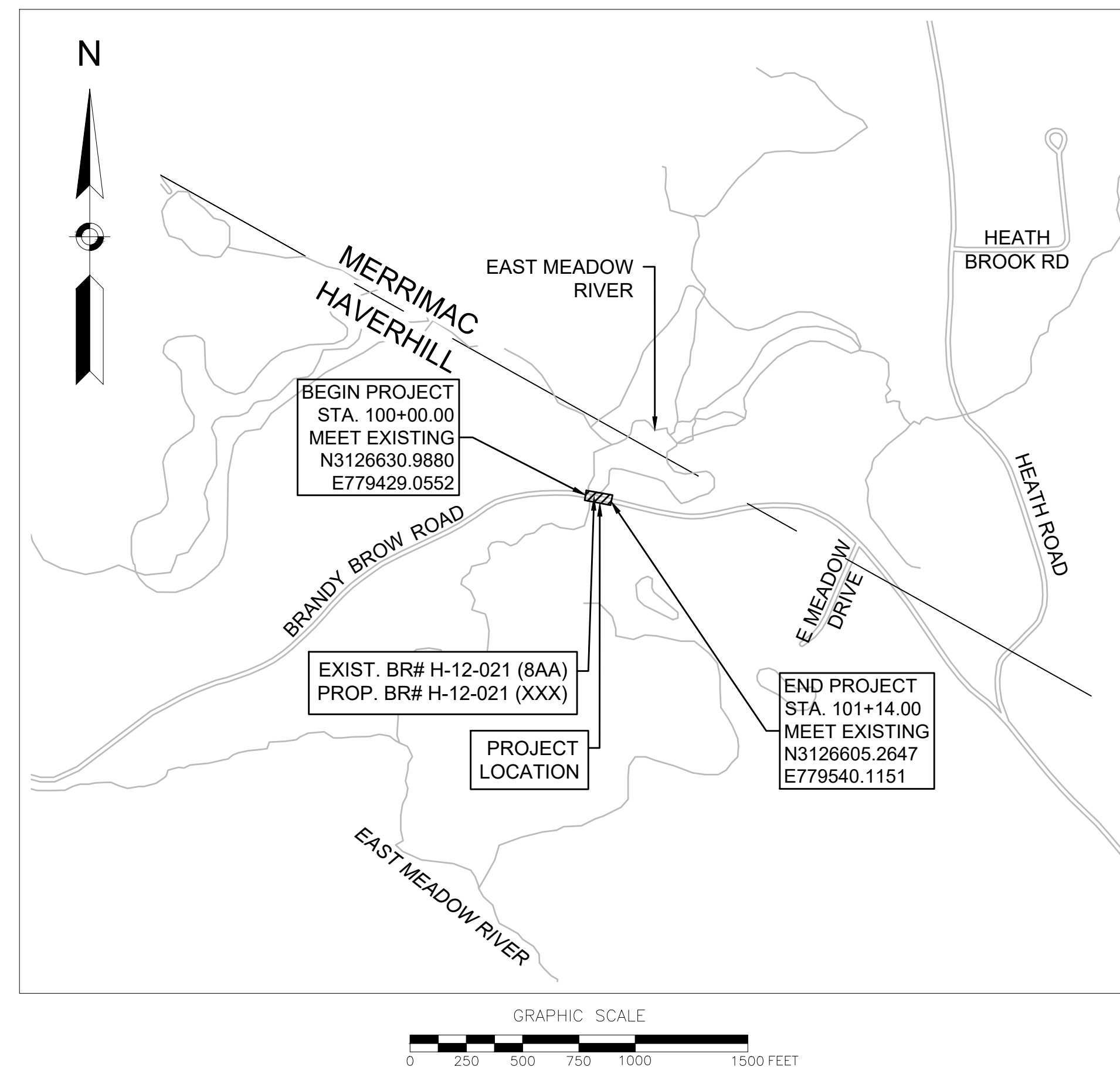


IN THE CITY OF
HAVERHILL
ESSEX COUNTY
COMMONWEALTH OF MASSACHUSETTS

INDEX

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET & INDEX
2	LEGEND & ABBREVIATIONS
3	TYPICAL SECTIONS
4	CONSTRUCTION PLAN
5	CONSTRUCTION PROFILE
6	GRADING PLAN
7 - 8	CONSTRUCTION DETAILS
9 - 17	BRIDGE PLANS
18 - 20	CROSS SECTIONS



THESE PLANS ARE SUPPLEMENTED BY THE LATEST EDITIONS OF THE FOLLOWING PUBLICATIONS, AS IDENTIFIED IN THE CONTRACT SPECIAL PROVISIONS: THE MASSDOT CONSTRUCTION STANDARD DETAILS, THE MASSDOT STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE MASSDOT STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, THE MASSDOT OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, THE MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, AND THE ANSI AMERICAN STANDARD FOR NURSERY STOCK.



MELINDA E. BARRETT, MAYOR

KAITLIN M. WRIGHT, CITY CLERK

CITY COUNCIL
THOMAS J. SULLIVAN, PRESIDENT

HIGHWAY & PARKS
MICHAEL ARPINO, HIGHWAY SUPERINTENDENT

ENGINEERING DEPARTMENT
JOHN H. PETTIS

DPW
ROBERT E. WARD, DPW DIRECTOR

WPA NOTICE OF INTENT PLANS

LENGTH OF PROJECT = 114.00 FEET = 0.022 MILES

PREPARED FOR
CITY OF HAVERHILL
4 SUMMER STREET
HAVERHILL, MA 01830

**REPLACEMENT OF BRANDY BROW ROAD
CULVERT OVER EAST MEADOW RIVER**

**BRANDY BROW ROAD
HAVERHILL, MASSACHUSETTS**

[illegible]

TITLE SHEET & INDEX

SCALE:	AS NOTED
	NEX-2300100.00

1 OF 20

EX)

REPLACEMENT OF BRANDY BROW ROAD
CULVERT OVER EAST MEADOW RIVER
BRANDY BROW ROAD
HAVERHILL, MASSACHUSETTS

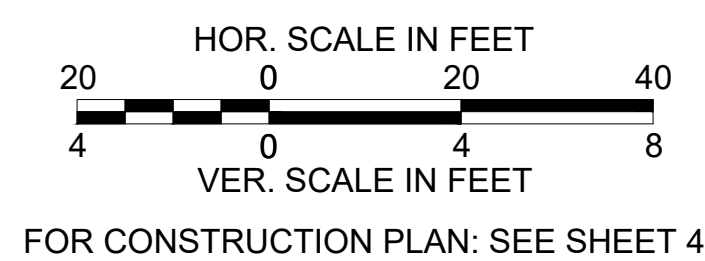
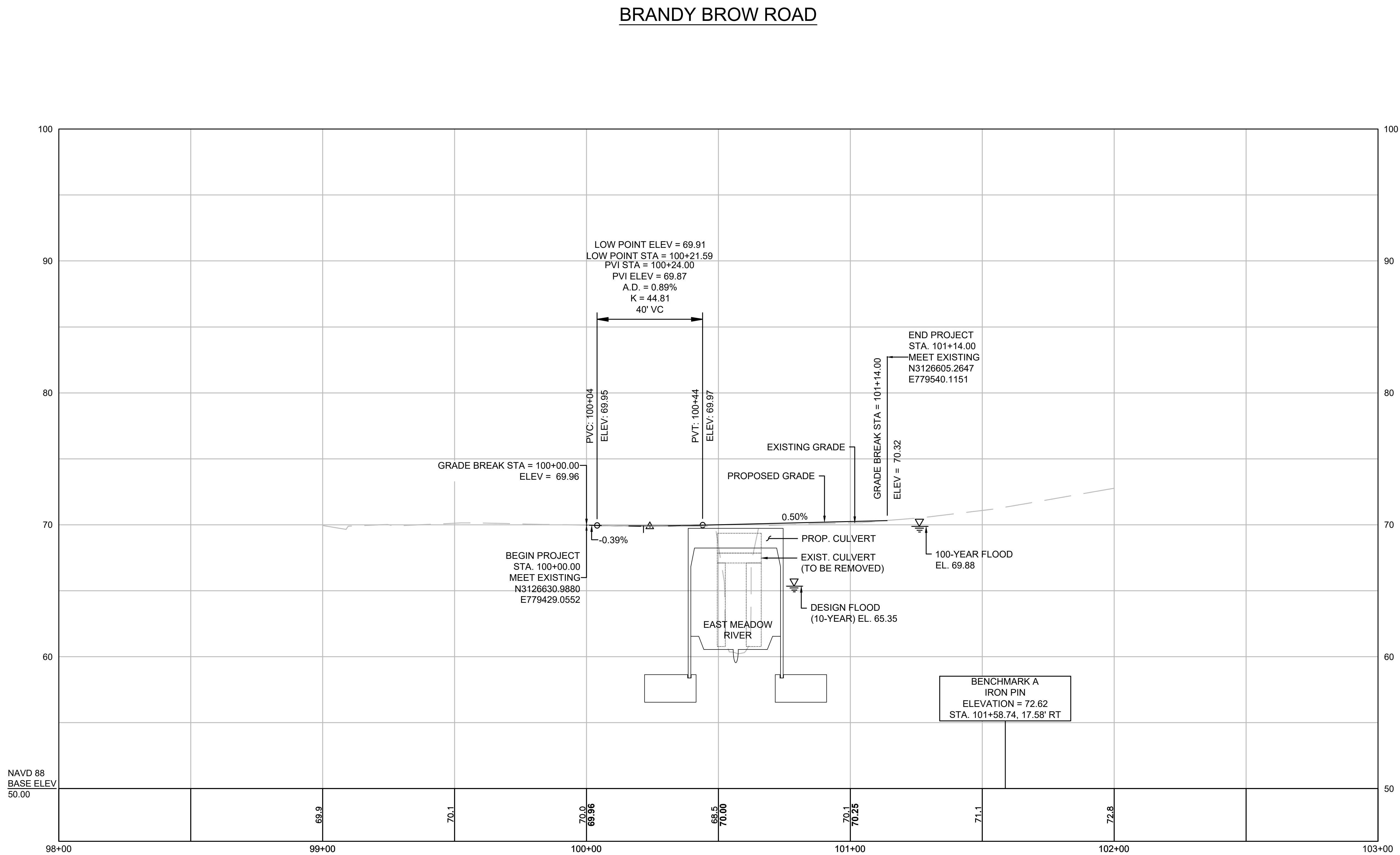
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NO.	REVISION	DATE
11/6/2025		
DRAWN/DESIGN BY		CHECKED BY
GBP/NHG		GJH

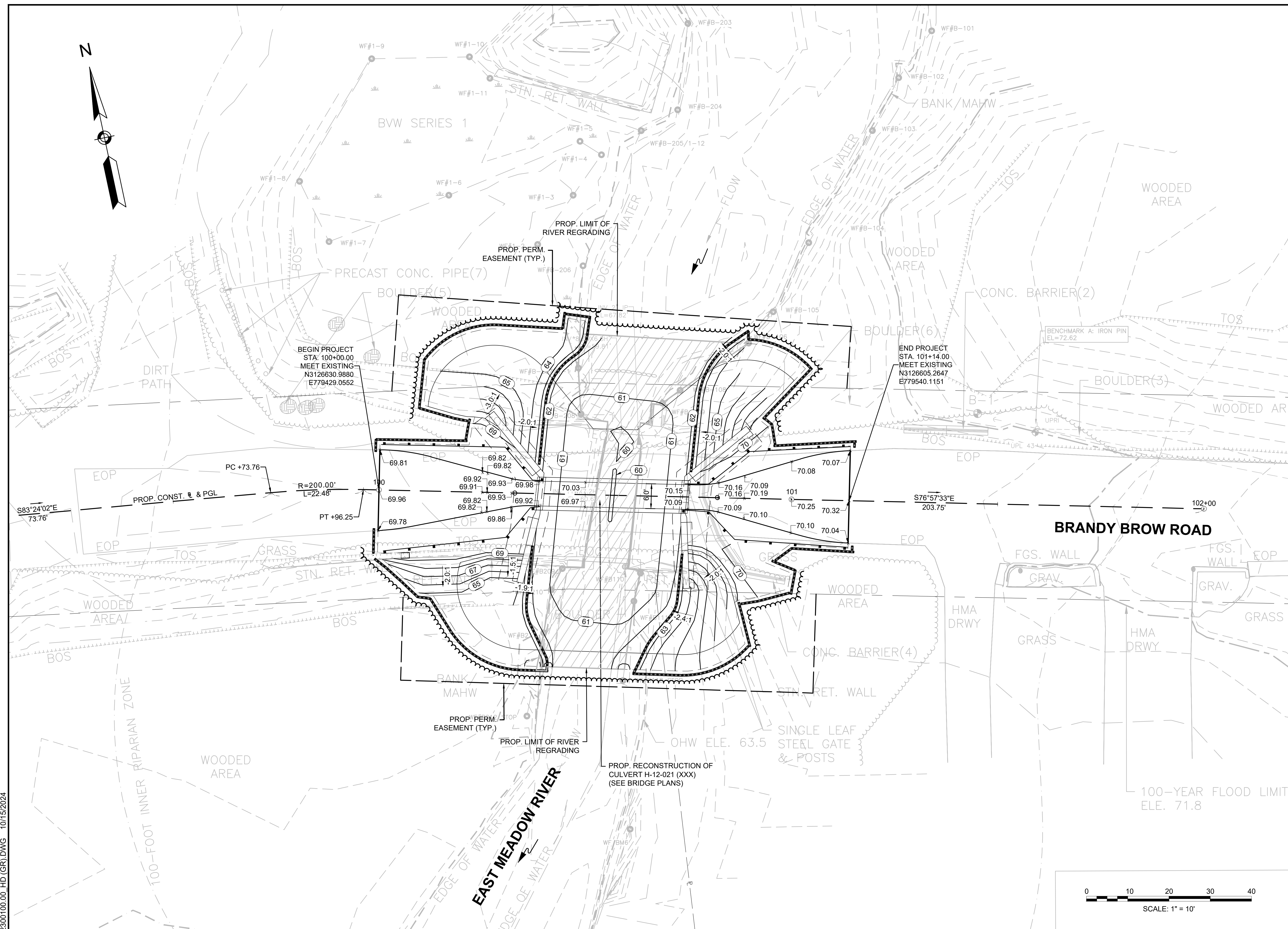
CONSTRUCTION PROFILE

SCALE: AS NOTED

NEX-2300100.00

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**REPLACEMENT OF BRANDY BROW ROAD
CULVERT OVER EAST MEADOW RIVER**

**BRANDY BROW ROAD
HAVERHILL, MASSACHUSETTS**

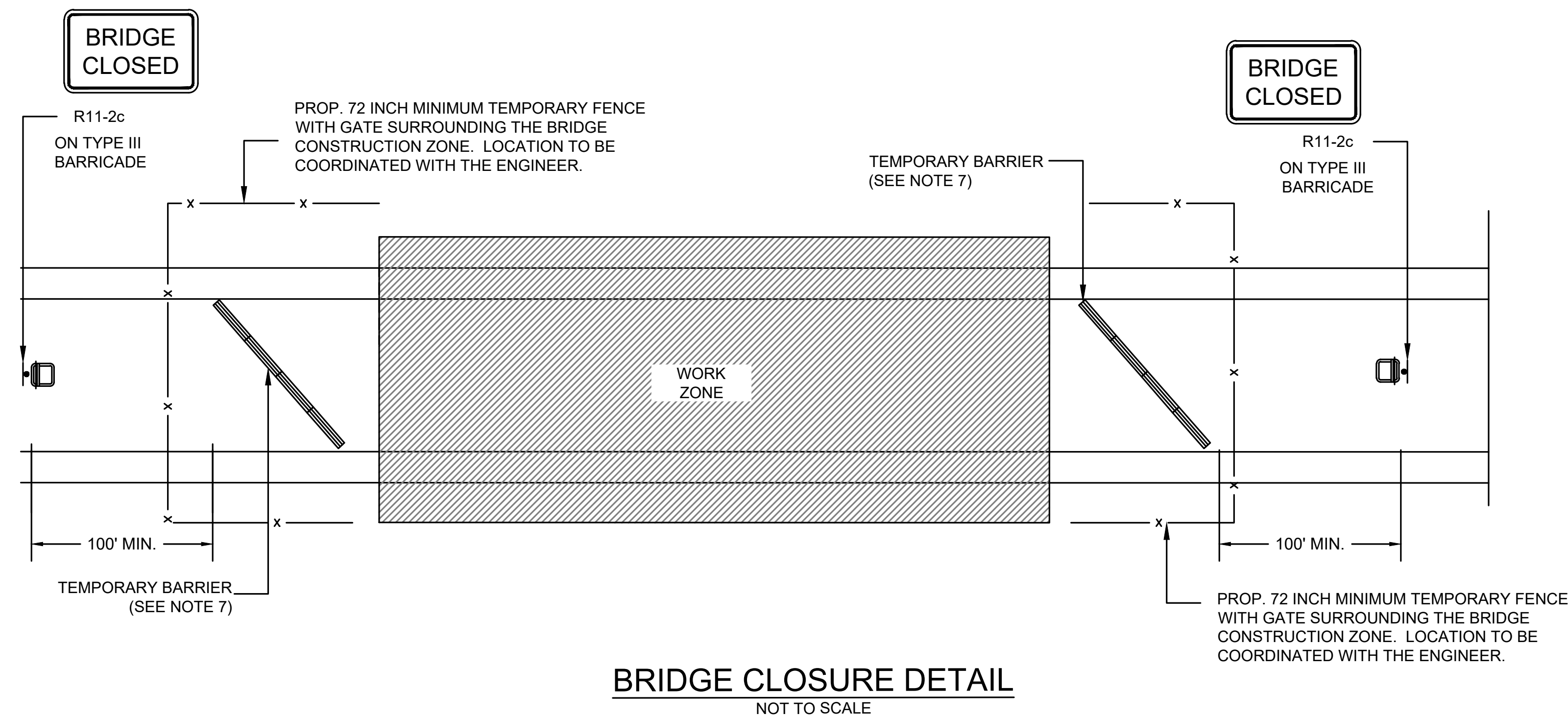
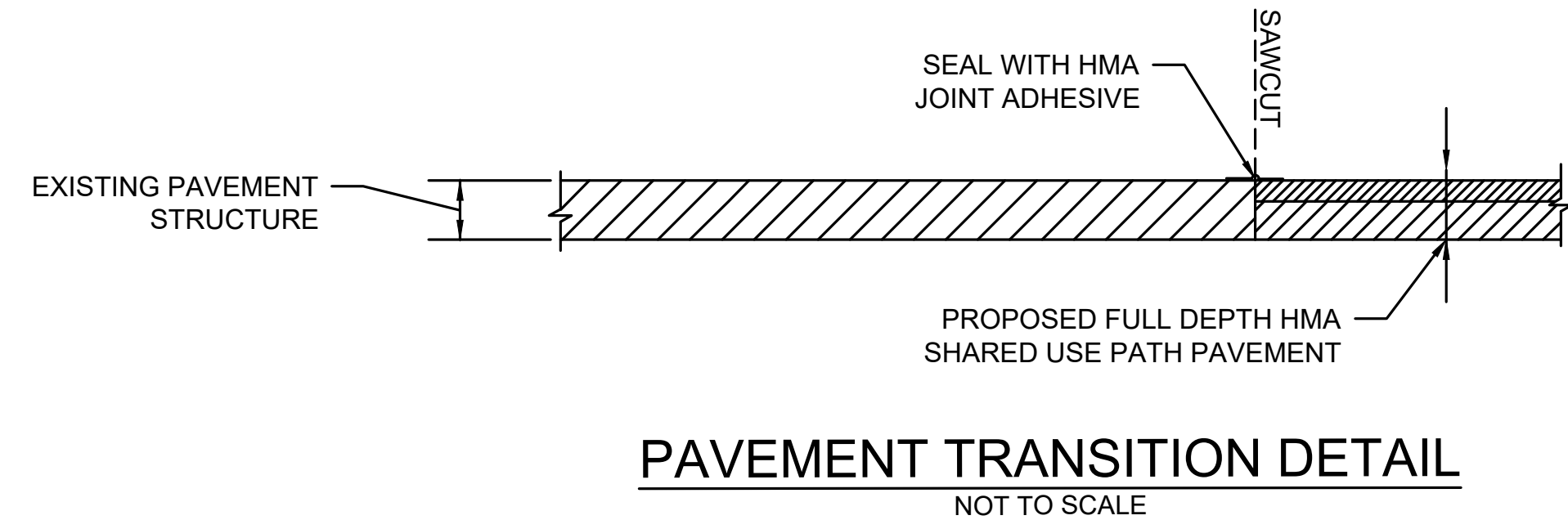
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DRAWN/DESIGN BY GBP		CHECKED BY GJH

GRADING PLAN

SCALE:	1"=10'
NEX-2300100.00	
6 OF 20	

**REPLACEMENT OF BRANDY BROW ROAD
CULVERT OVER EAST MEADOW RIVER**

**BRANDY BROW ROAD
HAVERHILL, MASSACHUSETTS**



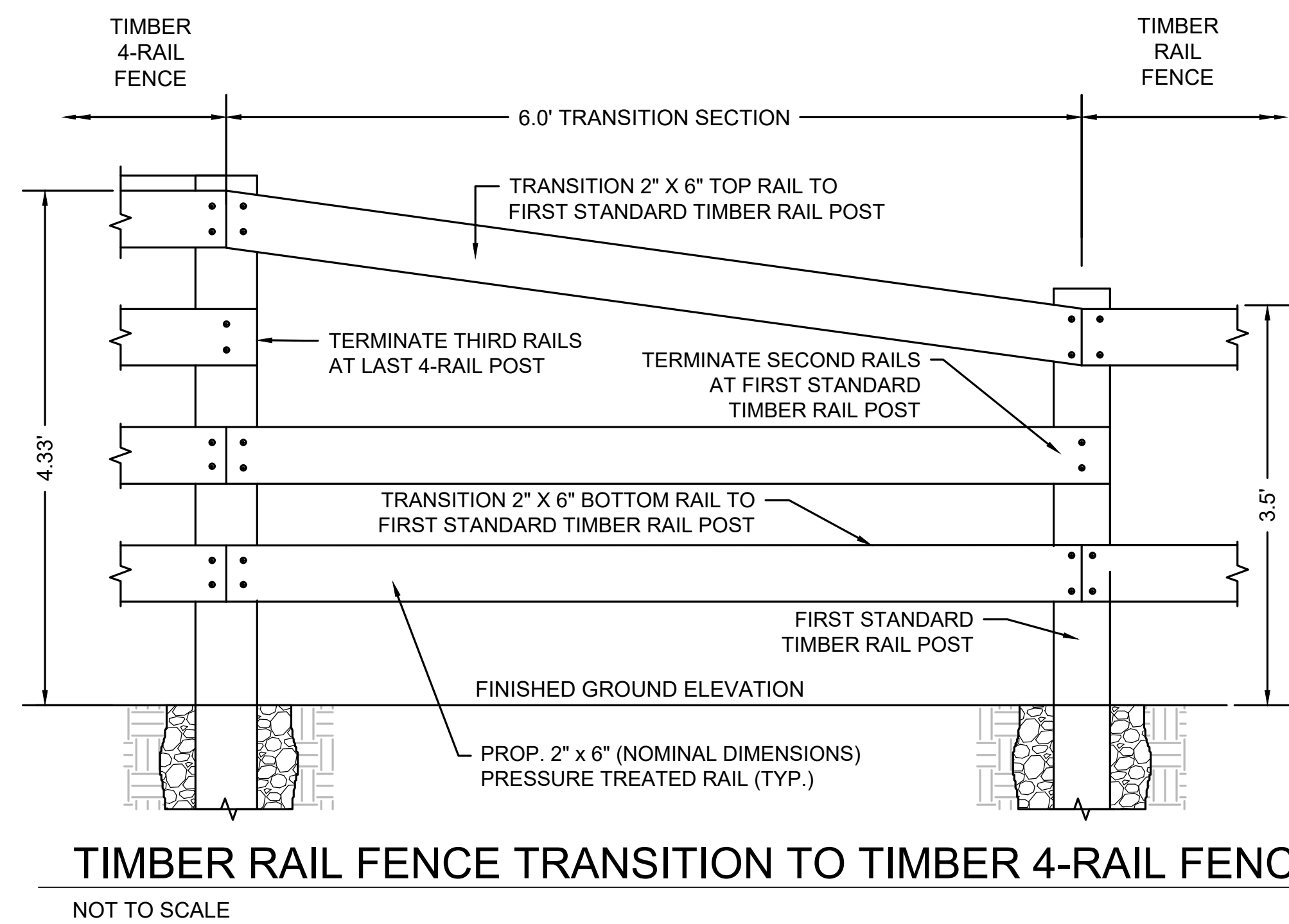
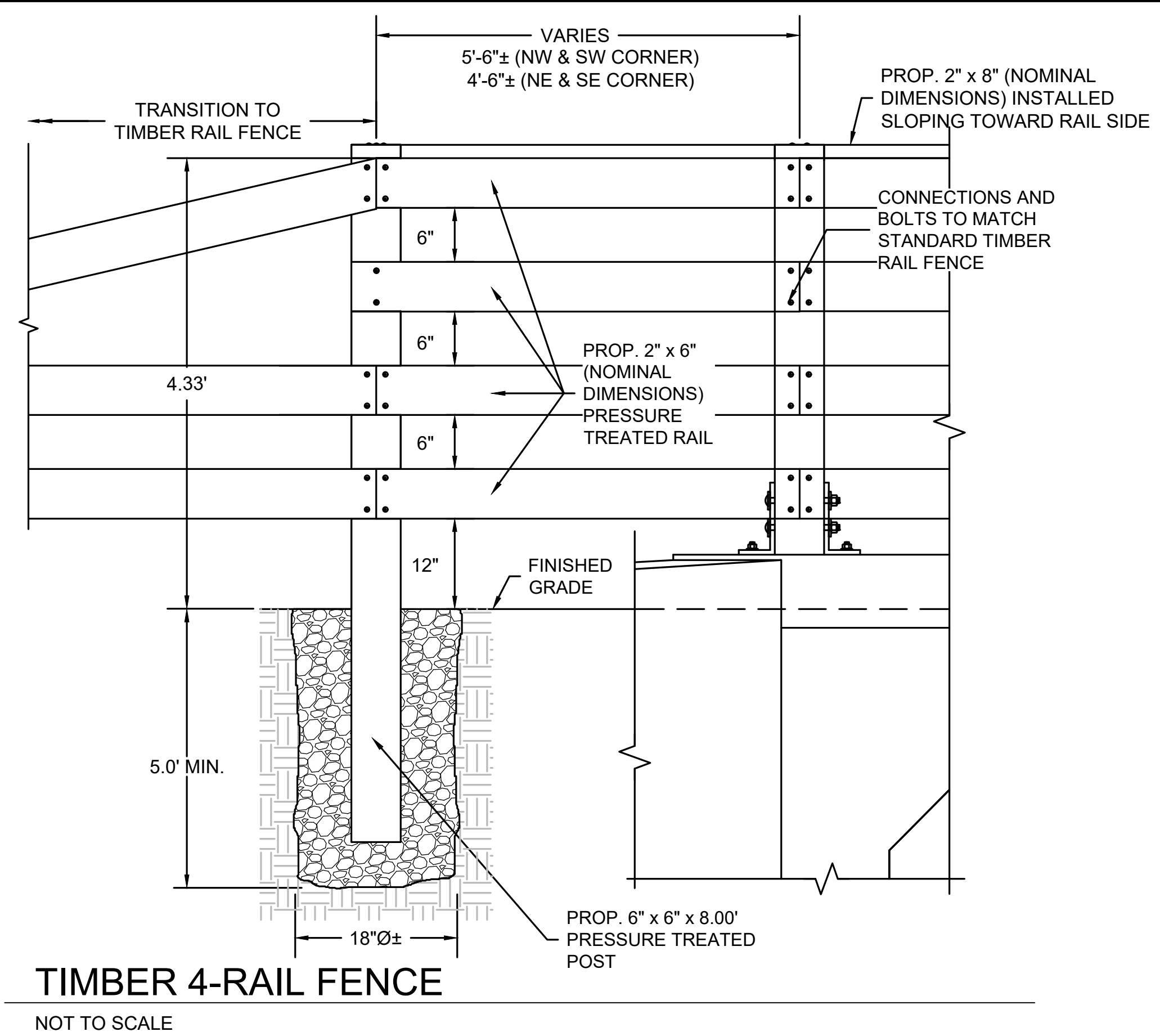
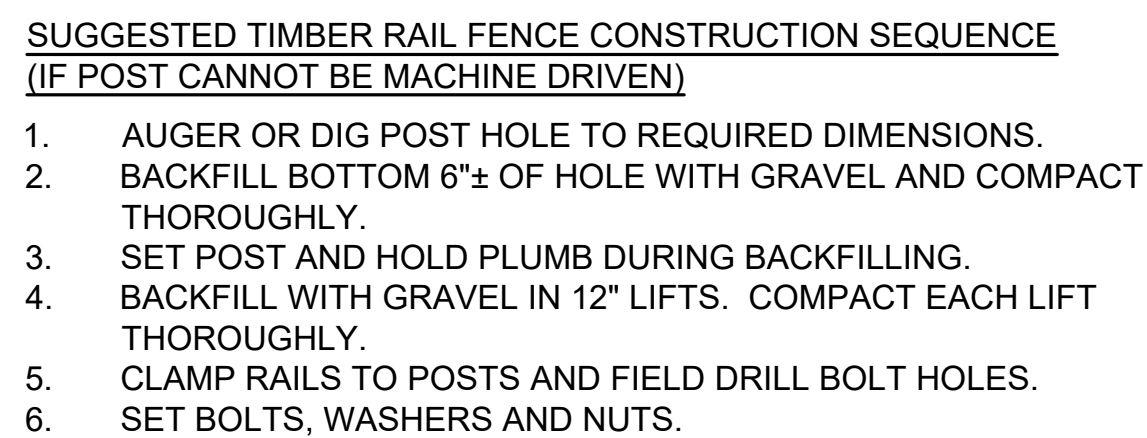
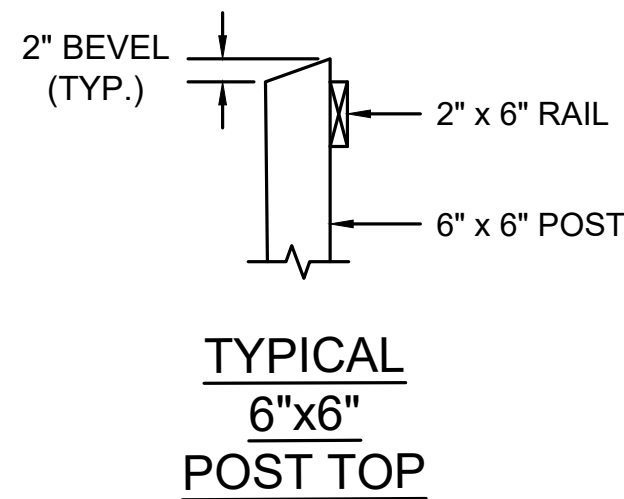
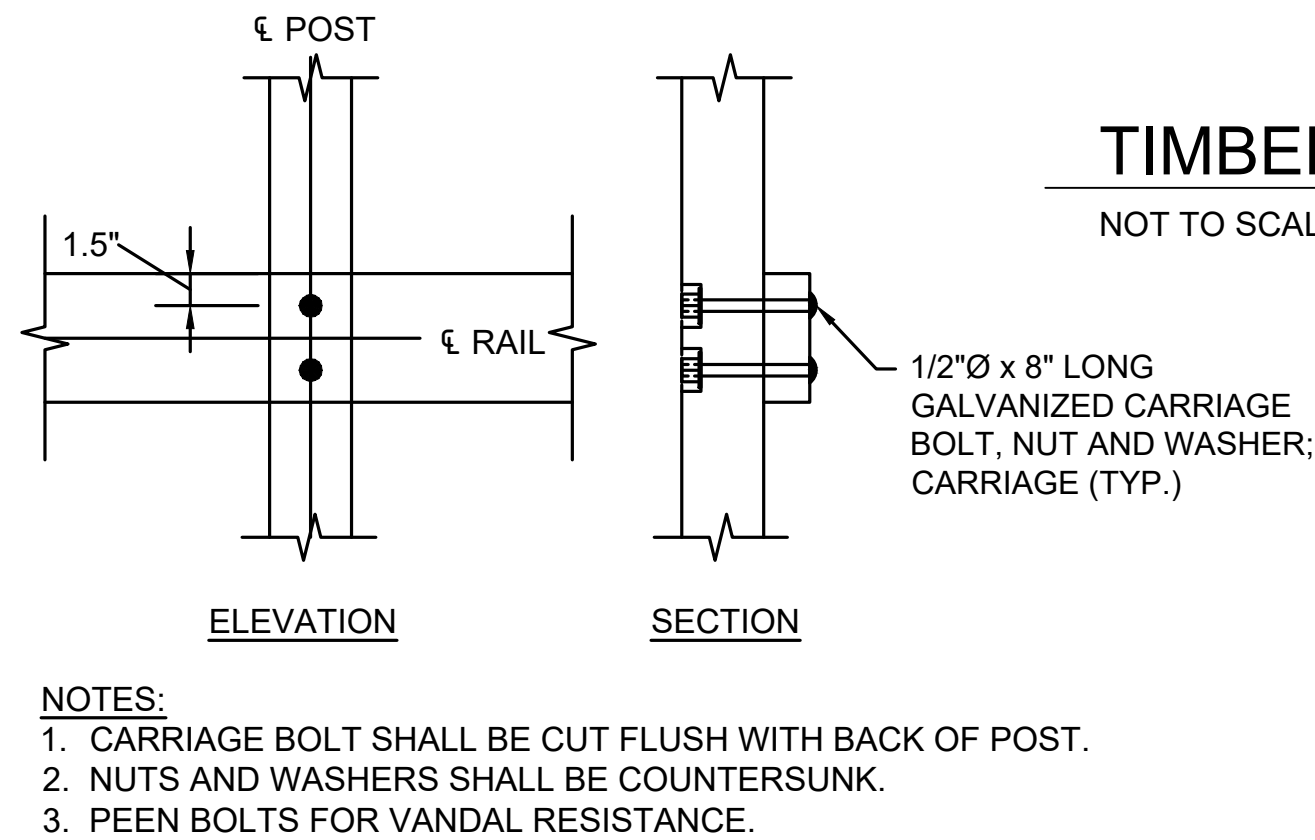
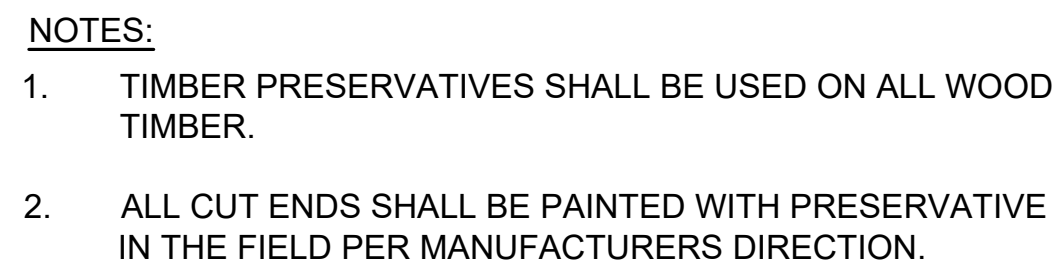
	WORK AREA
	PORTABLE TYPE III BARRICADE (4' WIDE, MIN.)
	TEMPORARY PRECAST CONCRETE BARRIER WITH TEMPORARY FENCE & WHITE REFLECTORS

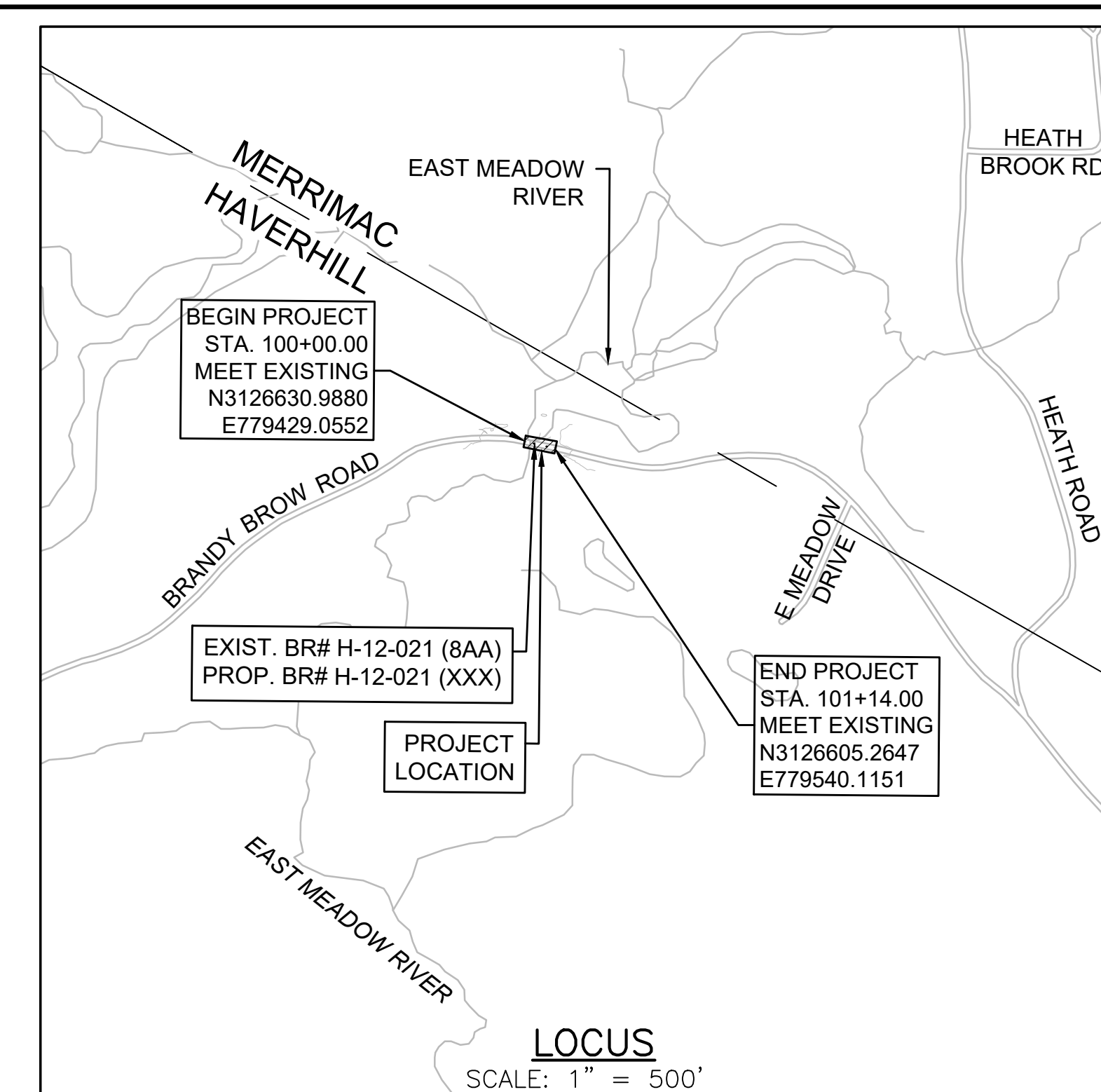
1. ALL TRAFFIC MANAGEMENT AND WORK ZONE TRAFFIC CONTROL MEASURES SHALL CONFORM TO THE CURRENT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.), MASSDOT - HIGHWAY DIVISION'S "STANDARD DETAILS AND DRAWINGS FOR THE DEVELOPMENT OF TRAFFIC MANAGEMENT PLANS", THE STANDARD SPECIFICATIONS, AND THE FOLLOWING NOTES.
2. THE TEMPORARY TRAFFIC CONTROL PLANS CONTAINED HEREIN ARE GIVEN AS A GUIDE FOR TYPICAL WORK ZONE TRAFFIC CONTROL APPLICATIONS FOR THE TYPES OF WORK ANTICIPATED FOR THIS PROJECT. THEY ARE NOT INTENDED TO COVER ALL POSSIBLE CONSTRUCTION OPERATIONS WHICH THE CONTRACTOR MAY CHOOSE TO EMPLOY. WORK ZONE TRAFFIC CONTROL FOR OTHER CONSTRUCTION OPERATIONS OR OTHER TRAFFIC SITUATIONS IF APPLICABLE SHALL BE IN ACCORDANCE WITH THE REFERENCES LISTED IN NOTE NO. 1 AND AS APPROVED OR DIRECTED BY THE ENGINEER.
3. AFTER EACH WORKING DAY, TRAFFIC CONTROL DEVICES THAT ARE NOT REQUIRED SHALL BE MOVED OFF THE ROADWAY OR FULL DEPTH CONSTRUCTION AREA AND PLACED SO AS NOT TO IMPEDE PEDESTRIAN AREAS, ABUTTER ACCESS OR CAUSE CONFUSION TO MOTORISTS. IN CERTAIN CIRCUMSTANCES, AND ONLY WITH THE APPROVAL OF THE CITY AND THE ENGINEER, LANE RESTRICTIONS MAY REMAIN OVERNIGHT.
4. PLACE ALL CONSTRUCTION SIGNING AND TRAFFIC CONTROL DEVICES FOR EACH PHASE PRIOR TO COMMENCEMENT OF CONSTRUCTION.
5. DISTANCES SHOWN ON THE TEMPORARY TRAFFIC CONTROL PLANS ARE A GUIDE ONLY, AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
6. CONTRACTOR SHALL REMOVE SEGMENTS OF TEMPORARY CONCRETE BARRIER AS NECESSARY TO GAIN ACCESS TO THE SITE. CONTRACTOR SHALL REPLACE THE BARRIER AT THE END OF EACH WORKING DAY TO SECURE THE SITE. THE COST ASSOCIATED WITH REMOVING AND RESETTING THE TEMPORARY CONCRETE BARRIER SHALL BE CONSIDERED INCIDENTAL TO ITEM 853.2.
7. PROPOSED TEMPORARY BARRIER SHALL CONFORM TO MASH TEST LEVEL 2.

[illegible]

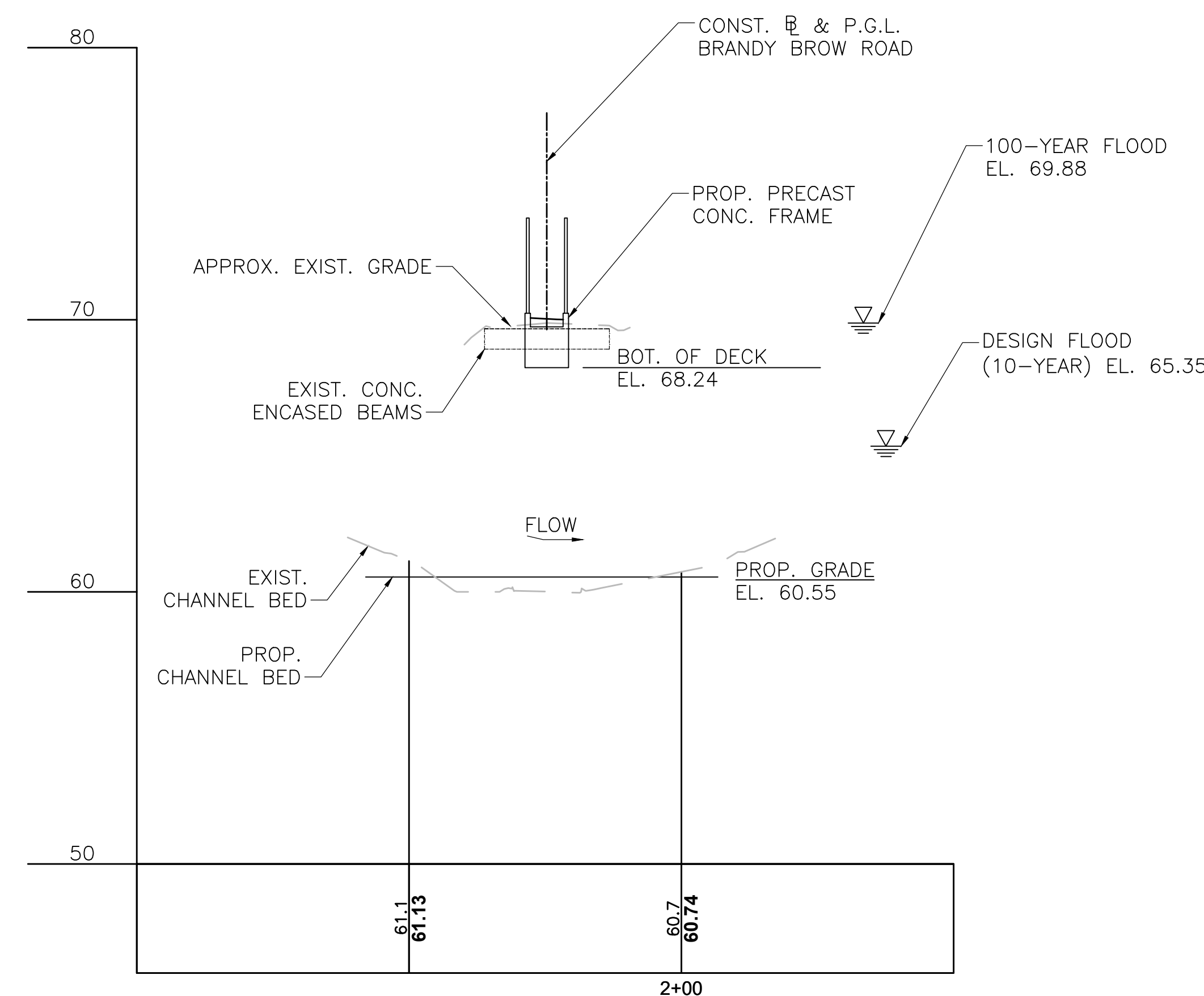
CONSTRUCTION DETAILS

7 OF 20

[illegible]



1. KEY PLAN, LOCUS MAP, & PROFILES
2. GENERAL NOTES & ESTIMATED QUANTITIES
3. BORING LOG
4. ELEVATIONS & CROSS SECTIONS
5. PLAN & FRAMING PLAN
6. EXCAVATION PLAN & TIMBER RAIL FENCE DETAILS
7. FOOTING PLAN & MISC. DETAILS
8. LONGITUDINAL & WINGWALL SECTIONS
9. SCOUR PROTECTION PLAN & CHANNEL DETAILS



PROFILE — ALONG B EAST MEADOW RIVER

SCALE: 1" = 20'-0" HORZ.
1" = 1'-0" VERT.

SHEET 1 OF 9 SHEETS BRIDGE NO. H-12-021 (DOQ)

BORING B-1

BORING B-1 (CONT.)

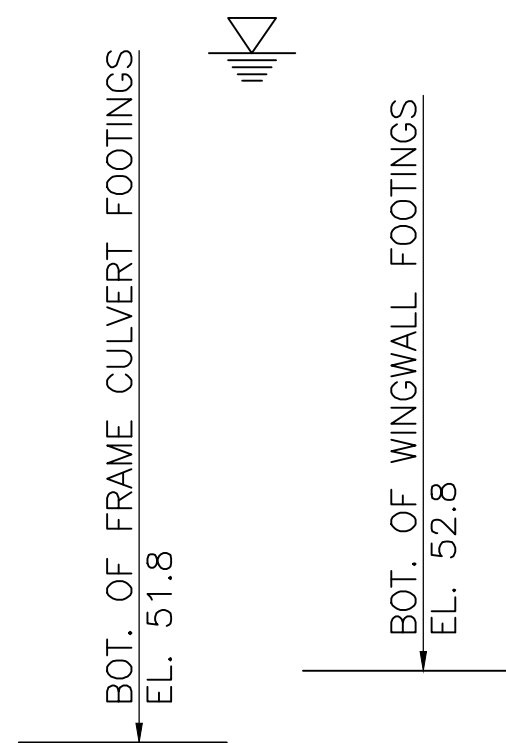
BORING INFORMATION LOCATION: See Site Plan GROUND SURFACE EL. (ft): ~70 VERTICAL DATUM: Project Datum TOTAL DEPTH (ft): 51.0 LOGGED BY: A. Han					BORING B-1 PAGE 1 of 2										
DRILLING INFORMATION HAMMER TYPE: Automatic AUGER I.D./O.D.: NA / NA DRILLING METHOD: Drive and Wash WATER LEVEL DEPTHS (ft): ∇ 8.6 1/23/2024 11:45 am										CASING I.D./O.D.: 4 inch/ 4.25 inch DRILL ROD O.D.: NM CORE BARREL TYPE: CORE BARREL I.D./O.D. NA / NA					
ABBREVIATIONS: Pen. = Penetration Length Rec. = Recovery Length RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen., % WOR = Weight of Rods WOH = Weight of Hammer S = Split Spoon Sample C = Core Sample U = Undisturbed Sample SC = Sonic Core DP = Direct Push Sample HSA = Hollow-Stem Auger Qp = Pocket Penetrometer Strength Sv = Pocket Torvane Shear Strength LL = Liquid Limit PI = Plasticity Index PID = Photoionization Detector I.D./O.D. = Inside Diameter/Outside Diameter NA, NM = Not Applicable, Not Measured Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.															
Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description							
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD										
5	5	S1	0 to 2	24/20	60-73-26-27	Drove casing and rollerbit to 4'.	GRAVEL	S1 (0"-4"): Asphalt. S1 (4"-20"): Moist, very dense, brown, FINE TO COARSE GRAVEL, some fine to coarse sand, trace inorganic silt.							
		S2	2 to 4	24/12	20-19-14-11		SAND	S2: Moist, dense, brown, FINE TO COARSE SAND, some fine to coarse gravel, trace inorganic silt.							
		S3	4 to 6	24/10	8-7-6-4			S3: Moist, medium dense, orange, FINE TO COARSE SAND, some fine to coarse gravel, trace inorganic silt.							
		S4	6 to 8	24/11	4-3-2-5			S4: Moist, loose, orange, FINE TO COARSE SAND, some fine to coarse gravel, trace inorganic silt.							
	10	S5	8 to 10	24/9	6-8-10-8	Drove casing to 10'.	GRAVEL	S5: Wet, medium dense, orange, FINE TO COARSE GRAVEL, some fine to coarse sand.							
		S6	10 to 12	24/9	6-9-12-12			S6: Wet, medium dense, brown, FINE TO COARSE GRAVEL, some fine to coarse sand, trace inorganic silt.							
		S7	12 to 14	24/13	16-7-9-9			S7: Moist, medium dense, brown, FINE TO COARSE GRAVEL, some fine to coarse sand, trace inorganic silt.							
		S8	14 to 16	24/9	7-12-9-11			S8: Wet, medium dense, brown, FINE TO COARSE GRAVEL, some fine to coarse sand.							
20	20	S9	19 to 21	24/4	4-2-2-2	Drove casing and rollerbit to 19'.	SAND	S9: Wet, loose, grey, FINE TO COARSE SAND.							
NOTES: Driller notes that he maintained a head on the casing as rods were pulled during sampling.							PROJECT NAME: Brandy Brow Road Over East Meadow River CITY/STATE: Haverhill, Massachusetts GEI PROJECT NUMBER: 2400197								

LOCATION: See Site Plan GROUND SURFACE EL. (ft): ~70 VERTICAL DATUM: Project Datum							DATE START/END: 1/23/2024 - 1/23/2024 DRILLING COMPANY: Northern Drill Service, Inc.		BORING B-1 PAGE 2 of 2	
Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description		
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD					
45	25	S10	24 to 26	24/9	2-5-4-5	Drove casing and rollerbit to 24'.	SAND	S10: Similar to S9.		
40	30	S11	29 to 31	24/0	9-6-7-8	Drove casing and rollerbit to 29'. Redrove S11 with 3" spoon.		S11 (Redrive): Wet, medium dense, grey, FINE GRAVEL, some fine to coarse sand.		
35	35	S12	34 to 36	24/2	6-10-11-9	Drove casing and rollerbit to 34'.	GRAVEL	S12: Similar to S9.		
30	40	S13	39 to 41	24/10	6-7-8-8	Drove casing and rollerbit to 39'.		S13: Wet, medium dense, grey, FINE TO COARSE GRAVEL, trace fine to coarse sand.		
25	45	S14	44 to 46	24/14	4-3-5-7	Drove casing and rollerbit to 44'.		S14: Wet, loose, grey, FINE GRAVEL, some fine to coarse sand.		
20	50	S15	49 to 51	24/15	WOH-2-3-4	Drove casing and rollerbit to 49'.		S15: Similar to S14.		
15	55					Driller terminated hole due to time constraints.		Bottom of borehole at 51.0'. Backfilled with soil cuttings and bentonite. Patched with asphalt.		
NOTES: Driller notes that he maintained a head on the casing as rods were pulled during sampling.							PROJECT NAME: Brandy Brow Road Over East Meadow River CITY/STATE: Haverhill, Massachusetts GEI PROJECT NUMBER: 2400197			

- BORING NOTES:**
1. LOCATION OF BORINGS SHOWN ON THE PLAN THUS:  B-1
 2. 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.
 3. 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.
 4. FIGURES IN COLUMNS INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE A $1\frac{3}{8}$ " I.D. SPLIT SPOON SAMPLER 6" USING A 140 POUND WEIGHT FALLING 30".
 5. CONTRACTOR MAY EXAMINE THE SOIL AND ROCK SAMPLES BY CONTACTING GREENMAN-PEDERSEN, INC.
 6. BORING B1 WAS MADE ON JANUARY 23, 2024.
 7. BORINGS WERE MADE BY NORTHERN DRILL SERVICE, INC. OF NORTHBOROUGH, MA UNDER THE GUIDANCE OF GEI CONSULTANTS, INC.
 8. THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.
 9. GROUND SURFACE ELEVATIONS ARE APPROXIMATE.

BORING LOG

SCALE: $\frac{3''}{80'} = 1'-0'$





NOTE:
SW AND SE WINGWALLS
SHOWN, NW AND NE
WINGWALLS SIMILAR.

1. CONTRACT COMPLETION DATE TO BE IMPRINTED ON THE TOP SLAB OF BOTH FASCIA FRAME HEADWALL SECTIONS, CENTERED BOTH HORIZONTALLY AND VERTICALLY.
2. CHAMFER WIDTH TO MATCH THREE SIDED FRAME WALL THICKNESS.
3. TIMBER RAIL FENCE INSTALLED BEHIND THE WINGWALLS NOT SHOWN, SEE BRIDGE SHEET 1.
4. ASPHALT SHALL BE APPLIED DIRECTLY TO THE MEMBRANE/TOP OF OF FRAME. THE CONTRACTOR SHALL ADJUST/INCREASE ASPHALT THICKNESS OVER THE FRAME AS REQUIRED TO ACCOMMODATE THE FRAME DESIGN CEILING THICKNESS.
5. WINGWALL TIMBER RAIL FENCE NOT SHOWN FOR CLARITY.
6. FOLD DOWN BOLLARD NOT SHOWN FOR CLARITY.

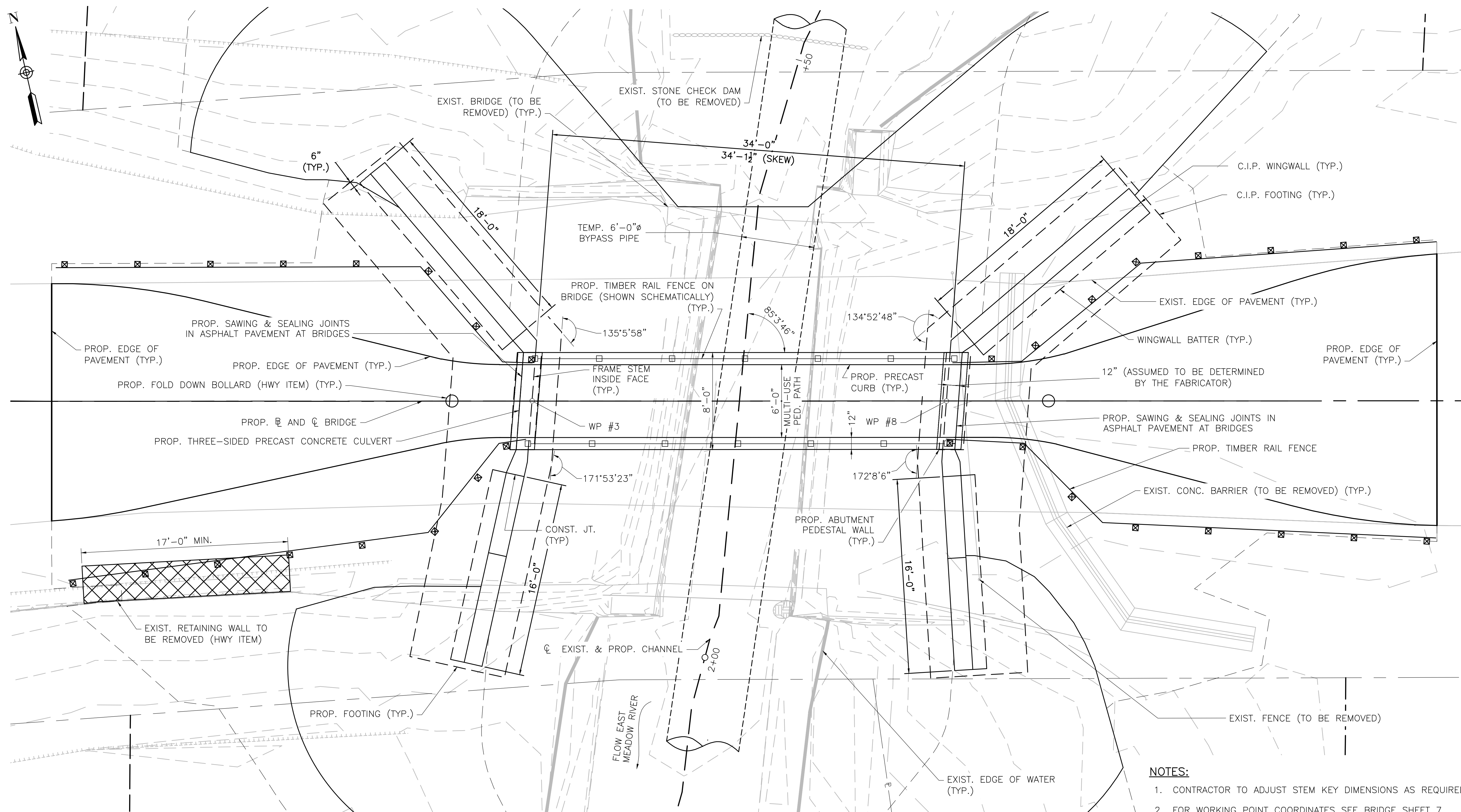
12 OF 20

**REPLACEMENT OF BRANDY BROW ROAD
CULVERT OVER EAST MEADOW RIVER**

**BRANDY BROW ROAD
HAVERHILL, MASSACHUSETTS**

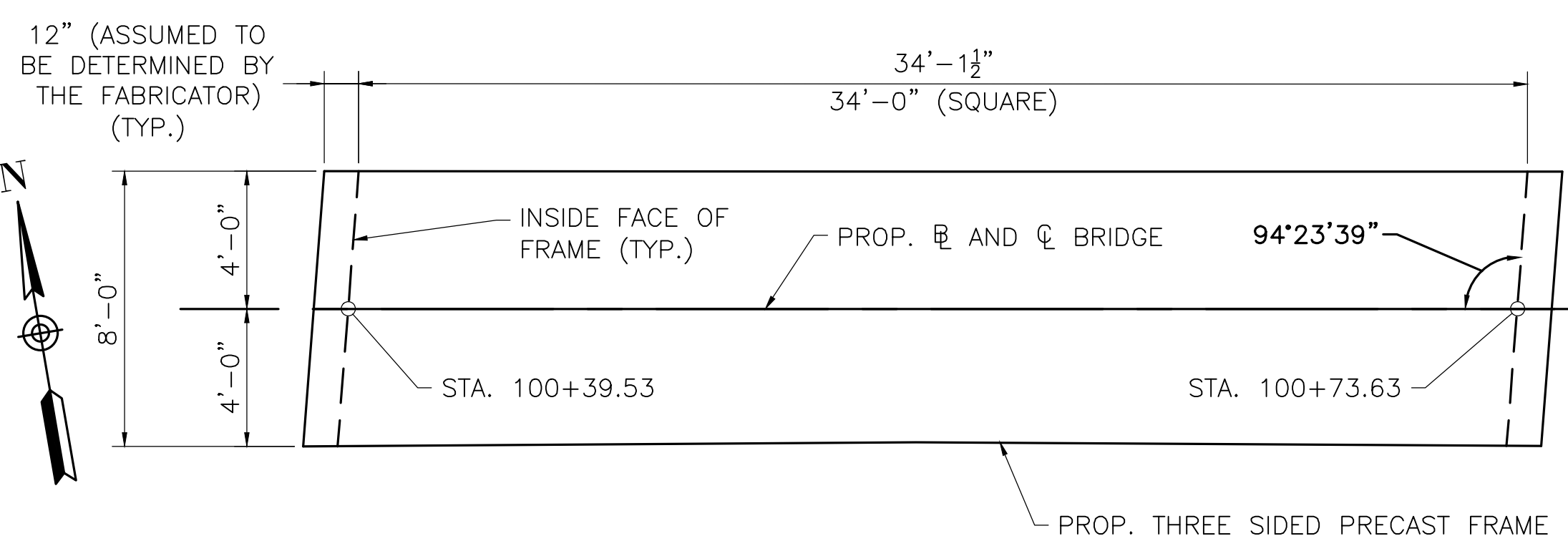
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BRIDGE PLAN AND DETAILS	
SCALE:	AS NOTED
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13 OF 20	



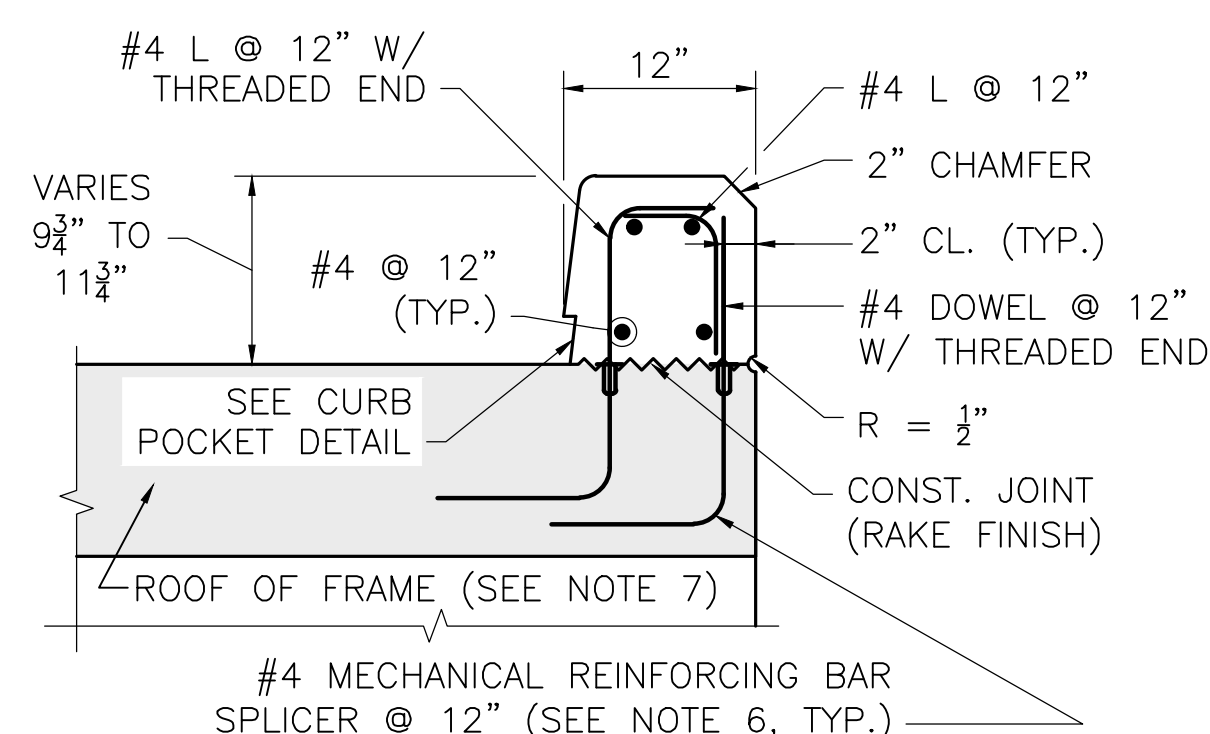
PLAN

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



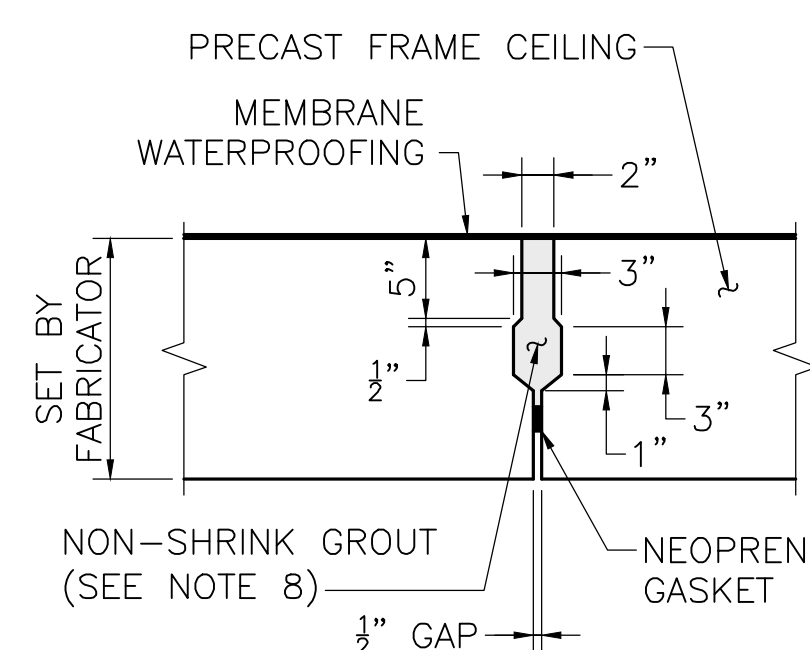
FRAMING PLAN

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



HEADWALL DETAILS

SCALE: 1" = 1'-0"

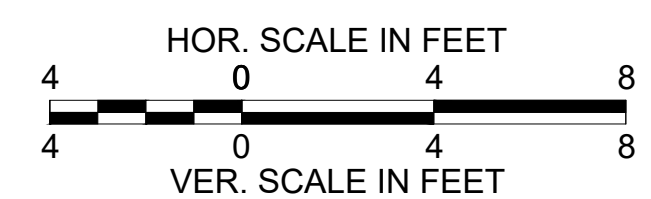
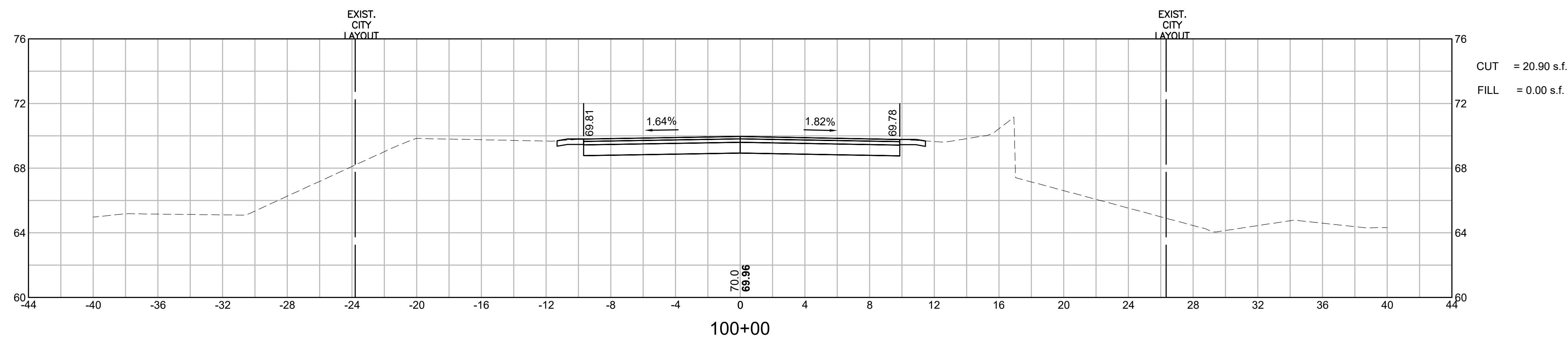
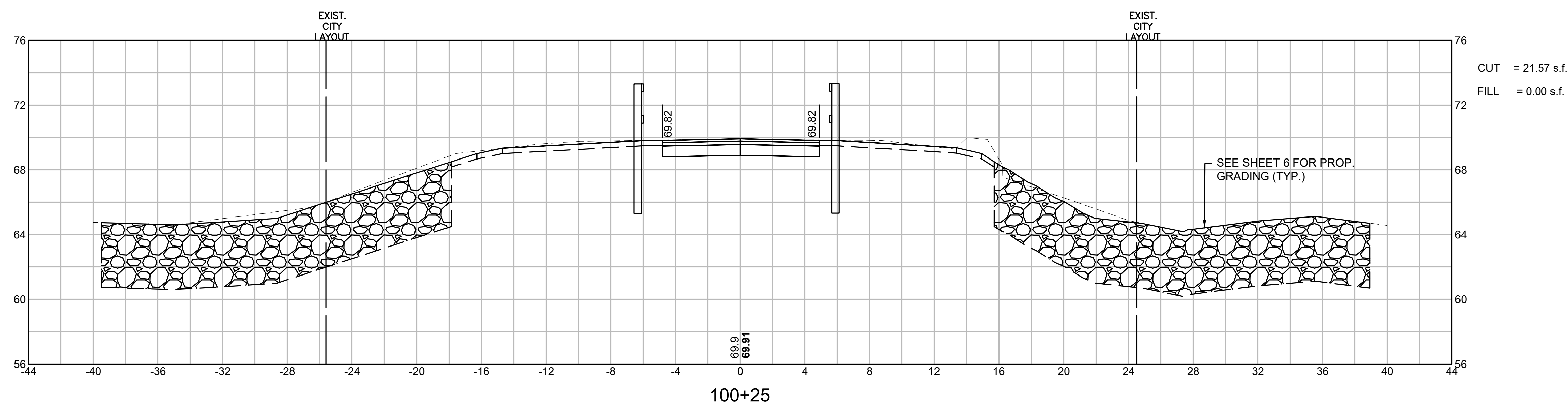
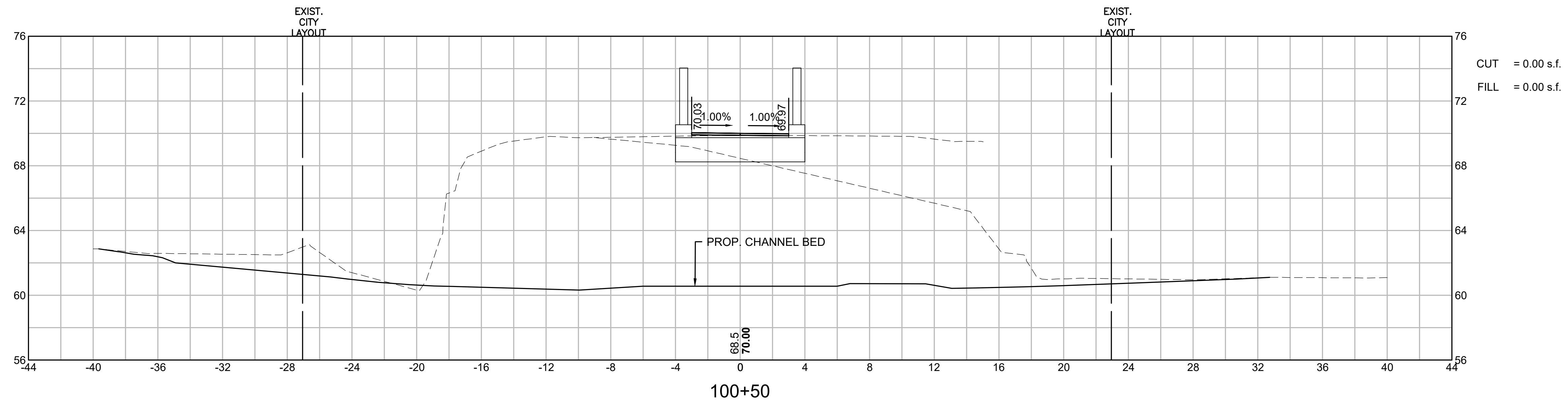


FRAME SHEAR KEY

SCALE: 1" = 1'-0"

- NOTES:

1. CONTRACTOR TO ADJUST STEM KEY DIMENSIONS AS REQUIRED.
2. FOR WORKING POINT COORDINATES SEE BRIDGE SHEET 7.
3. TEMPORARY WATER CONTROL PIPE SHOWN FOR REFERENCE. SYSTEM TO BE CONTRACTOR DESIGNED.
4. FOR SCOUR PROTECTION LIMITS SEE BRIDGE SHEET 8.
5. FOR EXISTING RIGHT OF WAY AND PROPOSED EASEMENTS SEE BRIDGE SHEET 1.
6. THE CONTRACTOR MAY SUBSTITUTE EXTENDED #4 HOOPS FOR THE MECHANICAL REINFORCING BAR SPLICERS AND THREADED REBARS AS SHOWN.
7. FRAME REINFORCEMENT IS NOT SHOWN FOR CLARITY.
8. SHEAR KEY DETAILS AND DIMENSIONS ARE CONCEPTUAL AND MAY BE ALTERED BY THE FABRICATOR TO SUIT THEIR OPERATIONS, HOWEVER THE FUNCTION AND INTENT OF THE DETAIL MUST BE MET. ALL DETAILS ARE TO BE APPROVED BY THE ENGINEER BEFORE FABRICATION.



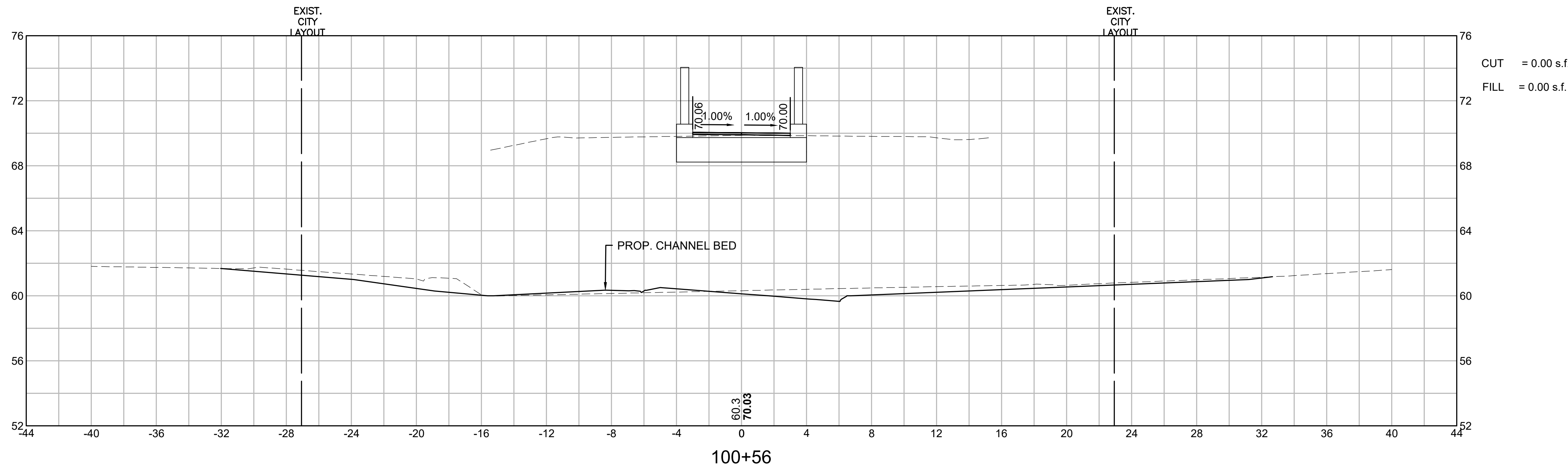
REVISIONS		
NO.	REVISION	DATE

11/6/2025

DRAWN/DESIGN BY NHG/GBP	CHECKED BY GJH
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**REPLACEMENT OF BRANDY BROW ROAD
CULVERT OVER EAST MEADOW RIVER**

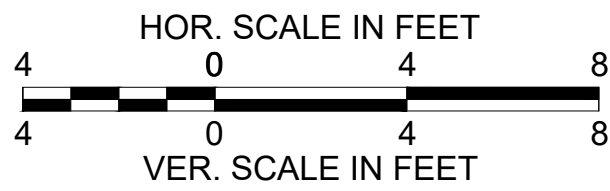
**BRANDY BROW ROAD
HAVERHILL, MASSACHUSETTS**



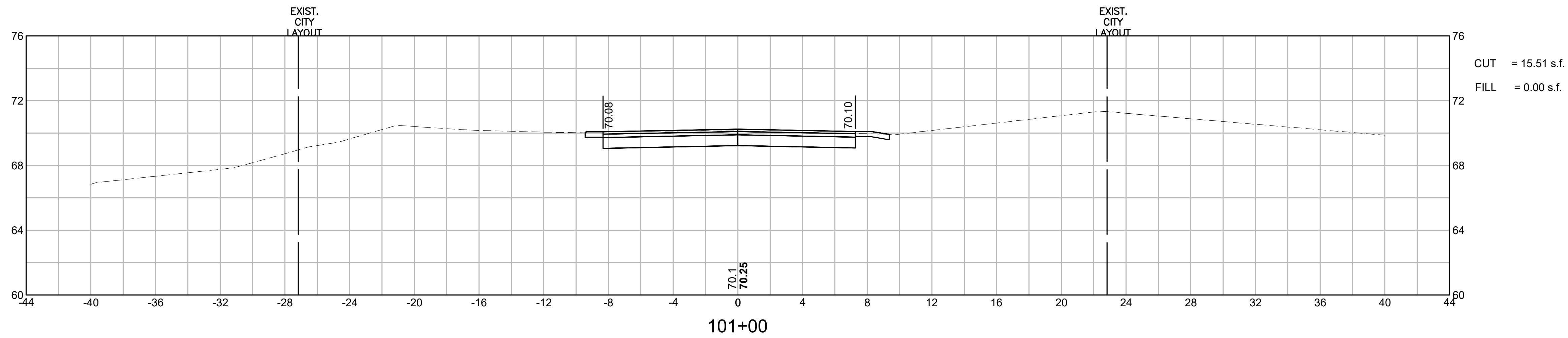
REVISIONS		
NO.	REVISION	DATE
11/6/2025		
DRAWN/DESIGN BY NHG/GBP		CHECKED BY GJH

CROSS SECTIONS

SCALE: 1"=4'



**REPLACEMENT OF BRANDY BROW ROAD
CULVERT OVER EAST MEADOW RIVER
BRANDY BROW ROAD
HAVERHILL, MASSACHUSETTS**



REVISIONS		
NO.	REVISION	DATE
11/6/2025		
DRAWN/DESIGN BY NHG/GBP		CHECKED BY GJH

CROSS SECTIONS

SCALE: 1"=4'

NEX-2300100.00

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