

BRIDGE NO.
B-07-017
STA 502+37.15
N 4696030.00
E 321515.92

CONCORD AVE

CONCORD AVE

LOCUS

SCALE: 1" = 2000'

SEISMIC DESIGN CRITERIA

DESIGN RETURN PERIOD: 1000

DESIGN SPECTRA

As 0.119

SDs 0.243

SD1 0.094

SITE CLASS D

SEISMIC DESIGN CATEGORY (SDC) A

PROJECT INFORMATION
PROJECT FILE NO.: 609204
PROJECT DESCRIPTION: PROPOSED BRIDGE
BRIDGE DESIGN LOADING: COOPER E-80
SURVEY: ELECTRONIC SURVEY BY NITSCH ENGINEERING
ELEVATION REFERENCE: NAVD OF 1988
BENCH MARK: SQ-CUT ON CONCRETE PAD CORNER

N. 2969536.3302 E. 745612.8095 EL. 29.96

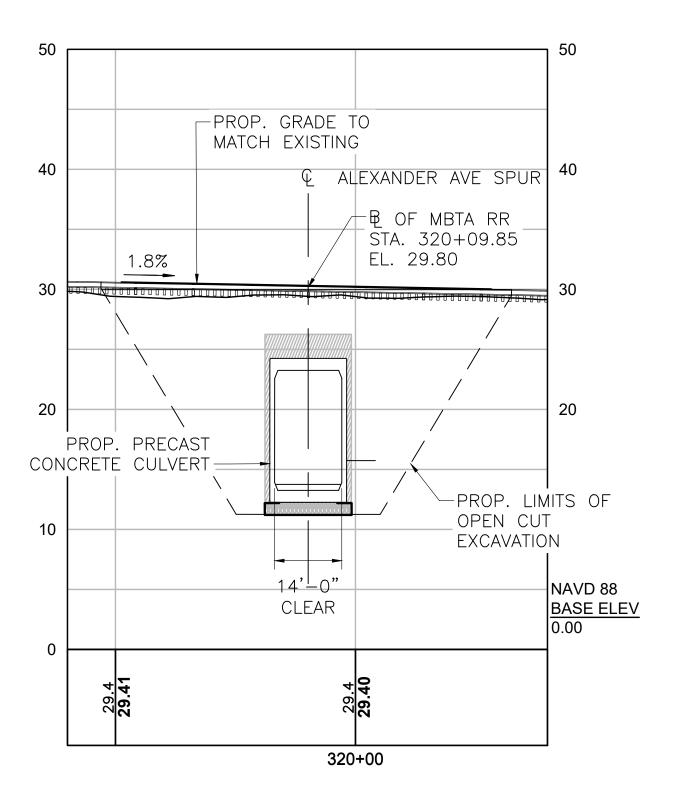
#### GENERAL NOTES:

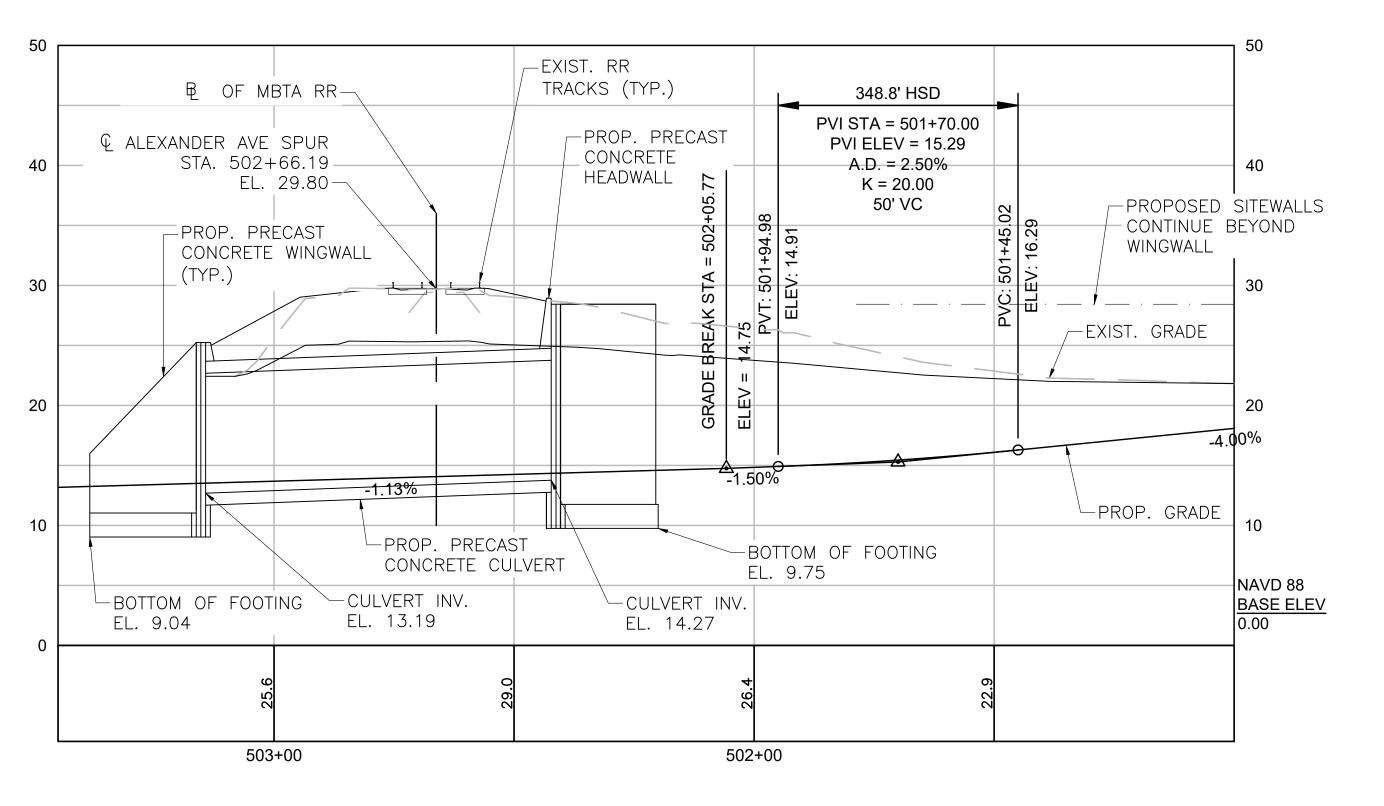
#### **DESIGN:**

IN ACCORDANCE WITH THE 2023 AREMA SPECIFICATIONS FOR RAIL BRIDGES, WITH INTERIM SPECIFICATIONS THROUGH 2023.

#### NOTES:

- 1. APPROVAL DOES NOT INCLUDE STRUCTURAL ANALYSIS.
- 2. DIMENSIONS OF STRUCTURAL MEMBERS ARE APPROXIMATE, AND WILL BE FINALIZED DURING THE FINAL DESIGN PHASE.
- 3. SEE GEOTECHNICAL REPORT, DATED OCTOBER 29, 2021.
- 4. NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.





## PROFILE ALONG & OF RAIL ROAD CONSTRUCTION AND SURVEY

HORIZONTAL SCALE: 1" = 20'VERTICAL SCALE:  $\frac{1}{8}" = 1'-0"$ 

# PROFILE ALONG & OF ALEXANDER AVE SPUR

HORIZONTAL SCALE: 1" = 20'VERTICAL SCALE:  $\frac{1}{8}" = 1'-0"$ 

	_
NITSCH ENGINEERING	
2 CENTER PLAZA, SUITE 430	
BOSTON, MA 02108	



SKETCH PLANS OF PROPOSED BRIDGE

### BELMONT

MBTA OVER ALEXANDER AVE SPURS,
BELMONT COMMUNITY PATH

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION

APPROVED BY	DATE
STRUCTURAL ELEMENTS:	
TITLE:	
HIGHWAY ELEMENTS:	

SHEET 1 OF 6 SHEETS BRIDGE NO. B-07-017 (CDE)

G		GZA Geol Engin	E <b>nviro</b> Pers and	nme Scient	ntal, ists	Inc.		Belmont Co	Engineering ommunity Path //assachusetts		BORING NO.: SHEET: PROJECT NO REVIEWED BY	1 of 01.0	2 174493	.00				
Forer	Foreman: Ken Smith Rig						Final Boring Depth (ft.): 25.0  Boring Location: See Plan  Ground Surface Elev. (ft.): 25.0  Final Boring Depth (ft.): 71  Date Start - Finish: 6/26/2020							H. Datum: See Plan  V. Datum: NAVD88				
I.D/O. Hamn	r/Casin .D.(in): ner Wei ner Fall	ight (Ib	4" O.D.	omatic		I.D./C Samp	ler Hm	- P P		Date Not	Groundv Time measured	Wate	er Depth	Ι	g Stab	o. Tin		
Depth	Casing Blows	7	Dontk	Samp Pen		Plouro	SPT	Sample	Description an	d Identifica	tion	nark	Field	Depth (ft.)	Stratum	. ?		
(ft)	Core Rate		(ft.)		(in)	Blows (per 6 in.)		(1)100	lified Burmister			Remark	Test Data	De l	Description	ר ב		
_		S-1	0-2	24	10	23 20	29	S-1: Medium dense, b	•	e SAND, little	e Silt, little to fine		ND					
-		S-2	2-4	24	7	9 7 6 6		to coarse Gravel, dry ( S-2: Loose, black, fine	. ,	EL, some fine	to coarse Sand	, 1	ND					
						9 5	15	trace Silt, dry (fill).					ND		=			
5 _		S-3	4-6	24	8	5 3	6	S-3: Very loose, black	tan, fine to coarse	SAND, little	fine Gravel,				FILL			
-		S-4	6-8	24	18	3 5 7 3		trace Silt, dry (fill). S-4: Top 5": Black/tan	, fine to coarse SA	ND, little fine	e Gravel. trace		ND					
-						3 3	6	Silt, dry (fill).	, 07	,								
-		S-5	8-10	24	15	8 12	0.5	S-4: Bottom 13": Tan,	•	Gravel, trace	Sand, wet.		ND	8.5'				
10 _						13 16	25	S-5: Very stiff, tan, Sil	ty CLAY, moist.									
- - - 15 _		S-6	14-16	24	24	4 8 7 8	15	S-6: Stiff, tan, Silty CL	AY, moist.				ND					
- - 20 _ - -		S-7	19-21	24	20	3 2 6 6	8	S-7: Stiff, tan, Silty CL	AY, trace Sand, n	noist.			ND					
25 _		S-8	24-26	24	24	PUSH		S-8: Gray, Silty CLAY,	, moist.				ND	s	SILTY CLA	Υ		
30		S-9	29-31	24	24	WOH WOH WOH 2	0	S-9: Very soft, gray, S	ilty CLAY, moist.				ND					
35 _ -																		
40		S-10	39-41	24	24	WOR WOF	8						ND					
	. Grour	1	1			i	1	Lace provided by Nitsch E	Engineering in the f	le "609204_H	HD(BASE) - Stand	lard.dv	wg".	<u>I</u>				
REMARKS																		
								rocedures. Stratification lin										

# BORING TB-1 (1 OF 2)

NOT TO SCALE

STA. 501+75.30 OFF: 6.63' L N: 2969576.7984 E: 745678.6451

NOT TO SCALE

BORING TB-1 (2 OF 2)

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.:

TB-1

**TEST BORING LOG** 

Nitsch Engineering Belmont Community Path Belmont, Massachusetts

S-11: Soft, gray, Silty CLAY, wet.

S-13 69-71 24 5 WOH 24 S-13: Dense, gray, fine to coarse SAND, some Gravel, some Silty Clay, wet.

Sample Description and Identification (Modified Burmister Procedure)

Bottom of boring at 71 feet.

BORING NO.: TB-1 SHEET: 2 of 2 PROJECT NO: 01.0174493.00 REVIEWED BY: ERS

Field Stratum Stratum

SILTY CLAY

<u>| 68' \_ \_ \_ \_ \_ -43.0' | </u>

GLACIAL TILL

GZA
GeoEnvironmental, Inc.
Engineers and Scientists
Sample

Depth (ft) Core Rate No. (ft.) Core Rate No. (ft.) Core Rate Sample No. (ft.) Core No. (ft

S-12 59-61 24 WOR WOR WOR S-12: Soft, gray, Silty CLAY, wet.

Difficult drilling noted at approximately 68 feet below ground surface.
 Upon completion, borehole backfilled with soil cuttings to approximate ground surface.

S-11 49-51 24 12 WOR WOR

#### **BORING NOTES**

- 1. LOCATION OF BORINGS SHOWN ON THE PLAN THUS: •
- 2. BORINGS ARE TAKEN FOR THE PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF MATERIAL 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 3 I.D. SPLIT SPOON SAMPLER 6" USING A 140 POUND WEIGHT FALLING 30".
- 5. BORINGS SAMPLES ARE STORED AT A STORAGE FACILITY LOCATED ON ROUTE 114 (219 WINTHROP AVE.) IN LAWRENCE, MA. THE CONTRACTOR MAY EXAMINE THE SOIL AND ROCK SAMPLES BY CONTACTING THE MASSDOT GEOTECHNICAL SECTION AT 10 PARK PLAZA, BOSTON, MA.
- 6. BORINGS TB-1 AND TB-3 WERE MADE BETWEEN JUNE 25 AND 30, 2020, BORING TB-2 WAS MADE BETWEEN AUGUST 31 AND SEPTEMBER 1, 2021.
- 7. BORINGS WERE MADE BY NEW ENGLAND BORING CONTRACTORS, 1215 WEST CHESTNUT STREET, BROCKTON, MA 02301.
- 8. THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.

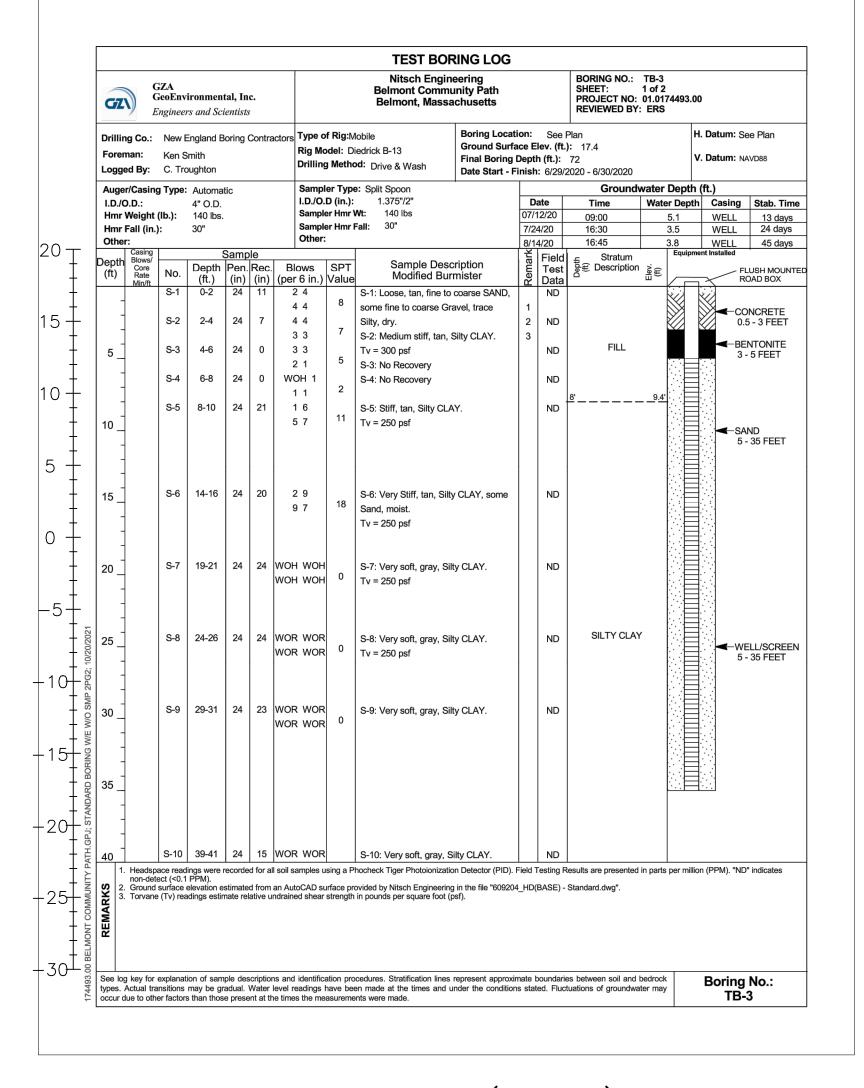
G	Z	) (	ZA GeoE	nviroi	<b>ime</b> i Scient	ntal,	Inc.			Nitsch E Belmont Co	RING LOG ngineering mmunity Path lassachusetts		BORING NO.: SHEET: PROJECT NO REVIEWED B	1 of : 01.0	1 174493.	00								
	ling ema			ngland B		Contra		Type o	of Rig:	ATV Soil Scout	Boring Location Ground Surface Final Boring De	e Elev. (ft.):	29.6		H.	H. Datum: See Plan								
		Ву:		0				Drillin	g Meth	od: Drive & Wash	Date Start - Fir	,	2021 - 9/1/202				NAVD88							
-		asing	٠.	Casi	_			-	ler Typ D. (in.)			Date	Ground	1	Depth (f er Depth	T .	g Stab	Time						
Hammer Fall (in.): 30" Sampler Hm					er Hmi Ier Hmi	r <b>Wt (lb):</b> 140 lbs r <b>Fall (in):</b> 30" Auto Hammer	measured	vvalt	л Бери															
Oth	С	asing	ilo nar		Şamp	_		Other			Description an	d Idontificat	ion	ᆤ	Field	₽~	Stratum							
(ft)	) (	Blows/ Core Rate	No.	Depth (ft.)	Pen.	Rec. (in)	Blo (per 6		SPT Value	(N/od	ified Burmister			Remark	Test	Dept (ft.)	Stratum Description	Elev						
	ľ	Kale	S-1	0-2	Grab	<del></del>	(I	,		S-1: Brown/dark brown		arse SAND an	d GRAVEL, littl	e 1										
	+									Silt, trace (-) Organics	dry.			3										
	+													ľ										
5	7		S-2	4-6	Grab					S-2: Brown/dark brown	, fine to coarse S	AND and GRA	AVEL, little Silt,											
	+									dry.				4			FILL							
	1																							
10	+		S-3	9-11	24	8	4	6		S-3: Medium dense, ta	ın/brown, fine to c	oarse SAND	some fine											
IU	+						5		11	Gravel, little Silt, wet.			<b>.</b>											
	]															12.5'		17						
	+				1																			
15	_		S-4	14-16	24	15	14		27	S-4: Very stiff, tan/bro	vn, SILT & CLAY,	wet.												
	+						15	20	27															
	+																							
	1		0.5	10.01		0.4	_	10		S. E. Vores eliff ( "	···· OII TO OI AN	at					SILTY CLAY	,						
20	$\dashv$		S-5	19-21	24	24	7 16		26	S-5: Very stiff, tan/bro	vii, SILT & CLAY,	wel.					I OLA	•						
	1																							
	+																							
25	_		U-6	24-26	24	24	Push	/24"	R	U-6: Gray, Silty CLAY,	wet.													
	+				-					l E	ottom of boring a	t 26 feet.		5		26'		;						
	1										g													
	]																							
30	$\dashv$																							
	1																							
	+																							
35																								
	+																							
	+																							
	]																							
40				1 "				A	A.D			I- 11000000	D/DAGE' =:											
RKS	2. E	Boring v grab sa	acuum/ mples f	excavate from the v	ed to a acuum	depth excav	of approation a	oximate	ely 6 fe walls o	ace provided by Nitsch E et below ground surface f the boring. The boring v pth of approximately 14 f	bgs) to clear for ut vas backfilled with	tilities on 8/23/ the excavated	2021. Soil exca soil upon comp	vated v	vās visua			on						
REMARKS	4. (	Grinding	g and c	olor chan	ge obs	erved	(black t	o brow	n/dark l	provincely 14 for approximately 14 for approximate for approximate ground surfa	w ground surface (		a.oroditor.											
뀝	'			., 25,611					3, 10 0		•													
										rocedures. Stratification line						Bori	ng No.:							
										een made at the times and nents were made.	unuer the condition	io stateu. FIUCI	uations of ground	water	nay	Т	B-2							

#### BORING TB-2

NOT TO SCALE

STA. 502+42.24 OFF: 10.01' R N: 2969518.9307 E: 745698.1721 BOTTOM OF
CULVERT AT
CULVERT INLET
EL. 12.77

BOTTOM OF
WINGWALL
FOOTING AT
CULVERT INLET
EL. 9.75



### BORING TB-3 (1 OF 2)

NOT TO SCALE

STA. 503+37.02 OFF: 4.25' R N: 2969426.1580 E: 745696.5370

#### **BORING NOTES**

(7/24/2020)

BOTTOM OF

EL. 12.03-

CULVERT AT

CULVERT OUTLET

-BOTTOM OF

WINGWALL

EL. 9.04

FOOTING AT

CULVERT OUTLET

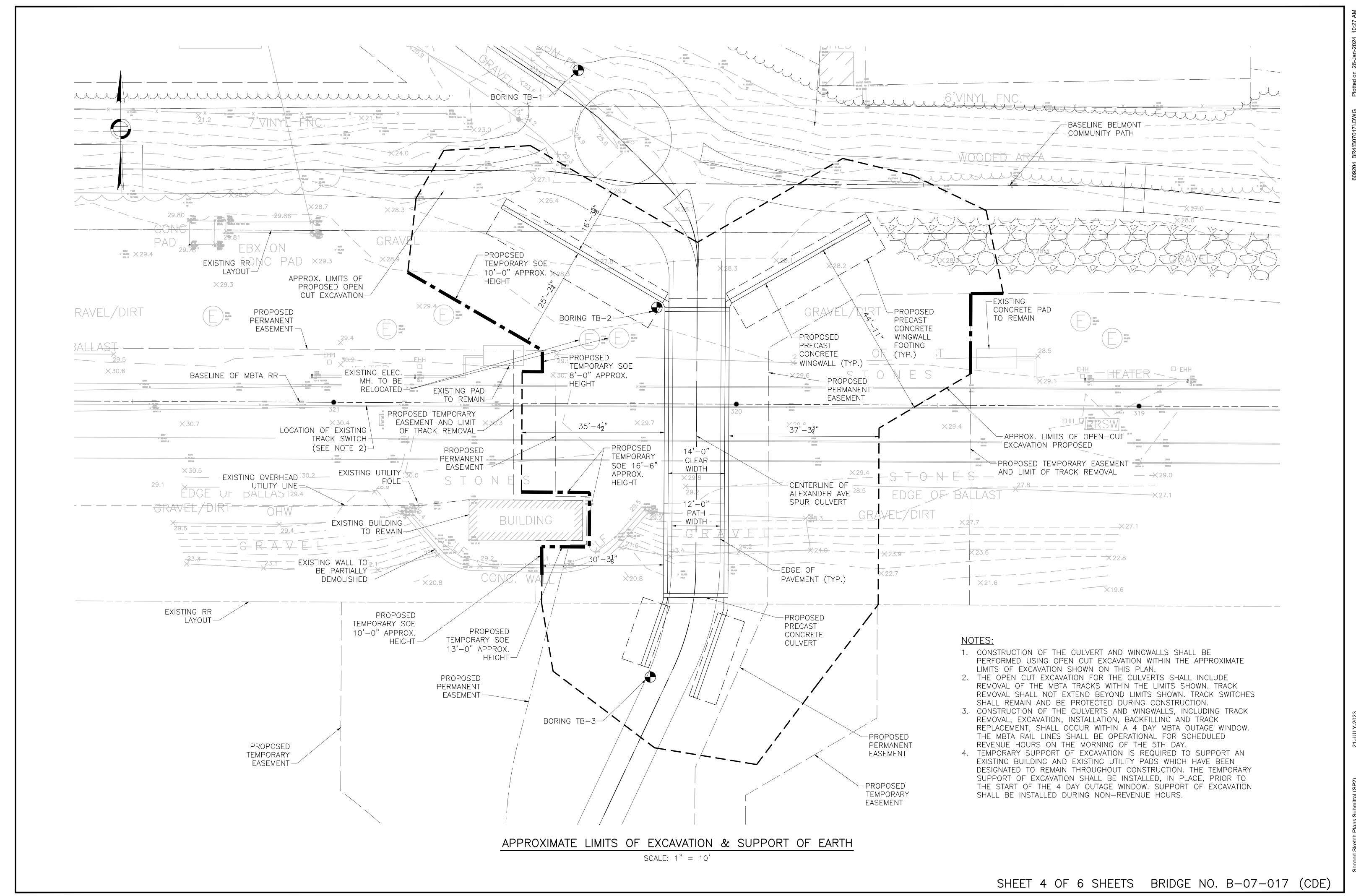
- 1. LOCATION OF BORINGS SHOWN ON THE PLAN THUS: •
- 2. BORINGS ARE TAKEN FOR THE PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF MATERIAL TO BE ENCOUNTERED DURING CONSTRUCTION.
- 3. WATER LEVELS SHOWN ON THE BORING LOGS WERE OBSERVED AT THE TIME 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 3" I.D. SPLIT SPOON SAMPLER 6" USING A 140 POUND WEIGHT FALLING 30".
- 5. BORINGS SAMPLES ARE STORED AT A STORAGE FACILITY LOCATED ON ROUTE 114 (219 WINTHROP AVE.) IN LAWRENCE, MA. THE CONTRACTOR MAY EXAMINE THE SOIL AND ROCK SAMPLES BY CONTACTING THE MASSDOT GEOTECHNICAL SECTION AT 10 PARK PLAZA, BOSTON, MA.
- \_\_\_\_\_\_ 6. BORINGS TB−1 AND TB−3 WERE MADE BETWEEN JUNE 25 AND 30, 2020, BORING TB−2 WAS MADE BETWEEN AUGUST 31 AND SEPTEMBER 1, 2021.
  - 7. BORINGS WERE MADE BY NEW ENGLAND BORING CONTRACTORS, 1215 WEST CHESTNUT STREET, BROCKTON, MA 02301.
  - 8. THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.

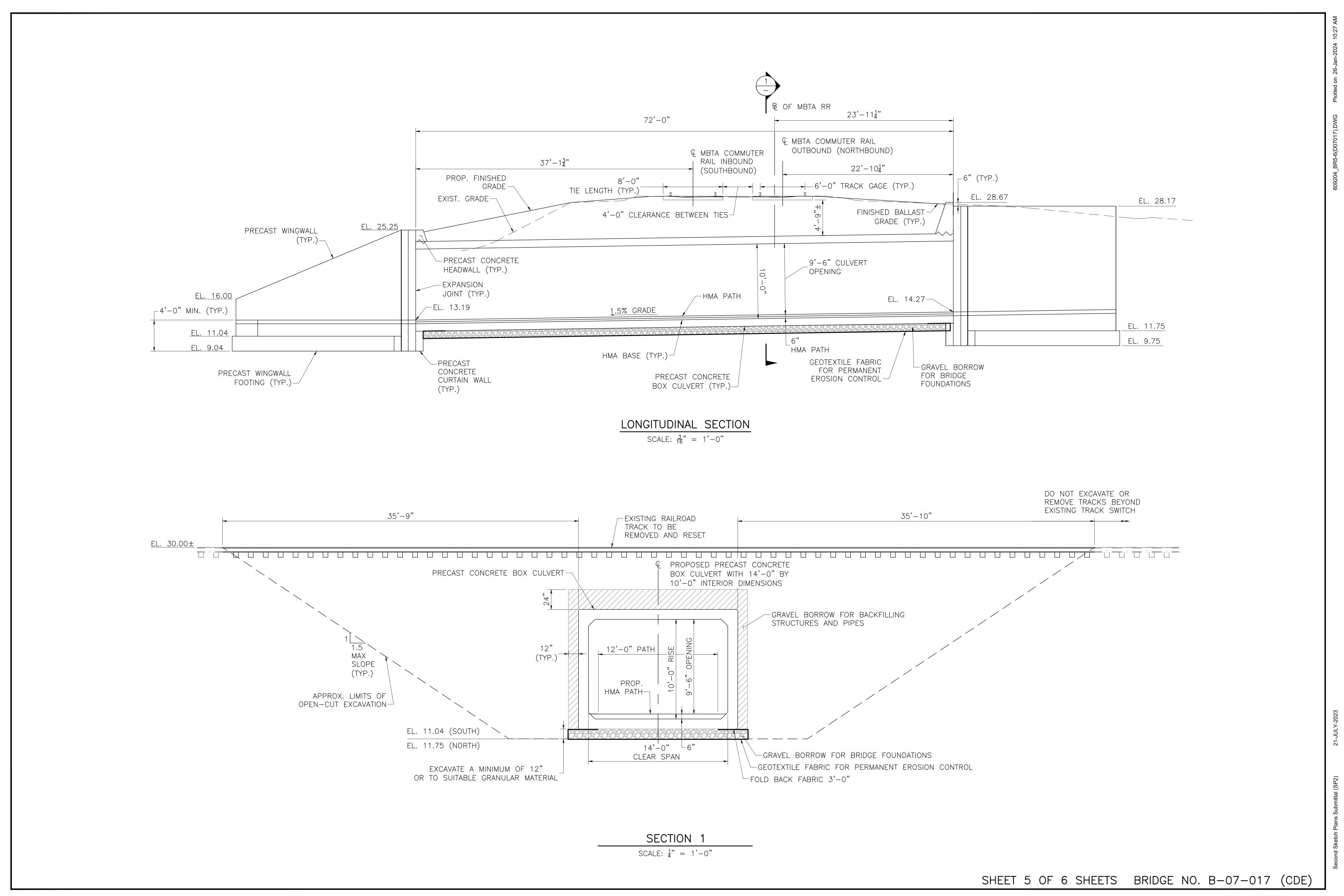
**TEST BORING LOG** Nitsch Engineering Belmont Community Path Belmont, Massachusetts BORING NO.: TB-3 SHEET: 2 of 2 PROJECT NO: 01.0174493.00 GZA
GeoEnvironmental, Inc.
Engineers and Scientists REVIEWED BY: ERS Depth (ft) | Casing Blows/ (ft) | Core Rate Min/ft | No. | Depth | Pen. Rec. | Blows | SPT | (ft.) | (in) | (in) | (per 6 in.) | Value | Field Stratum
Test Description Sample Description Modified Burmister Equipment Installed S-11 49-51 24 24 PUSH S-11: Gray, Silty CLAY. SILTY CLAY S-12: Very soft, gray, Silty CLAY. wor wor GLACIAL TILL S-13 | 69-71 | 24 | 15 | 16 38 S-13: Very dense, gray, fine to coarse 77 87 GRAVEL, some Silty Clay, some fine to coarse Sand, wet. Bottom of boring at 72 feet. 4. Shelby Tube pushed from approximately 49 to 51 feet.
5. Increased drilling resistance at approximately 66 feet, indicating transition to glacial till.
6. Rollerbit refusal at 72 feet due to hole collapse. See log key for explanation of sample descriptions and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

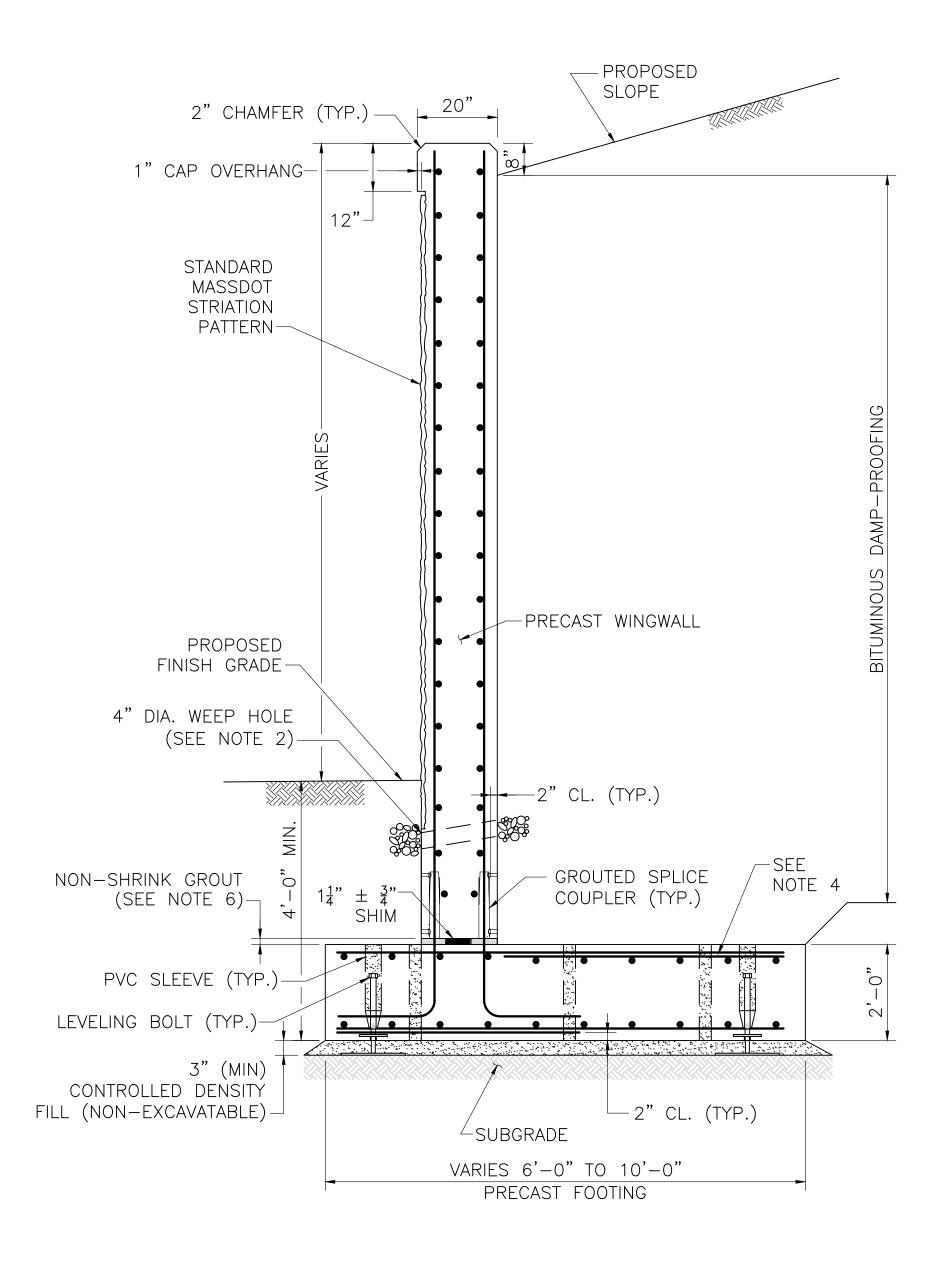
BORING TB-3 (2 OF 2)

NOT TO SCALE

SHEET 3 OF 6 SHEETS BRIDGE NO. B-07-017 (CDE)



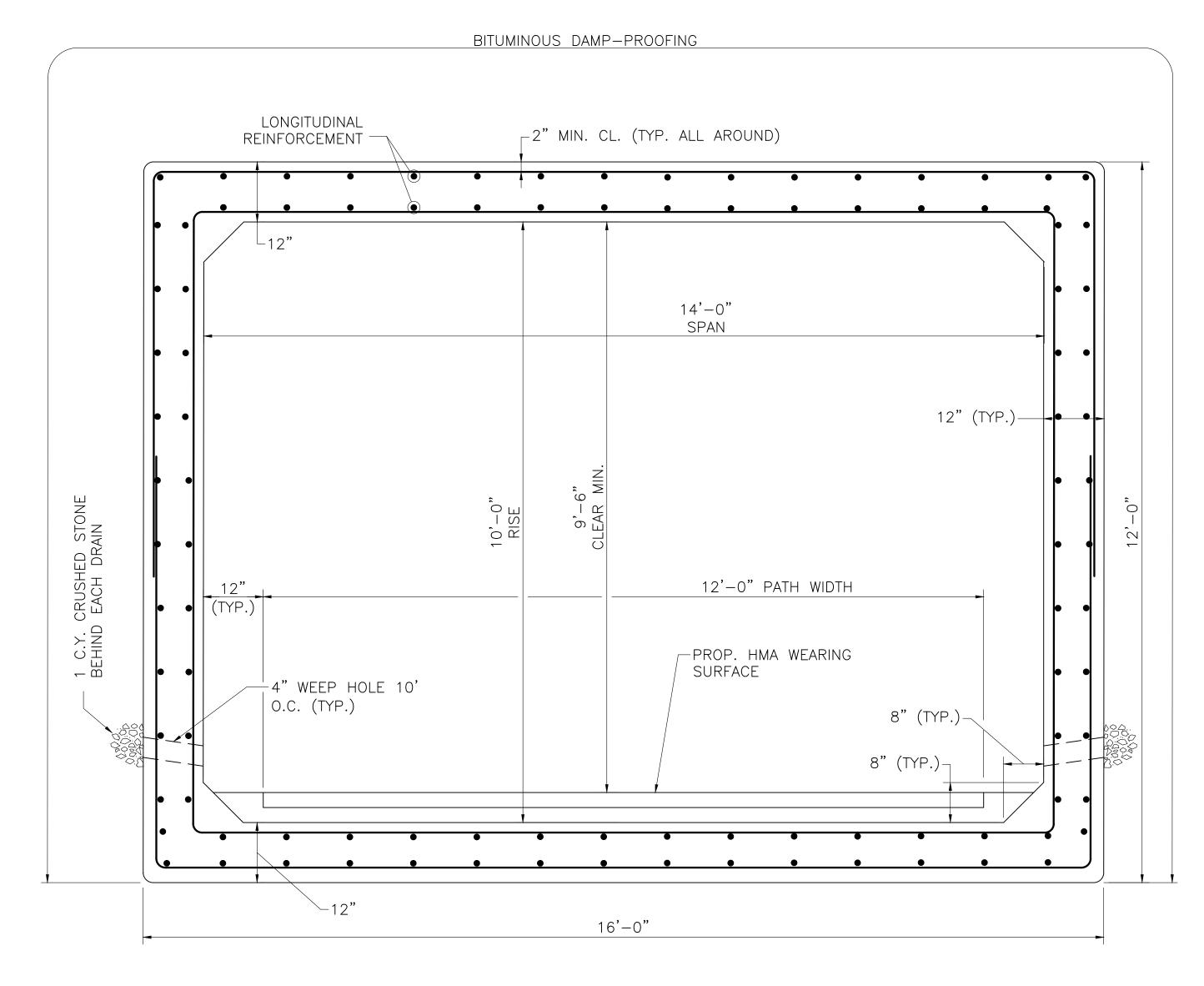




PRECAST WINGWALL SECTION SCALE:  $\frac{1}{2}$ " = 1'-0"

### NOTES:

- 1. BITUMINOUS DAMP-PTOOFING SHALL BE APPLIED CONTINUOUSLY ALONG THE BACK OF THE WALL STEM AND THE TOP OF THE FOOTING HEEL AS SHOWN.
- 2. 4" Ø WEEP HOLES 10'-0" O.C. 18" ABOVE BASE OF STEM. PROVIDE 1 CUBIC YARD OF CRUSHED STONE AT EACH END OF WEEP HOLE.
- 3. ALL CONCRETE SHALL BE 4000 PSI,  $1\frac{1}{2}$  IN, 565 CEMENT CONCRETE. 4. ALLOWABLE BEARING CAPACITY OF 2500 PSF WITH A FACTOR OF SAFETY OF
- 5. PRE-BED PRECAST ELEMENT WITH NON-SHRINK GROUT WITH THICKNESS MORE THAN SHIM STACK.



#### NOTES:

- 1. ALLOWABLE BEARING CAPACITY = 2.50 KSF, FACTOR OF SAFETY = 3.0
- 2. TRANSVERSE REINFORCING SHALL BE PLACED NORMAL TO THE Q OF THE CULVERT.

PRECAST CULVERT SECTION SCALE:  $\frac{3}{4}$ " = 1'-0"

SHEET 6 OF 6 SHEETS BRIDGE NO. B-07-017 (CDE)