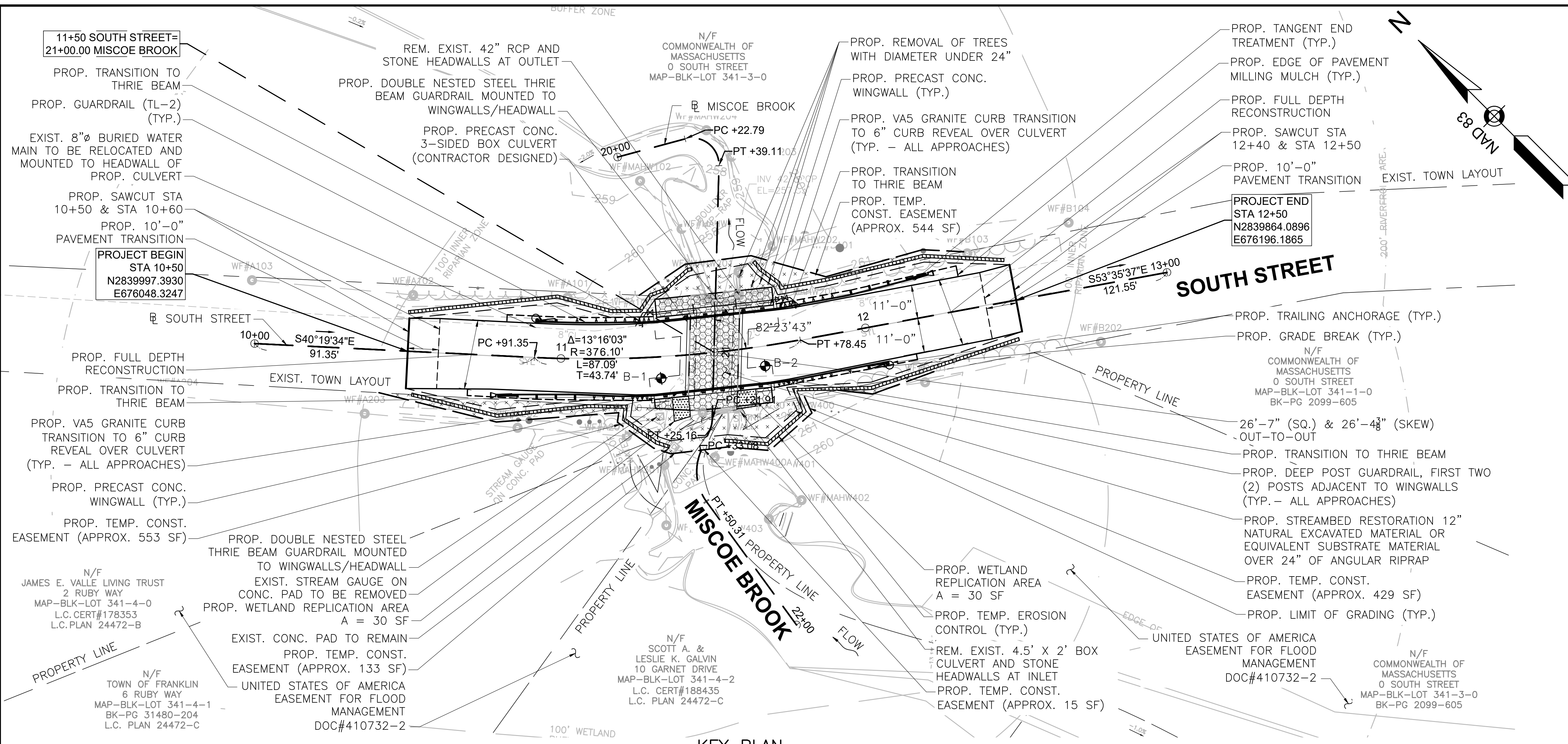
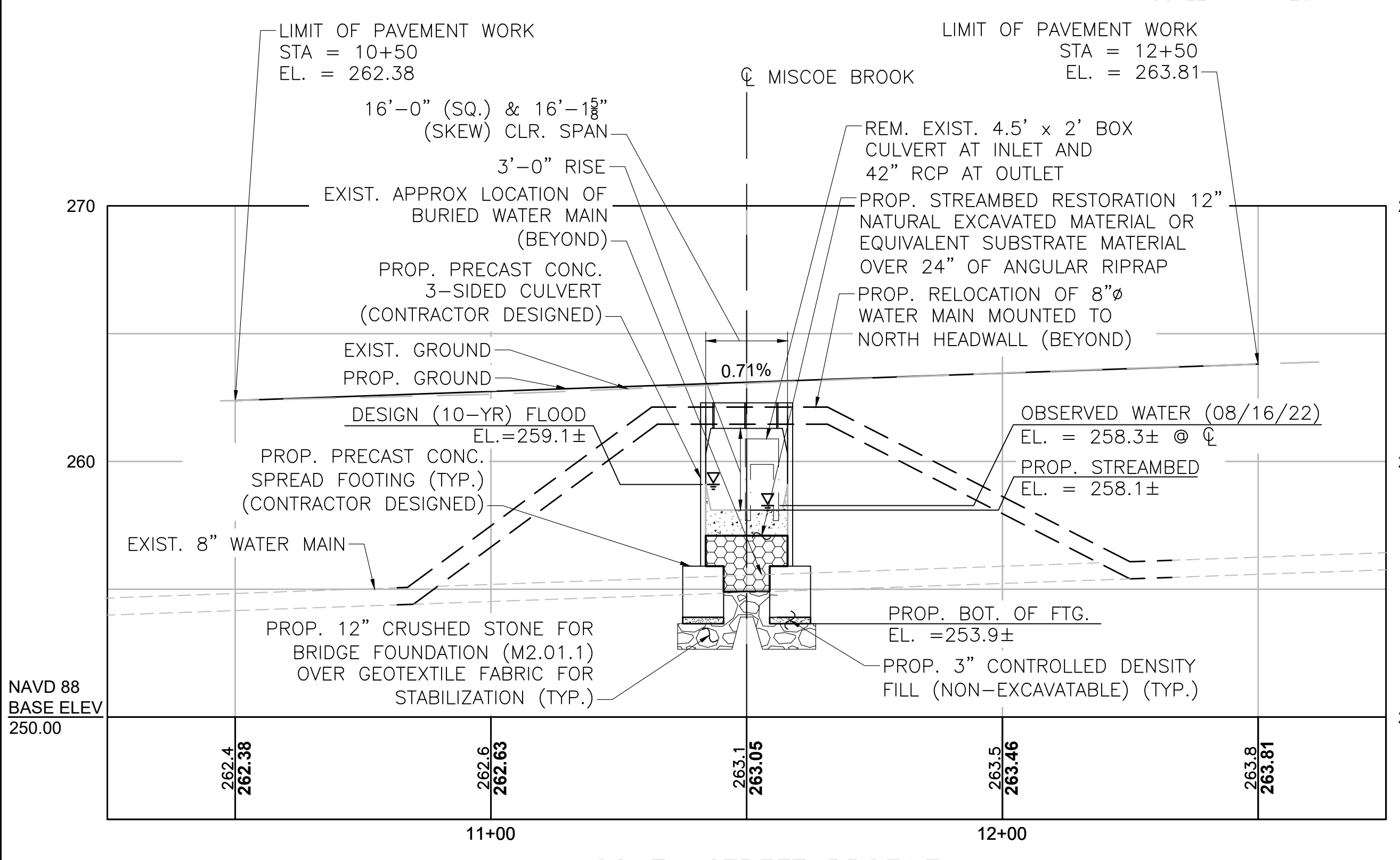


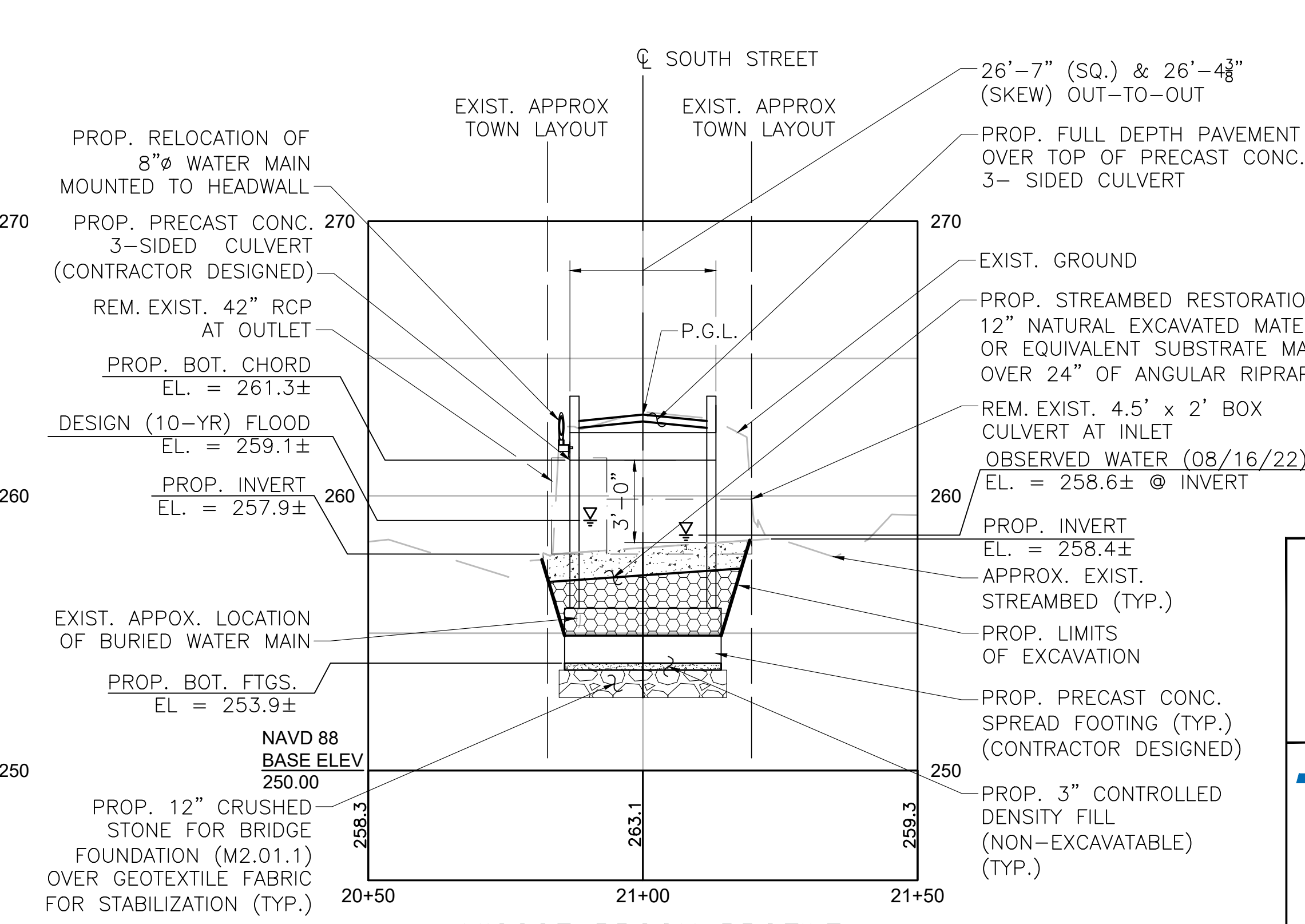
T:1406_BR1_(KEYPLANPROF).DWG Plotted on 15-Apr-2024 3:40 PM



KEY PLAN
SCALE: 1" = 20'



SOUTH STREET PROFILE
VERTICAL SCALE: 1" = 4'
HORIZONTAL SCALE: 1" = 20'

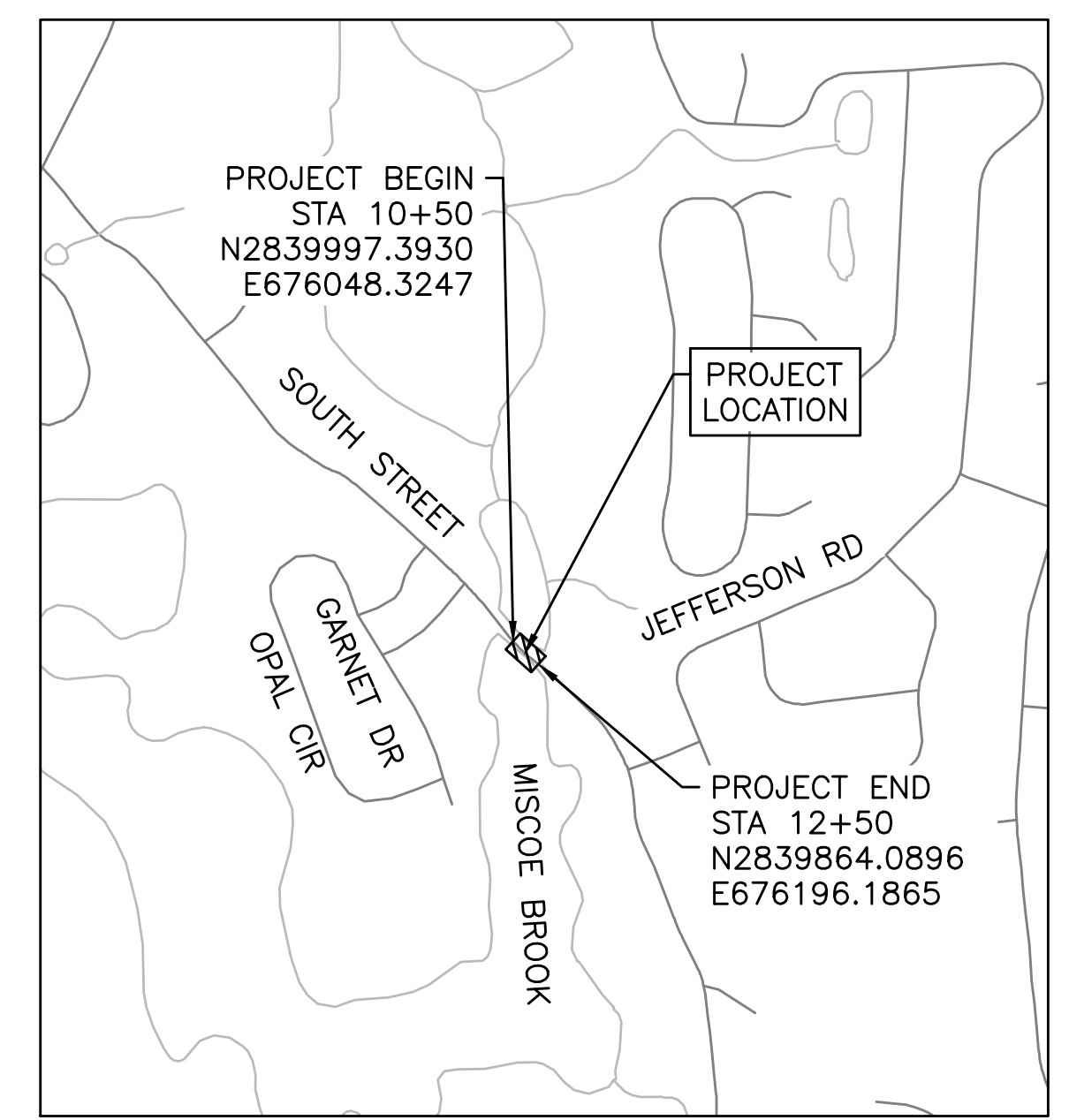


MISCOE BROOK PROFILE
VERTICAL SCALE: 1" = 4'
HORIZONTAL SCALE: 1" = 20'

FRANKLIN SOUTH STREET

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	1	17
PROJECT FILE NO.			T1406

KEY PLAN & PROFILE



LOCUS
SCALE: 1" = 1000'

INDEX	
SHEET NUMBER	SHEET TITLE
1	KEY PLAN AND PROFILES
2	GENERAL NOTES
3	BORING LOGS
4	PLAN AND ELEVATION
5	SUBSTRUCTURE AND FRAME
6-8	STRUCTURE DETAILS
9-12	MISCELLANEOUS DETAILS
13	PREFABRICATED TOLERANCES
14-15	CONTROL OF WATER
16-17	TRAFFIC MANAGEMENT PLANS

COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING

DISTRICT III BRIDGE ENGINEER DATE

4/12/2024	ISSUED FOR CONSTRUCTION
CULVERT REPLACEMENT FRANKLIN SOUTH STREET OVER MISCOE BROOK	
APPROVAL DATE	TOWN ADMINISTRATOR

TEC
The Engineering Corp
282 Merrimack Street,
2nd Floor
Lawrence, MA 01843
169 Ocean Blvd
Hampton, NH 03842

GENERAL NOTES

DESIGN:

IN ACCORDANCE WITH THE 2020 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS LRFD BRIDGE DESIGN SPECIFICATIONS, FOR HL-93 LOADING. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH MASSDOT 2023 STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES.

CHAPTER 85 SECTION 35 REVIEW AND APPROVAL:

IN ACCORDANCE AND COMPLIANCE WITH THE REQUIREMENTS OF CHAPTER 85 SECTION 35 OF THE MASSACHUSETTS GENERAL LAWS, THE CONTRACTOR SHALL SUBMIT TO THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION ALL CONSTRUCTION DRAWINGS AND DESIGN CALCULATIONS THAT SHALL BE USED TO FABRICATE AND CONSTRUCT THE STRUCTURE DENOTED ON THESE PLANS FOR REVIEW AND APPROVAL. THIS APPROVAL SHALL CONSTITUTE THE FINAL APPROVAL AS STIPULATED BY CHAPTER 85 SECTION 35 OF THE MASSACHUSETTS GENERAL LAWS.

SURVEY BENCHMARKS:

BENCHMARK: N/W CORNER CONCRETE PAD
EL. = 263.57'

DATE:

TO BE PLACED ON THE OUTSIDE FACE OF BOTH HEADWALLS. A SHEET SHOWING SIZE AND CHARACTER OF NUMERALS WILL BE FURNISHED. THE DATE USED SHALL BE THE LATEST YEAR OF CONTRACT COMPLETION AS OF THE DATE THE FIRST HEADWALL IS CONSTRUCTED. BOTH HEADWALLS SHALL FEATURE THE SAME DATE.

SURVEY NOTES:

1. THE HORIZONTAL DATUM FOR THIS SURVEY IS THE MASSACHUSETTS COORDINATE SYSTEM, NAD 1983, MAINLAND ZONE. THE VERTICAL DATUM FOR THIS SURVEY IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). SAID DATUMS WERE ESTABLISHED VIA GPS OBSERVATIONS UTILIZING REALIZATION NAD83(2011) AND GEOID 12A.
2. THE LIMIT OF BORDERING VEGETATED WETLANDS SHOWN HEREON WAS DELINEATED BY HANCOCK ASSOCIATES ON SEPTEMBER 28, 2022.
3. THIS PLAN IS THE RESULT OF AN ON-THE-GROUND INSTRUMENT SURVEY PERFORMED BY HANCOCK ASSOCIATES IN OCTOBER 2022.
4. ABUTTING PROPERTY LINES HAVE BEEN COMPILED FROM RECORD INFORMATION.
5. AT THE TIME OF THE SURVEY, PORTIONS OF MISCOE BROOK ON THE SOUTHERLY SIDE OF SOUTH STREET WERE FLOODED DUE TO PARTIAL DAMMING OF THE STREAM BY LOCAL WILDLIFE.

EXISTING CONDITIONS:

ALL DIMENSIONS AND DETAILS SHOWN FOR THE EXISTING STRUCTURE ARE NOT GUARANTEED. THE CONTRACTOR SHALL DETERMINE AND ESTABLISH ALL DIMENSIONS AND DETAILS NECESSARY FOR COMPLETION OF ALL WORK BY FIELD MEASUREMENT AND SURVEY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ADEQUACY AND ACCURACY THEREOF, AND NOT ORDER ANY MATERIAL OR COMMENCE ANY FABRICATION OR WORK UNTIL HE/SHE HAS MADE THE REQUIRED MEASUREMENTS ON THE ACTUAL STRUCTURE AND THE EXTENT OF THE PROPOSED WORK HAS BEEN APPROVED BY THE ENGINEER.

CONCRETE

PRECAST ELEMENTS:
THE FABRICATOR IS RESPONSIBLE FOR THE DESIGN AND INSTALLATION OF LIFT HOOKS FOR ALL PRECAST ELEMENTS. UNDER NO CIRCUMSTANCES WILL THE REBAR ELEMENTS SHOWN ON THE PLANS BE USED TO LIFT THE PRECAST ELEMENTS. FOR ADDITIONAL REQUIREMENTS, REFER TO THE "PRECAST CONCRETE ELEMENTS" PORTION OF ITEM 995.1 IN THE SPECIAL PROVISIONS.

THE FOLLOWING CONCRETE MIXES ARE TO BE USED:

5000 PSI, 3/4 INCH, 685 HP: PRECAST CULVERT, PRECAST HEADWALL, PRECAST WINGWALLS, AND PRECAST CULVERT FOOTINGS.

TRAFFIC:

THE BRIDGE WILL BE CLOSED TO VEHICULAR TRAFFIC DURING ALL PHASES OF DEMOLITION AND CONSTRUCTION. VEHICULAR TRAFFIC WILL BE DETOURED AS SHOWN ON THE PLANS.

SCALES:

SCALES NOTED ON THE PLANS ARE NOT APPLICABLE TO REDUCED SIZE PRINTS. DIVIDE SCALES BY 2 FOR HALF-SIZE 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.

REINFORCEMENT:

REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 31 GRADE 60. ALL REINFORCING STEEL SHALL BE EPOXY COATED UNLESS OTHERWISE NOTED. 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. EPOXY COATED BARS, COVER < 3db, OR CLEAR SPACING < 6db	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.

WATERPROOFING:

ALL WATERPROOFING USED ON TOP SLAB OF PRECAST 3-SIDED CULVERT SHALL BE DAMP-PROOFING. DAMP PROOFING SHALL EXTEND DOWN TO THE BOTTOM OF THE 3-SIDED CULVERT LEGS.

CONTROL OF WATER SYSTEM:

THE CONTROL OF WATER SYSTEM SHALL BE DESIGNED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR APPROVAL, PER ITEM 991.1. THE CONTROL OF WATER SYSTEM SHALL BE DESIGNED USING THE 2-YEAR FLOOD EVENT OF 31.3± CFS. APPROXIMATE LIMITS SHOWN ON THIS PLAN ARE CONCEPTUAL AND THE FINAL LOCATION SHALL BE DETERMINED BY THE CONTRACTOR.

UTILITIES:

DURING CONSTRUCTION, THE CONTRACTOR SHALL LOCATE AND PROTECT FROM DAMAGE ALL UTILITIES THAT ARE TO REMAIN. ALL EXISTING UTILITY POLES AND OVERHEAD WIRES SHALL BE LEFT IN PLACE DURING CONSTRUCTION. ANY TEMPORARY UTILITY SUPPORTS OR UTILITY RELOCATIONS REQUIRED AND SHOWN ON THE CONSTRUCTION DRAWINGS SHALL BE COORDINATED WITH THE ENGINEER.

THE WATER LINE SHALL BE PERMANENTLY RELOCATED TO THE NORTH HEADWALL OF THE PROPOSED CULVERT. DURING CONSTRUCTION, THE CONTRACTOR SHALL CUT, CAP, AND REMOVE THE PORTION OF THE WATER LINE THAT INTERFERES WITH THE CONSTRUCTION OF THE CULVERT FOOTINGS BEFORE ITS PERMANENT RELOCATION. CONTRACTOR TO PERFORM ALL WORK WITH THE APPROVAL OF THE TOWN OF FRANKLIN WATER DEPARTMENT.

STREAMBED INSTALLATION NOTES:

STREAMBED SHOULD BE INSTALLED HIGHER AGAINST THE WALLS OF THE CULVERT VERSUS THE CENTER OF THE CULVERT TO CREATE A LOW FLOW/CENTER CHANNEL AND PROVIDE DRY BANKS DURING NORMAL FLOW.

STREAMBED MATERIAL CAN BE SLIGHTLY UPSIZED ON THE SIDES OF THE STRUCTURE (DRY BANKS) TO PREVENT SCOUR.

SOME "KEY PIECES" (UPSIZED STREAMBED MATERIAL) MAY BE PLACED WITHIN THE STREAM CHANNEL AND/OR THE LOW FLOW CHANNEL.

AFTER INSTALLATION OF THE STREAMBED MATERIAL, WASHING OF THE STREAMBED SHALL OCCUR SO THAT FINES WILL FILL VOIDS IN THE RIPRAP AND PREVENT SUBSURFACE FLOW.

**FRANKLIN
SOUTH STREET**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	2	17
PROJECT FILE NO.		T1406	

GENERAL NOTES

TRAFFIC DATA

	ROADWAY OVER	ROADWAY UNDER
DESIGN YEAR	XXX	N/A
AVERAGE DAILY TRAFFIC – PRESENT	XXX	N/A
AVERAGE DAILY TRAFFIC – DESIGN YEAR	XXX	N/A
DESIGN HOURLY VOLUME	XXX	N/A
DIRECTIONAL DISTRIBUTION	XXX	N/A
TRUCK PERCENTAGE – AVERAGE DAY	X%	N/A
TRUCK PERCENTAGE – PEAK HOUR	X%	N/A
DESIGN SPEED	XXX	N/A
DIRECTIONAL DESIGN HOURLY VOLUME	XXX	N/A

SEISMIC DESIGN CRITERIA

DESIGN RETURN PERIOD:	1000
DESIGN SPECTRA	
As	0.078g
SDs	0.156 g
SD1	0.061 g
SITE CLASS	C
SEISMIC DESIGN CATEGORY (SDC)	HIGH A

HYDRAULIC DESIGN DATA

DRAINAGE AREA (SQ. MILES)	1.14
DESIGN FLOOD DISCHARGE (C.F.S.)	69.8
DESIGN FLOOD FREQUENCY (YEARS)	10
DESIGN FLOOD VELOCITY (F.P.S.)	3.2
DESIGN FLOOD ELEVATION (FEET, NAVD)	259.1

BASE (100-YEAR) FLOOD DATA

BASE FLOOD DISCHARGE (C.F.S.)	137
BASE FLOOD ELEVATION (FEET, NAVD)	263.0

DESIGN AND CHECK SCOUR DATA

DESIGN SCOUR FLOOD EVENT	
RETURN FREQUENCY (YEARS)	25
DESIGN FLOOD ABUTMENT SCOUR DEPTH (FEET)	1.6
DESIGN FLOOD PIER SCOUR DEPTH (FEET)	0.3
CHECK SCOUR FLOOD EVENT	
RETURN FREQUENCY (YEARS)	50
CHECK FLOOD ABUTMENT SCOUR DEPTH (FEET)	2.9
CHECK FLOOD PIER SCOUR DEPTH (FEET)	0.3

FLOOD OF RECORD

DISCHARGE (C.F.S.)	UNKNOWN
FREQUENCY (IF KNOWN, YEARS)	UNKNOWN
MAXIMUM ELEVATION (FEET, NAVD)	UNKNOWN
DATE (MM/YYYY)	UNKNOWN
HISTORY OF ICE FLOES	NO
EVIDENCE OF SCOUR AND EROSION	NO

**ESTIMATED QUANTITIES
(NOT GUARANTEED)**

ITEM 101.	CLEARING AND GRUBBING.....	0.1 A
ITEM 103.	TREE REMOVED – DIAMETER UNDER 24 INCHES.....	4 EA
ITEM 120.	EARTH EXCAVATION.....	40 CY
ITEM 120.1	UNCLASSIFIED EXCAVATION.....	50 CY
ITEM 140.	BRIDGE EXCAVATION.....	370 CY
ITEM 148.01	DREDGING AND STOCKPILING OF STREAMBED MATERIAL.....	10 CY
ITEM 150.	ORDINARY BORROW.....	20 CY
ITEM 151.	GRAVEL BURROW.....	240 CY
ITEM 151.2	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES.....	145 CY
ITEM 153.1	CONTROL DENSITY FILL – NON-EXCAVATABLE.....	6 CY
ITEM 156.	CRUSHED STONE.....	25 TON
ITEM 156.1	CRUSHED STONE FOR BRIDGE FOUNDATIONS.....	45 TON
ITEM 170.	FINE GRADING AND COMPACTING – SUBGRADE AREA.....	400 SY
ITEM 302.06	6 INCH DUCTILE IRON WATER PIPE (RUBBER GASKET).....	25 FT
ITEM 302.08	8 INCH DUCTILE IRON WATER PIPE (RUBBER GASKET).....	35 FT
ITEM 310.	FACTORY INSULATED 8 INCH DUCTILE IRON WATER PIPE.....	50 FT

ITEM 350.06	6 INCH GATE AND GATE BOX.....	1 EA
ITEM 350.08	8 INCH GATE AND GATE BOX.....	2 EA
ITEM 376.	HYDRANT.....	1 EA
ITEM 415.1	PAVEMENT STANDARD MILLING.....	55 SY
ITEM 443.	WATER FOR ROADWAY DUST CONTROL.....	4 MGL
ITEM 450.31	SUPERPAVE INTERMEDIATE COURSE – 12.5 (SIC – 12.5).....	40 TON
ITEM 450.61	SUPERPAVE BRIDGE SURFACE COURSE–12.5 (SSC–B–12.5).....	45 TON
ITEM 452.	ASPHALT EMULSION FOR TACK COAT.....	35 GAL
ITEM 453.	HMA JOINT ADHESIVE.....	95 FT
ITEM 482.3	SAWCUTTING ASPHALT PAVEMENT.....	95 FT
ITEM 505.	GRANITE CURB TYPE VA5 – STRAIGHT.....	25 FT
ITEM 620.12	GUARDRAIL, TL–2 (SINGLE FACED).....	50 FT
ITEM 620.131	GUARDRAIL, DEEP POST (SINGLE FACED).....	15 FT
ITEM 627.1	TRAILING ANCHORAGE.....	2 EA
ITEM 627.82	GUARDRAIL TANGENT END TREATMENT, TL–2.....	2 EA
ITEM 628.25	TRANSITION TO THRIE BEAM.....	4 EA
ITEM 634.11	STEEL THRIE BEAM HIGHWAY GUARD.....	100 FT
ITEM 697.2	FLOATING SILT FENCE.....	30 FT

ITEM 698.1	GEOTEXTILE FABRIC FOR STABILIZATION.....	65 SY
ITEM 698.4	GEOTEXTILE FABRIC FOR PERMANENT EROSION CONTROL.....	50 SY
ITEM 748.	MOBILIZATION.....	1 LS
ITEM 751.	LOAM FOR ROADSIDES.....	10 CY
ITEM 765.	SEEDING.....	40 SY
ITEM 767.121	SEDIMENT CONTROL BARRIER.....	395 FT
ITEM 769.	PAVEMENT MILLING MULCH UNDER GUARDRAIL.....	220 FT
ITEM 852.	SAFETY SIGNING FOR TRAFFIC MANAGEMENT.....	240 SF
ITEM 853.2	TEMPORARY BARRIER (TL–2).....	50 FT
ITEM 861.106	6 INCH REFLECTORIZED YELLOW LINE (PAINTED).....	200 FT
ITEM 960.1	STRUCTURAL STEEL – COATED STEEL.....	435 LB
ITEM 983.1	RIPRAP.....	70 TON
ITEM 983.521	STREAMBED RESTORATION.....	50 CY
ITEM 991.1	CONTROL OF WATER – STRUCTURE NO. F–XX–XXX.....	1 LS
ITEM 995.01	BRIDGE STRUCTURE, BRIDGE NO. F–XX–XXX.....	1 LS

**COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING**

DISTRICT III BRIDGE ENGINEER

DATE

**FRANKLIN
SOUTH STREET**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	3	17
PROJECT FILE NO.		T1406	

BORING LOGS

BORING B-1

TEST BORING LOG

		Project: Miscos Brook Culvert		Sheet 1 of 1							
MILLER ENGINEERING & TESTING, INC.		Franklin, MA		Boring No: B-1							
100 Sheffield Road - Manchester, NH 03103 Ph. (603) 668-6016 - Fax: (603) 668-8641		Project No: 22.133.NH		Location: See Notes							
		Date Start: 08-23-22		Date End: 08-23-22							
		Approx. Surface Elev: 261'									
GROUNDWATER OBSERVATIONS											
Type	CASING	SAMPLER	Date	Depth	Casing At	Stabilization Period					
HSA	HSA	SS	08-23-22	5'	23.5'	Upon Completion					
Size	2-1/4" ID	2-3/8" ID									
Hammer	140 lbs.										
Fall	30"										
Depth/ Elev.	Cas bl/ft	SAMPLE			BLOWS				Strata Change	Sample Description	Notes
		Sample No.	Depth Range	Pen.	Rec.	0-6"	6-12"	12-18"			
0	261	-	0.0-0.4	5						< 5" Asphalt	B
		S-1	0.6-2.0	17	12	9/5"	13	15		S-1: Brown, fine to coarse sand, little gravel, little silt (FILL)	
		S-2	2.0-4.0	24	7	12	20	21	31	S-2: Brown, fine to coarse sand, little gravel, little silt (rock fragment in bottom 2" of sample) (FILL)	
4	257	S-3	4.0-5.0	12	7	9	13			S-3: Dark brown/black, fine to coarse sand, some organic silt, trace gravel (FILL)	
		S-3A	5.0-6.0	12	4			11	9	S-3A: Gray, fine sand, some silt, trace gravel, wet (rock in tip of split-spoon)	
8	253										
		S-4	9.0-11.0	24	15	5	14	13	10	S-4: Red, fine to medium sand, some silt, little gravel and coarse sand, wet	
12	249										
		S-5	14.0-16.0	24	15	17	35	23	21	S-5: Red, fine to medium sand, trace gravel, trace silt	
16	245										
		S-6	19.0-19.5	6	4	64				S-6: Red, fine to medium sand, trace gravel, trace silt	
20	241									Auger Refusal at 23.5'	
24	237									BORING TERMINATED AT 23.5 ft	
Driller: R. Marcoux		COHESIVE CONSISTENCY (Blows/Foot)			COHESIONLESS (Blows/Foot)			PROPORTIONS USED			
Helper: J. Donahue		0-2 VERY SOFT			0-4 VERY LOOSE			TRACE: 0-10%			
Inspector: T. Young		2-4 SOFT			4-10 LOOSE			LITTLE: 10-20%			
		4-8 MEDIUM STIFF			10-30 MEDIUM DENSE			SOME: 20-35%			
		8-15 STIFF			30-50 DENSE			AND: 35-50%			
		15-50 HARD			50+ VERY DENSE						
NOTES: 42°02'27.16"N											
71°25'35.70"W											
REMARKS: THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITION MAY BE GRADUAL. WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORING LOGS. FLUCTUATIONS IN THE LEVEL OF THE GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.											

EXIST. GROUND SURFACE
EL = 261.0±

OBSERVED GROUNDWATER (08/23/22)
EL = 256.0±

PROP. BOT. OF FOOTING
EL = 253.9±

BORING NOTES:

- LOCATION OF BORINGS SHOWN ON THE PLAN 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 2" O.D. SPLIT SPOON SAMPLER USING A 140 POUND WEIGHT FALLING 30".
- ALL BORINGS WERE MADE IN AUGUST OF 2022 BY MILLER ENGINEERING & TESTING, INC.
- THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.

BORING B-2

TEST BORING LOG

		Project: Miscos Brook Culvert		Sheet 1 of 1							
MILLER ENGINEERING & TESTING, INC.		Franklin, MA		Boring No: B-2							
100 Sheffield Road - Manchester, NH 03103 Ph. (603) 668-6016 - Fax: (603) 668-8641		Project No: 22.133.NH		Location: See Notes							
		Date Start: 08-23-22		Date End: 08-23-22							
		Approx. Surface Elev: 261'									
GROUNDWATER OBSERVATIONS											
Type	CASING	SAMPLER	Date	Depth	Casing At	Stabilization Period					
HSA	HSA	SS	08-23-22	5'	14.5'	Upon Completion					
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		S-1	0.5-2.0	18	8	8	13	17		S-1: Brown, fine to coarse sand, some gravel, little silt (FILL)	
		S-2	2.0-4.0	24	13	12	22	23	35	S-2: Brown, fine to coarse sand, some gravel, little silt (FILL)	
4	257	S-3	4.0-5.0	12	3	8	2	23		S-3: Brown, fine to coarse sand, some gravel, little silt (FILL)	
		S-3A	5.0-5.5	6	3			44		S-3A: Dark brown/black, fine to coarse sand, some organic silt, little gravel (FILL)	
		S-3B	5.5-6.0	6	1			15		S-3B: Gray, fine to coarse sand, some gravel, trace silt (rock in top of split-spoon)	
8	253										
		S-4	9.0-11.0	24	9	20	11	7	6	S-4: Red, fine to medium sand, some silt, trace gravel	
12	249										
		S-5	14.0-14.3	3	0	50/0"				S-5: No recovery	
16	245									Auger Refusal at 14.5'	BORING TERMINATED AT 14.5 ft
20	241										
24	237										
Driller: R. Marcoux		COHESIVE CONSISTENCY (Blows/Foot)			COHESIONLESS (Blows/Foot)			PROPORTIONS USED			
Helper: J. Donahue		0-2 VERY SOFT			0-4 VERY LOOSE			TRACE: 0-10%			
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		4-8 MEDIUM STIFF			10-30 MEDIUM DENSE			SOME: 20-35%			
		8-15 STIFF			30-50 DENSE			AND: 35-50%			
		15-50 HARD			50+ VERY DENSE						
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COMMONWEALTH OF MASSACHUSETTS
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CONCEPTUAL DESIGN IS ACCEPTABLE
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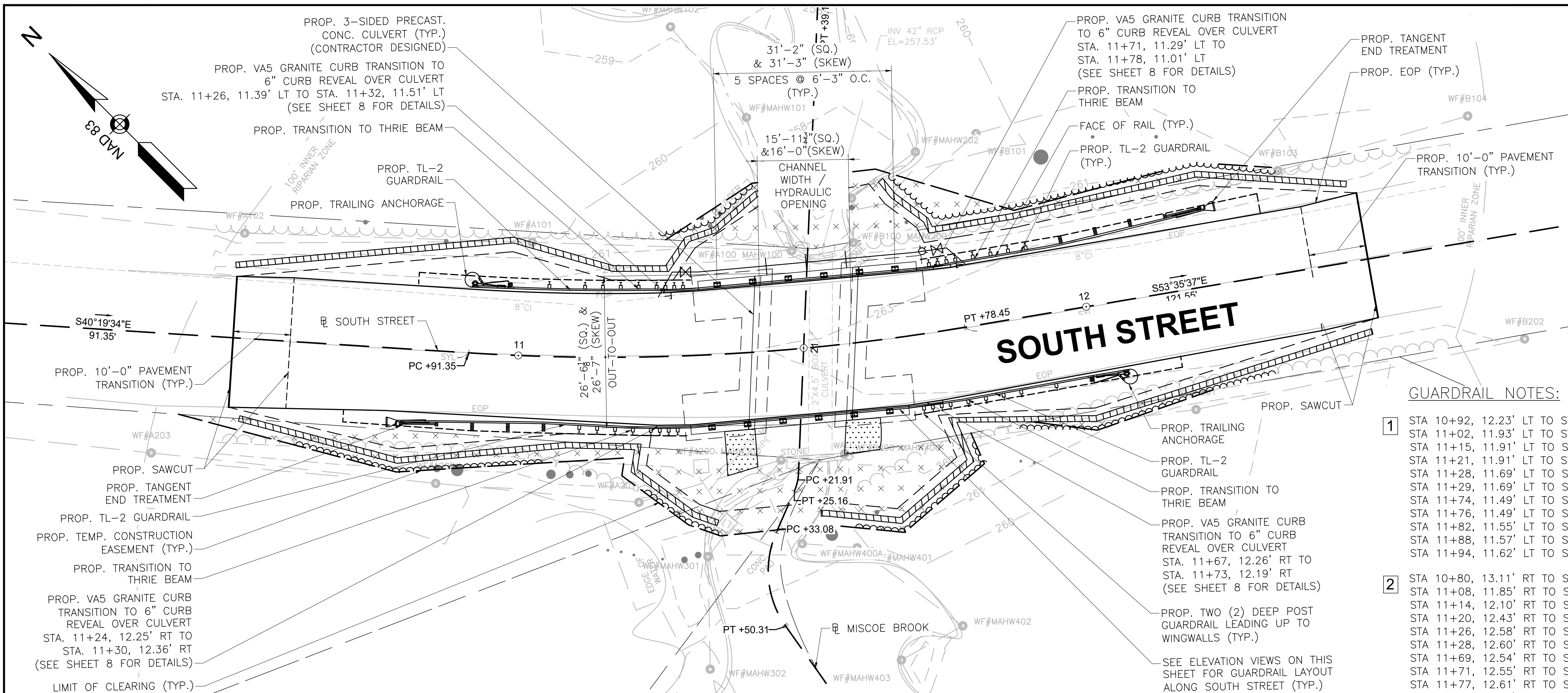
DISTRICT III BRIDGE ENGINEER

DATE

**FRANKLIN
SOUTH STREET**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	4	17
PROJECT FILE NO.			T1406

PLAN & ELEVATION



GUARDRAIL NOTES:

- STA 10+92, 12.23' LT TO STA 11+01, 11.93' LT TRAILING ANCHORAGE

STA 11+02, 11.93' LT TO STA 11+15, 11.91' LT GUARDRAIL, TL-2

STA 11+15, 11.91' LT TO STA 11+21, 11.91' LT TRANSITION TO THRIE BEAM

STA 11+21, 11.91' LT TO STA 11+28, 11.69' LT THRIE BEAM (DOUBLE NESTED)

STA 11+28, 11.69' LT TO STA 11+29, 11.69' LT THRIE BEAM (DEEP POSTS)

STA 11+29, 11.69' LT TO STA 11+74, 11.49' LT THRIE BEAM (DOUBLE NESTED)

STA 11+74, 11.49' LT TO STA 11+76, 11.49' LT THRIE BEAM (DEEP POSTS)

STA 11+76, 11.49' LT TO STA 11+82, 11.55' LT THRIE BEAM (DOUBLE NESTED)

STA 11+82, 11.55' LT TO STA 11+88, 11.57' LT TRANSITION TO THRIE BEAM

STA 11+88, 11.57' LT TO STA 11+94, 11.62' LT GUARDRAIL, TL-2

STA 11+94, 11.62' LT TO STA 12+22, 13.72' LT TANGENT END TREATMENT, TL-2
- STA 10+80, 13.11' RT TO STA 11+08, 11.85' RT TANGENT END TREATMENT, TL-2

STA 11+08, 11.85' RT TO STA 11+14, 12.10' RT GUARDRAIL, TL-2

STA 11+14, 12.10' RT TO STA 11+20, 12.43' RT TRANSITION TO THRIE BEAM

STA 11+20, 12.43' RT TO STA 11+26, 12.58' RT THRIE BEAM (DOUBLE NESTED)

STA 11+26, 12.58' RT TO STA 11+28, 12.60' RT THRIE BEAM (DEEP POSTS)

STA 11+28, 12.60' RT TO STA 11+69, 12.54' RT THRIE BEAM (DOUBLE NESTED)

STA 11+69, 12.54' RT TO STA 11+71, 12.55' RT THRIE BEAM (DEEP POSTS)

STA 11+71, 12.55' RT TO STA 11+77, 12.61' RT THRIE BEAM (DOUBLE NESTED)

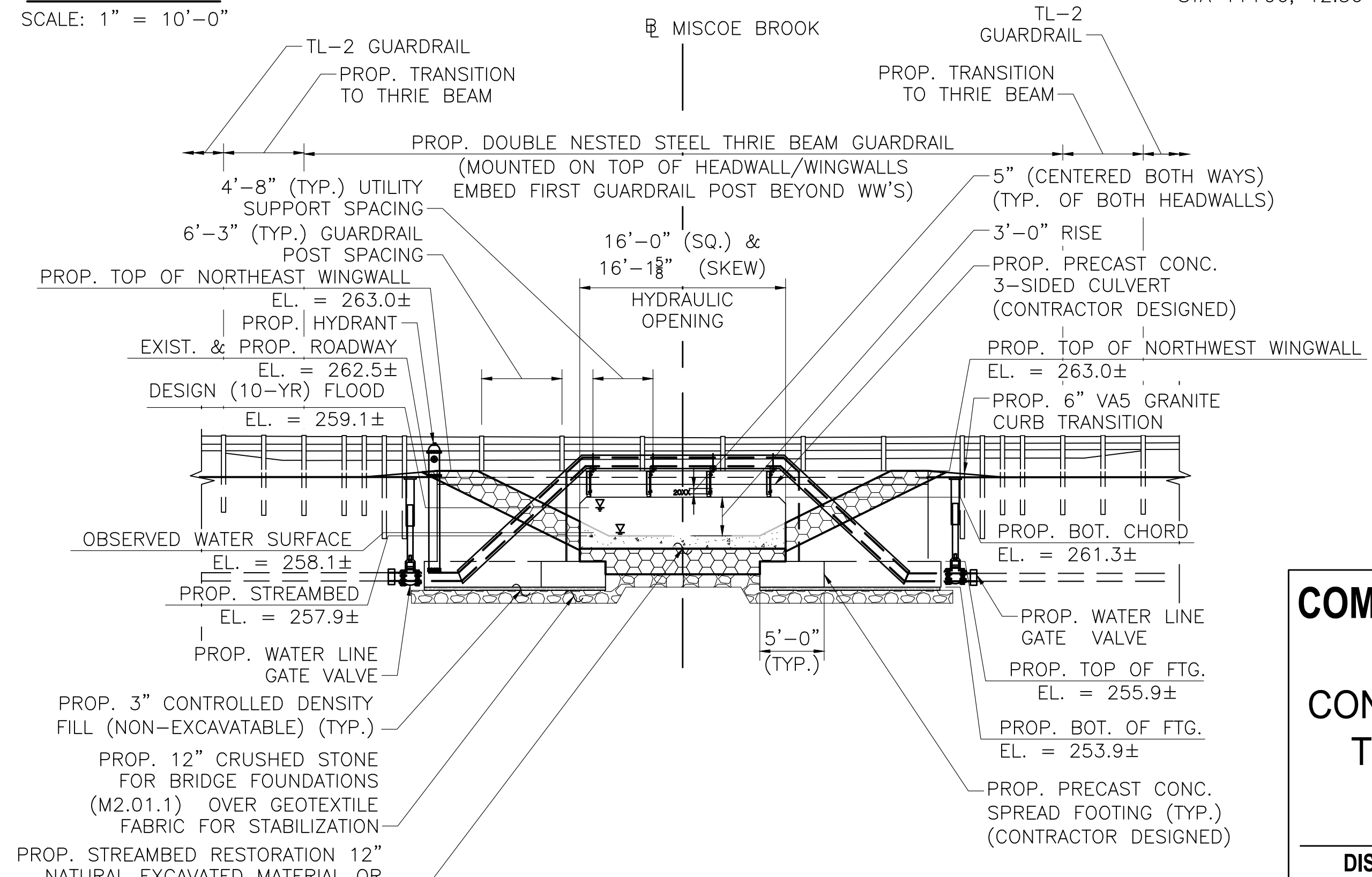
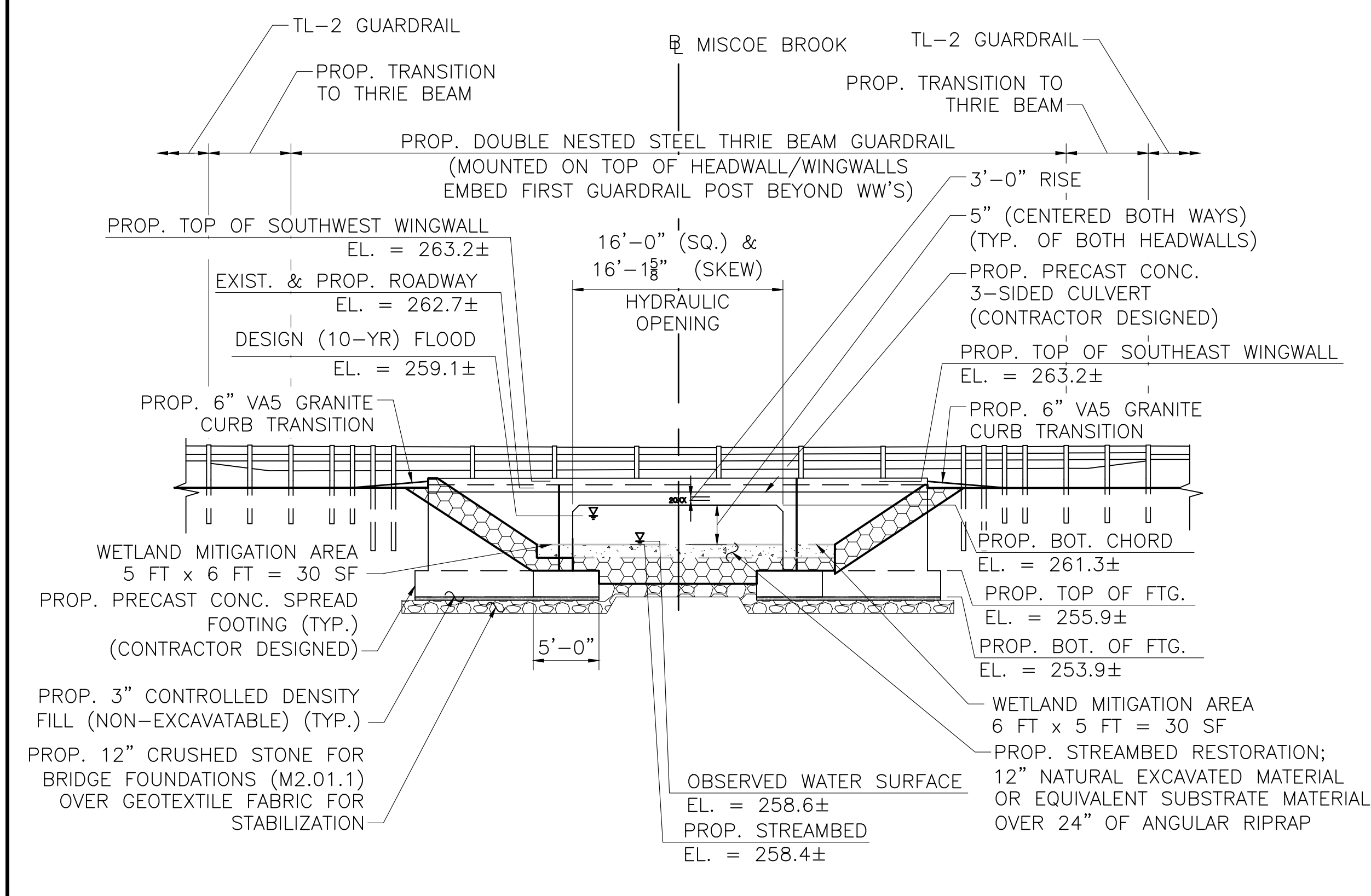
STA 11+77, 12.61' RT TO STA 11+83, 12.52' RT TRANSITION TO THRIE BEAM

STA 11+83, 12.52' RT TO STA 11+96, 12.36' RT GUARDRAIL, TL-2

STA 11+96, 12.36' RT TO STA 12+05, 12.31' RT TRAILING ANCHORAGE

**MASSDOT CONSTRUCTION
STANDARD DRAWINGS:**

- DRAWING 400.1.2 - TL-2 GUARDRAIL
- DRAWING 400.1.3 - TRANSITION TO THRIE BEAM
- DRAWING 400.1.5 - DEEP POST GUARDRAIL
- DRAWING 400.2.1 - TANGENT END TREATMENT
- DRAWING 400.4.1 - TRAILING ANCHORAGE



COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
**CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING**

DISTRICT III BRIDGE ENGINEER

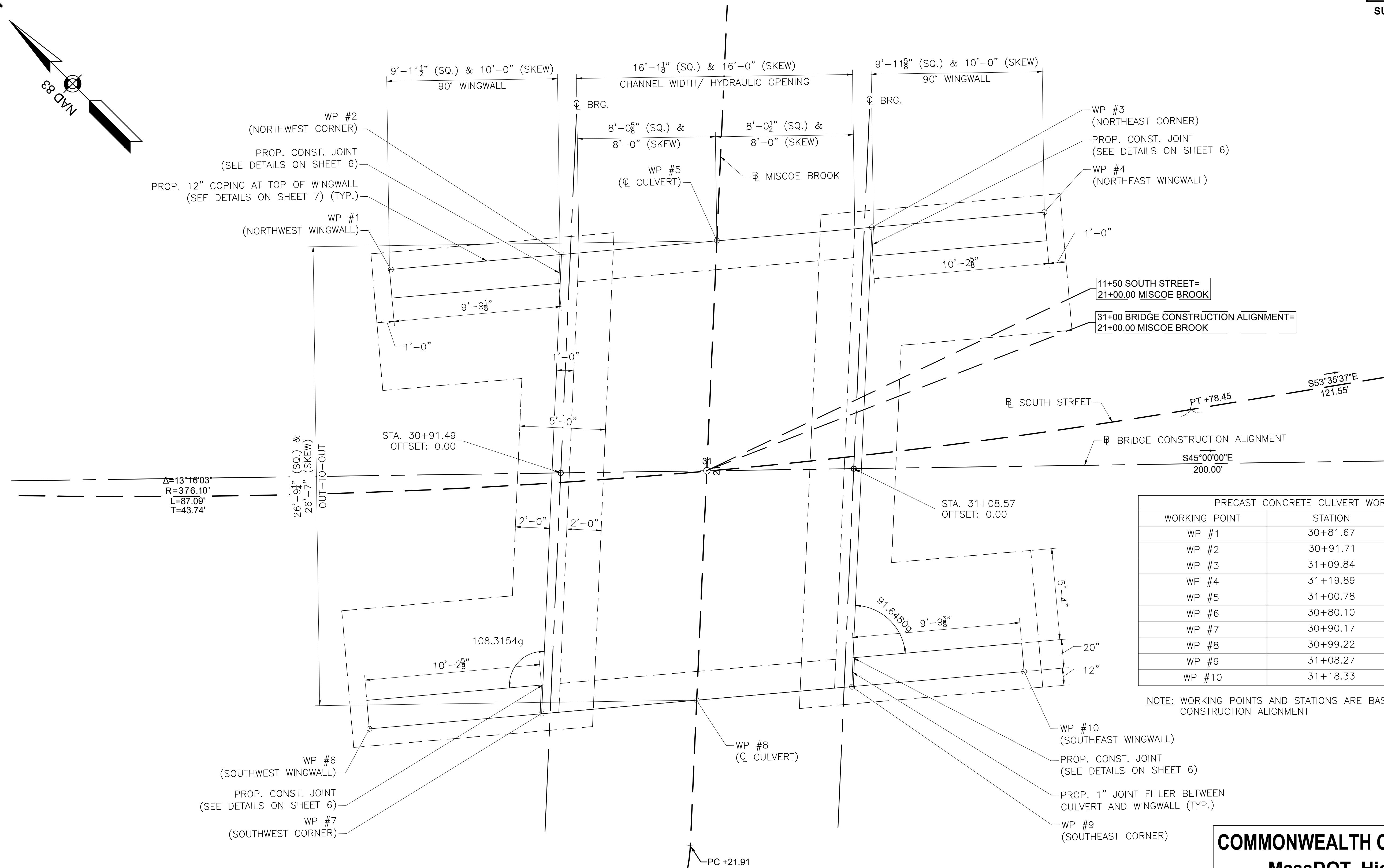
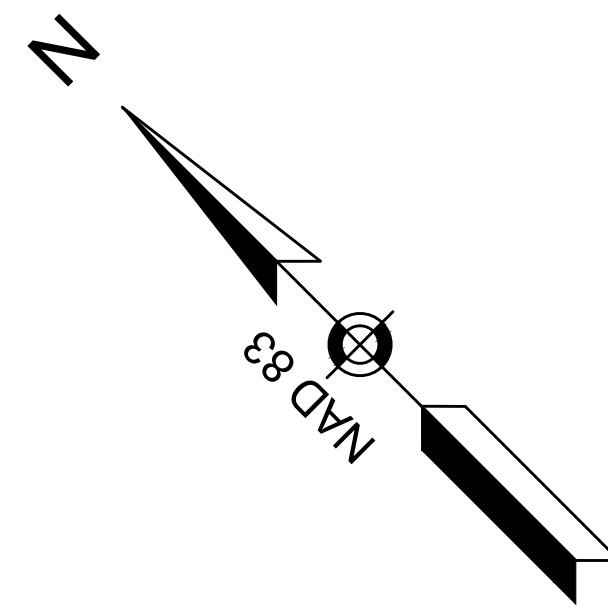
DATE

T1406_BRA_(PLANELEV).DWG 2-April-2024 3:40 PM Ch. 85 Submission

**FRANKLIN
SOUTH STREET**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	5	17
PROJECT FILE NO.		T1406	

SUBSTRUCTURE AND FRAMING



NOTE: WORKING POINTS AND STATIONS ARE BASED OFF THE BRIDGE CONSTRUCTION ALIGNMENT

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

COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE
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DISTRICT III BRIDGE ENGINEER

DATE

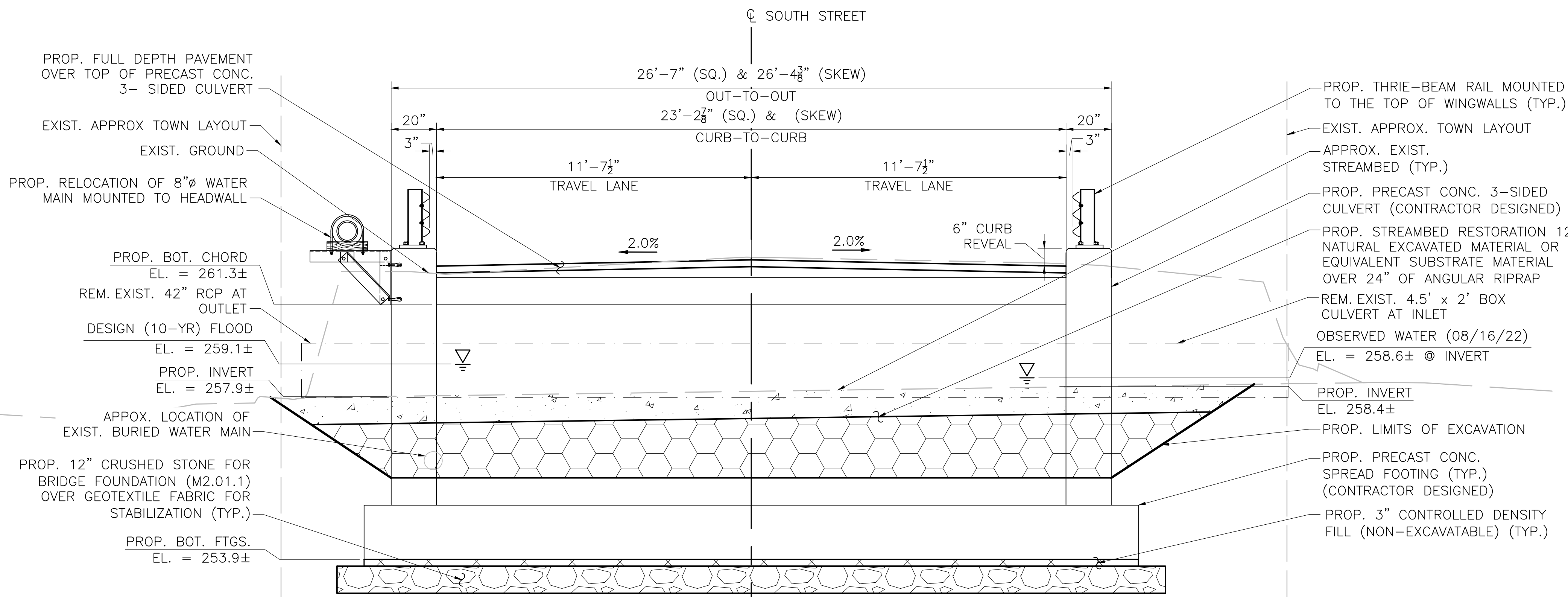
T1406_BR5_(SUBSTRUCTURE&FRAME).DWG Plotted on 15-Apr-2024 3:40 PM 2-April-2024 Ch. 85 Submission

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	6	17
PROJECT FILE NO.		T1406	

STRUCTURAL DETAILS (1 OF 3)

PRECAST CONCRETE CULVERT NOTES:

1. CONTRACTOR SHALL SUBMIT PRECAST CONCRETE 3-SIDED BOX CULVERT AND FOOTING DESIGN CALCULATIONS AND SHOP DRAWINGS SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE COMMONWEALTH OF MASSACHUSETTS FOR APPROVAL PRIOR TO FABRICATION. PRESCRIBED HYDRAULIC OPENING (16'X3') SHALL BE MAINTAINED.
2. ALL CULVERT AND CULVERT FOOTING CONCRETE SHALL BE 5000 PSI, 3/4", 685 HP CEMENT CONCRETE.
3. THE CONTRACTOR SHALL APPROVE ALL ELEVATIONS AND DIMENSIONS OF THE SHOP DRAWINGS PRIOR TO FABRICATION. SHOP DRAWINGS AND CALCULATIONS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.
4. REINFORCEMENT SHALL BE PLACED WITH A MINIMUM OF 1 1/2" COVER.
5. ALL CULVERT REINFORCEMENT SHOWN IS CONCEPTUAL FOR BIDDING PURPOSES. THE CONTRACTOR SHALL SUBMIT DESIGN CALCULATIONS AS PART OF THE SHOP DRAWINGS.
6. DESIGN SHALL BE IN ACCORDANCE WITH THE 2020 AASHTO LRFD BRIDGE DESIGN AND MASSDOT LRFD BRIDGE MANUAL SPECIFICATIONS FOR HL-93 LOADING.
7. A FACTORED BEARING RESISTANCE OF 10.3 KSF SHALL BE USED IN THE DESIGN OF THE CULVERT FOOTING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SUBGRADE PREPARATION SUCH THAT THE DESIGN BEARING CAPACITY SHALL BE ACHIEVED. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF THIS BEARING CAPACITY CANNOT BE MET.

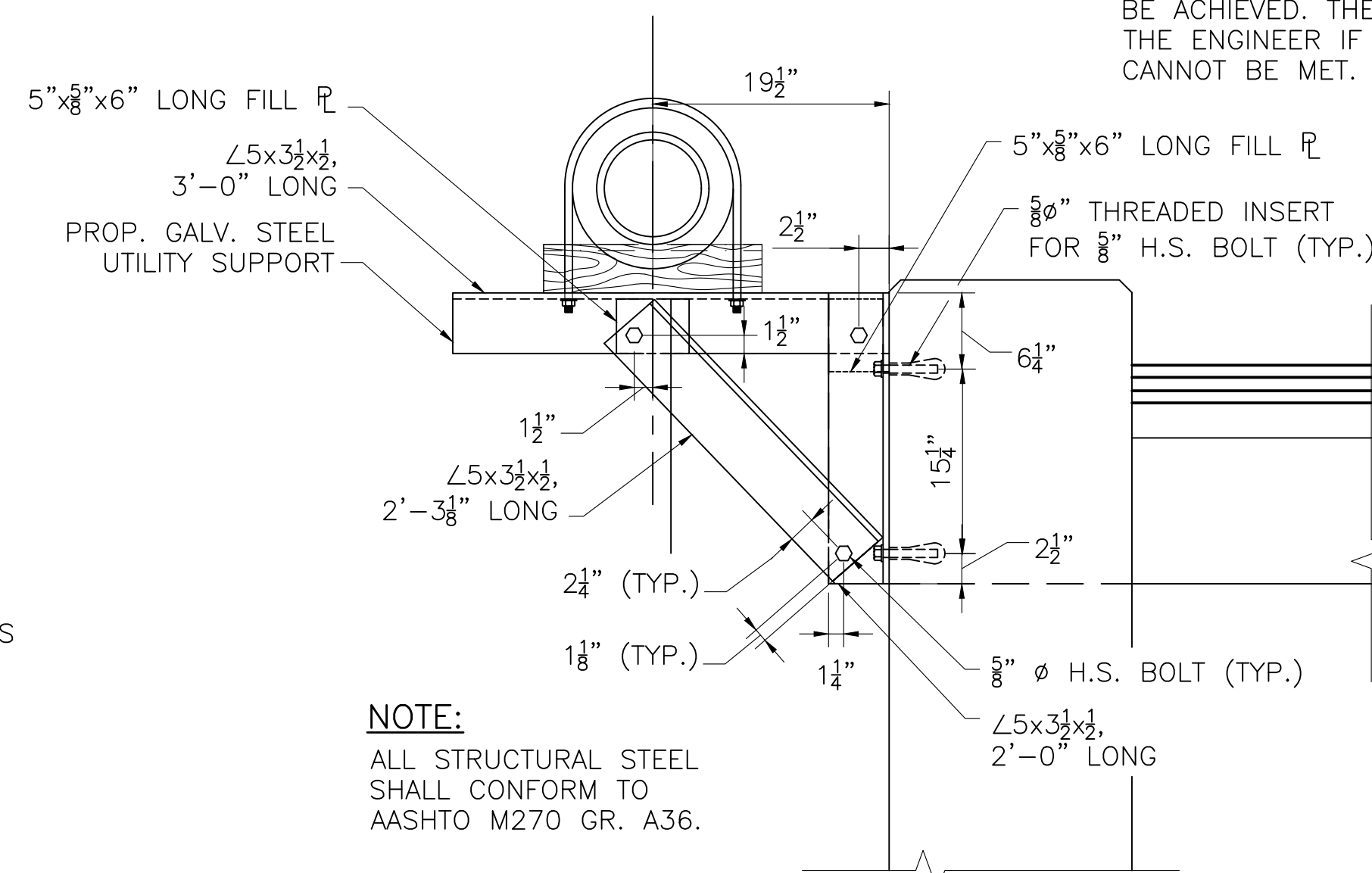


TRANSVERSE CULVERT SECTION (LOOKING EAST)

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

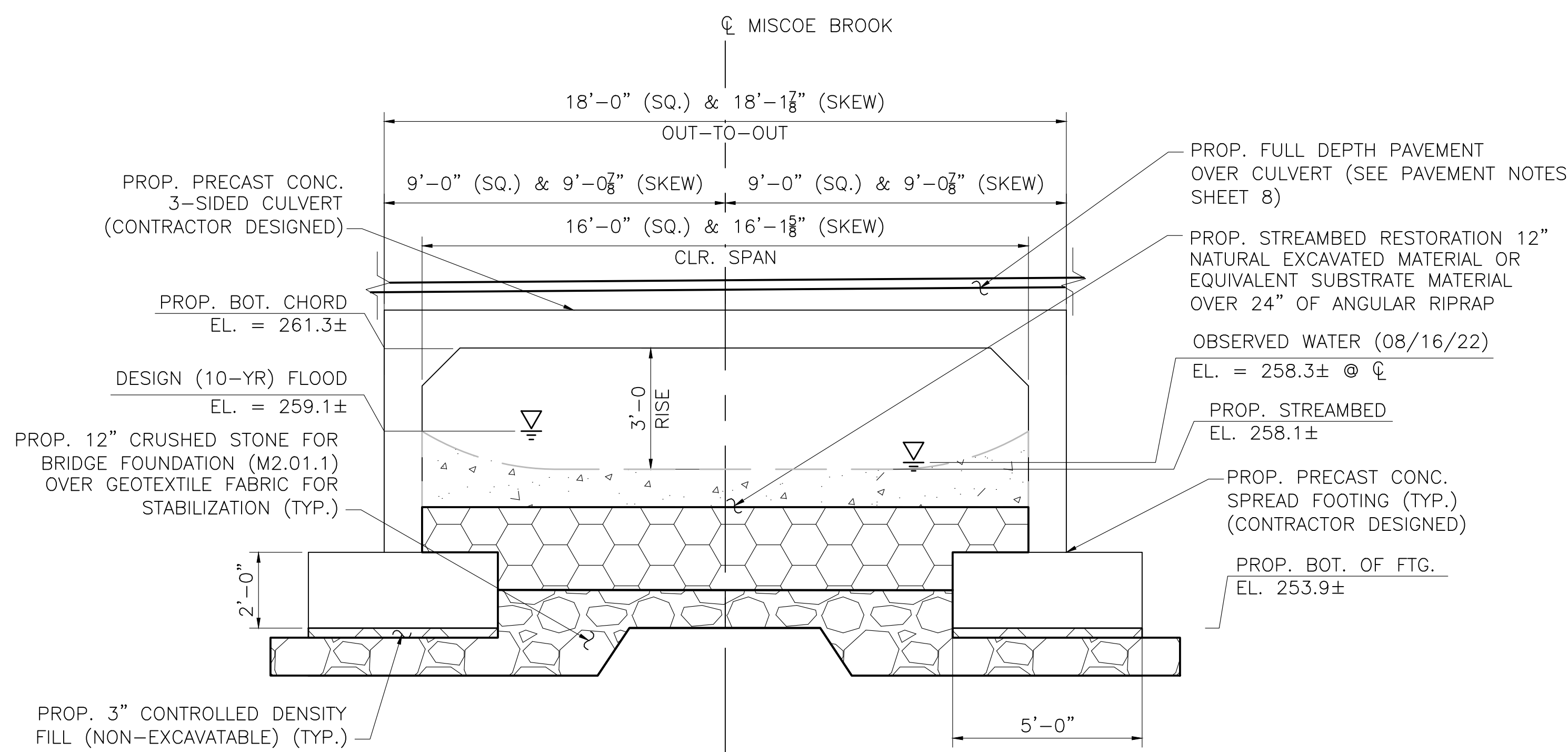
TRANSVERSE SECTION NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR DEMOLITION OF ALL EXISTING CULVERT INFRASTRUCTURE.
2. THE PROPOSED ROADWAY ELEVATIONS AND CROSS SLOPES ARE INTENDED TO MATCH EXISTING CONDITIONS. CONTRACTOR SHALL SMOOTHLY TRANSITION ALL PROPOSED ELEMENTS INTO THE EXISTING APPROACHES AND EMBANKMENT SLOPES.



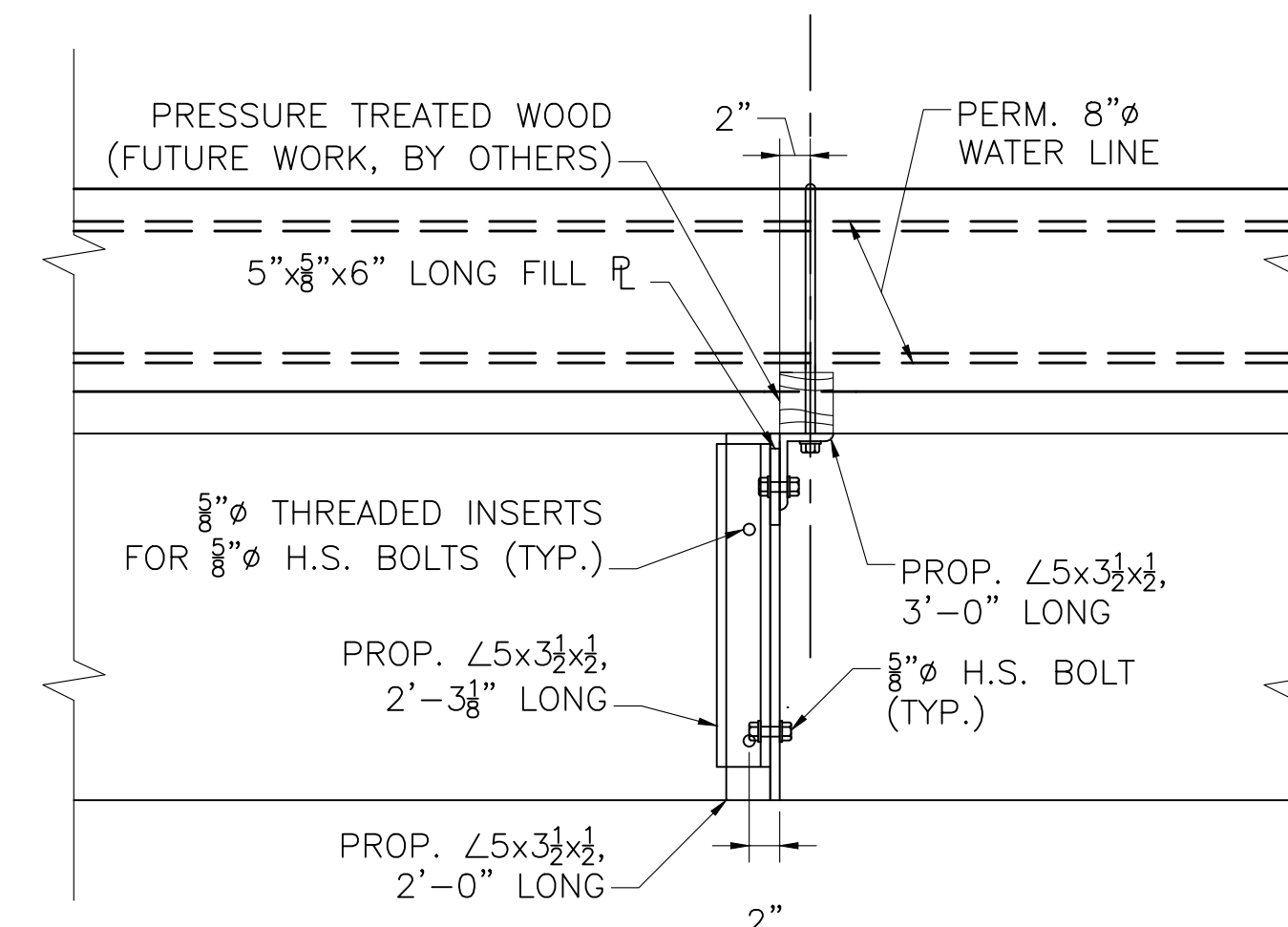
UTILITY SUPPORT SECTION

SCALE: 1" = 1'-0"



LONGITUDINAL CULVERT SECTION (AT SOUTH STREET)

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



UTILITY SUPPORT ELEVATION

SCALE: 1" = 1'-0"

COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
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**FRANKLIN
SOUTH STREET**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	7	17
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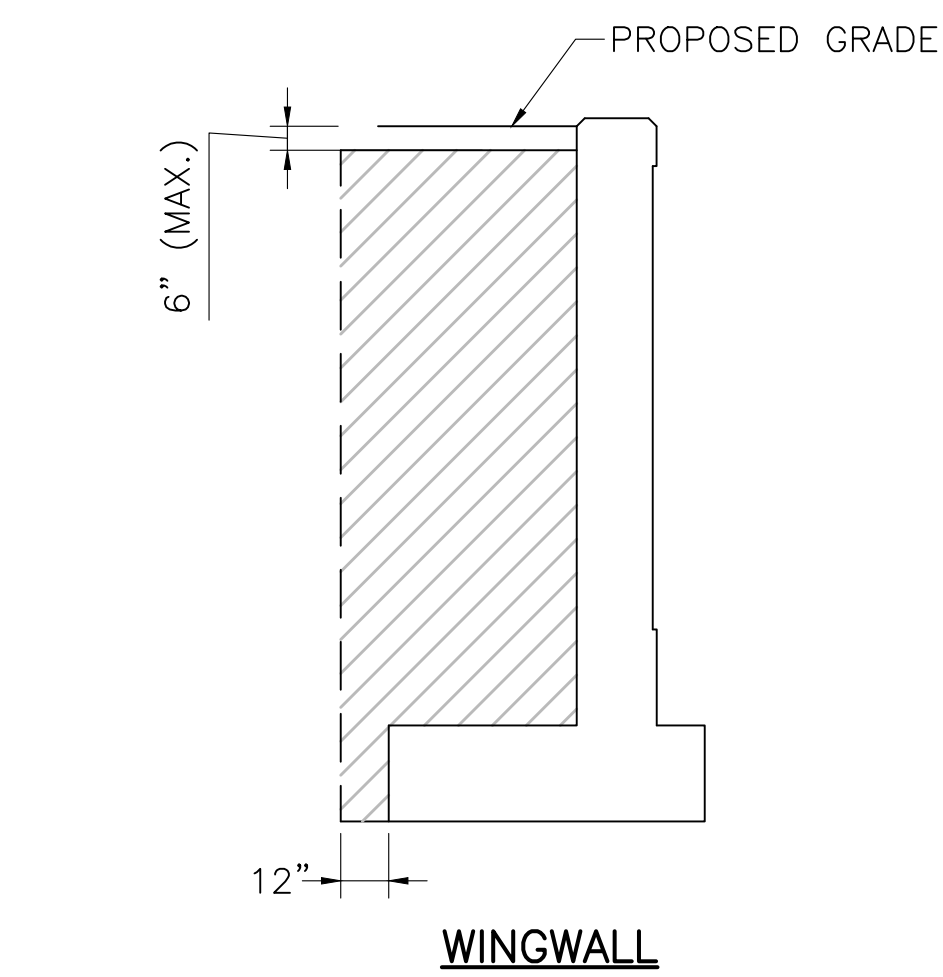
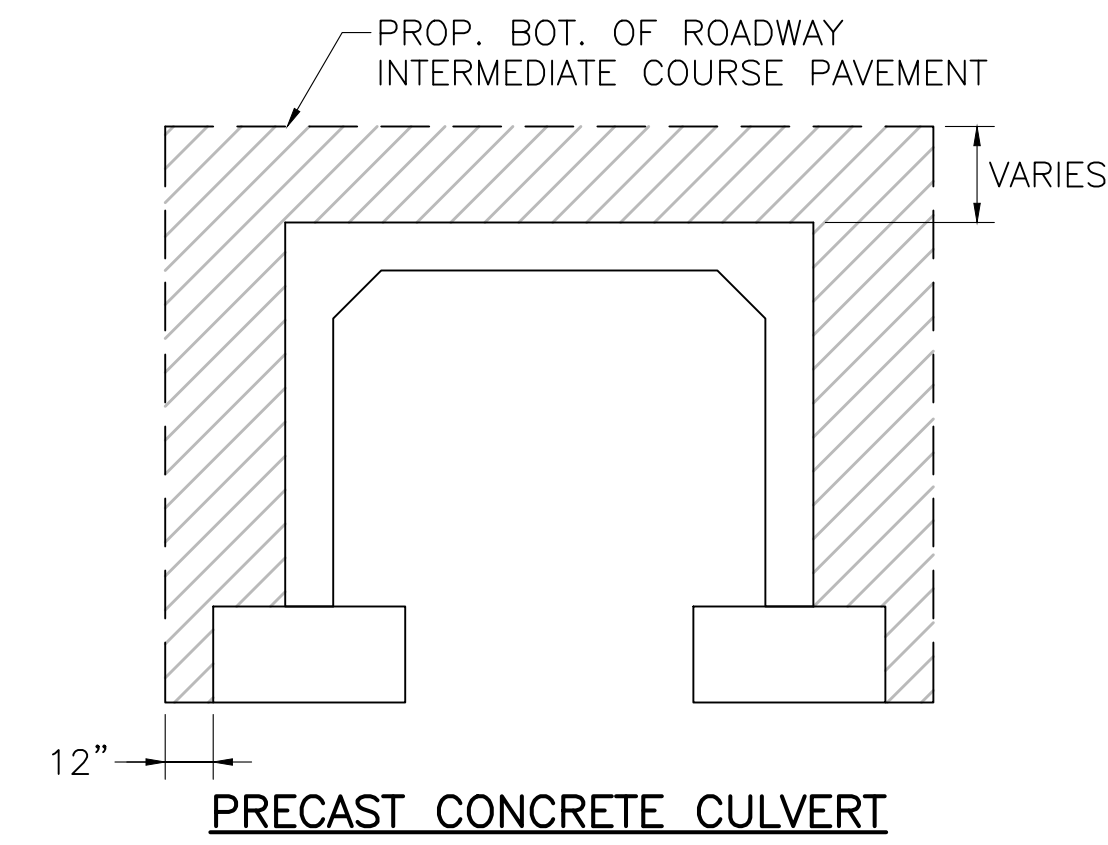
STRUCTURAL DETAILS (2 OF 3)

WINGWALL CONSTRUCTION NOTES:

- DAMP-PROOFING OR OTHER WATERPROOFING PROTECTIVE COURSE, SHALL BE APPLIED TO THE BACK OF THE STEM AS SPECIFIED IN MASSDOT STANDARD SPECIFICATIONS.
- 4" Ø WEEP HOLES AT FIFTH POINTS OF WALL LENGTHS (JUST ABOVE PROTECTIVE COURSE). PROVIDE 1 CUBIC YARD OF CRUSHED STONE AT EACH END OF WEEP HOLE.
- ALL WINGWALL CONCRETE SHALL BE 5000 PSI, 3/4" IN, 685 HP CEMENT CONCRETE.
- THE FACTORED BEARING PRESSURE = 2.47 KSF PER AASHTO LRFD BRIDGE DESIGN SPECIFICATION STRENGTH 1 LOAD COMBINATION IS BASED ON A MINIMUM FOOTING WIDTH OF 8- FEET.
- THE FACTORED BEARING RESISTANCE = 10.3 KSF BASED ON A MINIMUM FOOTING WIDTH OF 8- FEET. FACTORED BEARING RESISTANCE IS THE PRODUCT OF THE NOMINAL BEARING RESISTANCE AND A RESISTANCE FACTOR OF 0.45.
- PRE-BED PRECAST ELEMENT WITH NON-SHRINK GROUT WITH THICKNESS MORE THAN SHIM STACK.
- THE CONTRACTOR SHALL DETERMINE THE SIZE AND SPACING OF THE GROUT PORTS BASED ON THE CDF'S FLOW PROPERTIES AND THE SIZE OF THE FOOTING.

LEVELING BOLT ASSEMBLY NOTES:

- THE LEVELING BOLT ASSEMBLY SHOWN IS SCHEMATIC. DESIGN OF THE LEVELING BOLT ASSEMBLY SHALL BE PERFORMED BY THE CONTRACTOR AND SUBMITTED WITH THE ASSEMBLY PLAN TO THE ENGINEER FOR APPROVAL.
- BOLT SHALL BE REMOVED AFTER THE CONTROLLED DENSITY FILL (NON-EXCAVATABLE) HAS SET.
- STEEL PLATES SHALL BE AASHTO M 270 GRADE 36 UNCOATED STEEL.
- BOLTS SHALL BE H.S. AASHTO M 164 AND UNCOATED.
- REINFORCEMENT SHALL BE WELDABLE LOW-ALLOW ASTM A 706 BARS.
- GREASE OF OIL NUT AND BOLT THREADS TO FACILITATE LEVELING AND REMOVAL.

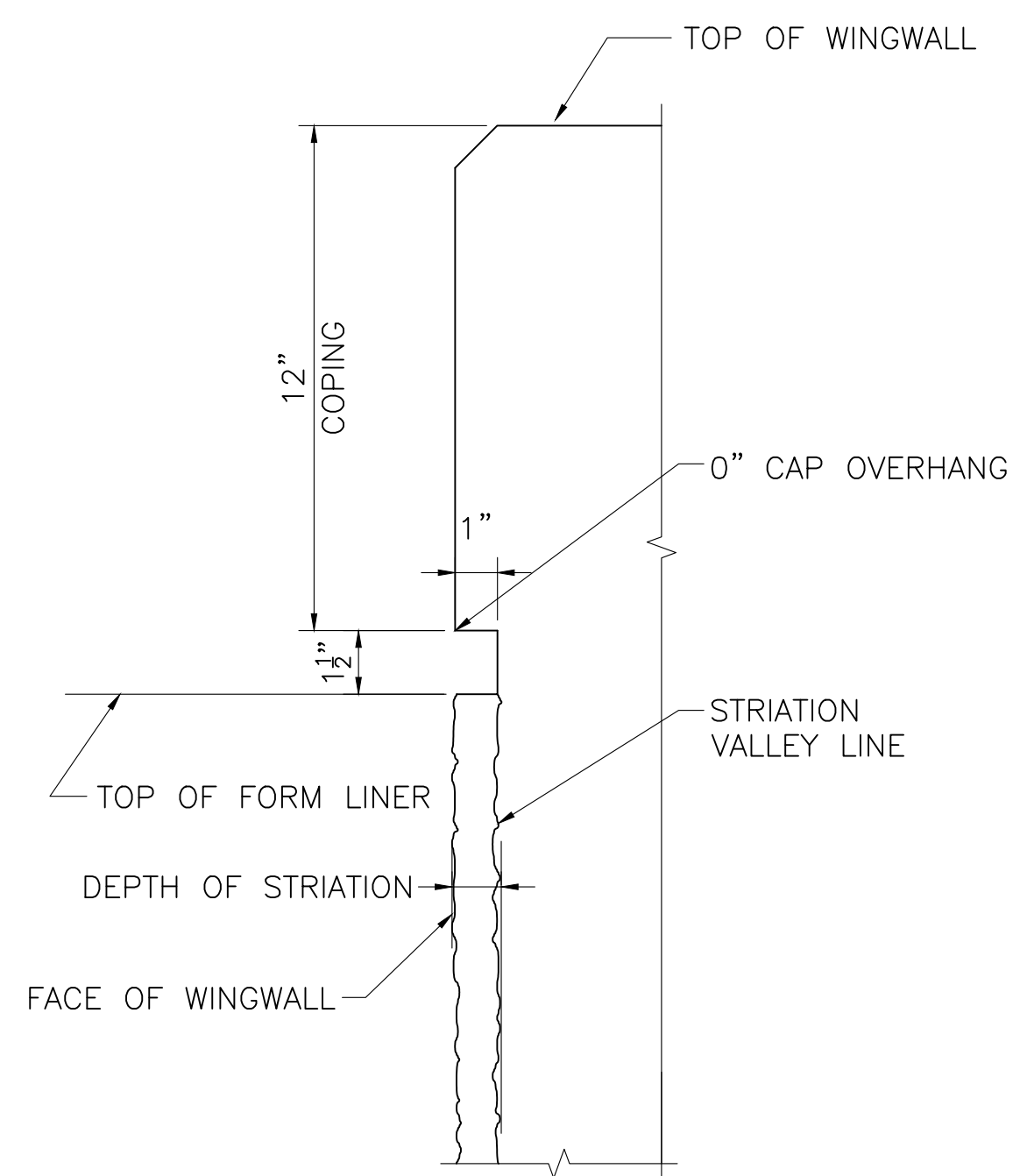


LIMITS OF GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES

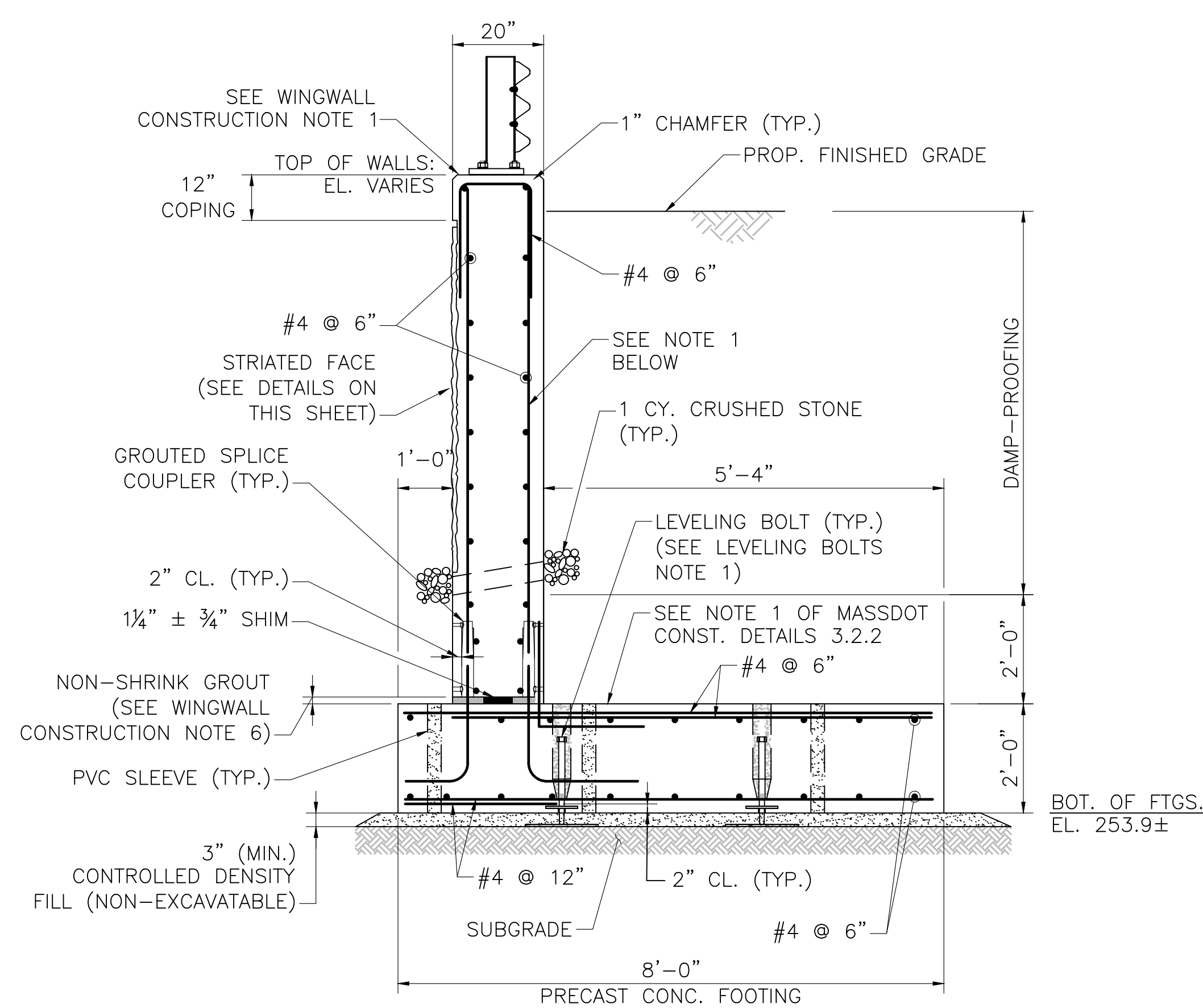
SCALE: 1/4" = 1'-0"

NOTES:

- HATCHED AREAS INDICATE THE LIMIT OF GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES.
- THE BACKFILL PLACED AROUND THE STRUCTURE SHALL BE DEPOSITED ON BOTH SIDES TO APPROXIMATELY THE SAME ELEVATION AT THE SAME TIME.



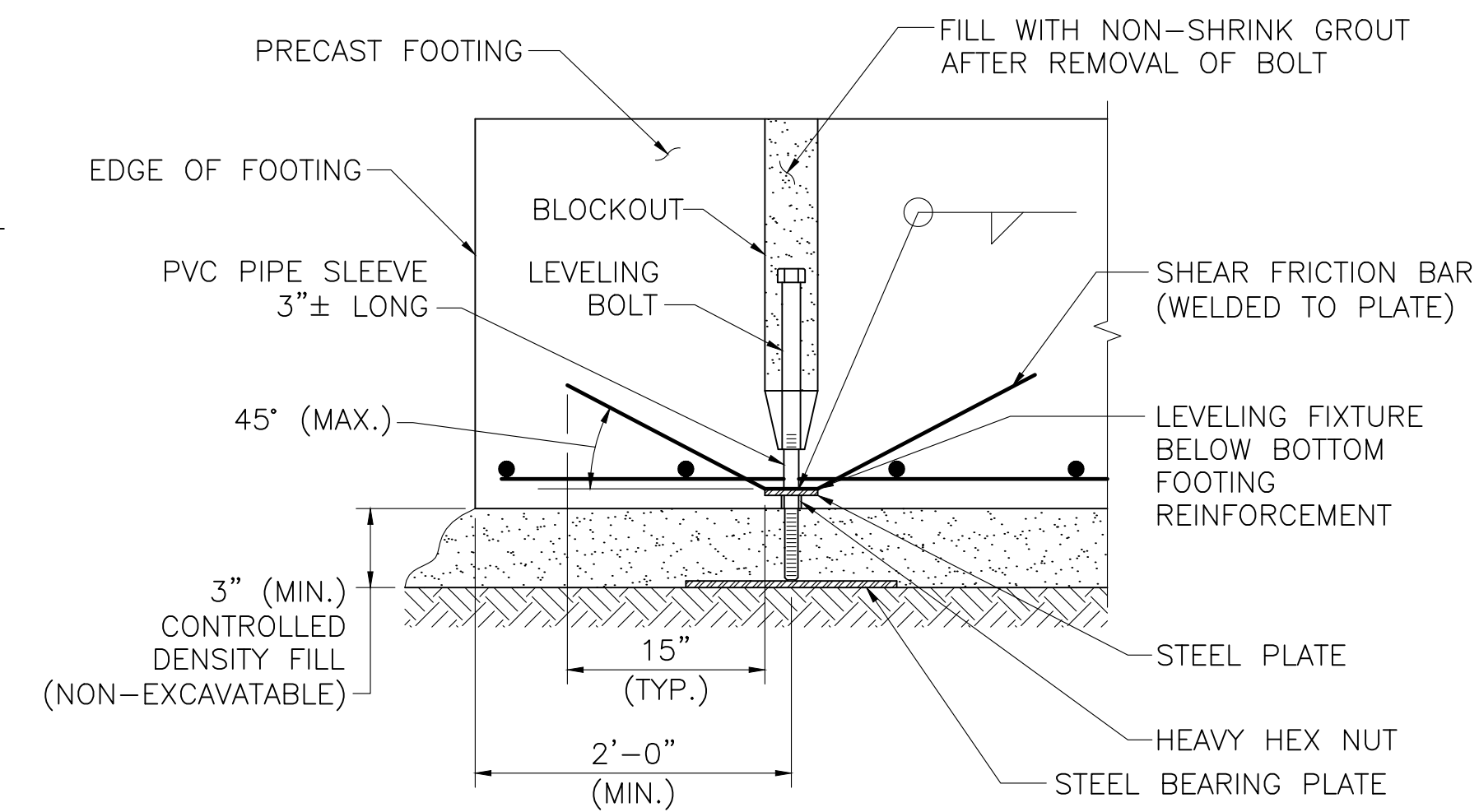
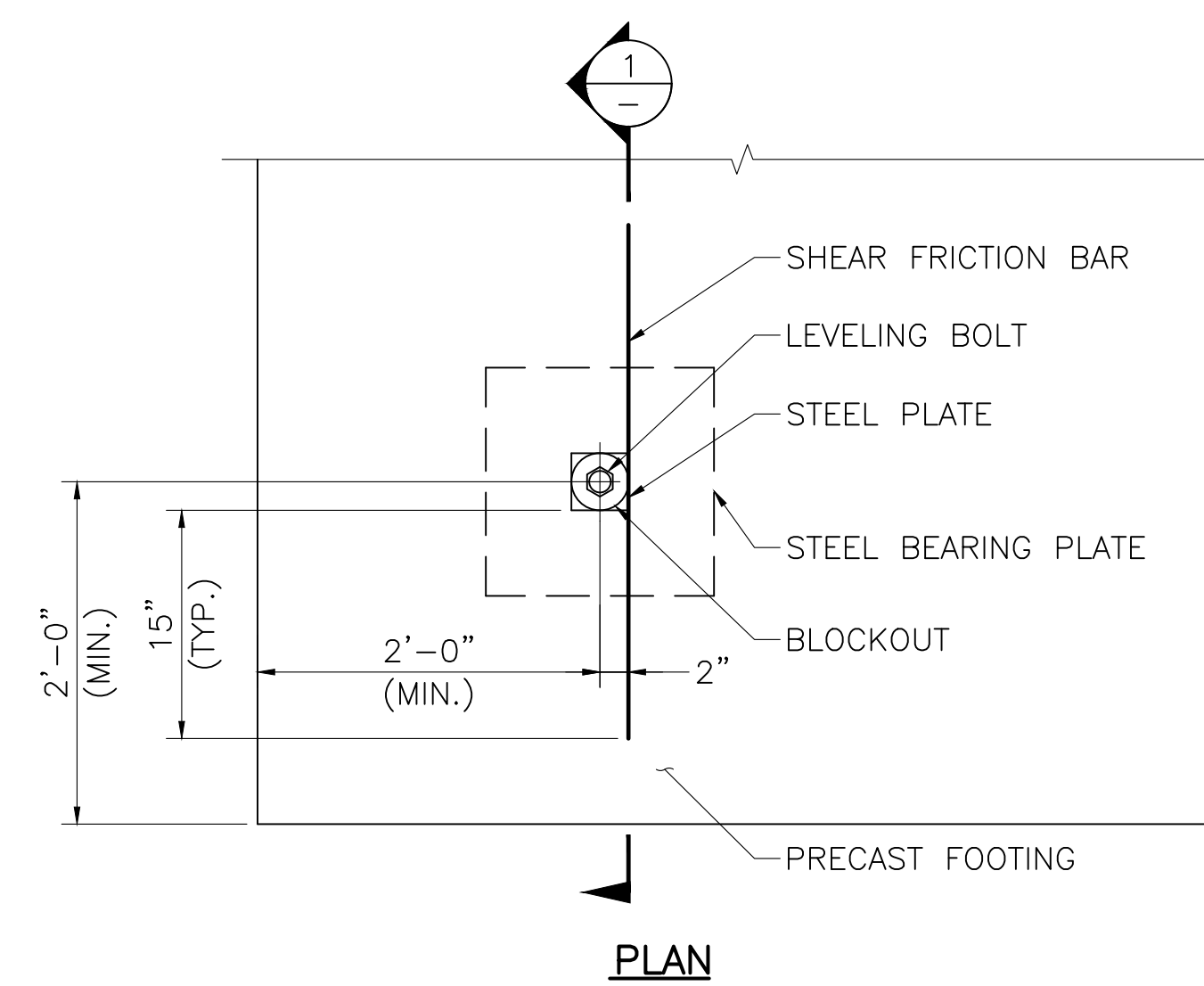
DETAIL AT TOP OF WINGWALL
SCALE: 3" = 1'-0"



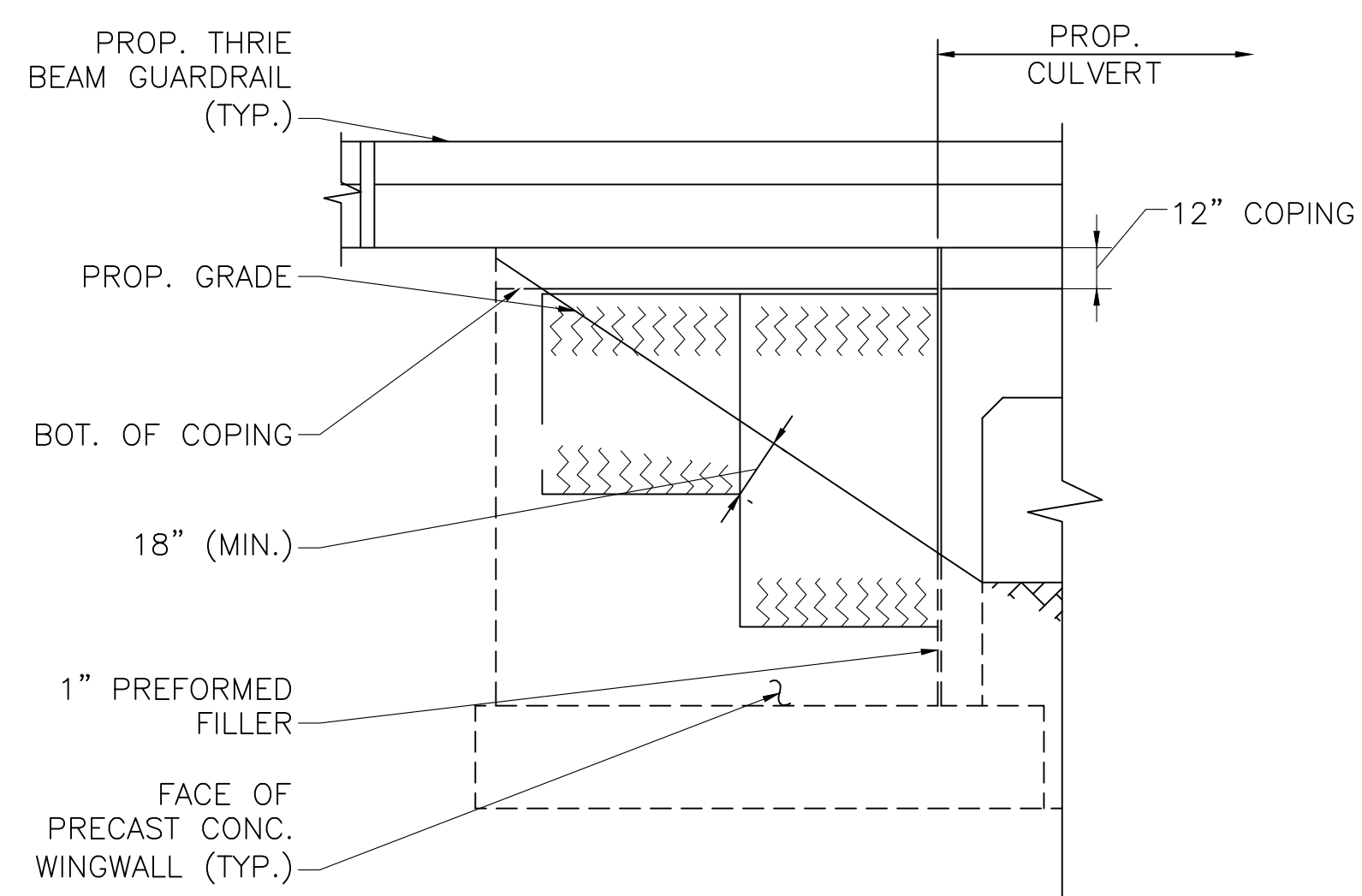
NOTES:

- CONCRETE DIMENSIONS AND STEEL REINFORCEMENT SHOWN IS CONCEPTUAL ONLY. FINAL DIMENSIONS AND STEEL REINFORCEMENT SHALL BE BY PRECASTER.
- PRE-BED PRECAST ELEMENT WITH NON-SHRINK GROUT WITH THICKNESS MORE THAN SHIM STACK.

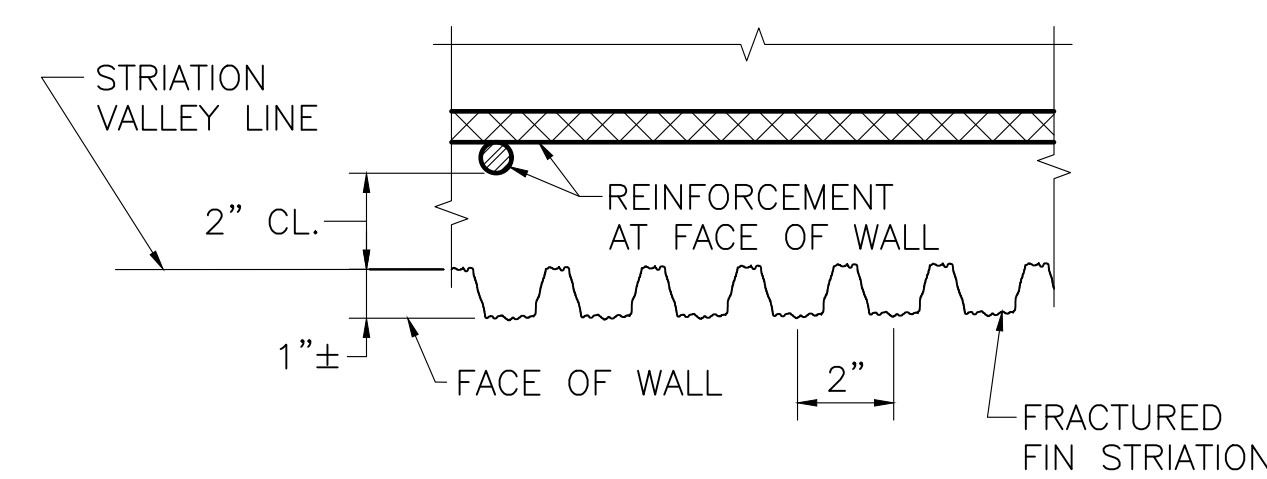
PRECAST WINGWALL SECTION
SCALE: 1/2" = 1'-0"



LEVELING BOLT ASSEMBLY
SCALE: 1" = 1'-0"



WINGWALL STRIATION - ELEVATION
SCALE: 3" = 1'-0"



NOTES:

- THE CONTRACTOR SHALL MAKE SURE THAT THE STRIATION FINNS ARE PLUMB AND LINED UP VERTICALLY FROM PANEL TO PANEL FOR THE FULL HEIGHT OF THE WALL.
- THE HORIZONTAL JOINT MAY BE OMITTED IF THE CONTRACTOR CAN DEMONSTRATE THAT THE FORM LINER PANELS CAN BE INSTALLED END TO END WITHOUT CREATING A VISIBLE SEAM IN THE FINAL CAST CONCRETE.

TYPICAL STRIATION DETAIL
SCALE: 3" = 1'-0"

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MassDOT, Highway Division
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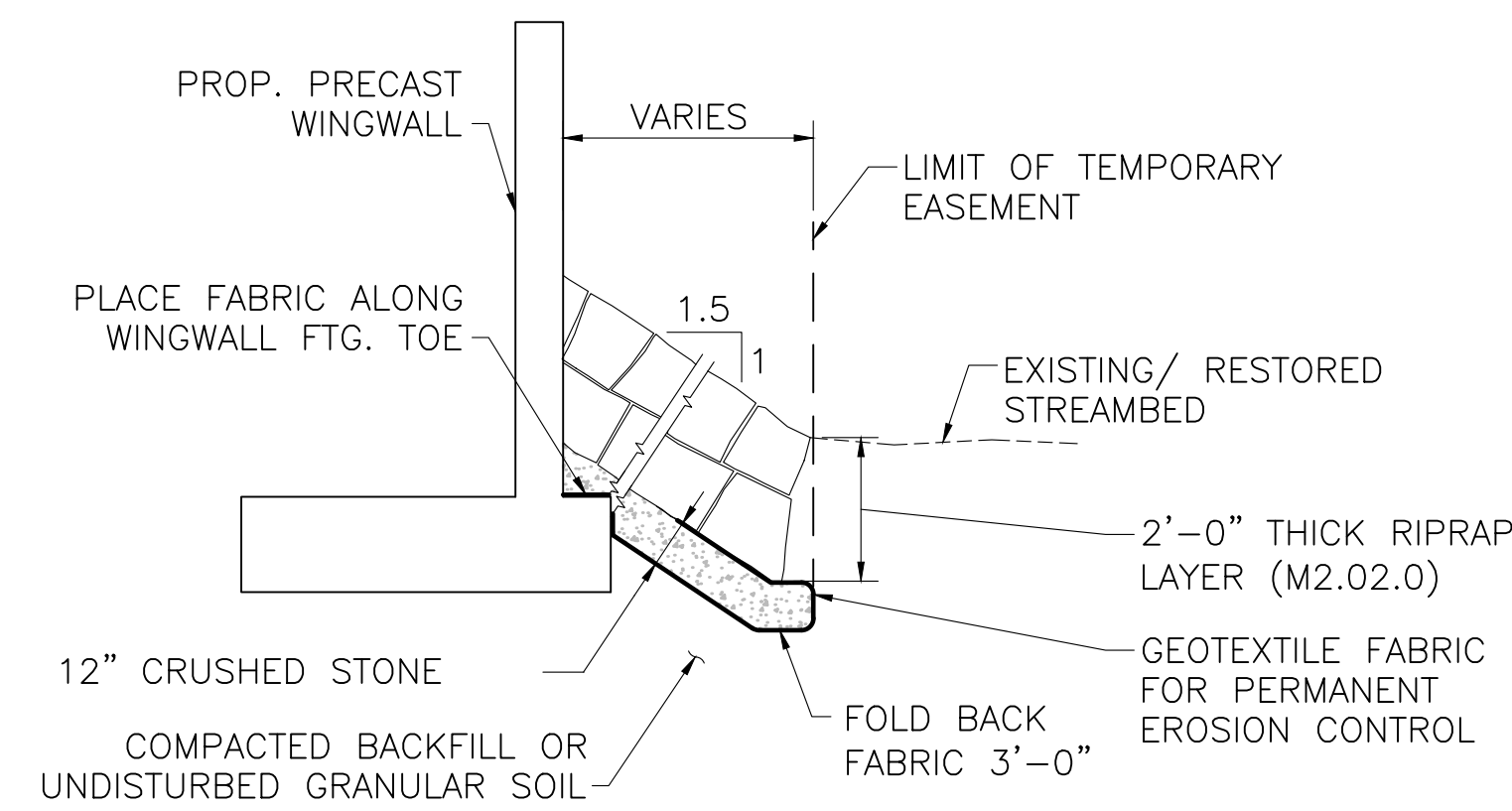
DISTRICT III BRIDGE ENGINEER

DATE

**FRANKLIN
SOUTH STREET**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	8	17
PROJECT FILE NO.		T1406	

STRUCTURAL DETAILS (3 OF 3)

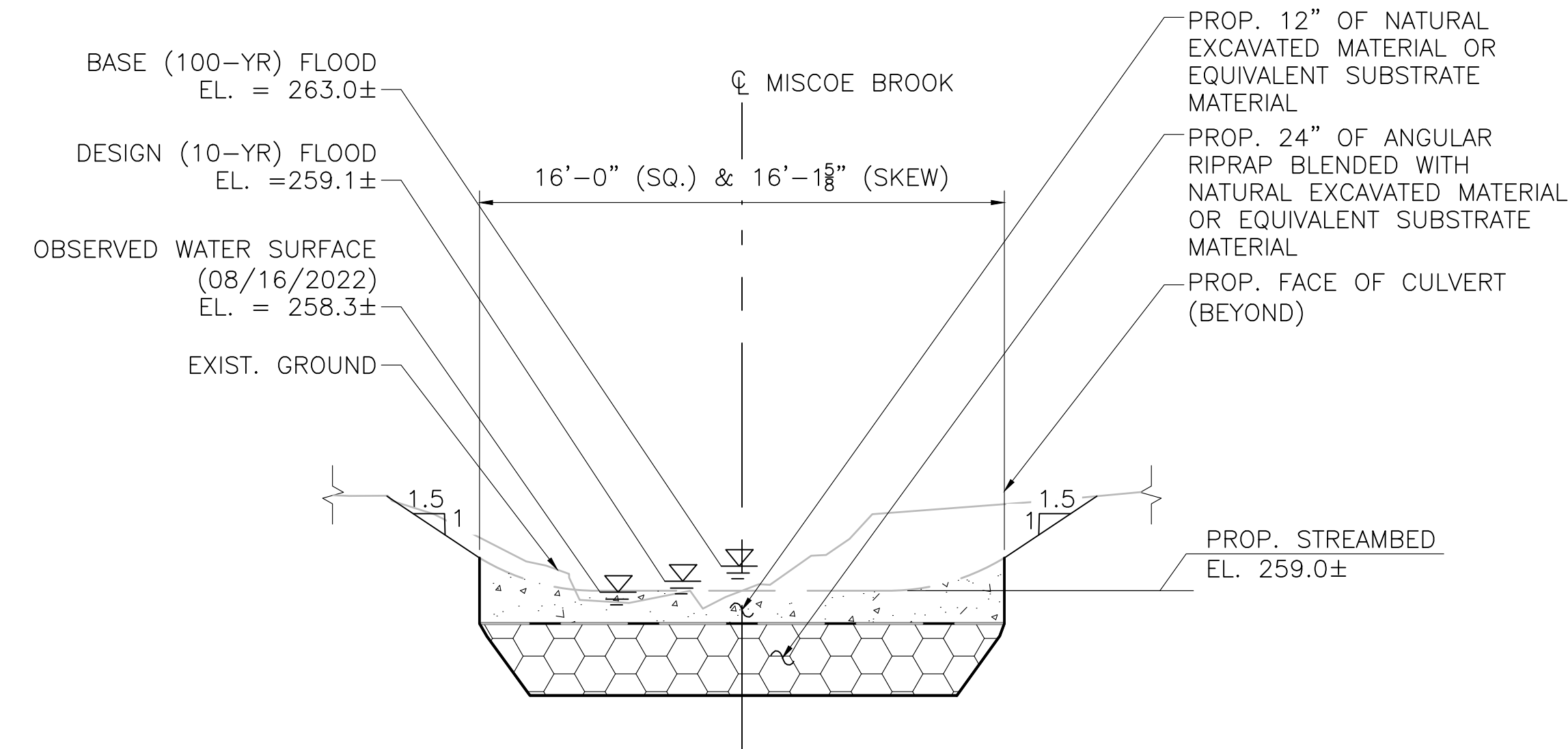


RIPRAP DETAIL @ WINGWALLS

N.T.S.

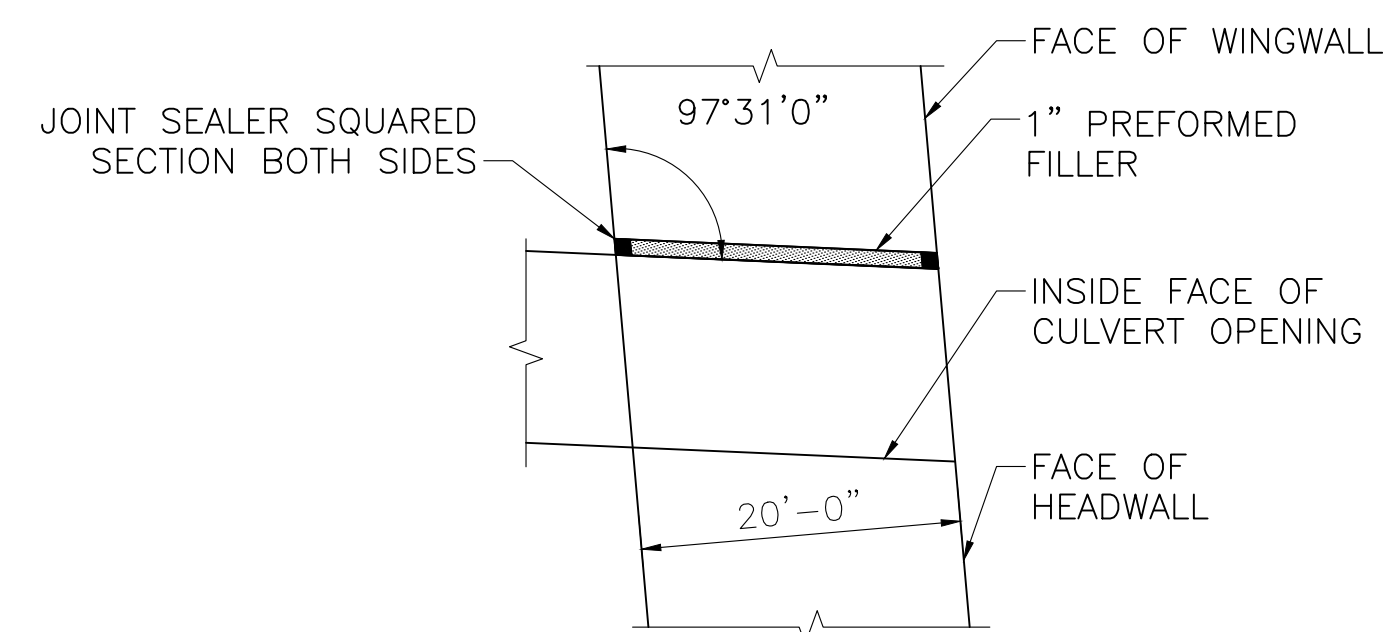
NOTE:

IF BEDROCK IS ENCOUNTERED CLOSER THAN 4'-0" TO FINISHED GRADE, ELIMINATE CRUSHED STONE LAYER AND GEOTEXTILE FABRIC.



CHANNEL APPROACH SECTION

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



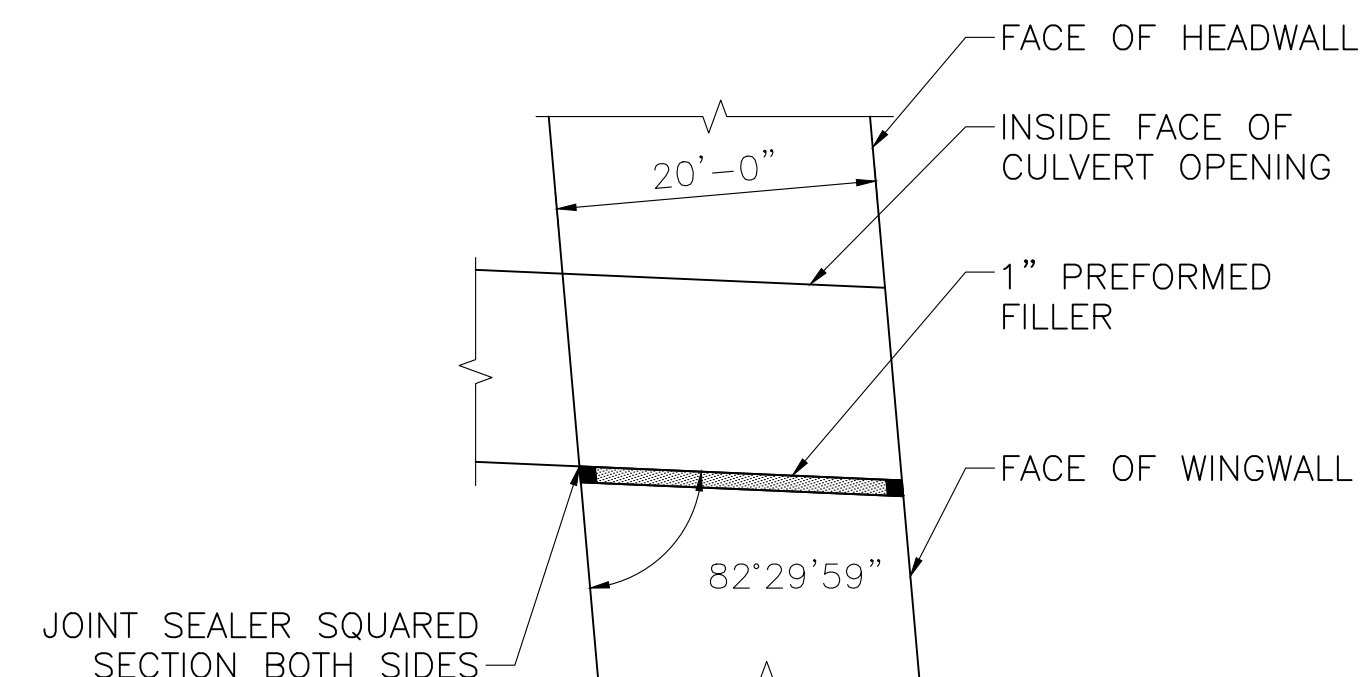
PLAN VIEW

NOTE:

REINFORCEMENT NOT SHOWN FOR CLARITY.

NORTH EXPANSION JOINT DETAILS

SCALE: 1" = 1'-0"



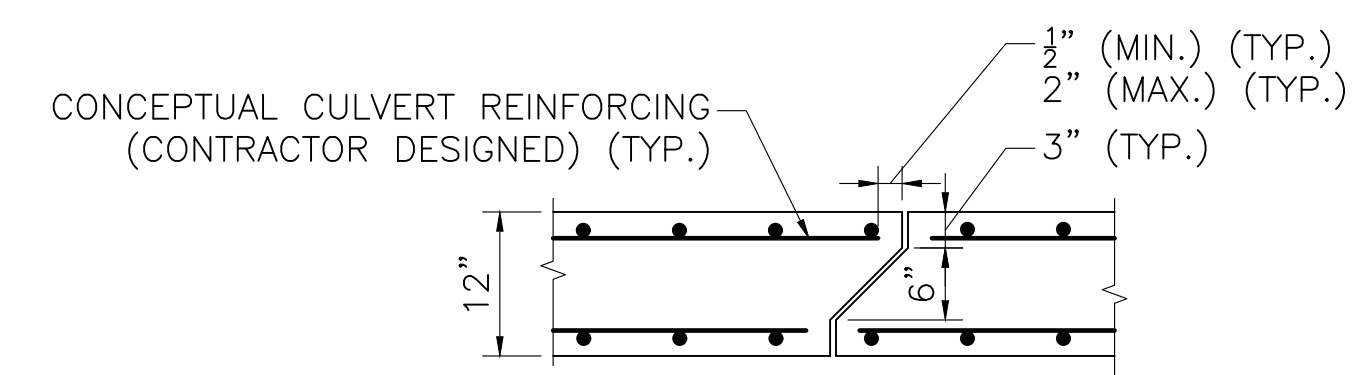
PLAN VIEW

NOTE:

REINFORCEMENT NOT SHOWN FOR CLARITY.

SOUTH EXPANSION JOINT DETAILS

SCALE: 1" = 1'-0"



NOTES:

1. JOINT DIMENSIONS ARE CONCEPTUAL AND SHALL BE CONFIRMED BY THE PRECASTER.
2. ALL CULVERT JOINTS SHALL BE LAPPED AND SEALED WITH JOINT SEALER.
3. ALL CULVERT SECTIONS SHALL ALSO BE MECHANICALLY TIED TOGETHER. ALL BOLT POCKETS SHALL BE GROUTED AFTER INSTALLATION OF BOLTS.

CULVERT JOINT DETAIL

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

COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING

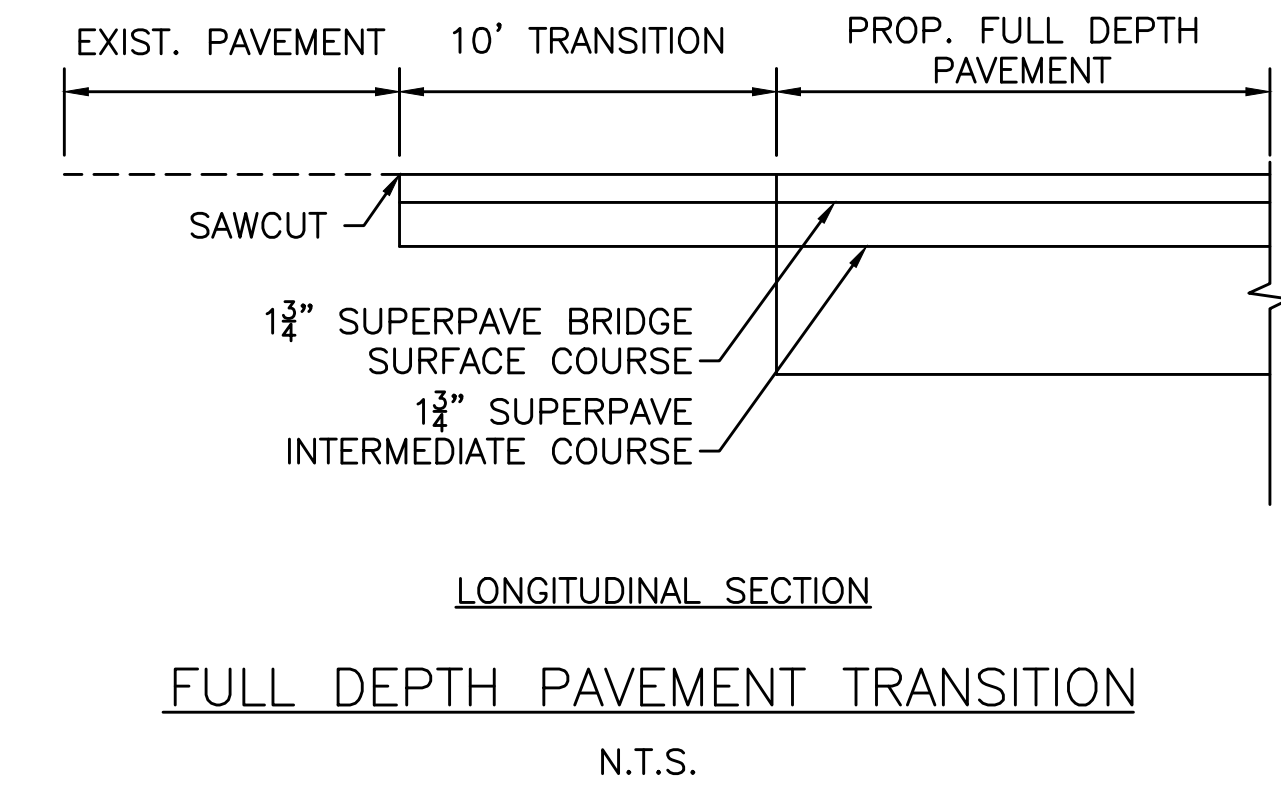
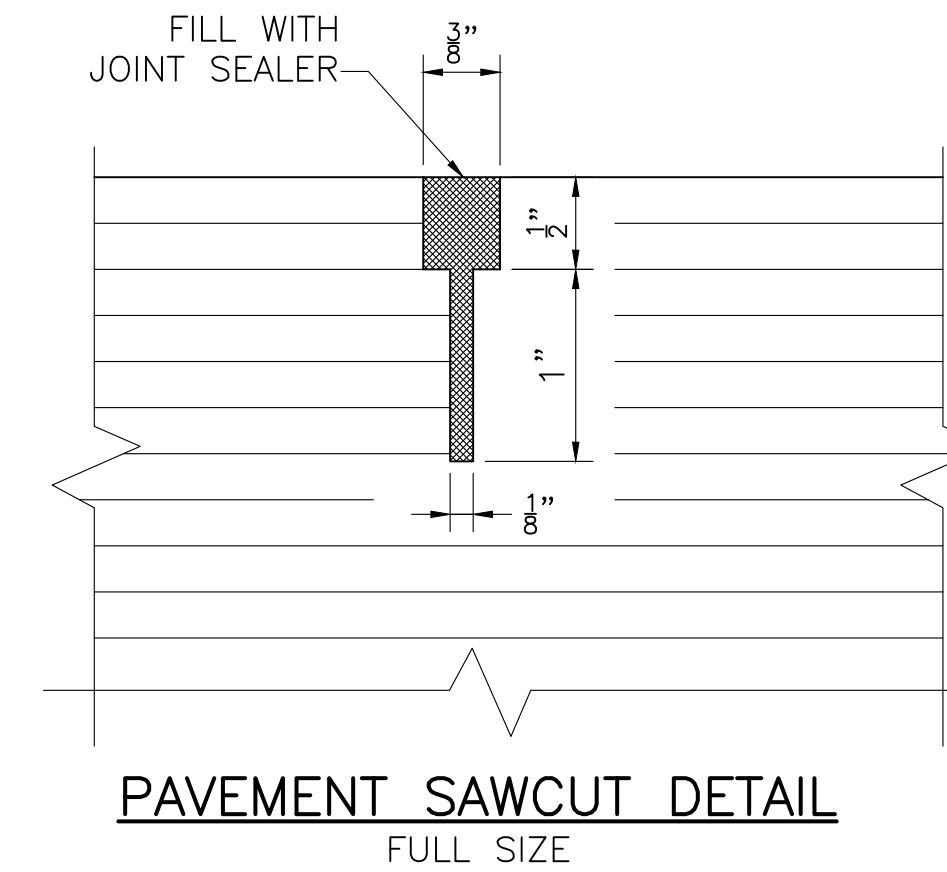
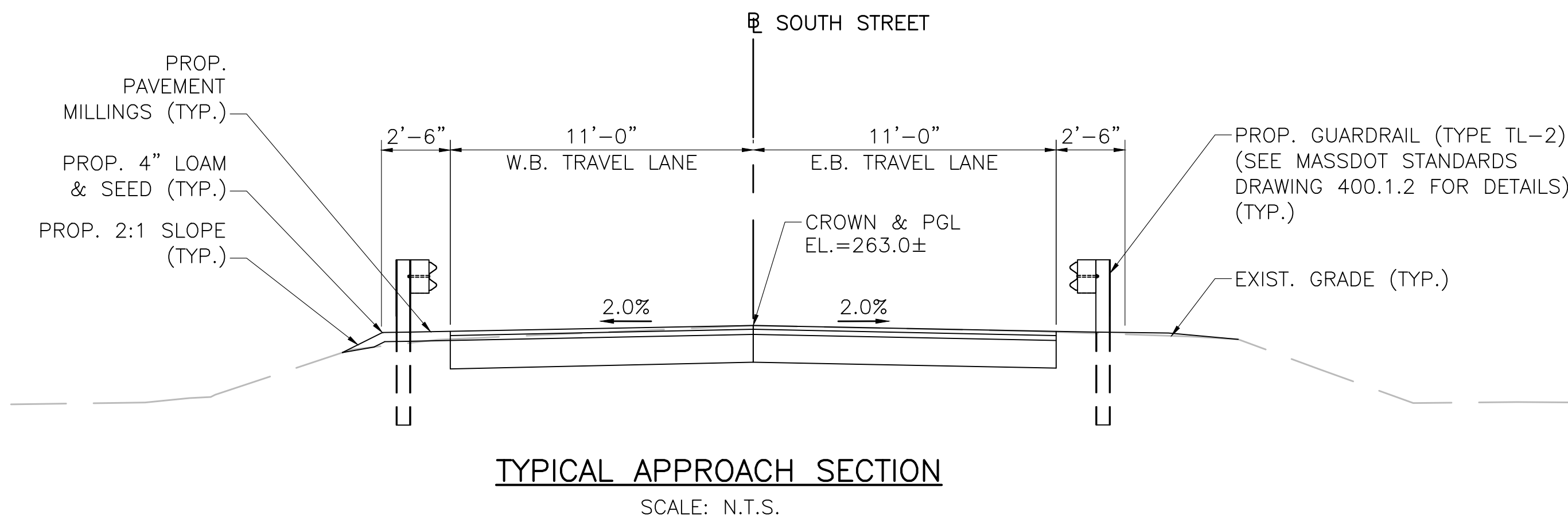
DISTRICT III BRIDGE ENGINEER

DATE

**FRANKLIN
SOUTH STREET**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	9	17
PROJECT FILE NO.		T1406	

MISCELLANEOUS DETAILS (1 OF 5)



PAVEMENT NOTES:

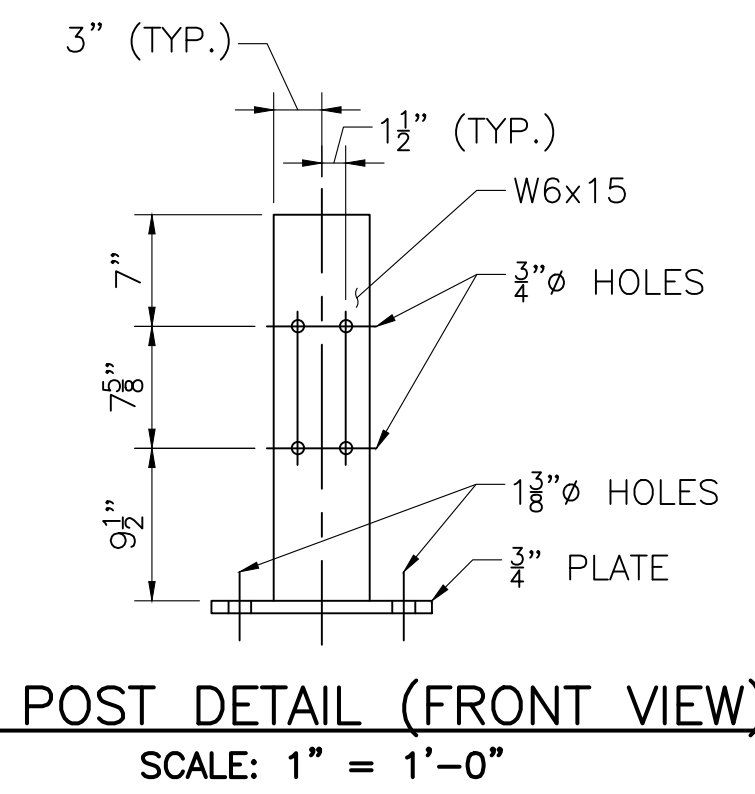
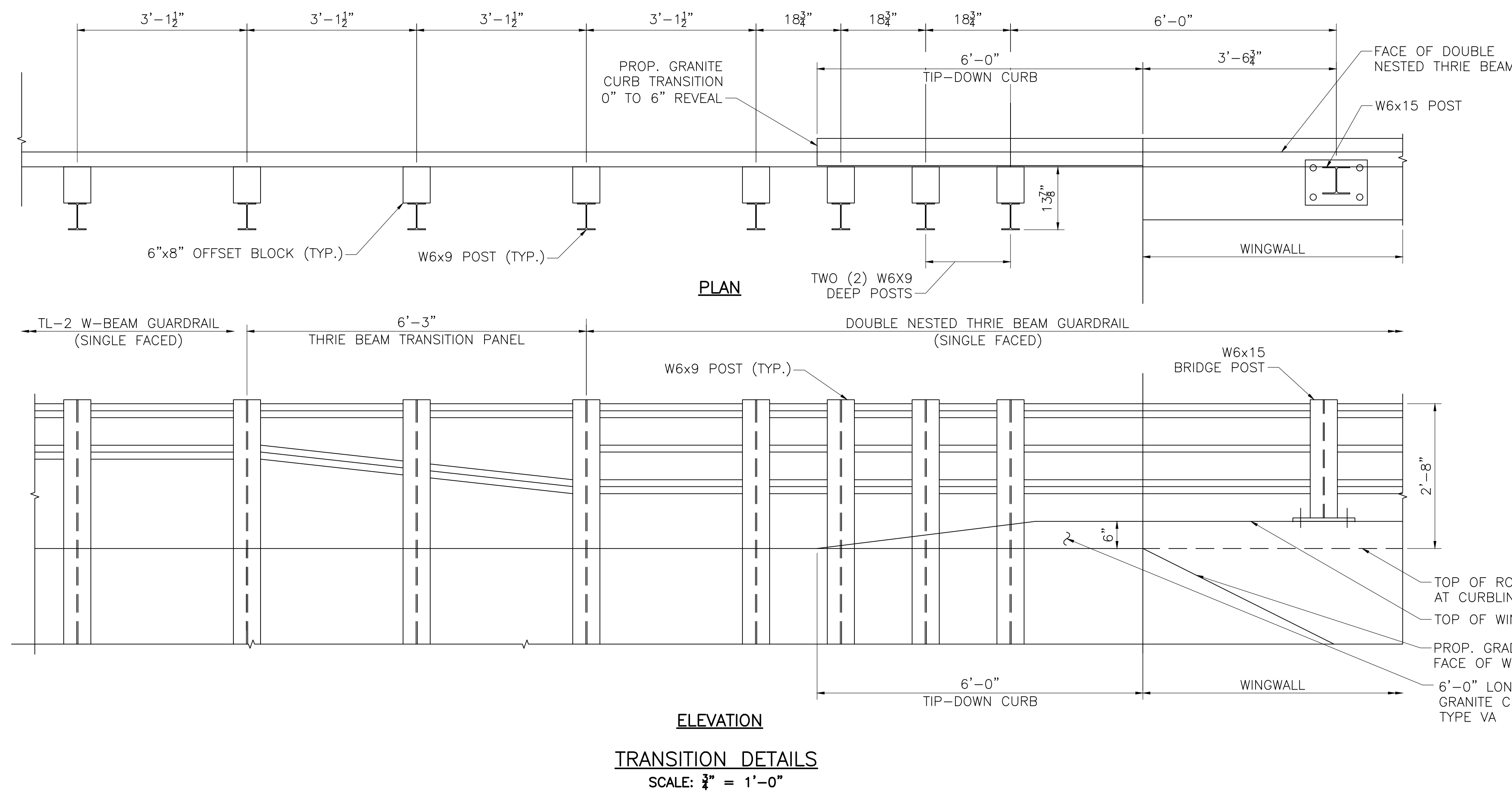
PROPOSED FULL DEPTH PAVEMENT OVER CULVERT:
SURFACE: 1 1/2" SUPERPAVE BRIDGE SURFACE COURSE - 12.5 (SSC-B-12.5) OVER
1 1/2" SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC - 12.5) OVER

SUBBASE: VARIABLE DEPTH GRAVEL FOR BACKFILLING STRUCTURES & PIPES.

PROPOSED FULL DEPTH PAVEMENT:
SURFACE: 1 1/2" SUPERPAVE BRIDGE SURFACE COURSE - 12.5 (SSC-B-12.5) OVER
1 1/2" SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC-12.5) OVER

SUBBASE: 12" GRAVEL BORROW, TYPE B OVER GRAVEL BURROW OR EXISTING MATERIAL MEETING TYPE B SPECIFICATIONS

PROPOSED PAVEMENT MILLING TRANSITION:
SURFACE: 1 1/2" SUPERPAVE BRIDGE SURFACE COURSE - 12.5 (SSC-B-12.5) OVER
1 1/2" PAVEMENT MILLING



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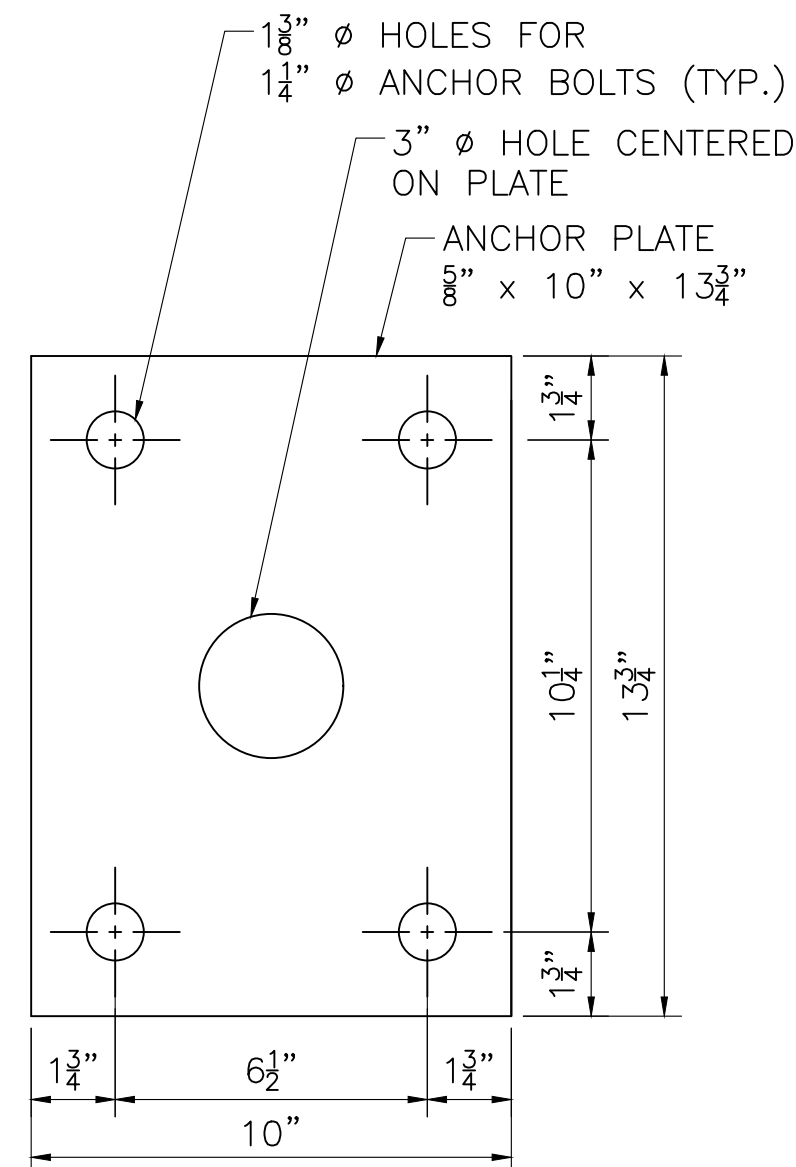
DISTRICT III BRIDGE ENGINEER

DATE

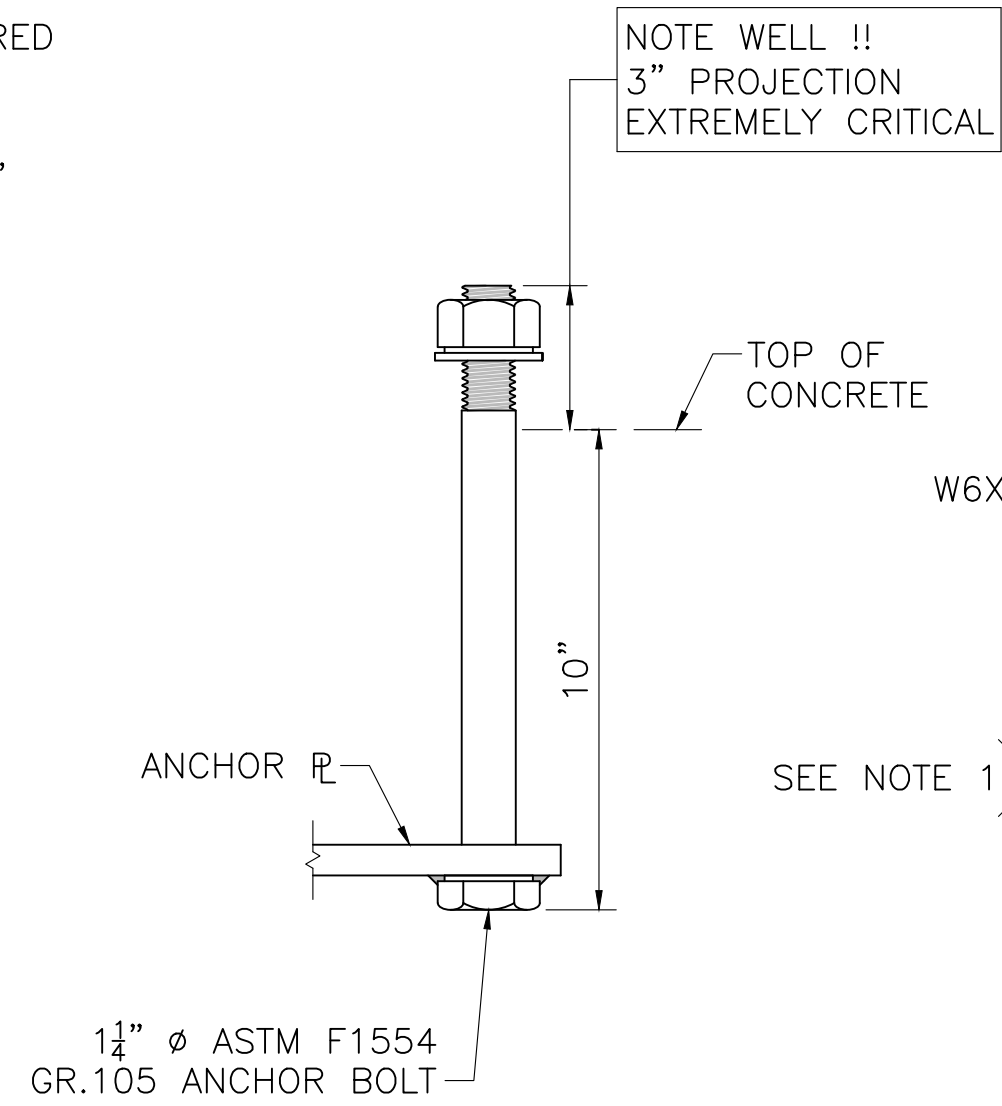
**FRANKLIN
SOUTH STREET**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	10	17
PROJECT FILE NO.		T1406	

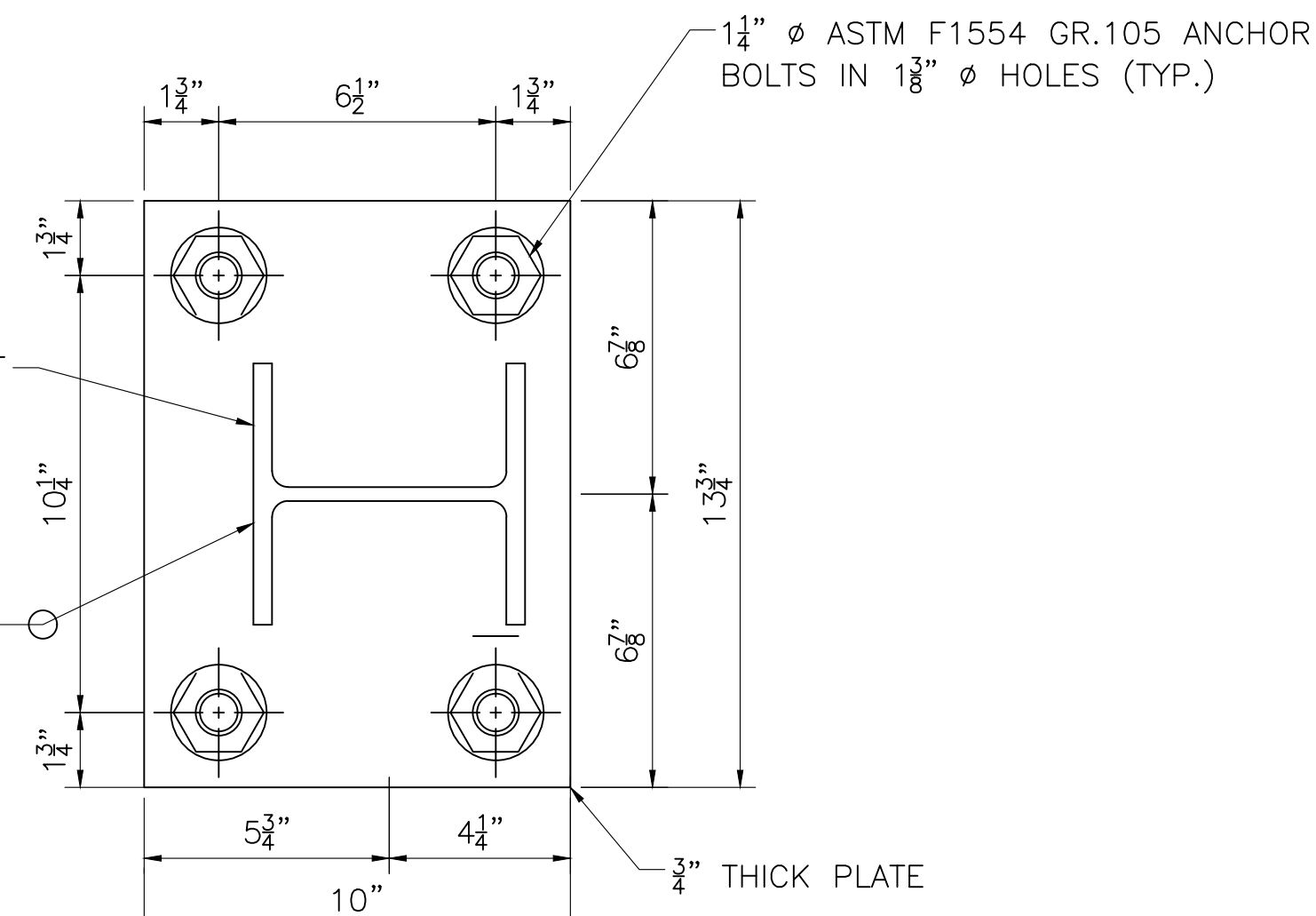
MISCELLANEOUS DETAILS (2 OF 5)



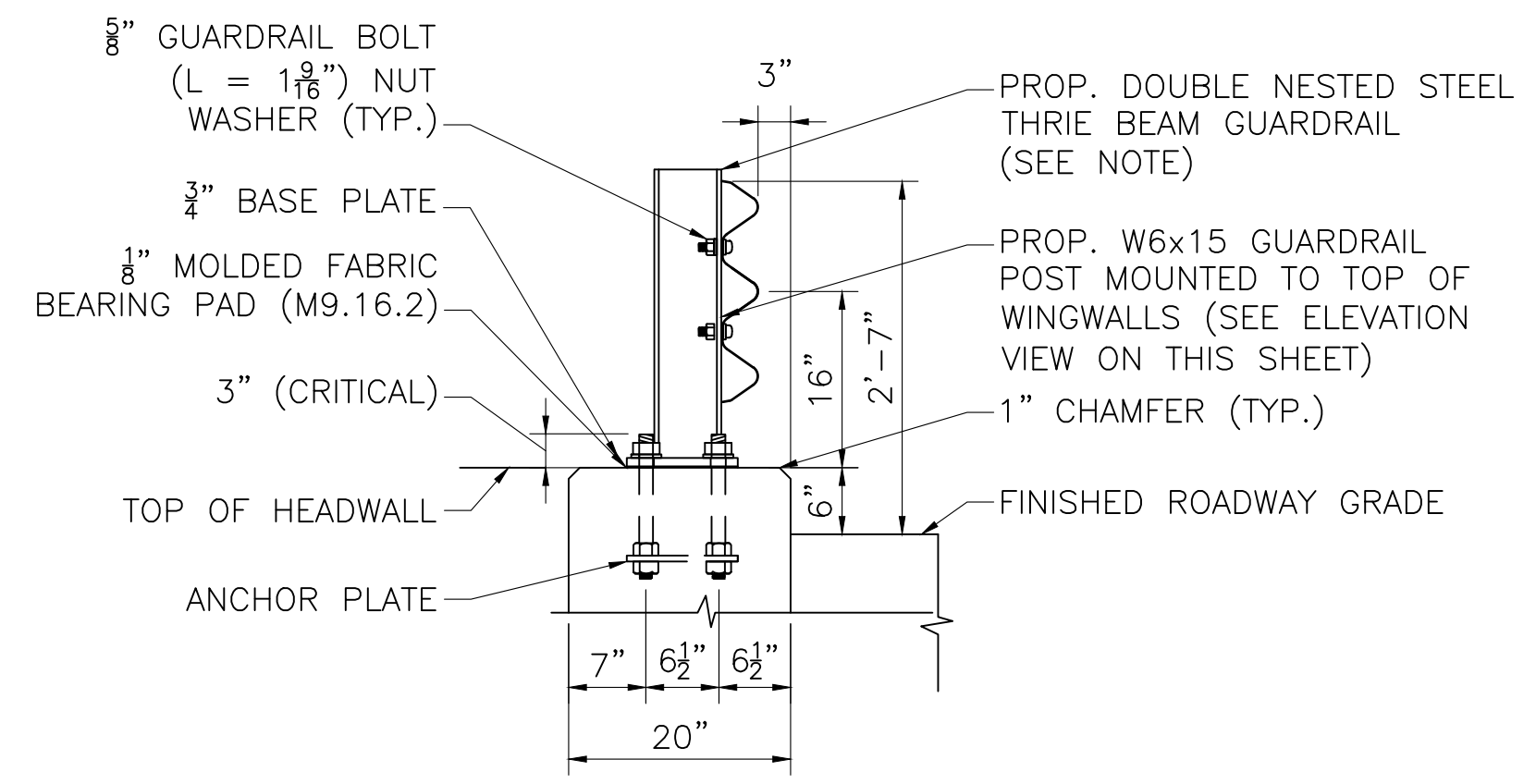
ANCHOR PLATE
SCALE: 3" = 1'-0"



ANCHOR BOLT
SCALE: 3" = 1'-0"

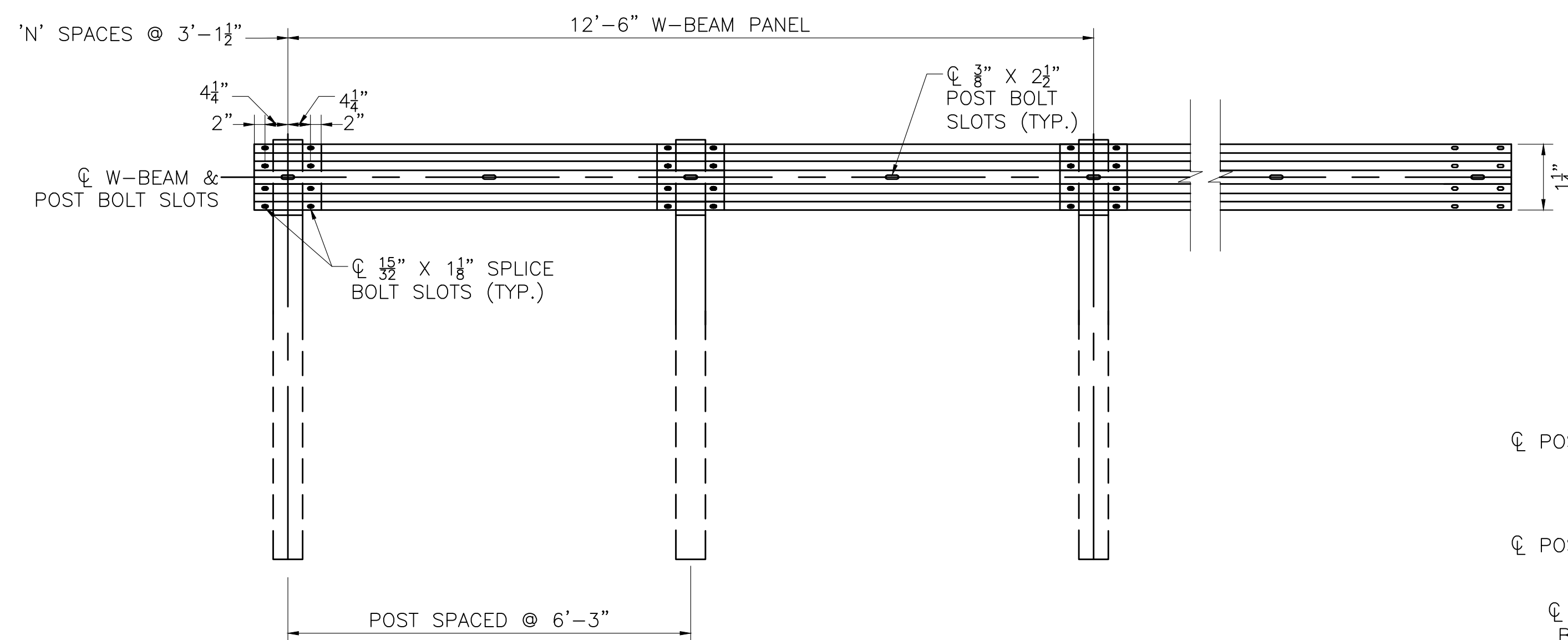


BASE PLATE
SCALE: 3" = 1'-0"

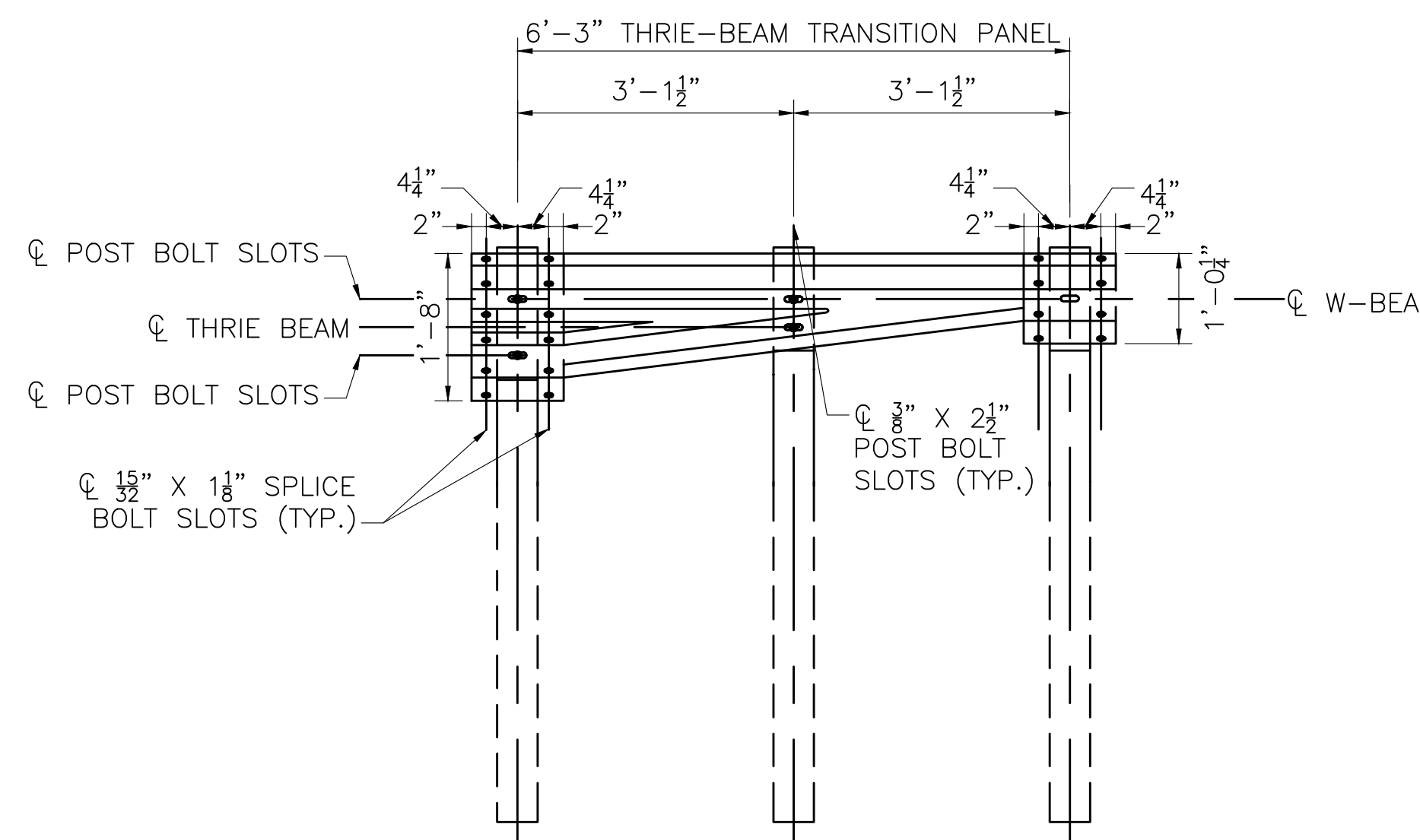


- NOTES:**
- REFER TO MASSDOT CONST. STD. DETAILS 400.1.0, 400.1.2 AND 400.1.3 FOR ADDITIONAL INFORMATION REGARDING THE THRIE BEAM GUARDRAIL AND HARDWARE DETAILS.
 - SEE BASE PLATE, ANCHOR PLATE AND ANCHOR BOLT DETAILS ON THIS SHEET FOR ADDITIONAL INFORMATION.

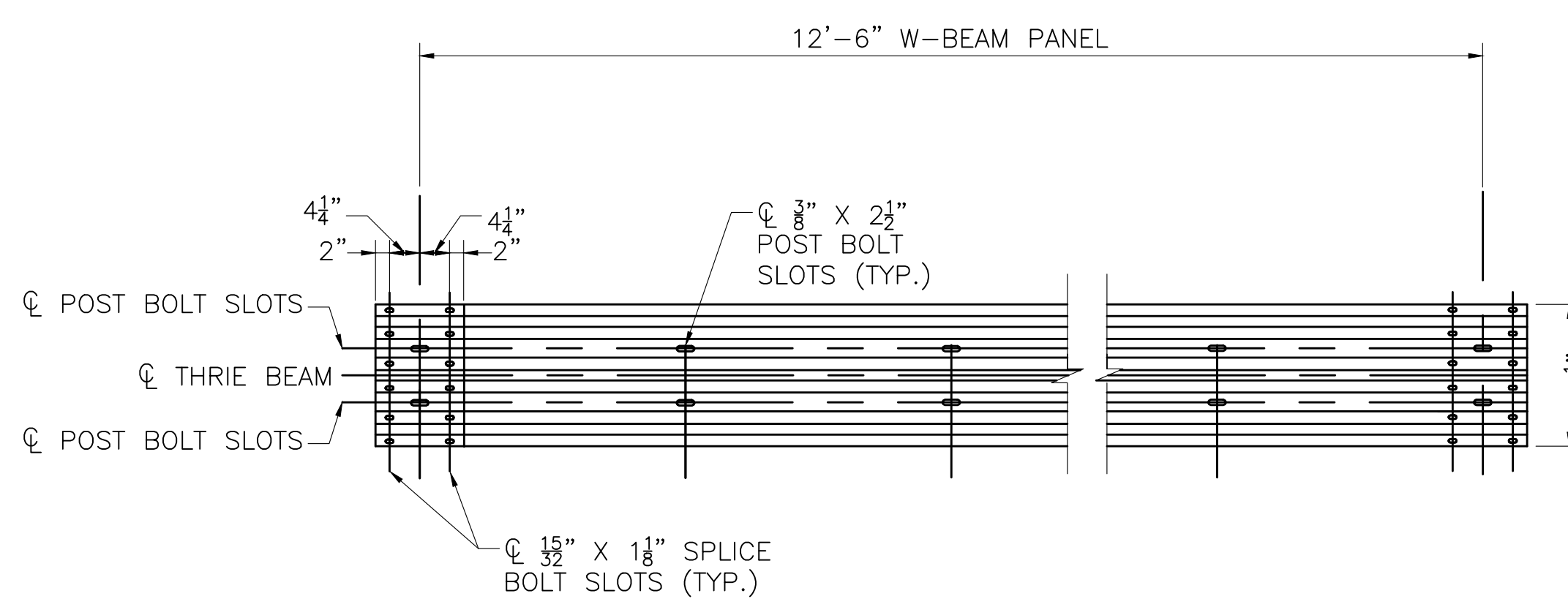
GUARDRAIL SECTION ATTACHED TO HEADWALL/WINGWALL
SCALE: 3/4" = 1'-0"



W-BEAM PANEL ELEVATION
SCALE: 1" = 20'



THRIE-BEAM TRANSITION PANEL ELEVATION
SCALE: 1" = 20'



THRIE-BEAM PANEL ELEVATION
SCALE: 1" = 20'

THRIE BEAM NOTES:

- ALL STEEL CONNECTING BOLTS AND FASTENERS FOR POSTS SHALL CONFORM TO ASTM A325 TYPE III. ANCHOR BOLTS SHALL CONFORM TO ASTM F1554, GRADE 105.
- RAIL POSTS AND ANCHOR PLATES SHALL BE SEATED ON MOLDED FABRIC BEARING PADS OR HALF PADS MAY BE USED IN SHIMMING FOR ALIGNMENT.
- RAIL POSTS SHALL BE SET PERPENDICULAR TO ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION, EXCEPT THAT THE RAIL POSTS SHALL BE ALIGNED BY THE USE OF SHIMS SO THAT IN THE FINAL ADJUSTMENT NO PART SHALL DEVIATE MORE THAN ONE HALF INCH FROM TRUE HORIZONTAL ALIGNMENT. THE SHIMS SHALL BE 3"x1 1/2" AND PLACED BETWEEN THE POST AND THE THRIE BEAM RAIL. THE THICKNESS OF THE SHIMS SHALL BE DETERMINED BY THE CONTRACTOR AND SHOWN IN THE SHOP DRAWINGS FOR APPROVAL BY THE ENGINEER BEFORE ORDERING MATERIAL FOR THIS WORK.
- MINIMUM LENGTH OF THE THRIE BEAM SECTIONS IS EQUAL TO TWO POST SPACES.
- THRIE BEAM GUARDRAIL STEEL SHALL BE GALVANIZED AND CONFORM TO THE AASHTO M180, CLASS B, TYPE IV AND SHALL BE 10 GAGE THICK. USE OF 12 GAGE THICK THRIE BEAM IS EXPRESSLY FORBIDDEN.
- POSTS, HAND RAIL STEEL, ANCHOR PLATES AND BASE PLATES SHALL BE FABRICATED FROM STEEL CONFORMING TO AASHTO M270 GRADE 50 STEEL. ALL STEEL TO BE GALVANIZED.
- SPECIAL DRILLING OF THE THRIE BEAM MAY BE REQUIRED AT THE SPLICES. ALL DRILLING DETAILS ARE TO BE SHOWN ON THE SHOP DRAWINGS.
- PLACE A REFLECTORIZED DELINEATOR IN THE UPPER VALLEY OF THRIE BEAM EVERY THIRD POST.
- DETAILS ARE SHOWN FOR THE STEEL THRIE BEAM HIGHWAY GUARD TO BE INSTALLED ALONG THE HEADWALL AND WINGWALLS.

GUARDRAIL NOTES:

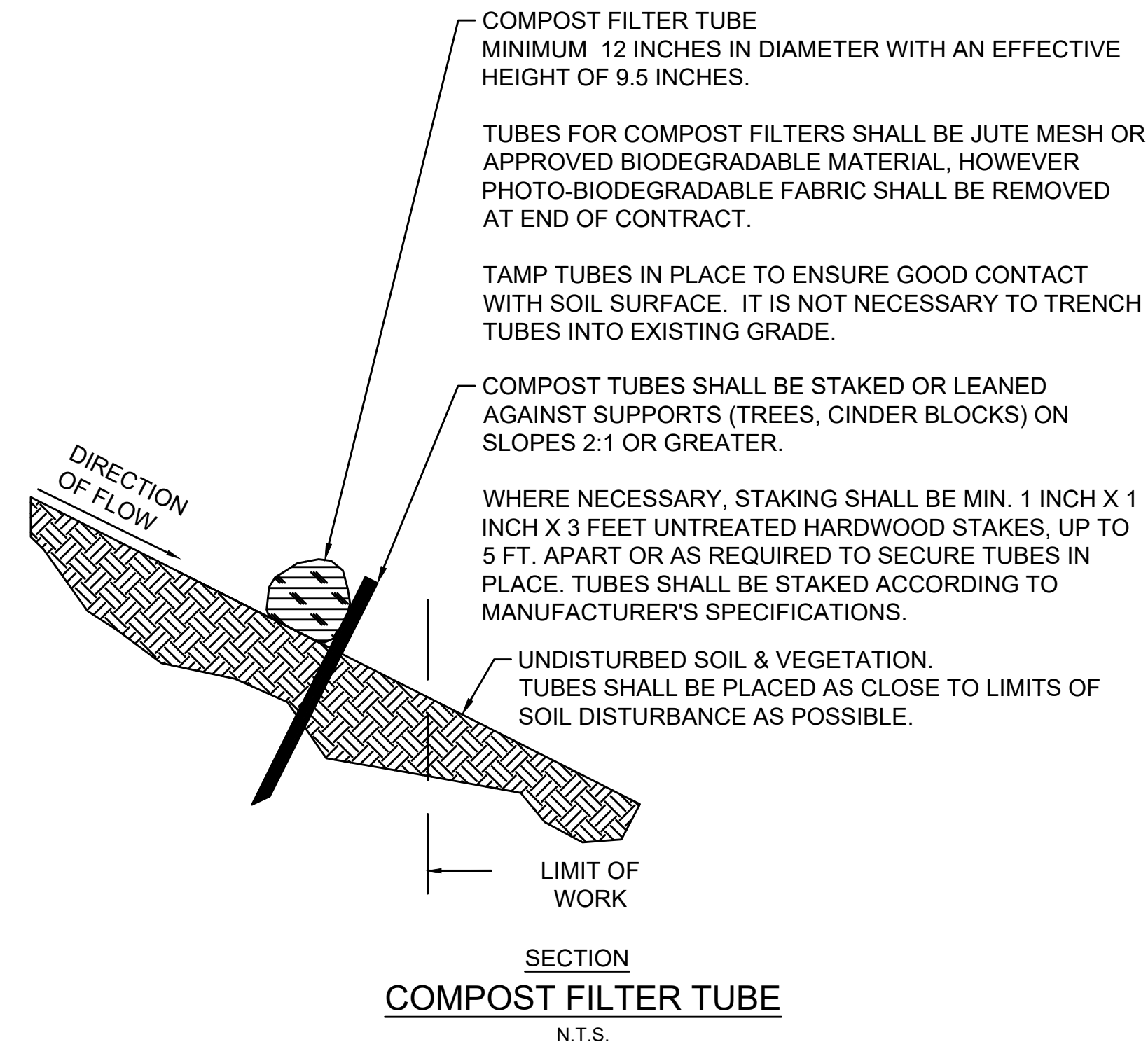
- GUARDRAIL BASE PLATES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M270 GRADE 50.
- ANCHOR BOLTS SHALL BE SET WITH TEMPLATES. THE NUT SECURING THE POST BASE PLATE TO THE CONCRETE SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL 1/8 TURN AFTER STEEL IS IN PLACE.
- THRIE-BEAM DETAILS, EXCEPT ATTACHMENT TO WINGWALLS, SHALL BE STANDARD RELEVANT TO MASSDOT CONSTRUCTION STANDARDS.
- ALL GUARDRAIL ELEMENTS AND END TREATMENTS SHALL BE PAINTED TO RESEMBLE CORTEN STEEL. REFER TO SPECIAL PROVISIONS (NO. 634.1, 627.1, AND 627.82) FOR ADDITIONAL INFORMATION.

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CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING

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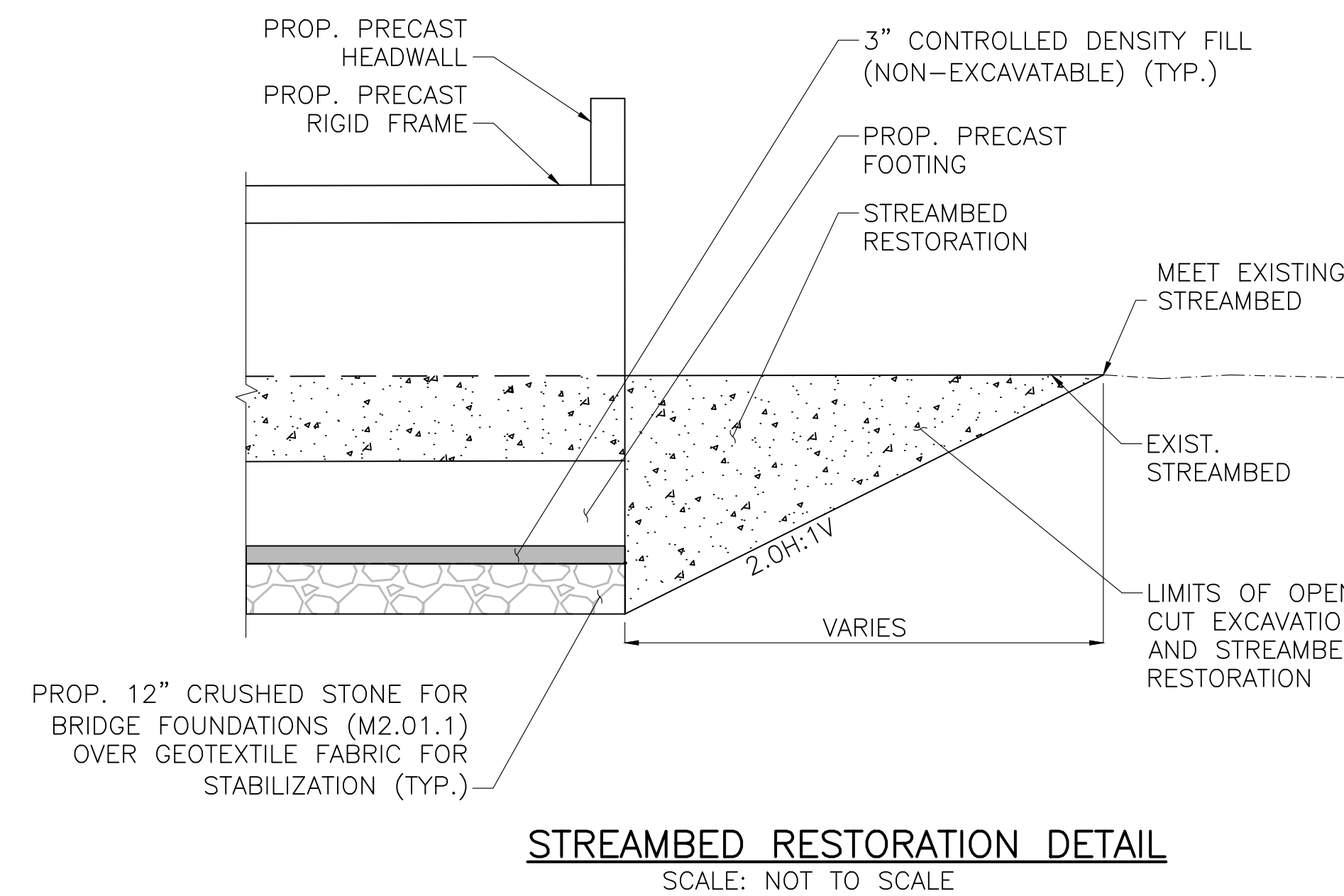
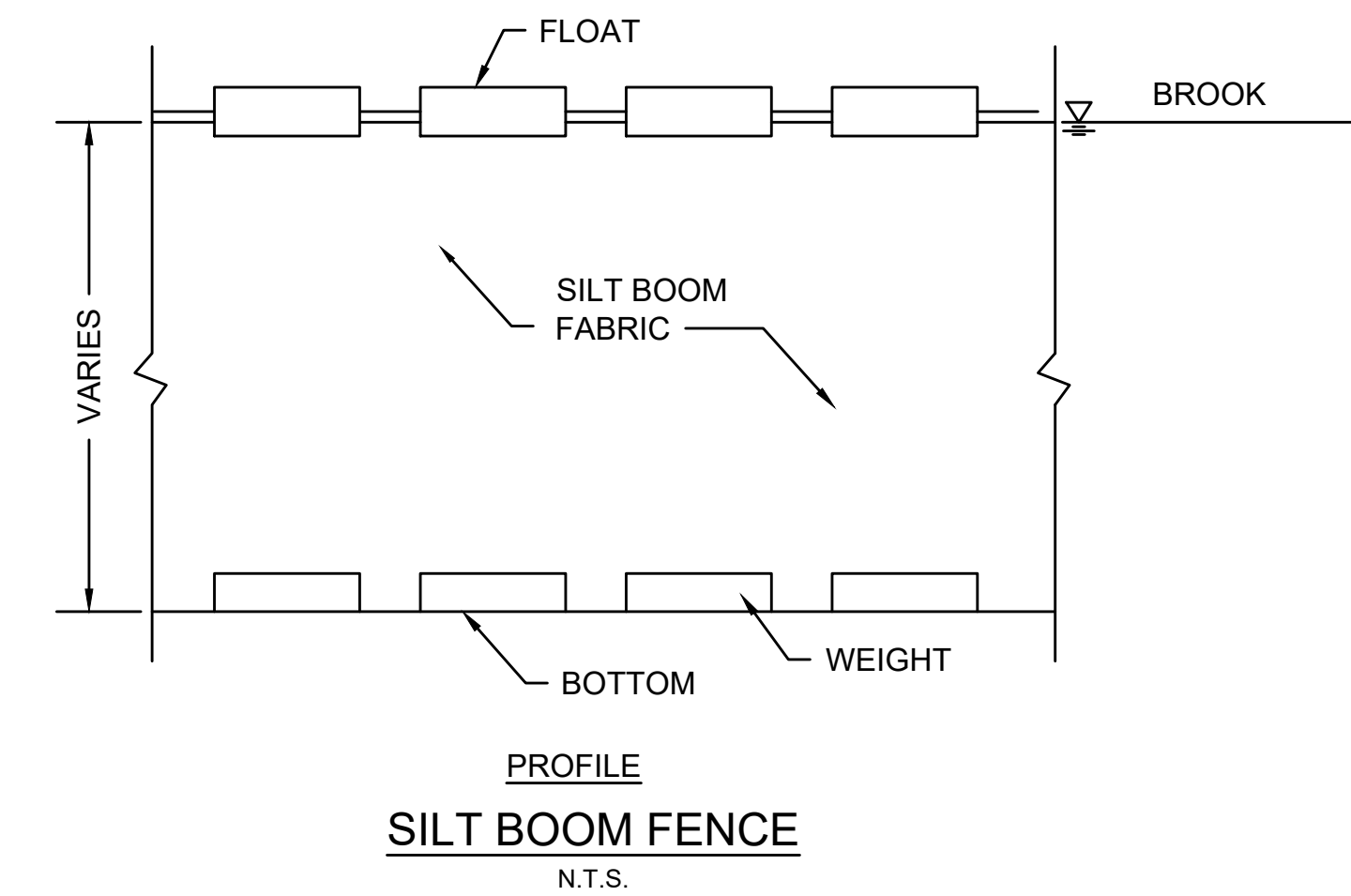
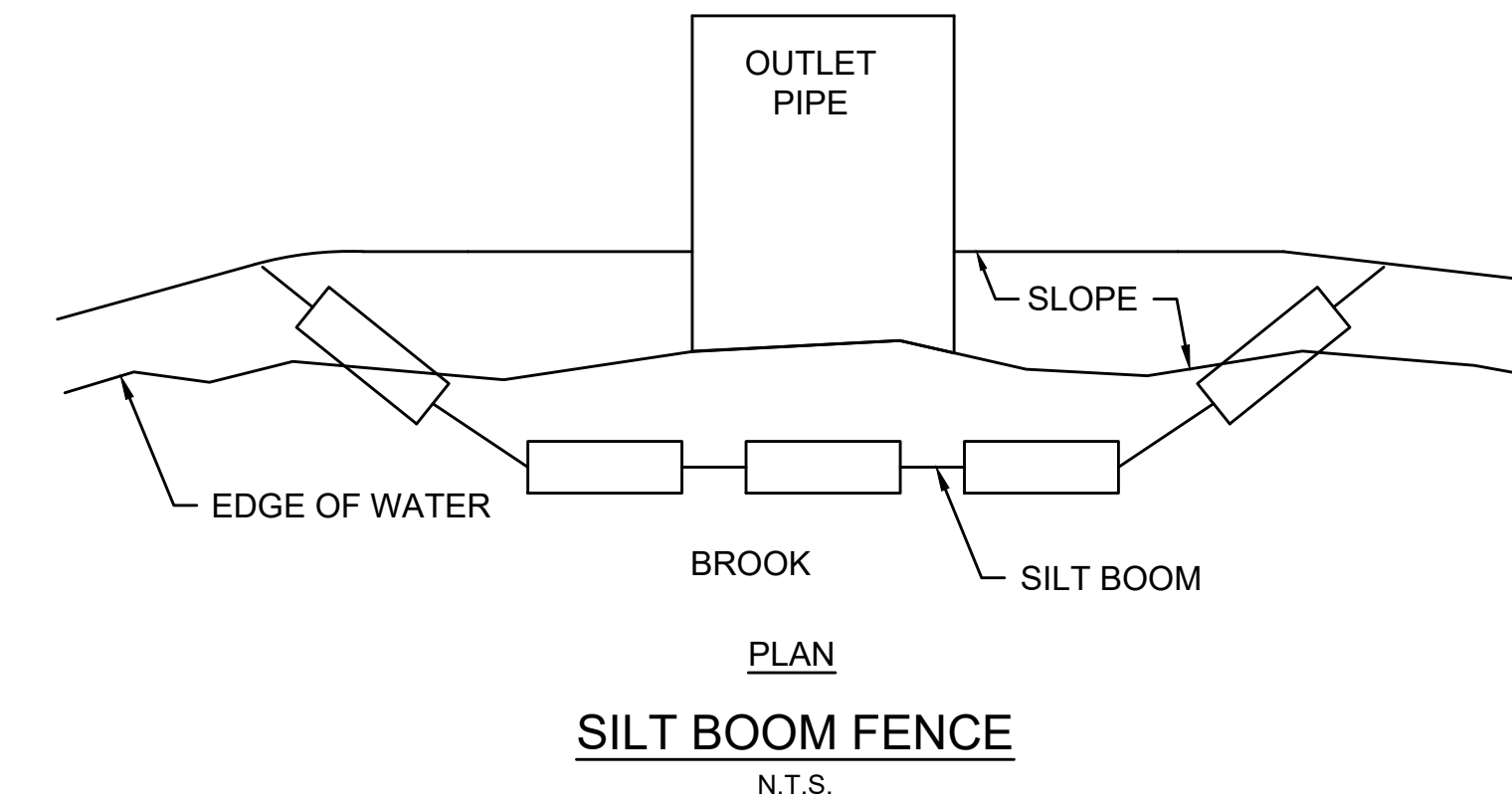
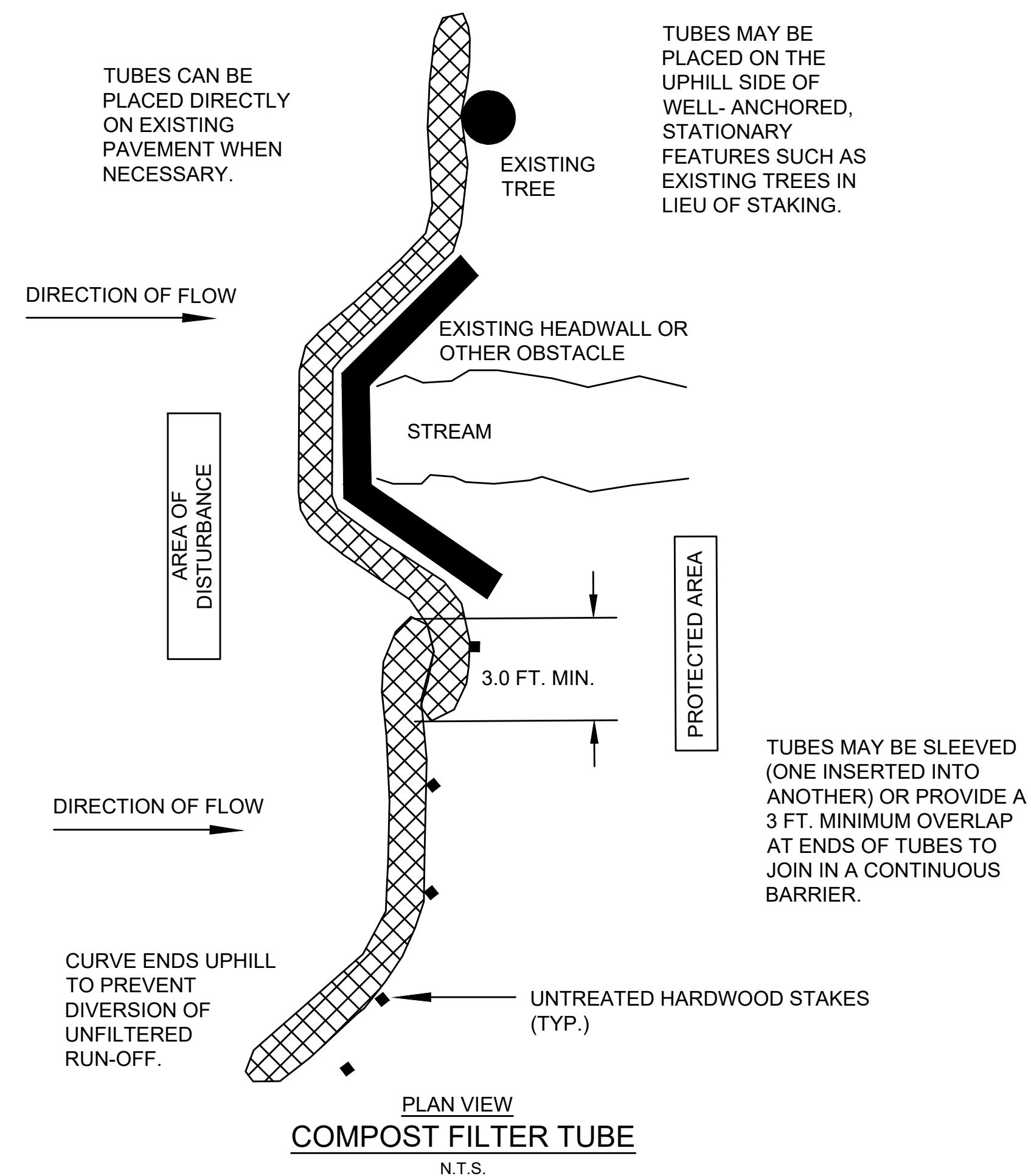
DATE

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NOTES:

1. PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES FOR SLOPES UP TO 50 FEET IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
3. TUBE LOCATION MAY BE SHIFTED TO ADJUST TO LANDSCAPE FEATURES, BUT SHALL PROTECT UNDISTURBED AREA AND VEGETATION TO MAXIMUM EXTENT POSSIBLE.
4. DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS.
5. ADDITIONAL TUBES SHALL BE USED AT THE DIRECTION OF THE ENGINEER.
6. ADDITIONAL STAKING SHALL BE USED AT THE DIRECTION OF THE ENGINEER.



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DISTRICT III BRIDGE ENGINEER

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**FRANKLIN
SOUTH STREET**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	12	17
PROJECT FILE NO.			T1406

MISCELLANEOUS DETAILS (4 OF 5)

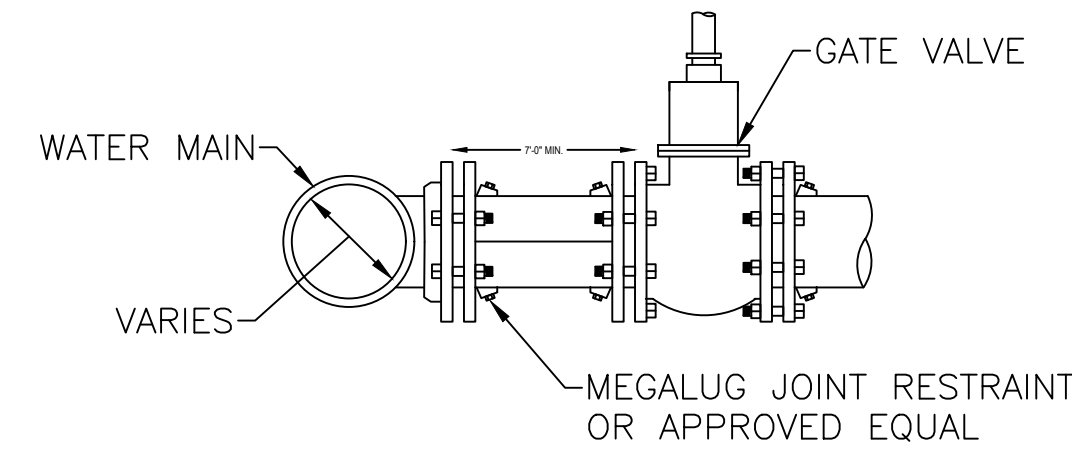
NOTES:

- 1) HYDRANT SHALL BE SET ON FLAT STONE
- 2) THRUST BLOCKS SET ON UNDISTURBED SOIL AT HYDRANT AND ANCHOR TEE
- 3) PLACE 1/2 CUBIC YARD OF 3/4" STONE AT HYDRANT BASE
- 4) PLACE SOLID CONCRETE BLOCK ON UNDISTURBED EARTH ON ALL THREE SIDES OF HYDRANT BASE
- 5) ALL HYDRANTS SHALL HAVE RETAINER GLANDS

MINIMUM LENGTH OR PIPE TO BE RESTRAINED IN THE REQUIRED DIRECTION (IN FEET)
BASED ON DUCTILE IRON PIPE WITH A 150 PSI TEST PRESSURE BURIED 5' IN UNIFIED SOIL CLASSIFICATION SM

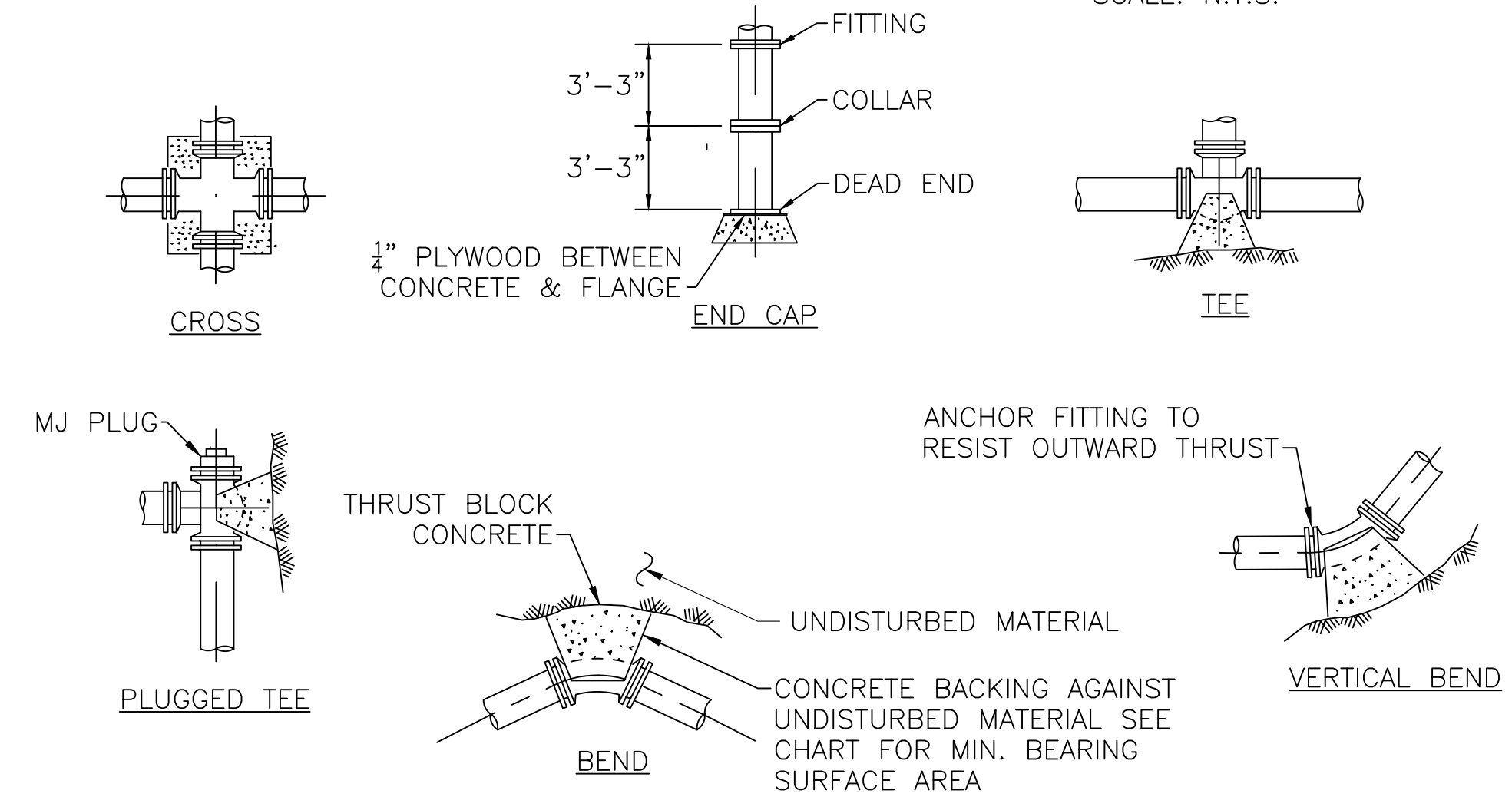
PIPE SIZE (INCHES)	1/4 BEND	1/2 BEND	3/4 BEND	TEES	PLUGS & CAPS
6	16.0	7.0	3.0	29.0	29.0
8	21.0	9.0	4.0	29.0	38.0
10	26.0	11.0	5.0	38.0	46.0
12	33.0	14.0	6.0	48.0	69.0
16	42.0	17.0	8.0	57.0	89.0

*LENGTHS SHOWN ARE FOR THE TEE BRANCH. THE REQUIRED LENGTH OF RESTRAINT FOR THE TEE RUN IS 18 FEET



MECHANICAL JOINT RESTRAINT

SCALE: N.T.S.



AREA OF BEARING FACE ON CONCRETE THRUST BLOCKS IN SQUARE FEET
*BASED ON 250 PSI AND 1.5 TON/SF ALLOWABLE SOIL BEARING CAPACITY

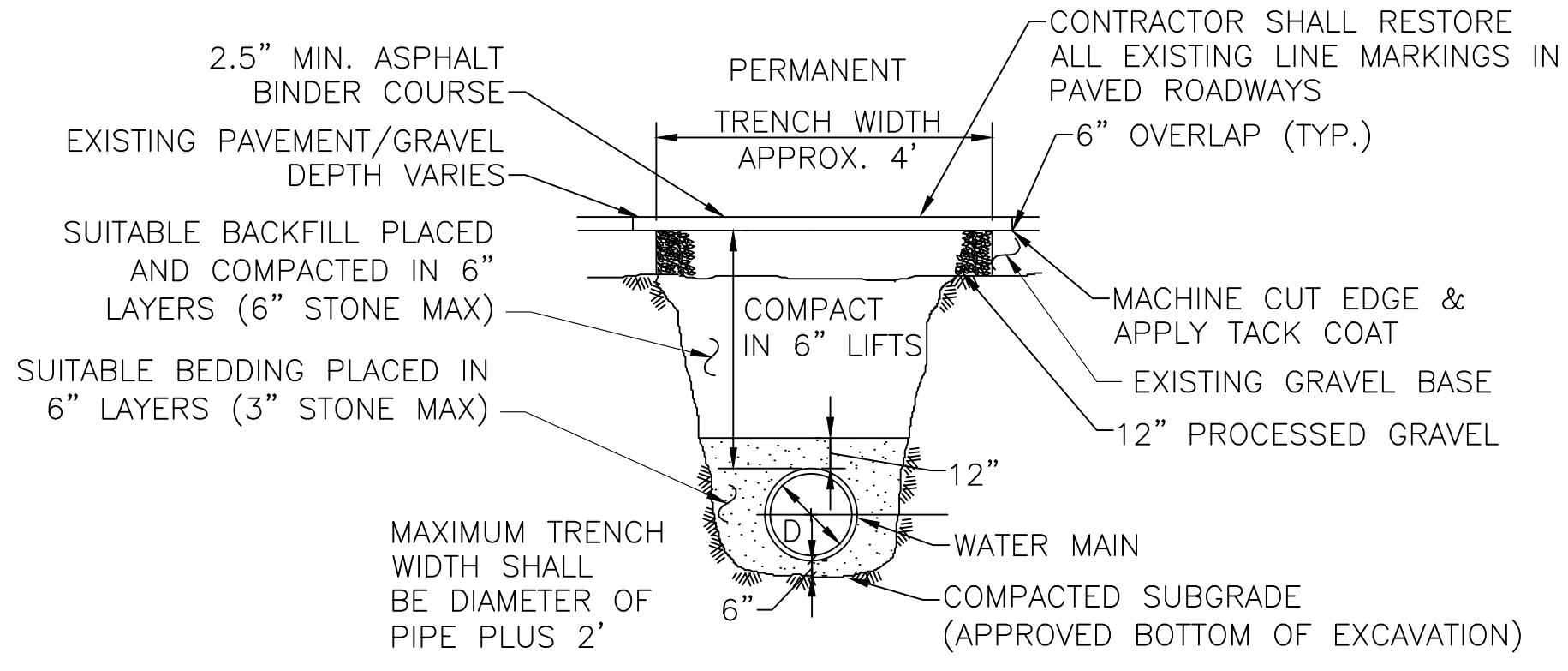
PIPE SIZE (INCHES)	1/4 BEND	1/2 BEND	3/4 BEND	PLUGS & TEES
4,6,8	6.0	3.3	1.6	5.2
10	9.6	5.2	2.3	9.0
12	13.3	7.2	3.7	11.7
16	24.0	12.3	6.4	17.0

NOTES:

- 1) CONCRETE SHALL BE 8,000 PSI MINIMUM AT 28 DAYS
- 2) THRUST BLOCKS SHALL BE PLACED AGAINST UNDISTURBED EARTH
- 3) ALL FITTINGS SHALL BE SUPPORTED IN CONCRETE
- 4) FOR FIRE HYDRANT THRUST BLOCK ARRANGEMENT SEE HYDRANT DETAIL
- 5) POURED CONCRETE SHALL NOT COME WITHIN 6" OF MECHANICAL JOINTS FOR FUTURE REPAIR AND REMOVAL
- 6) RETAINER GLANDS REQUIRED ON ALL FITTINGS
- 7) COST OF CAST-IN-PLACE CONCRETE INCIDENTAL TO WATER LINE WORK

TYPICAL CONCRETE BACKING AREA

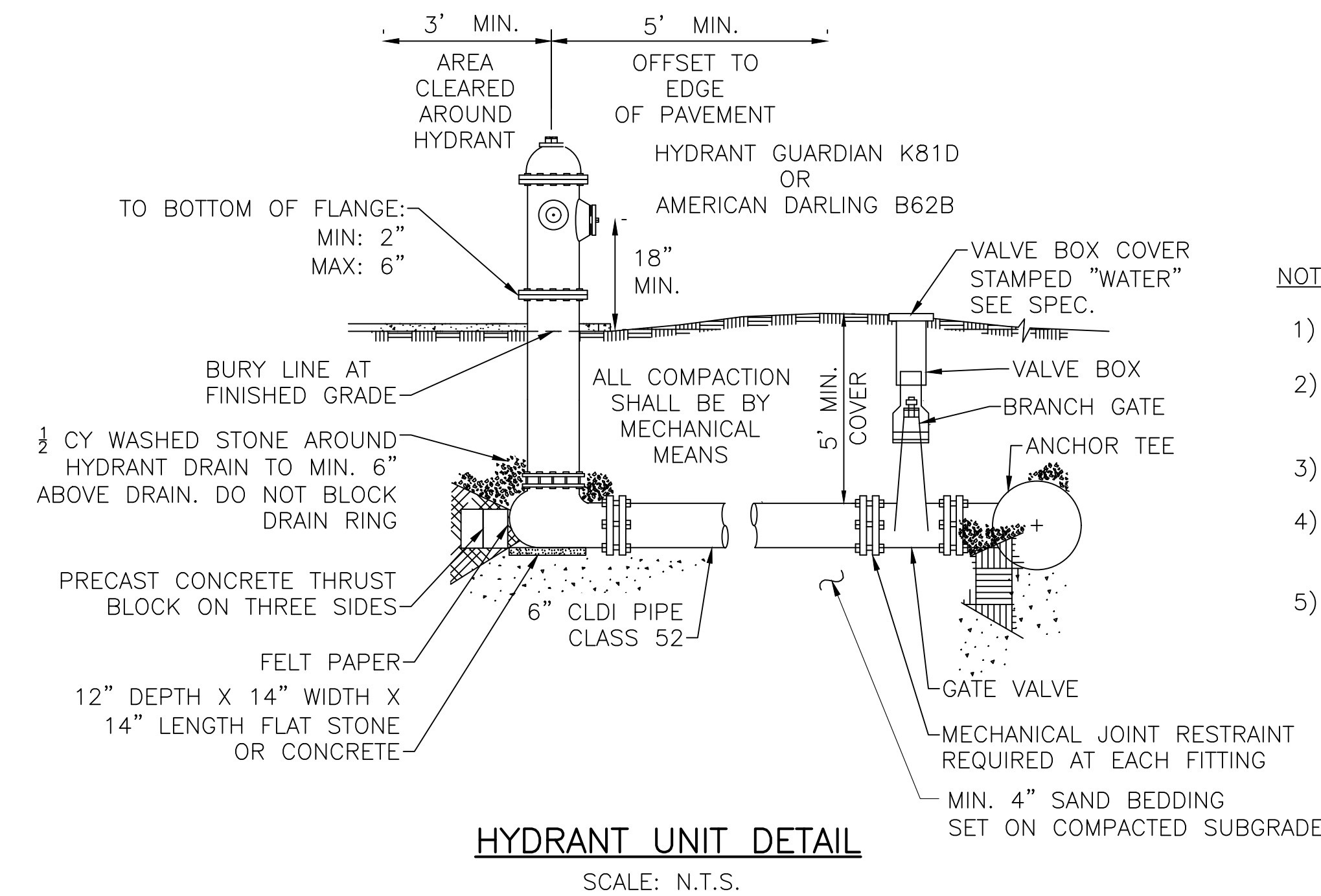
SCALE: N.T.S.



WATER MAIN TRENCH

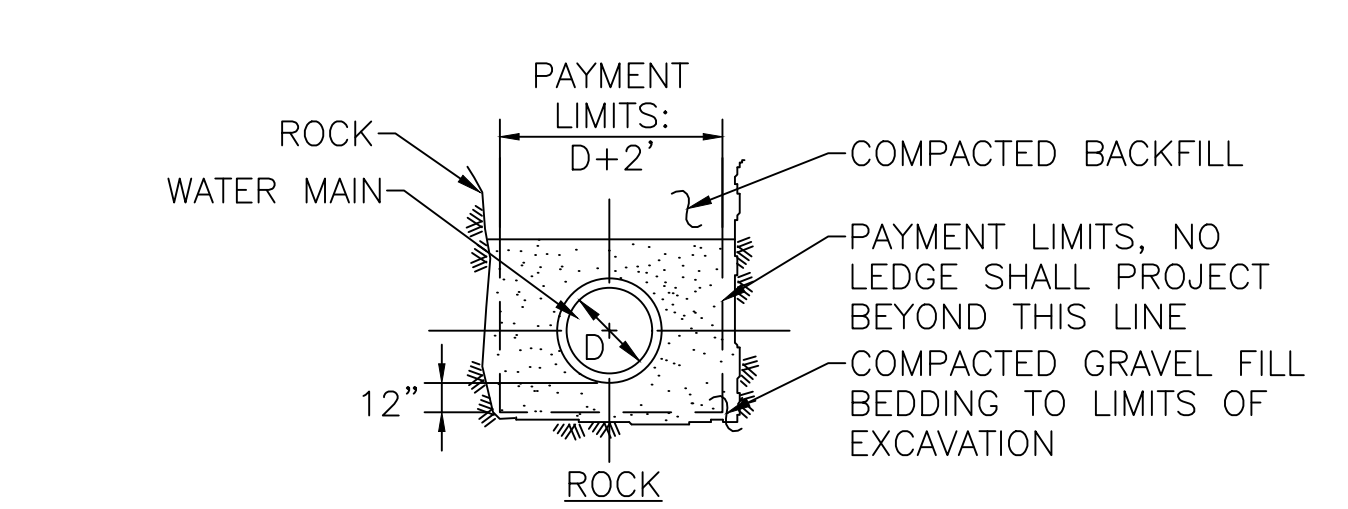
SCALE: N.T.S.

NOTE: TRENCH WIDTH MAY VARY BASED ON FIELD CONDITIONS.



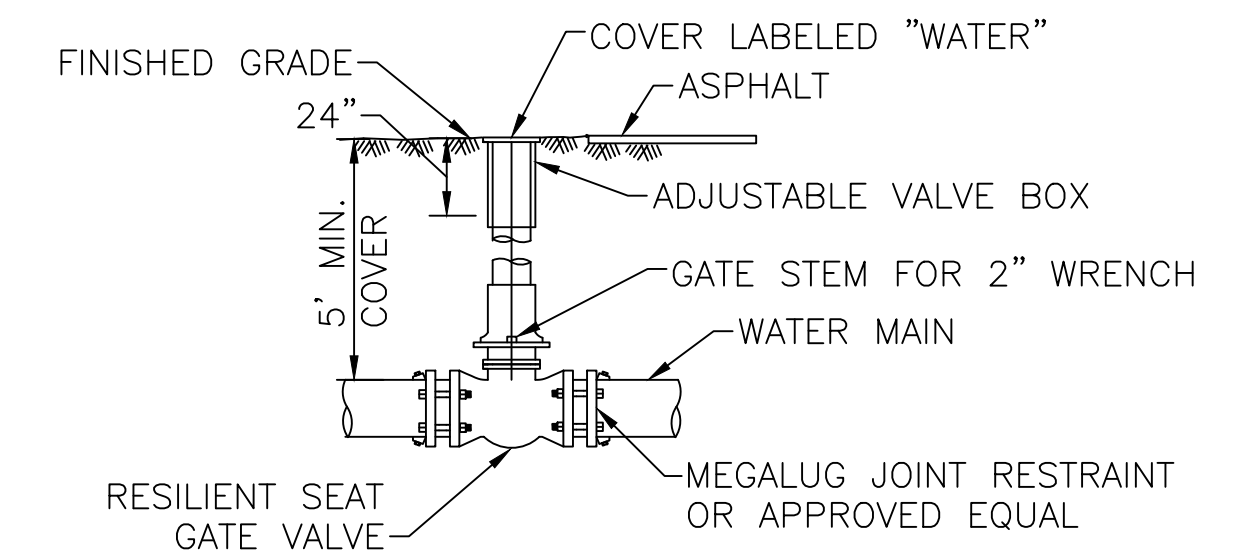
HYDRANT UNIT DETAIL

SCALE: N.T.S.



TYPICAL PIPE INSULATION

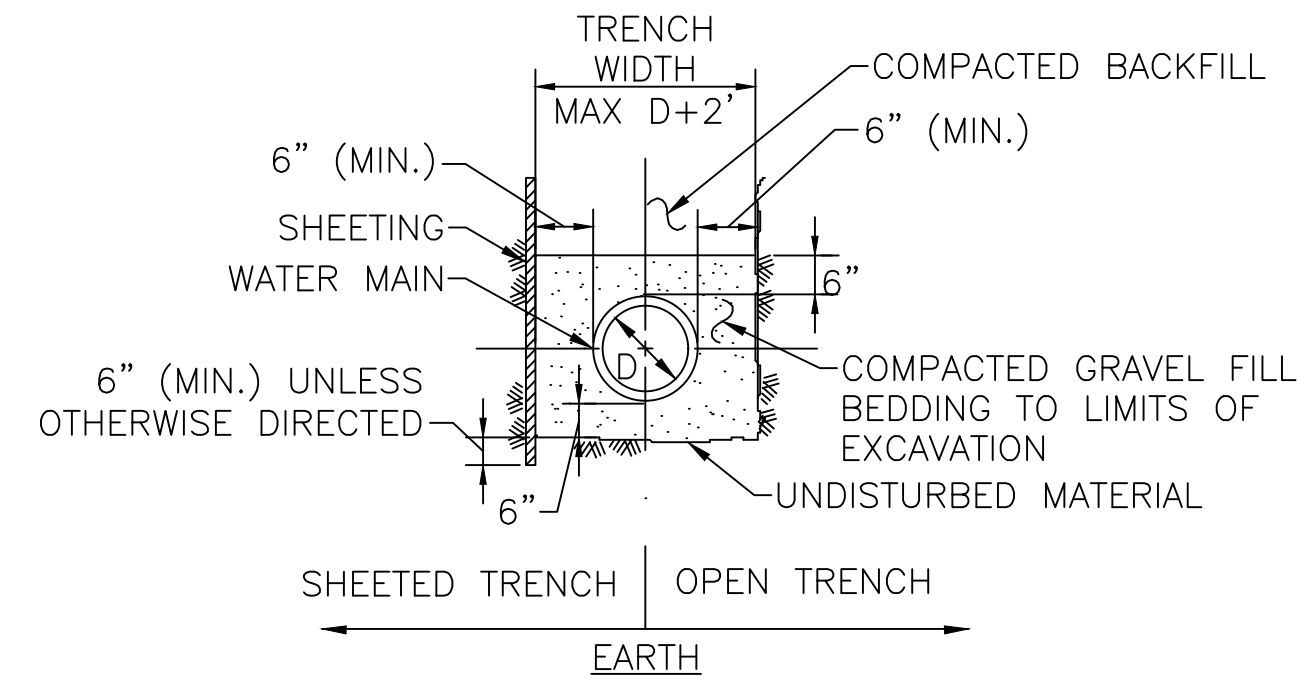
SCALE: N.T.S.



WATER GATE VALVE DETAIL

SCALE: N.T.S.

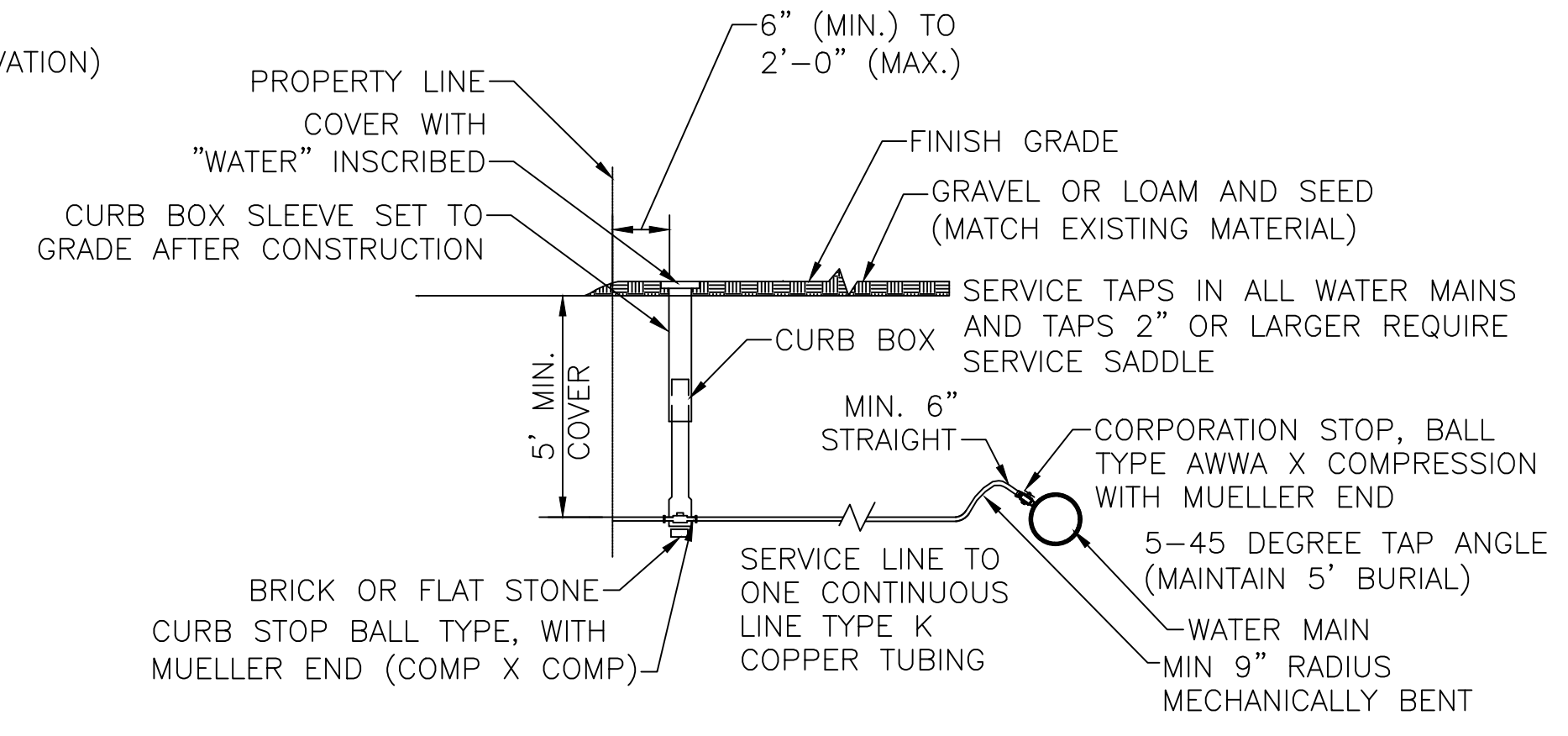
NOTE: ALL GATE VALVES SHALL BE RESTRAINED AS SPECIFIED



TYPICAL TRENCH SECTIONS

SCALE: N.T.S.

NOTE: MIN. DEPTH OF COVER ABOVE PIPE BARREL TO BE 5'



WATER SERVICE DETAIL

SCALE: N.T.S.

NOTES:

- 1) THE CONTRACTOR SHALL CONNECT NEW FINISH WATER SAMPLE TAPS TO EXISTING SAMPLE LINES. EXISTING WATER SAMPLE LINE MATERIALS AND DIAMETERS VARY
- 2) ALL STOPS/VALVES SHALL OPEN LEFT.
- 3) COPPER SHALL BE A CONTINUOUS LENGTH BETWEEN CORPORATION AND CURB STOP

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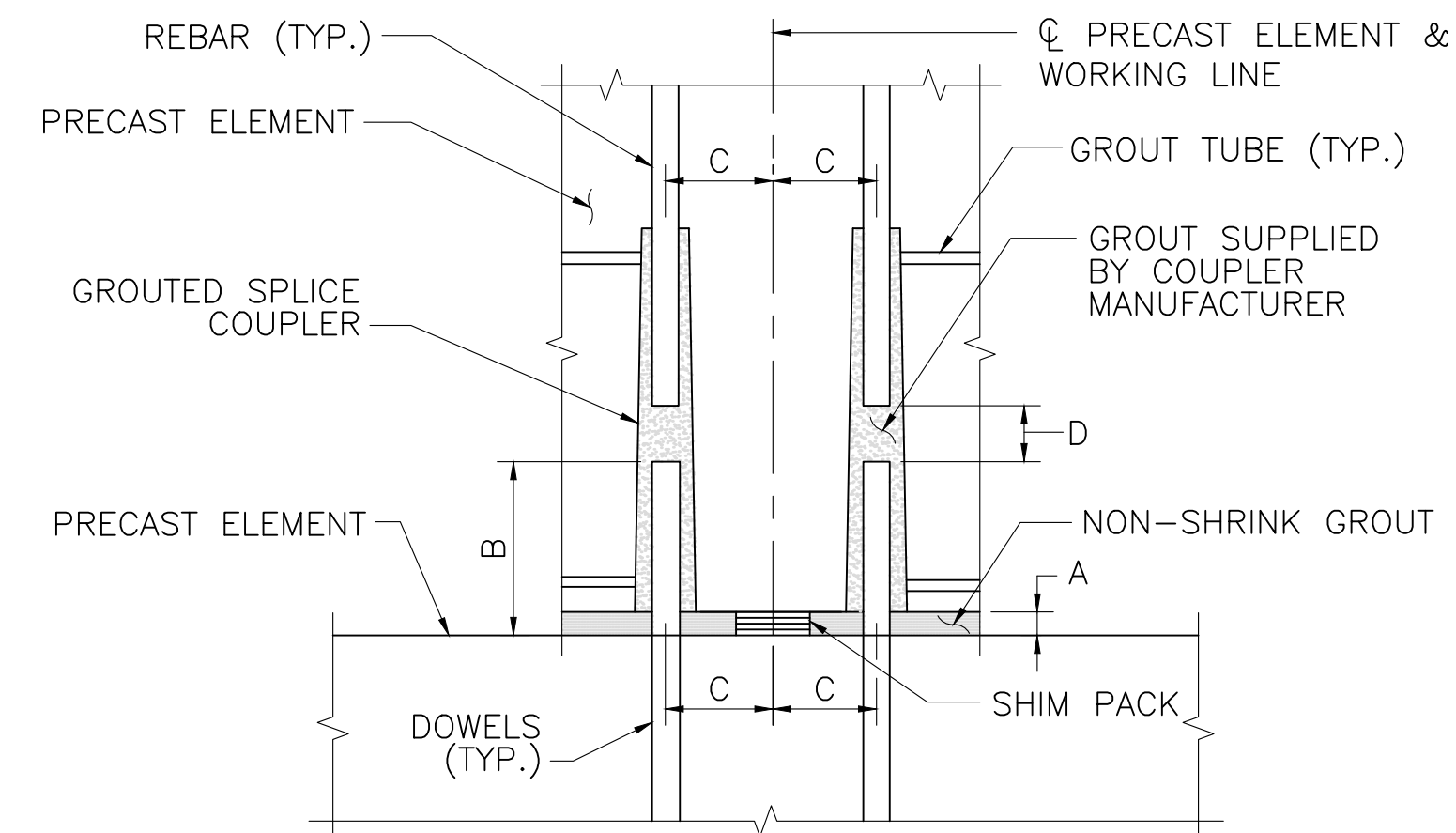
DISTRICT III BRIDGE ENGINEER _____ DATE _____

T1406_BRG-13_(MISCDETAILS)DWG Plotted on 15-Apr-2024 3:42 PM 2-April-2024 Ch. 85 Submission

**FRANKLIN
SOUTH STREET**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	13	17
PROJECT FILE NO.		T1406	

MISCELLANEOUS DETAILS (5 OF 5)



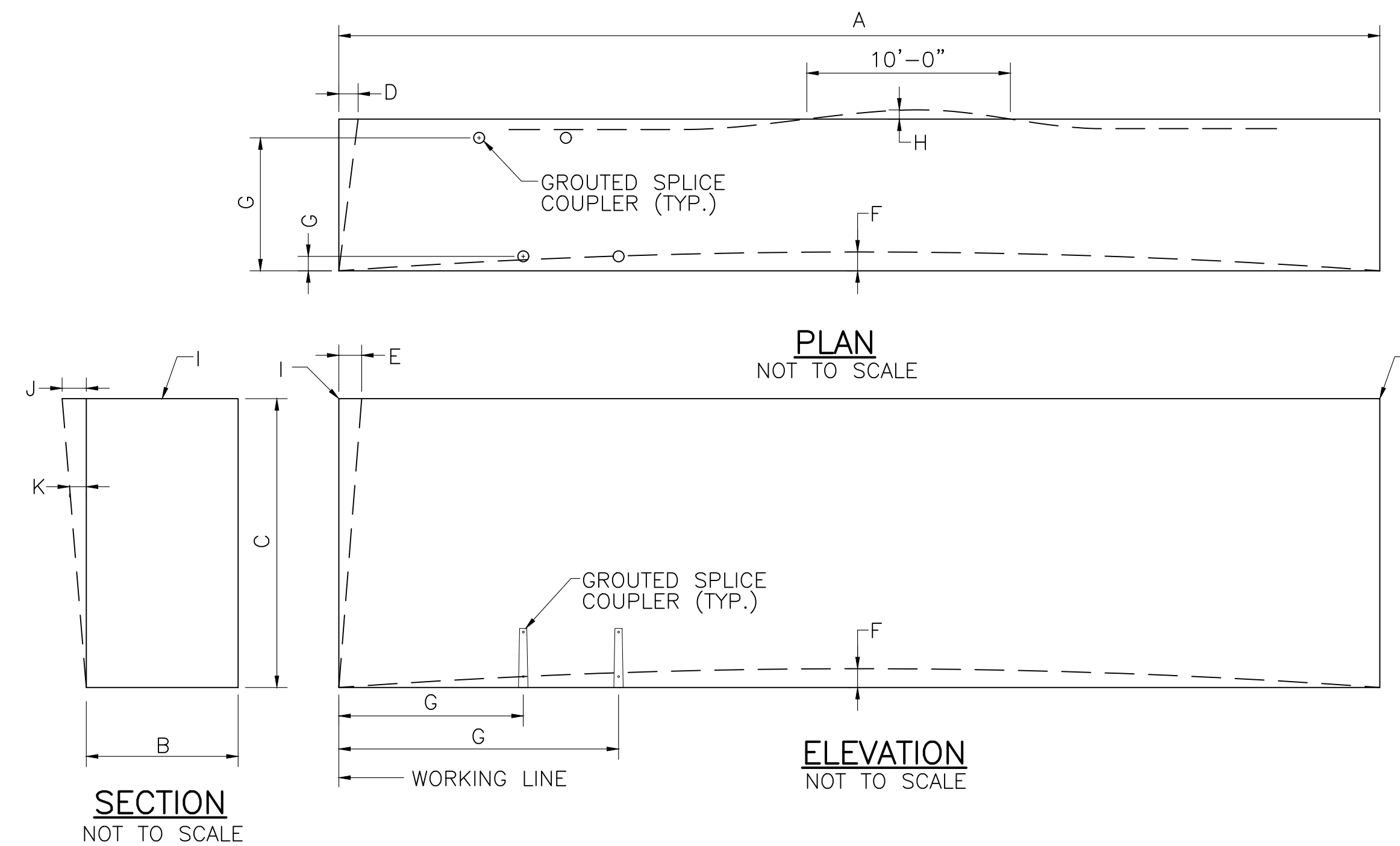
NOTES:

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

GROUTED SPLICE COUPLER DETAILS
NOT TO SCALE

GROUTED SPLICE COUPLER TOLERANCES

A	SHIM PACK HEIGHT	$1\frac{1}{2}'' \pm \frac{3}{8}''$
B	DOWEL HEIGHT	CONSULT MANUFACTURER
C	LOCATION OF REINFORCING, GROUTED SPLICE COUPLER, AND DOWELS MEASURED FROM A WORKING LINE	$\pm \frac{1}{4}''$
D	GAP BETWEEN DOWELS AND REINFORCING	CONSULT MANUFACTURER



WALL SEGMENT ELEVATION ERECTION TOLERANCES

I	TOP ELEVATION FROM NOMINAL TOP ELEVATION	$\frac{1}{4}''$
J	MAXIMUM PLUMB VARIATION OVER HEIGHT OF PANEL	$\frac{1}{2}''$
K	PLUMB IN ANY 10 FEET OF PANEL HEIGHT	$\frac{1}{4}''$

WALL SEGMENT FABRICATION TOLERANCES

A	LENGTH	$\pm \frac{1}{4}''$
B	WIDTH (OVERALL)	$\pm \frac{1}{4}''$
C	DEPTH (OVERALL)	$\pm \frac{1}{4}''$
D	VARIATION FROM SPECIFIED PLAN END SQUARENESS OR SKEW	$\pm \frac{1}{2}''$
E	VARIATION FROM SPECIFIED ELEVATION END SQUARENESS OR SKEW	$\pm \frac{1}{2}''$
F	SWEEP OVER MEMBER LENGTH	$\pm \frac{3}{8}''$
G	LOCATION OF GROUTED SPLICE COUPLER MEASURED FROM A WORKING LINE	$\pm \frac{1}{4}''$
H	LOCAL SMOOTHNESS OF ANY SURFACE	$\pm \frac{1}{4}''$ IN 10 FEET

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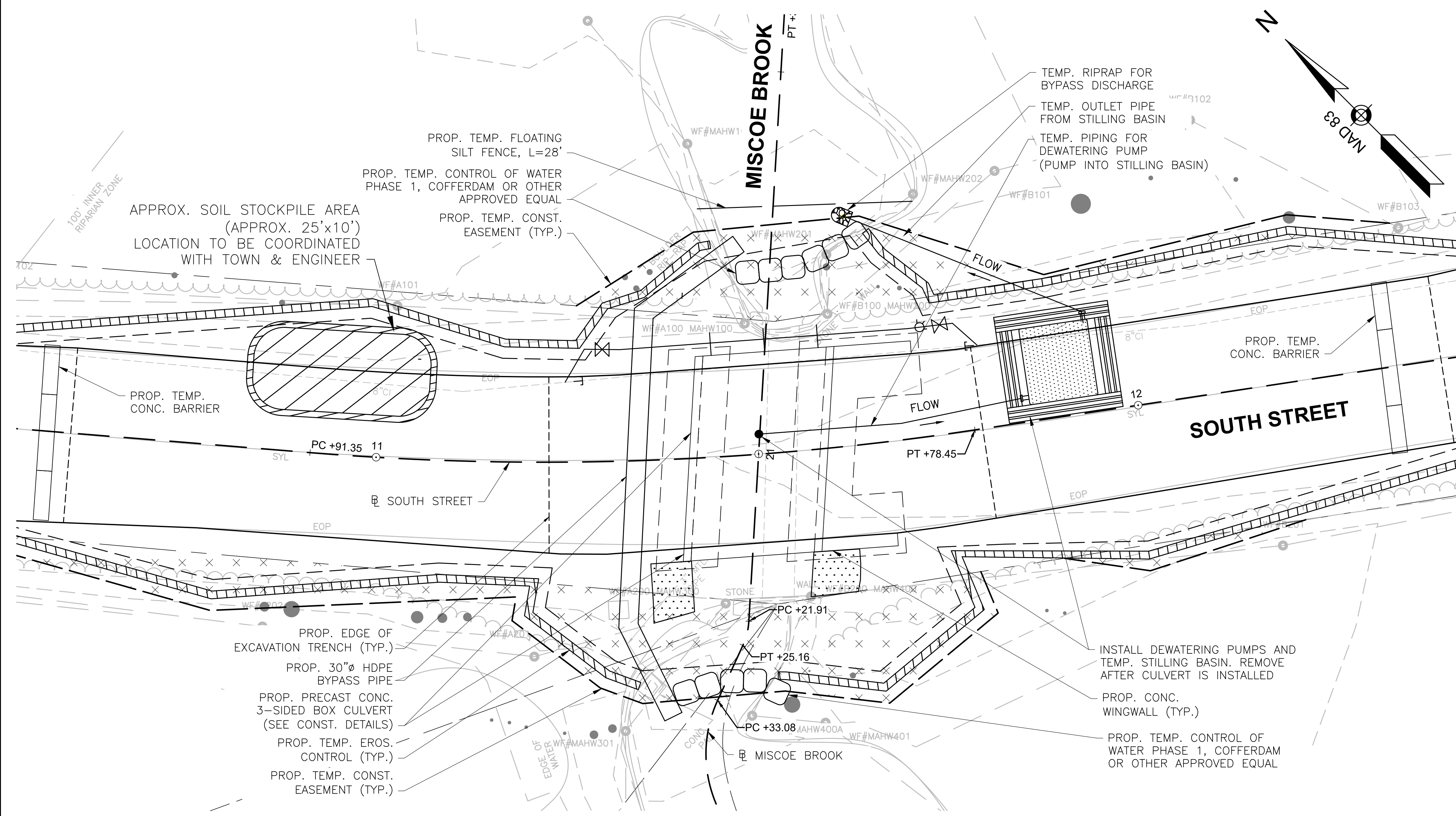
DISTRICT III BRIDGE ENGINEER

DATE

**FRANKLIN
SOUTH STREET**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	14	17
PROJECT FILE NO.			T1406

WATER CONTROL (1 OF 2)



CONTROL OF WATER NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF THE CONTROL OF WATER (C.O.W.) SYSTEM AND SHALL SUBMIT A C.O.W. PLAN TO THE ENGINEER AND FRANKLIN CONSERVATION COMMISSION FOR APPROVAL. THE C.O.W. SYSTEM SHOWN IS CONCEPTUAL ONLY. THE C.O.W. SYSTEM SHALL BE DESIGNED TO BYPASS NORMAL STREAM FLOW CONDITIONS WITH PROVISIONS TO PASS THE 2-YEAR DESIGN FLOW OF 31.3 CFS IF THERE IS A FORECASTED STORM EVENT.
2. SOUTH STREET SHALL BE CLOSED TO VEHICULAR AND PEDESTRIAN TRAFFIC AT THE CULVERT CROSSING PRIOR TO BEGINNING EXCAVATION. DETOUR SIGNAGE WILL BE INSTALLED IN ACCORDANCE WITH THE MUTCD AND THE TEMPORARY TRAFFIC CONTROL PLANS INCLUDED IN THESE CONSTRUCTION DRAWINGS.
3. C.O.W. SYSTEM SHALL BE INSPECTED DAILY FOR WATER LEAKS OR EROSION AND REPAIRS PROCEDURES SHALL BE IMPLEMENTED ACCORDINGLY.
4. THE CONSTRUCTION SEQUENCE WITH REGARDS TO THE C.O.W. SYSTEM SHALL BE AS FOLLOWS:
 - 4.1. CLOSE THE ROADWAY TO VEHICULAR AND PEDESTRIAN TRAFFIC AT THE CULVERT CROSSING.
 - 4.2. INSTALL EROSION CONTROLS: TEMPORARY EROSION CONTROL AROUND PROJECT LIMITS TO PROTECT THE TRIBUTARY BROOK FROM WORK ZONE SEDIMENT; FLOATING SILT FENCE IN THE TRIBUTARY BROOK TO THE MISCOE BROOK DOWNSTREAM OF THE PROJECT LIMITS TO TRAP ANY FLOATING DEBRIS/SILT THAT MAY ENTER THE TRIBUTARY.
 - 4.3. INSTALL C.O.W. PHASE 1 COFFERDAM, BYPASS PIPE/PUMPS, DEWATERING PUMPS, AND TEMPORARY STILLING BASIN.
 - 4.4. PLACE TEMPORARY RIPRAP AT OUTLET FOR BYPASS DISCHARGE.
 - 4.5. DEWATER THE WORK AREA PRIOR TO (AND THROUGHOUT) EXCAVATION TO FACILITATE INSTALLING THE PRECAST CULVERT AND WINGWALLS IN THE DRY CONDITION. ALL DEWATERING FLOW SHALL PASS THROUGH THE STILLING BASIN TO REMOVE SEDIMENT PRIOR TO DEPOSITING BACK INTO THE STREAM.
 - 4.6. INSTALL THE THREE-SIDED PRECAST CULVERT AND PHASE 1 WINGWALLS AND RESTORE THE STREAMBED IN ACCORDANCE WITH THESE PLANS. LOAM AND SEED WITH EROSION CONTROL BLANKET IN FRONT OF THE WINGWALLS.
 - 4.7. REMOVE THE PHASE 1 COFFERDAM AND BYPASS PIPE AND INSTALL THE PHASE 2 COFFERDAM TO REDIRECT STREAM FLOW THROUGH THE PRECAST CULVERT.
 - 4.8. INSTALL THE REMAINING TWO WINGWALLS IN PHASE 2 AND RESTORE THE STREAMBED IN ACCORDANCE WITH THESE PLANS. LOAM AND SEED WITH EROSION CONTROL BLANKET IN FRONT OF THE WINGWALLS.
 - 4.9. REMOVE THE C.O.W. COFFERDAMS, BYPASS PUMPS, AND TEMPORARY STILLING BASIN.

SANDBAG PREPARATION:

1. UTILIZE 36" X 36" X 36" POLYPROPYLENE BAGS.
2. A HEAVY BODIED OR SANDY SOIL IS MOST DESIRABLE FOR FILLING SANDBAGS. ON-SITE SOURCES MAY BE UTILIZED, AS APPROPRIATE WITH THE APPROVAL OF THE ENGINEER.
3. BAGS SHOULD BE FILLED BETWEEN ONE-THIRD TO ONE-HALF OF THEIR CAPACITY TO PREVENT THE BAG FROM BEING TOO HEAVY AND PERMITS THE BAGS TO BE STACKED WITH A GOOD SEAL.

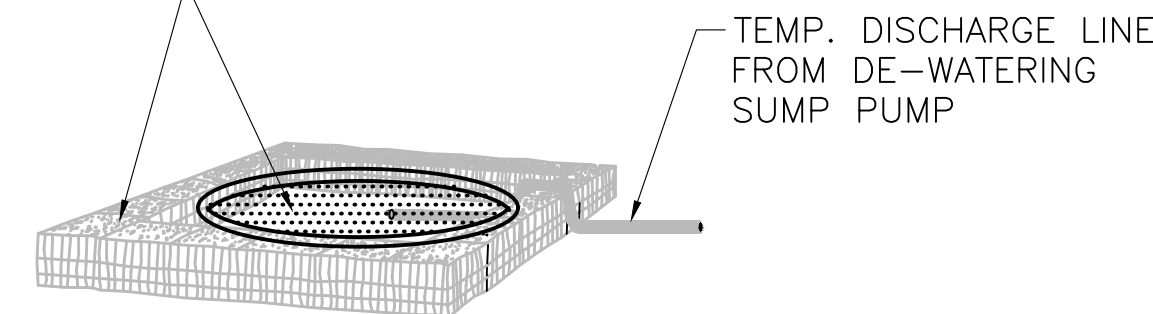
SANDBAG PLACEMENT:

1. REMOVE ANY DEBRIS FROM THE AREA WHERE THE BAGS ARE TO BE PLACED.
2. FOLD THE OPEN END OF THE UNFILLED PORTION OF THE SANDBAG TO FORM A TRIANGLE.
3. PLACE THE PARTIALLY FILLED BAGS LENGTHWISE AND PARALLEL TO THE DIRECTION OF FLOW WITH THE OPEN END FACING AGAINST THE WATER FLOW.
4. TUCK THE FLAPS UNDER, KEEPING THE UNFILLED PORTION UNDER THE WEIGHT OF THE SACK.
5. STAGGER THE JOINT CONNECTIONS WHEN MULTIPLE LAYERS ARE NECESSARY USING THE PYRAMID PLACEMENT METHOD.
6. ALL SANDBAG BERMS SHALL BE A MINIMUM OF 3- FEET HIGH, UNLESS NOTED OTHERWISE.
7. PLACE POLYETHYLENE LINER ALONG WATER SIDE OF COFFERDAM AND TUCK LINER INTO TOP COURSE OF SANDBAGS AS SHOWN ON THE DETAIL ON THIS PLAN. STABILIZE LINE WITH WOODEN STAKE AND ADDITIONAL SANDBAG IN STREAM.

CONTROL OF WATER PLAN - PHASE 1

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

SEDIMENT FILTER BAG w/
CONTAINMENT SYSTEM OR
APPROVED EQUAL

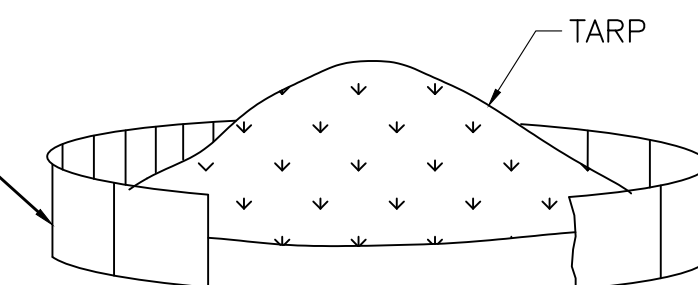


NOTE:
DISCHARGE TO SEDIMENTATION BASIN (AS SHOWN) OR TO SILTATION/
DEWATERING BAG SUCH AS FLOGARD DEWATERING BAG MODEL
SC-DW1215Z, OR APPROVED EQUAL BY BOXFORD CONSERVATION
COMMISSION. SYSTEM SHOWN IS CONCEPTUAL ONLY AND IS TO BE
DESIGNED BY CONTRACTOR.

TEMPORARY STILLING AREA

SCALE: N.T.S.

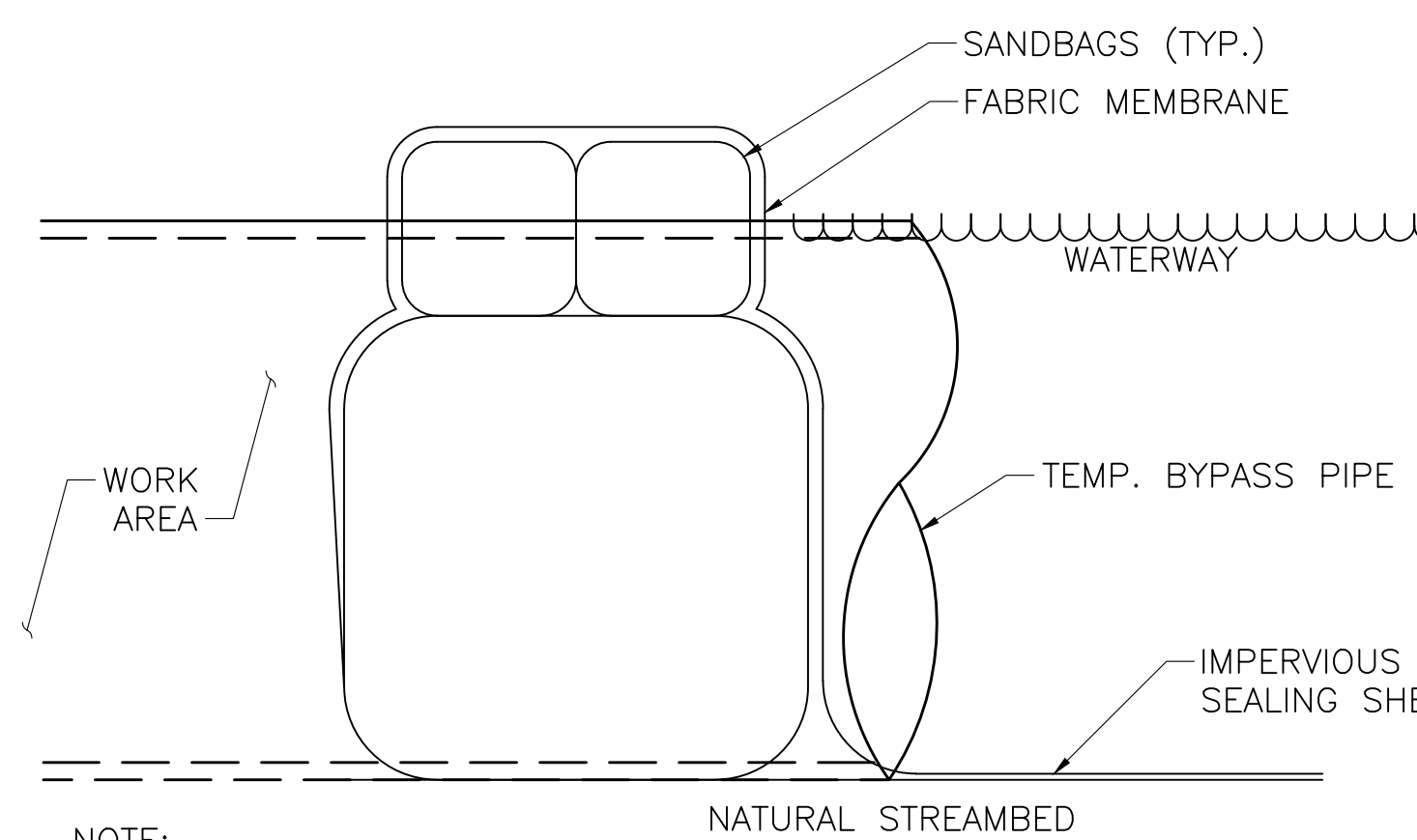
STOCKPILES SHALL BE SURROUNDED
BY DOUBLE-STAKED STRAW BALES,
OR SILT FENCE ENTRENCHED 6" INTO
THE GROUND WITH STRAW BALES.



TEMP. SOIL STOCKPILE

SCALE: N.T.S.

NOTES:
IF STOCKPILE IS PLACED ON PAVEMENT,
THEN IT SHALL BE SURROUNDED BY
COMPOST FILTER TUBES.



NOTE:

THE SANDBAG COFFERDAM SHOWN ABOVE IS SHOWN IN CONCEPT ONLY AS ONE OPTION FOR
CONTROL OF WATER. THE CONTRACTOR SHALL DETERMINE THE APPROPRIATE SYSTEM FOR
CONTROLLING THE WATER (I.E. BULK SANDBAGS, SHEETING, ETC). THE CONTRACTOR SHALL SUBMIT
THEIR PROPOSED CONTROL OF WATER DESIGN TO THE ENGINEER FOR REVIEW AND APPROVAL.

TEMPORARY SANDBAG COFFERDAM

SCALE: N.T.S.

2-YEAR (CONSTRUCTION)
RETURN FLOOD
Q=31.3± CFS

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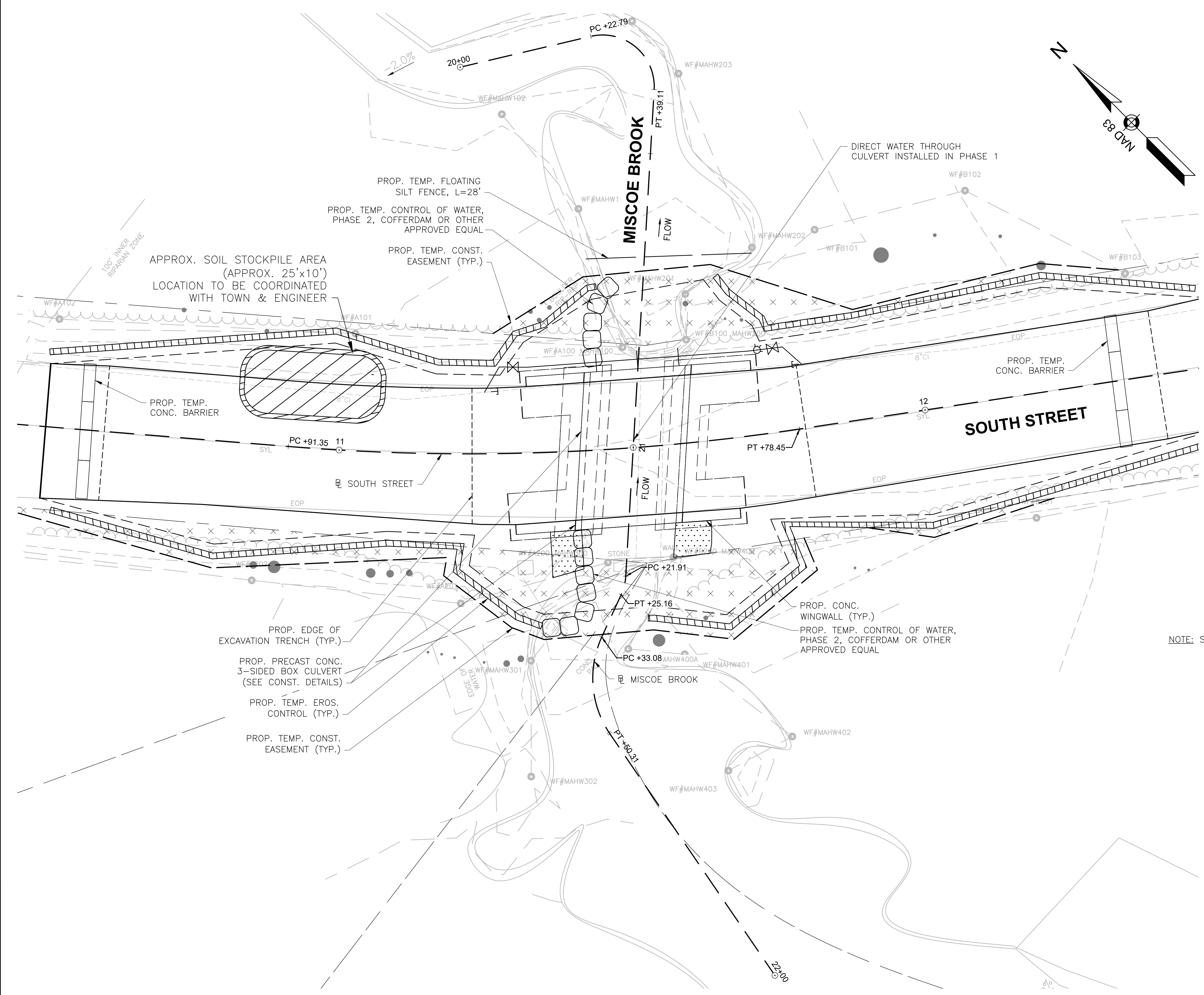
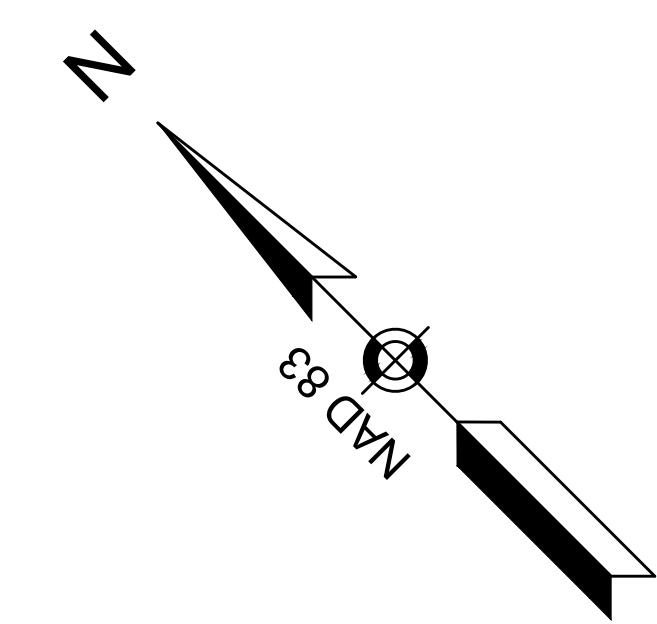
DISTRICT III BRIDGE ENGINEER

DATE

FRANKLIN
SOUTH STREET

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	15	17
PROJECT FILE NO.		T1406	

WATER CONTROL (2 OF 2)



APPROX. SOIL STOCKPILE AREA
(APPROX. 25'x10')
LOCATION TO BE COORDINATED
WITH TOWN & ENGINEER

PROP. TEMP. FLOATING
SILT FENCE, L=28'
PROP. TEMP. CONTROL OF WATER,
PHASE 2, COFFERDAM OR OTHER
APPROVED EQUAL
PROP. TEMP. CONST.
EASEMENT (TYP.)

PROP. TEMP.
CONC. BARRIER

PROP. TEMP.
CONC. BARRIER

PROP. EDGE OF
EXCAVATION TRENCH (TYP.)
PROP. PRECAST CONC.
3-SIDED BOX CULVERT
(SEE CONST. DETAILS)
PROP. TEMP. EROS.
CONTROL (TYP.)
PROP. TEMP. CONST.
EASEMENT (TYP.)

PROP. CONC.
WINGWALL (TYP.)
PROP. TEMP. CONTROL OF WATER,
PHASE 2, COFFERDAM OR OTHER
APPROVED EQUAL

NOTE: SEE SHEET 14 FOR CONTROL OF WATER DETAILS AND NOTES

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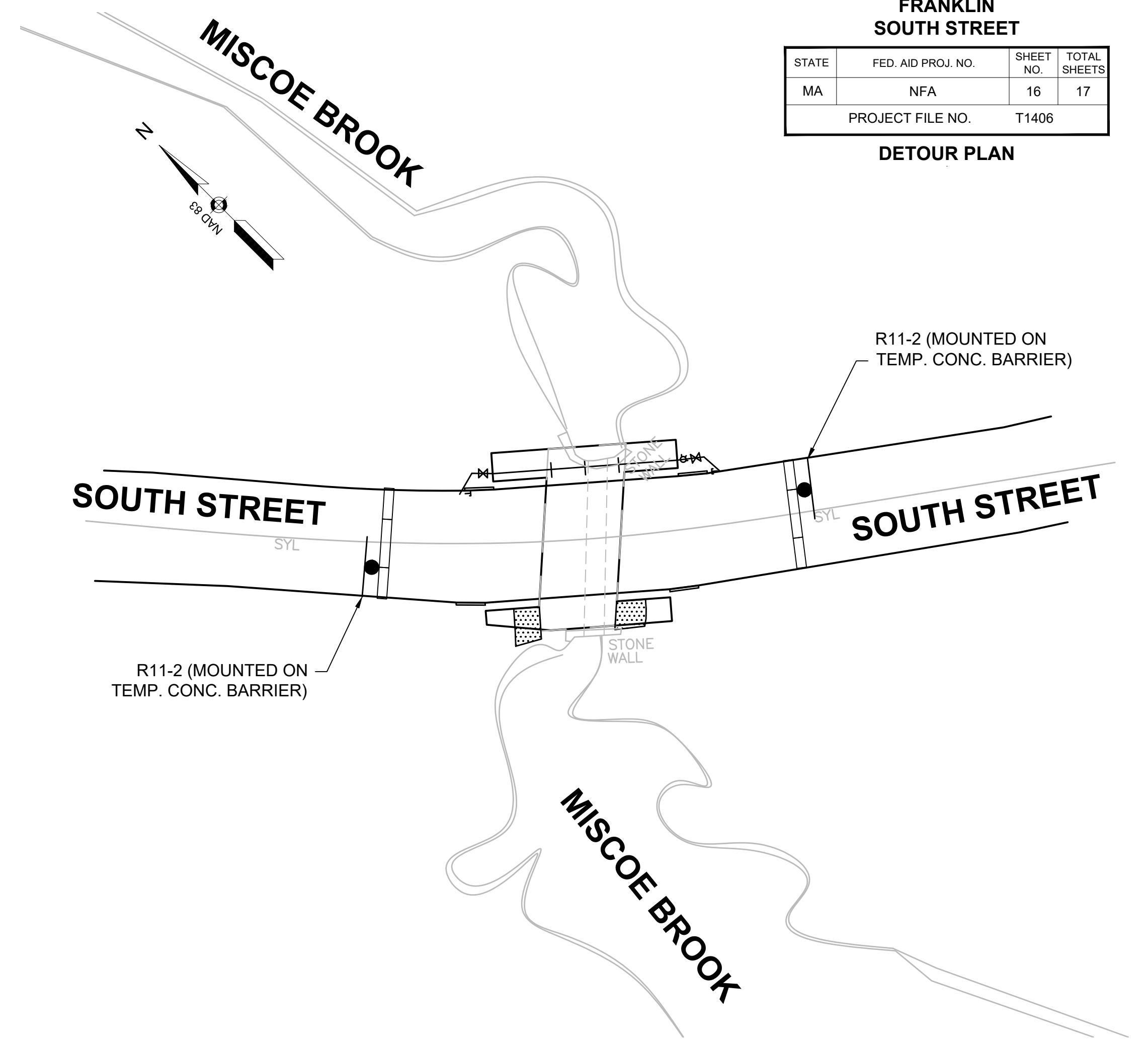
CONTROL OF WATER PLAN -- PHASE 2
SCALE: 1" = 8'

T1406_BR14-15 (WATER CONTROL) DWG Plotted on 15-Apr-2024 3:42 PM 2-April-2024 Ch. 85 Submission

**FRANKLIN
SOUTH STREET**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	16	17
PROJECT FILE NO.		T1406	

DETOUR PLAN



SOUTH STREET CLOSURE SET-UP
SCALE: 1" = 20'

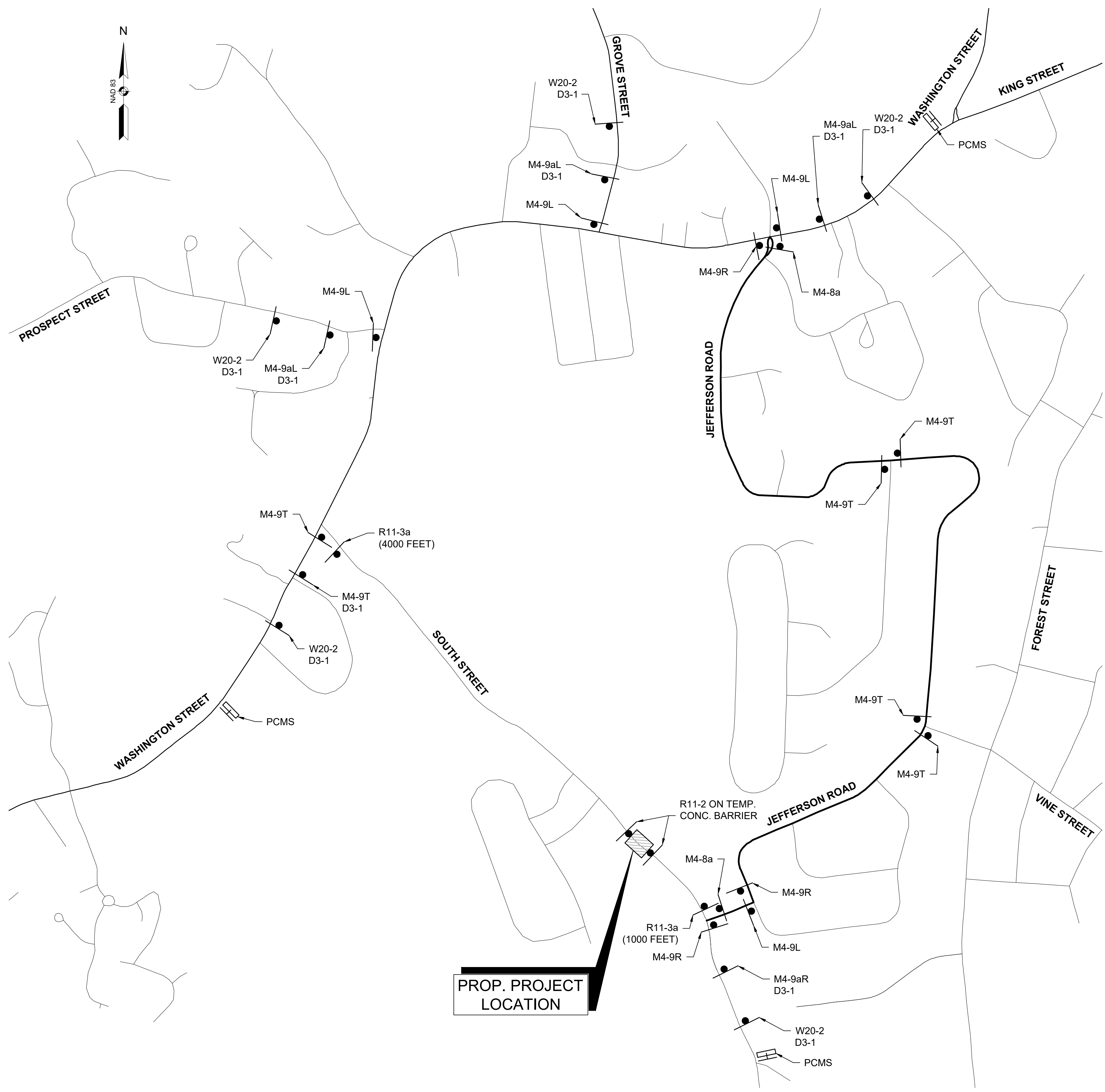
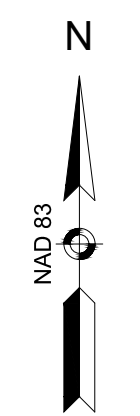
GENERAL NOTES:

1. ALL WORK ZONES AND DETOURS ARE ESTABLISHED FOR 24-HOURS A DAY. TEMPORARY CONSTRUCTION SIGNING, BARRICADES, AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE HIGHWAY OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF TRAFFIC.
2. ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM WITH THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (M.U.T.C.D.) AND ALL REVISIONS, UNLESS SUPERCEDED BY THESE PLANS.
3. ALL SIGN LEGENDS, BORDERS, AND MOUNTING SHALL BE IN ACCORDANCE WITH THE M.U.T.C.D.
4. TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
5. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350, "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES" AND/OR "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH).
6. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
7. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS AT THE DISCRETION OF THE ENGINEER.
8. PORTABLE CHANGEABLE MESSAGE SIGN (PCMS) SHALL BE IN PLACE 14 DAYS PRIOR TO THE INITIATION OF WORK.
9. PCMS SHALL CONFORM TO THE 2009 MUTCD AS AMENDED AND SHOULD BE PLACED ON THE SHOULDER OF THE ROADWAY OR IF PRACTICAL SET WELL AWAY FROM THE TRAVEL LANE.

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DETOUR PLAN & ADVANCED SIGNAGE SCHEMATIC - SOUTH STREET
SCALE: 1" = 500'

**FRANKLIN
SOUTH STREET**

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MA	NFA	17	17
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SIGN SUMMARY

IDENTIFICATION NUMBER	SIZE OF SIGN (INCHES)		LEGEND	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			NUMBER OF SUPPORTS REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACKGROUND	LEGEND	BORDER			
R11-2	48	30		①			2	WHITE	BLACK	BLACK	0 ON TEMP. CONC. BARRIER	10.00	20.00
R11-3a(1000 FEET)	60	30					1	WHITE	BLACK	BLACK	1	12.50	12.50
R11-3a(4000 FEET)	60	30					1	WHITE	BLACK	BLACK	1	12.50	12.50
W20-2	36	36					5	FL. ORANGE	BLACK	BLACK	0 5 W/ D3-1	9.00	45.00
M4-8a	24	18					2	FL. ORANGE	BLACK	BLACK	2	3.00	6.00
M4-9L	30	24					4	FL. ORANGE	BLACK	BLACK	4	5.00	20.00
M4-9aL	30	30					3	FL. ORANGE	BLACK	BLACK	0 3 W/ D3-1	6.25	18.75
M4-9R	30	24					3	FL. ORANGE	BLACK	BLACK	3	5.00	15.00
M4-9aR	30	30					1	FL. ORANGE	BLACK	BLACK	0 1 W/ D3-1	6.25	6.25
M4-9T	30	24					6	FL. ORANGE	BLACK	BLACK	5 1 W/ D3-1	5.00	30.00
D3-1	30	24		4D 4D	5.33 5.33 5.33	N/A	10	FL. ORANGE	BLACK	BLACK	10	5.00	50.00

NOTE:

- ①. CONTRACTOR TO FURNISH SIGNS CONSISTENT WITH 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS (OR LATEST EDITION). SEE MANUAL FOR TEXT AND LEGEND DIMENSIONS.

PORTABLE CHANGEABLE MESSAGE SIGNS TEXT



COMMONWEALTH OF MASSACHUSETTS
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