SIZE AND CHARACTER OF THE NUMERALS WILL BE FURNISHED. THE DATE USED SHALL BE THE LATEST YEAR OF THE CONTRACT COMPLETION AS OF THE DATE THE FIRST HIGHWAY GUARDRAIL TRANSITION IS CONSTRUCTED. BOTH HIGHWAY GUARDRAIL TRANSITIONS SHALL FEATURE THE SAME DATE.

**MASSDOT SURVEY NOTEBOOKS:**  
ELECTRONIC SURVEY WAS USED IN THE PREPARATION OF CONSTRUCTION DRAWINGS AND A COPY OF THE FILES MAY BE OBTAINED FROM MASSDOT.

**SCALES:**  
SCALES NOTED ON THE PLANS ARE NOT APPLICABLE TO REDUCED SIZE PRINTS. DIVIDE SCALES BY 2 FOR HALF-SIZED PRINTS (A3).

**FOUNDATIONS:**  
FOUNDATIONS MAY BE ALTERED, IF NECESSARY, TO SUIT CONDITIONS ENCOUNTERED DURING CONSTRUCTION, WITH THE APPROVAL OF THE ENGINEER.

**UNSUITABLE MATERIAL:**  
ALL UNSUITABLE MATERIAL SHALL BE REMOVED WITHIN THE LIMITS OF THE FOUNDATIONS OF THE STRUCTURE, AS DIRECTED BY THE ENGINEER.

**CONCRETE:**  
ALL CONCRETE SHALL BE 4000 PSI HP CEMENT CONCRETE, EXCEPT AS NOTED BELOW: SAFETY CURBS, C.I.P. SAFETY CURB EXTENSIONS, PRECAST HIGHWAY GUARDRAIL TRANSITIONS, THE PRECAST 3-SIDED BOX, THE PRECAST APPROACH SLAB SHELF, PRECAST PEDESTAL WALLS, AND PRECAST WINGWALL STEM SHALL BE 5000 PSI 3/4" 685 HP CEMENT.

**REINFORCEMENT:**  
REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 31 GRADE 60. UNLESS OTHERWISE NOTED ON THE CONSTRUCTION DRAWINGS, ALL BARS SHALL BE LAPPED AS FOLLOWS:

MODIFICATION CONDITION	#4 BARS	#5 BARS	#6 BARS
1. NONE	16"	19"	23"
2. 12" OF CONCRETE BELOW BAR	20"	25"	30"
3. COATED BARS, COVER <3d, OR CLEAR SPACING <6d	23"	29"	34"
4. COATED BARS, ALL OTHER CASES	18"	23"	27"
5. CONDITION 2. AND 3.	26"	32"	39"
6. CONDITION 2. AND 4.	24"	30"	36"

ALL OTHER BARS SHALL BE LAPPED AS SHOWN ON THE CONSTRUCTION DRAWINGS.

ALL REINFORCEMENT SHALL BE COATED.

**UTILITIES:**  
ALL EXISTING UTILITIES SHALL BE LOCATED AND PROTECTED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH UTILITY OWNERS TO RELOCATE OVERHEAD WIRES AND UTILITY POLES AS REQUIRED BY THE CONSTRUCTION.

**TRAFFIC:**  
THE BRIDGE WILL BE OPEN TO TRAFFIC DURING ALL PHASES OF DEMOLITION AND CONSTRUCTION. REFER TO THE TEMPORARY TRAFFIC CONTROL PLANS FOR THE ASSOCIATED DETOUR.

SPENCER			
ST 31 (NORTH SPENCER ROAD)			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	17	46
PROJECT FILE NO.		609179	

**GENERAL NOTES & ESTIMATED QUANTITIES**

TRAFFIC DATA		
	ROADWAY OVER	ROADWAY UNDER
DESIGN YEAR	2042	YEAR
AVERAGE DAILY TRAFFIC - PRESENT	5150	ADT
AVERAGE DAILY TRAFFIC - DESIGN YEAR	6535	ADT
DESIGN HOURLY VOLUME	502	DDHV
DIRECTIONAL DISTRIBUTION	50%	DIR
TRUCK PERCENTAGE - AVERAGE DAY	N/A	ADTT
TRUCK PERCENTAGE - PEAK HOUR	2%	PHTT
DESIGN SPEED	45 MPH	DES
DIRECTIONAL DESIGN HOURLY VOLUME	251	DDHV

SEISMIC DESIGN CRITERIA	
DESIGN RETURN PERIOD:	1000 YR
DESIGN SPECTRA	
As	0.098
SDs	0.214
SD1	0.091
SITE CLASS	D
SEISMIC DESIGN CATEGORY (SDC)	A

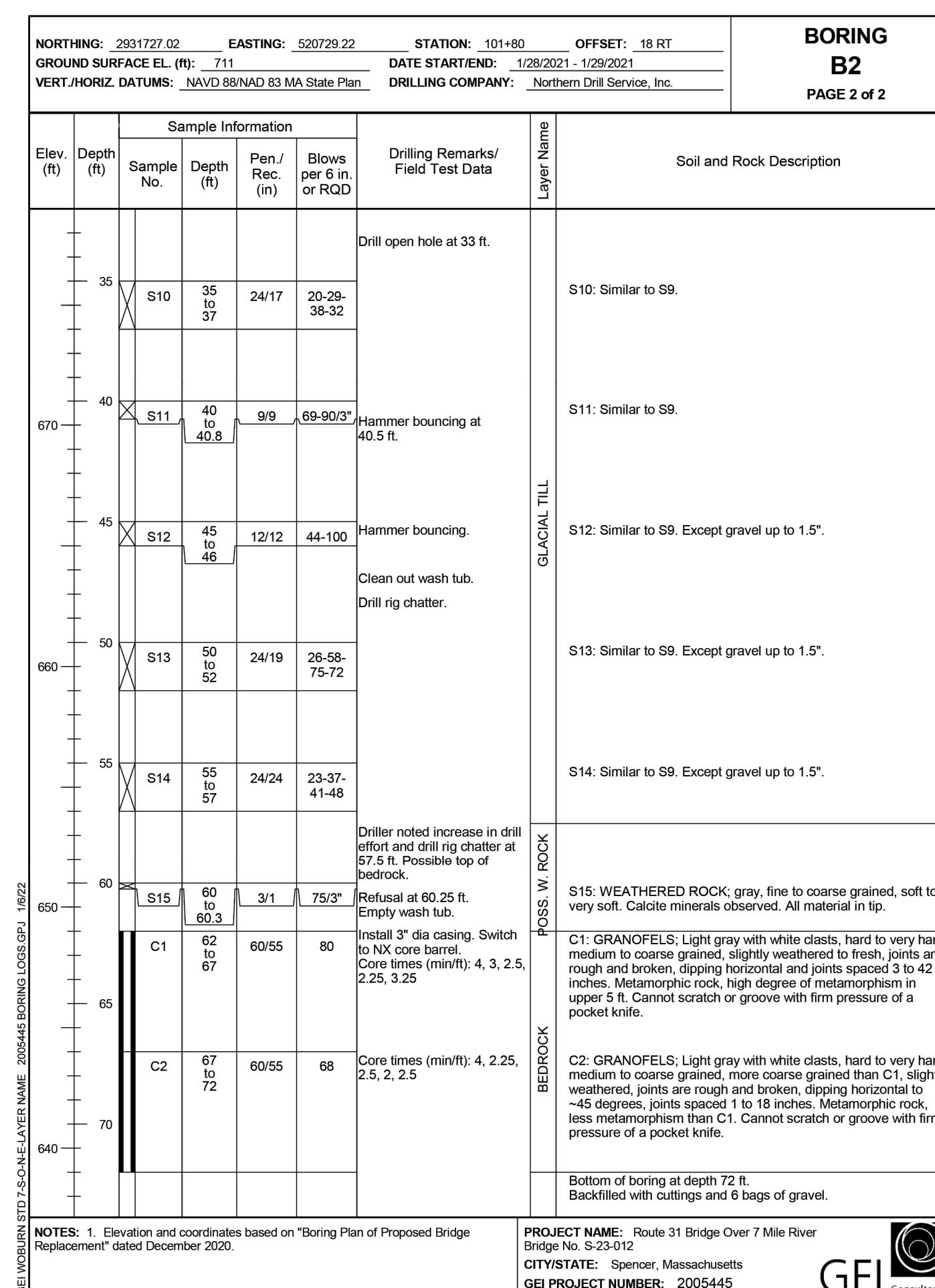
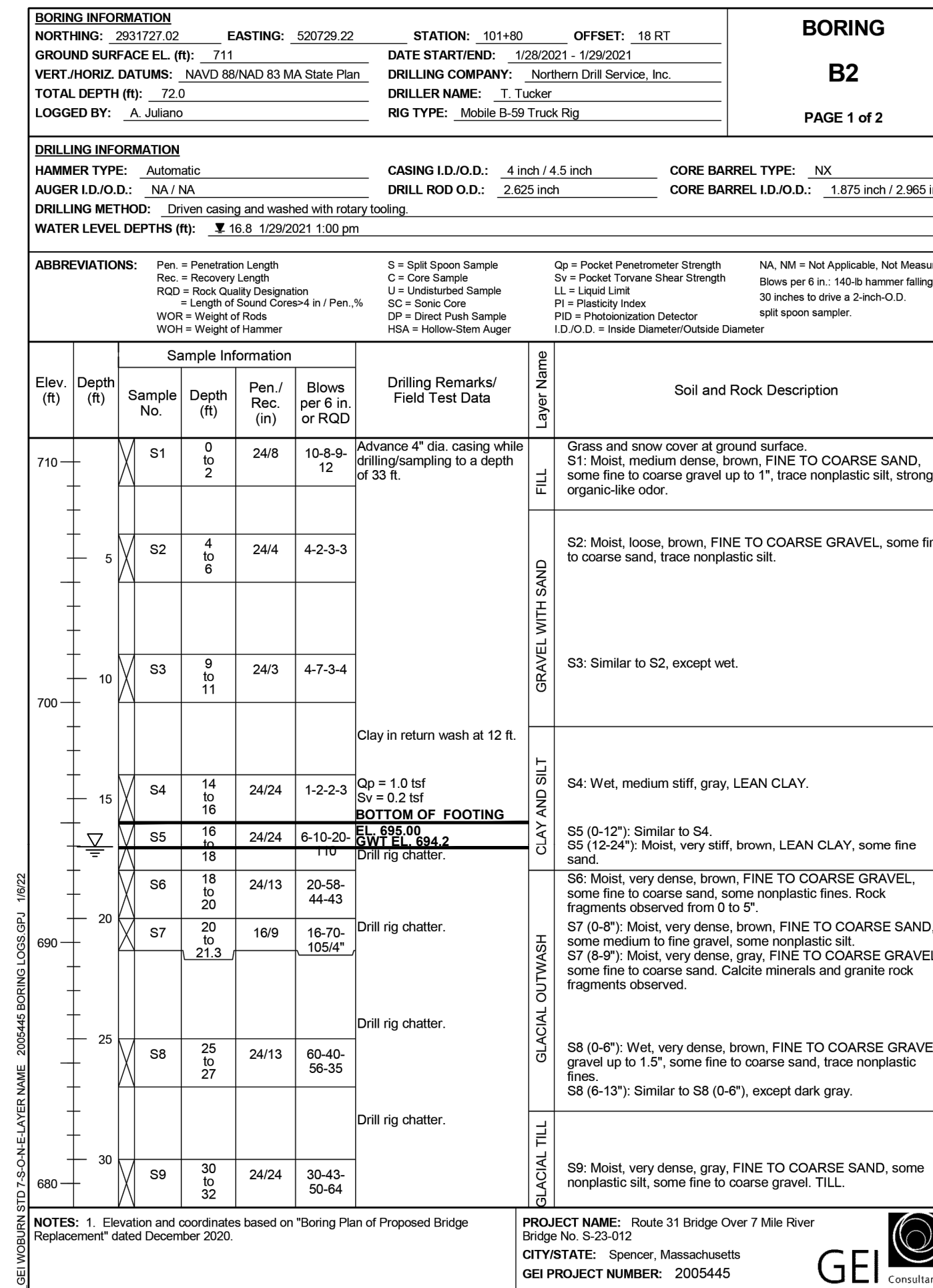
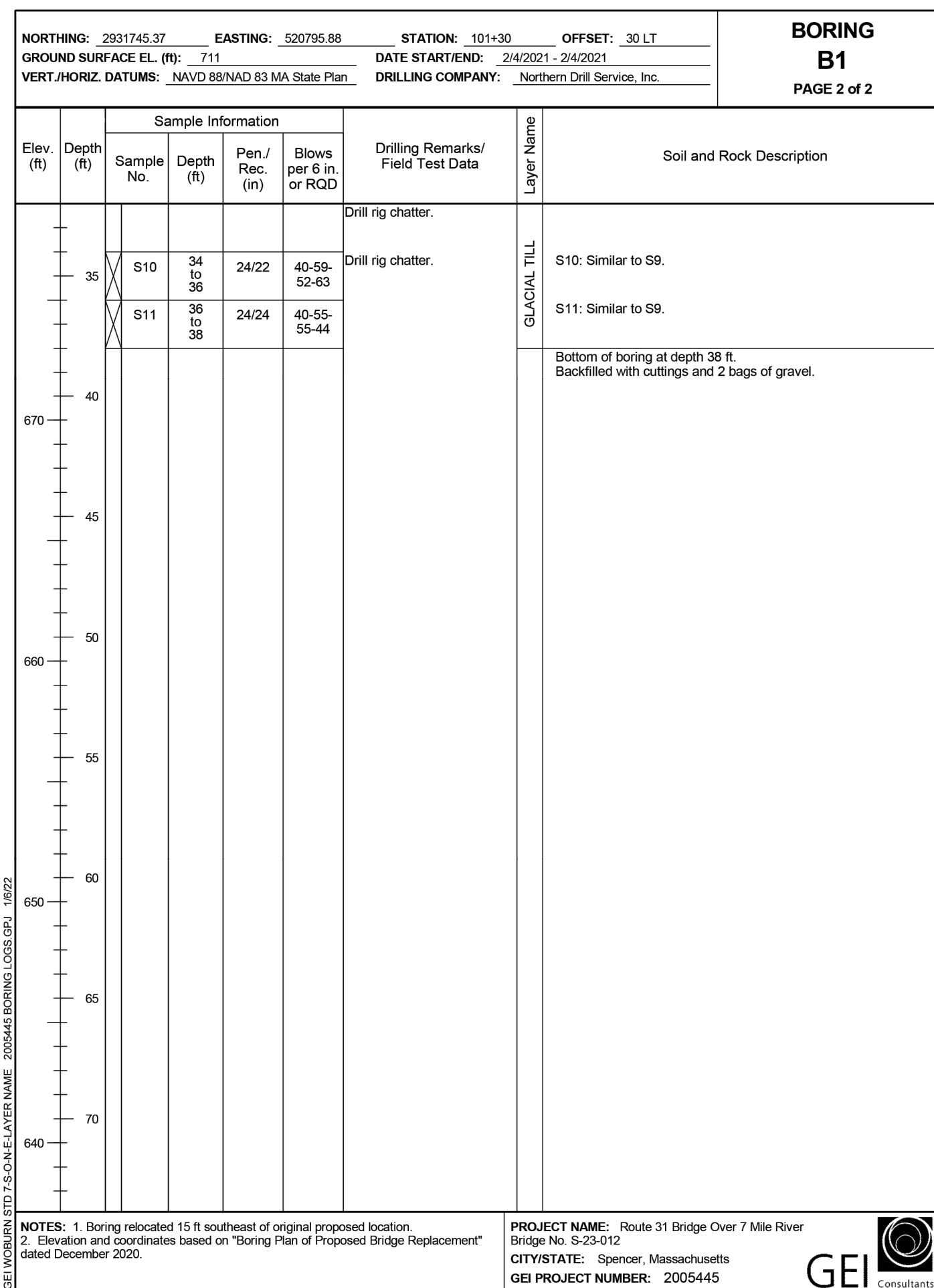
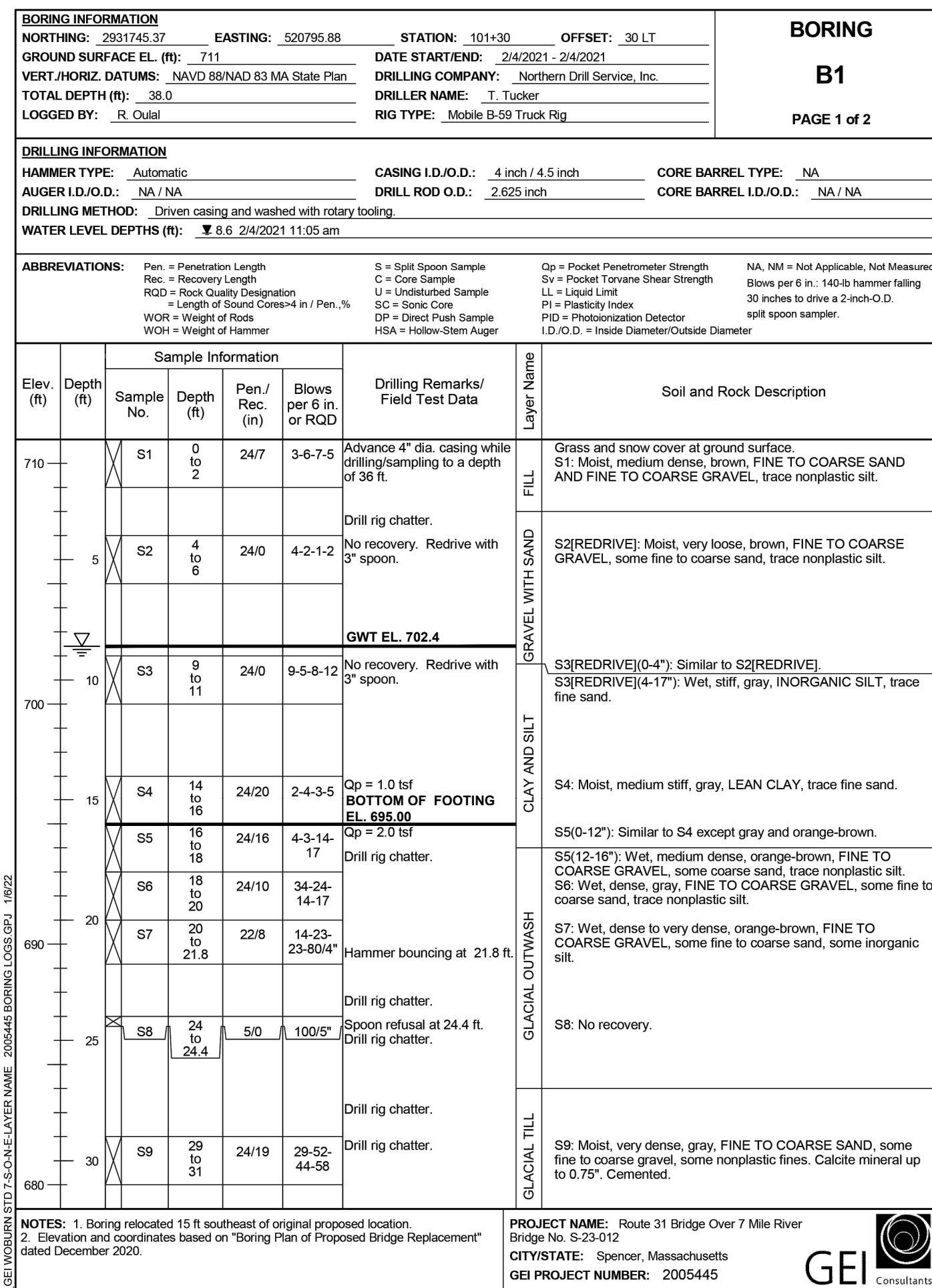
HYDRAULIC DESIGN DATA	
DRAINAGE AREA (SQ. MILES)	6.27
DESIGN FLOOD DISCHARGE (C.F.S.)	531
DESIGN FLOOD FREQUENCY (YEARS)	25
DESIGN FLOOD VELOCITY (F.P.S.)	4.32
DESIGN FLOOD ELEVATION (FEET, NAVD)	706.72
BASE (100-YEAR) FLOOD DATA	
BASE FLOOD DISCHARGE (C.F.S.)	840
BASE FLOOD ELEVATION (FEET, NAVD)	707.73
DESIGN AND CHECK SCOUR DATA	
DESIGN SCOUR FLOOD EVENT	50
RETURN FREQUENCY (YEARS)	
DESIGN FLOOD ABUTMENT SCOUR DEPTH (FEET)	0.82
DESIGN FLOOD PIER SCOUR DEPTH (FEET)	N/A
CHECK SCOUR FLOOD EVENT	100
RETURN FREQUENCY (YEARS)	
CHECK FLOOD ABUTMENT SCOUR DEPTH (FEET)	1.02
CHECK FLOOD PIER SCOUR DEPTH (FEET)	N/A
FLOOD OF RECORD	
DISCHARGE (C.F.S.)	N/A
FREQUENCY (IF KNOWN, YEARS)	N/A
MAXIMUM ELEVATION (FEET, NAVD)	N/A
DATE (MM/YYYY)	N/A
HISTORY OF ICE FLOES	NONE
EVIDENCE OF SCOUR AND EROSION	NONE

TEMPORARY WATER CONTROL DESIGN DATA	
DESIGN FLOOD DISCHARGE (C.F.S.)	166
DESIGN FLOOD FREQUENCY (YEARS)	2
DESIGN FLOOD VELOCITY (F.P.S.)	5.93
*DESIGN FLOOD ELEVATION (FEET, NAVD)	706.89

\*THIS IS THE RECOMMENDED TOP OF COFFERDAM ELEVATION

ESTIMATED QUANTITIES (NOT GUARANTEED)		
ITEM DESCRIPTION	QUANTITY	UNITS
DEMOLITION OF SUPERSTRUCTURE OF BRIDGE BR. NO. S-23-012 (IDE)	1	LS
CONCRETE EXCAVATION	400	CY
BRIDGE EXCAVATION	840	CY
CLASS B ROCK EXCAVATION	85	CY
GRAVEL BORROW FOR BRIDGE FOUNDATIONS	40	CY
GRAVEL BORROW FOR BACKFILLING STRUCTURES & PIPES	560	CY
CRUSHED STONE FOR BRIDGE FOUNDATIONS	235	TON
CRUSHED STONE FOR FILTER BLANKET	45	CY
SUPERPAVE BRIDGE SURFACE COURSE-9.5 POLYMER (SSC-B-9.5-P)	11	TON
SUPERPAVE BRIDGE PROTECTIVE COURSE-9.5 POLYMER (SPC-B-9.5-P)	25	TON
GEOTEXTILE FABRIC FOR SEPARATION	190	SY
GEOTEXTILE FABRIC FOR PERMANENT EROSION CONTROL	130	SY
MUSSEL TRANSLOCATION	1	LS
TEMPORARY BARRIER - LIMITED DEFLECTION (TL-3)	230	FT
TEMPORARY BARRIER REMOVED AND RESET	230	FT
MODIFIED ROCKFILL	160	TON
STREAMBED MATERIAL REMOVED AND RELAID	45	CY
NATURAL STREAMBED MATERIAL	25	CY
TEMPORARY EXCAVATION SUPPORT - BR NO. S-23-012 (CCL)	1	LS
CONTROL OF WATER - STRUCTURE NO. S-23-012 (CCL)	1	LS
TEMPORARY PROTECTIVE SHIELDING, BRIDGE NO. S-23-012 (CCL)	1	LS
BRIDGE STRUCTURE, BRIDGE NO. S-23-012 (CCL)	1	LS

APRIL 13, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	



**SPENCER  
ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	18	46
PROJECT FILE NO.		609179	

**BORING LOGS**

**NOTES:**

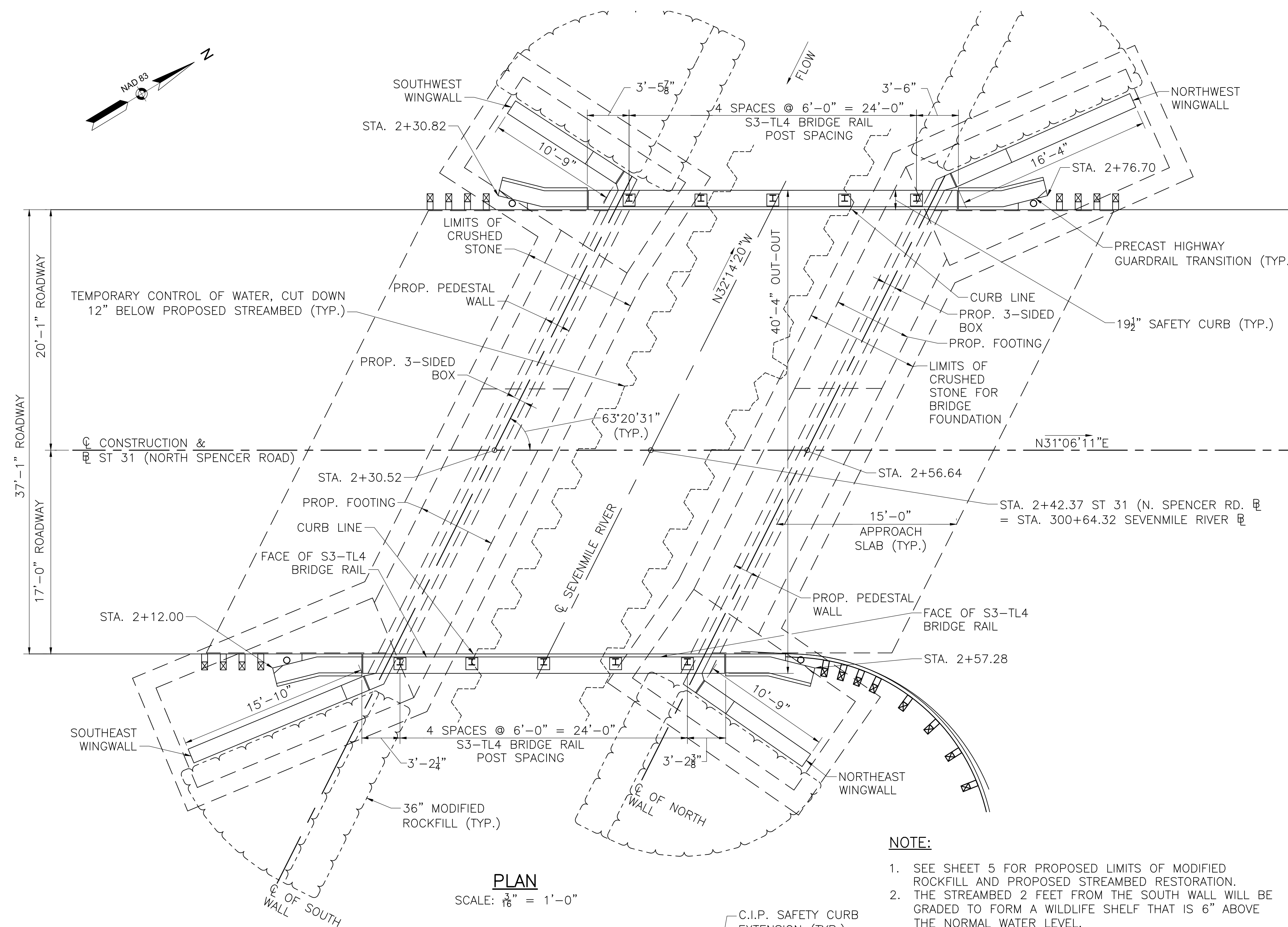
- LOCATION OF BORINGS SHOWN ON THE PLANS THUS:
- BORINGS ARE TAKEN FOR PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF THE MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.
- WATER LEVELS SHOWN ON THE BORING LOGS WERE OBSERVED AT THE TIME OF TAKING BORINGS AND DO NOT NECESSARILY SHOW THE TRUE GROUND WATER LEVEL.
- FIGURES IN COLUMNS INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE A 1 3/8" I.D. SPLIT SPOON SAMPLER 12" USING A 140 POUND WEIGHT FALLING 30".
- ALL BORINGS WERE MADE IN JANUARY AND FEBRUARY 2021.
- BORINGS WERE MADE BY NORTHERN DRILL SERVICE, INC., NORTHBOROUGH, MASSACHUSETTS. BORING SAMPLES ARE NO LONGER AVAILABLE.
- THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.

APRIL 13, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

**SPENCER  
ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	19	46
PROJECT FILE NO.		609179	

**PLAN & ELEVATION**

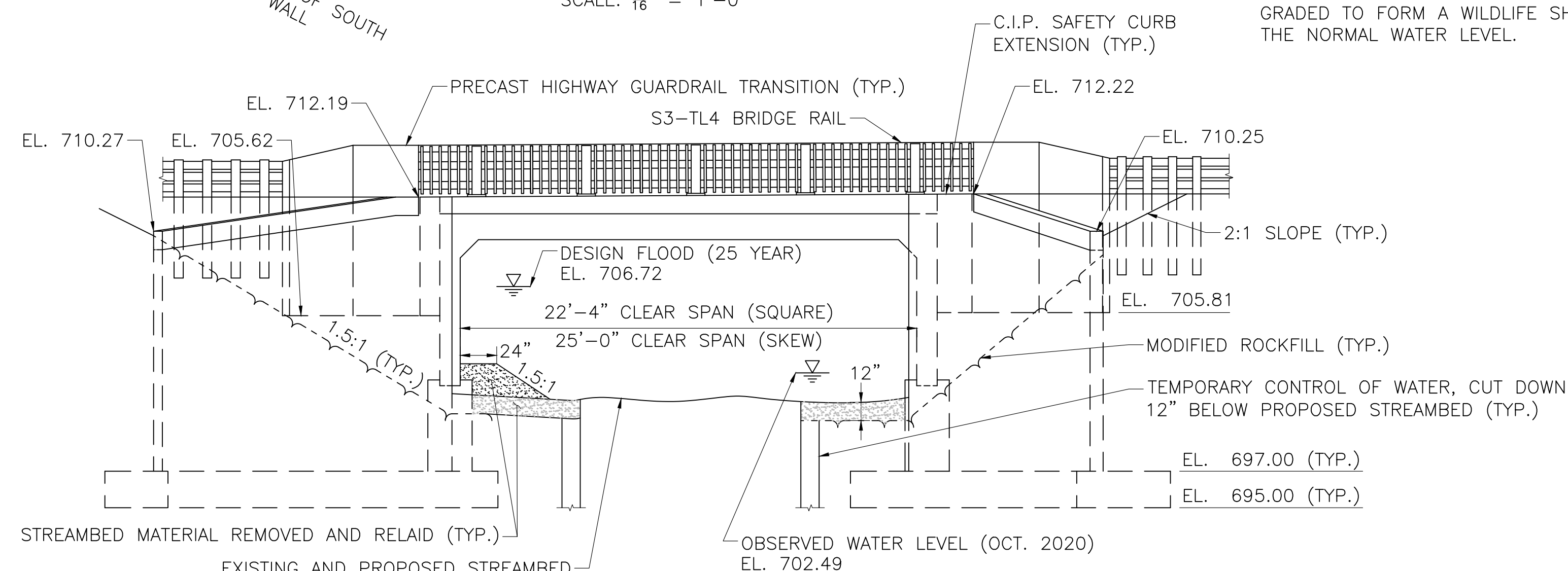


**PLAN**

SCALE:  $\frac{3}{16}'' = 1'-0''$

**NOTE:**

- SEE SHEET 5 FOR PROPOSED LIMITS OF MODIFIED ROCKFILL AND PROPOSED STREAMBED RESTORATION.
- THE STREAMBED 2 FEET FROM THE SOUTH WALL WILL BE GRADED TO FORM A WILDLIFE SHELF THAT IS 6" ABOVE THE NORMAL WATER LEVEL.



**EAST ELEVATION**

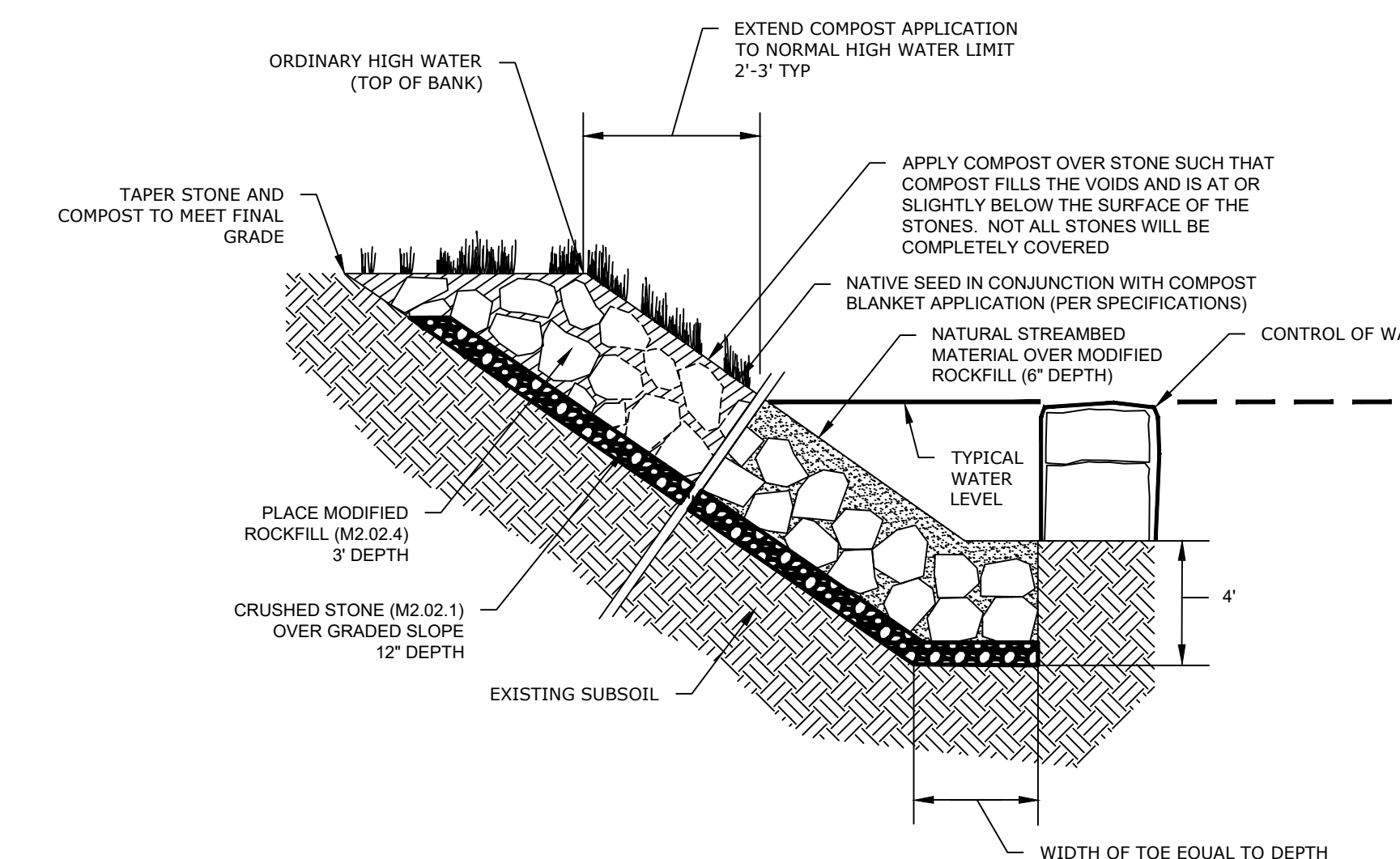
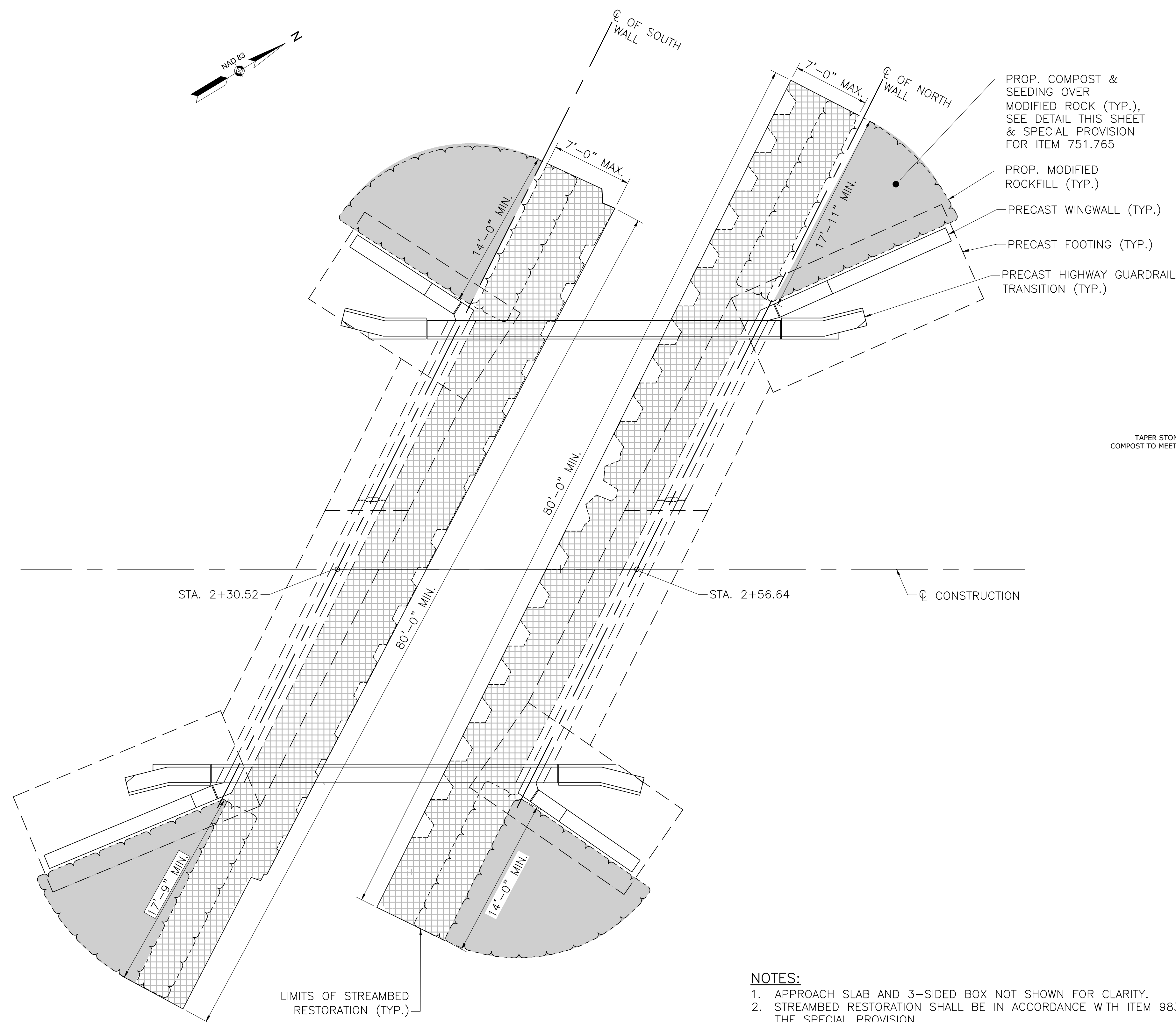
SCALE:  $\frac{3}{16}'' = 1'-0''$

DATE	DESCRIPTION
APRIL 13, 2024	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

**SPENCER  
ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	20	46
PROJECT FILE NO.		609179	

**STREAMBED RESTORATION PLAN**



**RIVERBANK ARMORING AND COMPOST/SEEDING  
NOT TO SCALE**

- NOTES:**
1. APPROACH SLAB AND 3-SIDED BOX NOT SHOWN FOR CLARITY.
  2. STREAMBED RESTORATION SHALL BE IN ACCORDANCE WITH ITEM 983.35 OF THE SPECIAL PROVISION.
  3. STREAMBED RESTORATION SHOWN AS THIS:

**STREAMBED RESTORATION PLAN**  
SCALE: 1/8" = 1'-0"

APRIL 13, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

609179\_BRS(623012).DWG Plotted on 12-Mar-2024 1:28 PM 11-18-2023 609179 Structural Submittal (PS&E)

**SPENCER**  
**ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	21	46
PROJECT FILE NO.		609179	

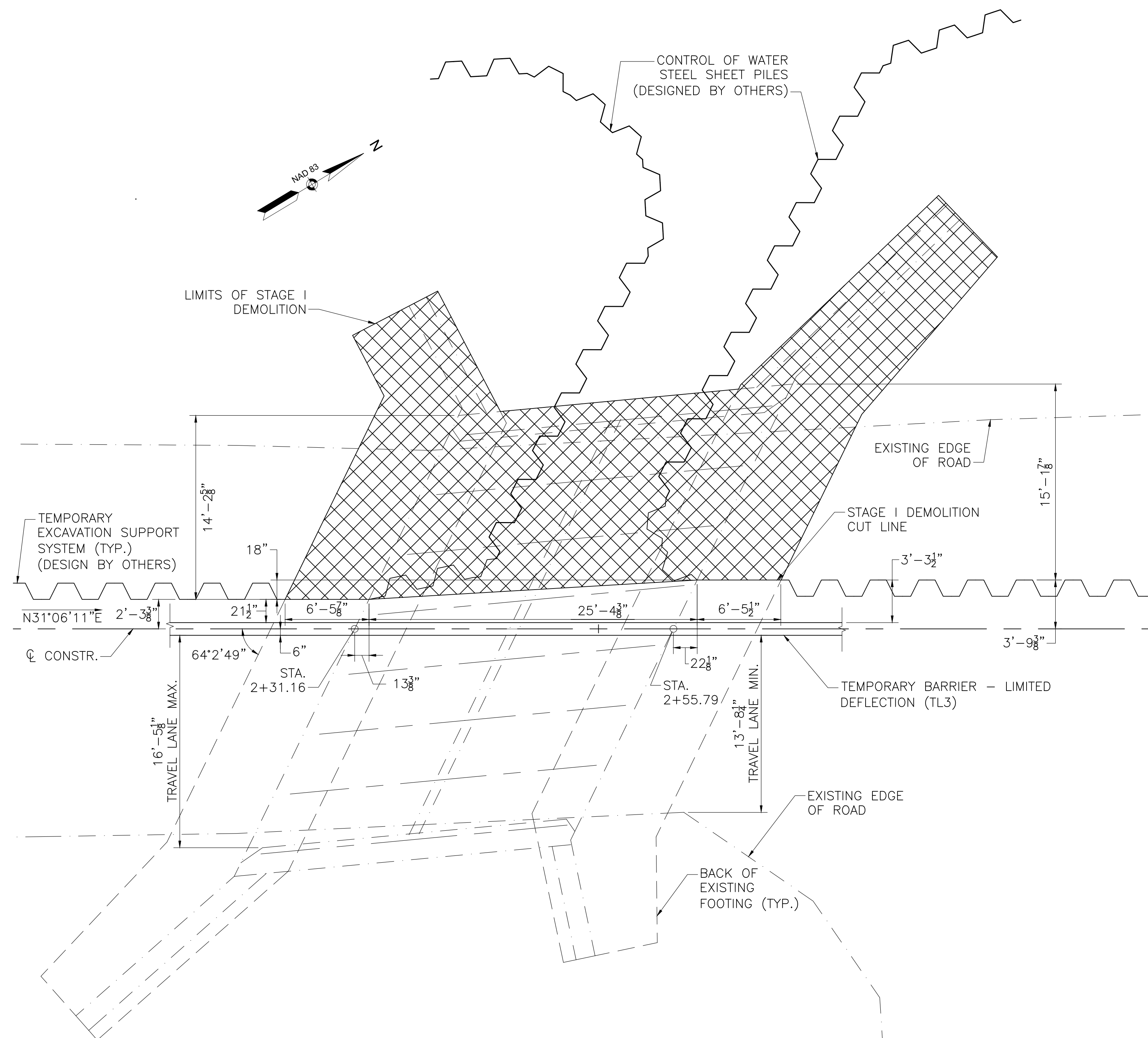
**STAGE I DEMOLITION**

**DEMOLITION NOTE:**

1. SEE EXISTING SUBSTRUCTURE SECTIONS THIS SHEET.
2. EXISTING ROADWAY IS NOT PARALLEL TO CURBLINE.
3. ALL DEMOLITION SHALL BE IN ACCORDANCE WITH ITEM 114.1 AND 127.1 OF THE SPECIAL PROVISIONS.

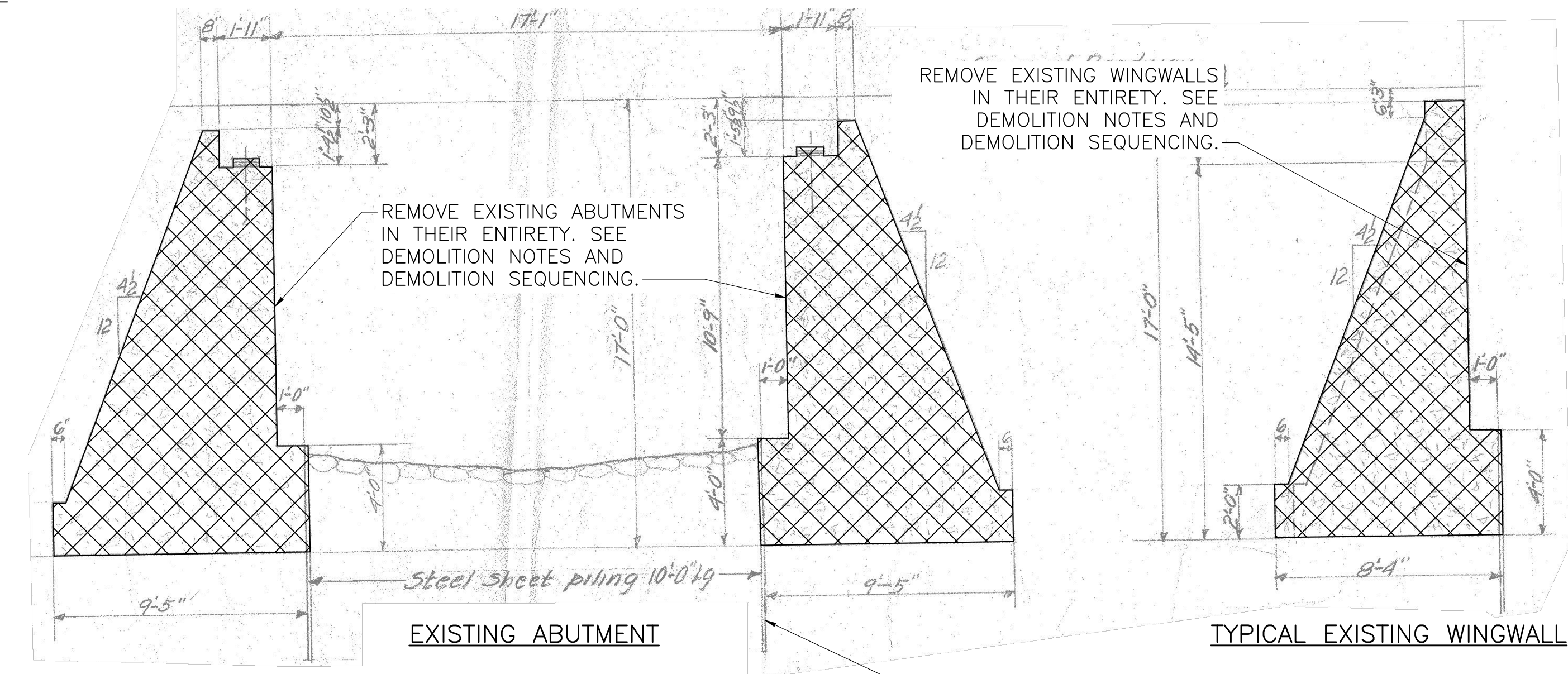
**STAGE I DEMOLITION SEQUENCE:**

1. RELOCATE OVERHEAD UTILITIES.
2. INSTALL TEMPORARY TRAFFIC CONTROLS FOR STAGE I.
3. INSTALL TEMPORARY PROTECTIVE SHIELDING TO THE WEST OF THE STAGE I DEMOLITION LINE.
4. SAW CUT NEAT LINES IN THE DECK AT THE STAGE 1 DEMOLITION CUT LINE.
5. REMOVE THE DECK PLATES, DECK, BEAMS S1-S3, BEARINGS, INTERMEDIATE DIAPHRAGM, AND END DIAPHRAGMS WEST OF THE STAGE 1 DEMOLITION CUT LINE WITHOUT DAMAGING THE COMPONENTS TO REMAIN.
6. INSTALL TEMPORARY EXCAVATION SUPPORT SYSTEM (DESIGNED BY OTHERS).
7. INSTALL CONTROL OF WATER (DESIGNED BY OTHERS).
8. REMOVE AND STORE THE TOP 12 INCHES OF STREAMBED MATERIAL TO THE LIMITS SHOWN ON THE STREAMBED RESTORATION PLAN IN ACCORDANCE WITH ITEM 983.35 OF THE SPECIAL PROVISIONS.
9. EXCAVATE THE ABUTMENTS & WINGWALLS WEST OF THE STAGE 1 DEMOLITION CUT LINE.
10. SAW CUT NEAT LINES ON ALL FACES OF THE BACKWALLS, ABUTMENTS, AND FOOTINGS AT THE STAGE 1 DEMOLITION CUT LINE.
11. REMOVE THE NORTHWEST AND SOUTHWEST WINGWALLS AND FOOTINGS IN THEIR ENTIRETY.
12. REMOVE THE BACKWALLS, ABUTMENTS, AND FOOTINGS WEST OF THE STAGE 1 DEMOLITION CUT LINE WITHOUT DAMAGING THE COMPONENTS TO REMAIN.
13. CUT DOWN EXISTING ABUTMENT SHEET PILES TO THE BOTTOM OF THE LIMITS OF CRUSH STONE FOR BRIDGE FOUNDATION (SEE SHEET 14).



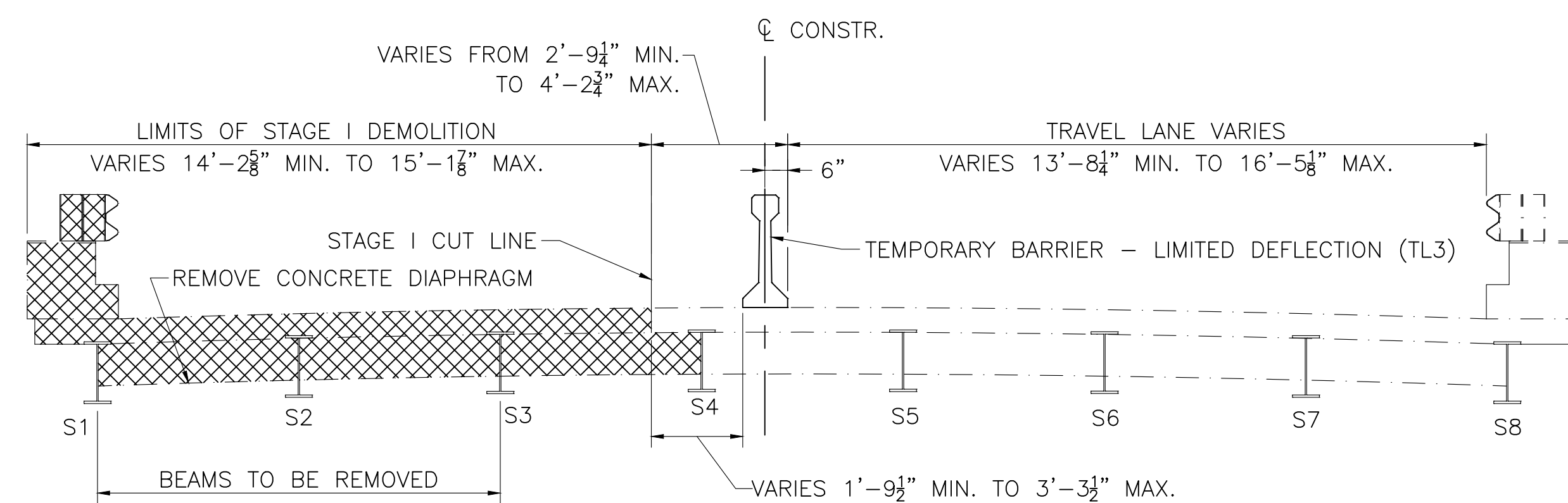
**STAGE I DEMOLITION PLAN**

SCALE: 1/8" = 1'-0"



**EXISTING SUBSTRUCTURE SECTIONS**

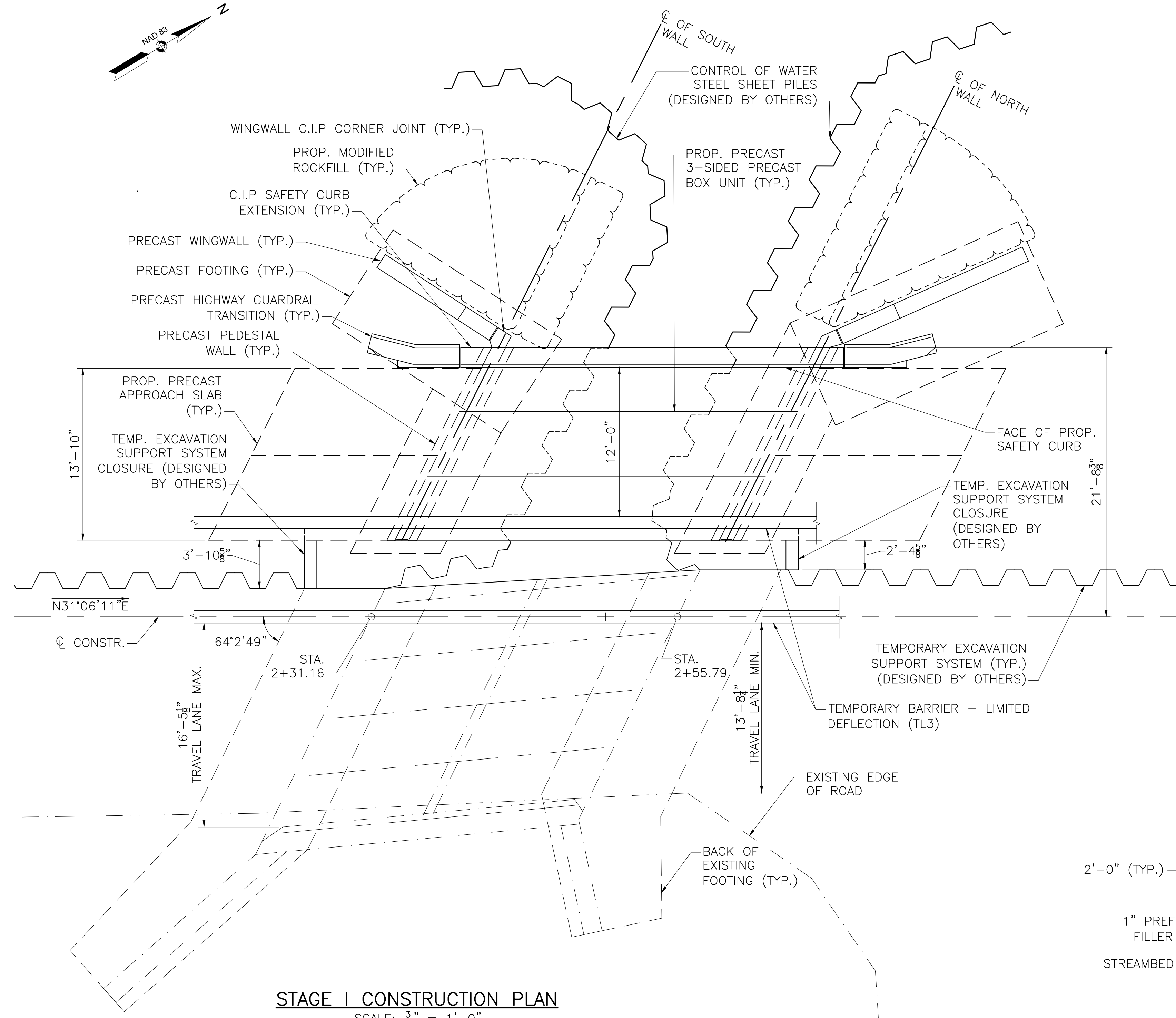
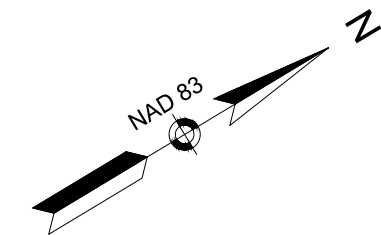
SCALE: 1/4" = 1'-0"



**STAGE I DEMOLITION SECTION**

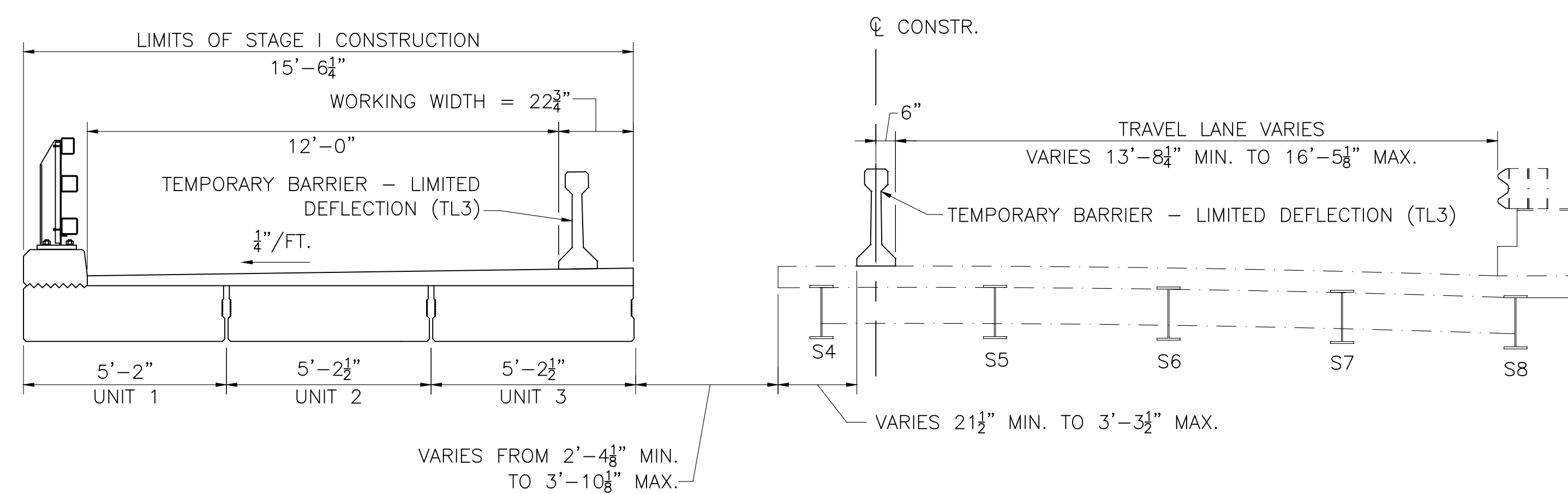
SCALE: 3/8" = 1'-0"

APRIL 13, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	



**STAGE I CONSTRUCTION PLAN**

SCALE:  $\frac{1}{16}'' = 1'-0''$



**STAGE I CONSTRUCTION SECTION**

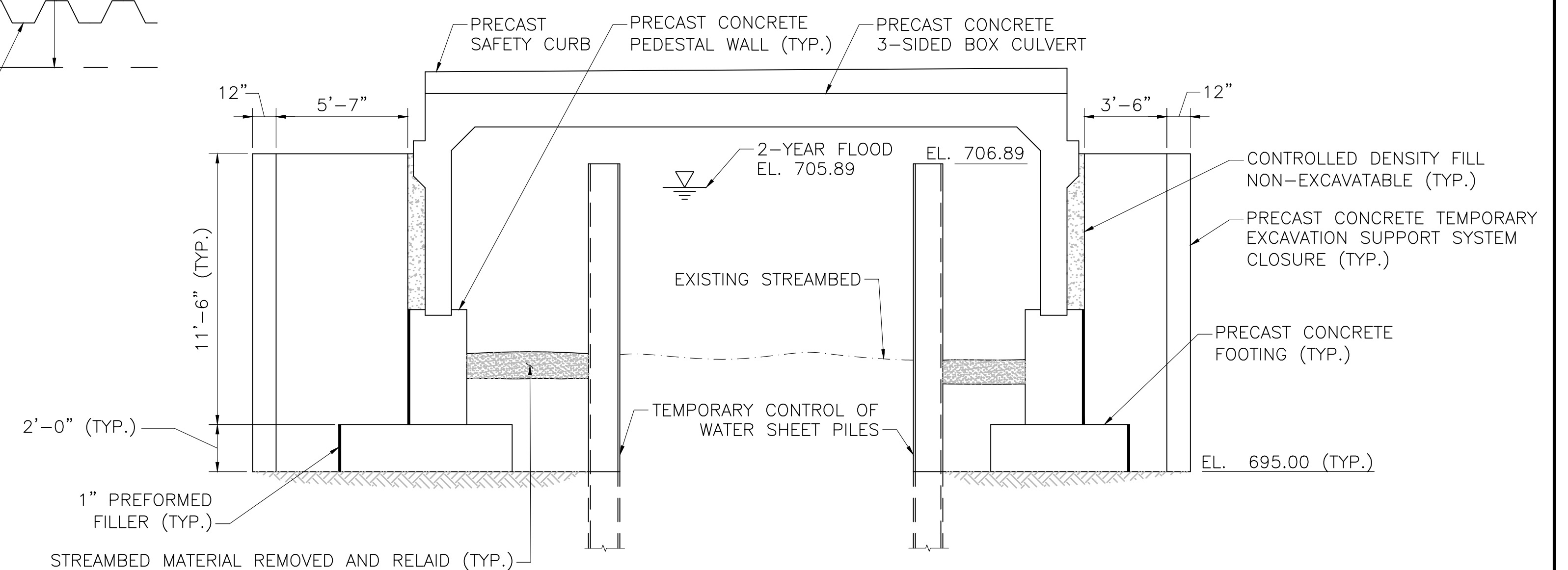
SCALE:  $\frac{3}{8}'' = 1'-0''$

**CONSTRUCTION NOTE:**

ALL STAGE I CONSTRUCTION TO TAKE PLACE WEST OF THE STAGE I DEMOLITION CUT LINE.

**STAGE I CONSTRUCTION SEQUENCE:**

1. PREP. SUBGRADE AND INSTALL THE PRECAST CONCRETE FOOTINGS IN THE DRY.
2. INSTALL THE PRECAST CONCRETE PEDESTAL WALLS IN THE DRY.
3. INSTALL THE NORTHWEST & SOUTHWEST WINGWALLS IN THE DRY.
4. INSTALL THE PRECAST CONCRETE 3 SIDED BOX UNITS IN THE DRY.
5. FORM & PLACE C.I.P. CONCRETE CORNER JOINT & CONCRETE SAFETY CURB EXTENSIONS.
6. INSTALL THE TEMPORARY EXCAVATION SUPPORT SYSTEM CLOSURE (DESIGNED BY OTHERS) IN THE DRY.
7. BACKFILL THE STRUCTURE WITH GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES LEAVING TEMPORARY EXCAVATION SUPPORT SYSTEM (STEEL SHEET PILES) IN PLACE.
8. INSTALL RIPRAP SLOPE PROTECTION IN ACCORDANCE WITH ITEM 983.1 OF THE SPECIAL PROVISIONS.
9. INSTALL PRECAST CONCRETE APPROACH SLABS.
10. INSTALL PRECAST CONCRETE HIGHWAY GUARDRAIL TRANSITIONS.
11. PLACE SUPERPAVE BRIDGE PROTECTIVE COURSE - POLYMER (SPC-B-9.5-P) OVER MEMBRANE WATERPROOFING FOR BRIDGE DECKS. THE PROTECTIVE COURSE THICKNESS VARIES FROM 2.07" MIN. TO 7.88" MAX.
12. INSTALL S3-TL4 BRIDGE RAIL & GUARDRAIL TRANSITIONS.
13. INSTALL TEMPORARY BARRIER - LIMITED DEFLECTION (TL3) PER THE MANUFACTURERS RECOMMENDATIONS. NO DRILLING INTO THE PRECAST UNITS WILL BE ALLOWED. CONTRACTOR WILL BE RESPONSIBLE FOR HAVING THE PROPER INSERTS ADDED TO THE SHOP DRAWINGS FOR THE PRECAST MEMBERS.



**NOTE:**

THE TEMPORARY EXCAVATION SUPPORT SYSTEM CLOSURE SECTION IS SHOWN FOR INFORMATIONAL PURPOSES ONLY. THE TEMPORARY EXCAVATION SUPPORT SYSTEM CLOSURE IS THE RESPONSIBILITY OF THE CONTRACTOR AND WILL BE DESIGNED BY OTHERS.

**TEMPORARY EXCAVATION SUPPORT SYSTEM CLOSURE SECTION**

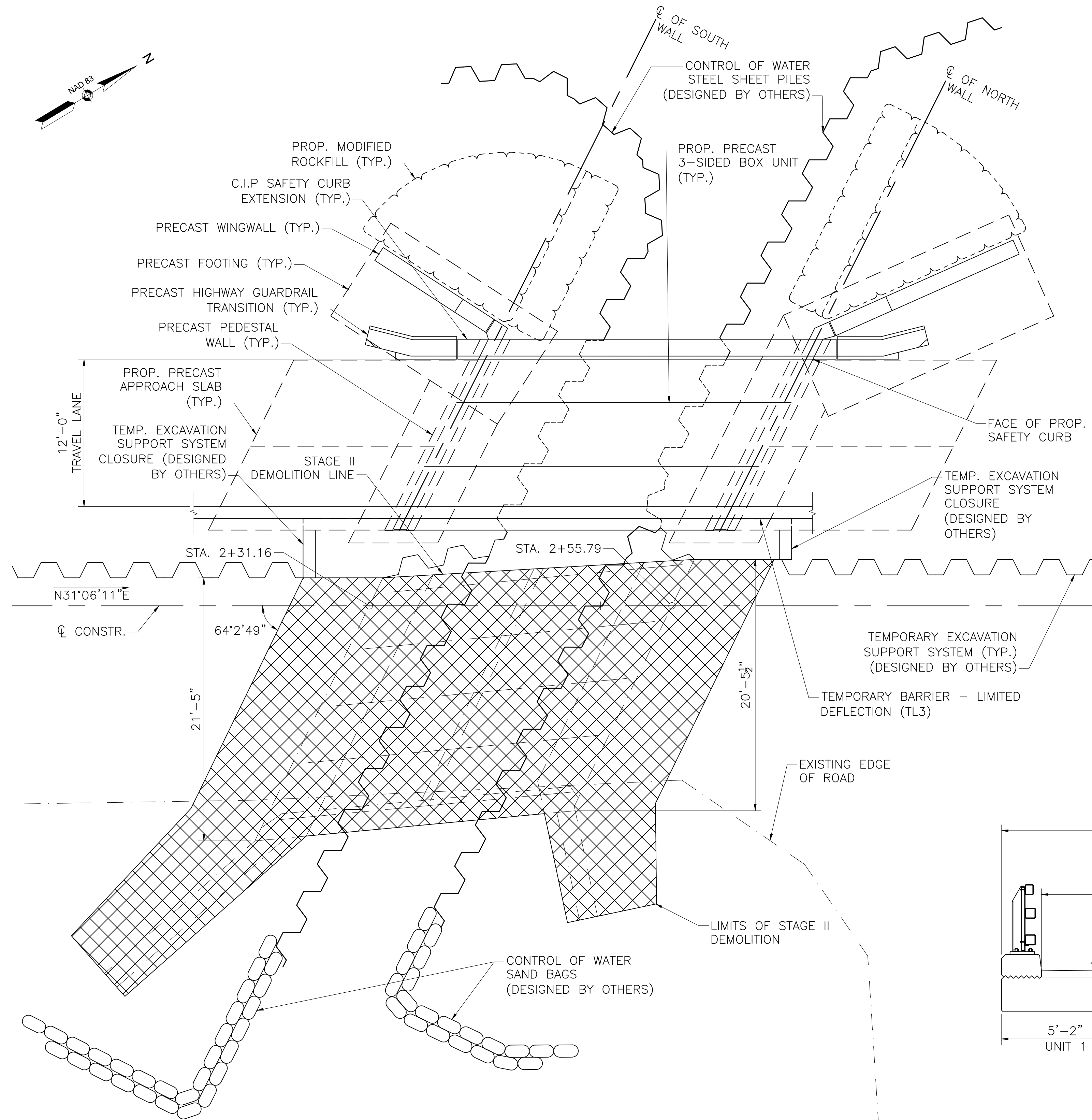
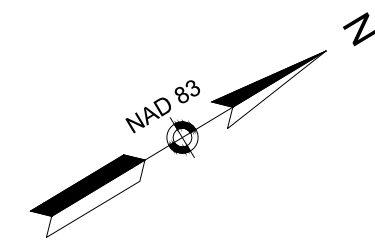
SCALE:  $\frac{1}{4}'' = 1'-0''$

**SPENCER  
ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	22	46
PROJECT FILE NO.		609179	

**STAGE I CONSTRUCTION**

APRIL 13, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	



**STAGE II DEMOLITION PLAN**

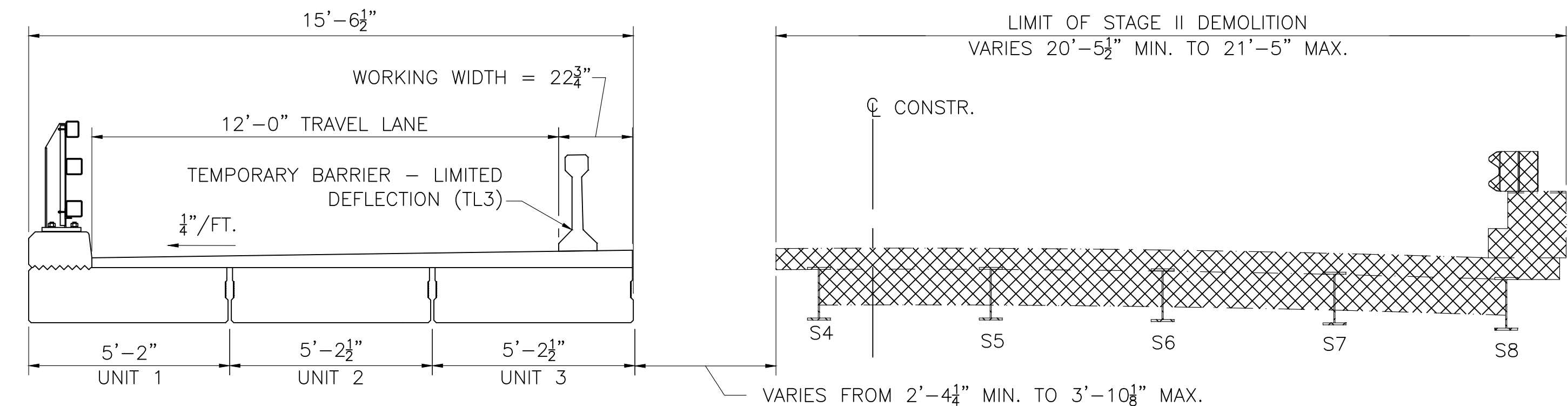
SCALE:  $\frac{3}{16}'' = 1'-0''$

**DEMOLITION NOTES:**

1. SEE SHEET 6 FOR EXISTING SUBSTRUCTURE SECTIONS.
2. EXISTING ROADWAY IS NOT PARALLEL TO CURBLINE.
3. ALL DEMOLITION SHALL BE IN ACCORDANCE WITH ITEM 114.1 AND 127.1 OF THE SPECIAL PROVISIONS.

**STAGE II DEMOLITION SEQUENCE:**

1. INSTALL TEMPORARY TRAFFIC CONTROLS FOR STAGE II.
2. INSTALL TEMPORARY PROTECTIVE SHIELDING TO THE EAST OF THE STAGE II DEMOLITION LINE.
3. REMOVE THE REMAINING DECK PLATES, DECK, BEAMS S4-S8, INTERMEDIATE DIAPHRAGM, AND END DIAPHRAGMS IN THEIR ENTIRETY.
4. INSTALL CONTROL OF WATER (DESIGNED BY OTHERS)
5. REMOVE & STORE THE 12" OF STREAMBED MATERIAL IN ACCORDANCE WITH ITEM 983.35 OF THE SPECIAL PROVISIONS.
6. EXCAVATE THE ABUTMENTS & WINGWALLS EAST OF THE DEMOLITION CUT LINE.
7. REMOVE THE NORTHEAST AND SOUTHEAST WINGWALLS AND FOOTINGS IN THEIR ENTIRETY.
8. REMOVE THE REMAINING EXISTING BACKWALLS, ABUTMENTS, AND FOOTINGS IN THEIR ENTIRETY.



**STAGE II DEMOLITION SECTION**

SCALE:  $\frac{3}{8}'' = 1'-0''$

**SPENCER  
ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	23	46
PROJECT FILE NO.		609179	

**STAGE II DEMOLITION**

APRIL 13, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

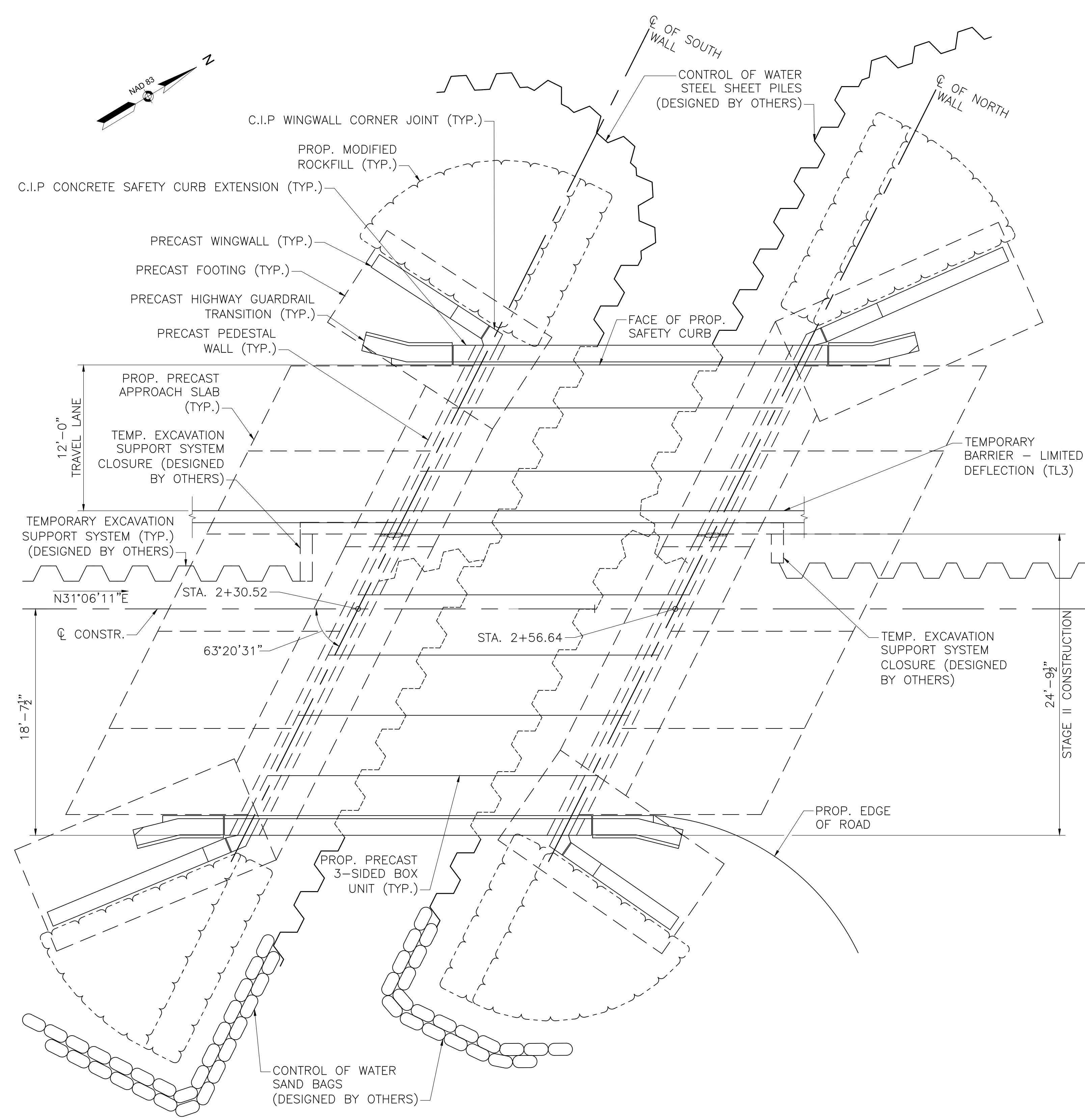
**SPENCER**  
**ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	24	46
PROJECT FILE NO.		609179	

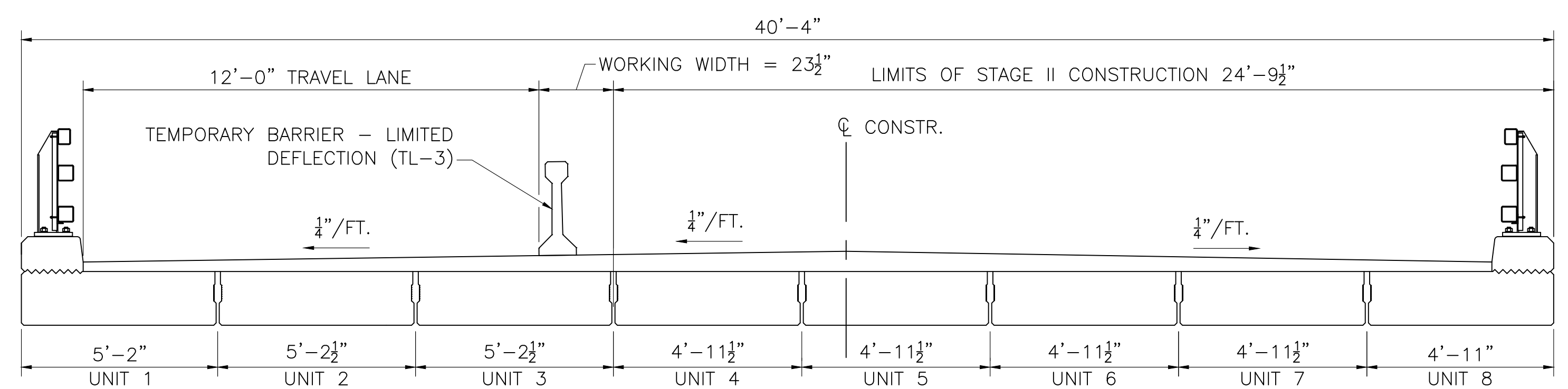
**STAGE II CONSTRUCTION**

**CONSTRUCTION NOTE:**  
ALL STAGE II CONSTRUCTION TO TAKE PLACE EAST OF THE STAGE I CONSTRUCTION.

- STAGE II CONSTRUCTION SEQUENCE:**
1. PREP. SUBGRADE AND INSTALL THE PRECAST CONCRETE FOOTINGS IN THE DRY.
  2. INSTALL THE PRECAST CONCRETE PEDESTAL WALLS IN THE DRY.
  3. INSTALL THE NORTHEAST & SOUTHEAST WINGWALLS IN THE DRY.
  4. INSTALL THE PRECAST CONCRETE 3 SIDED BOX UNITS IN THE DRY.
  5. FORM & PLACE C.I.P. CONCRETE WINGWALL CORNER JOINT & C.I.P CONCRETE SAFETY CURB EXTENSIONS.
  6. BACKFILL AREA IN FRONT OF THE TEMPORARY EXCAVATION SUPPORT SYSTEM CLOSURE AND BEHIND THE PEDESTAL WALL WITH CONTROLLED DENSITY FILL (NON-EXCAVATABLE).
  7. BACKFILL THE STRUCTURE WITH GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES LEAVING THE TEMPORARY EXCAVATION CONTROL SYSTEM (STEEL SHEET PILES) IN PLACE.
  8. CUT OFF TEMPORARY EXCAVATION SUPPORT SYSTEM AT 12" BELOW THE PROPOSED APPROACH SLAB.
  9. INSTALL MODIFIED ROCKFILL SLOPE PROTECTION IN ACCORDANCE WITH ITEM 986. OF THE SPECIAL PROVISIONS.
  10. INSTALL PRECAST CONCRETE APPROACH SLABS.
  11. INSTALL PRECAST CONCRETE HIGHWAY GUARDRAIL TRANSITIONS.
  12. REMOVE CONTROL OF WATER SHEET PILES WHERE PRACTICABLE. CUT OFF REMAINING CONTROL OF WATER SHEET PILES 12" BELOW PROPOSED STREAMBED ELEVATION AND REMOVED CONTROL OF WATER SANDBAGS.
  13. PLACE STREAMBED MATERIAL IN ACCORDANCE WITH ITEM 983.35 OF THE SPECIAL PROVISIONS. SEE STREAMED RESTORATION PLAN ON SHEET 5 FOR LIMITS.
  14. REMOVE TEMPORARY BARRIER - LIMITED DEFLECTION (TL3) AND SEAL INSERTS IN THE DECK.
  15. PLACE SUPERPAVE BRIDGE PROTECTIVE COURSE - 9.5 POLYMER (SPC-B-9.5-P) OVER MEMBRANE WATERPROOFING FOR BRIDGE DECKS. THE PROTECTIVE COURSE THICKNESS VARIES FROM 1.50" MIN. TO 8.51" MAX.
  16. INSTALL S3-TL4 BRIDGE RAIL & HIGHWAY GUARDRAIL TRANSITIONS.
  17. PLACE 1 1/2" SUPERPAVE BRIDGE SURFACE COURSE - 9.5 POLYMER (SSC-B-9.5-P) OVER THE BRIDGE PROTECTIVE COURSE FOR THE ENTIRE ROADWAY.



**STAGE II CONSTRUCTION PLAN**  
SCALE: 1/8" = 1'-0"



**STAGE II CONSTRUCTION**  
SCALE: 3/8" = 1'-0"

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DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

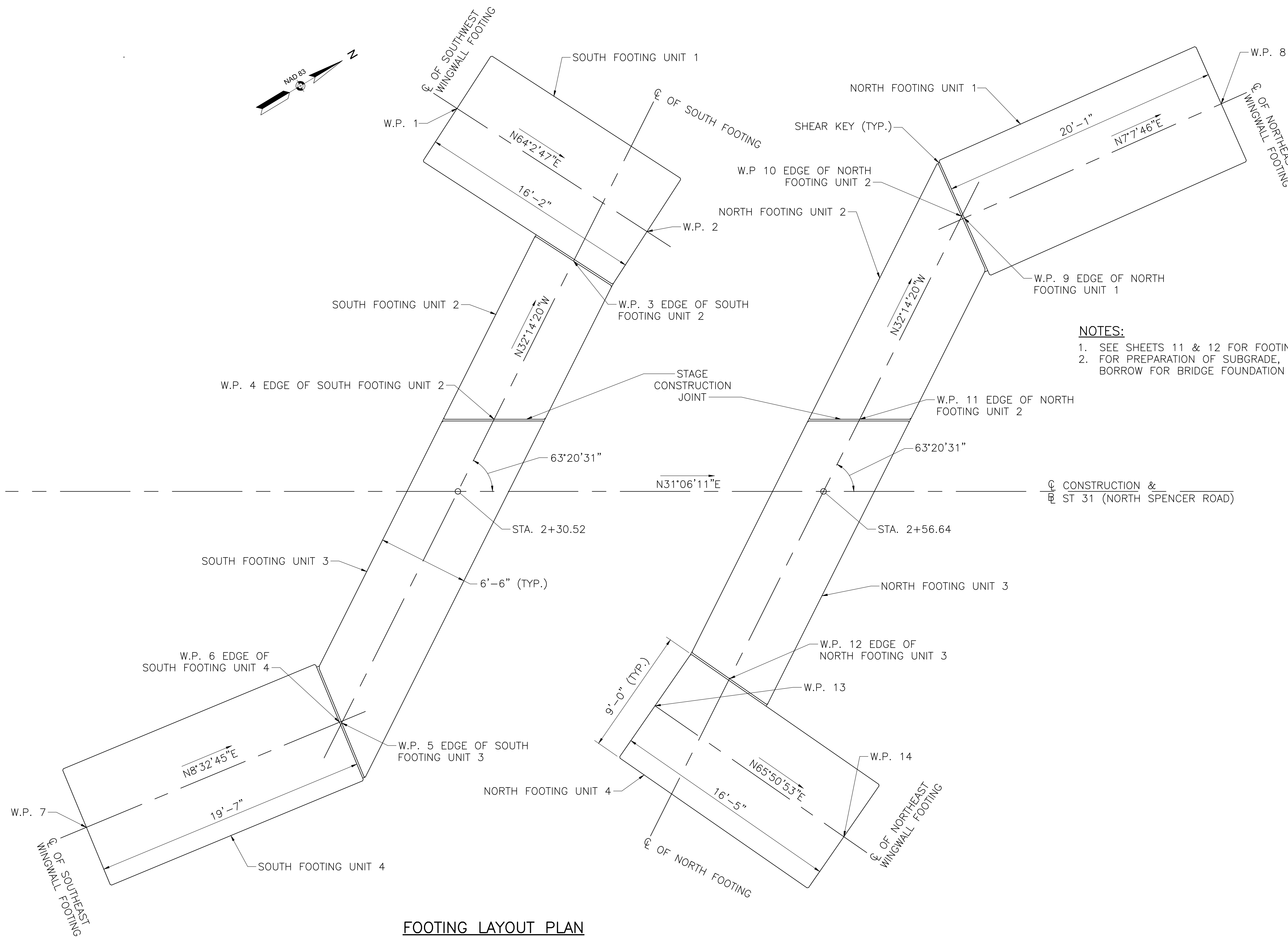
609179\_BR9(S23012).DWG Plotted on 12-Mar-2024 1:27 PM 11-6-2023 609179 Structural Submittal (PS&E)



**SPENCER  
ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	25	46
PROJECT FILE NO.		609179	

**FOOTING LAYOUT**



**FOOTING LAYOUT PLAN**  
SCALE: 1/4" = 1'-0"

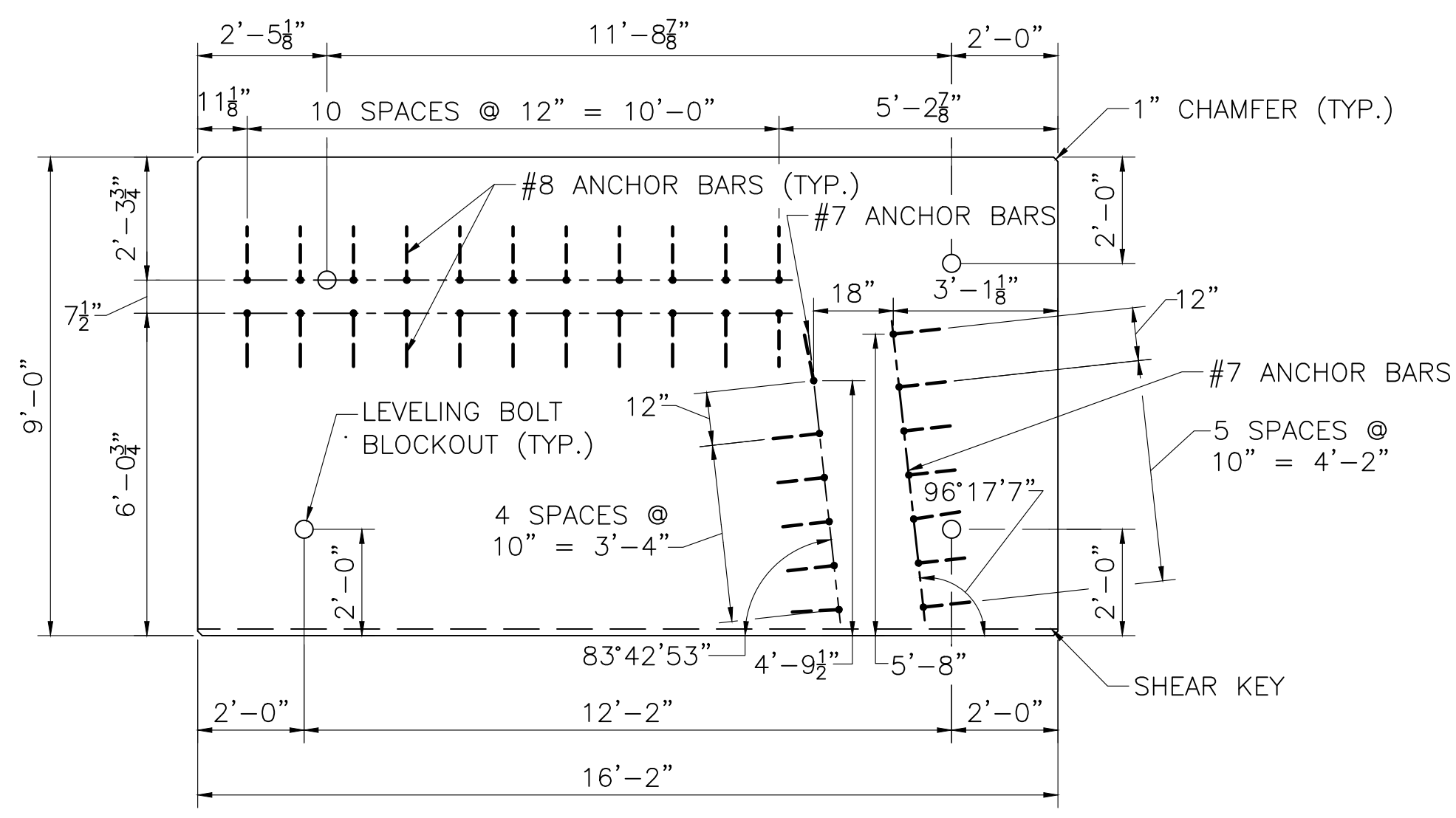
- NOTES:**
- SEE SHEETS 11 & 12 FOR FOOTING UNIT GEOMETRY.
  - FOR PREPARATION OF SUBGRADE, LIMITS OF CRUSHED STONE, & LIMITS OF GRAVEL BORROW FOR BRIDGE FOUNDATION REFER TO THE ABUTMENT SECTION ON SHEET 24.

WORKING POINTS				
W.P. #	STA.	OFFSET (FT)	NORTHING	EASTING
1	2+30.46	27.36 LT	2931741.082	520726.221
2	2+44.03	24.88 LT	2931748.159	520740.761
3	2+38.78	16.46 LT	2931742.576	520739.858
4	2+33.10	5.16 LT	2931731.880	520746.605
5	2+22.22	16.54 RT	2931711.345	520759.556
6	2+22.06	16.49 RT	2931711.237	520759.434
7	2+3.98	24.00 RT	2931691.875	520756.528
8	2+85.05	27.70 LT	2931788.002	520754.139
9	2+66.71	19.54 LT	2931768.072	520751.646
10	2+66.51	19.67 LT	2931767.971	520751.440
11	2+59.23	5.16 LT	2931754.243	520760.097
12	2+49.93	13.38 RT	2931736.699	520771.161
13	2+44.60	15.32 RT	2931731.143	520770.075
14	2+58.09	24.68 RT	2931737.860	520785.053

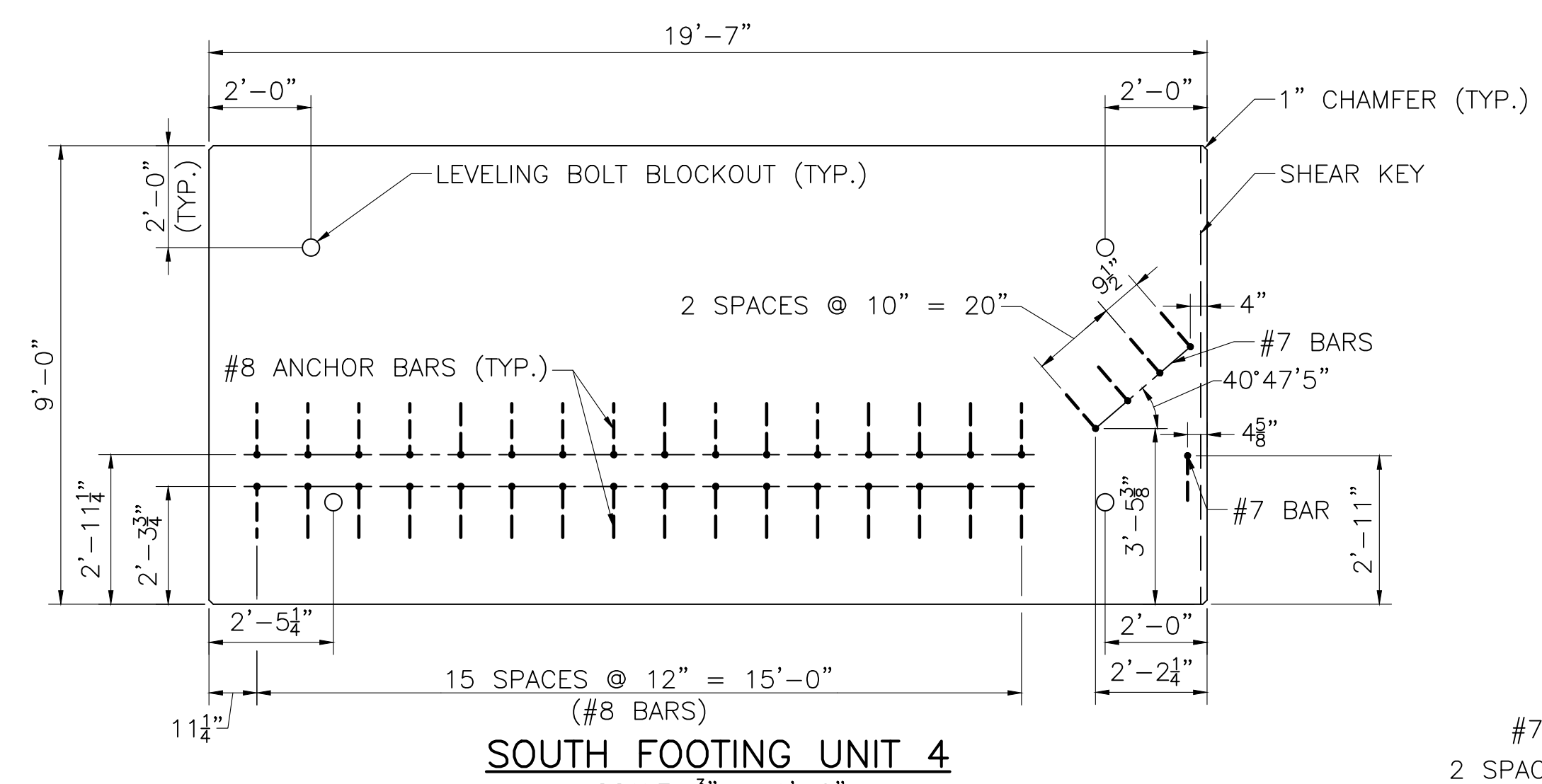
APRIL 13, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

SPENCER			
ST 31 (NORTH SPENCER ROAD)			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	26	46
PROJECT FILE NO.		609179	

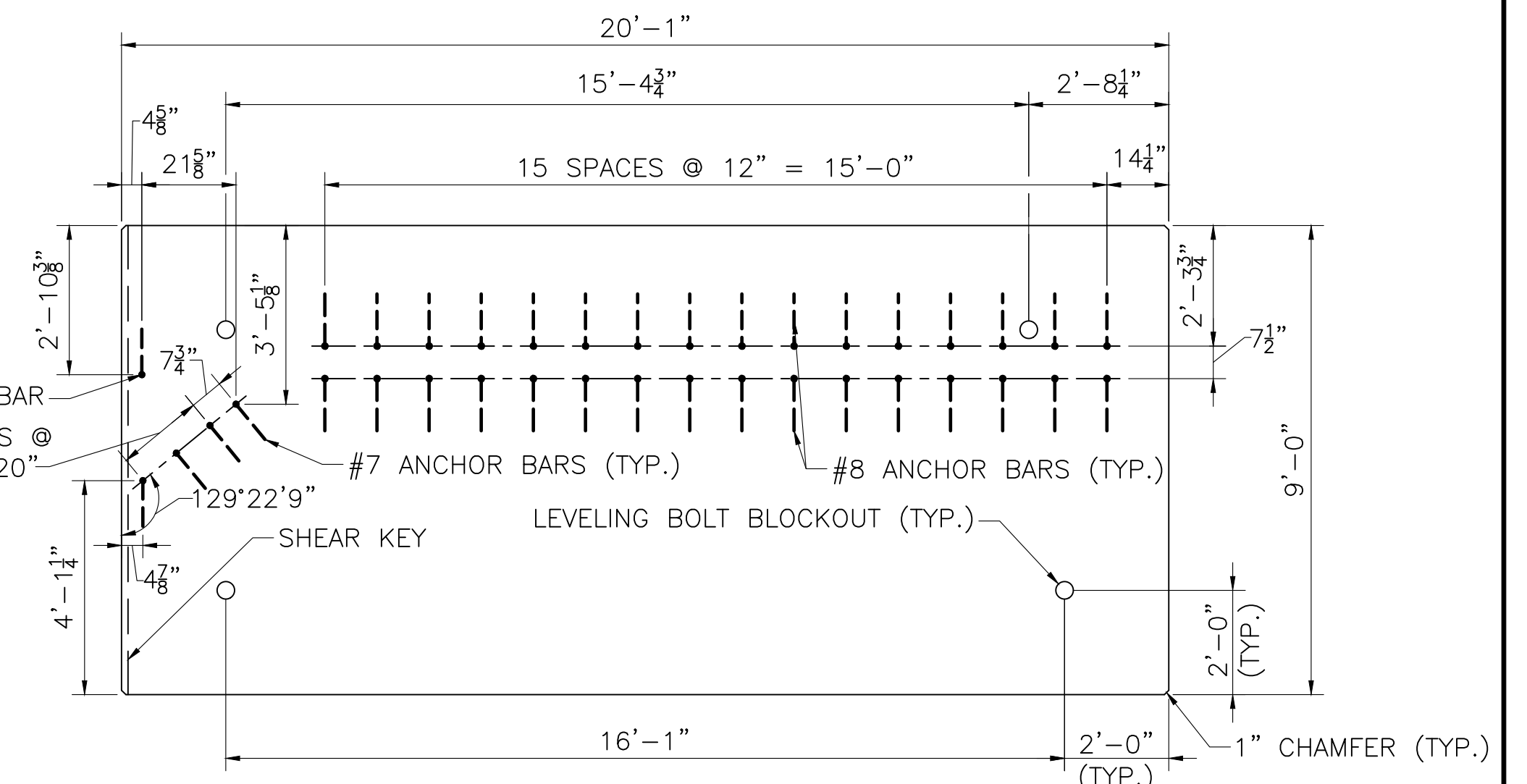
**PRECAST FOOTING DETAILS I**



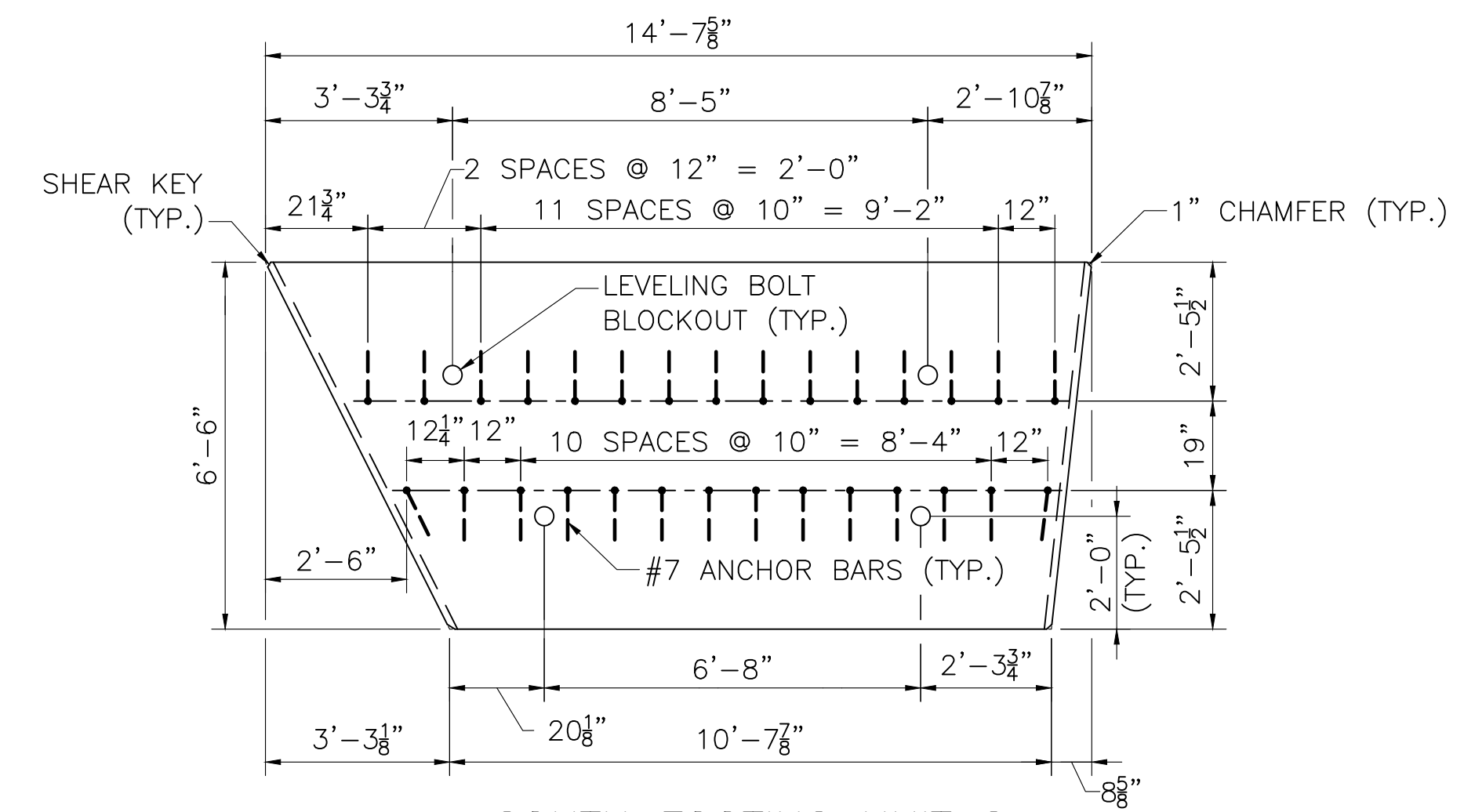
**SOUTH FOOTING UNIT 1**  
SCALE: 3/8" = 1'-0"



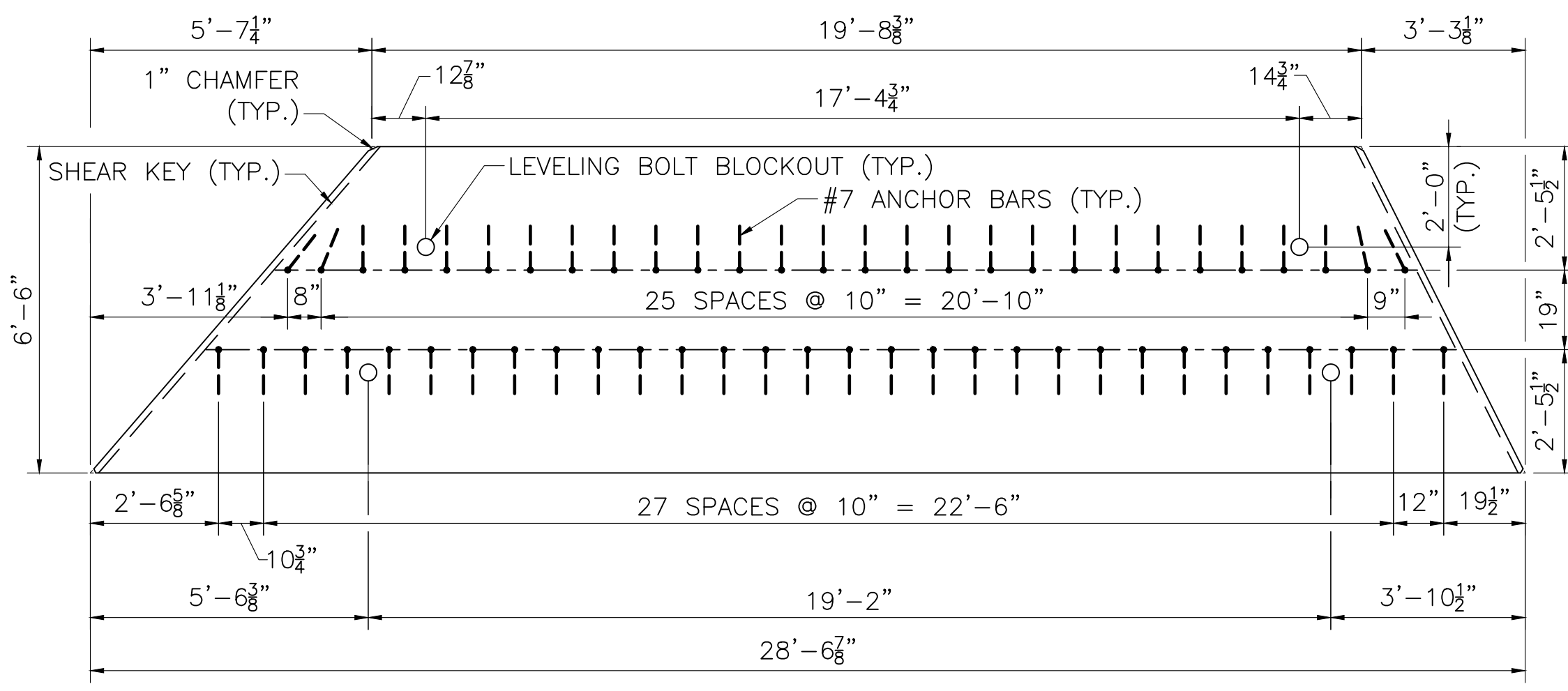
**SOUTH FOOTING UNIT 4**  
SCALE: 3/8" = 1'-0"



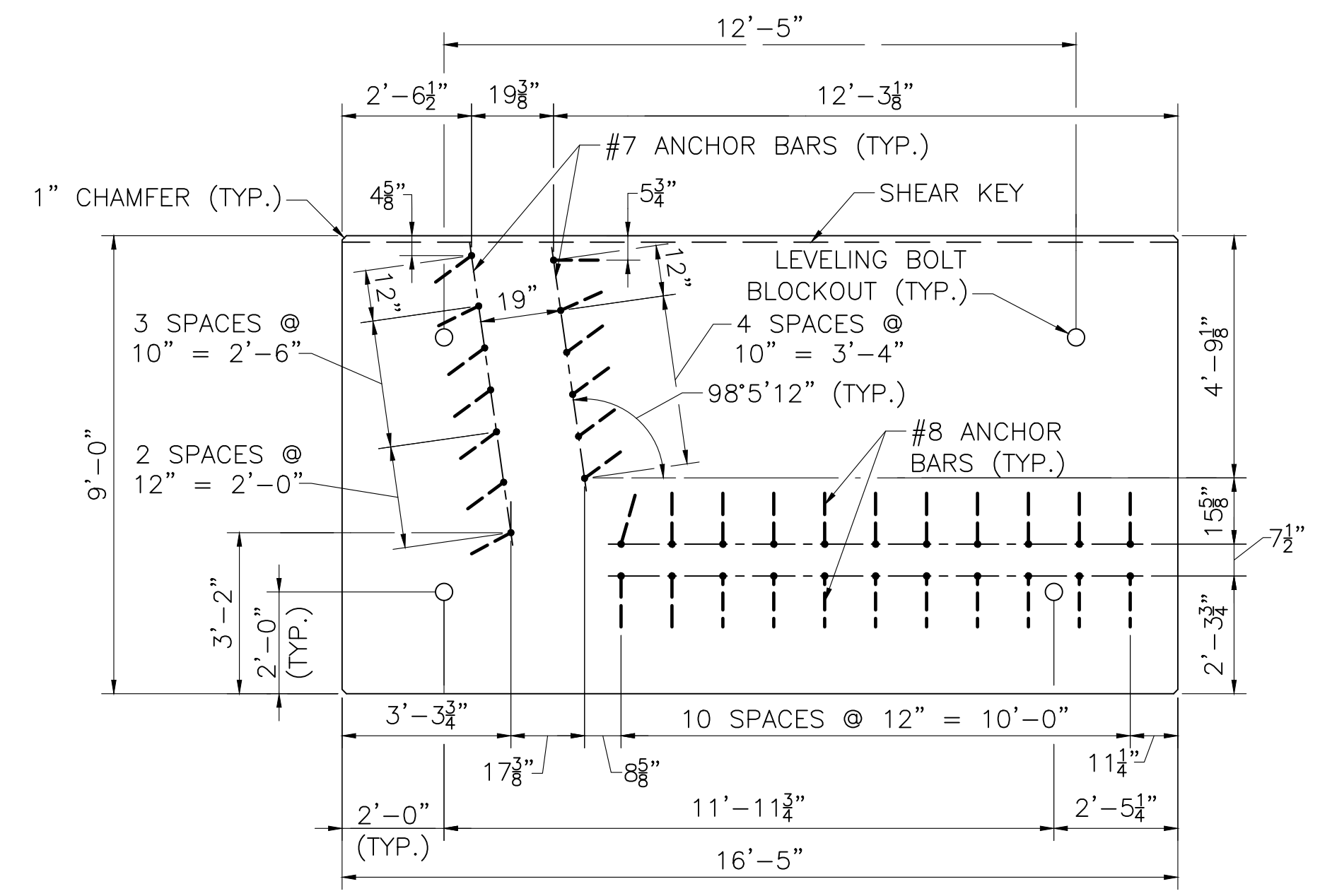
**NORTH FOOTING UNIT 1**  
SCALE: 3/8" = 1'-0"



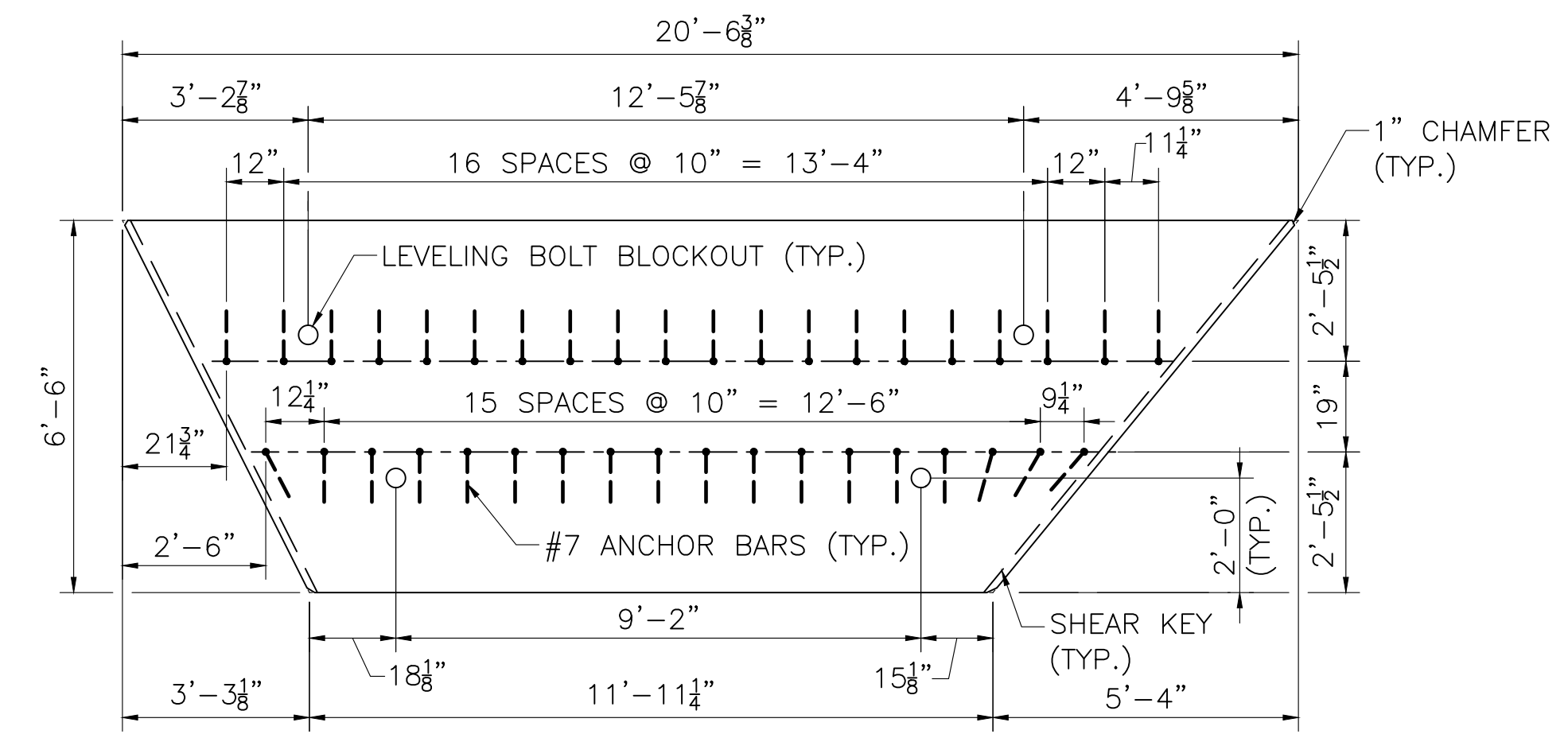
**SOUTH FOOTING UNIT 2**  
SCALE: 3/8" = 1'-0"



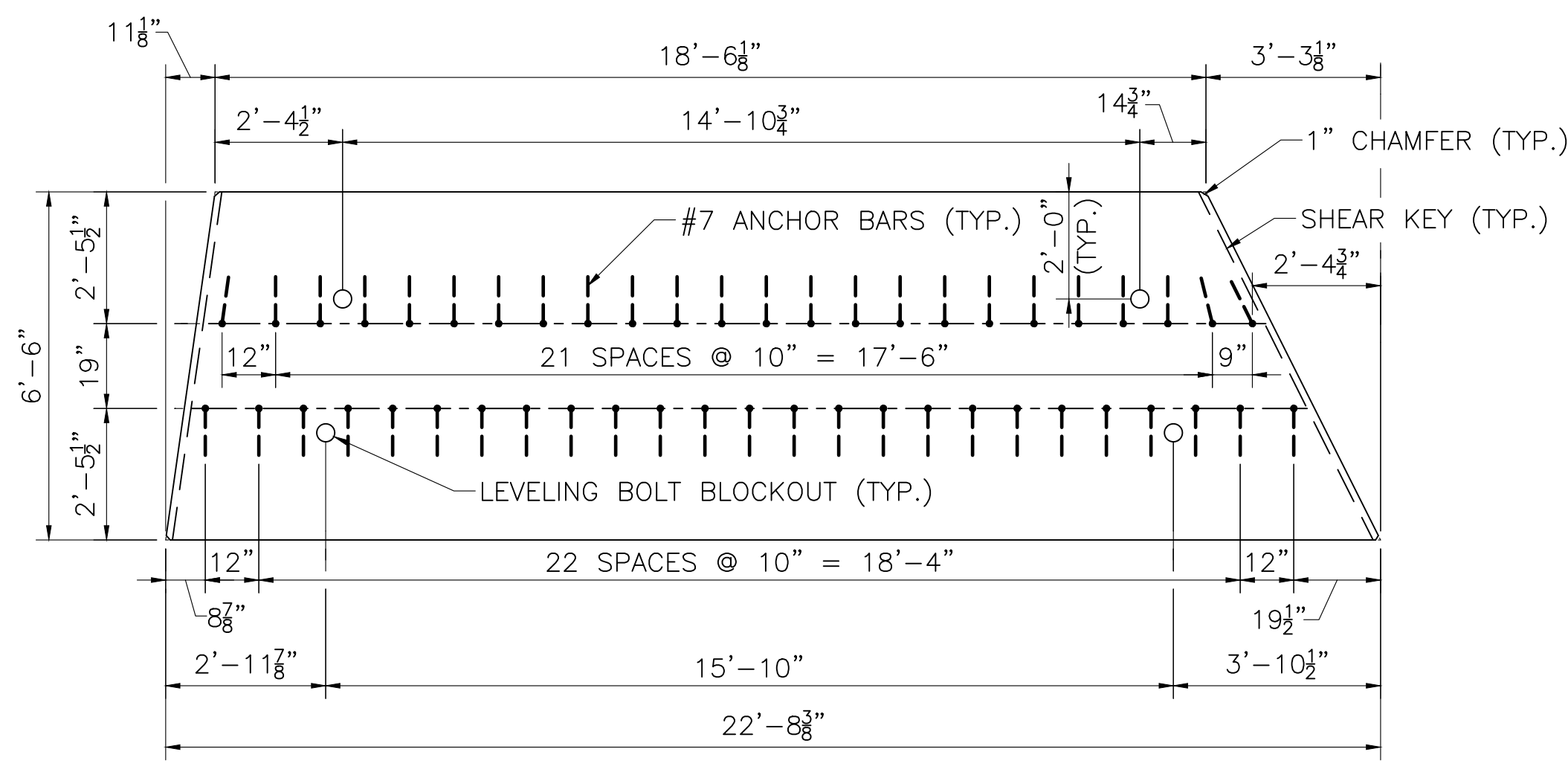
**SOUTH FOOTING UNIT 3**  
SCALE: 3/8" = 1'-0"



**NORTH FOOTING UNIT 4**  
SCALE: 3/8" = 1'-0"



**NORTH FOOTING UNIT 2**  
SCALE: 3/8" = 1'-0"



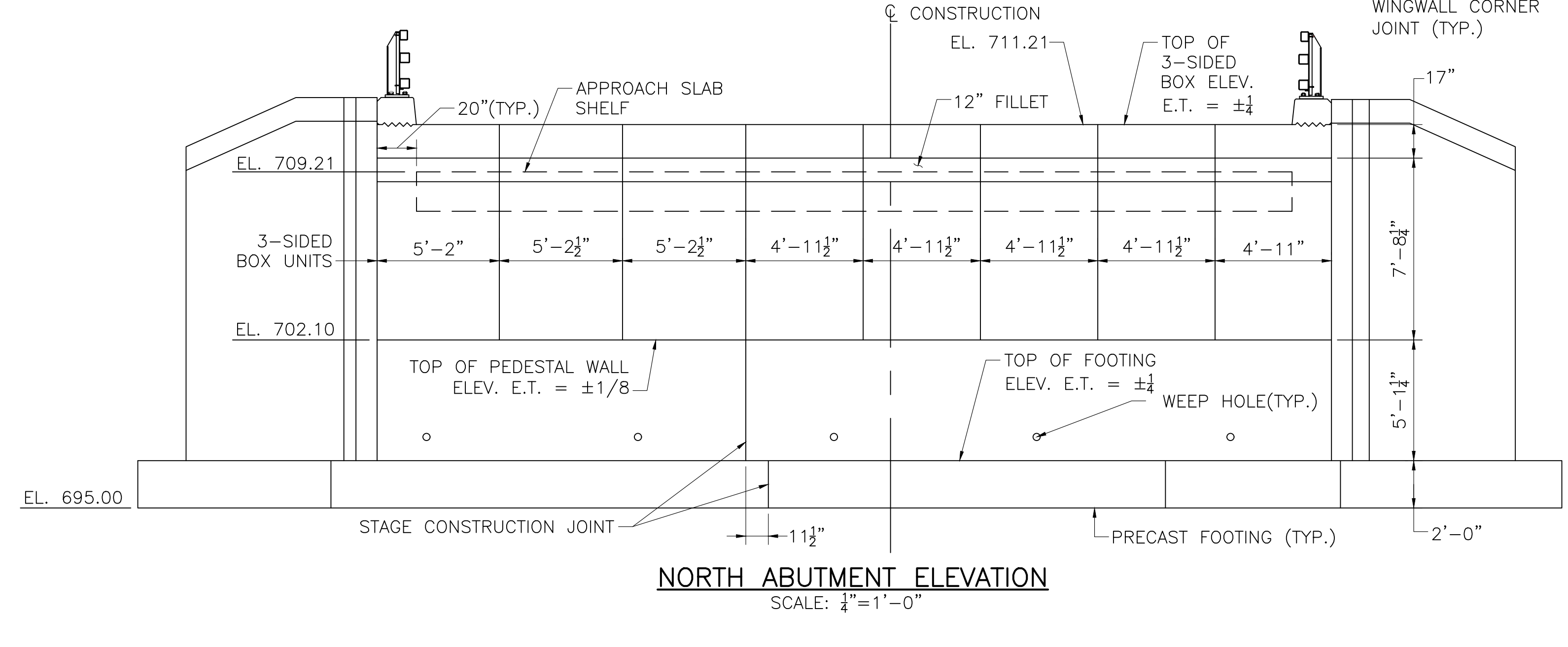
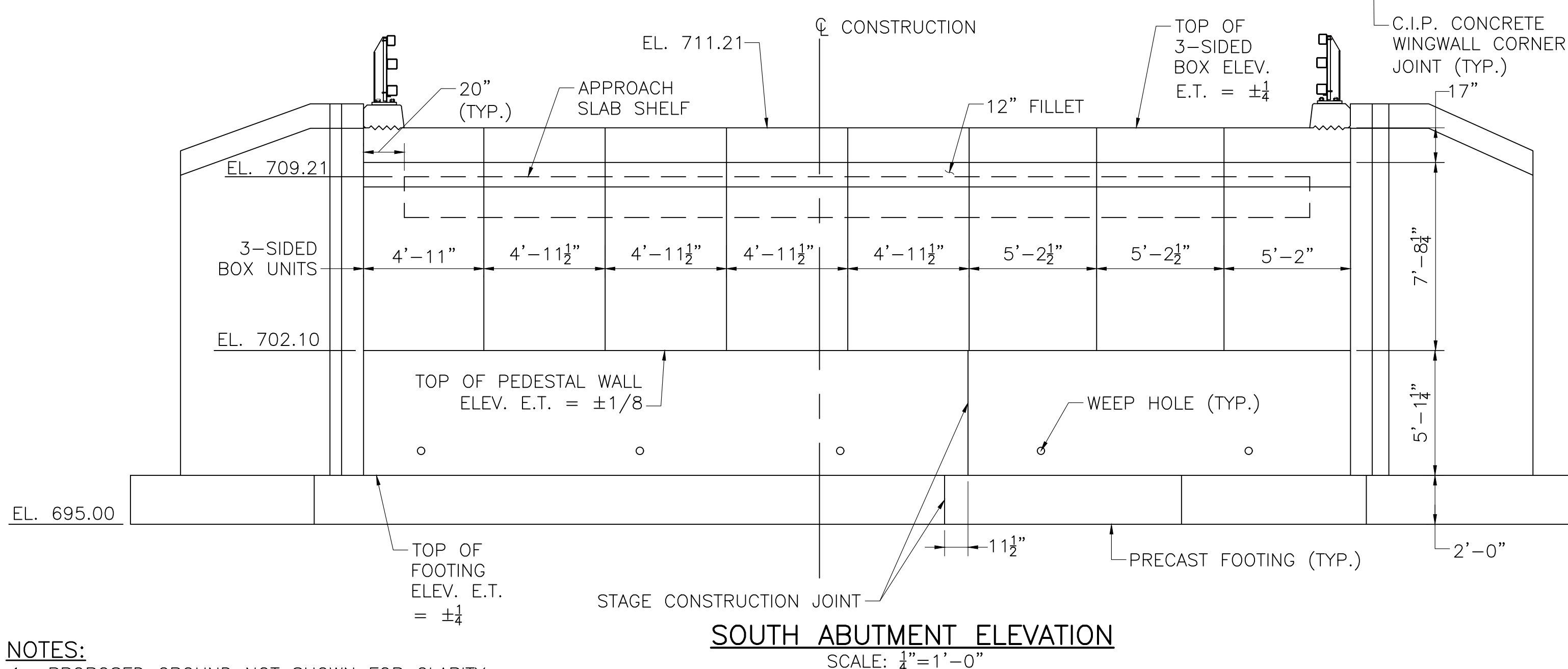
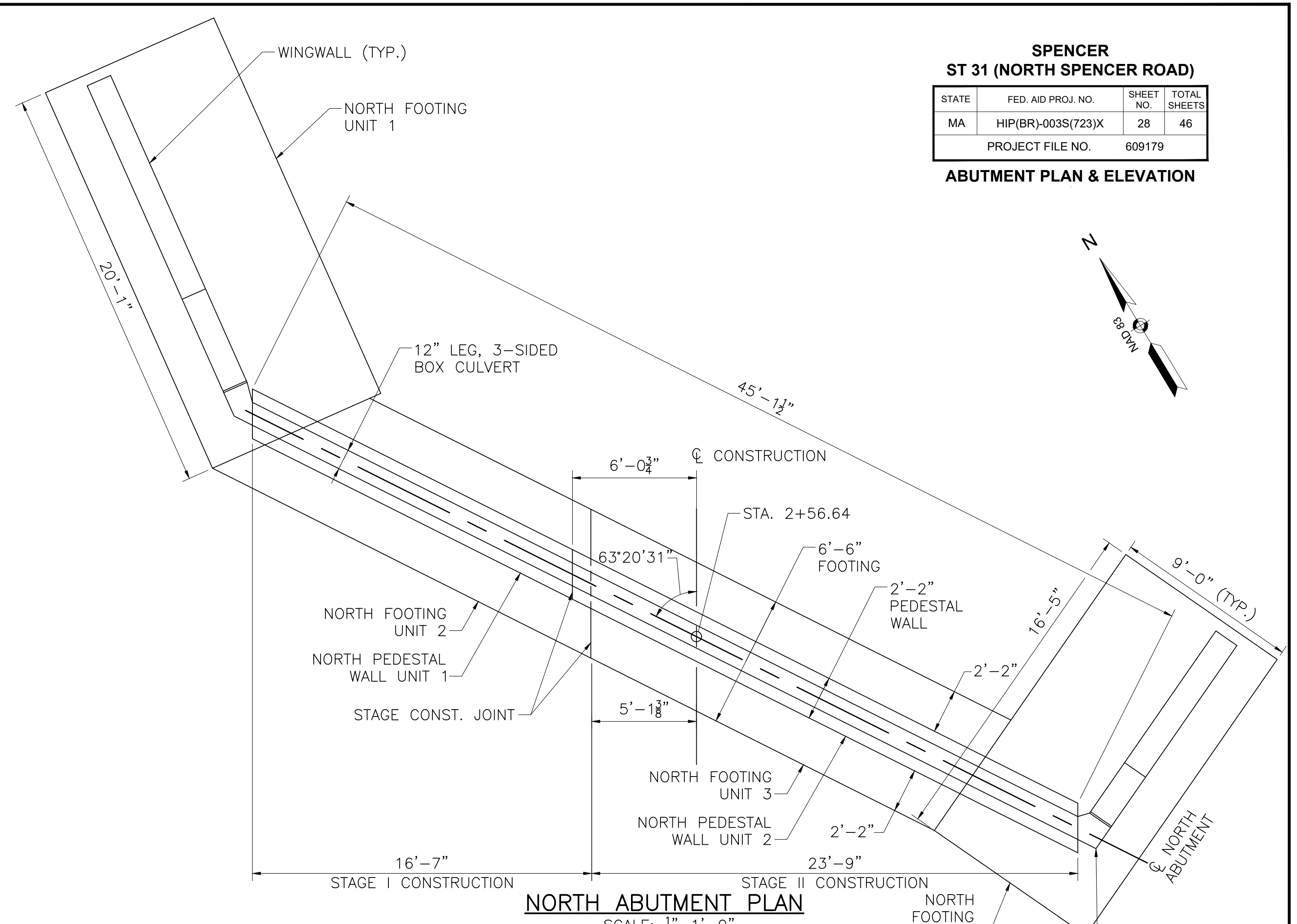
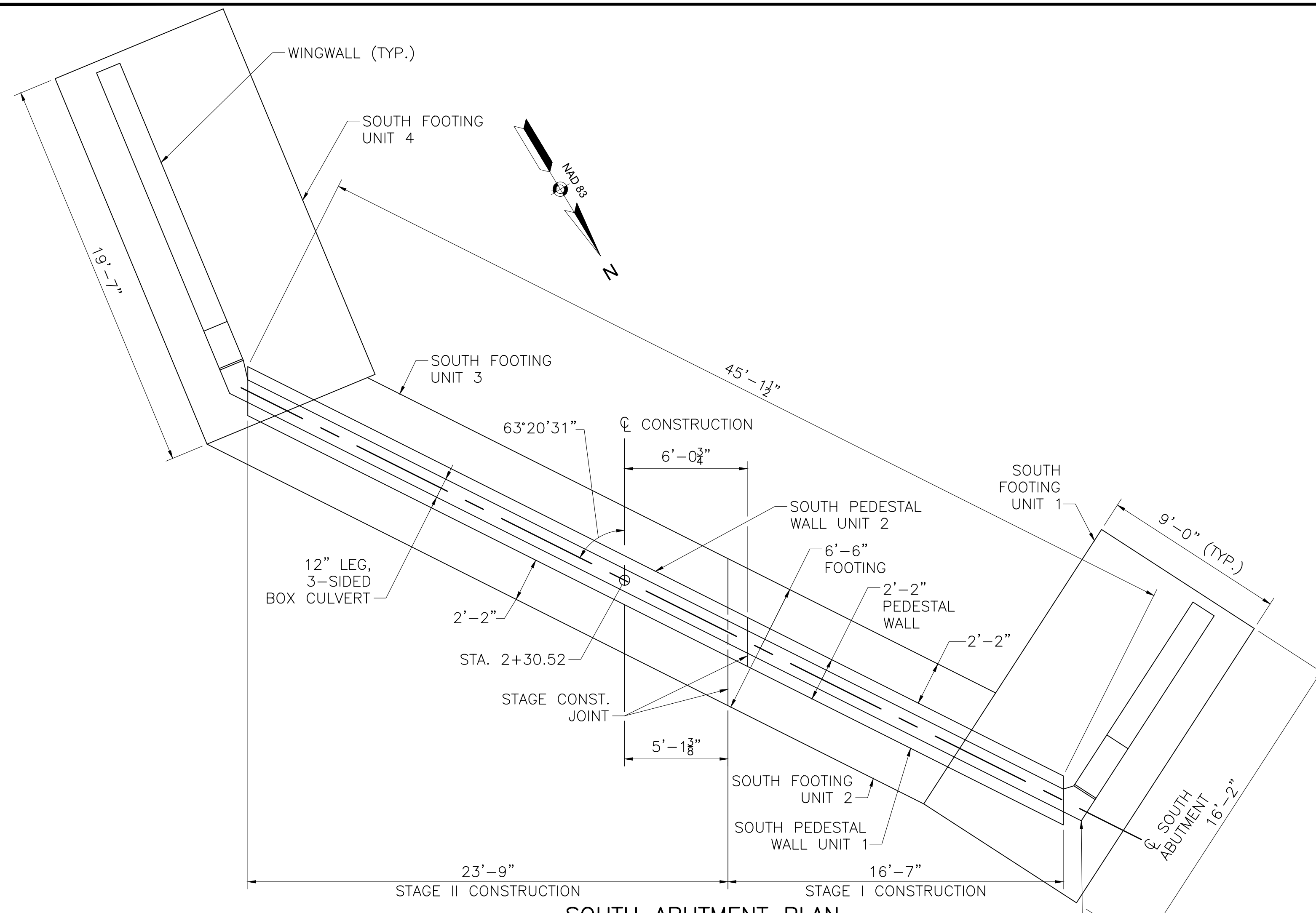
**NORTH FOOTING UNIT 3**  
SCALE: 3/8" = 1'-0"

- NOTES:**
- FOOTING REINFORCING NOT SHOWN FOR CLARITY.
  - ALL FOOTINGS WILL BE MARKED WITH THE NAME OF FOOTING ON THE TOP SURFACE OF THE FOOTING BY THE PRECASTER.
  - DIMENSIONS ARE FROM THE UNCHAMFERED CORNER.
  - 2" CLEAR MIN. FOR ALL REINFORCING.
  - ALL FOOTINGS ARE 4000 PSI 3/4" IN, 585 HP CEMENT CONCRETE.

APRIL 13, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

609179\_BR11(S23012)DWG 11-45-2023 Plotted on 12-Mar-2024 1:27 PM





- NOTES:**
1. PROPOSED GROUND NOT SHOWN FOR CLARITY.
  2. PRECAST APPROACH SLAB, APPROACH SLAB SHELF, AND HIGHWAY GUARDRAIL TRANSITIONS ARE NOT SHOWN IN THE PLAN VIEWS FOR CLARITY.
  3. FOOTING ERECTION TOLERANCE ±1/4" FROM C OF CONSTRUCTION.
  4. PEDESTAL WALL ERECTION TOLERANCE ±1/4" FROM C OF CONSTRUCTION.
  5. 3-SIDED BOX ERECTION TOLERANCE ±1/4" FROM C OF CONSTRUCTION FOR EACH PRECAST UNIT.
  6. THE FABRICATOR OF THE PEDESTAL WALL WILL ADJUST THE HEIGHT OF THE WEEP HOLES TO CLEAR THE GROUTED SPLICE COUPLER AND TO BE POSITIONED AS CLOSE TO THE FOOTING AS REASONABLE.
  7. SEE SHEET 21 FOR ERECTION TOLERANCE SCHEMATIC

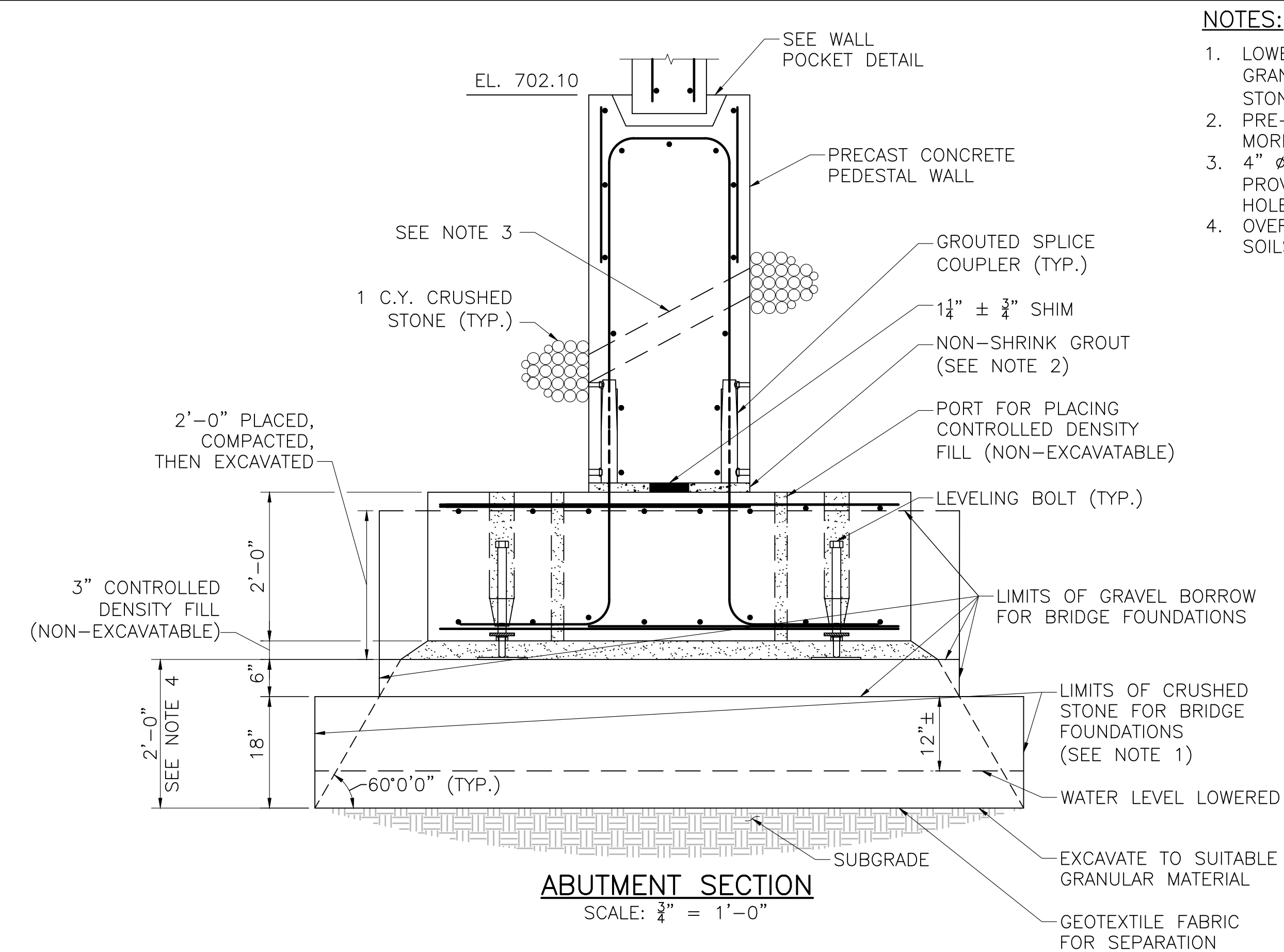
APRIL 13, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

609179\_BRI13(S23012).DWG Plotted on 12-Mar-2024 1:28 PM 11-6-2023 609179 Structural Submittal (PS&E)

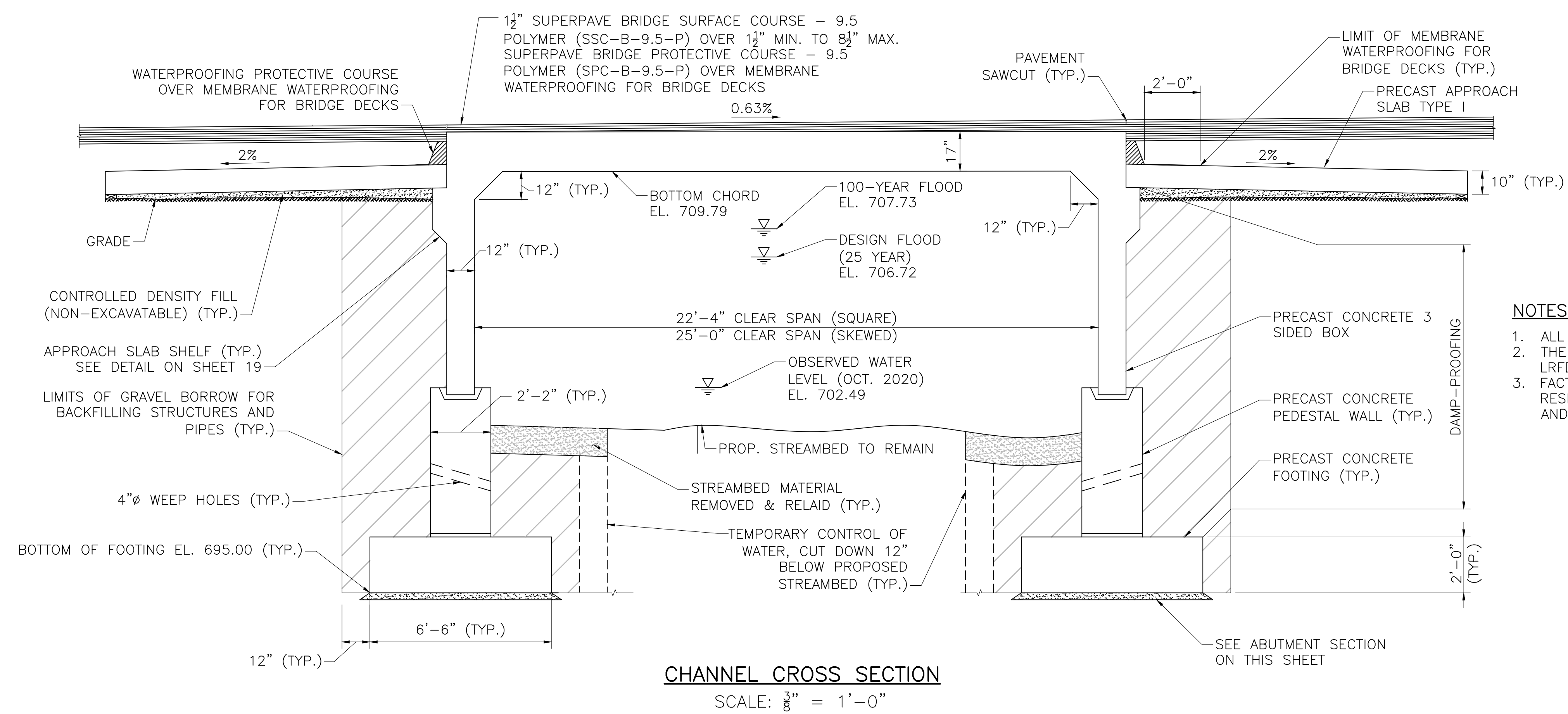
**SPENCER**  
**ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	29	46
PROJECT FILE NO.		609179	

**ABUTMENT & CHANNEL SECTIONS**



- NOTES:**
1. LOWER WATER LEVEL AS MUCH AS POSSIBLE WITHOUT DISTURBING THE GRANULAR SOIL (SIDES & BOTTOM) AND THEN TIGHTEN THE CRUSHED STONE IN PLACE (SEE STANDARD SPECIFICATIONS)
  2. PRE-BED PRECAST ELEMENT WITH NON-SHRINK GROUT WITH THICKNESS MORE THAN SHIM STACK.
  3. 4" Ø WEEP HOLES 10'-0" O.C. MAX. (JUST ABOVE PROTECTIVE COURSE). PROVIDE 1 CUBIC YARD OF CRUSHED STONE AT EACH END OF WEEP HOLE.
  4. OVER EXCAVATION OF SUBGRADE IS REQUIRED WHEN THERE ARE CLAY SOILS LOCATED AT THE BOTTOM OF FOOTING.



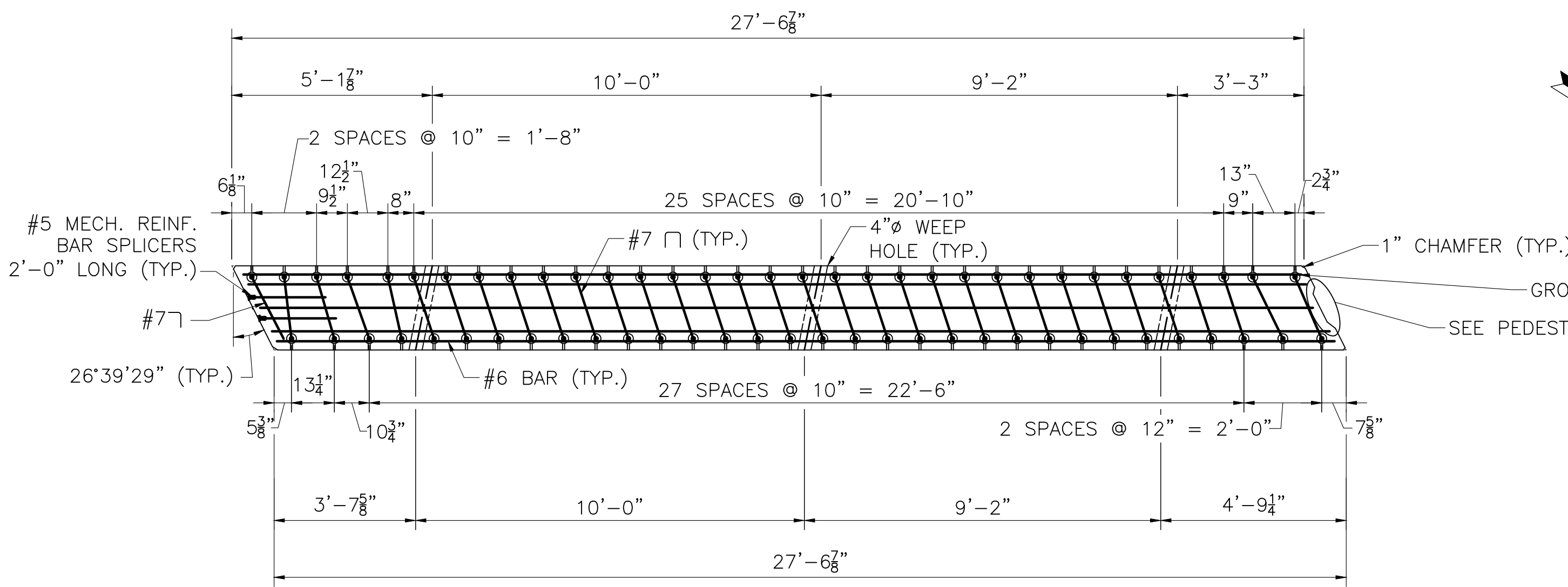
- NOTES:**
1. ALL DIMENSIONS ARE ON THE SQUARE UNLESS OTHERWISE NOTED.
  2. THE FACTORED BEARING PRESSURE = 7.20 KSF AS PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS STRENGTH I LOAD COMBINATION.
  3. FACTORED BEARING RESISTANCE = 10.8 KSF. FACTORED BEARING RESISTANCE IS THE PRODUCT OF THE NOMINAL BEARING RESISTANCE AND A RESISTANCE FACTOR OF 0.45.

APRIL 13, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
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AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
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**SPENCER**  
**ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-0035(723)X	30	46
PROJECT FILE NO.		609179	

**PRECAST PEDESTAL WALL DETAILS**

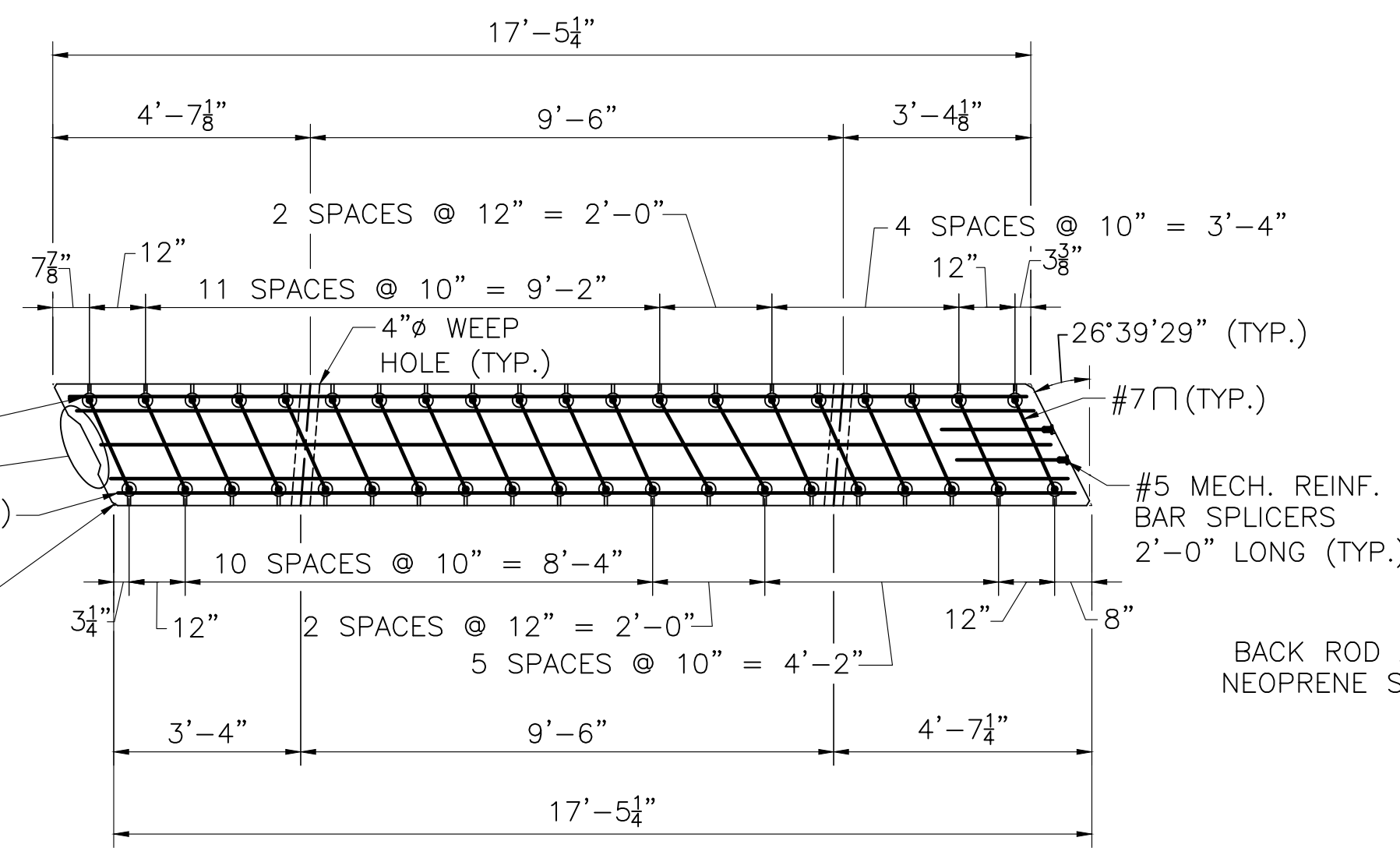


**SOUTH PEDESTAL WALL UNIT 2 SECTION**

SCALE: 3/8" = 1'-0"

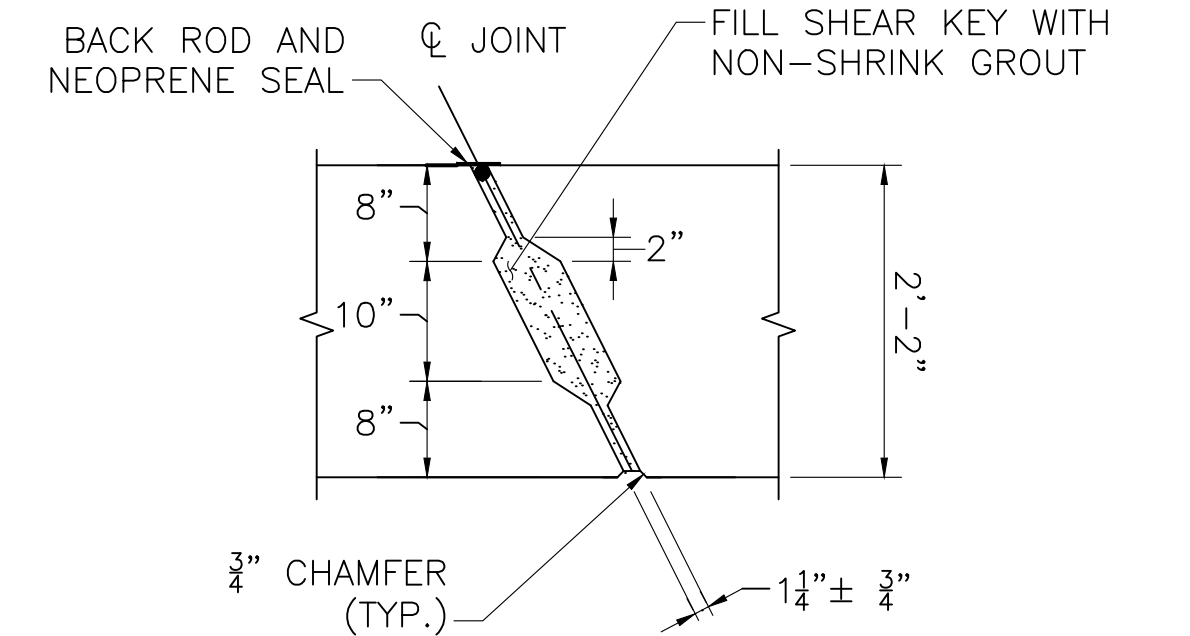
**NOTES:**

1. THE SOUTH PEDESTAL WALL UNITS WILL BE MARKED AS "SOUTH UNIT 1" OR "SOUTH UNIT 2" ON THE SOUTHERN WALL FACE BY THE PRECASTER.
2. DIMENSIONS TAKEN FROM THE UNCHAMFERED CORNER.
3. ALL PRECAST PEDESTAL WALLS ARE 5000 PSI 3/4 IN., 685 HP CEMENT CONCRETE.



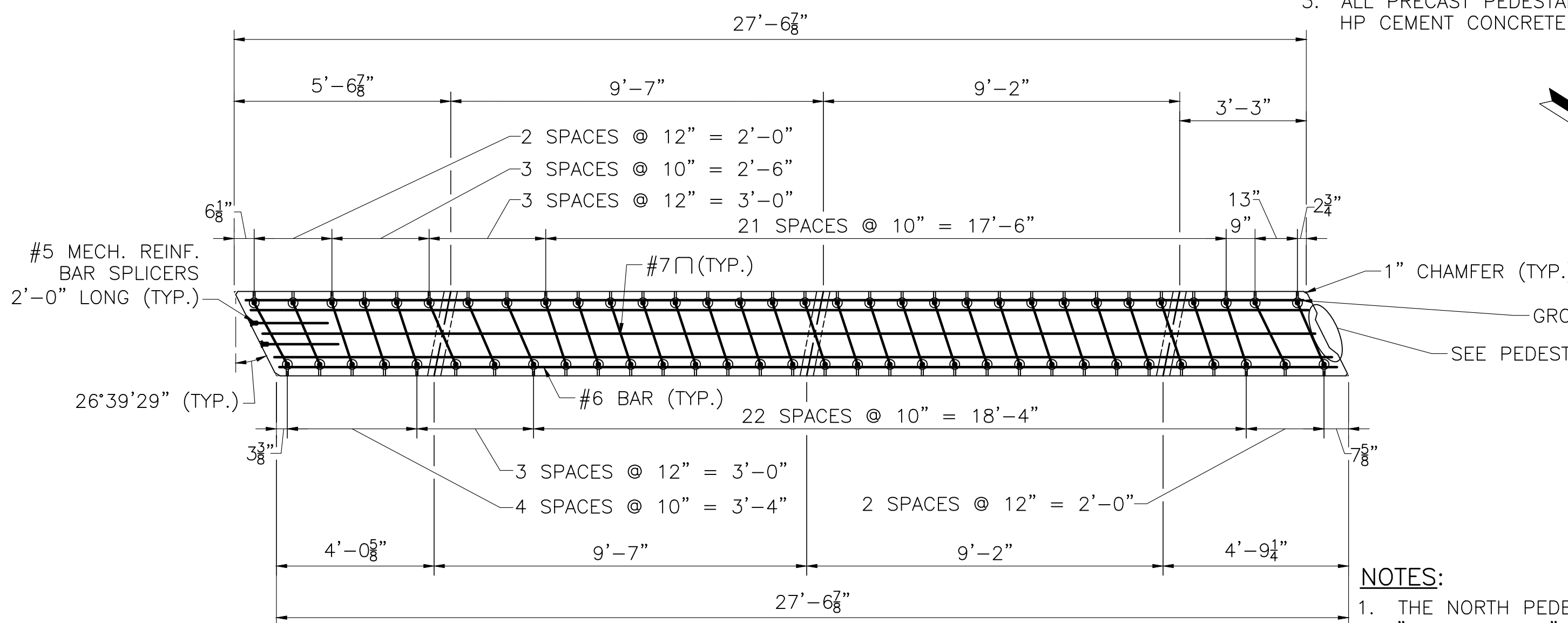
**SOUTH PEDESTAL WALL UNIT 1 SECTION**

SCALE: 3/8" = 1'-0"



**PEDESTAL WALL SHEAR KEY**

SCALE: 3/4" = 1'-0"

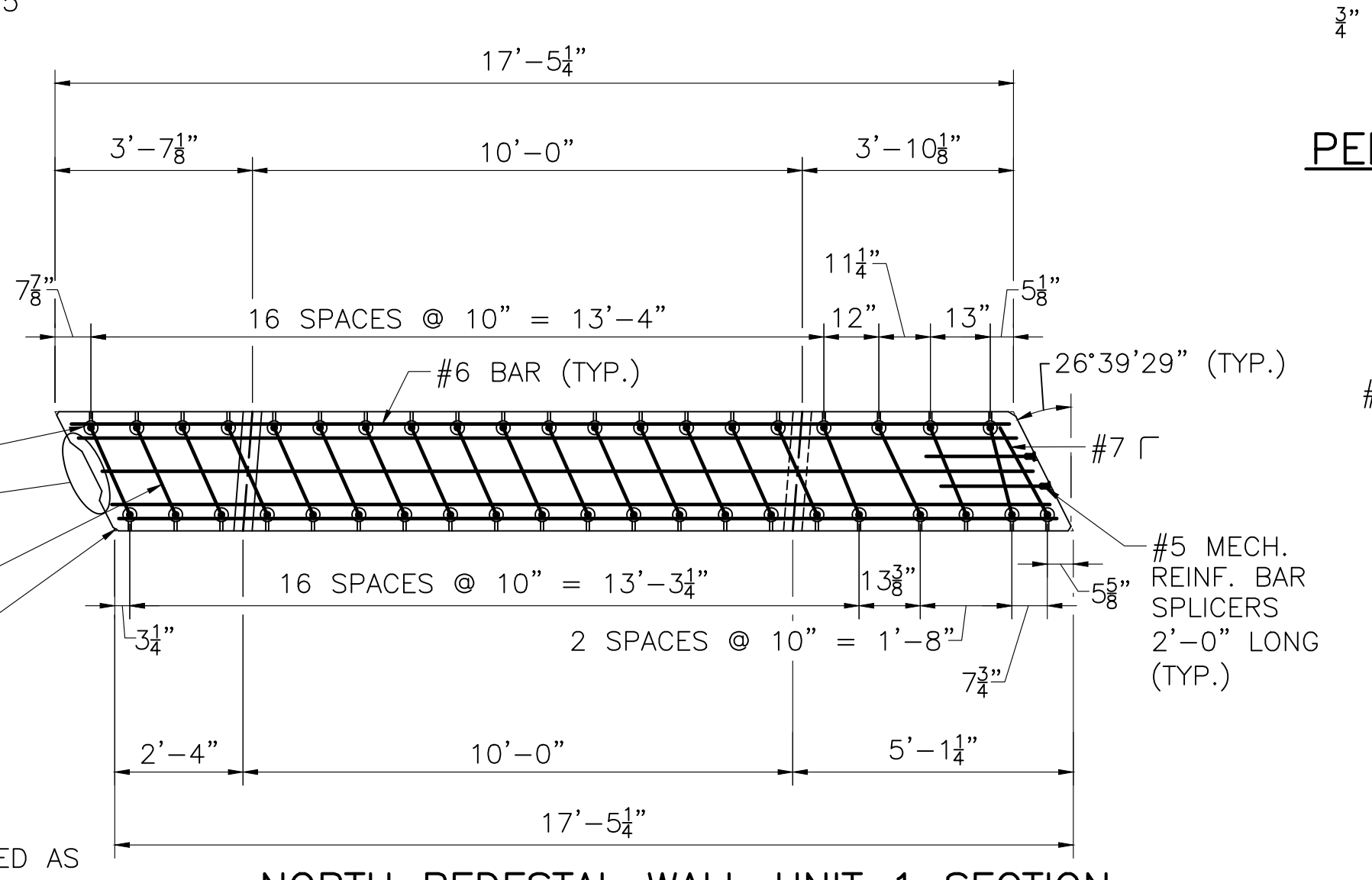


**NORTH PEDESTAL WALL UNIT 2 SECTION**

SCALE: 3/8" = 1'-0"

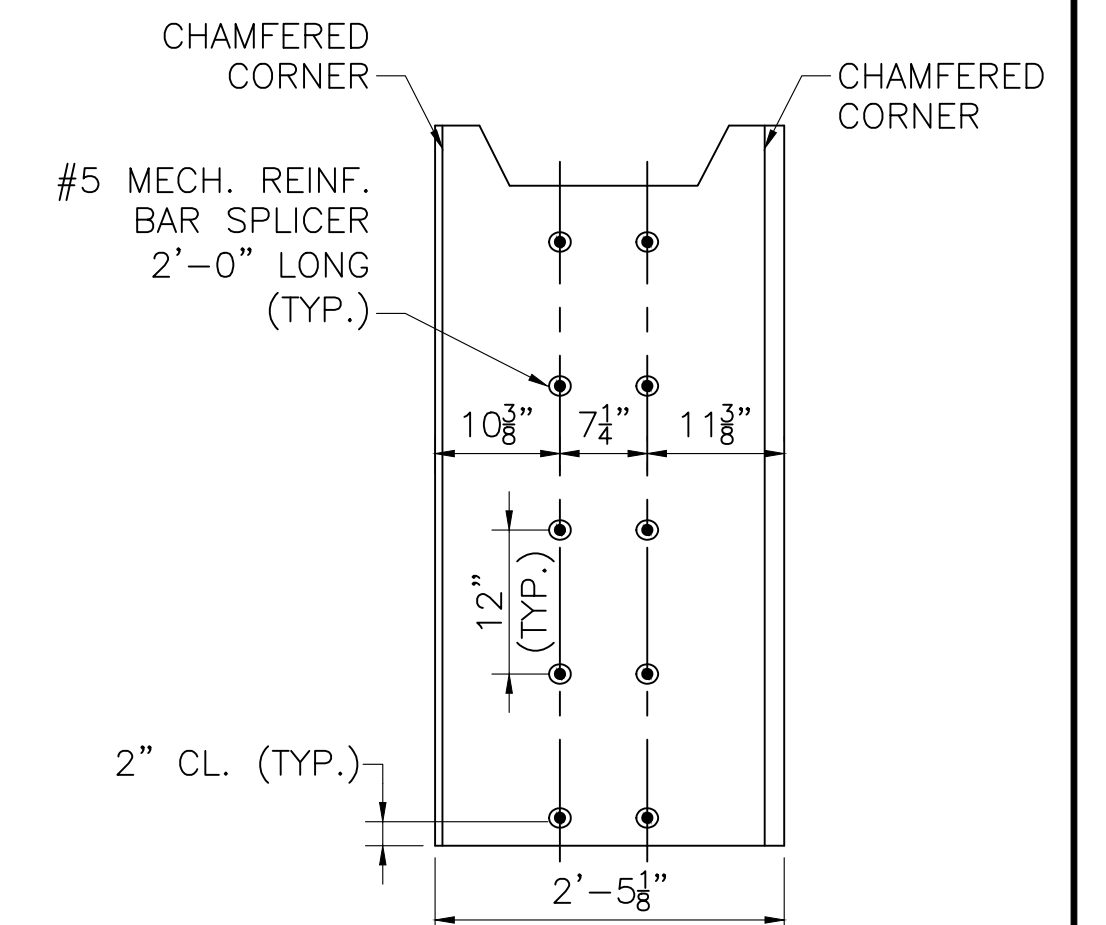
**NOTES:**

1. THE NORTH PEDESTAL WALL UNITS WILL BE MARKED AS "NORTH UNIT 1" OR "NORTH UNIT 2" ON THE NORTHERN WALL FACE BY THE PRECASTER.
2. DIMENSIONS ARE TAKEN FROM UNCHAMFERED CORNER.
3. ALL PRECAST PEDESTAL WALLS ARE 5000 PSI 3/4 IN., 685 HP CEMENT CONCRETE.



**NORTH PEDESTAL WALL UNIT 1 SECTION**

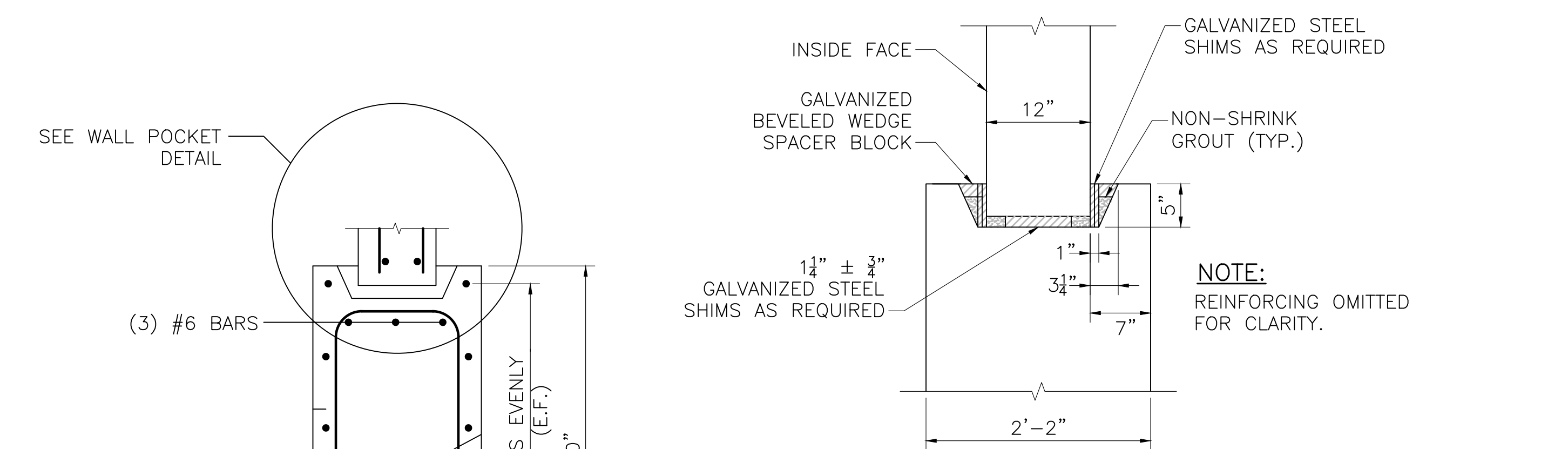
SCALE: 3/8" = 1'-0"



**NOTE:**  
DETAIL IS SQUARE TO THE FACE AT THE END OF THE WALL.

**END OF PEDESTAL WALL REINFORCEMENT**

SCALE: 3/4" = 1'-0"

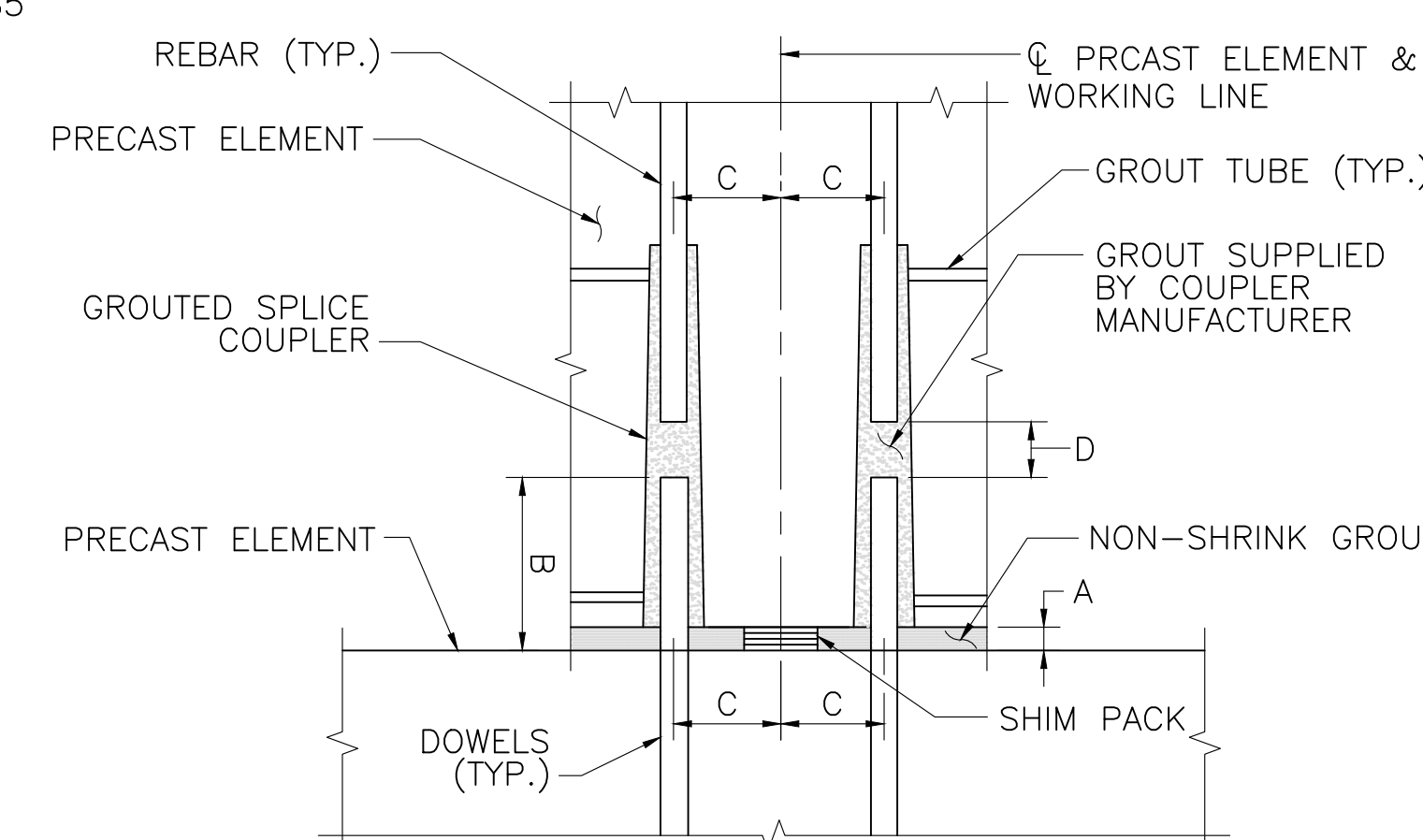


**WALL POCKET - DETAIL**

SCALE: 1" = 1'-0"

**GRADED SPLICE COUPLER TOLERANCES**

A	SHIM PACK HEIGHT	1 1/4" ± 3/8"
B	DOWEL HEIGHT	CONSULT MANUFACTURER
C	LOCATION OF REINFORCING, GRADED SPLICE COUPLER, AND DOWELS MEASURED FROM A WORKING LINE	± 1/4"
D	GAP BETWEEN DOWELS AND REINFORCING	CONSULT MANUFACTURER

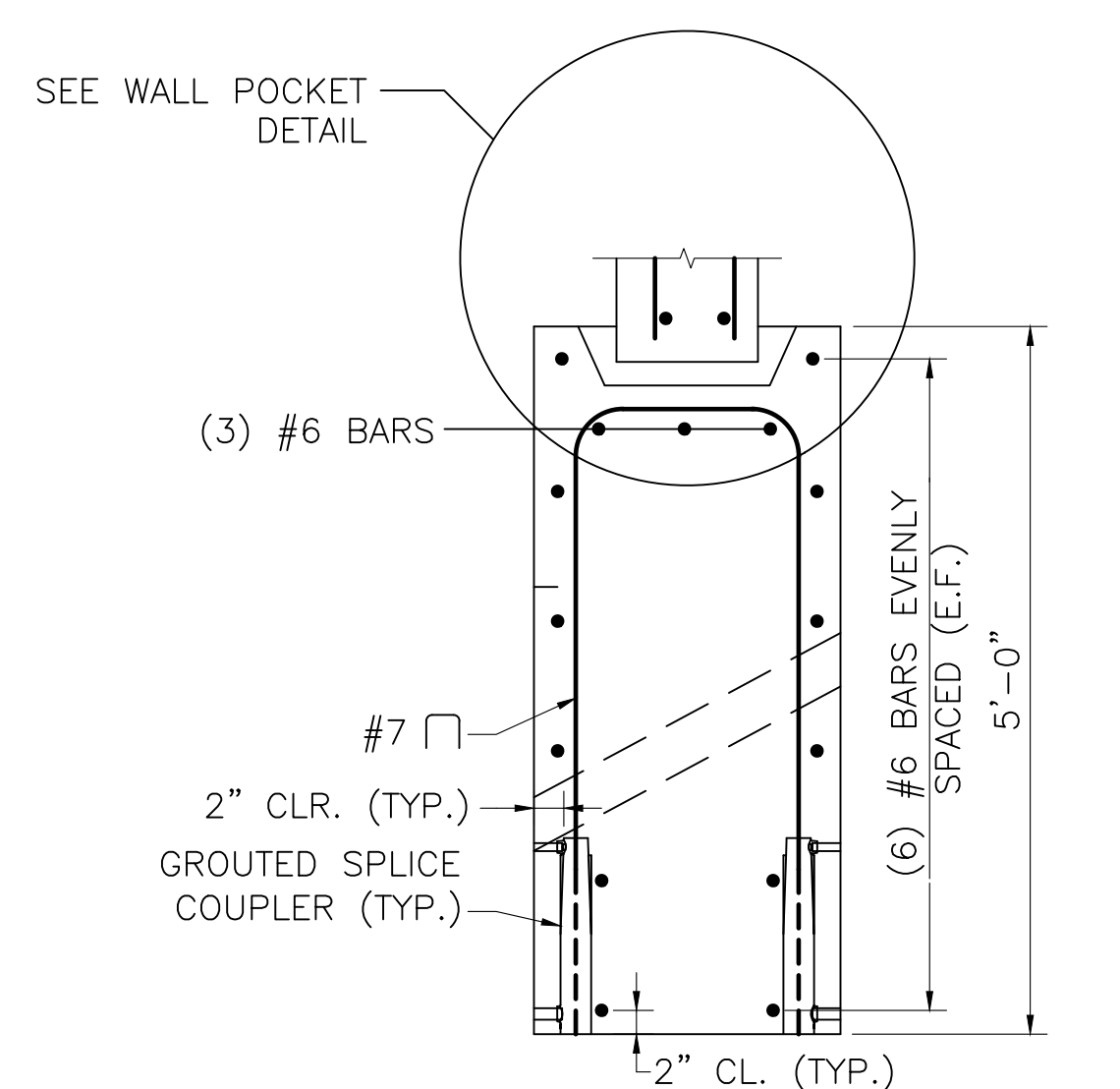


**GRADED SPLICE COUPLER DETAILS**

NOT TO SCALE

**NOTES:**

1. USE MATCHING TEMPLATES FOR THE LOCATION OF REINFORCEMENT AND GRADED SPLICE COUPLER PLACEMENT WITHIN THE ELEMENTS TO CONTROL THE CRITICAL DIMENSION "C".
2. CONSULT MANUFACTURER OF THE GRADED SPLICE COUPLER FOR PROPER DIMENSIONS "B" AND "D" AND FOR TOLERANCES ON THESE AND ALL DIMENSIONS.
3. BEFORE EXECUTING GRADED SPLICE COUPLER ASSEMBLIES, ALWAYS SEEK INSTALLATION RECOMMENDATIONS FROM THE MANUFACTURER OF THE GRADED SPLICE COUPLER USED.



**PEDESTAL WALL REINFORCEMENT**

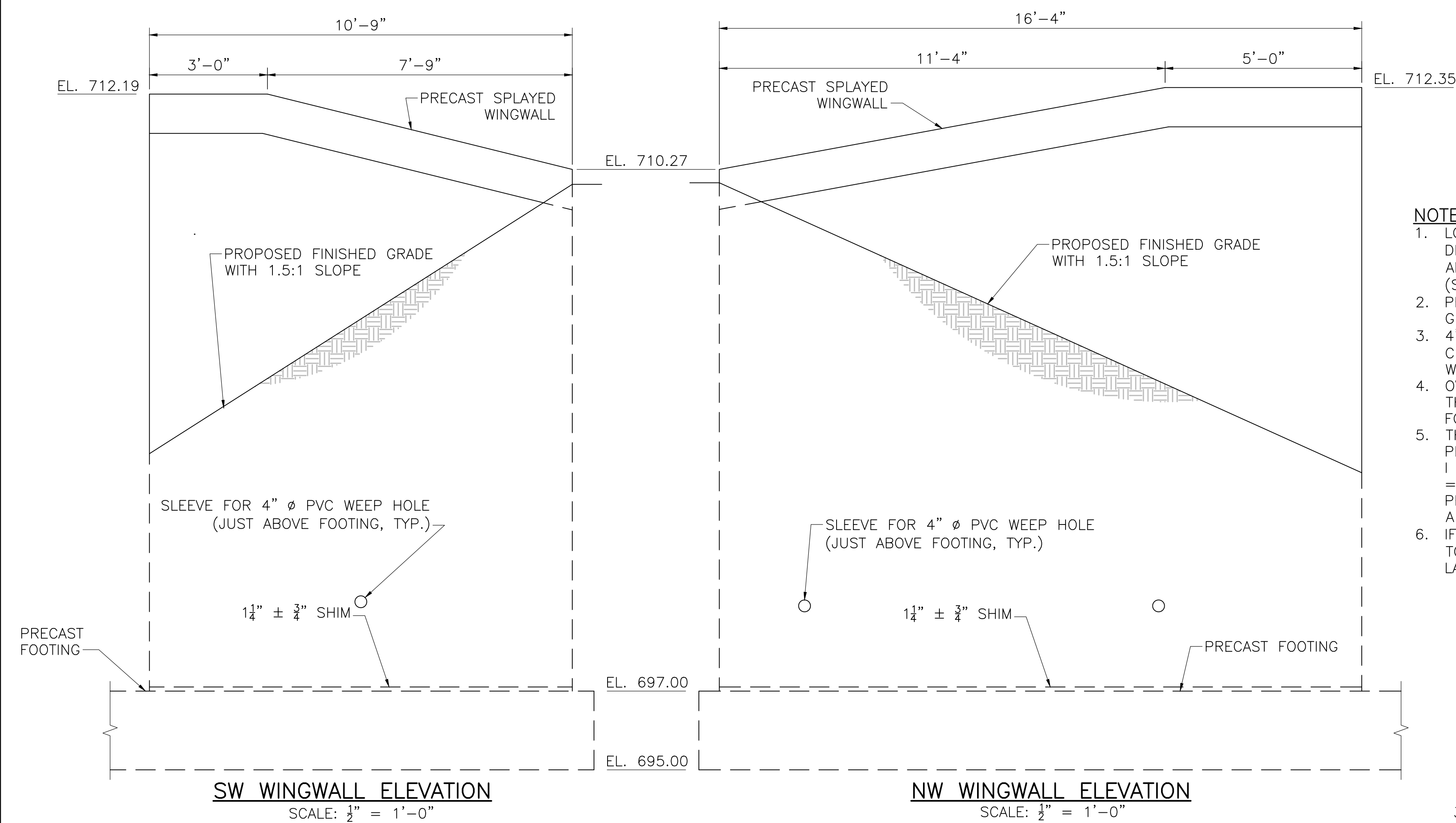
SCALE: 3/4" = 1'-0"

APRIL 13, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
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**SPENCER**  
**ST 31 (NORTH SPENCER ROAD)**

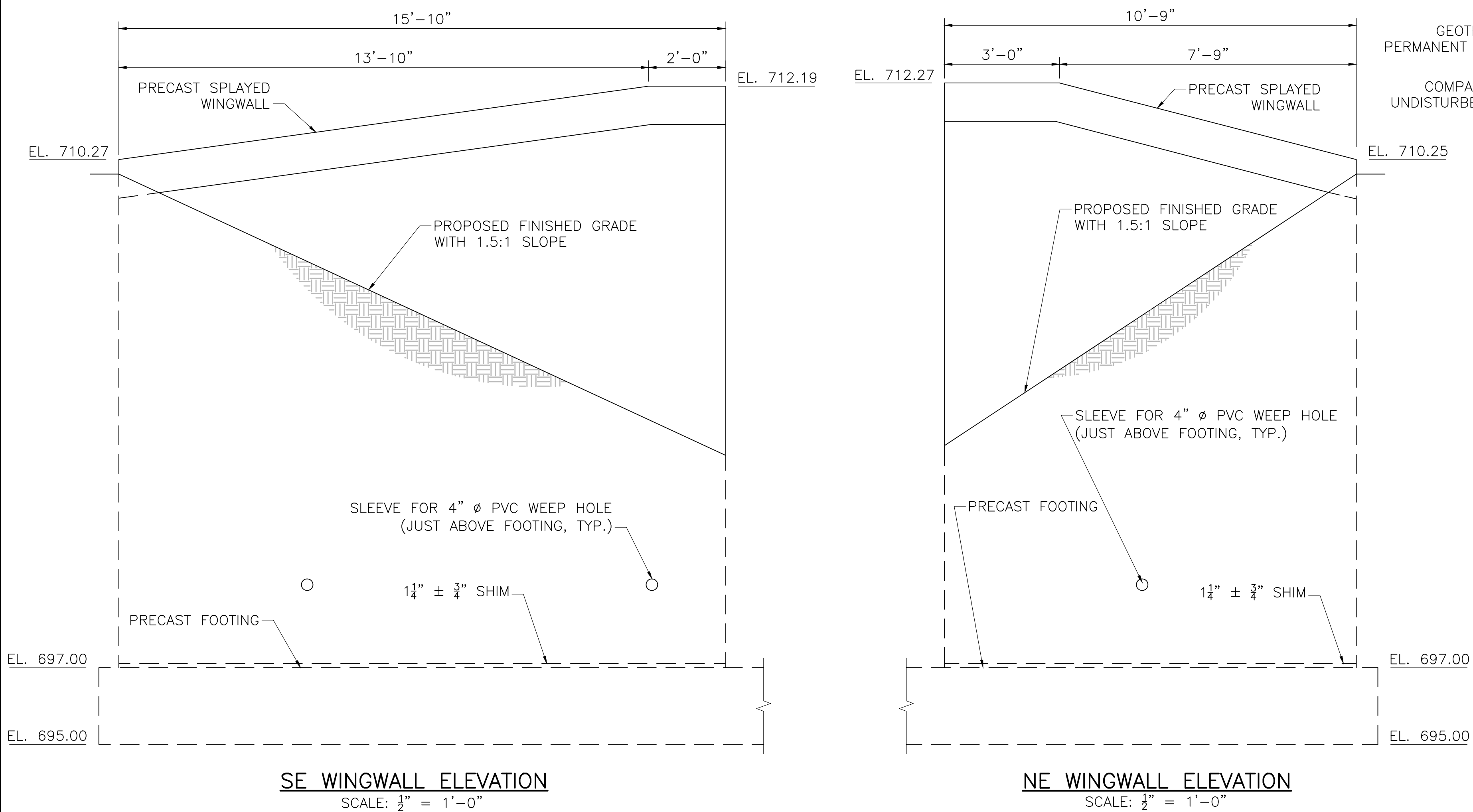
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	31	46
PROJECT FILE NO.		609179	

**PRECAST WINGWALL ELEVATIONS**



**SW WINGWALL ELEVATION**  
SCALE: 1/2" = 1'-0"

**NW WINGWALL ELEVATION**  
SCALE: 1/2" = 1'-0"

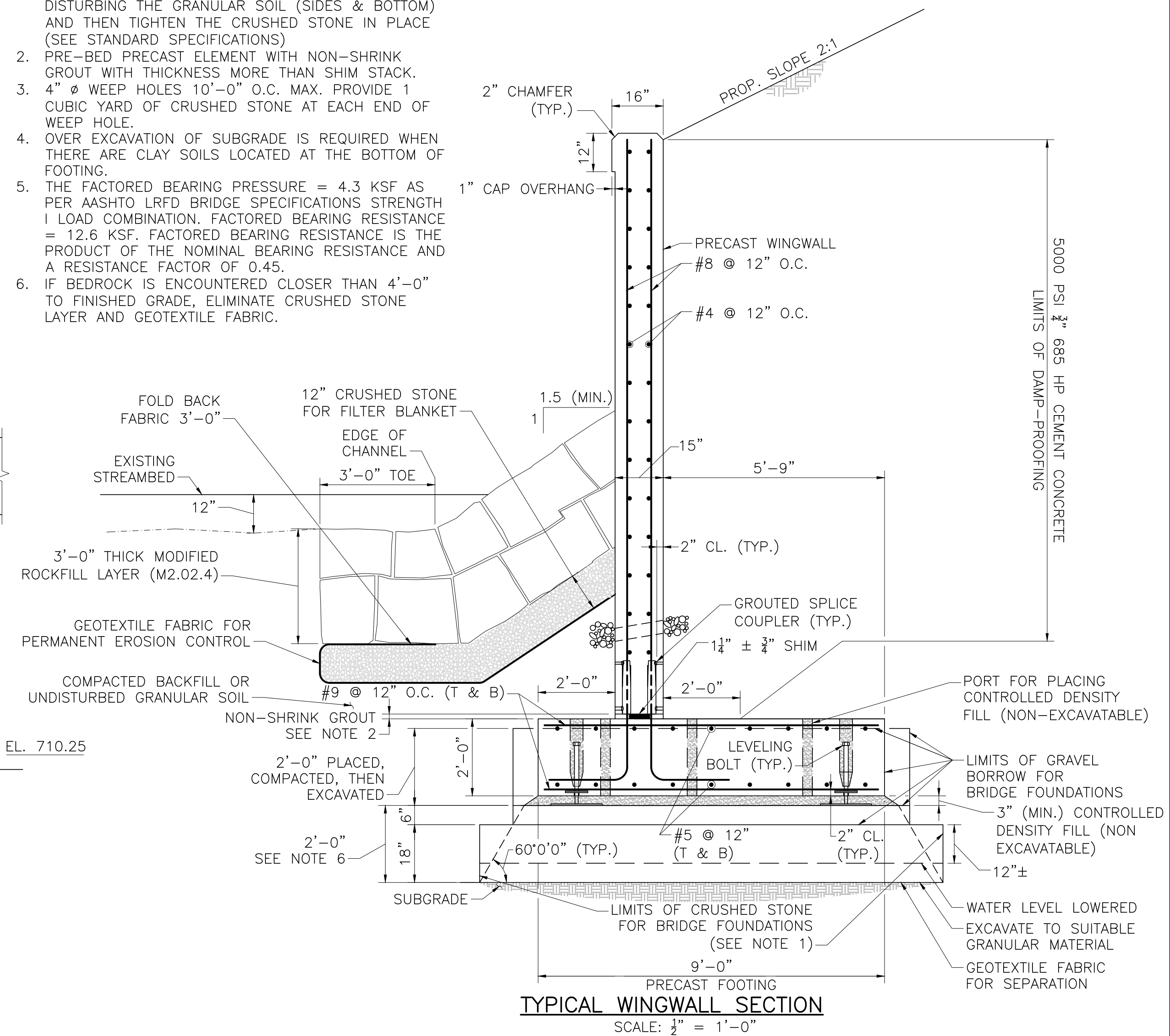


**SE WINGWALL ELEVATION**  
SCALE: 1/2" = 1'-0"

**NE WINGWALL ELEVATION**  
SCALE: 1/2" = 1'-0"

**NOTES:**

1. LOWER WATER LEVEL AS MUCH AS POSSIBLE WITHOUT DISTURBING THE GRANULAR SOIL (SIDES & BOTTOM) AND THEN TIGHTEN THE CRUSHED STONE IN PLACE (SEE STANDARD SPECIFICATIONS)
2. PRE-BED PRECAST ELEMENT WITH NON-SHRINK GROUT WITH THICKNESS MORE THAN SHIM STACK.
3. 4" Ø WEEP HOLES 10'-0" O.C. MAX. PROVIDE 1 CUBIC YARD OF CRUSHED STONE AT EACH END OF WEEP HOLE.
4. OVER EXCAVATION OF SUBGRADE IS REQUIRED WHEN THERE ARE CLAY SOILS LOCATED AT THE BOTTOM OF FOOTING.
5. THE FACTORED BEARING PRESSURE = 4.3 KSF AS PER AASHTO LRFD BRIDGE SPECIFICATIONS STRENGTH I LOAD COMBINATION. FACTORED BEARING RESISTANCE = 12.6 KSF. FACTORED BEARING RESISTANCE IS THE PRODUCT OF THE NOMINAL BEARING RESISTANCE AND A RESISTANCE FACTOR OF 0.45.
6. IF BEDROCK IS ENCOUNTERED CLOSER THAN 4'-0" TO FINISHED GRADE, ELIMINATE CRUSHED STONE LAYER AND GEOTEXTILE FABRIC.



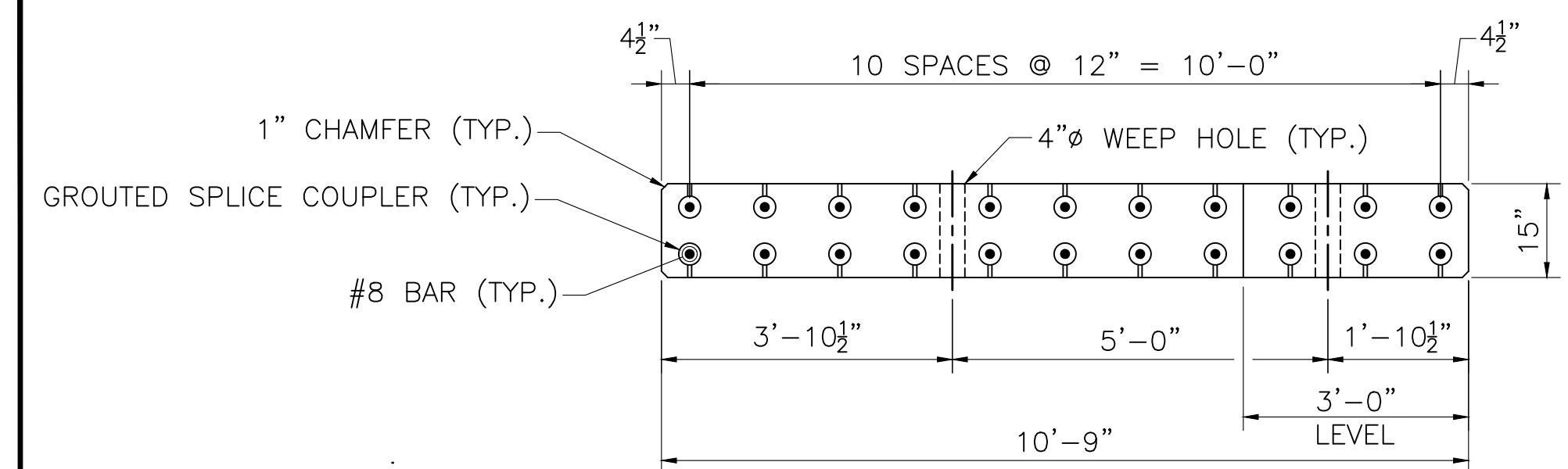
**TYPICAL WINGWALL SECTION**  
SCALE: 1/2" = 1'-0"

DATE	DESCRIPTION
APRIL 13, 2024	ISSUED FOR CONSTRUCTION
	CONSTRUCTION BY MASSDOT
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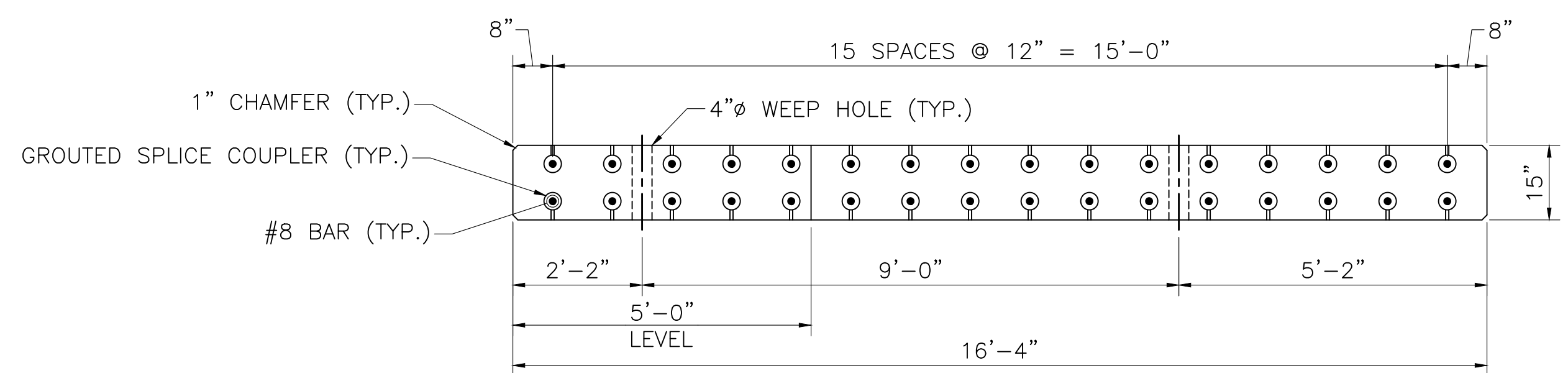
**SPENCER**  
**ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	32	46
PROJECT FILE NO.		609179	

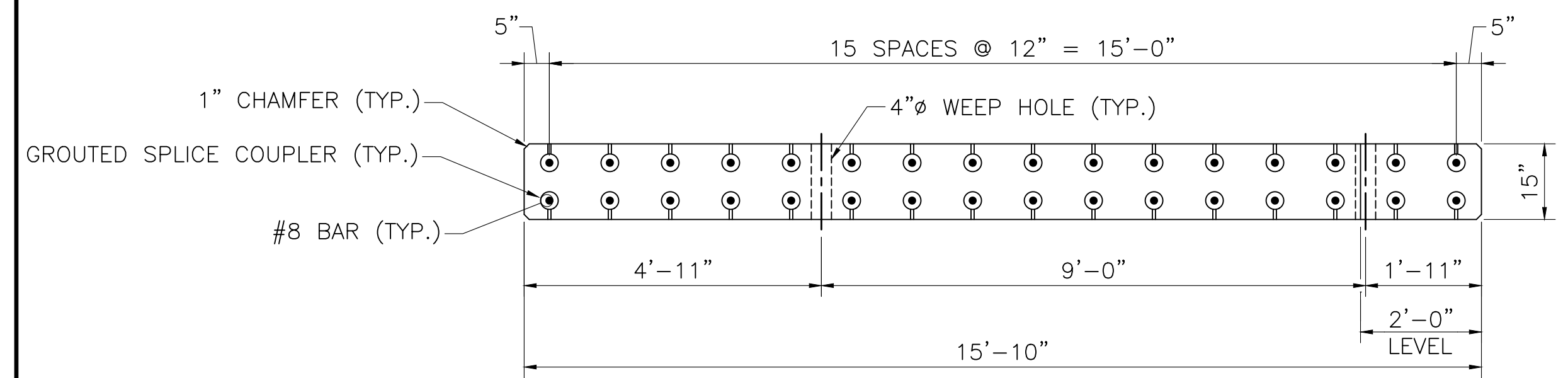
**PRECAST WINGWALL DETAILS**



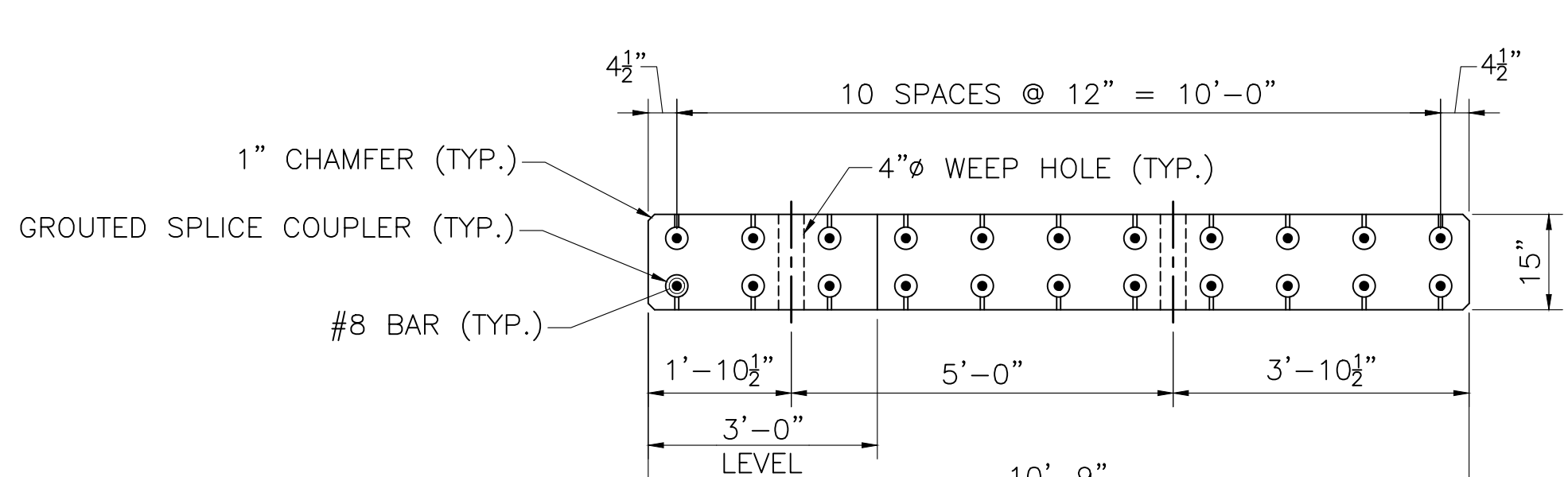
**SOUTHWEST WINGWALL SECTION**  
SCALE: 1/2" = 1'-0"



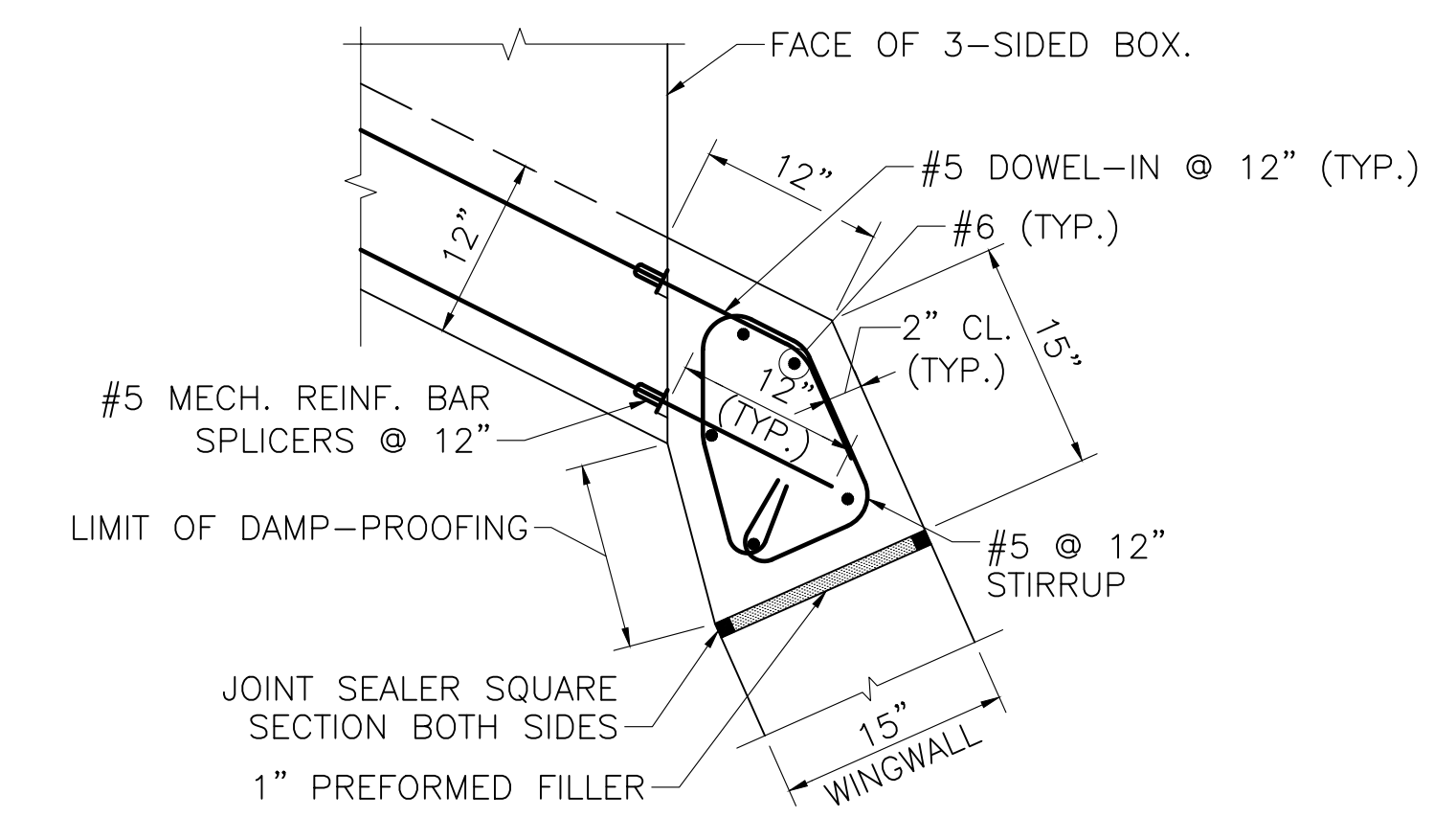
**NORTHWEST WINGWALL SECTION**  
SCALE: 1/2" = 1'-0"



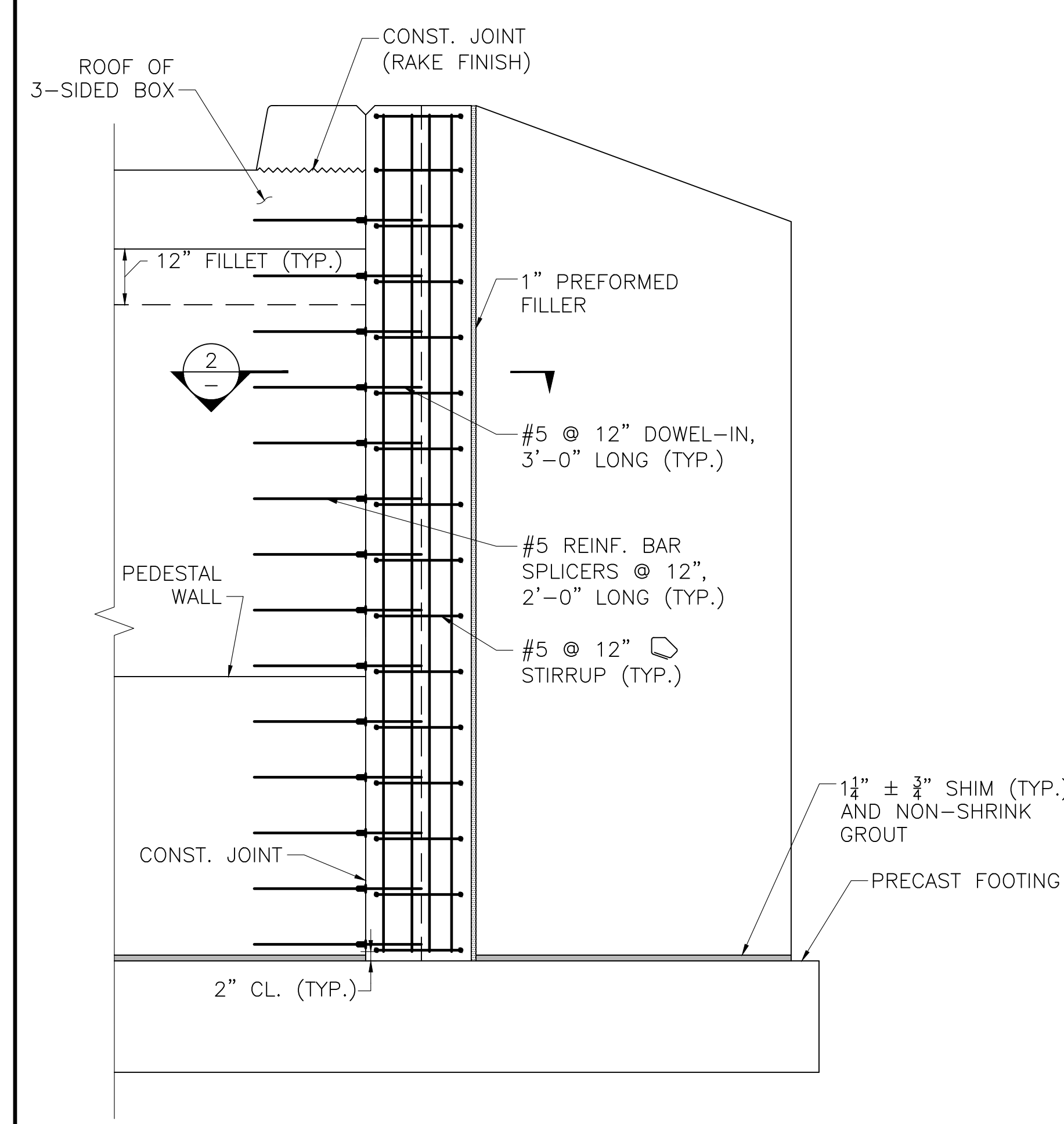
**SOUTHEAST WINGWALL SECTION**  
SCALE: 1/2" = 1'-0"



**NORTHEAST WINGWALL SECTION**  
SCALE: 1/2" = 1'-0"

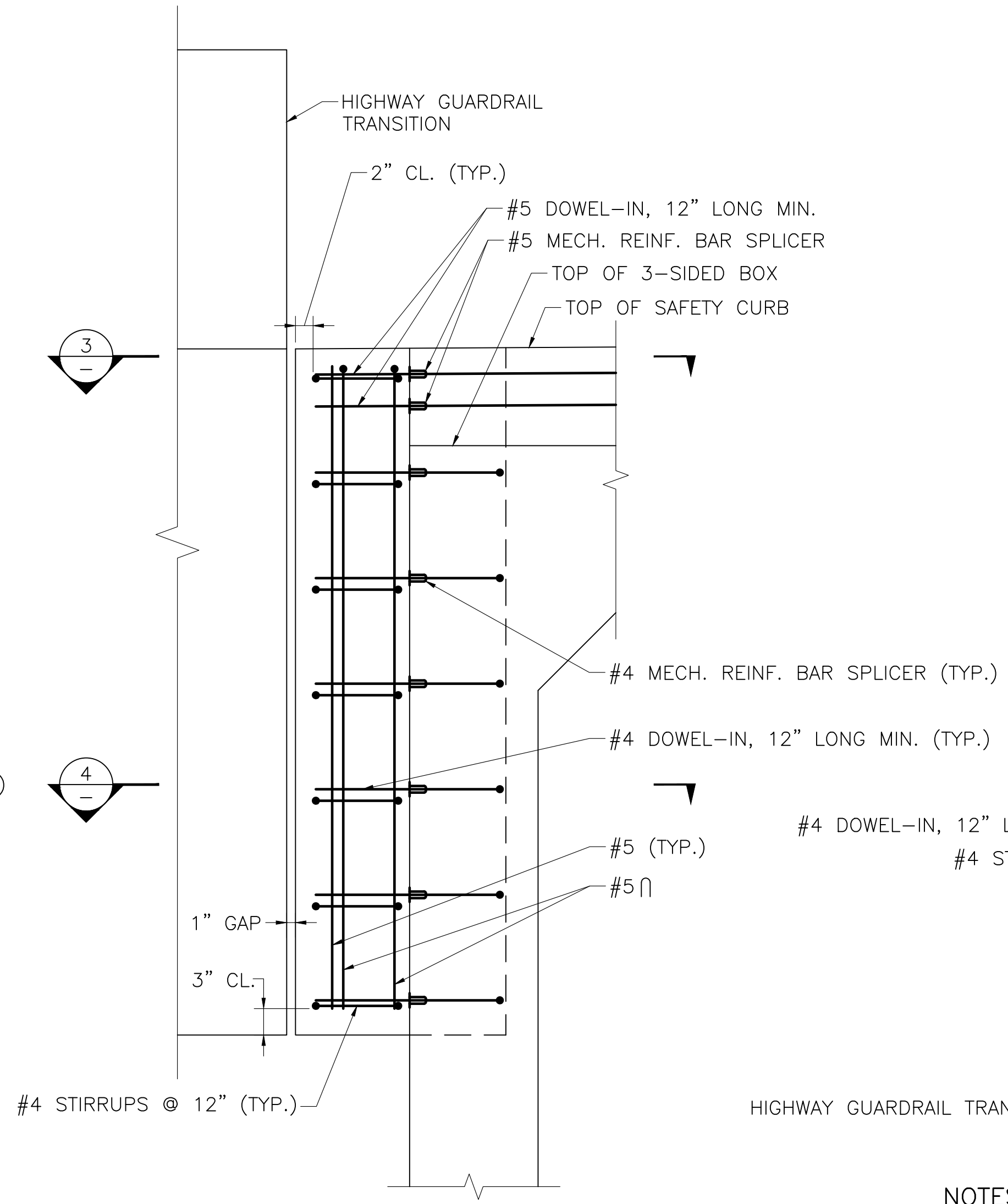


**NOTES:**  
1. 3-SIDED BOX REINFORCEMENT IS NOT SHOWN FOR CLARITY.

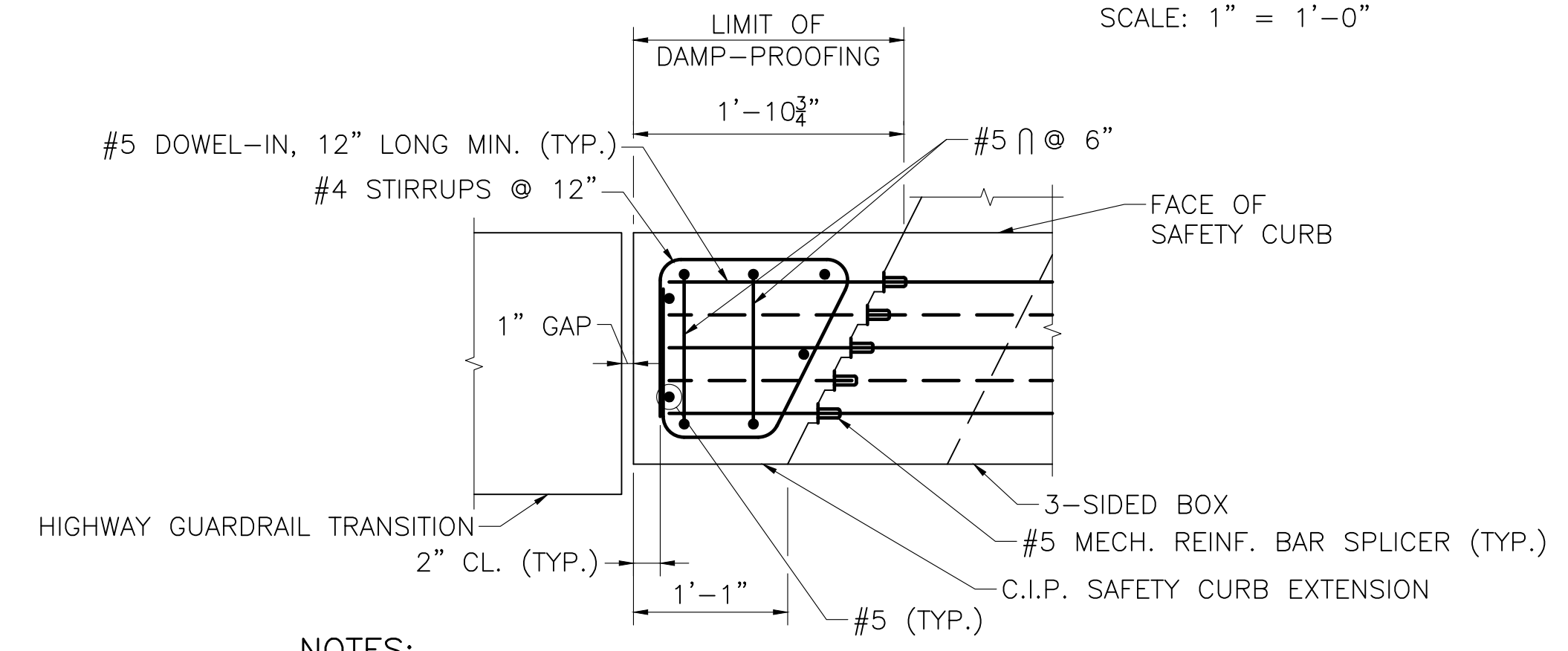


**SECTION AT WINGWALL**  
SCALE: 1/2" = 1'-0"

**NOTE:**  
3-SIDED BOX REINFORCEMENT IS NOT SHOWN FOR CLARITY.

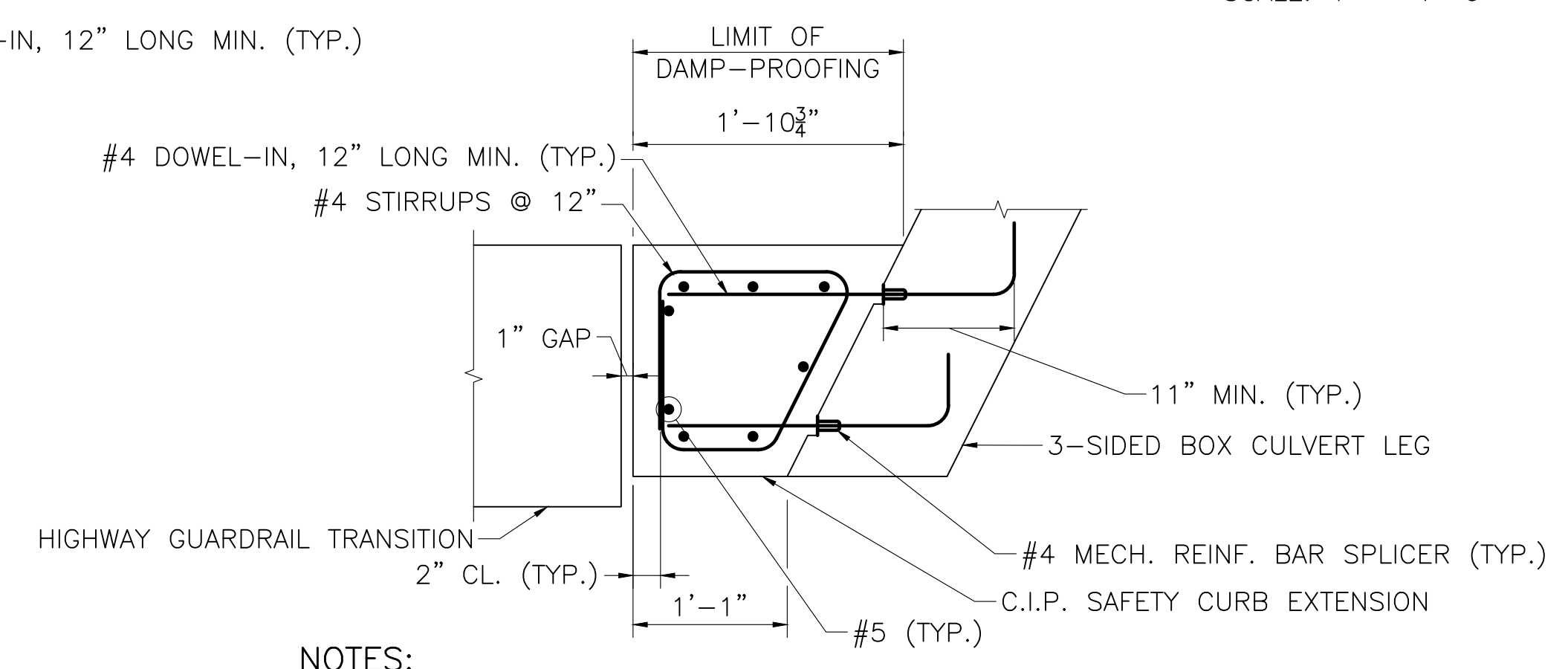


**SAFETY CURB EXTENSION DETAIL**  
SCALE: 1" = 1'-0"



**NOTES:**  
1. 3-SIDED BOX REINFORCEMENT IS NOT SHOWN FOR CLARITY.  
2. HIGHWAY GUARDRAIL TRANSITION REINFORCEMENT IS NOT SHOWN FOR CLARITY.  
3. SOUTHEAST EXTENSION SHOWN. THE OTHER 3 EXTENSIONS ARE SIMILAR.

**SECTION 2**  
SCALE: 1" = 1'-0"



**NOTES:**  
1. 3-SIDED BOX REINFORCEMENT IS NOT SHOWN FOR CLARITY.  
2. HIGHWAY GUARDRAIL TRANSITION REINFORCEMENT IS NOT SHOWN FOR CLARITY.  
3. SOUTHEAST EXTENSION SHOWN. THE OTHERS 3 EXTENSIONS ARE SIMILAR.

**SECTION 4**  
SCALE: 1" = 1'-0"

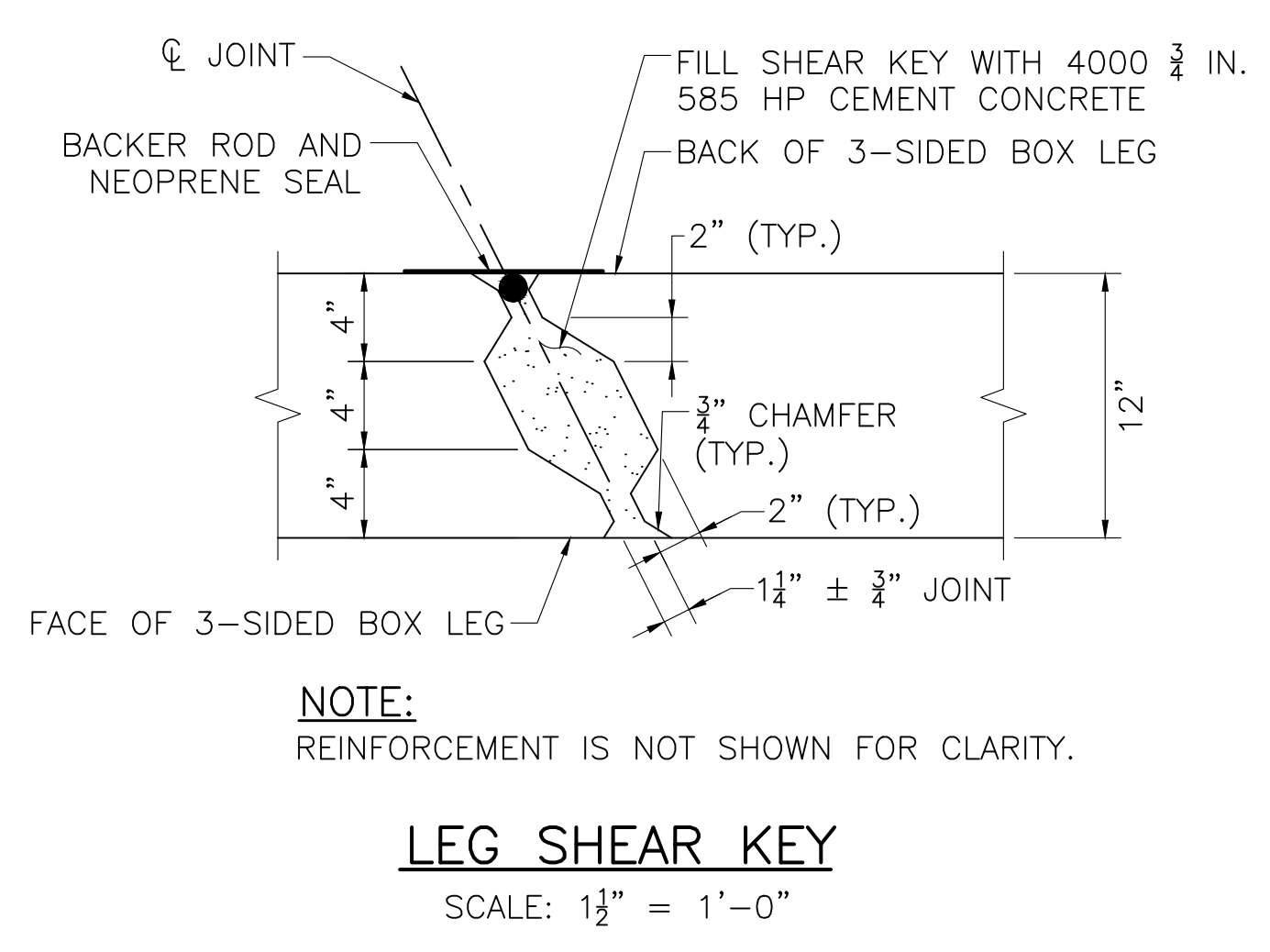
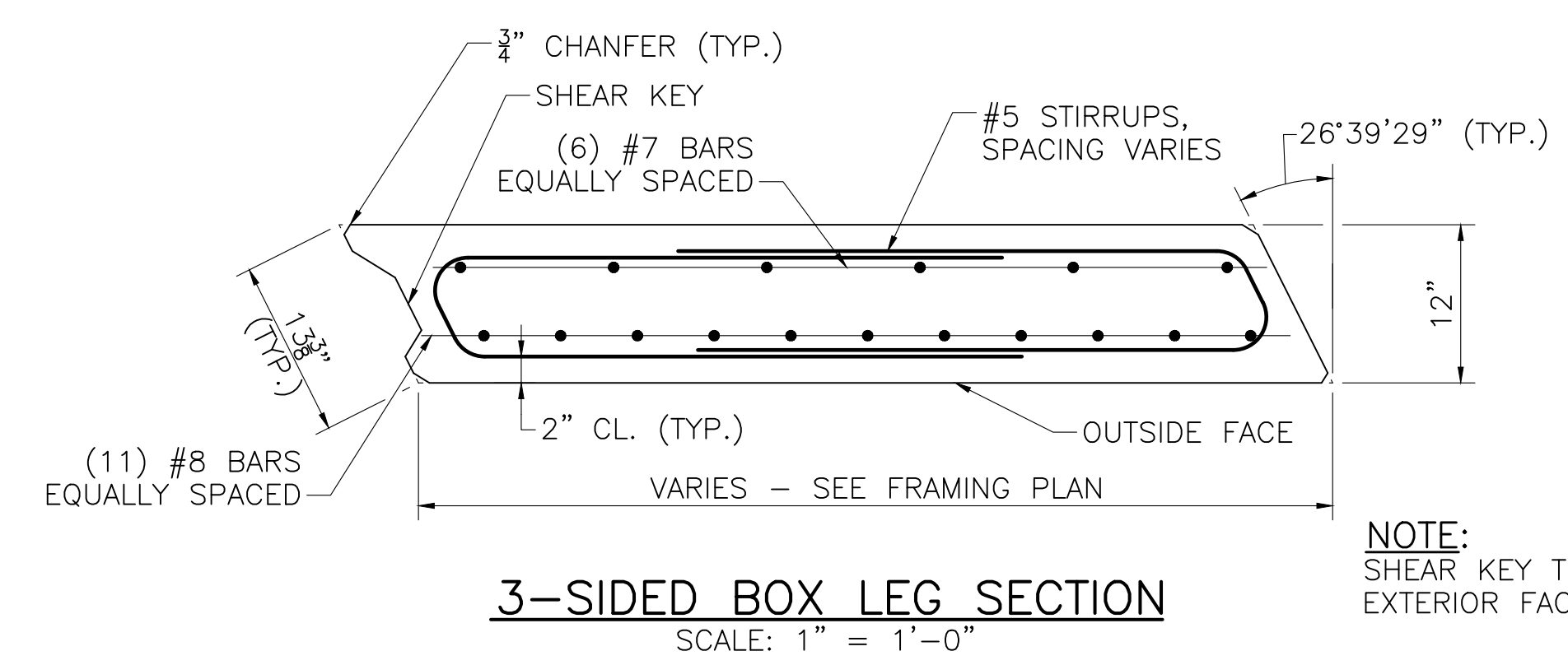
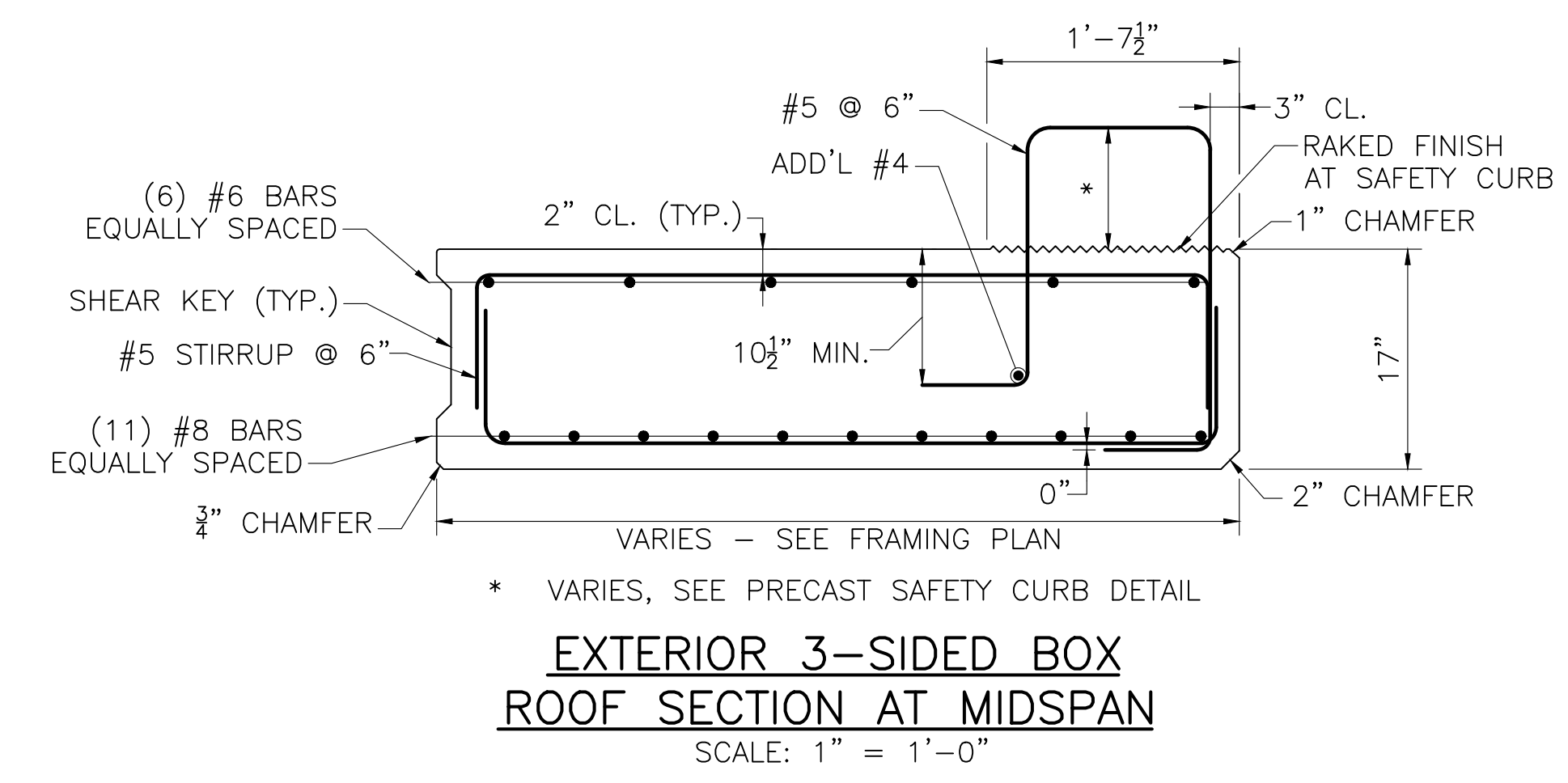
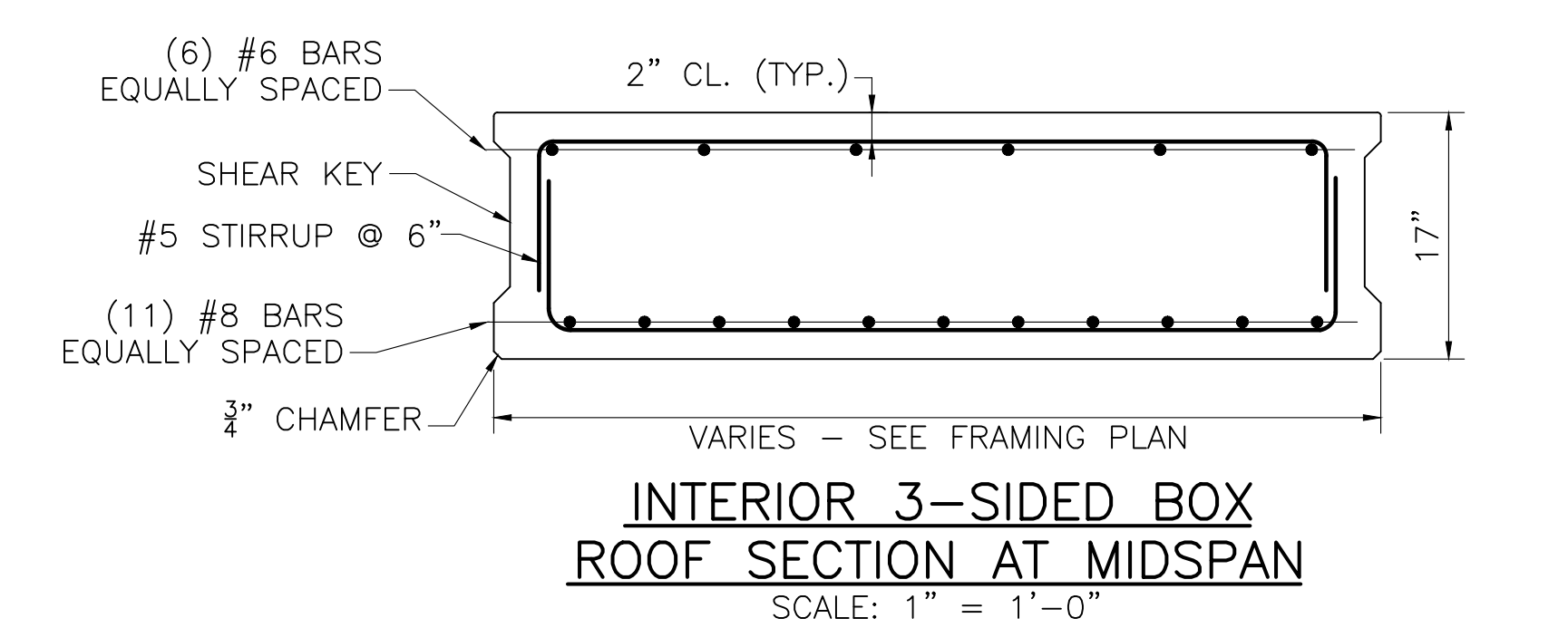
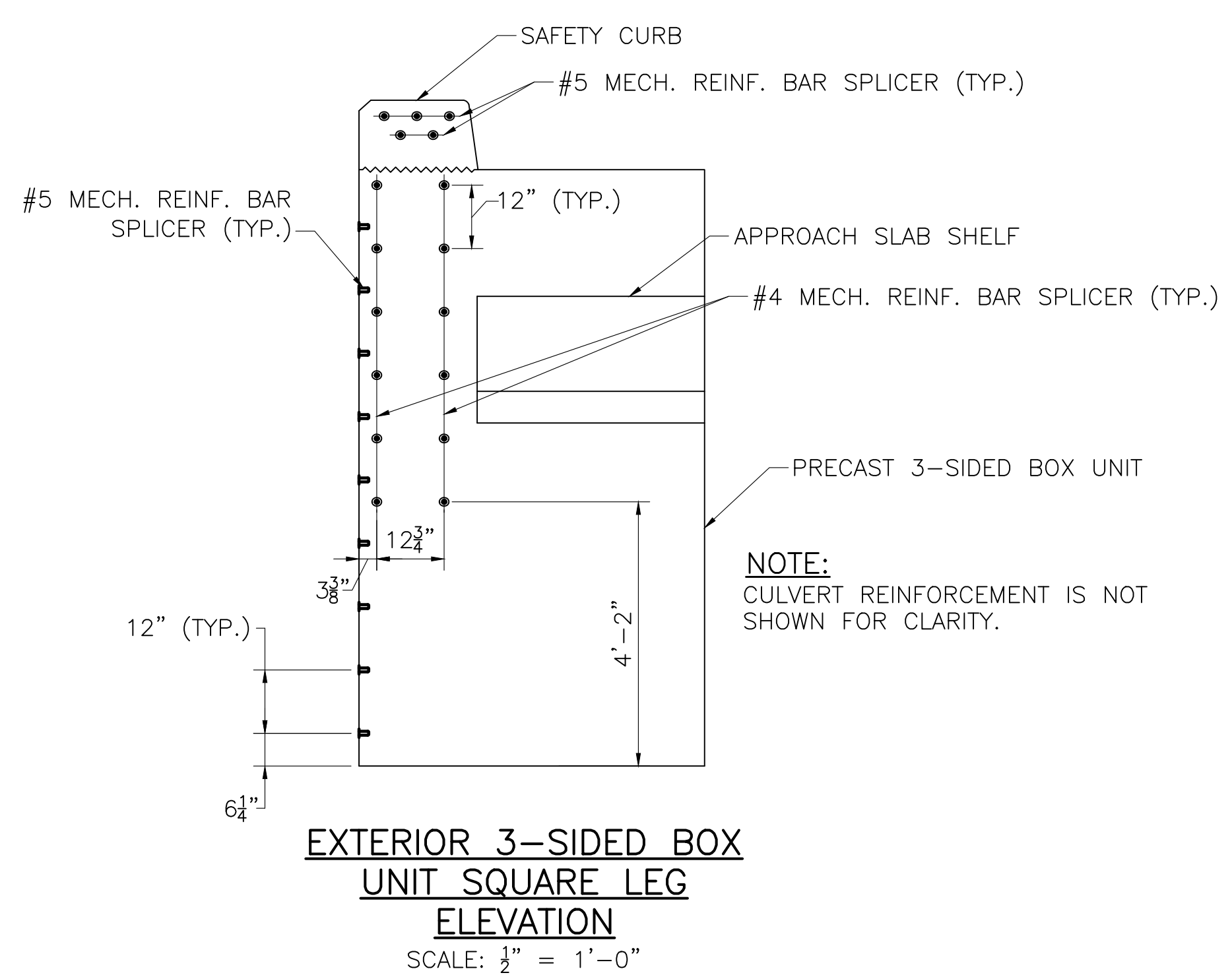
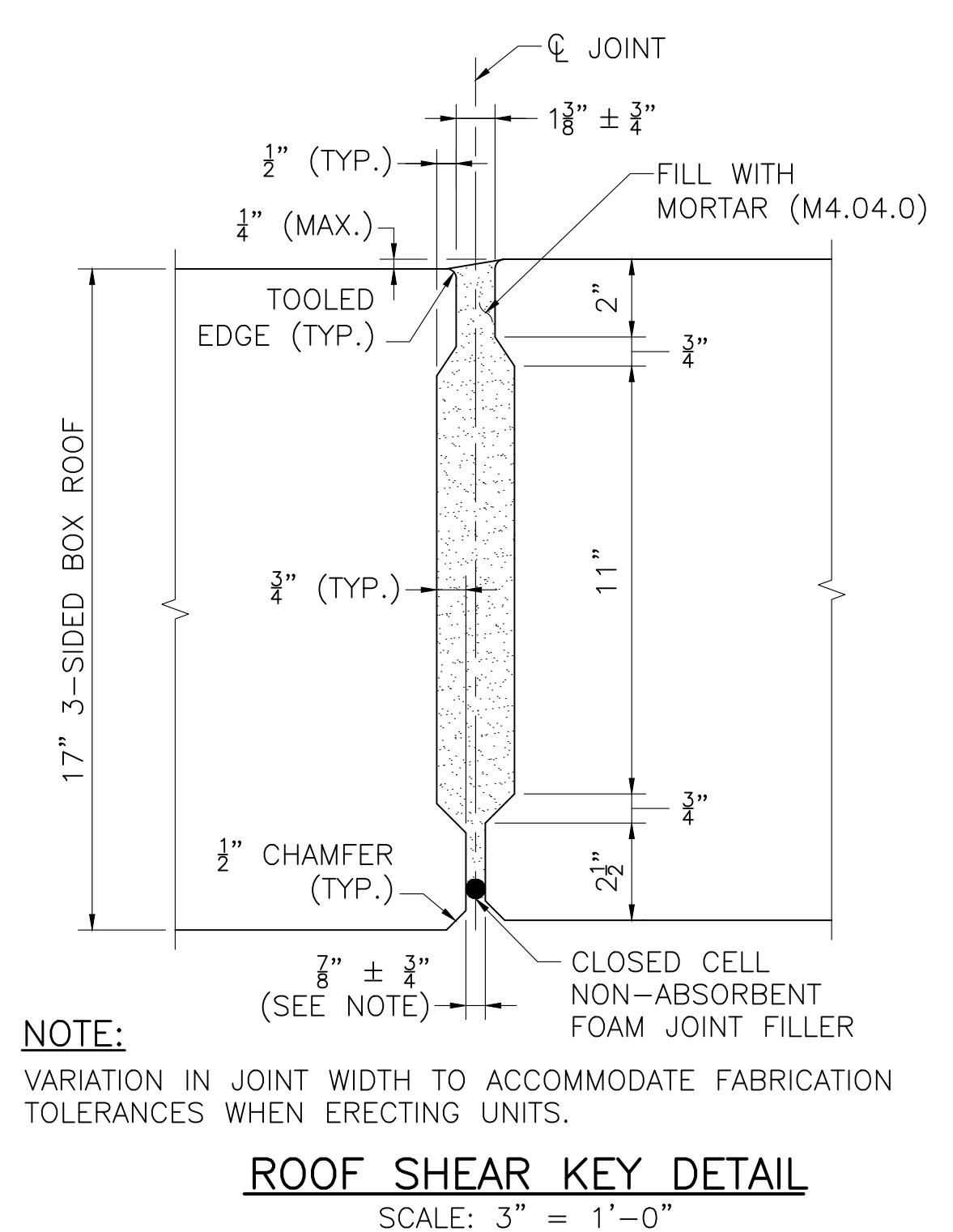
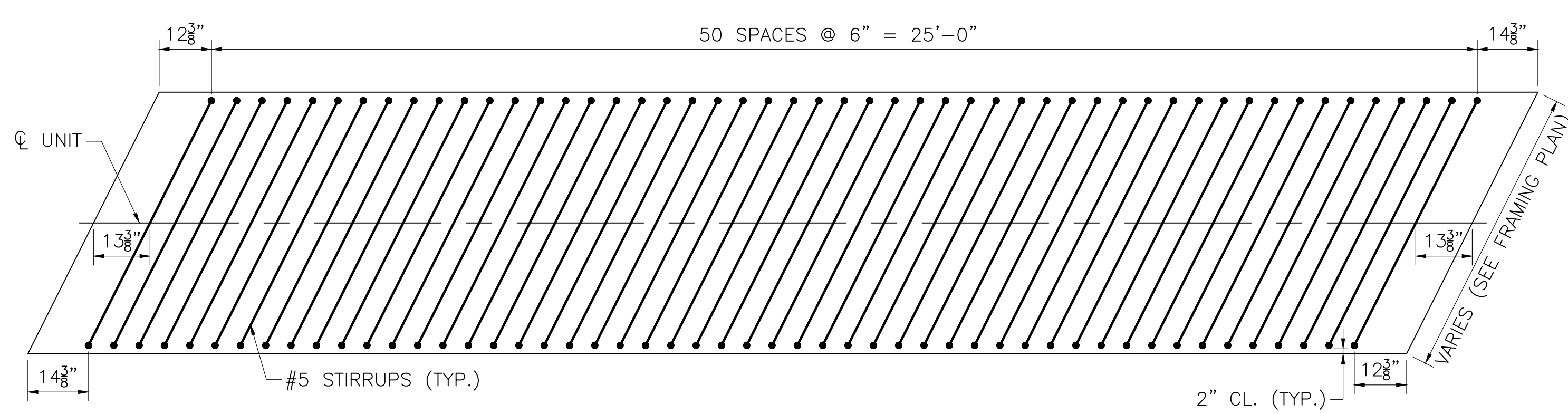
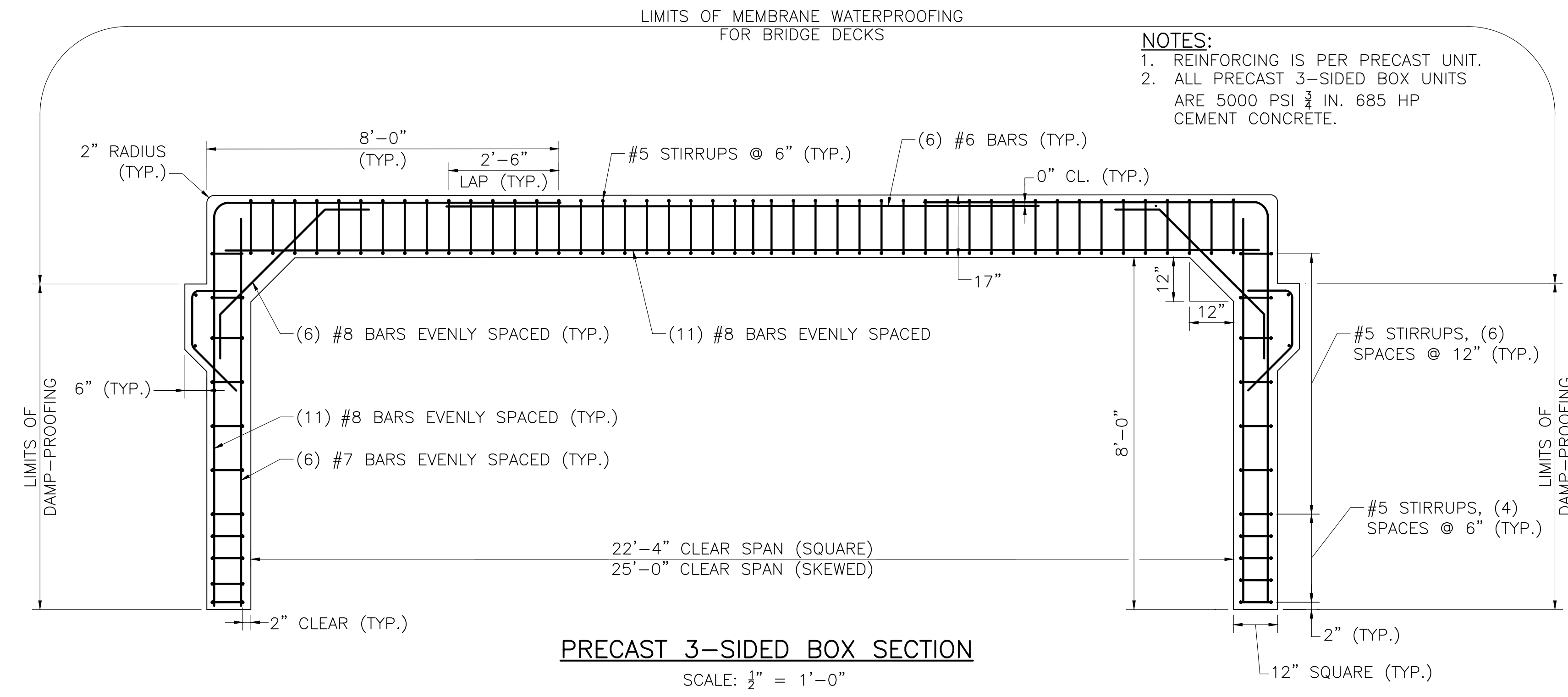
APRIL 13, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

609179\_BRI17(S23012)DWG 11-15-2023 1:31 PM 609179 Structural Submittal (PS&E)



STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	33	46
PROJECT FILE NO.		609179	

**PRECAST 3-SIDED BOX DETAILS**



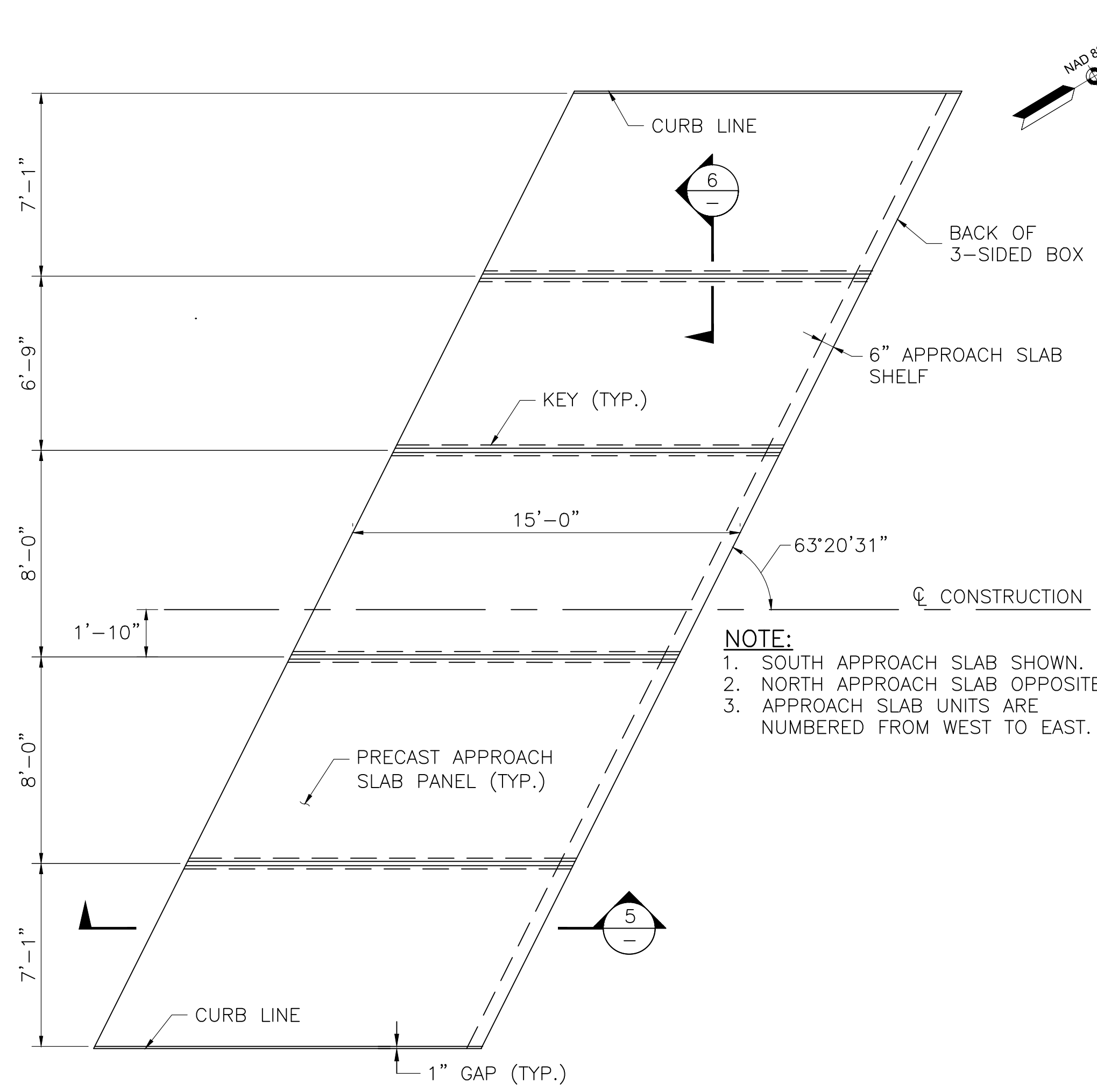
DATE	DESCRIPTION
APRIL 13, 2024	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

609179\_BR18(S23012).DWG Plotted on 12-Mar-2024 1:32 PM 11-16-2023 609179 Structural Submittal (PS&E)

**SPENCER**  
**ST 31 (NORTH SPENCER ROAD)**

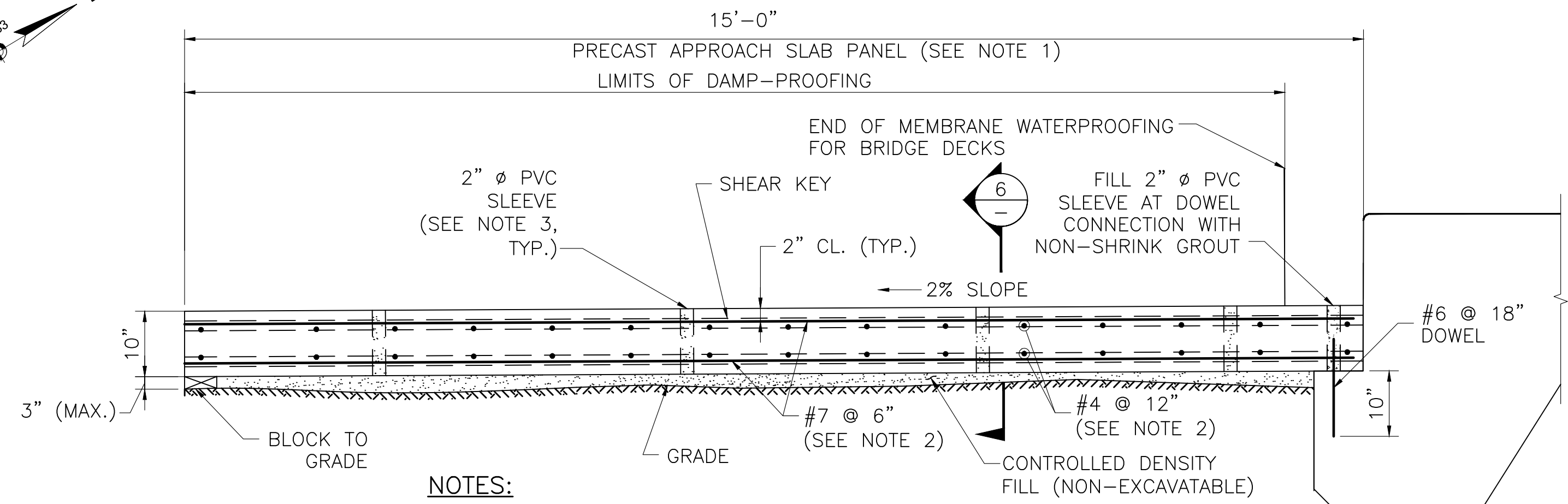
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	34	46
PROJECT FILE NO.		609179	

**PRECAST APPROACH SLAB DETAILS**



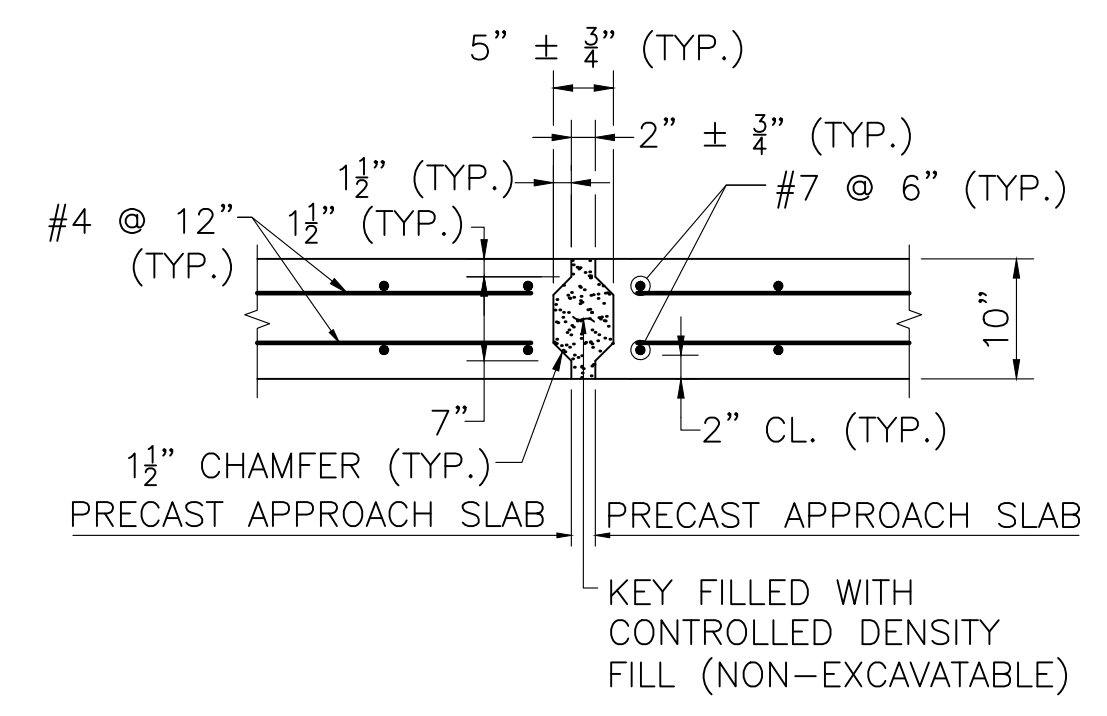
**PRECAST APPROACH SLAB PLAN**  
SCALE:  $\frac{1}{4}'' = 1'-0''$

**NOTE:**  
1. SOUTH APPROACH SLAB SHOWN.  
2. NORTH APPROACH SLAB OPPOSITE.  
3. APPROACH SLAB UNITS ARE NUMBERED FROM WEST TO EAST.

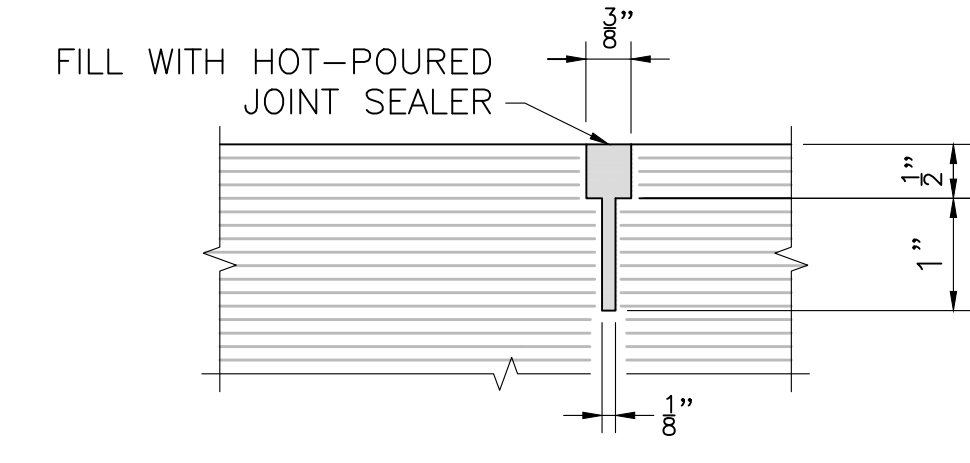


**NOTES:**  
1. PRECAST PANEL TO BE 4000 PSI  $\frac{3}{4}$  IN. 585 HP CEMENT CONCRETE. SUBSTITUTIONS WILL NOT BE PERMITTED.  
2. PLACE LONGITUDINAL REINFORCEMENT PARALLEL TO  $\bar{C}$  OF CONSTRUCTION. PLACE TRANSVERSE REINFORCEMENT PARALLEL TO ABUTMENT.  
3. PVC SLEEVES TO BE INCLUDED IN PRECAST APPROACH SLABS TO FACILITATE PLACEMENT OF CONTROLLED DENSITY FILL (NON-EXCAVATABLE).

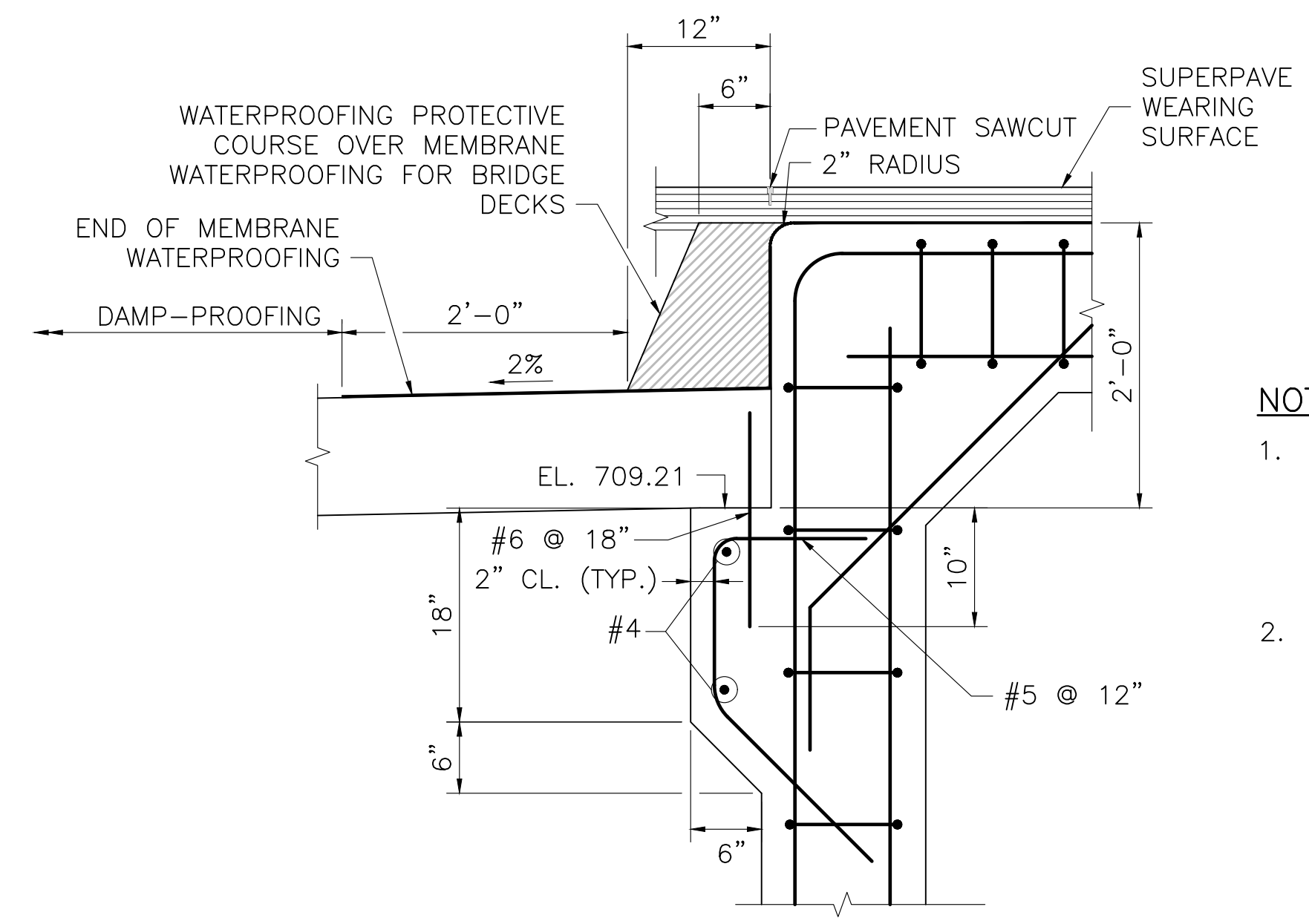
**SECTION 5**  
**TYPE I APPROACH SLAB**  
SCALE:  $\frac{3}{4}'' = 1'-0''$



**SECTION 6**  
SCALE:  $\frac{3}{4}'' = 1'-0''$



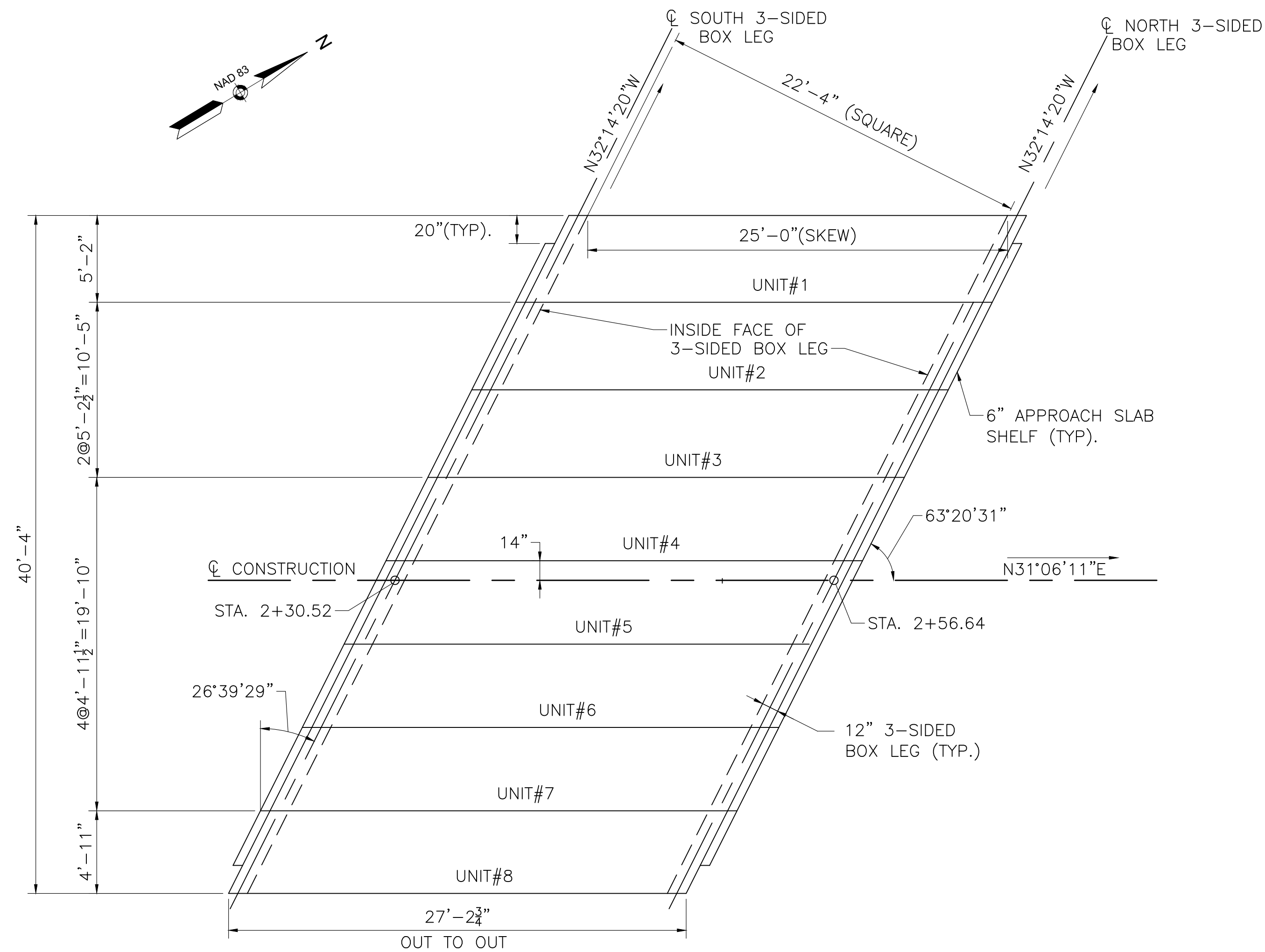
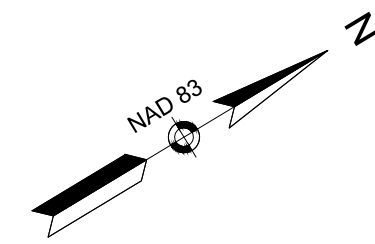
**PAVEMENT SAWCUT DETAIL**  
NOT TO SCALE



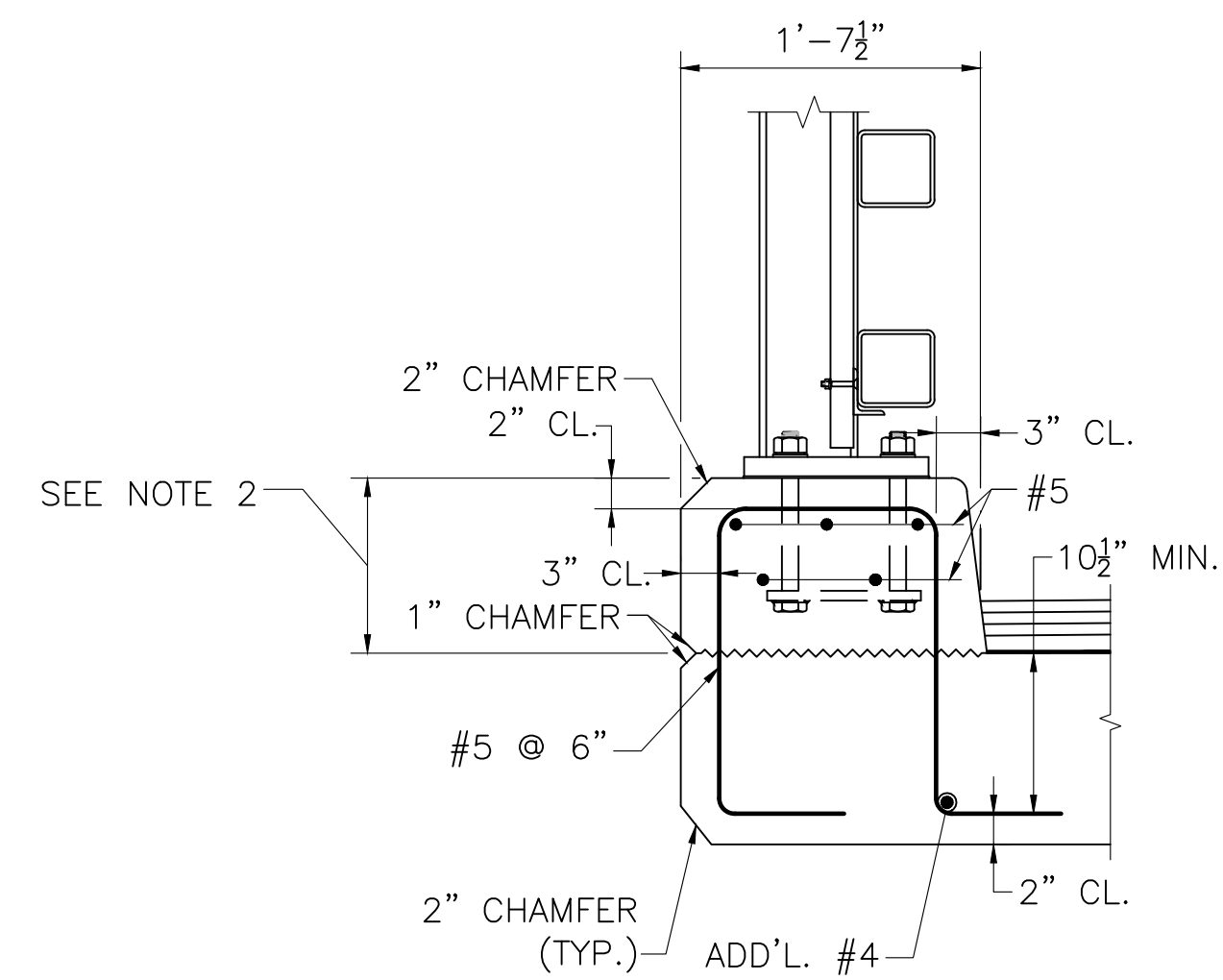
**PRECAST APPROACH SLAB SHELF - DETAILS**  
SCALE: 1" = 1'-0"

**NOTES:**  
1. PROTECTIVE COURSE TO BE SUPERPAVE BRIDGE PROTECTIVE COURSE (SPC-B-12.5), PLACED IN 2 IN. LAYERS AND COMPACTED WITH A MECHANICAL HAND-GUIDED TAMPER WITHIN 12 HOURS AFTER PLACING SPRAY-APPLIED MEMBRANE WATERPROOFING.  
2. SEE PRECAST 3-SIDED BOX SECTION SHEET 18 FOR 3-SIDED BOX REINFORCEMENT.

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**FRAMING PLAN**  
SCALE:  $\frac{3}{16}'' = 1'-0''$

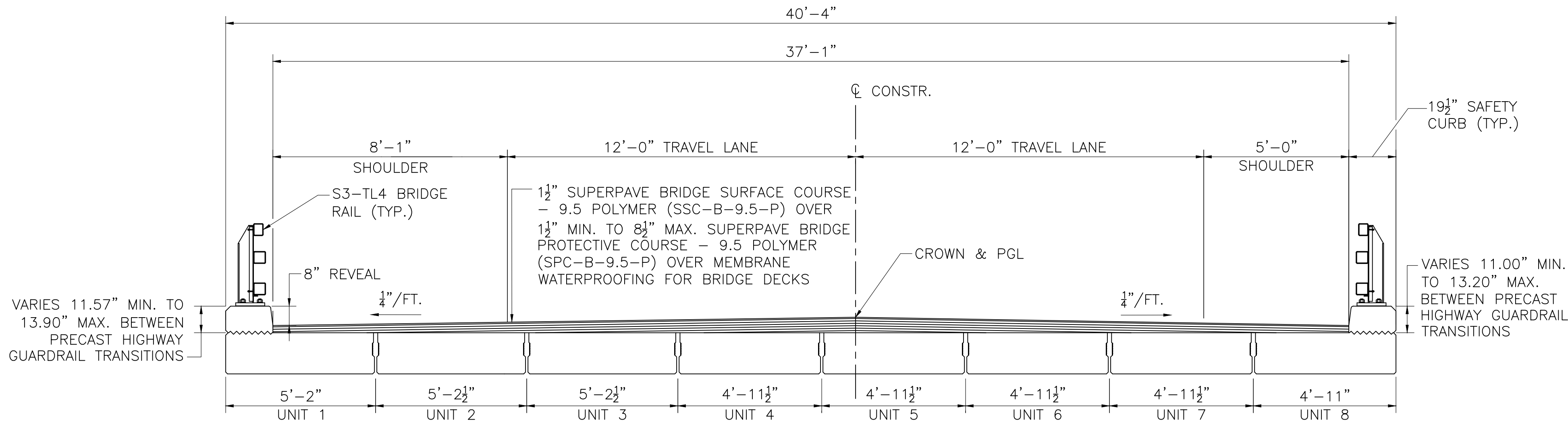


**NOTES:**

1. PRECAST 3-SIDED BOX REINFORCING NOT SHOWN FOR CLARITY.
2. PRECAST SAFETY CURB SHALL BE 5000 PSI,  $\frac{3}{4}$  IN., 685 HP CEMENT CONCRETE.
3. WEST PRECAST SAFETY CURB VARIES FROM 11.70" TO 13.76". EAST PRECAST SAFETY CURB VARIES FROM 11.11" TO 13.03".

**PRECAST SAFETY CURB**

SCALE: 1" = 1'-0"



**ROOF SQUARE CROSS-SECTION**

SCALE:  $\frac{3}{8}'' = 1'-0''$

LOCATION	SUPERPAVE THICKNESS @ WEST CURB	PROFILE GRADE LINE	SUPERPAVE THICKNESS @ EAST CURB
CL OF N. ABUT.	5.71"	9.97"	4.89"
MIDSPAN	4.73"	8.98"	3.90"
CL OF S. ABUT.	3.74"	7.99"	3.14"

**NOTES:**

1. THIS TABLE INDICATES THE THEORETICAL THICKNESS OF THE SUPERPAVE WEARING SURFACE IN INCHES BASED UPON THE CALCULATED BEAM CAMBER AT ERECTION, AND IS PROVIDED TO ASSIST IN ESTIMATING THE REQUIRED SUPERPAVE WEARING SURFACE AND CONCRETE VOLUMES ONLY. THE ACTUAL SUPERPAVE WEARING SURFACE THICKNESS WILL BE AS REQUIRED TO MEET THE PROFILE GRADES.
2. DO NOT USE FOR ACTUAL CONSTRUCTION.

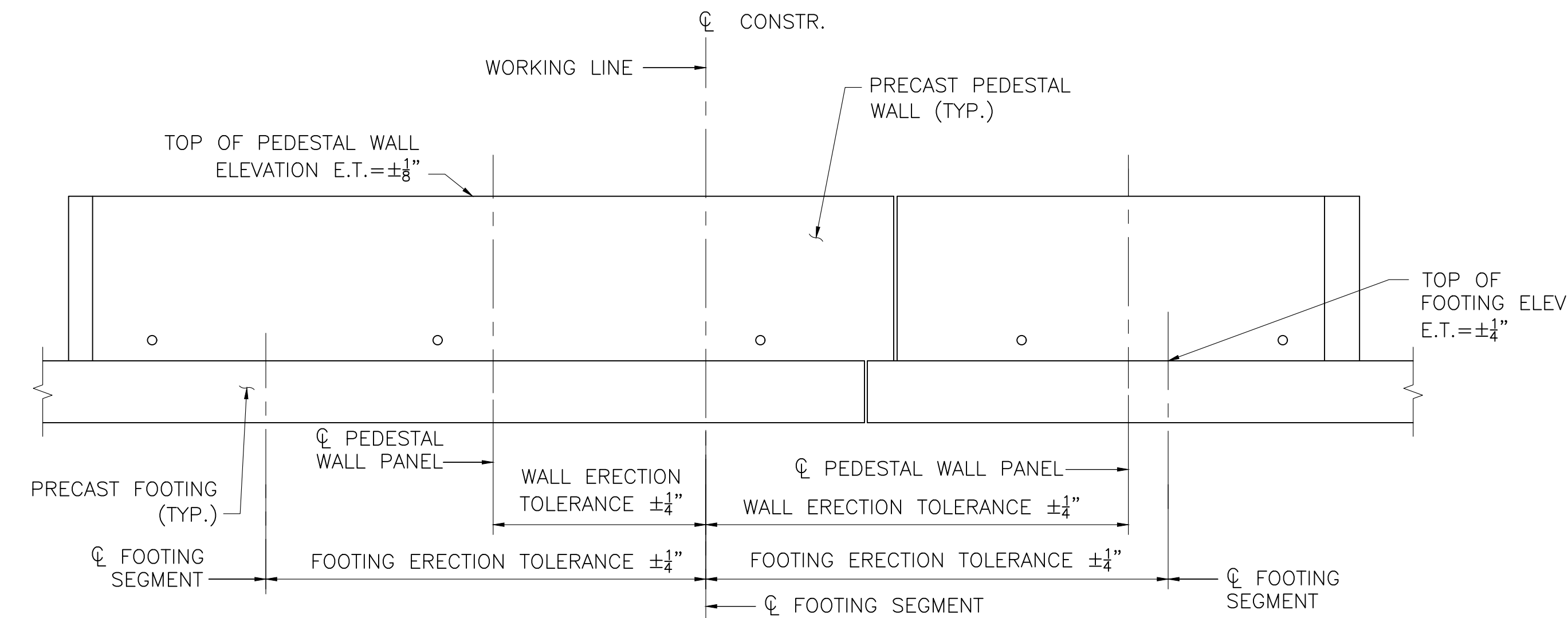
**THEORETICAL SUPERPAVE WEARING SURFACE THICKNESS TABLE**

APRIL 13, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
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AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
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**SPENCER  
ST 31 (NORTH SPENCER ROAD)**

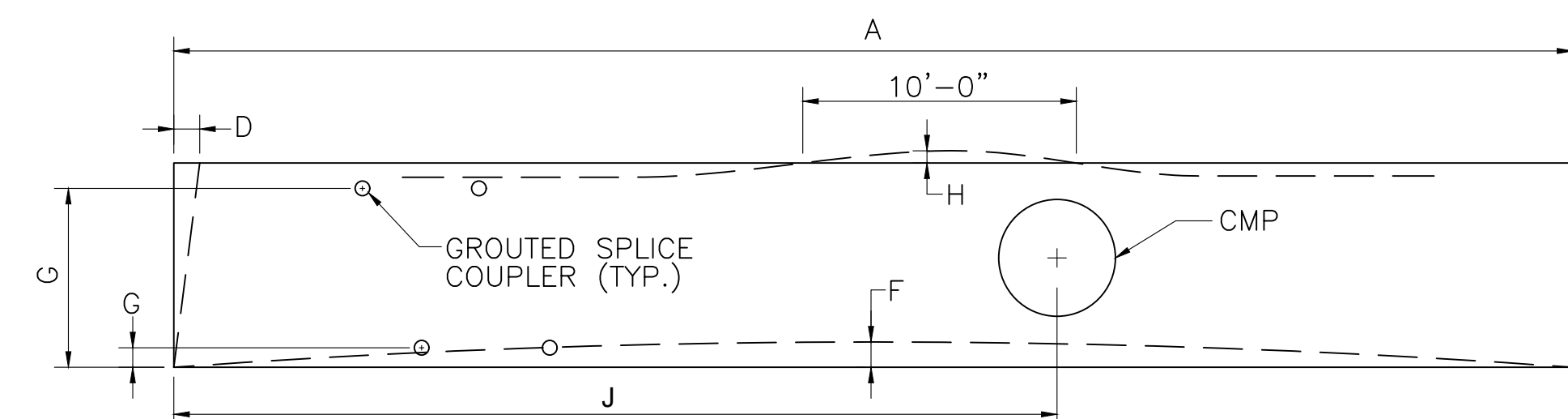
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	36	46
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**PRECAST ERECTION AND FABRICATION TOLERANCES**



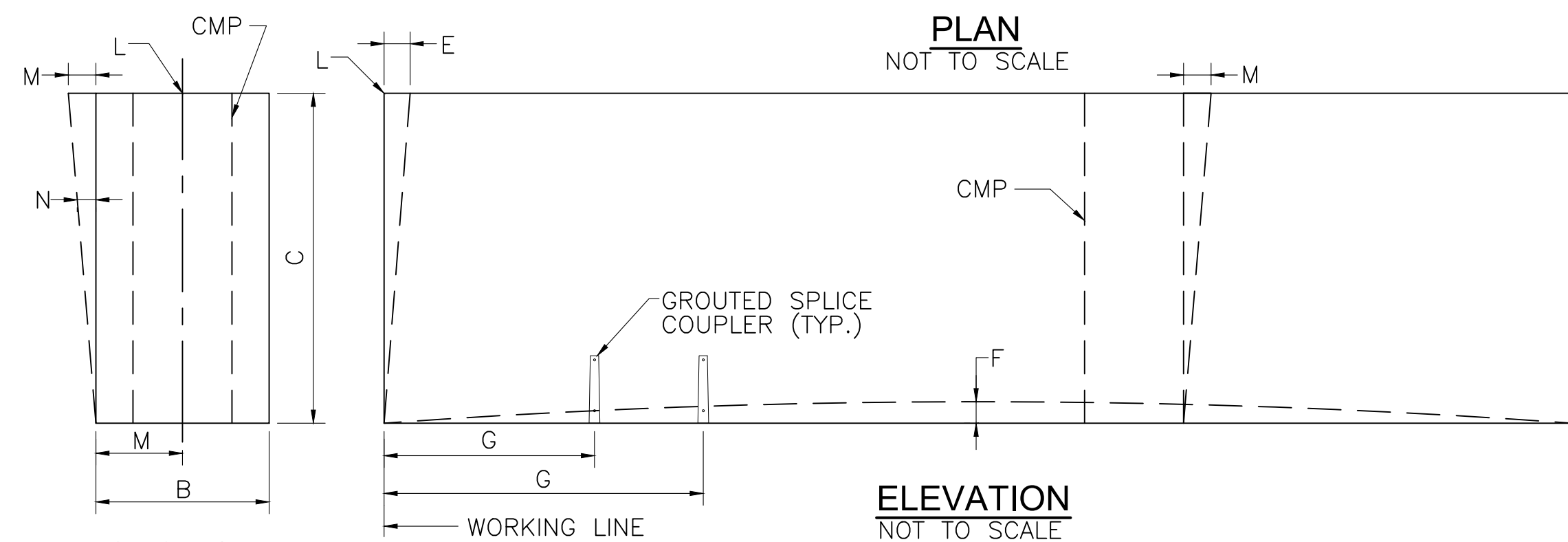
**ABUTMENT ELEVATION**

SCALE: 1/4" = 1'-0"



**PLAN**

NOT TO SCALE



**ELEVATION**

NOT TO SCALE

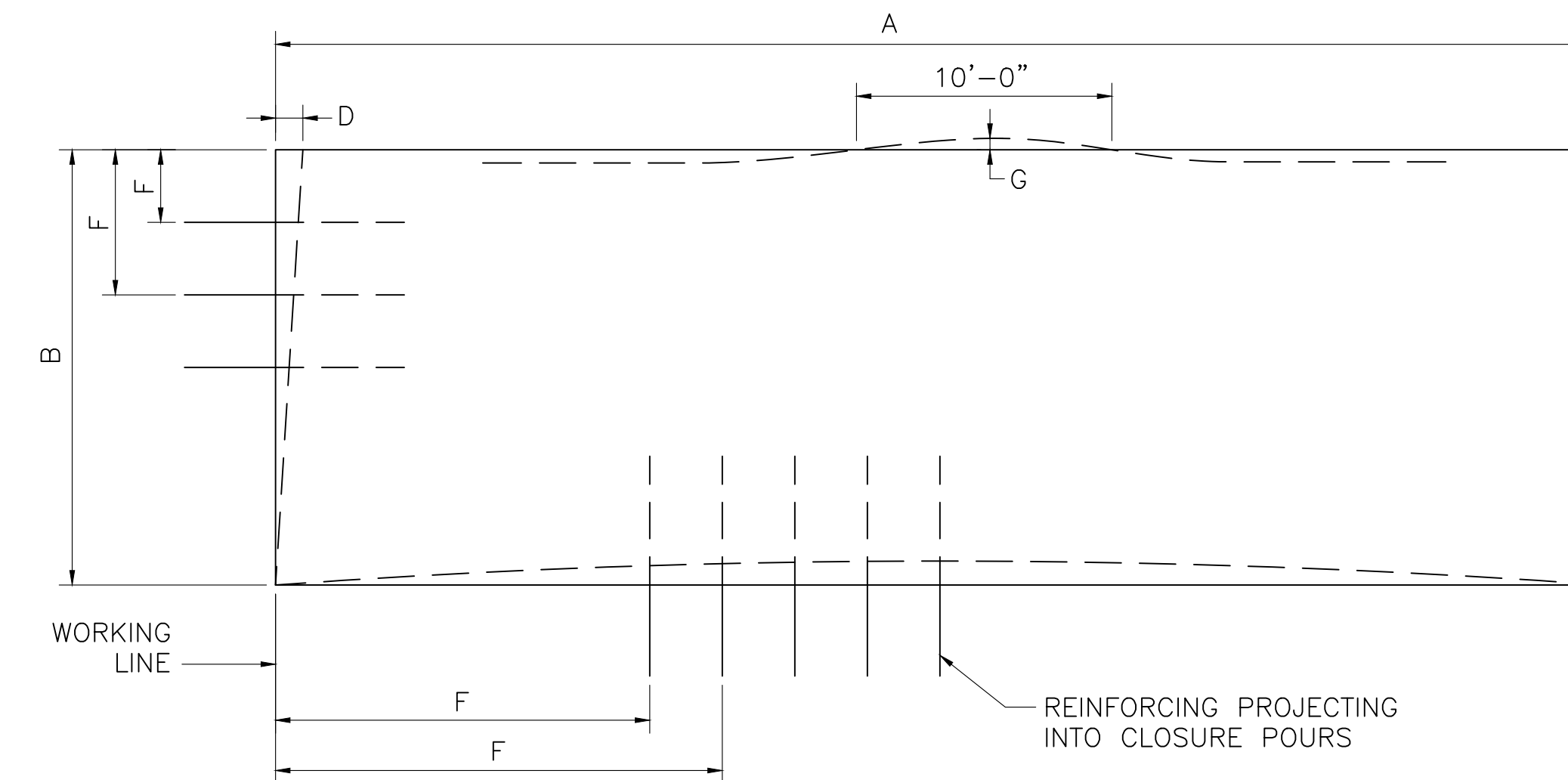
**SECTION**  
NOT TO SCALE

**WALL SEGMENT ELEVATION ERECTION TOLERANCES**

L	TOP ELEVATION FROM NOMINAL TOP ELEVATION	1/4"
M	MAXIMUM PLUMB VARIATION OVER HEIGHT OF PANEL	1/2"
N	PLUMB IN ANY 10 FEET OF PANEL HEIGHT	1/4"

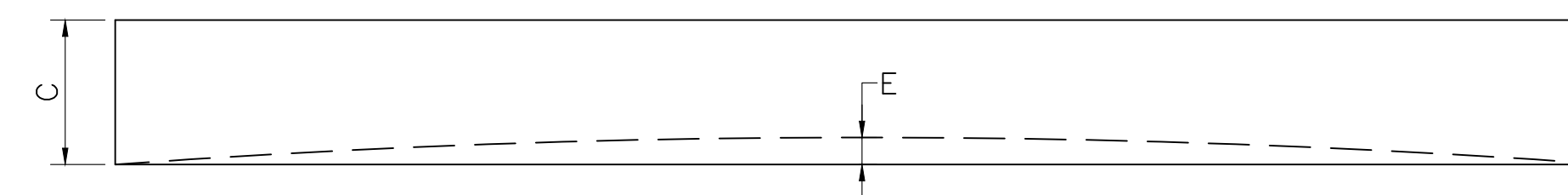
**WALL SEGMENT FABRICATION TOLERANCES**

A	LENGTH	±1/4"
B	WIDTH (OVERALL)	±1/4"
C	DEPTH (OVERALL)	±1/4"
D	VARIATION FROM SPECIFIED PLAN END SQUARENESS OR SKEW	±1/2"
E	VARIATION FROM SPECIFIED ELEVATION END SQUARENESS OR SKEW	±1/2"
F	SWEEP OVER MEMBER LENGTH	±3/8"
G	LOCATION OF GROUTED SPLICE COUPLER MEASURED FROM A WORKING LINE	±1/4"
H	LOCAL SMOOTHNESS OF ANY SURFACE	±1/4" IN 10 FEET
J	LOCATION OF BLOCKOUT FOR PILES OR VOIDS	±1/2"
K	MAXIMUM PLUMB VARIATION OVER HEIGHT OF CMP VOID	±1/2"



**PLAN**

NOT TO SCALE



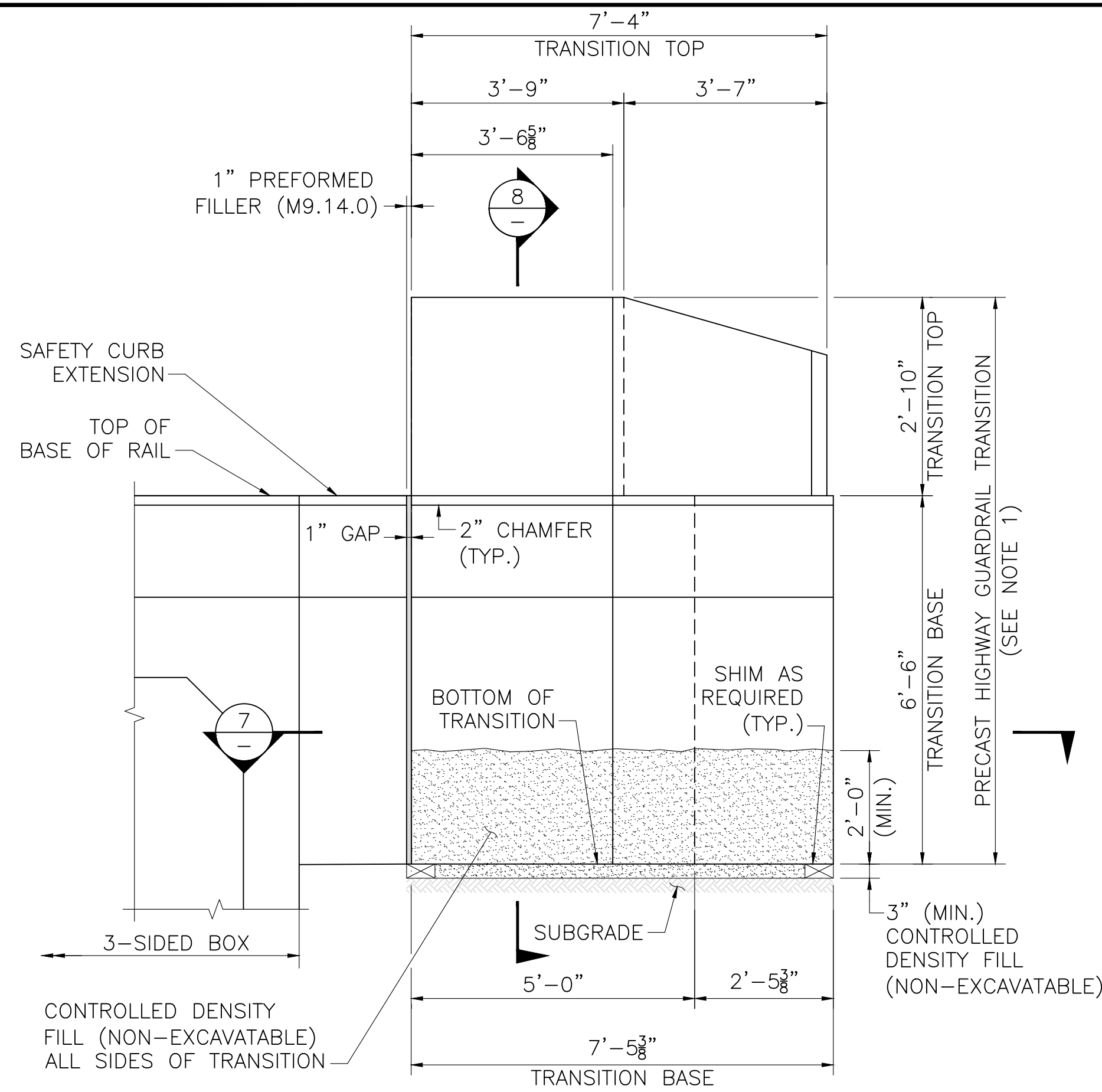
**ELEVATION**

NOT TO SCALE

**APPROACH SLAB FABRICATION TOLERANCES**

A	LENGTH (OVERALL)	±1/4"
B	WIDTH (OVERALL)	±1/4"
C	DEPTH (OVERALL)	±1/4"
D	VARIATION FROM SPECIFIED PLAN END SQUARENESS OR SKEW	±1/2"
E	SWEEP OVER MEMBER LENGTH	±3/8"
F	LOCATION OF PROJECTING REINFORCING MEASURED FROM A WORKING LINE	±1/4"
G	LOCAL SMOOTHNESS OF ANY SURFACE	±1/4" IN 10 FEET

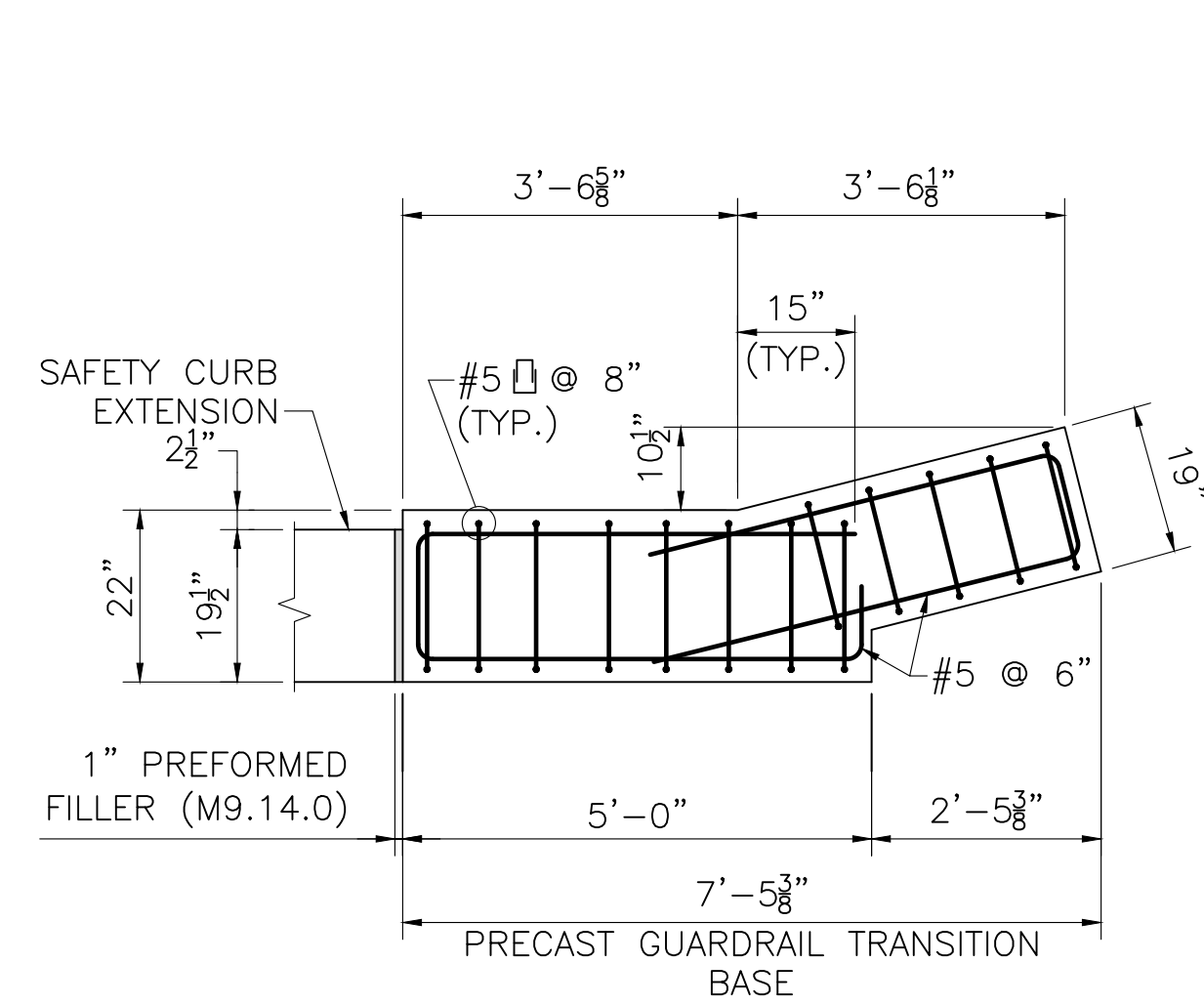
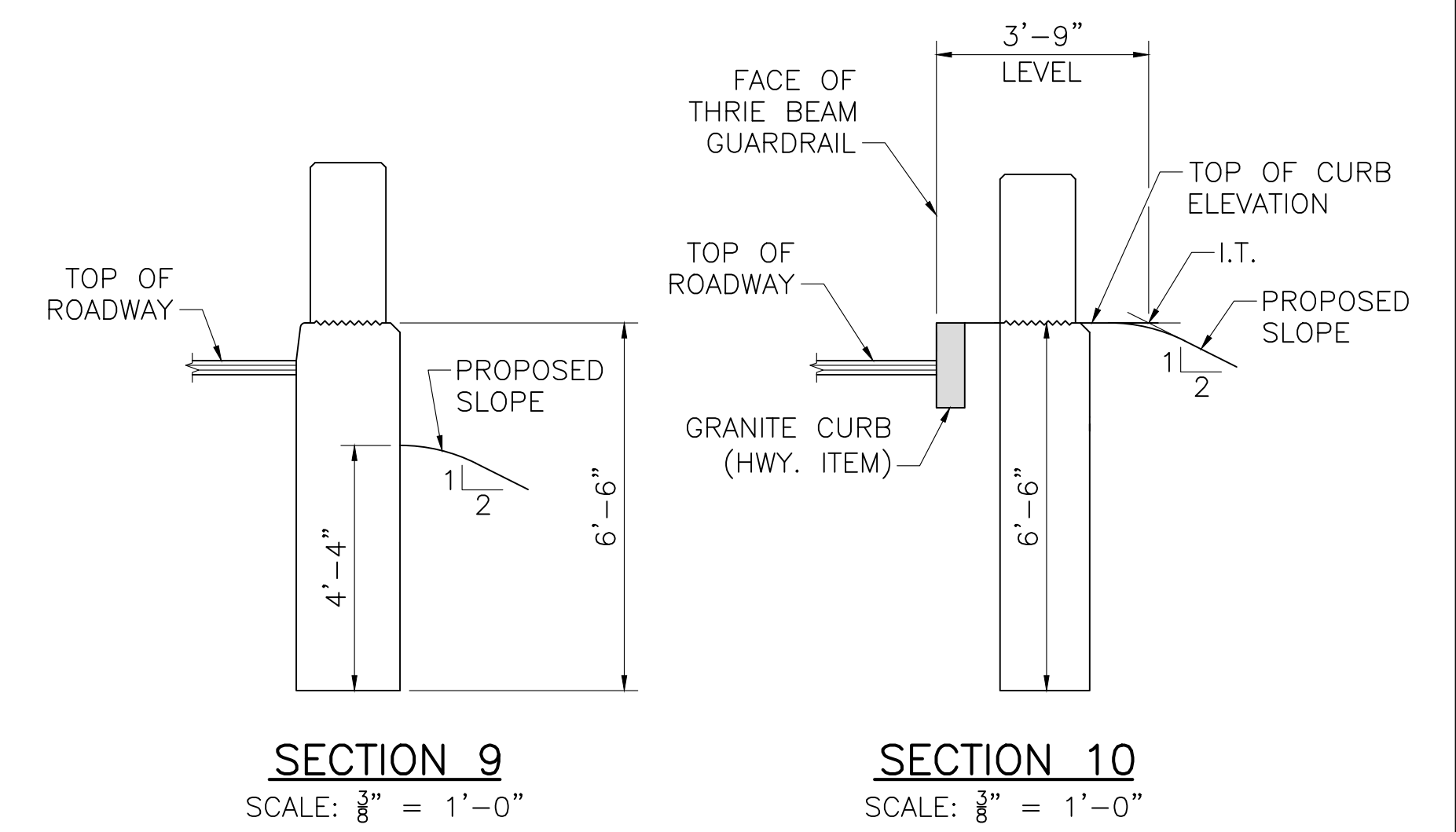
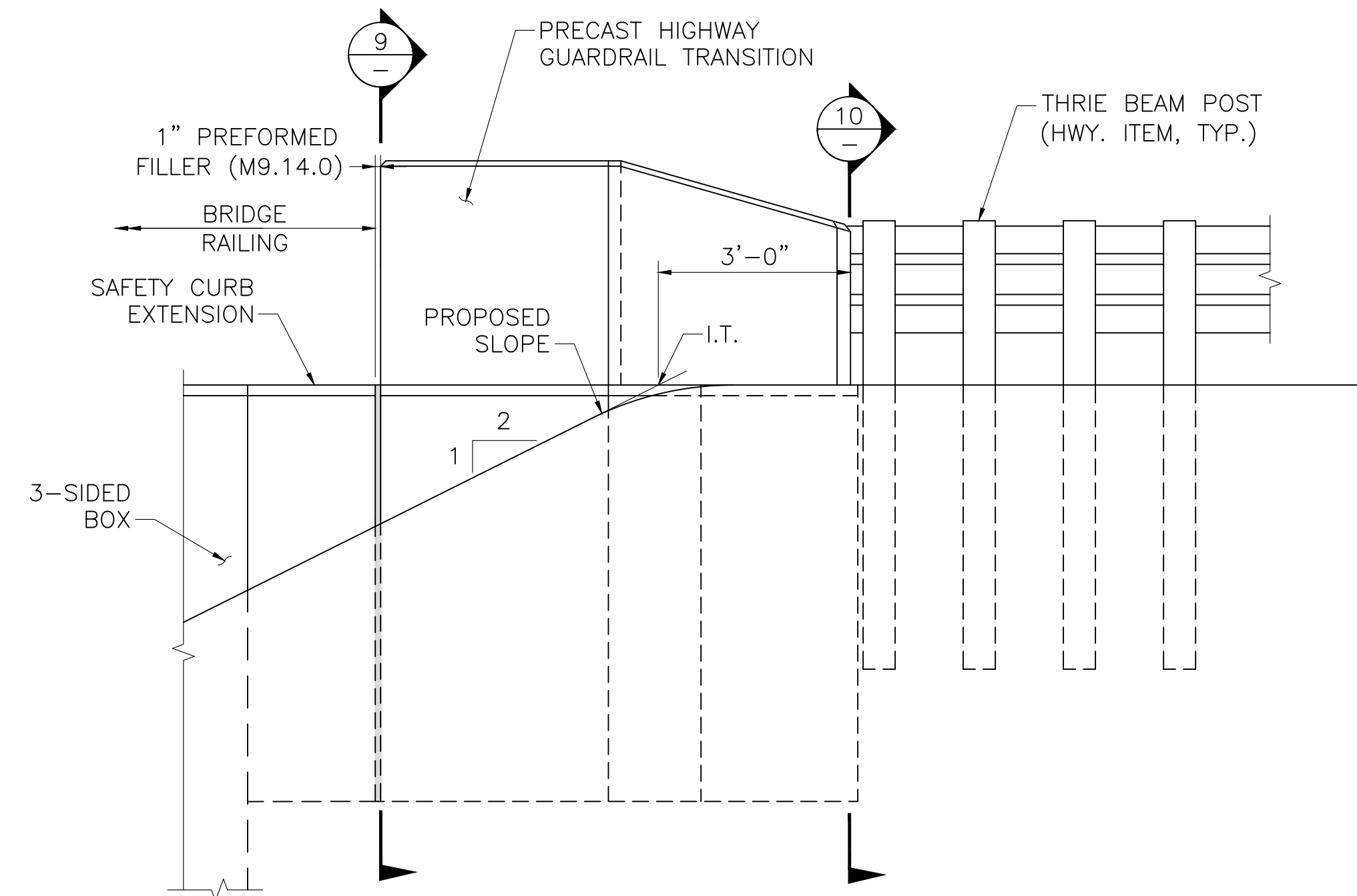
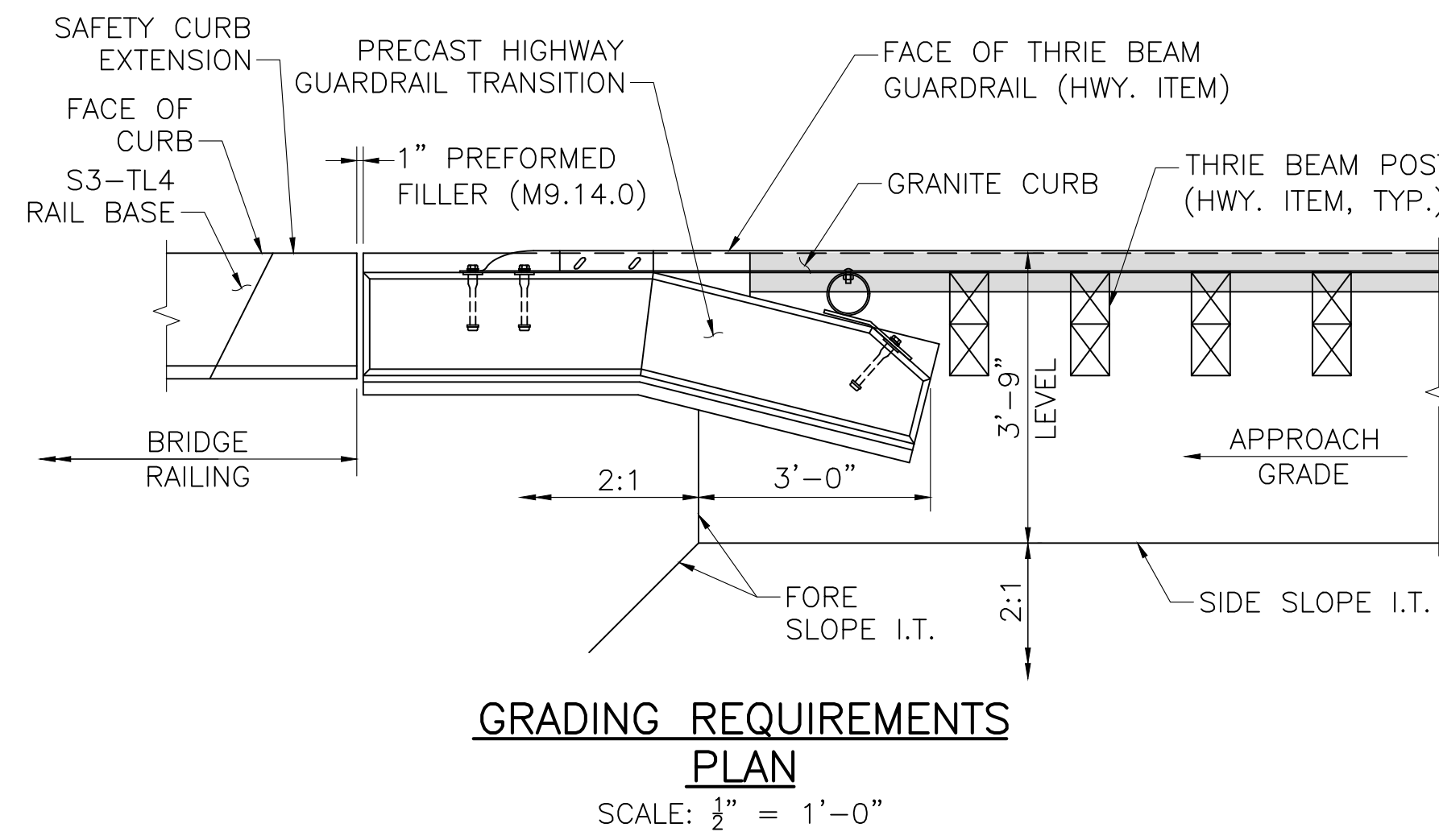
APRIL 13, 2024	ISSUED FOR CONSTRUCTION
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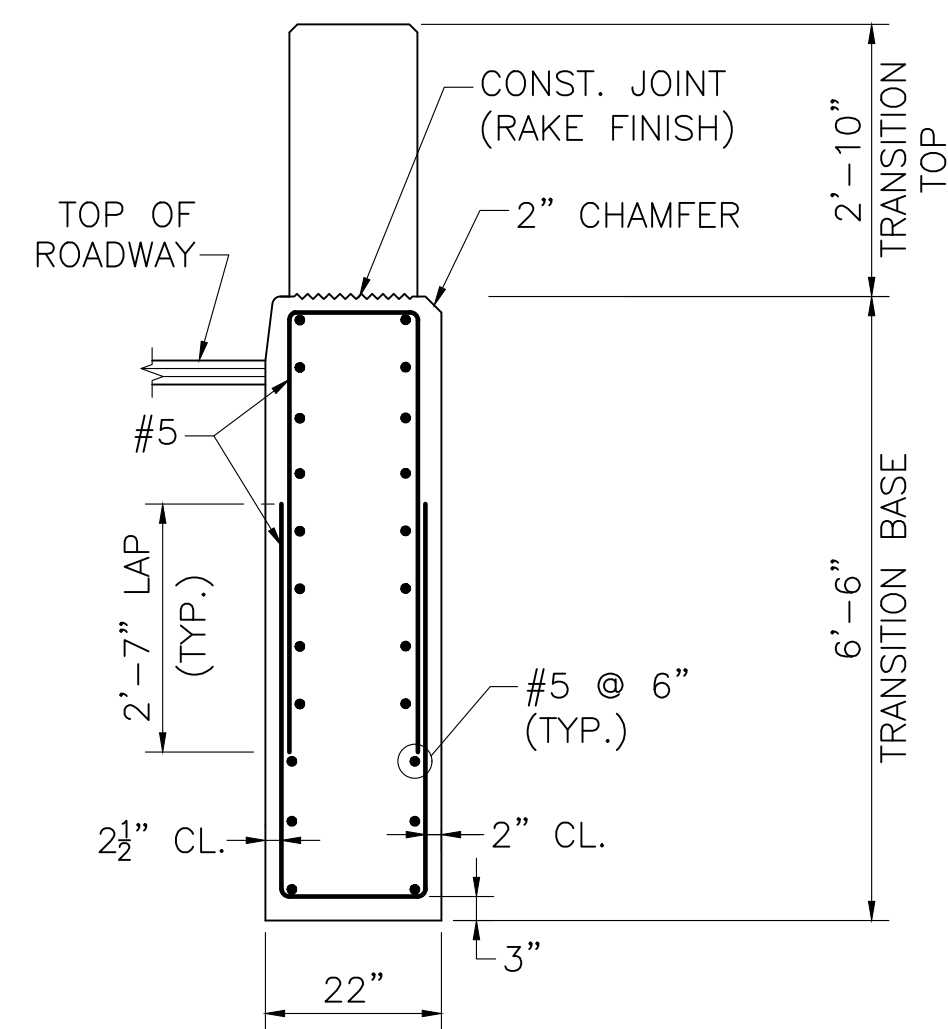
**NOTES:**

1. PRECAST GUARDRAIL TRANSITION SHALL BE 5000 PSI, 3/4 IN, 685 HP CEMENT CONCRETE.
2. GRAVEL BORROW SHALL BE PLACED AND THOROUGHLY COMPACTED TO THE GRADE OF 3" (MIN.) BELOW THE INTENDED BOTTOM OF THE PRECAST GUARDRAIL TRANSITION BASE AND TO A HEIGHT OF 2'-0" (MIN.) ON ALL SIDES OF THE TRANSITION BASE TO FORM A TRENCH IN WHICH TO SET THE TRANSITION. WHERE NO GRAVEL BORROW IS REQUIRED BELOW THE BASE, IT SHALL BE PLACED ON UNDISTURBED SOIL.
3. CONTRACTOR SHALL SET THE PRECAST GUARDRAIL TRANSITION TO THE REQUIRED ELEVATION AND ALIGNMENT, AND BACKFILL PRECAST GUARDRAIL TRANSITION WITH CONTROLLED DENSITY FILL (NON-EXCAVATABLE) TO THE ELEVATION SHOWN.

**ELEVATION AT SPLOYED WINGWALL**  
SCALE: 1/2" = 1'-0"



**NOTE:**  
SAFETY CURB REINFORCEMENT NOT SHOWN FOR CLARITY.



**NOTE:**  
REINFORCEMENT OF THE TRANSITION TOP IS NOT SHOWN FOR CLARITY.

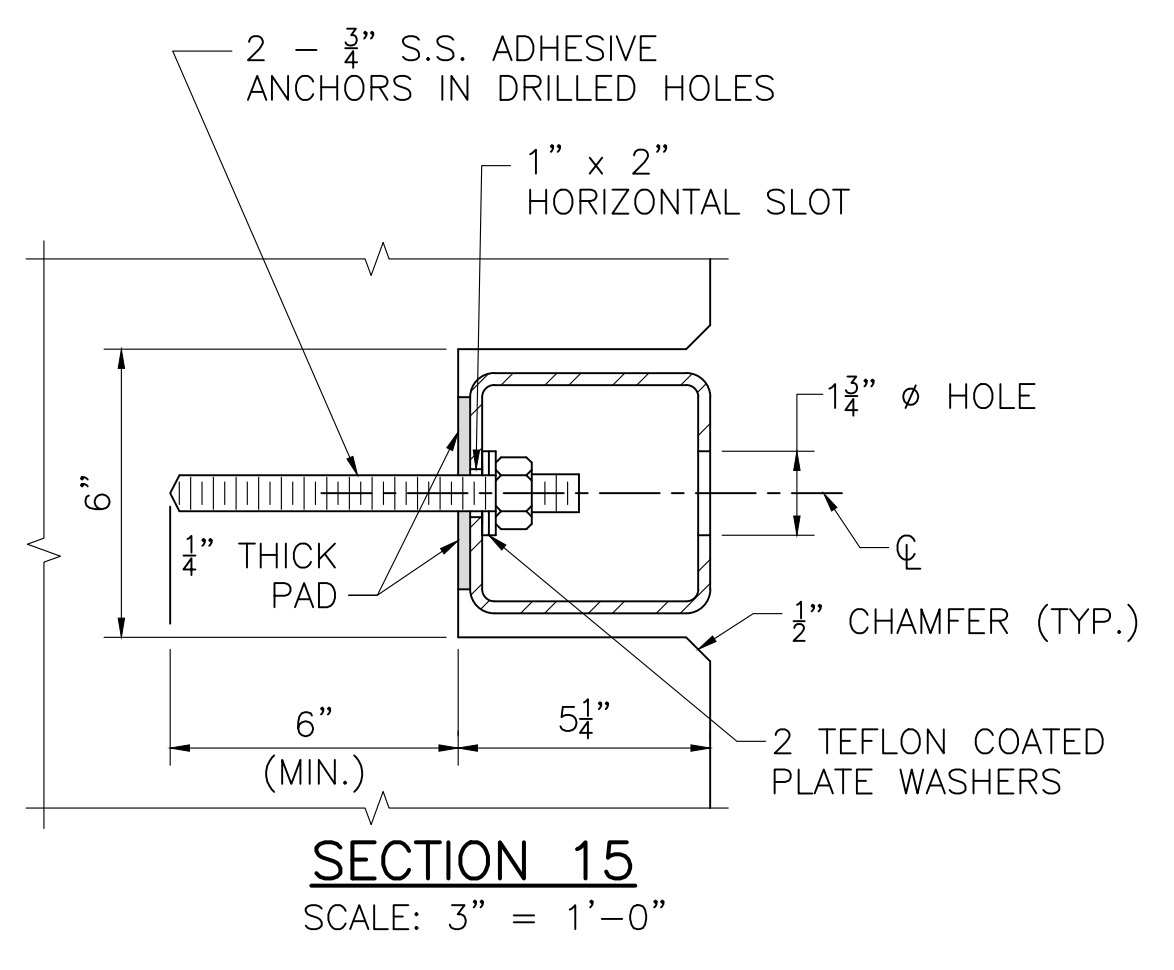
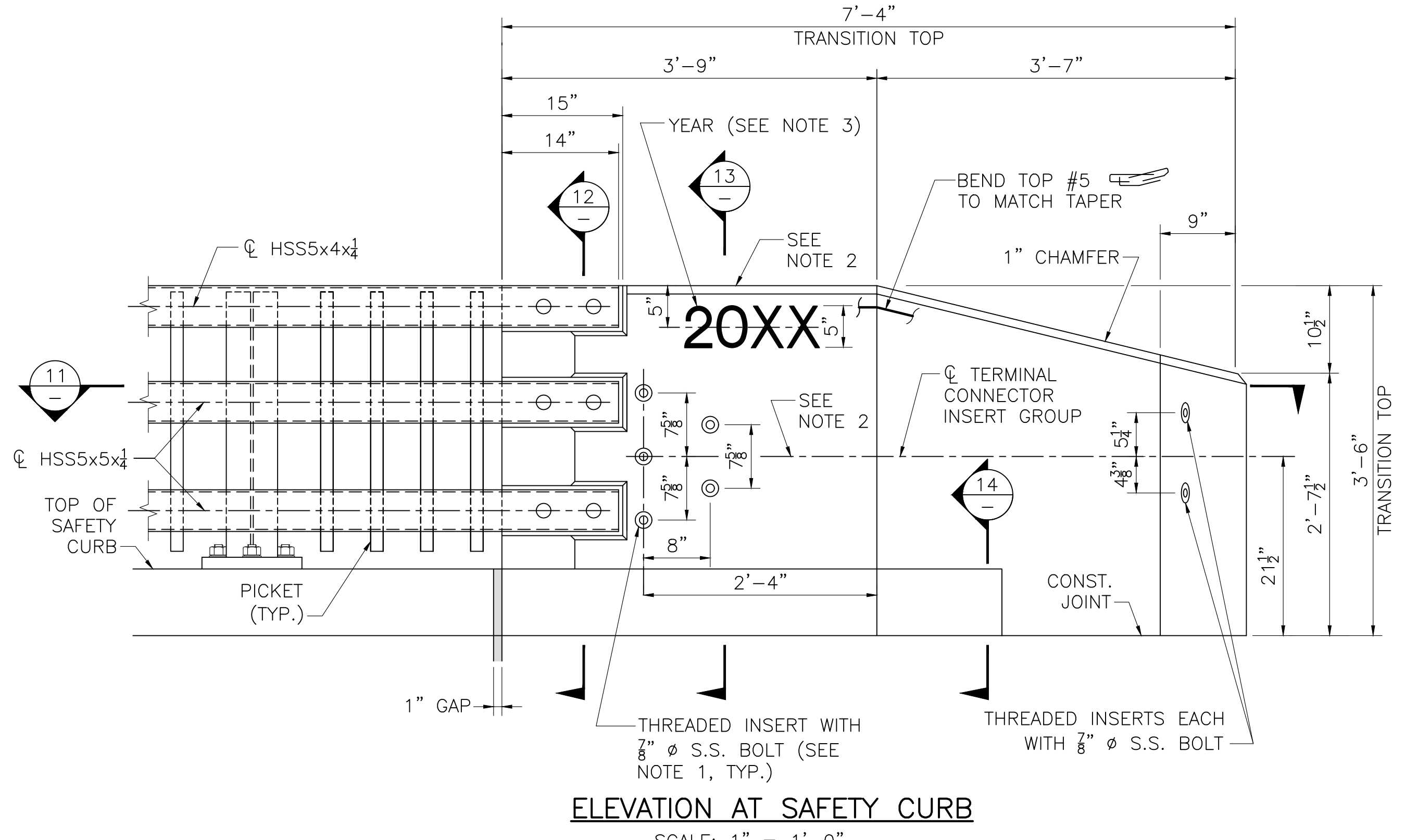
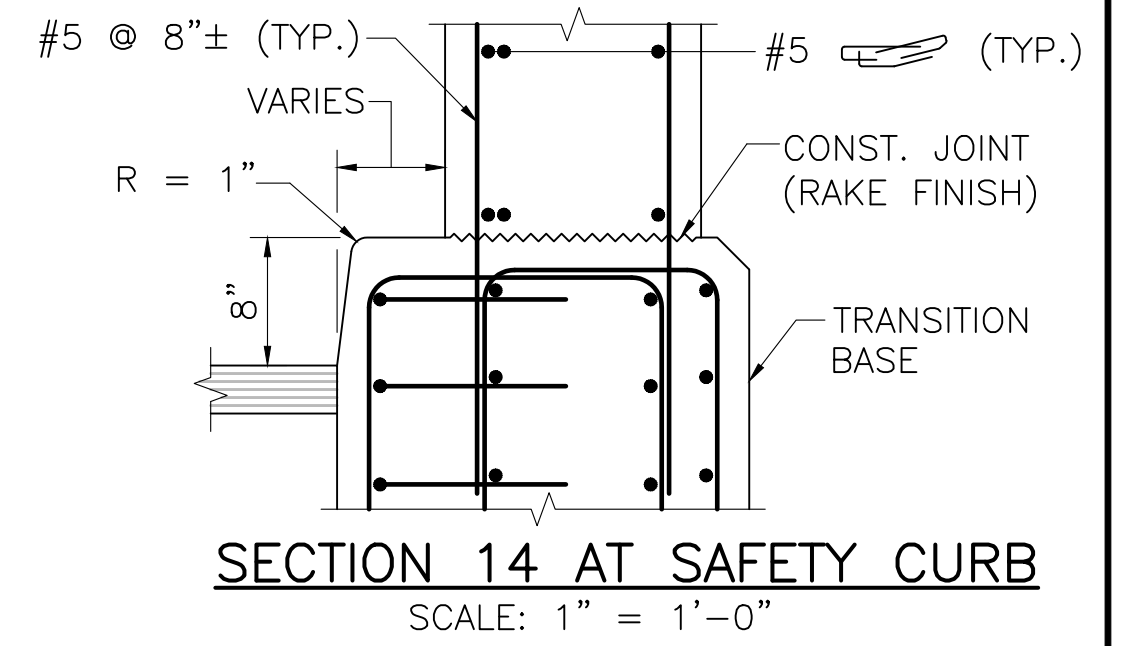
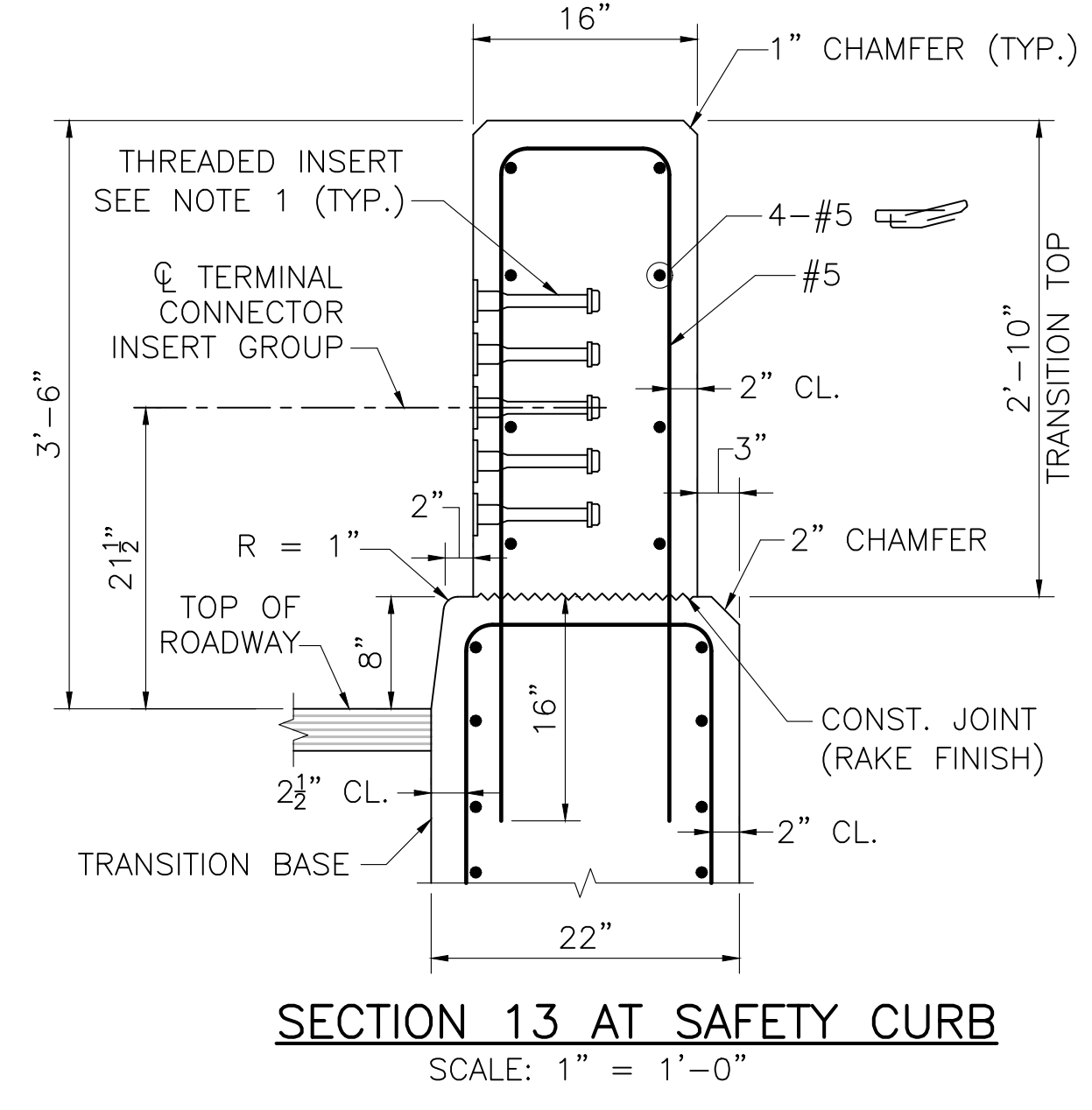
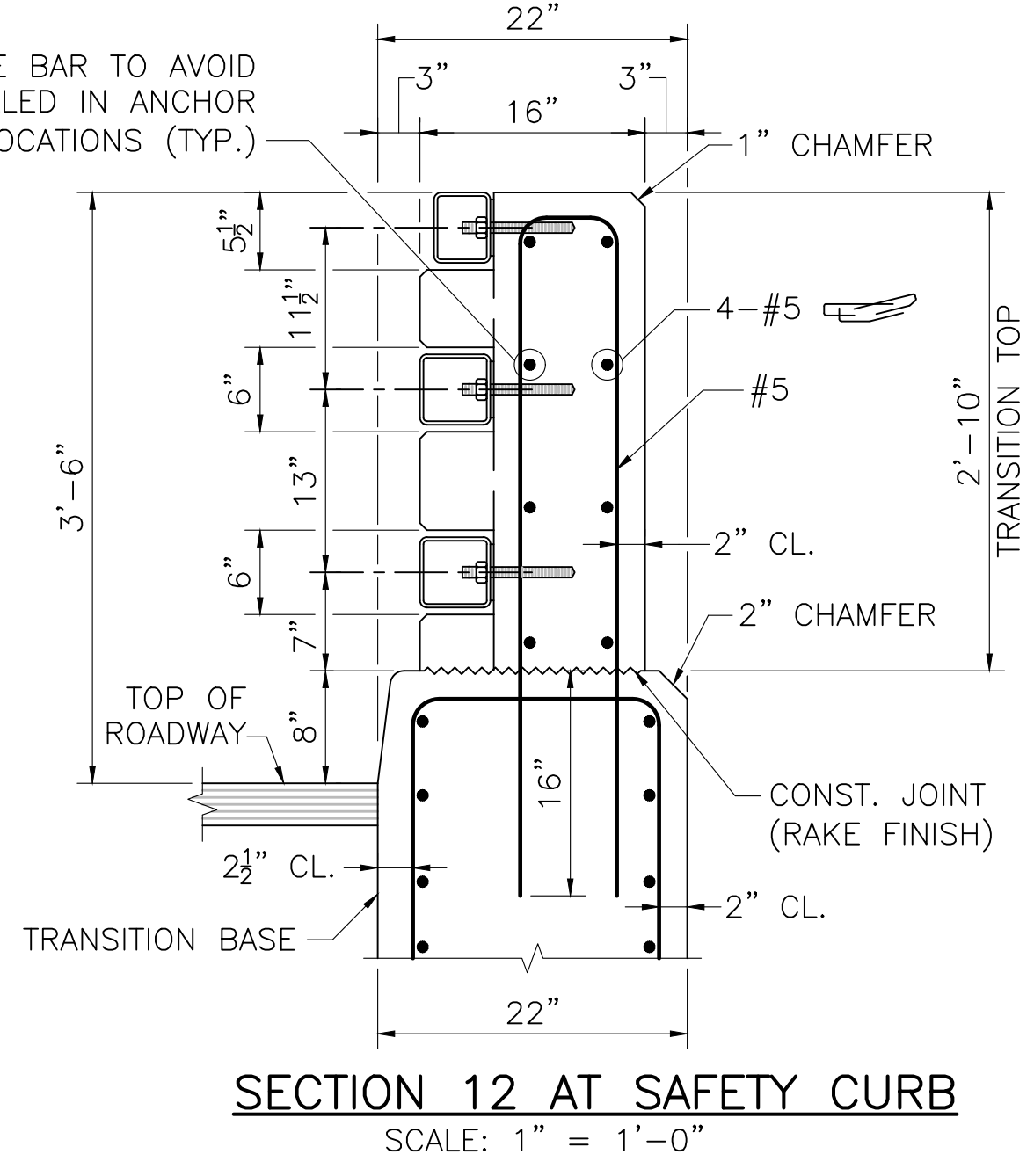
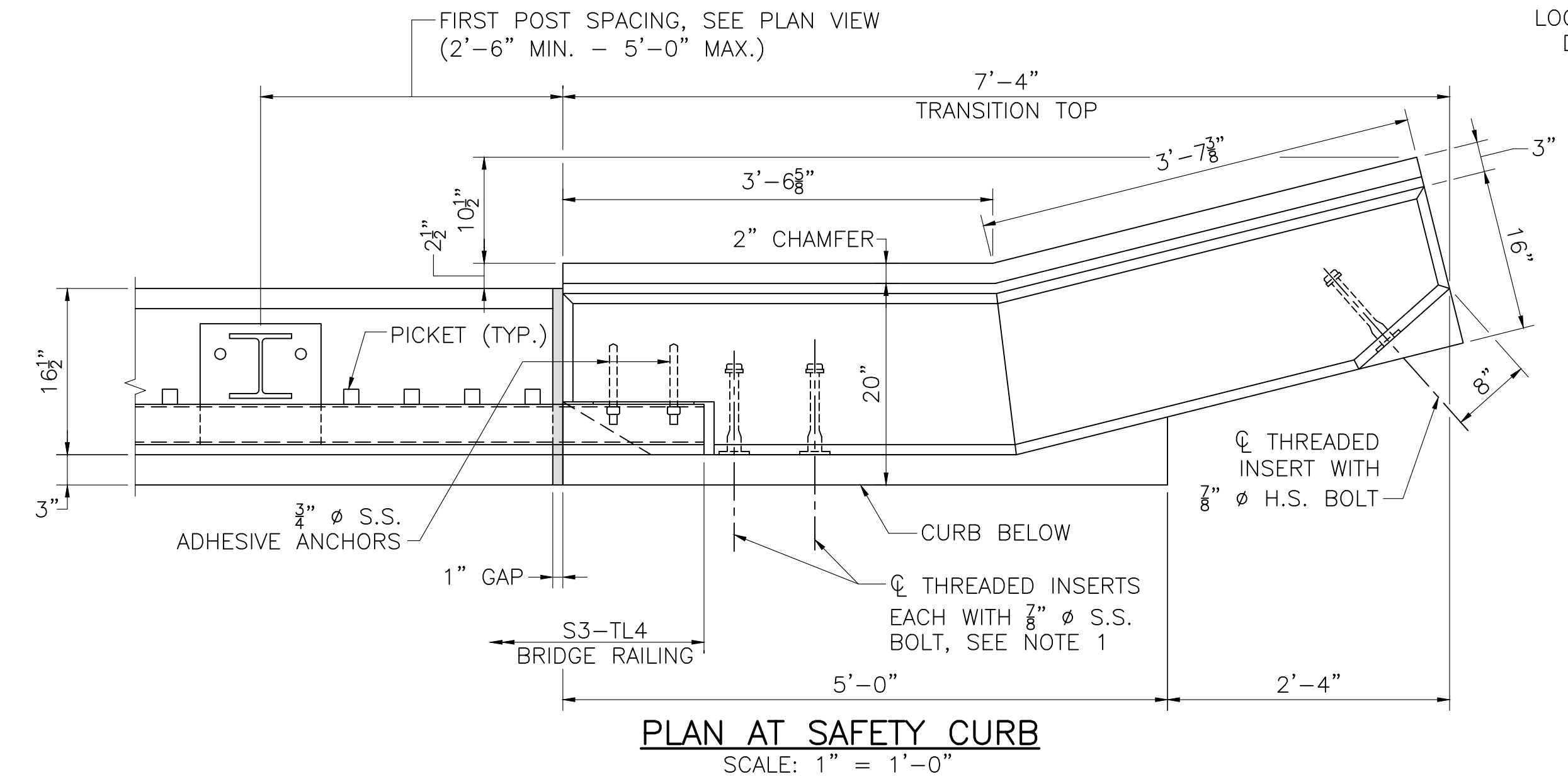
**BASE OF PRECAST HIGHWAY GUARDRAIL TRANSITION FOR S3-TL4 RAILING**

APRIL 13, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	<i>[Signature]</i> STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

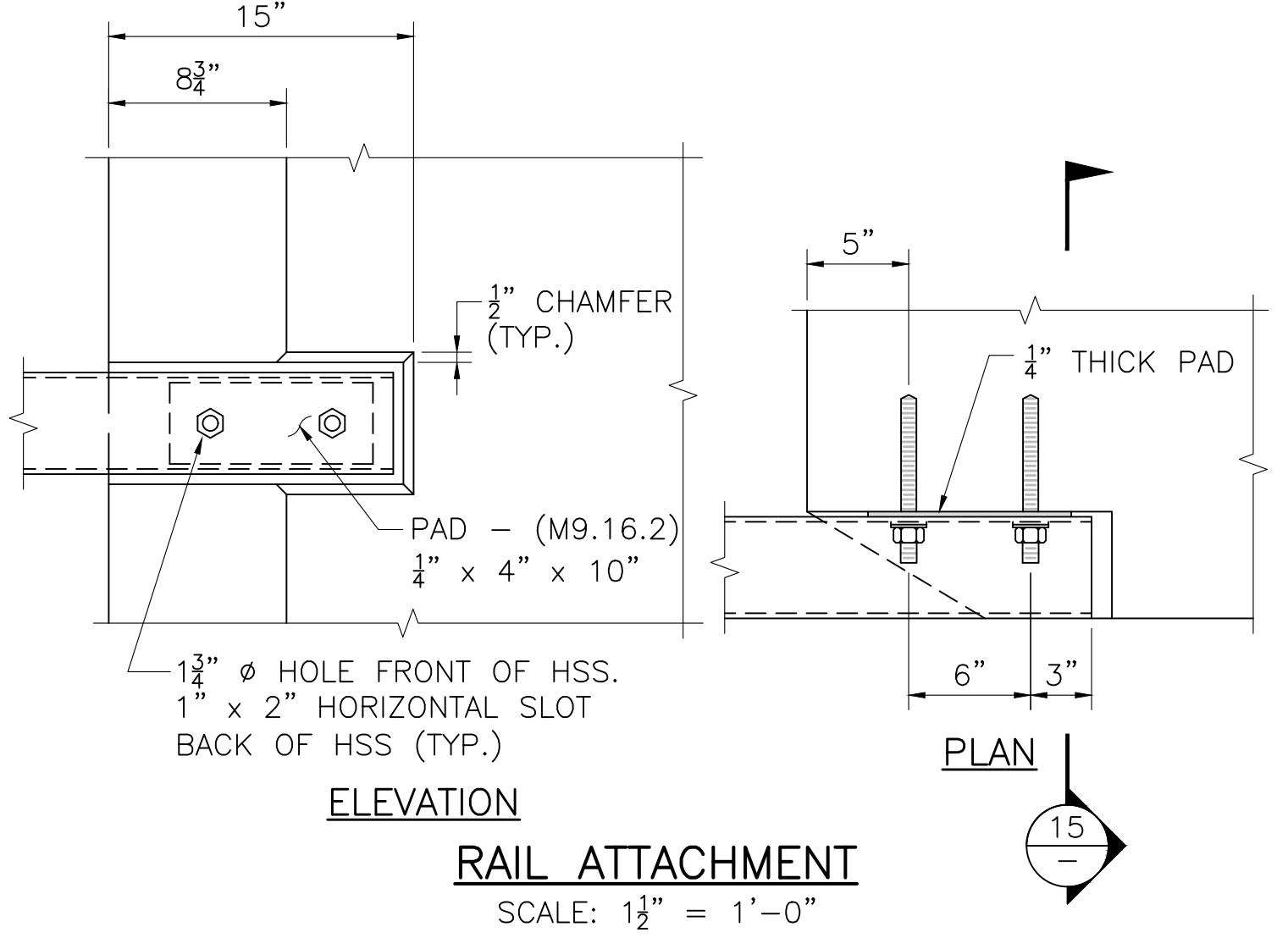
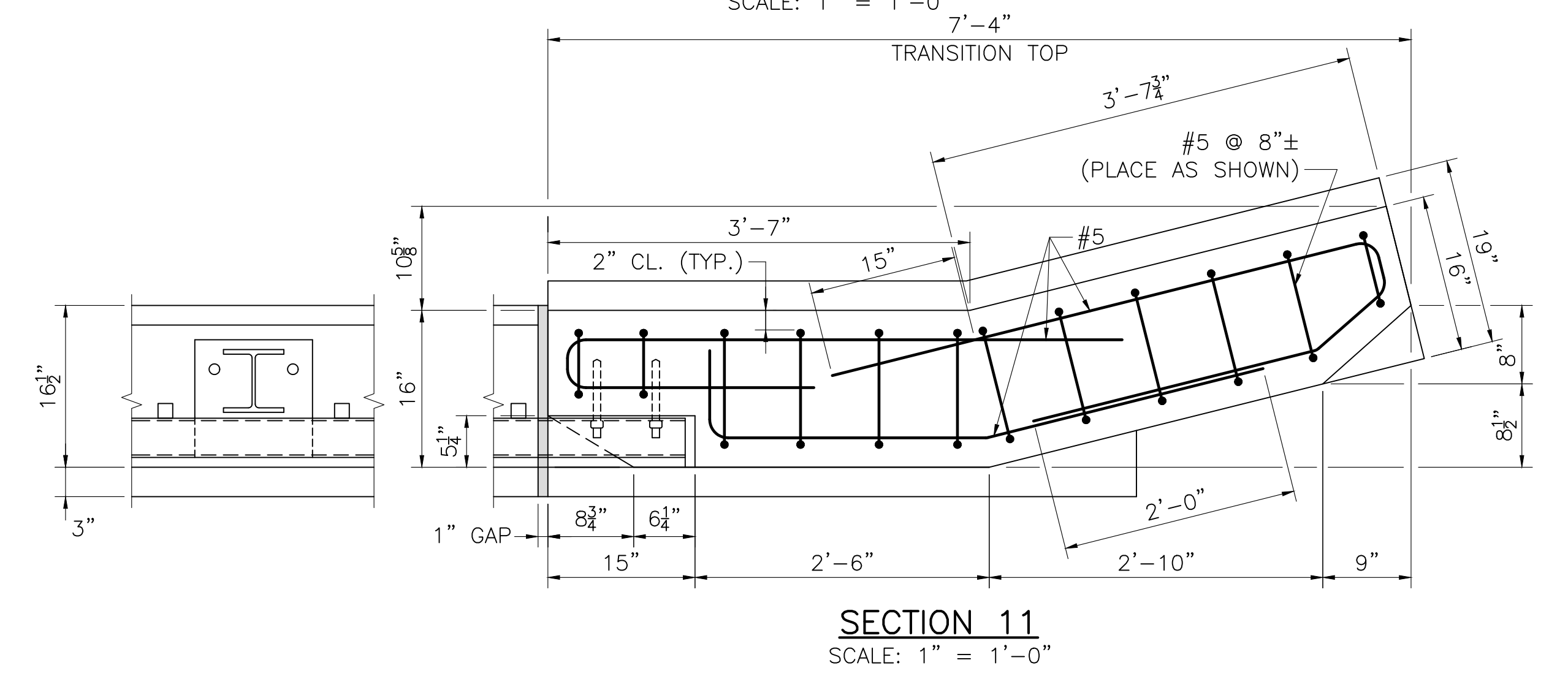
**SPENCER**  
**ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	38	46
PROJECT FILE NO.		609179	

**PRECAST HIGHWAY GUARDRAIL TRANSITION II**



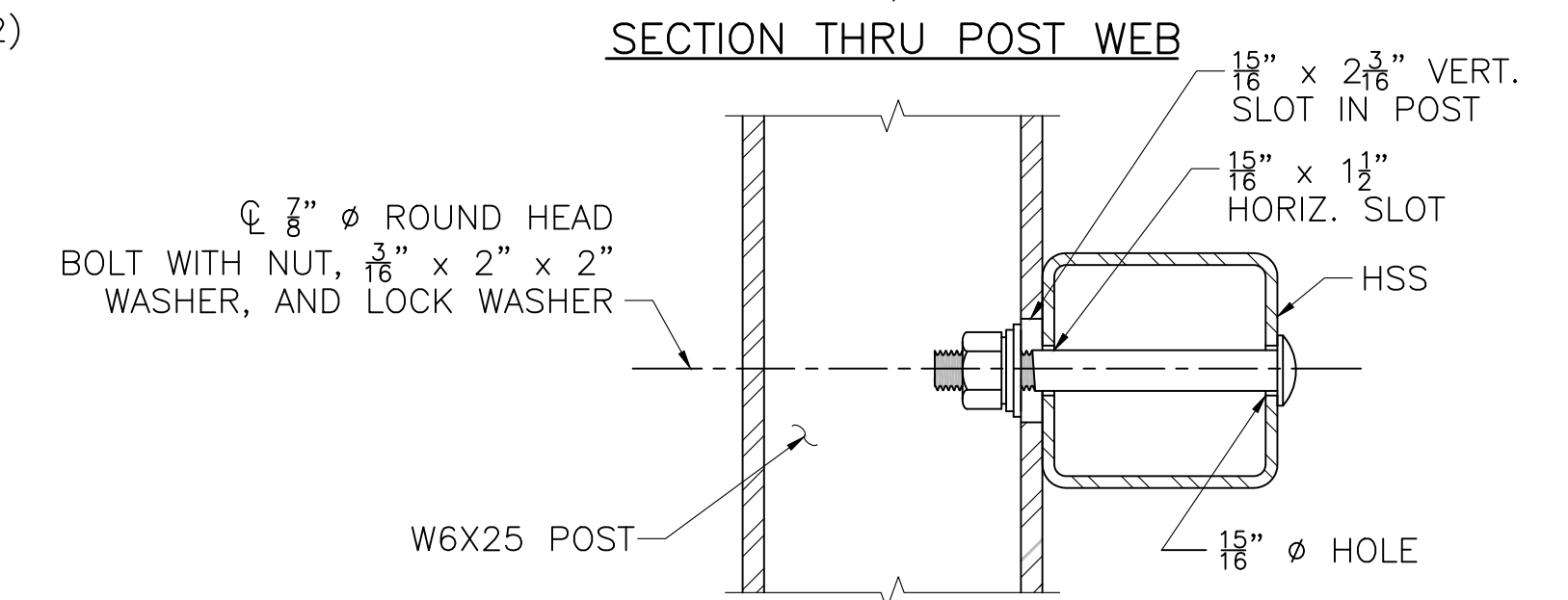
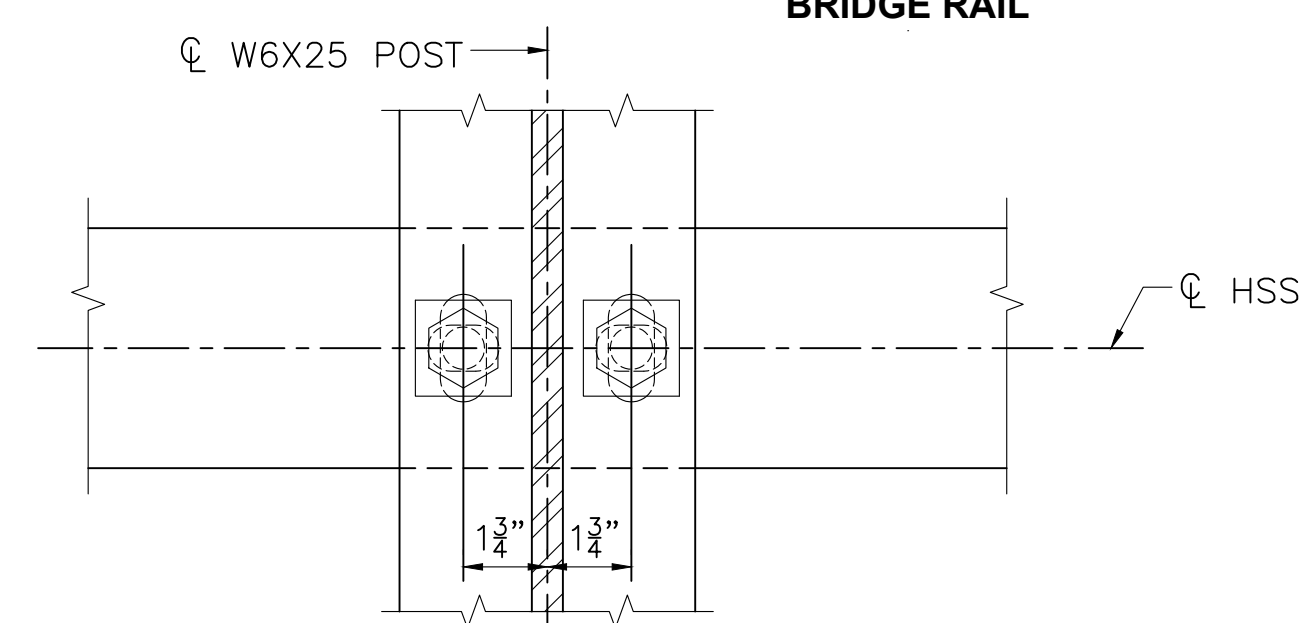
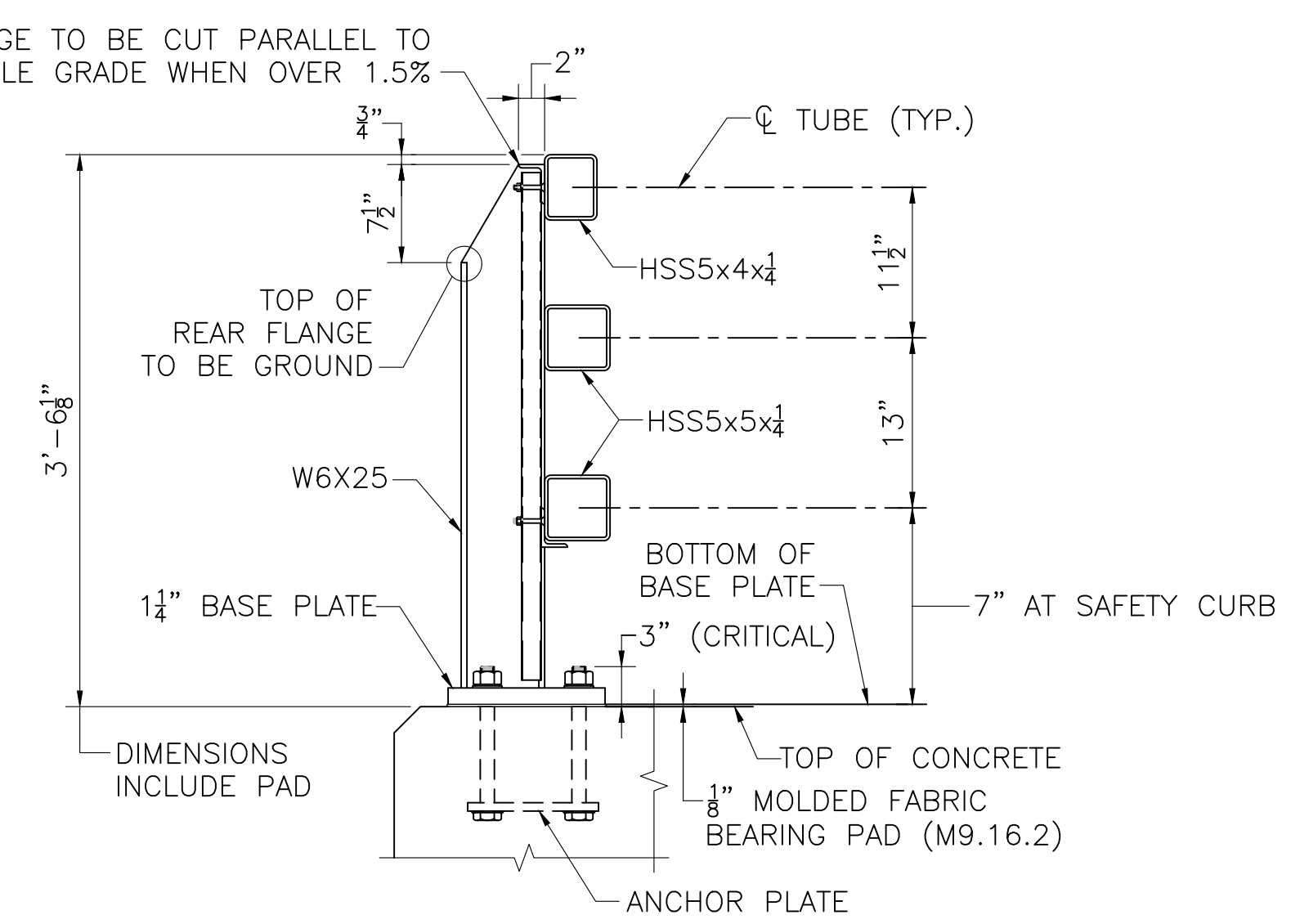
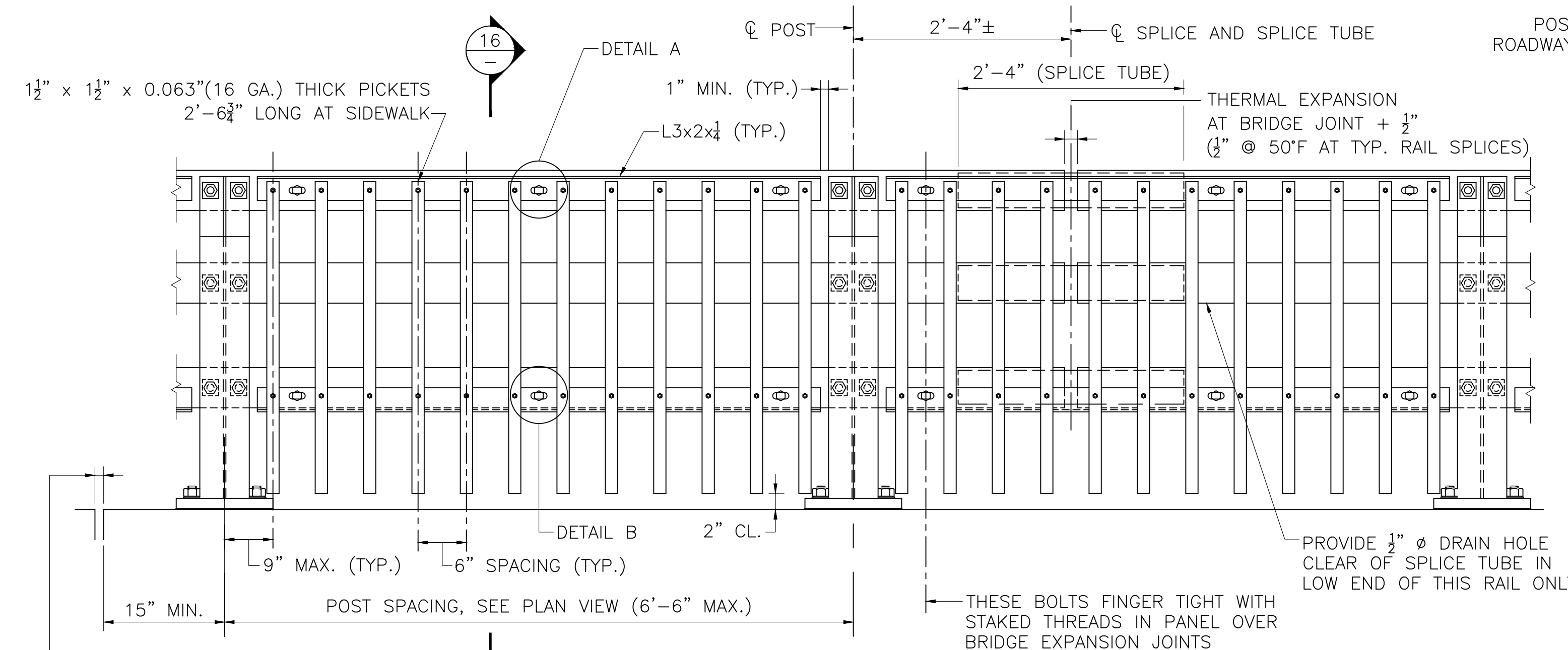
- NOTES:**
1. THREADED INSERTS SHALL BE PREQUALIFIED BY THE MANUFACTURER AS BEING CAPABLE OF DEVELOPING A NOMINAL SHEAR RESISTANCE OF 20 KIPS PER  $\frac{7}{8}$ "  $\phi$  S.S. BOLT. S.S. BOLTS SHALL BE  $\frac{7}{8}$ "  $\phi$  x  $1\frac{1}{2}$ " LONG FULLY THREADED AISI TYPE 304N STAINLESS STEEL. INSERTS FOR  $\frac{7}{8}$ " S.S. BOLTS SHALL BE GALVANIZED AND CAST INTO THE TRANSITION.
  2. FOR AN APPROACH GRADE UP TO 3%, THE TRANSITION MAY BE CAST SQUARE AND SET PLUMB WITH THE MINIMUM EMBEDMENT DEPTH SHOWN. THE TERMINAL CONNECTOR INSERT GROUP SHALL BE SQUARE TO THE POST.
  3. FOR AN APPROACH GRADE IN EXCESS OF 3%, THE TRANSITION TOP AND THE TOP OF CURB SHALL FOLLOW THE APPROACH GRADE. THE HEIGHT OF THE TRANSITION TOP SHALL VARY PROVIDED THAT THE MINIMUM DIMENSIONS SHOWN ON THE CONSTRUCTION DRAWINGS ARE MET. THE BOTTOM OF THE TRANSITION BASE SHALL BE SET LEVEL WITH THE MINIMUM EMBEDMENT DEPTH SHOWN. THE TERMINAL CONNECTOR INSERT GROUP SHALL BE SLOPED TO FOLLOW THE APPROACH GRADE.
  4. USE LATEST CONTRACT COMPLETION YEAR IN EFFECT WHEN THE FIRST GUARDRAIL TRANSITION IS CAST. USE THIS YEAR FOR ALL GUARDRAIL TRANSITIONS.
  5. ALL CONCRETE FOR THE PRECAST HIGHWAY GUARDRAIL TRANSITION SHALL BE 5000 PSI,  $\frac{3}{4}$ ", 685 HP CEMENT CONCRETE.
  6. LIFTING DEVICES (NOT SHOWN), INCLUDING THEIR NUMBER AND LOCATION, SHALL BE DESIGNED AND DETAILED BY THE PRECASTER. THEY SHALL BE GALVANIZED AND SHALL BE PLACED AND RECESSED IN POCKETS TO PROVIDE  $1\frac{1}{2}$ " CLEAR COVER TO THE FACE OF THE TRANSITION CONCRETE. THESE DEVICES SHALL BE CLEARLY SHOWN ON THE SHOP DRAWINGS ALONG WITH ALL SUPPORTING CALCULATIONS AND/OR CATALOG CUTS. ONCE THE PRECAST TRANSITION IS SET IN PLACE, THE LIFTING DEVICE POCKETS SHALL BE FILLED WITH A NON-SHRINK GROUT THAT MATCHES THE COLOR OF THE TRANSITION CONCRETE WHEN CURED AND THE FILLED POCKETS SHALL BE RUBBED WITH A CORUNDUM STONE TO BLEND OUT THE JOINTS.



**TOP OF PRECAST HIGHWAY GUARDRAIL TRANSITION FOR S3-TL4 RAILING**

APRIL 13, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
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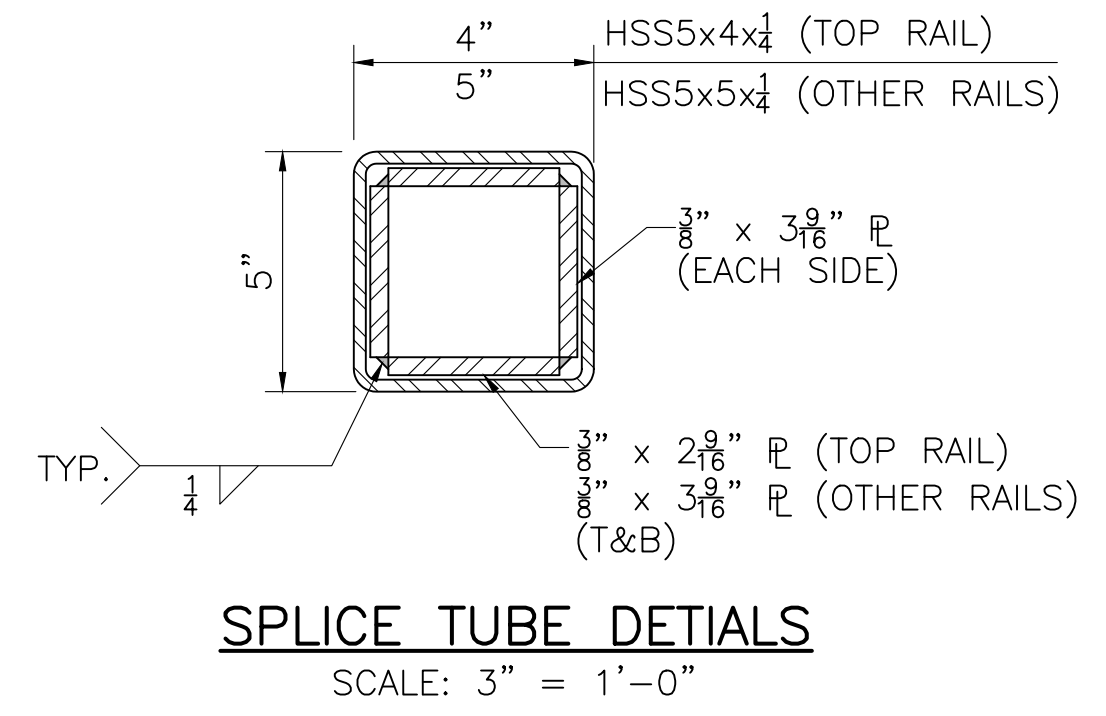
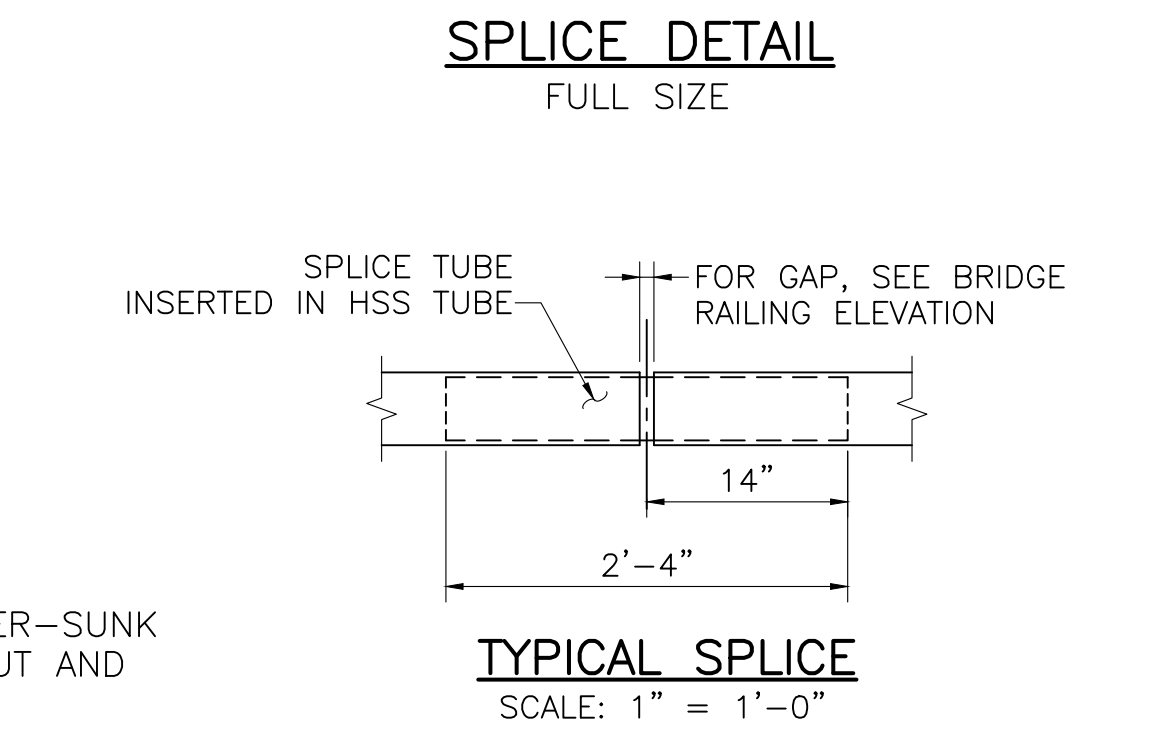
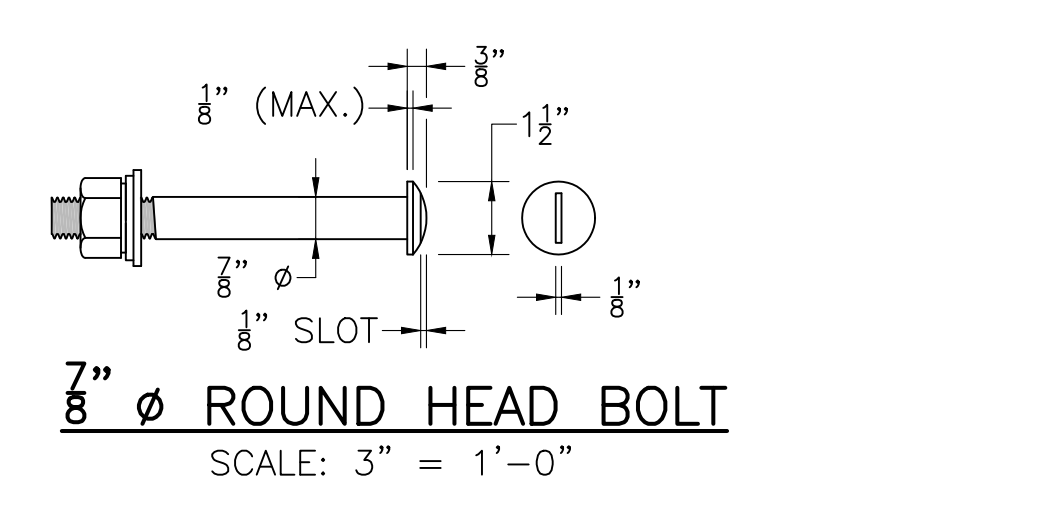
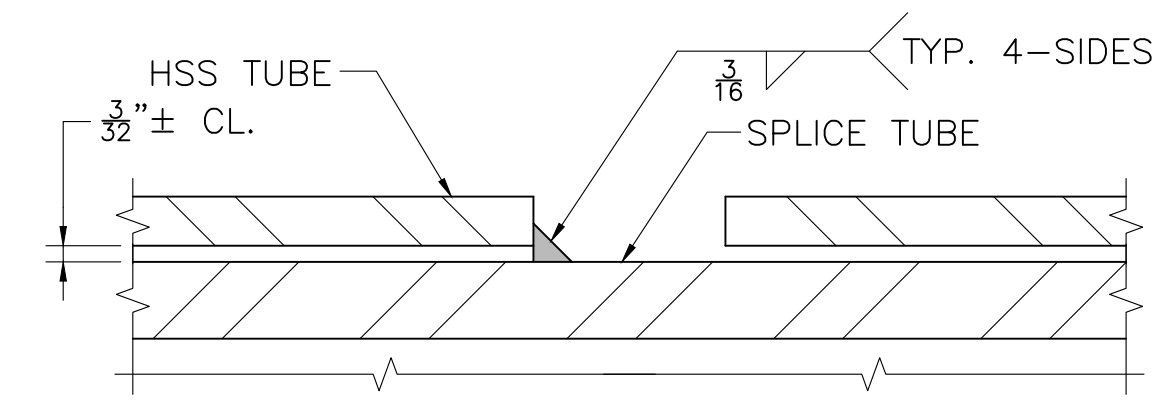
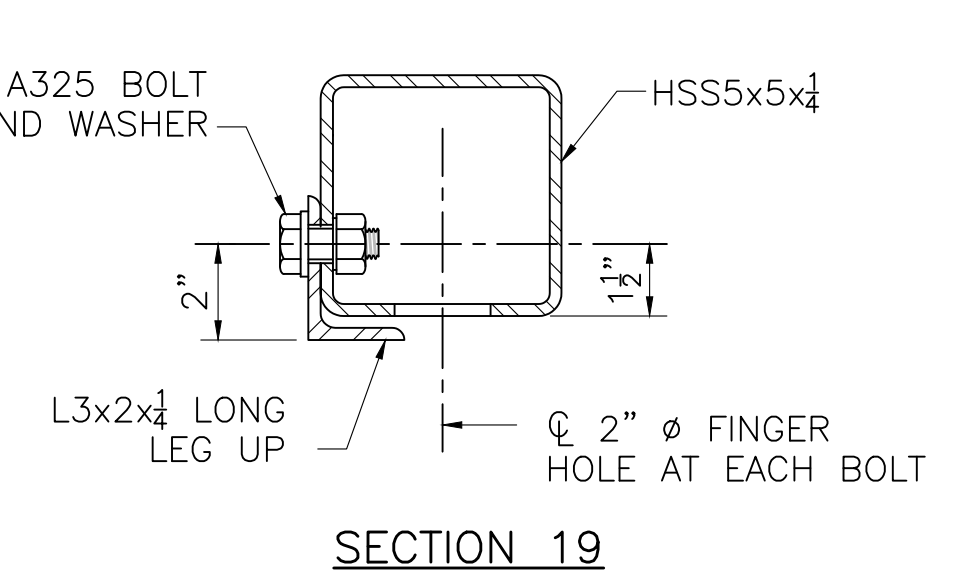
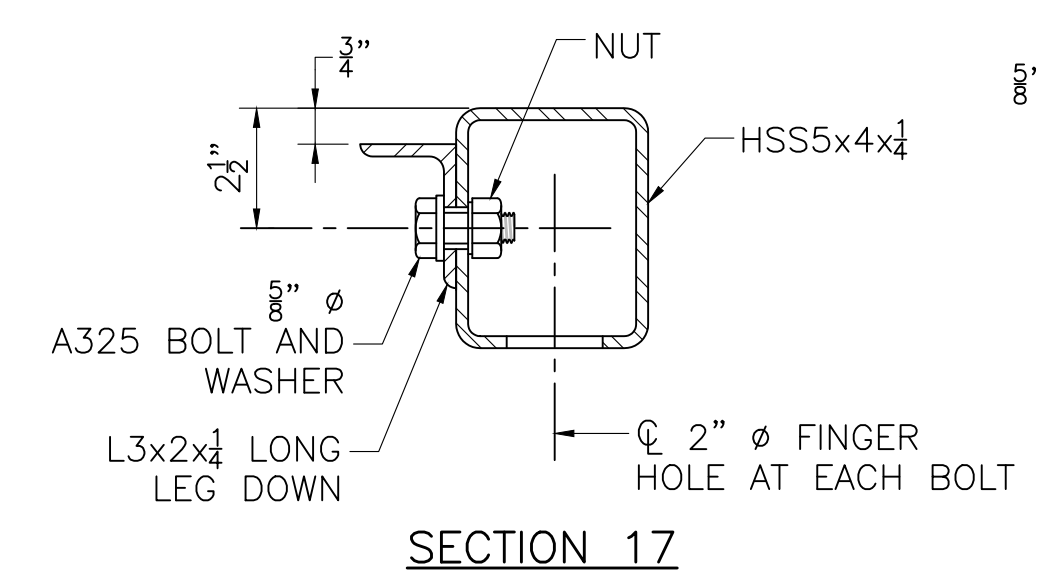
SPENCER			
ST 31 (NORTH SPENCER ROAD)			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	39	46
PROJECT FILE NO.		609179	



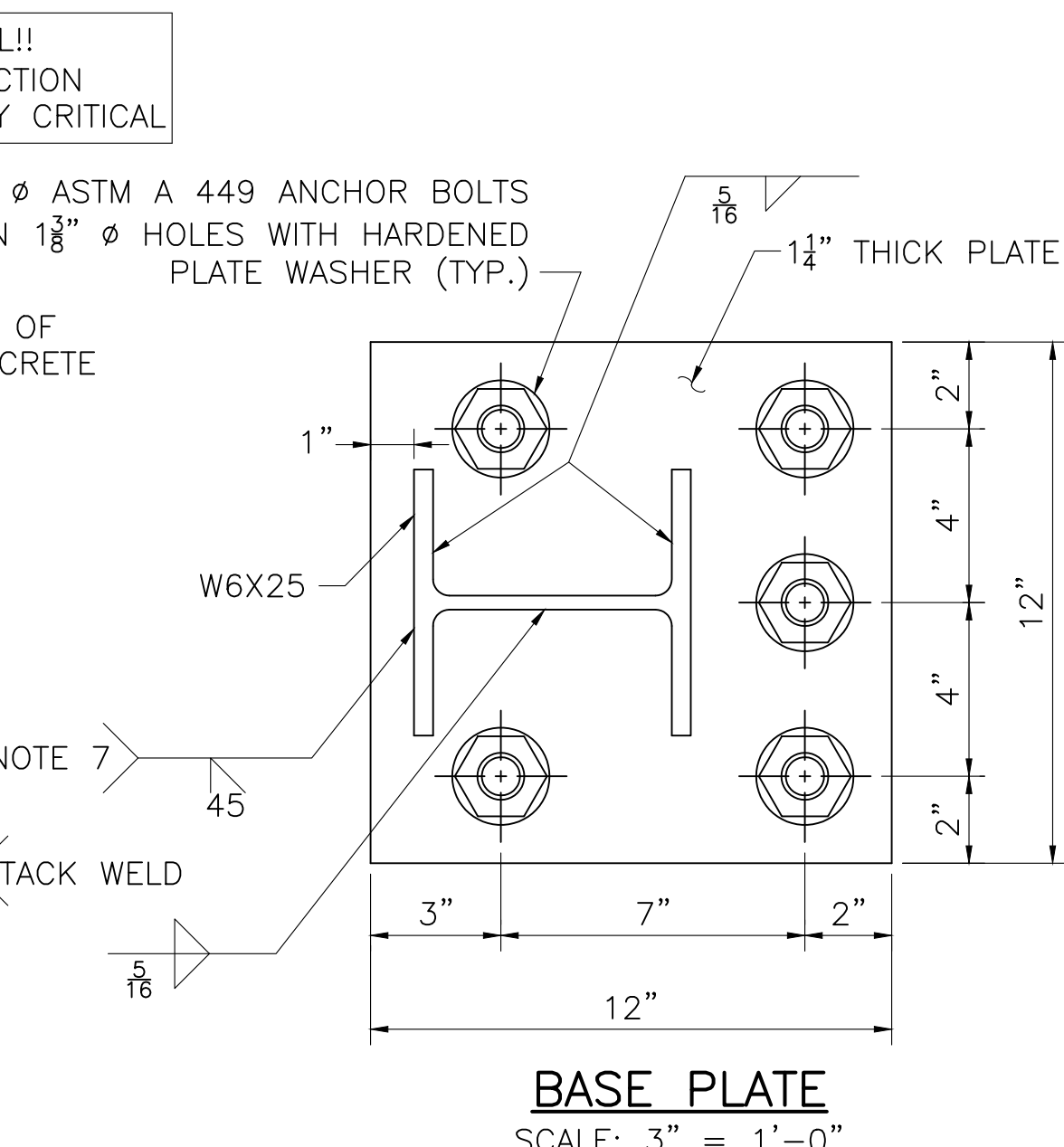
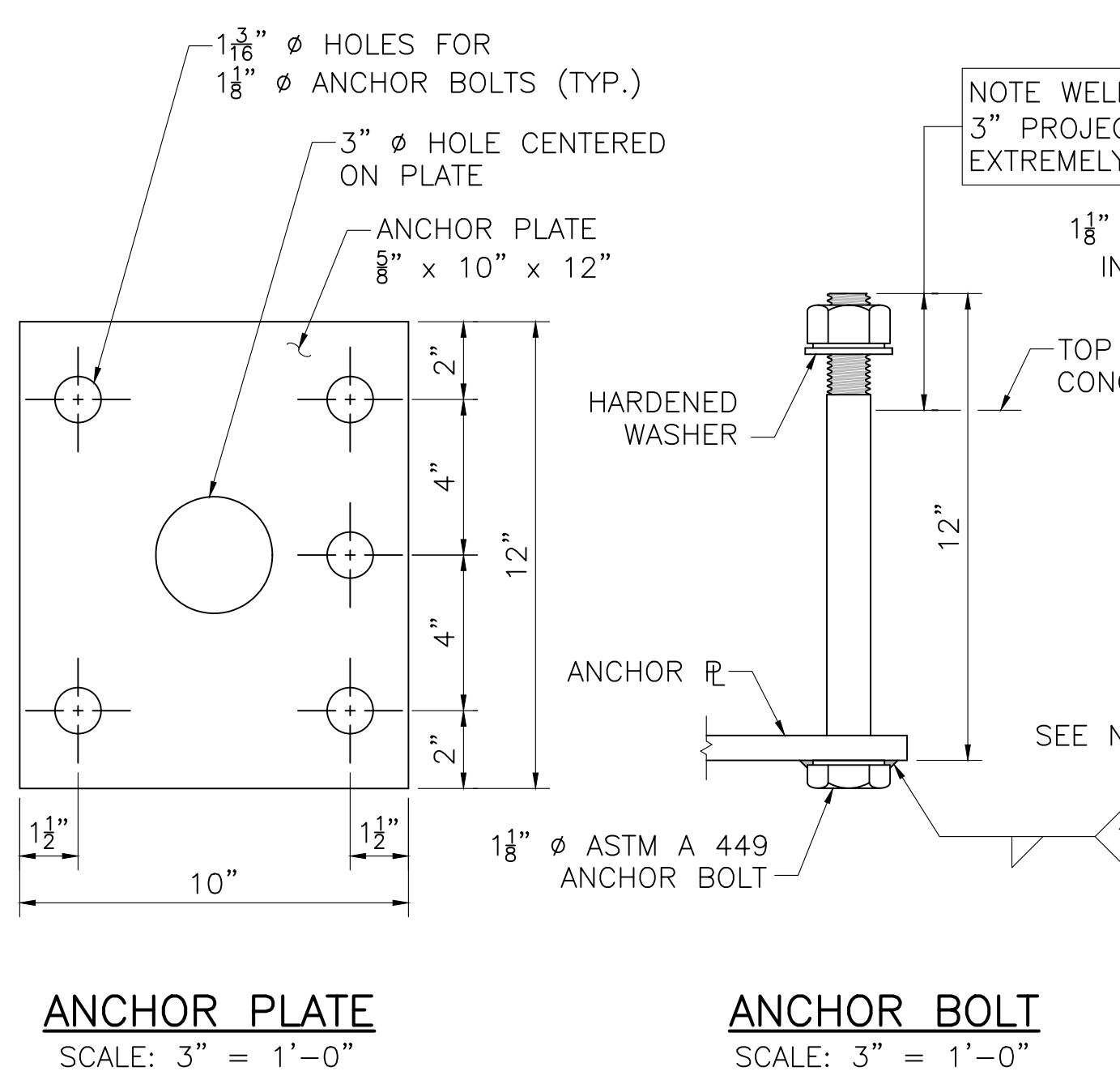
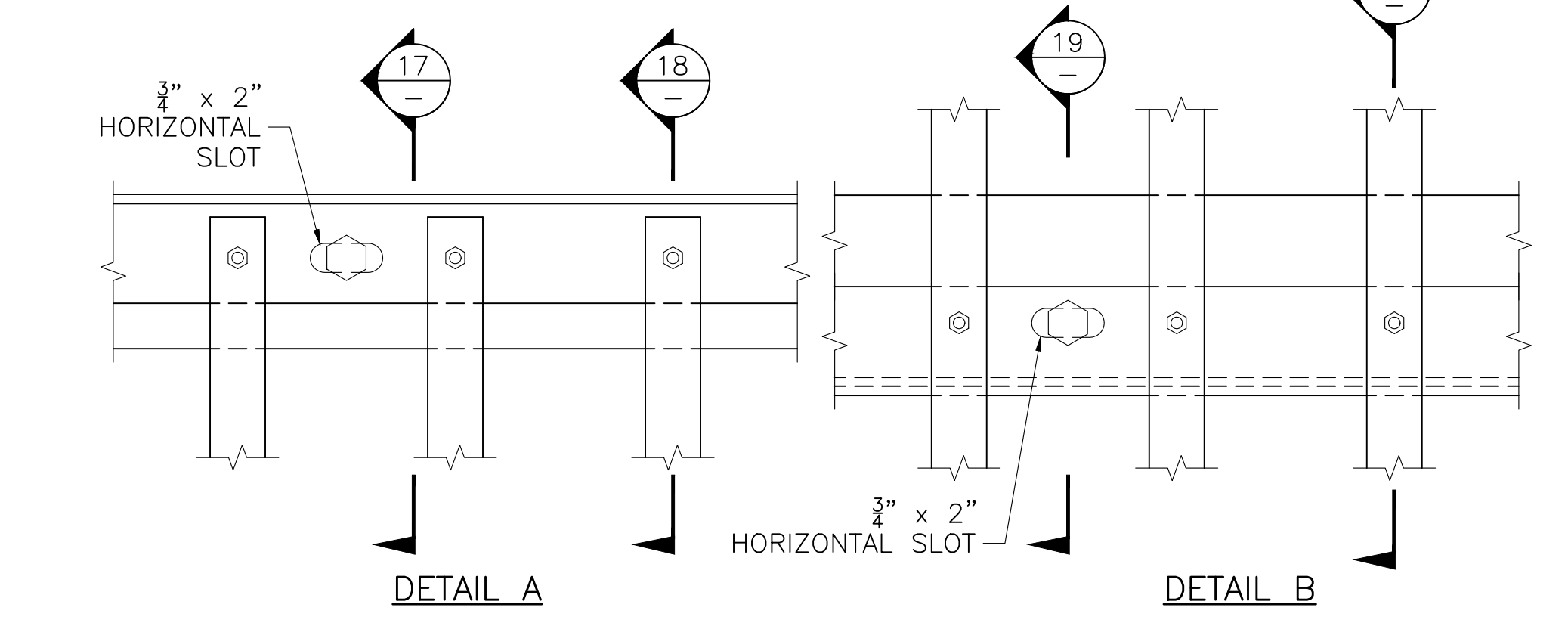
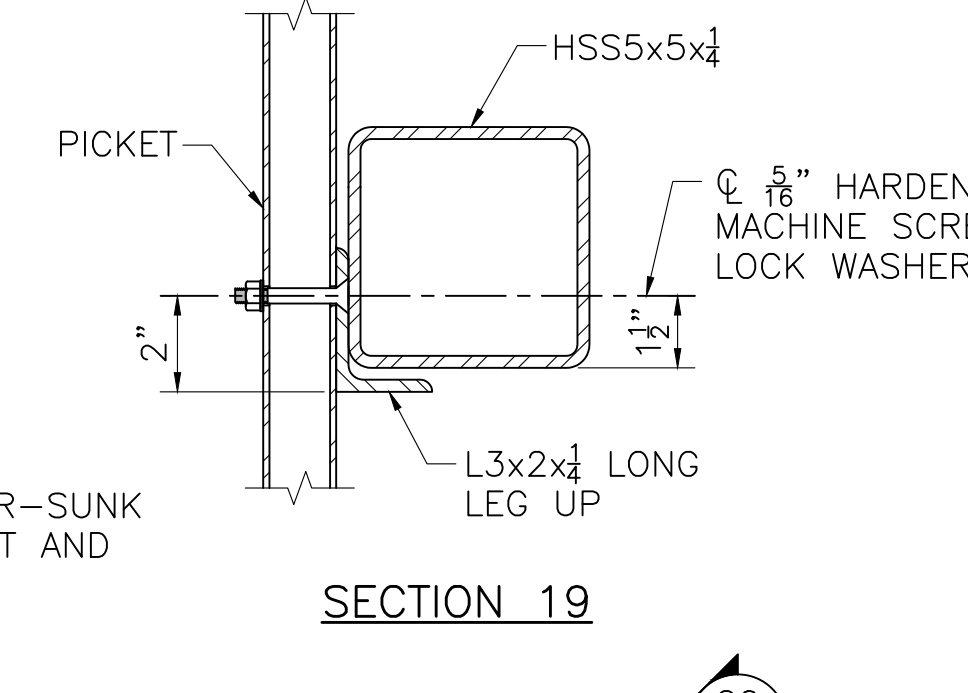
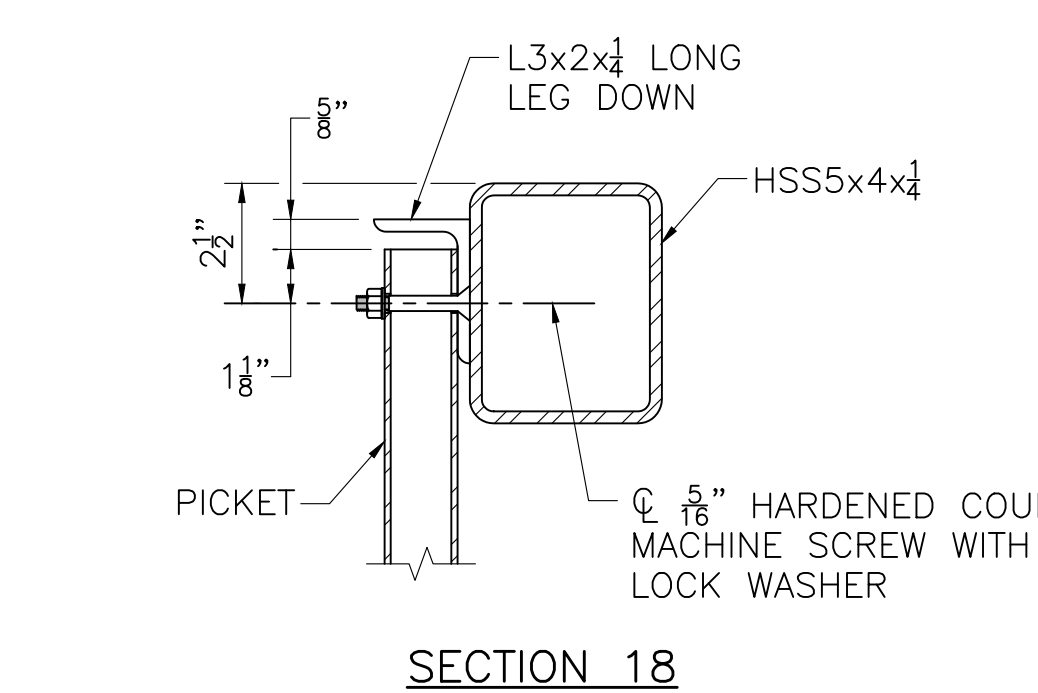
**NOTE:**  
CONNECTIONS AT LOWER RAILS SHOWN.  
CONNECTIONS AT TOP RAIL SIMILAR.

**TYPICAL RAIL TO POST CONNECTIONS**  
SCALE: 1" = 1'-0"

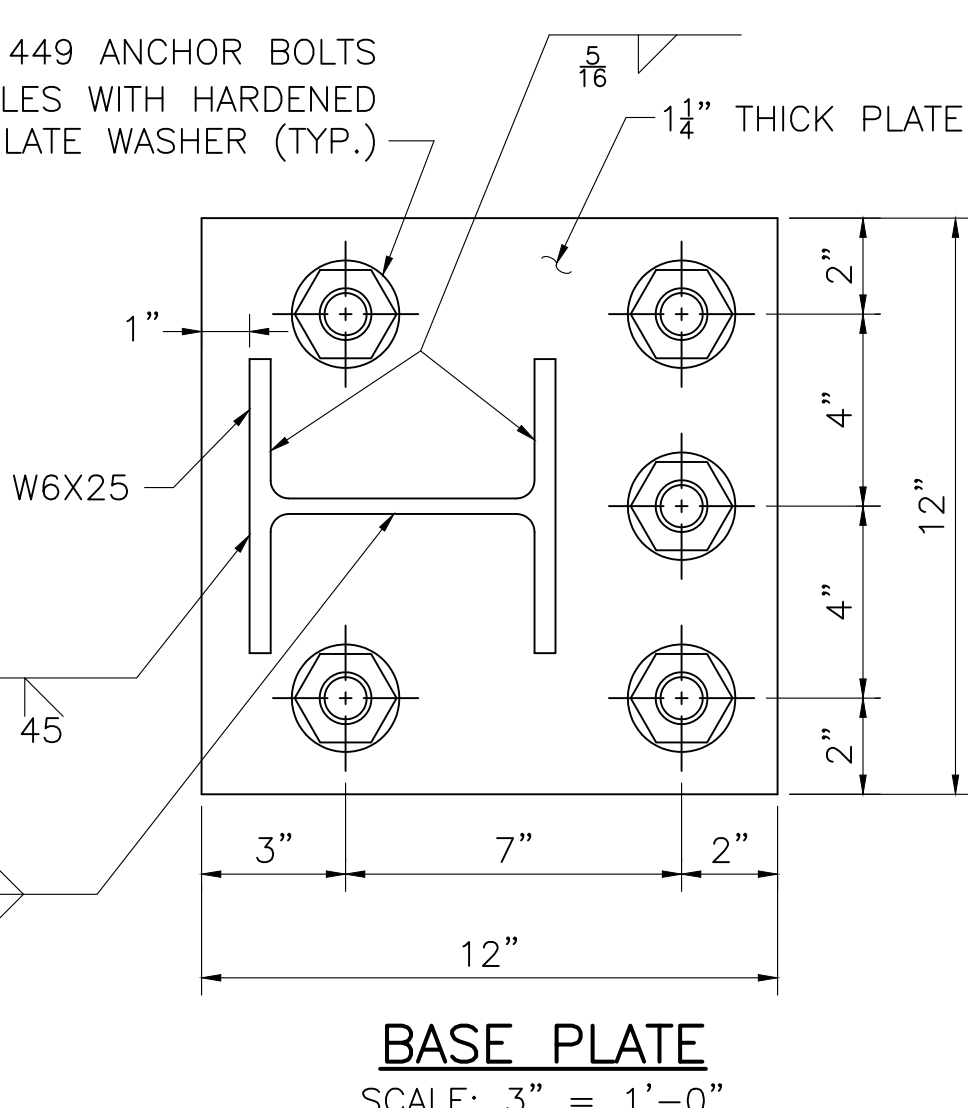
EXPANSION OR CONSTRUCTION JOINT



- RAILING NOTES:**
- RAIL POST AND BASE PLATES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 270 GRADE 50. HOLLOW RAILING STRUCTURAL TUBING (HSS) SHALL CONFORM TO THE REQUIREMENTS OF ASTM A 500 WITH A CERTIFIED  $F_y = 50$  KSI MINIMUM. THE MINIMUM HORIZONTAL BENDING RADII OF THE HSS TUBING SHALL BE 8 FEET. PICKET CARRIER ANGLES, ANCHOR PLATES, AND SPLICE TUBE PLATES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 270 GRADE 36. PICKET TUBING SHALL CONFORM TO ASTM A 513 WITH  $F_y = 36$  KSI MIN. OR A 500 GRADE B.
  - ALL STEEL (EXCEPT THE 5/8" ANCHOR PLATE AND FASTENERS) SHALL BE GALVANIZED AND PAINTED DARK BRONZE (FEDERAL STD. 595B COLOR NO. 10045). ANCHOR PLATE SHALL BE GALVANIZED ONLY. HEADS OF 7/8" ROUND HEAD BOLTS SHALL BE PAINTED TO MATCH RAIL.
  - ANCHOR BOLTS SHALL BE SET WITH TEMPLATES. THE NUT SECURING THE POST BASE PLATE TO THE CONCRETE SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL 1/8 TURN AFTER STEEL IS IN PLACE.
  - RAILS SHALL BE CONTINUOUS OVER A MINIMUM OF FOUR (4) POSTS WITHOUT SPLICES WHERE POSSIBLE. RAILS SHALL BE SPLICED IN THE PANELS OVER EXPANSION JOINT.
  - ENDS OF TUBE SECTIONS SHALL BE SAWED. GRIND SMOOTH EXPOSED EDGES. ALL CUT ENDS SHALL BE TRUE AND SMOOTH.
  - ALL POSTS TO BE PLUMB WHEN PROFILE GRADE EXCEEDS 1.5%. FOR PROFILE GRADES LESS THAN 1.5%, POSTS SHALL BE SET PERPENDICULAR TO GRADE.
  - POST FLANGE WELD DOES NOT REQUIRE MAGNETIC PARTICLE TESTING. WELD SHALL BE BACK-GOUGED ON BACK SIDE EXCEPT AT WEB. WELD IS THE SAME ON BOTH FLANGES.
  - 7/8" ROUND HEAD BOLTS SHALL CONFORM TO THE CHEMICAL AND PHYSICAL REQUIREMENTS OF AASHTO M 164.



**NOTE WELL!!**  
3" PROJECTION EXTREMELY CRITICAL



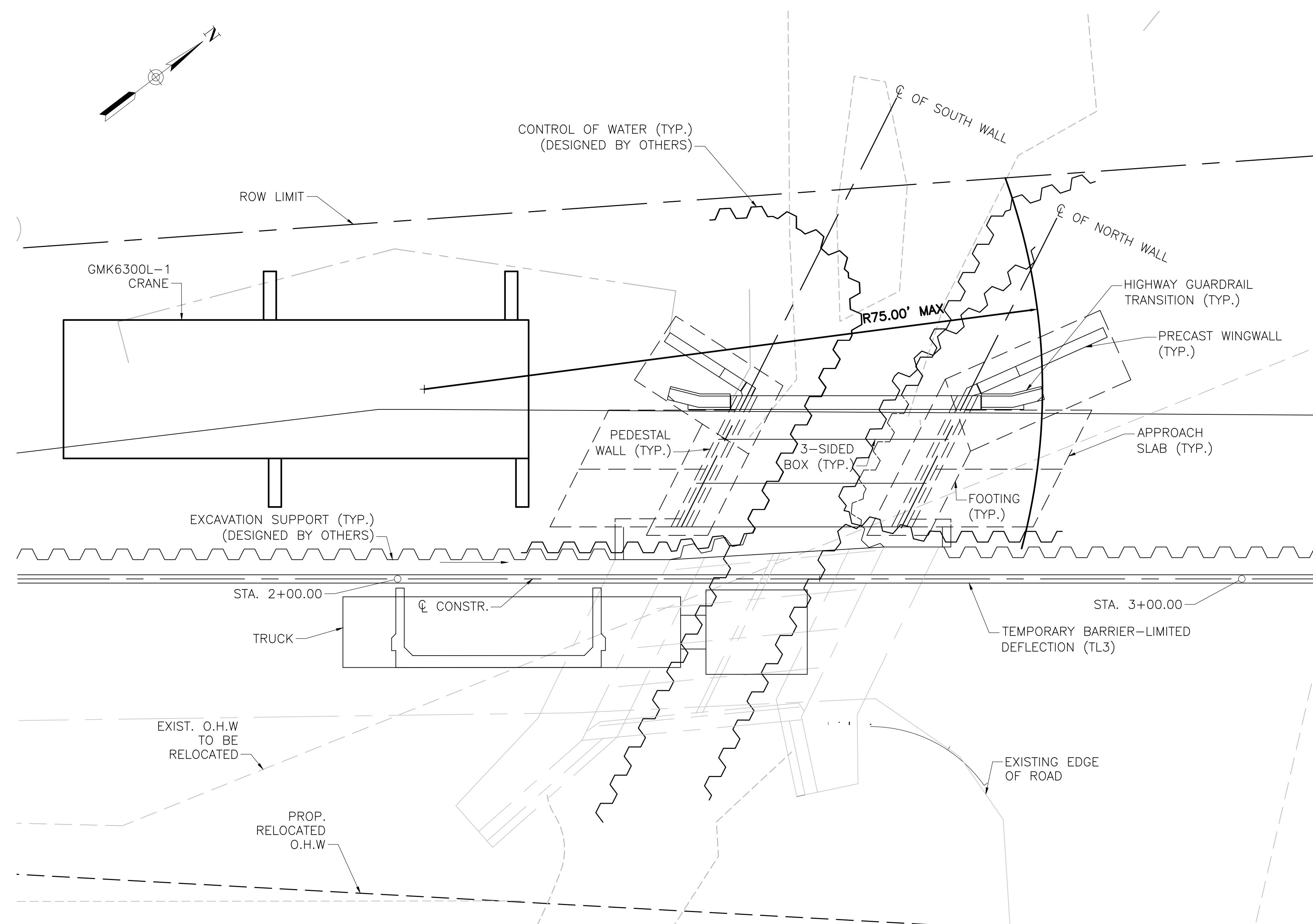
**S3-TL4 BRIDGE RAILING DETAILS**

APRIL 13, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
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AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

**SPENCER  
ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	40	46
PROJECT FILE NO.		609179	

**STAGE I SUGGESTED ERECTION PROCEDURE**



**SUGGESTED STAGE I  
ERECTION PROCEDURE**

SCALE: 1/8"=1'-0"

**NOTES:**

1. CRANE IS A GROVE GMK6300L-1 WITH 203,900 LBS OF COUNTER-WEIGHT.
2. THE CRITICAL LIFT IS NORTH FOOTING UNIT 1 WITH A REACH OF 75.00 FEET AND A FACTORED WEIGHT OF 60,000 LBS.
3. THE CRANE CAPACITY IS 74,000 LBS WITH A REACH OF 75.00 FEET.

**STAGE I SUGGESTED LIFTING PROCEDURE:**

1. TRAFFIC WILL BE TEMPORARILY STOPPED IN THE NORTHBOUND LANE.
2. THE TRUCK WILL STOP IN THE NORTHBOUND LANE WITH THE PRECAST ELEMENT.
3. THE CRANE WILL LIFT THE PRECAST ELEMENT OFF OF THE TRUCK AND LOWER IT INTO POSITION.
4. THE NORTHBOUND LANE WILL BE RE-OPENED TO TRAFFIC.
5. REPEAT STEPS 1 & 2 FOR ALL REMAINING PRECAST ELEMENTS.
6. PRECAST ELEMENT TO BE INSTALLED IN STAGE I:
  - A, SOUTH FOOTING UNITS 1 & 2
  - B, SOUTH PEDESTAL WALL UNIT 1
  - C, NORTH FOOTING UNITS 1 & 2
  - D, NORTH PEDESTAL WALL UNIT 1
  - E, 3-SIDED BOX UNITS 1-3
  - F, SOUTHWEST WINGWALL
  - G, NORTHEAST WINGWALL
  - H, SOUTHWEST HIGHWAY GUARDRAIL TRANSITION
  - I, NORTHWEST HIGHWAY GUARDRAIL TRANSITION
  - J, SOUTH APPROACH SLAB UNITS 1 & 2
  - K, NORTH APPROACH SLAB UNITS 1 & 2

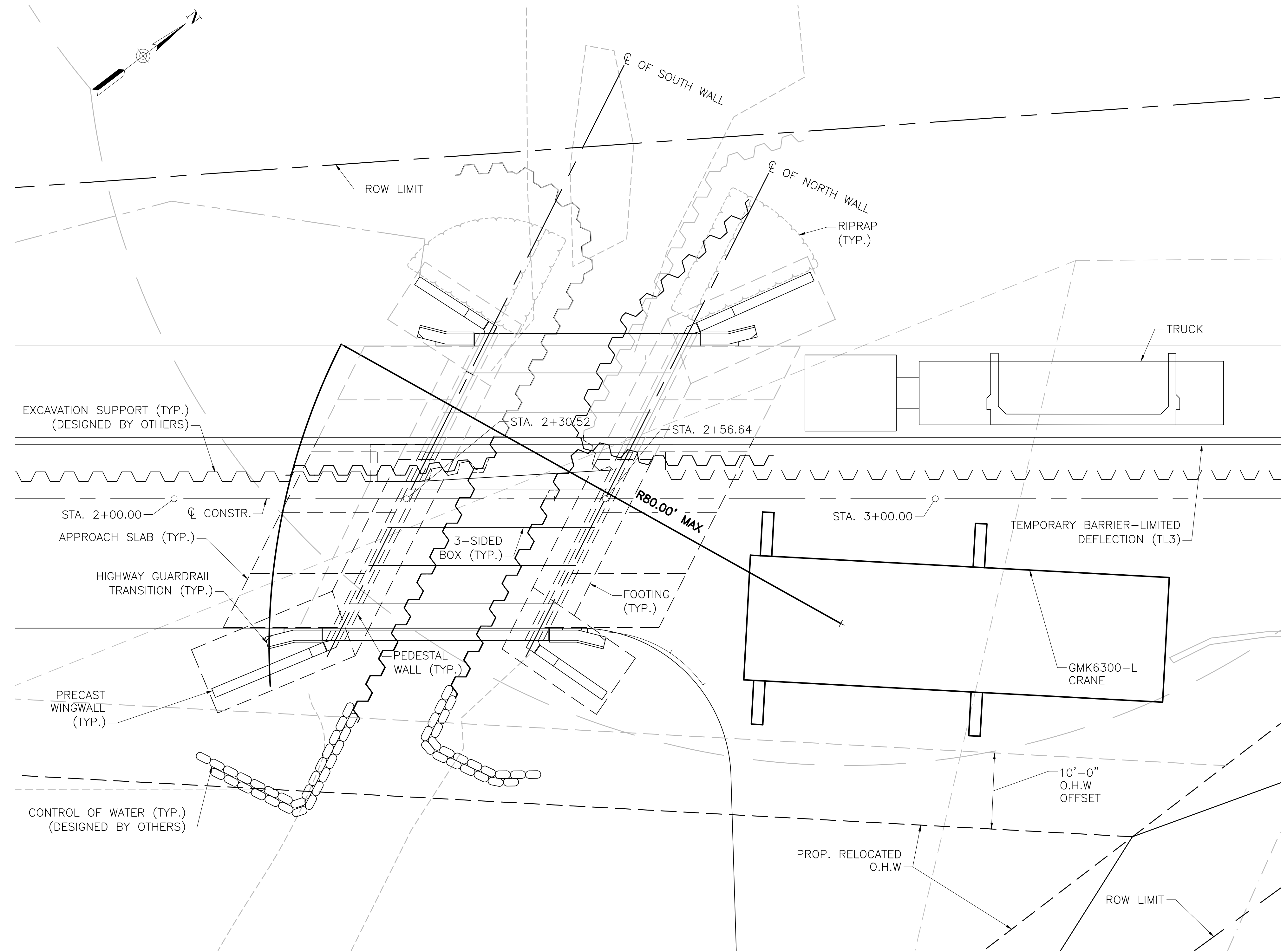
DATE	DESCRIPTION
APRIL 13, 2024	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
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USE ONLY PRINTS OF LATEST DATE	



**SPENCER  
ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	41	46
PROJECT FILE NO.		609179	

**STAGE II SUGGESTED ERECTION PROCEDURE**



**SUGGESTED STAGE II  
ERECTION PROCEDURE**

SCALE:  $\frac{1}{8}'' = 1'-0''$

**NOTE:**

CRANE IS A GROVE GMK6300L-1 WITH 203,900 LBS OF COUNTER-WEIGHT.  
THE CRITICAL LIFT IS SOUTH FOOTING UNIT 4 WITH A REACH OF 80.00 FEET AND FACTORED WEIGHT OF 55,000 LBS.  
THE CRANE CAPACITY WITH A REACH OF 80.00 FEET IS 68,000 LBS.

**STAGE II SUGGESTED LIFTING PROCEDURE:**

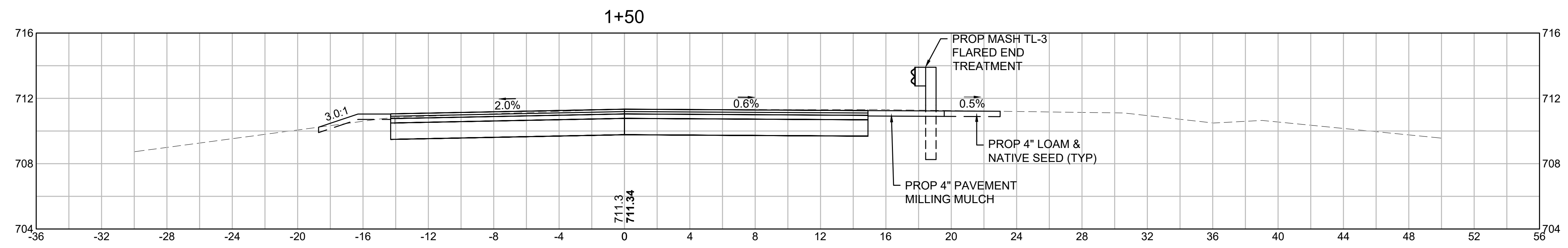
1. TRAFFIC WILL BE TEMPORARILY STOPPED IN THE SOUTHBOUND LANE.
2. THE TRUCK WILL STOP IN THE SOUTHBOUND LANE WITH PRECAST ELEMENT.
3. THE CRANE WILL LIFT THE PRECAST ELEMENT OFF OF THE TRUCK AND LOWER IT INTO POSITION.
4. THE SOUTHBOUND LANE WILL BE RE-OPENED TO TRAFFIC.
5. REPEAT STEPS 1 & 2 FOR ALL REMAINING PRECAST ELEMENTS.
6. PRECAST ELEMENT TO BE INSTALLED IN STAGE II:
  - A, SOUTH FOOTING UNITS 3 & 4
  - B, SOUTH PEDESTAL WALL UNIT 2
  - C, NORTH FOOTING UNITS 3 & 4
  - D, NORTH PEDESTAL UNIT 2
  - E, 3-SIDED BOX UNITS 4-8
  - F, SOUTHEAST WINGWALL
  - G, NORTHEAST WINGWALL
  - H, SOUTHEAST HIGHWAY GUARDRAIL TRANSITION
  - I, NORTHEAST HIGHWAY GUARDRAIL TRANSITION
  - J, SOUTH APPROACH SLAB UNITS 3-5
  - K, NORTH APPROACH SLAB UNITS 3-5

DATE	DESCRIPTION
APRIL 13, 2024	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
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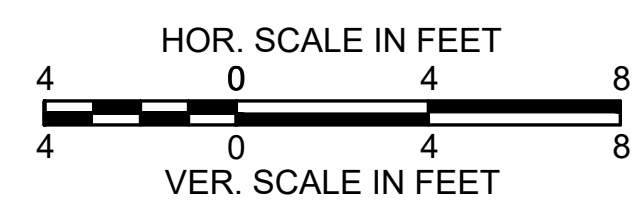
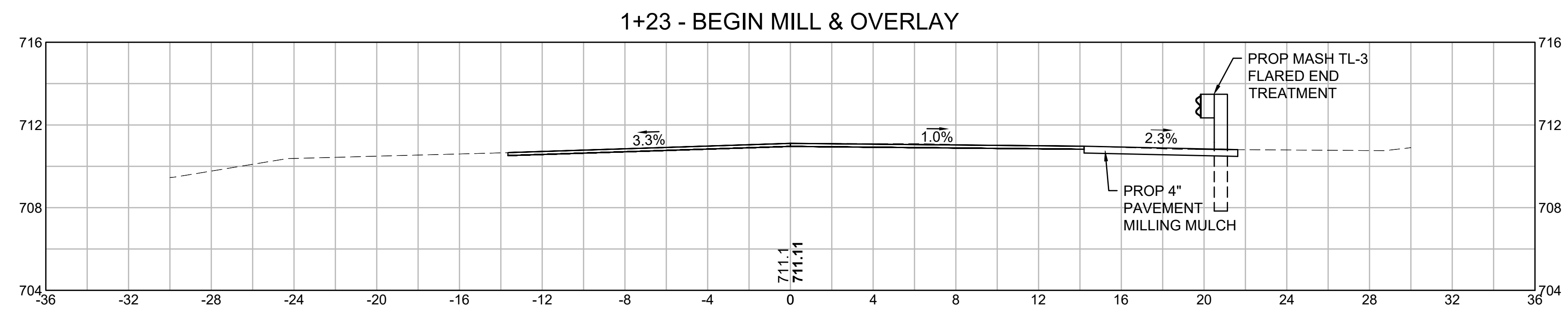
**SPENCER  
ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	42	46
PROJECT FILE NO.		609179	

**CROSS SECTIONS ST 31**



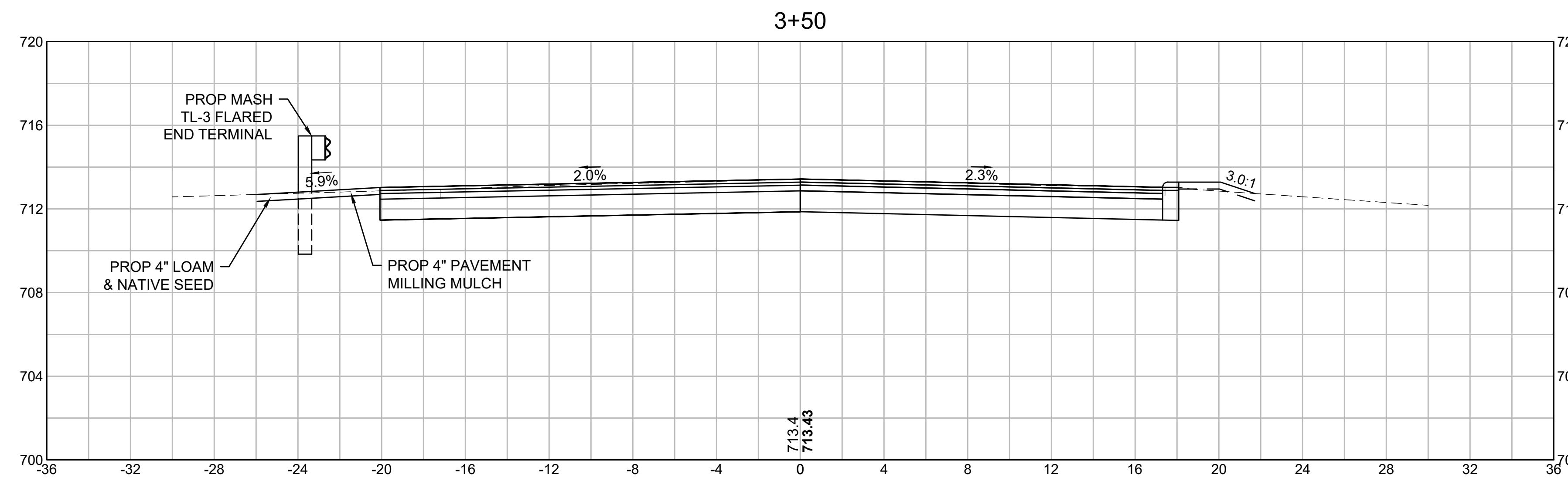
EXC: 48.02 SF  
EMB: 1.29 SF  
GRAVEL: 29.21 SF



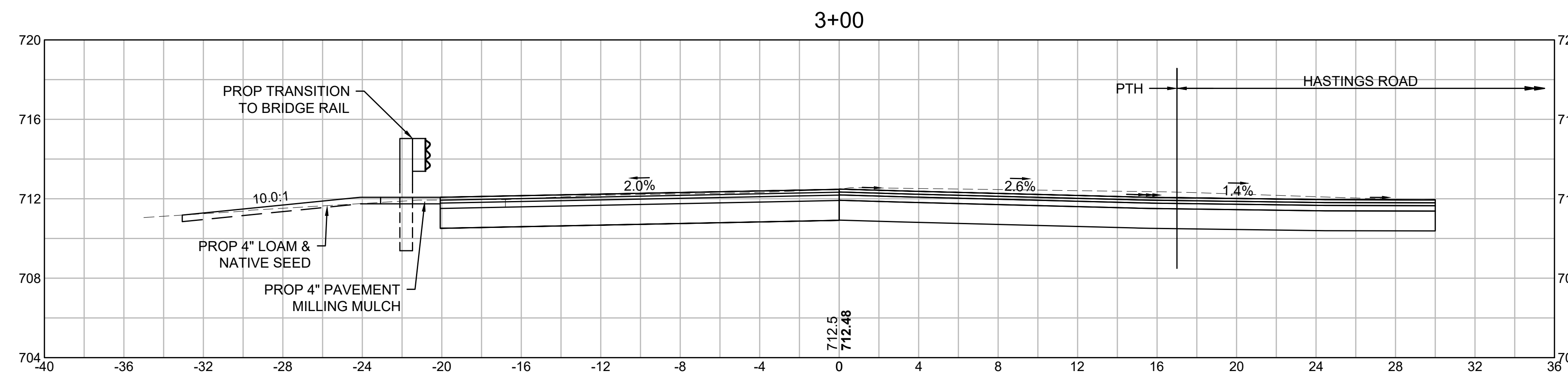
**SPENCER**  
**ST 31 (NORTH SPENCER ROAD)**

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MA	HIP(BR)-003S(723)X	43	46
PROJECT FILE NO.		609179	

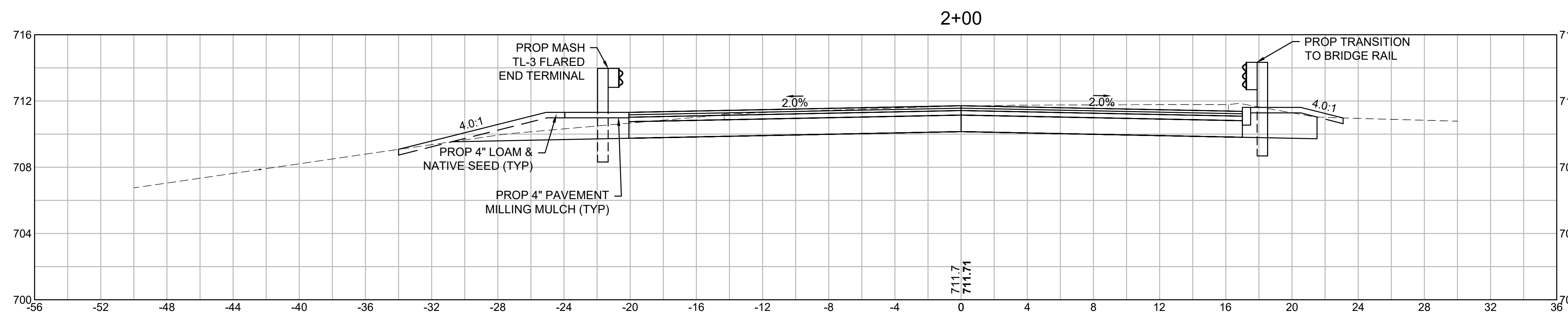
**CROSS SECTIONS ST 31 (2)**



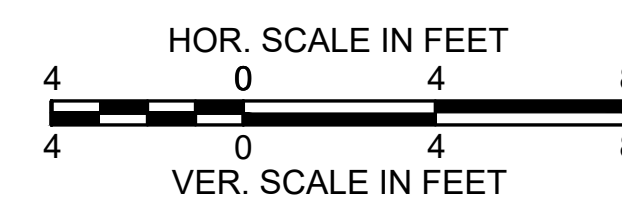
EXC: 59.81 SF  
EMB: 1.55 SF  
GRAVEL: 38.49 SF



EXC: 61.60 SF  
EMB: 2.20 SF  
GRAVEL: 37.07 SF



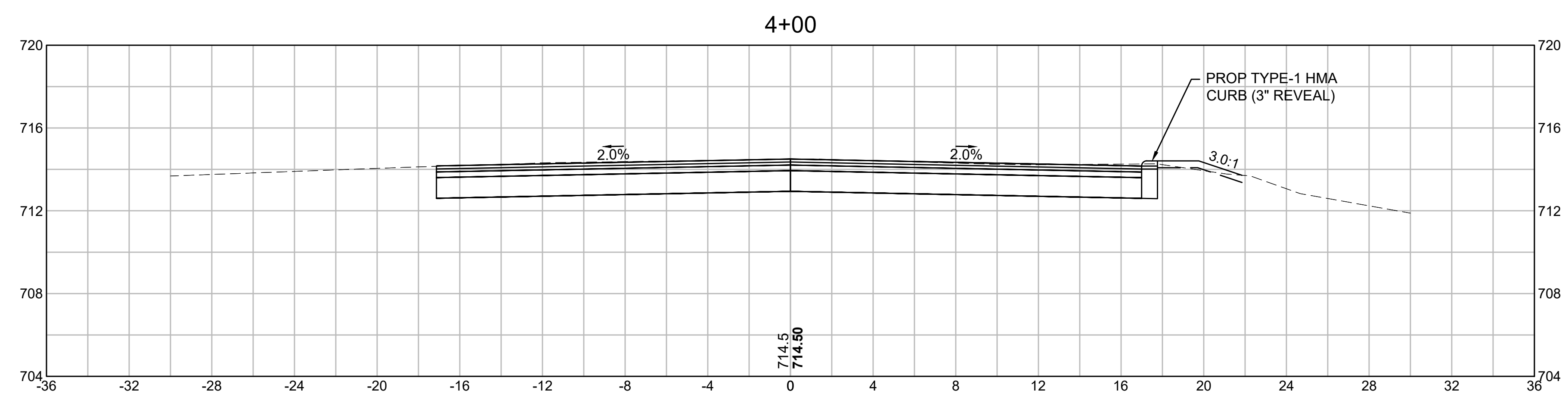
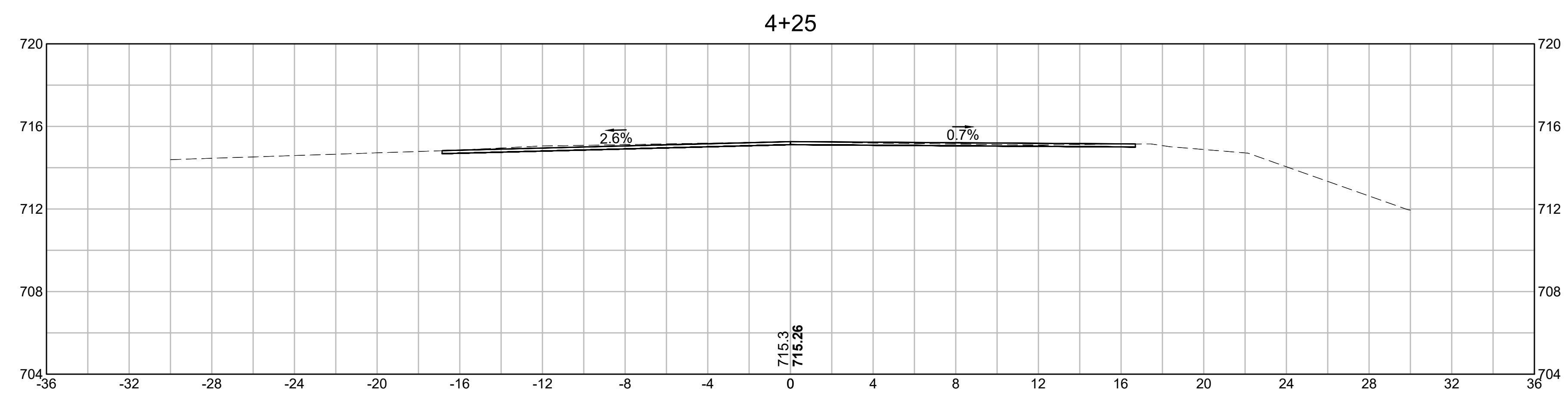
EXC: 71.33 SF  
EMB: 5.26 SF  
GRAVEL: 53.62 SF



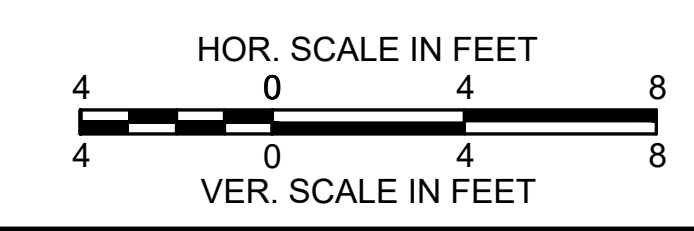
**SPENCER  
ST 31 (NORTH SPENCER ROAD)**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	44	46
PROJECT FILE NO.		609179	

**CROSS SECTIONS ST 31**



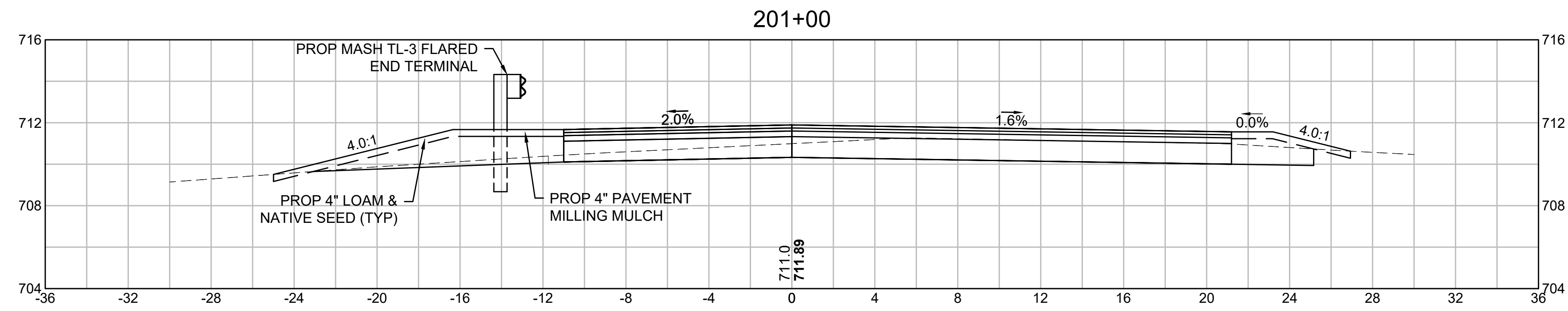
EXC: 55.28 SF  
 EMB: 1.08 SF  
 GRAVEL: 35.21 SF



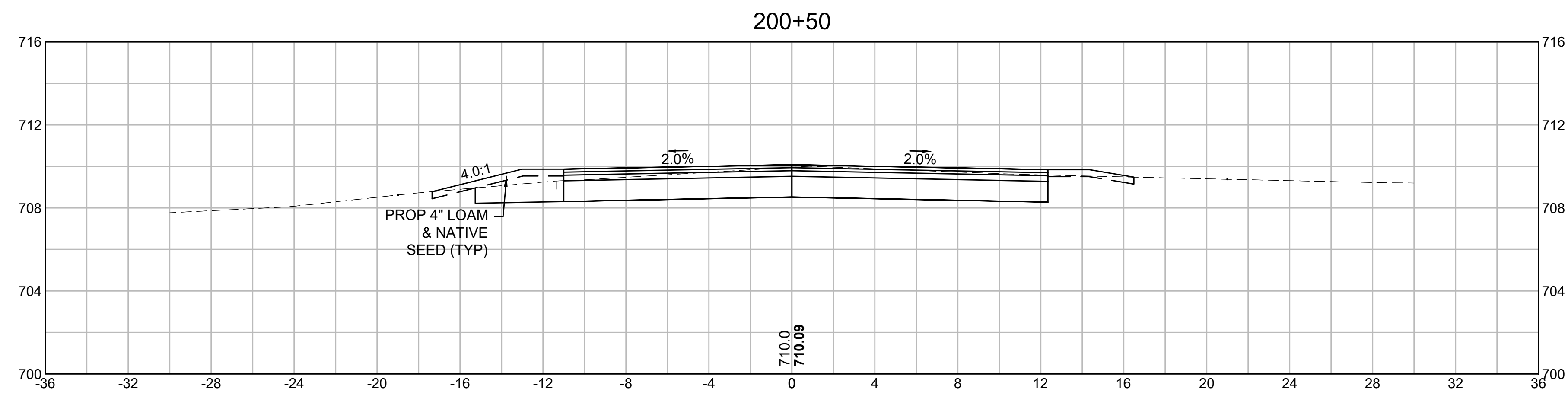
**SPENCER**  
**ST 31 (NORTH SPENCER ROAD)**

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MA	HIP(BR)-003S(723)X	45	46
PROJECT FILE NO.		609179	

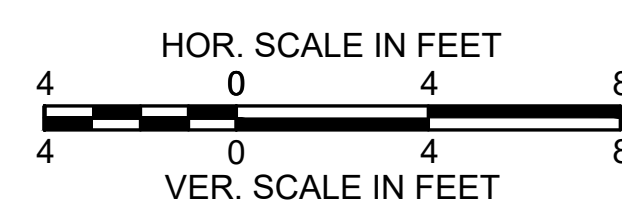
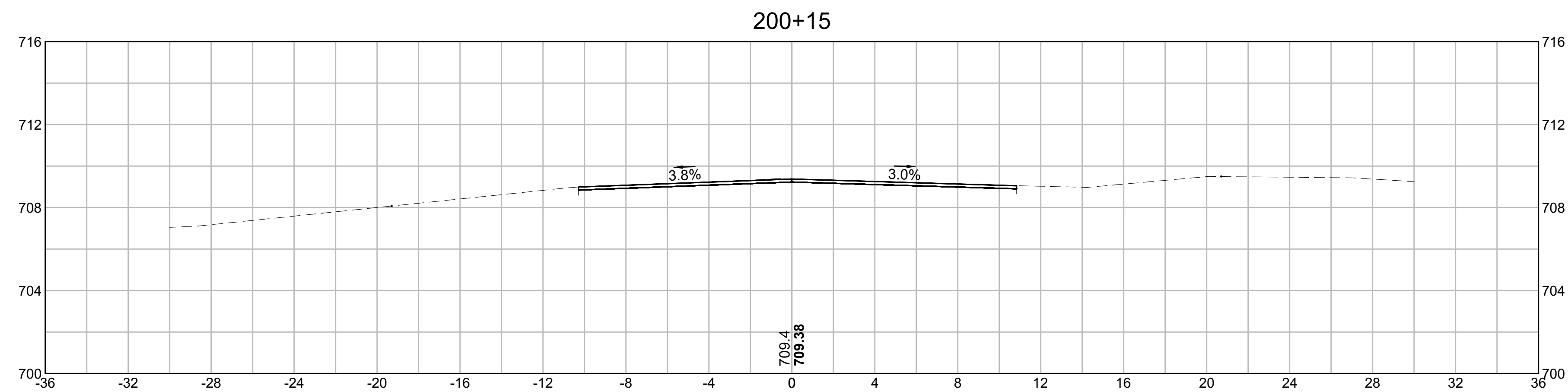
**CROSS SECTIONS HASTINGS ROAD**



EXC: 28.63 SF  
EMB: 5.96 SF  
GRAVEL: 49.84 SF



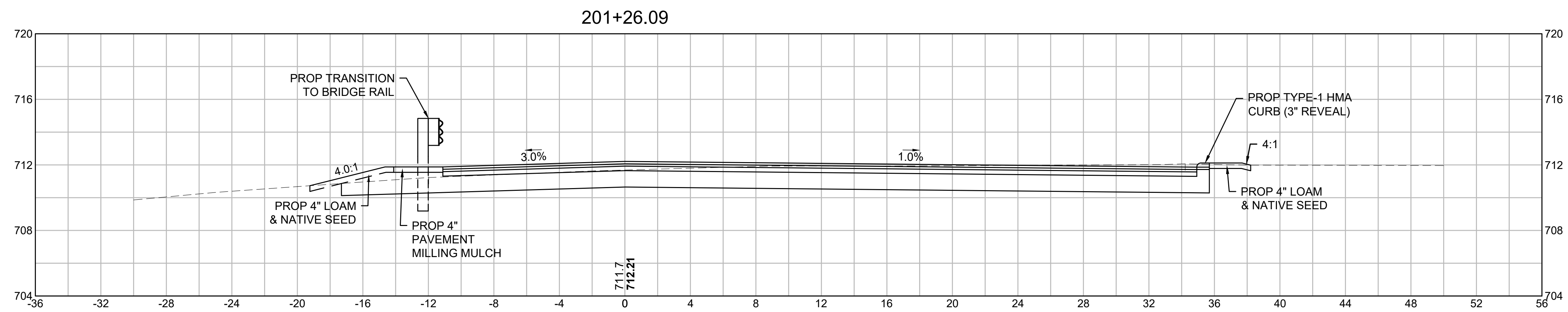
EXC: 35.23 SF  
EMB: 2.68 SF  
GRAVEL: 28.16 SF



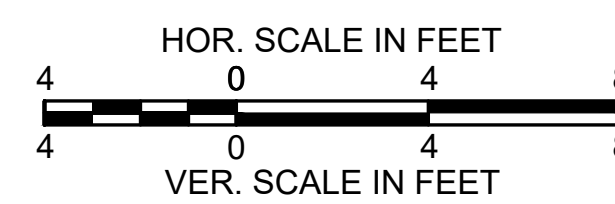
**SPENCER  
ST 31 (NORTH SPENCER ROAD)**

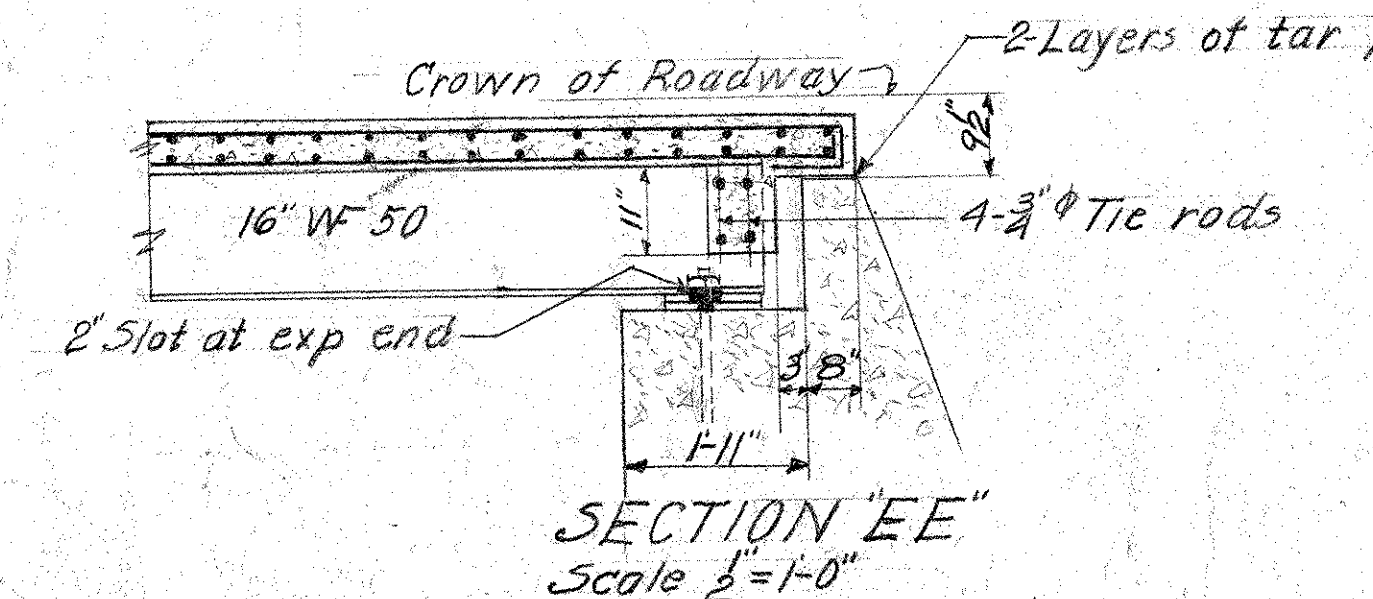
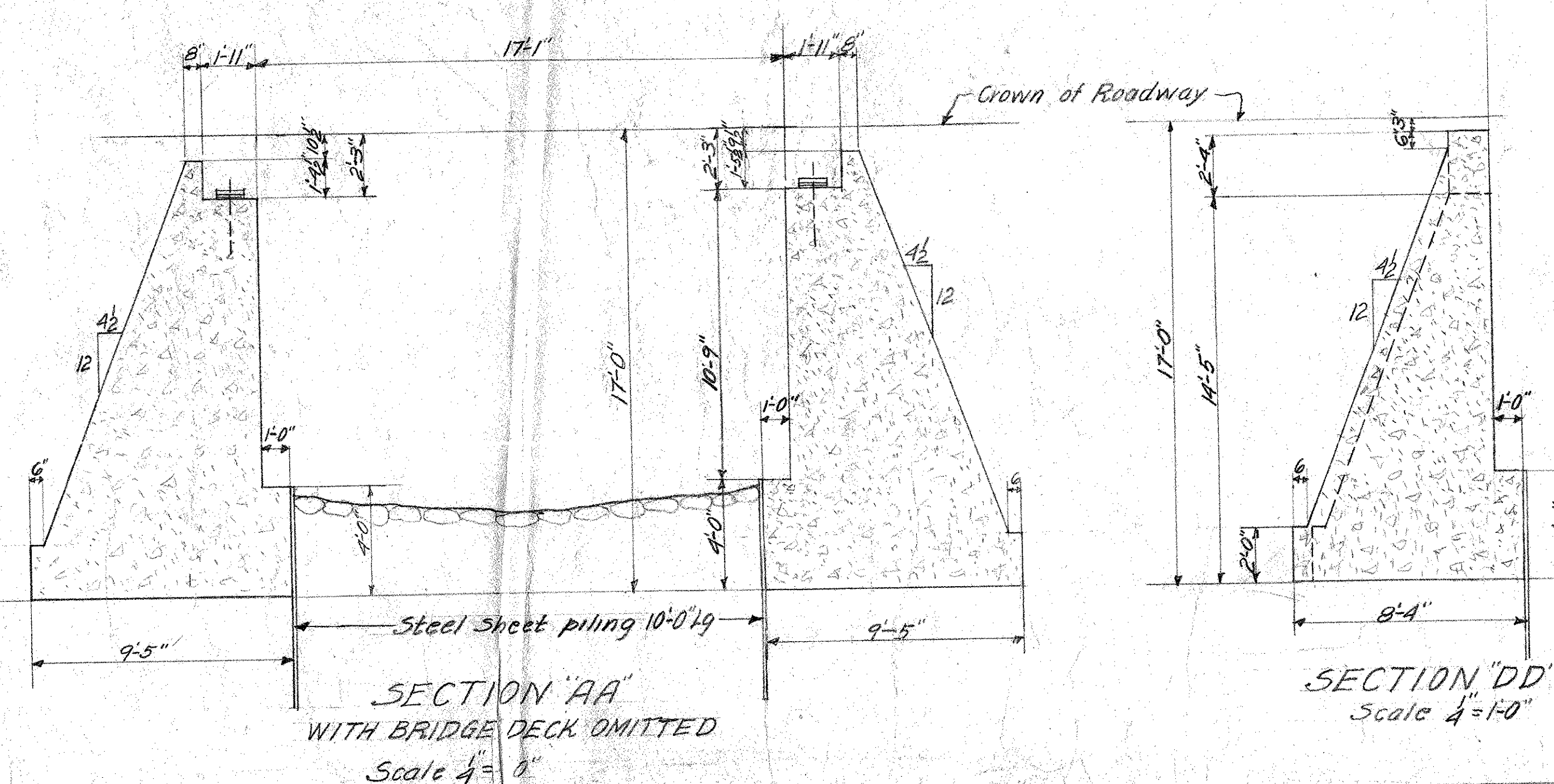
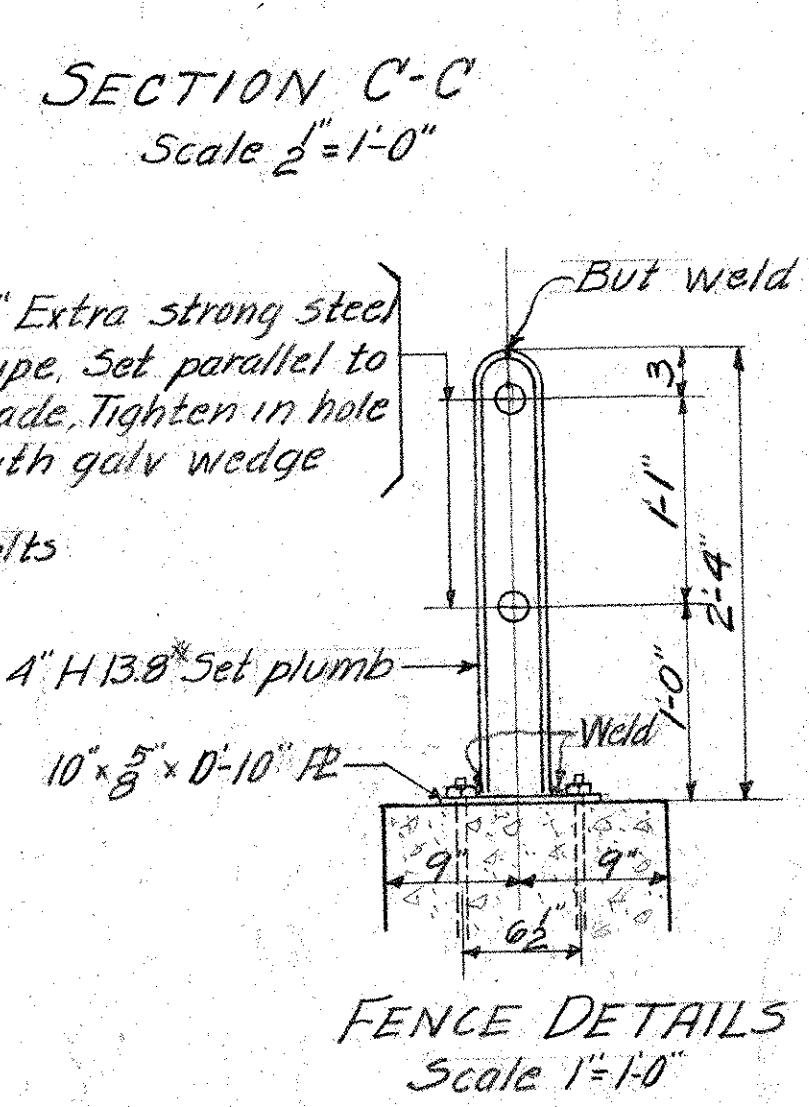
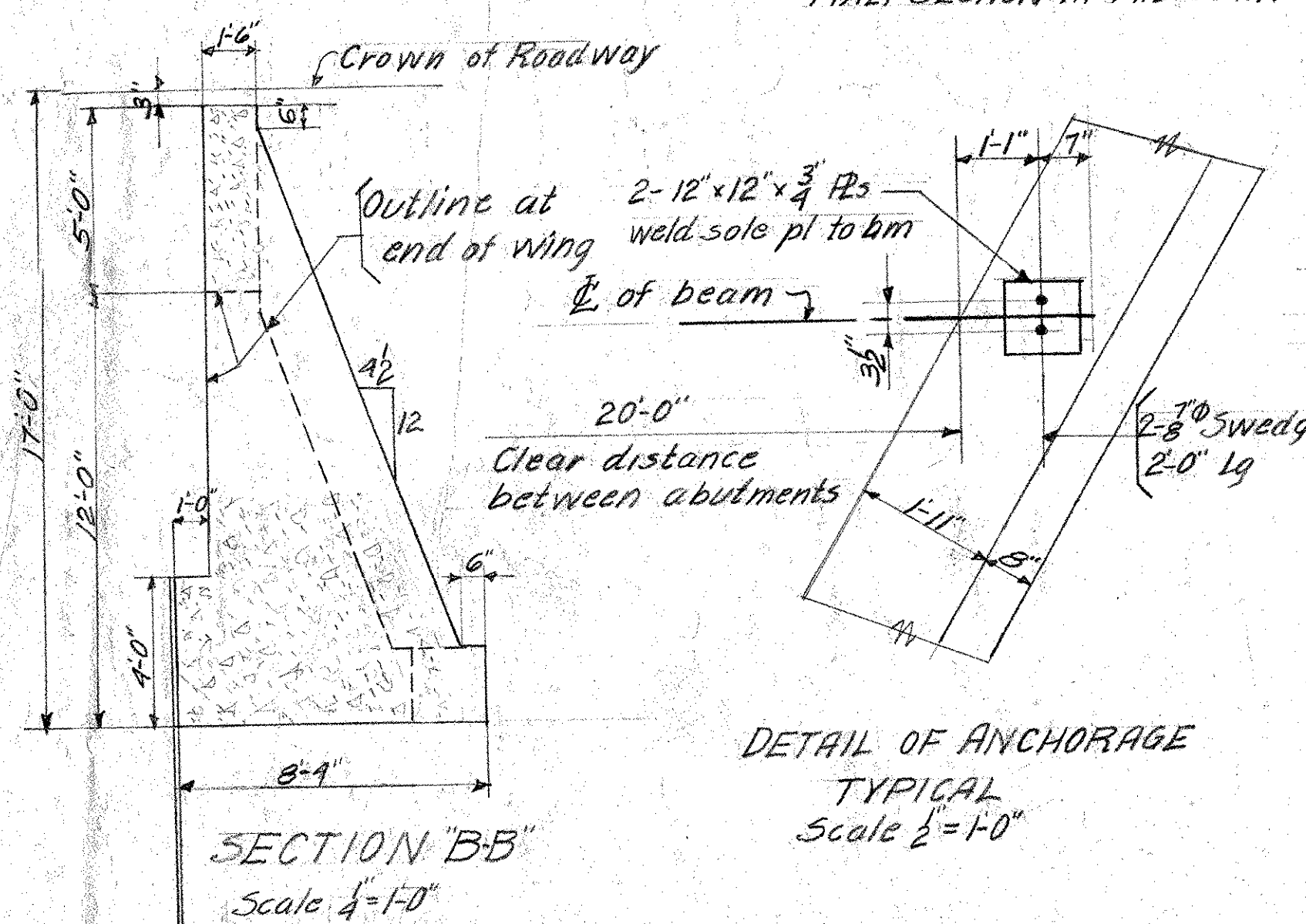
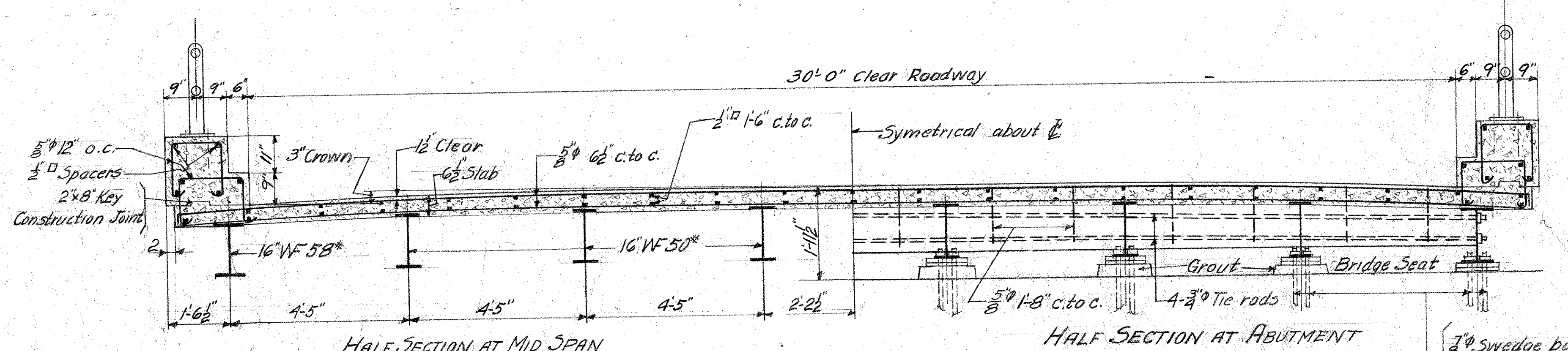
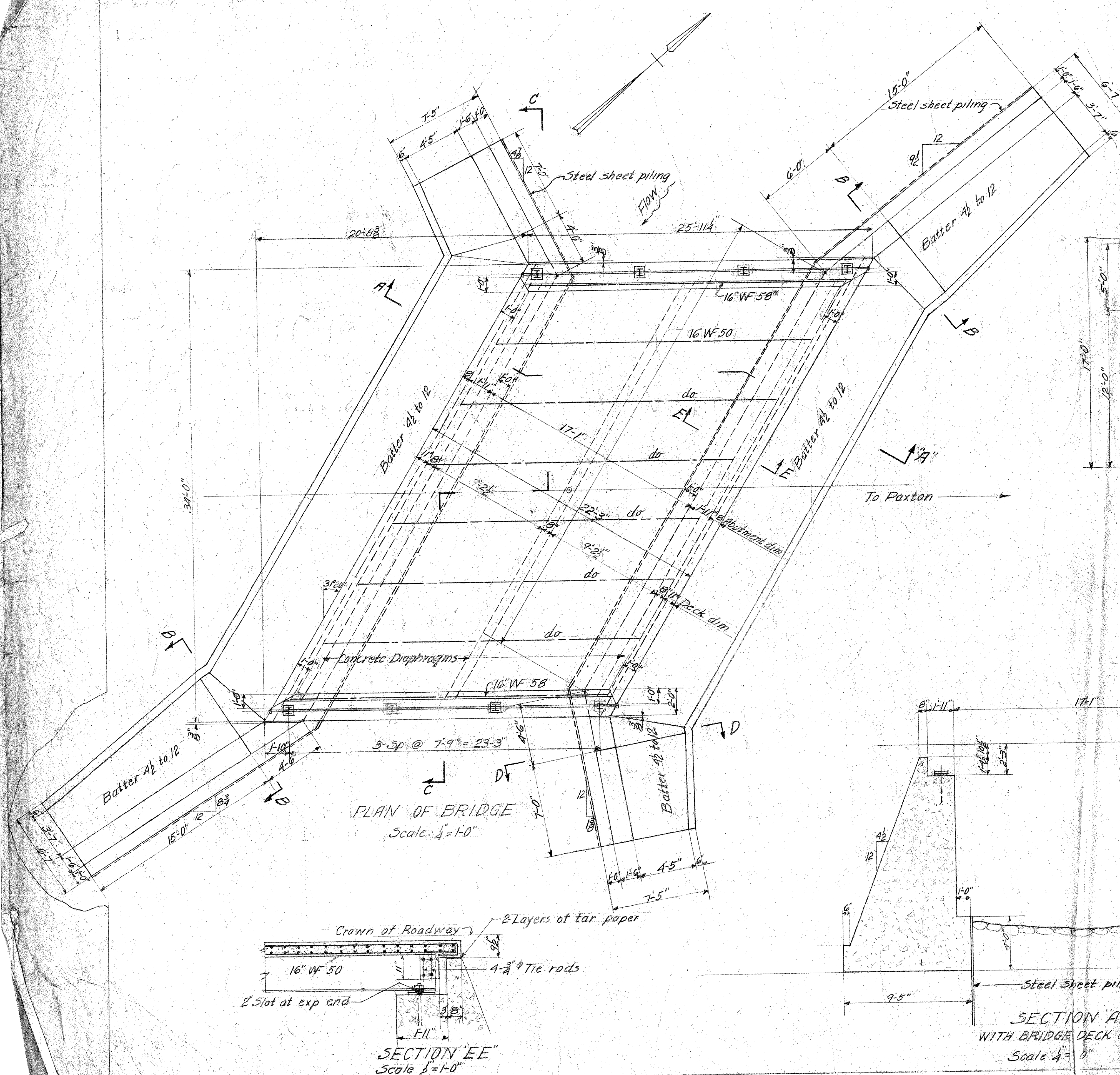
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HIP(BR)-003S(723)X	46	46
PROJECT FILE NO.		609179	

**CROSS SECTIONS HASTING ROAD**



EXC: 69.75 SF  
 EMB: 2.65 SF  
 GRAVEL: 54.43 SF





ESTIMATED QUANTITIES

BRIDGE EXCAVATION	896 c.y.
TRENCH EXCAVATION	30 c.y.
CHANNEL EXCAVATION	80 c.y.
LEDGE EXCAVATION	8 c.y.
CONCRETE EXCAVATION	82 c.y.
GRAVEL BORROW	252 c.y.
CONCRETE CLASS A	26 c.y.
CONCRETE CLASS C	427 c.y.
REINFORCING STEEL	5500 Lbs.
STRUCTURAL STEEL	45,500 Lbs.
2 RAIL STEEL FENCE	82 L.F.
RIP RAP	60 c.y.
STEEL SHEET PILING	32,500 Lbs.

FINISH: All exposed concrete surfaces to be rubbed smooth with corundum brick and left free from all form marks and imperfections.

FOUNDATIONS: May be altered if necessary to suit conditions of construction.

DESIGN: According to specifications of American Association of State Highway Officials (1935 Editions) for M-15 Loading.

WEEP HOLE: To be provided in wing walls and abutments as directed by the engineer.

CONCRETE: All concrete in superstructure Class A. All concrete in wings and abutments Class C.

RIP RAP: As directed by the engineers.

FOR CONSTRUCTION  
DATE 11/19/38

FAY, SPOFFORD & THORNDIKE  
ENGINEERS  
BOSTON, MASS.

THE COMMONWEALTH OF MASSACHUSETTS  
PROPOSED BRIDGE  
SPENCER  
SEVEN MILE RIVER BRIDGE

SCALES AS NOTED  
OFFICE OF  
DEPARTMENT OF PUBLIC WORKS  
100 NASHUA ST. BOSTON, MASS.  
OCTOBER 1938

BRIDGE ENGINEER: [Signature] CHIEF ENGINEER: [Signature]  
DESIGNED BY: [Signature] TRACED BY: [Signature] CHECKED BY: [Signature]

SHEET No. 1 OF 1 BRIDGE No. 1b

5-23-12