56 Prospect Street
P.O. Box 270
Hartford, CT 06141-0270

Kathleen M. Shanley
Manager – Transmission Siting
Tel: 860-728-4527

September 5, 2019

Ms. Melanie Bachman, Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Docket No. 461A: Greenwich Substation and Line Project, Indian Harbor Crossing Development and Management Plan
Submission of the Final Pedestrian/Utility Bridge Design and Provision of Information Regarding the Bridge Design and 100-Year Flood

Dear Ms. Bachman:

Pursuant to the condition in the Connecticut Siting Council's (Council's) May 23, 2019 approval of the above-referenced Development and Management (D&M) Plan, the Connecticut Light and Power Company doing business as Eversource Energy (Eversource) submits the enclosed information regarding the following:

1. Final design details and drawings for the pedestrian/utility bridge over Indian Harbor[1] (Attachment A); and

2. Information from the Town of Greenwich's engineering consultant demonstrating that the bridge will not be affected by a 100-year flood. (Attachment B).

Attached to this original are two copies of this information. Should you have any questions, please do not hesitate to contact me at via e-mail at kathleen.shanley@eversource.com or telephone at (860) 728-4527.

Sincerely,

Kathleen M. Shanley

[1] Note: The bridge will technically span Davis Mill Pond, which is the impounded area between the Interstate 95 and Davis Avenue bridges. Indian Harbor is to the south of the Davis Avenue bridge. However, for the purposes of the D&M Plan, the bridge is referred to generically as crossing "Indian Harbor".

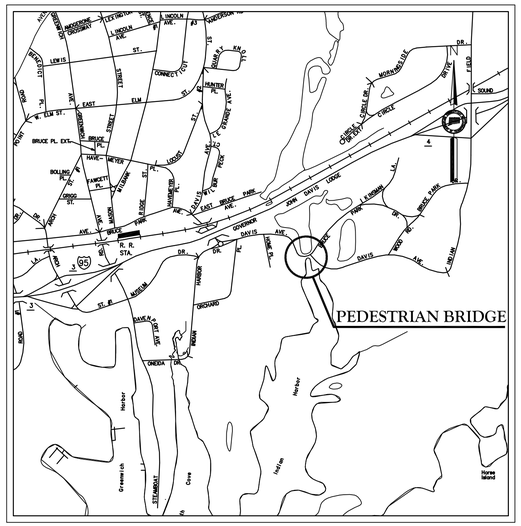
ATTACHMENT A

FINAL DESIGN
PEDESTRIAN/UTILITY BRIDGE OVER DAVIS MILL POND

PEDESTRIAN/UTILITY BRIDGE
OVER DAVIS MILL POND

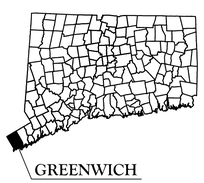
GREENWICH, CT

JULY 2019



LOCATION PLAN

SCALE
1000 0 1000 2000 3000 FEET



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Call Before You Dig, Inc.

LIST OF DRAWINGS

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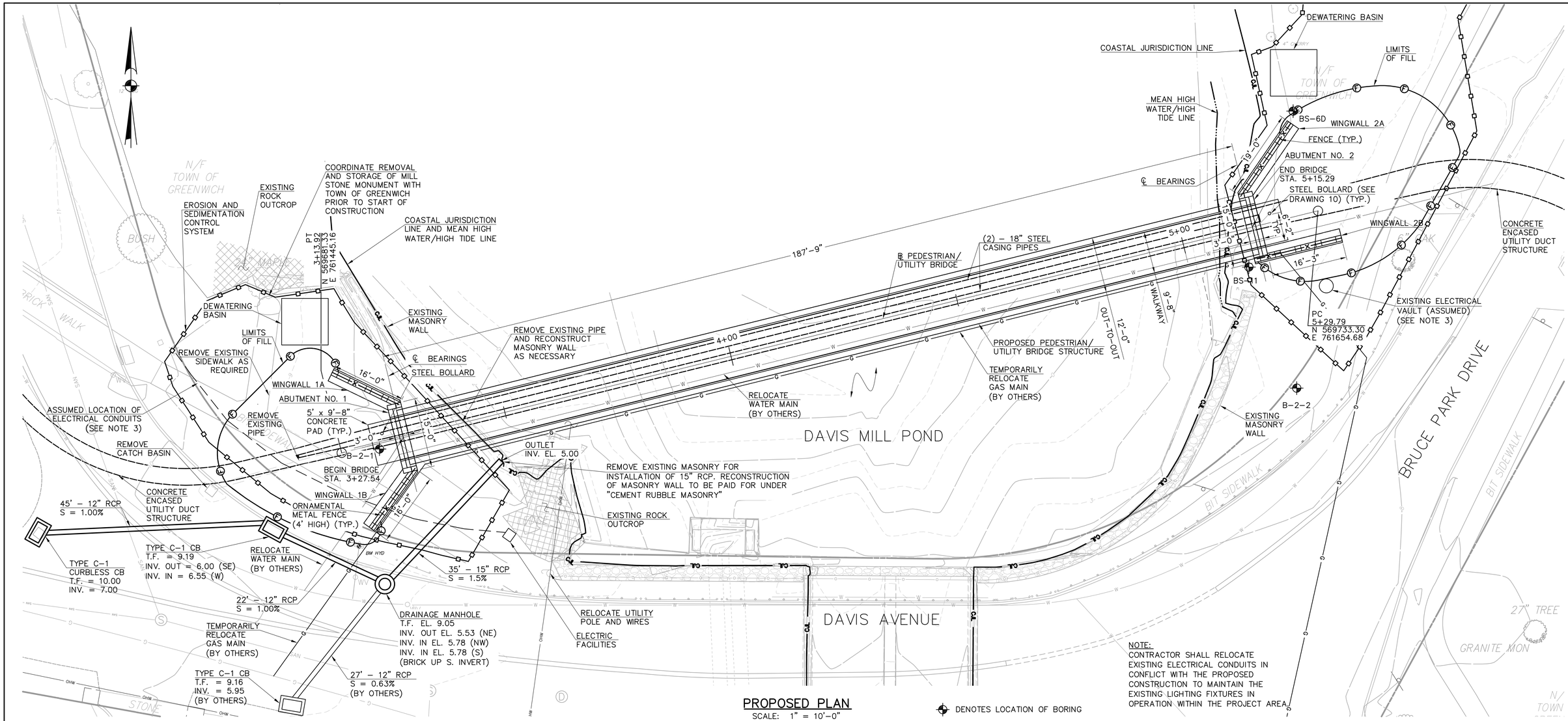
benesch
120 HEBRON AVENUE, GLASTONBURY, CT

STEVEN J. DRECHSLER CT P.E. LIC. NO. 23441 7/30/2019 DATE

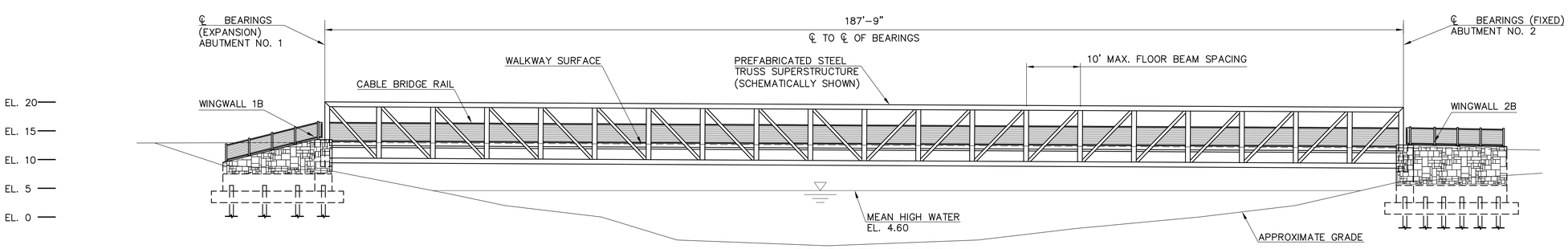


PROPOSED PLAN

SCALE: 1" = 10'-0"

DENOTES LOCATION OF BORING

NOTE:
CONTRACTOR SHALL RELOCATE EXISTING ELECTRICAL CONDUITS IN CONFLICT WITH THE PROPOSED CONSTRUCTION TO MAINTAIN THE EXISTING LIGHTING FIXTURES IN OPERATION WITHIN THE PROJECT AREA.



PROPOSED ELEVATION

SCALE: 1" = 10'-0"

NOTES:
1. CONTRACTOR TO COORDINATE WITH UNDERGROUND CONTRACTOR FOR TIE-IN OF 18"ø STEEL CASING PIPES OFF OF BOTH ENDS OF THE BRIDGE
2. TEMPORARY RE-ROUTING OF PEDESTRIAN TRAFFIC AROUND CONSTRUCTION SITE SHALL BE THE RESPONSIBILITY OF THE UNDERGROUND CONTRACTOR
3. CONTRACTOR SHALL RELOCATE EXISTING ELECTRICAL CONDUITS IN CONFLICT WITH THE PROPOSED CONSTRUCTION TO MAINTAIN THE EXISTING LIGHTING FIXTURES IN OPERATION WITHIN THE PROJECT AREA.

REV.	DATE	DESCRIPTION	SHEET. NO.
		REVISIONS	

MANUAL REVISIONS TO THIS DOCUMENT ARE PROHIBITED. ALL REVISIONS MUST BE DONE TO ELECTRONIC MEDIA.

DESIGNER: M. HABEK
DRAFTER: M. HABEK
CHECKED BY: R. MEARS
DATE CHECKED: 7/24/19

benesch

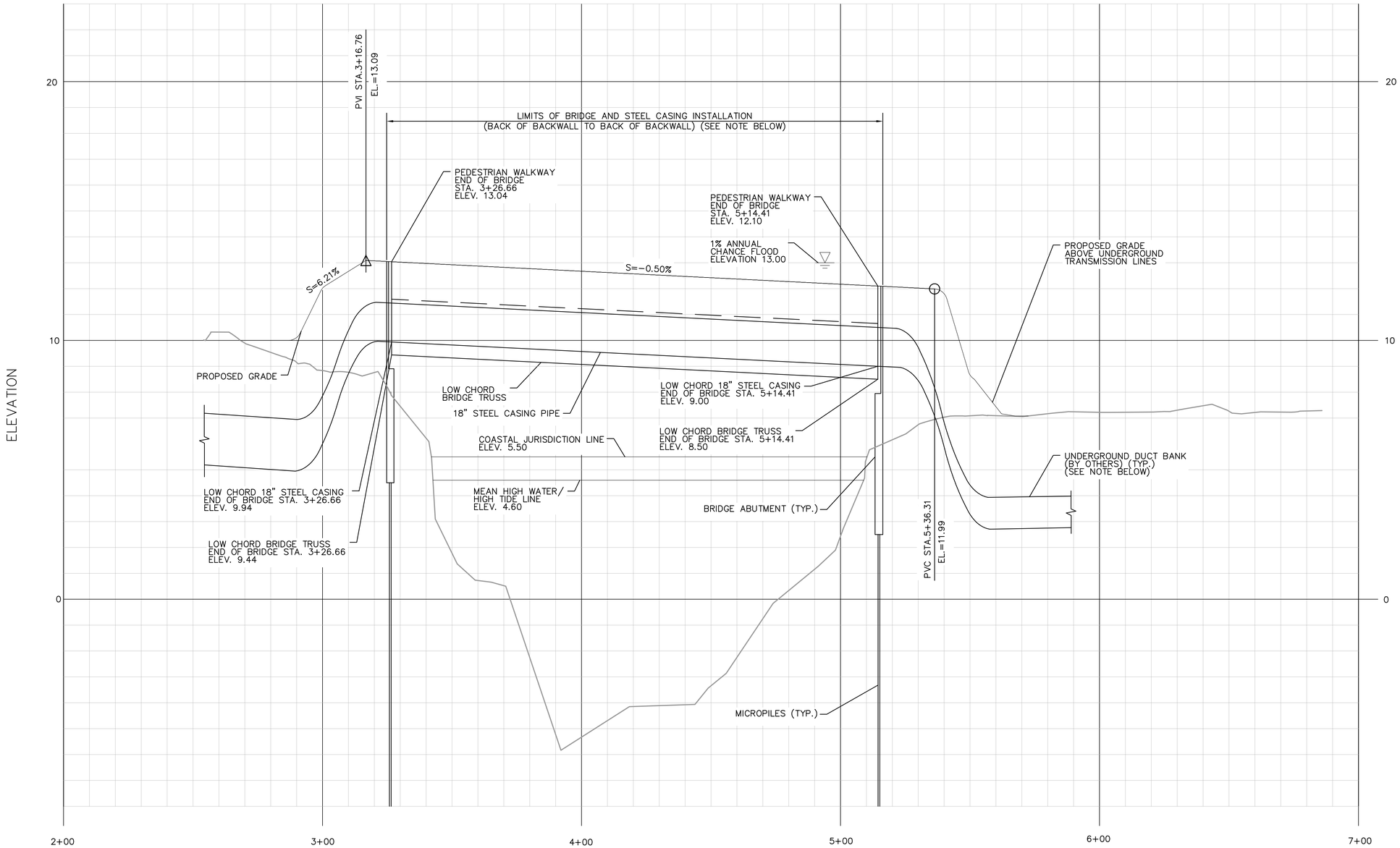
PROJECT TITLE:
PEDESTRIAN/UTILITY BRIDGE OVER DAVIS MILL POND

SCALE AS NOTED
PLOTTED: 7/24/2019

TOWN: GREENWICH, CONNECTICUT

DRAWING TITLE: GENERAL PLAN AND ELEVATION

PROJECT NO.:
DRAWING NO.: 2
SHEET NO.:



PEDESTRIAN BRIDGE PROFILE

SCALE: 1" = 20'-0"
(SCALED 10 TIMES VERTICAL)

NOTE: FOR WORK LIMITS OF TRANSMISSION LINE INSTALLATION, SEE "ABUTMENT ELEVATION AT ELECTRICAL ENTRY" DETAIL ON DWG. NO. 12.

REV.	DATE	DESCRIPTION	SHEET. NO.
		REVISIONS	

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DESIGNER: M. HABEK
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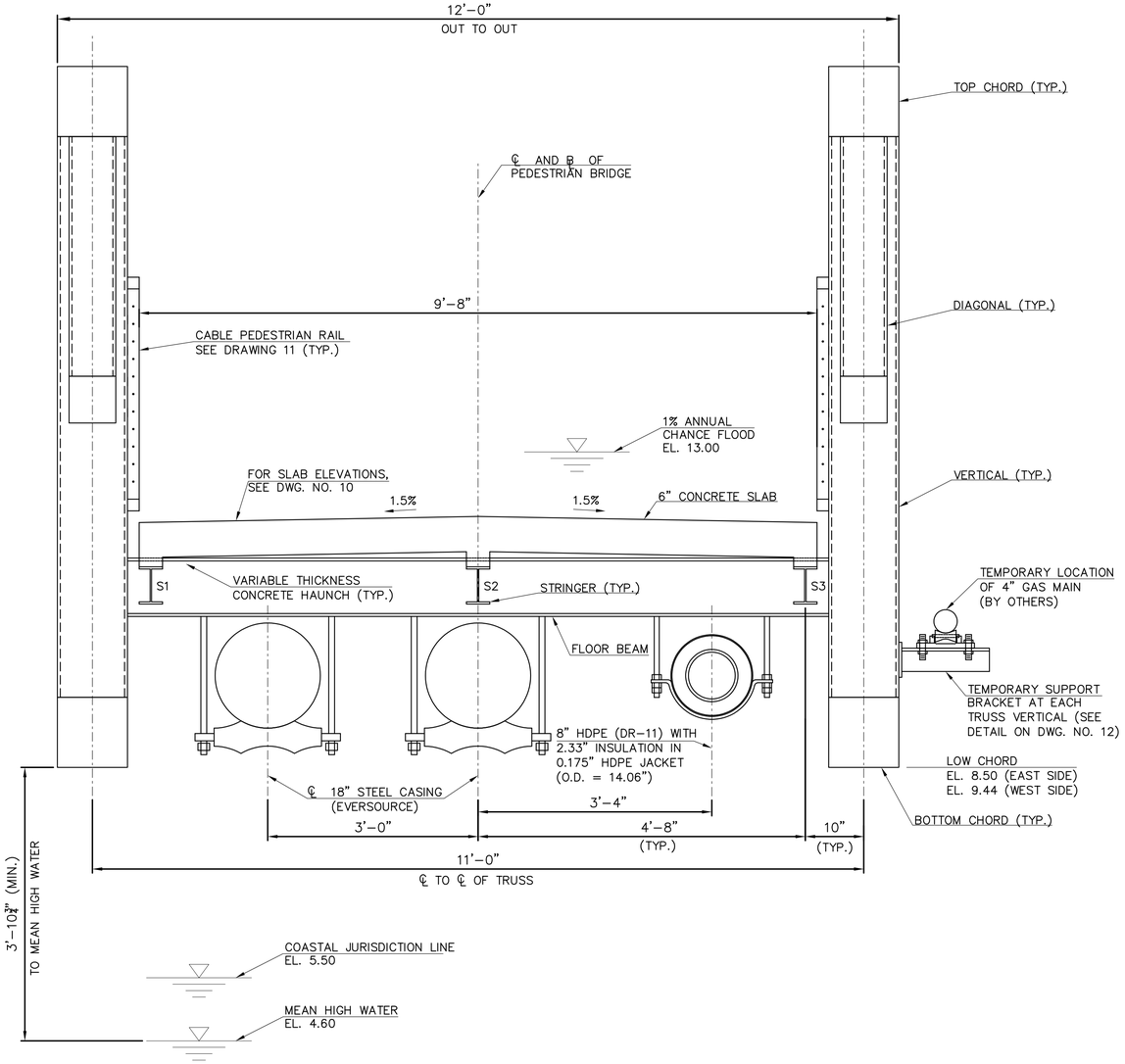
PROJECT TITLE: PEDESTRIAN/UTILITY BRIDGE OVER DAVIS MILL POND

SCALE AS NOTED | PLOTTED: 7/24/2019

TOWN: GREENWICH, CONNECTICUT
DRAWING TITLE: PROFILE

PROJECT NO.: 05012
DRAWING NO.: 3
SHEET NO.:



BRIDGE SECTION*

SCALE: 1" = 1'–0"

*SECTION SHOWN LOOKING EAST

SUGGESTED CONSTRUCTION SEQUENCE:

1. INSTALL EROSION AND SEDIMENTATION CONTROL SYSTEMS.
2. TEMPORARILY RELOCATE OR DE–ENERGIZE OVERHEAD UTILITY POLES AND WIRES TO ACCOMMODATE CRANES
3. INSTALL TEMPORARY EARTH RETAINING SYSTEM FOR THE CONSTRUCTION OF THE ABUTMENTS AND WINGWALLS
4. EXCAVATE AT LOCATIONS OF PROPOSED ABUTMENTS AND WINGWALLS
5. DRILL MICRO–PILES FOR THE ABUTMENTS AND WINGWALLS
6. POUR TREMIE CONCRETE WITHIN EXCAVATION
7. POUR CONCRETE FOR ABUTMENTS AND WINGWALLS
8. INSTALL ASHLAR MASONRY
9. ERECT PREFABRICATED PEDESTRIAN / UTILITY BRIDGE
10. INSTALL (2) – 18"ø STEEL CASING PIPES AND COORDINATE TIE–INS WITH UNDERGROUND CONTRACTOR
11. RELOCATE UTILITIES ONTO PEDESTRIAN / UTILITY BRIDGE
12. CONSTRUCT BACKWALLS AND CHEEKWALLS
13. BACKFILL PEDESTRIAN / UTILITY BRIDGE APPROACHES TO THE PROPOSED TEMPORARY GRADE
14. REMOVE EROSION AND SEDIMENTATION CONTROL SYSTEMS AFTER PERMANENT STABILIZATION IS ESTABLISHED
15. DEMOBILIZE

GENERAL NOTES:

SPECIFICATIONS: CONNECTICUT DEPARTMENT OF TRANSPORTATION FORM 817 (2016), SUPPLEMENTAL SPECIFICATIONS DATED JULY 2017 AND SPECIAL PROVISIONS.

DESIGN SPECIFICATIONS: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 2017 8TH EDITION, WITH THE INTERIM SPECIFICATIONS AND AS SUPPLEMENTED BY THE CONNECTICUT DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN MANUAL (2003). AASHTO LRFD GUIDE SPECIFICATIONS FOR DESIGN OF PEDESTRIAN BRIDGES.

ALLOWABLE DESIGN STRESSES:
CLASS 'A' CONCRETE BASED ON F'c = 3000 PSI
CLASS 'F' CONCRETE BASED ON F'c = 4000 PSI

REINFORCEMENT (ASTM A615 GRADE 60) Fy = 60,000 PSI

STRUCTURAL STEEL (AASHTO M270 GRADE 50 F2) Fy = 50,000 PSI

THE SPECIFIED CONCRETE STRENGTH USED IN DESIGN, F'c, OF THE CONCRETE COMPONENTS IS NOTED ABOVE. THE MINIMUM COMPRESSIVE STRENGTH OF THE CONCRETE IN THE CONSTRUCTED COMPONENTS SHALL CONFORM TO THE REQUIREMENTS OF 'SECTION 6.01 CONCRETE FOR STRUCTURES.'

PAINT: ALL STRUCTURAL STEEL SHALL BE PAINTED. THE COLOR OF THE TOPCOAT MATERIAL ON THE STRUCTURAL STEEL SHALL BE "CERTIFICATE GREEN" (CMYK 90 37 87 33). COST OF PAINTING TO BE INCLUDED UNDER THE ITEM "PEDESTRIAN BRIDGE SUPERSTRUCTURE."

LIVE LOAD: PEDESTRIAN: 90 PSF
VEHICULAR: H–5
LIVE LOAD DEFLECTION (MAX): SPAN/360 (PER AASHTO LRFD GUIDE SPECIFICATIONS FOR DESIGN OF PEDESTRIAN BRIDGES)

FLOOD PRESSURE LOADS: 9.5 LBS/LF OF BRIDGE (TOTAL FORCE = 1,800#) APPLIED ALONG AREA FROM TOP OF DECK TO LOW CHORD

FUTURE PAVING ALLOWANCE: NONE

FOUNDATION PRESSURES AND PILE LOADS: THE VARIOUS LOADINGS NOTED ON THE SUBSTRUCTURE PLAN SHEETS REFER TO THE LOAD COMBINATIONS AS GIVEN IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

DIMENSIONS: ALL ELEVATIONS ARE GIVEN IN FEET, WHEN ELEVATIONS ARE GIVEN TO LESS THAN THREE DECIMAL PLACES, THE OMITTED DIGITS SHALL BE ASSUMED TO BE ZERO.

UTILITIES: THE CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES LOCATED WITHIN THE VICINITY OF THE CONSTRUCTION SITE.

EXISTING DIMENSIONS: DIMENSIONS OF THE EXISTING STRUCTURE SHOWN ON THESE PLANS ARE FOR GENERAL REFERENCE ONLY. THEY ARE BASED ON ROUGH FIELD MEASUREMENTS OR EXISTING DRAWINGS AND ARE NOT GUARANTEED. THE CONTRACTOR SHALL TAKE ALL FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF THE FINISHED WORK AND SHALL ASSUME FULL RESPONSIBILITY FOR THEIR ACCURACY. WHEN SHOP DRAWINGS BASED ON FIELD MEASUREMENTS ARE SUBMITTED FOR APPROVAL, THE FIELD MEASUREMENTS SHALL ALSO BE SUBMITTED FOR REFERENCE BY THE REVIEWER.

TURF ESTABLISHMENT: AREAS OF TURF / LAWN DISTURBED BY CONSTRUCTION OPERATIONS SHALL BE RESTORED AT THE COMPLETION OF THE WORK WITH 4" OF TOPSOIL AND TURF ESTABLISHMENT. THE SEED MIX SHALL BE "SPORTS TURF SEED MIXTURE" SUPPLIED BY VALLEY GREEN (205 WILSON AVE STE#2, NORWALK, CT 06854) OR APPROVED EQUAL.

CONCRETE NOTES:

CLASS "A" CONCRETE: CLASS "A" CONCRETE SHALL BE USED FOR WINGWALLS, PILE CAPS, AND BACKWALLS

CLASS "F" CONCRETE: CLASS "F" CONCRETE SHALL BE USED FOR THE BRIDGE DECK AND CONCRETE PADS

UNDERWATER CONCRETE: UNDERWATER CONCRETE SHALL BE USED FOR TREMIES

EXPOSED EDGES: EXPOSED EDGES OF CONCRETE SHALL BE BEVELED 1" x 1" UNLESS DIMENSIONED OTHERWISE.

CONCRETE COVER: ALL REINFORCEMENT SHALL HAVE TWO INCHES COVER UNLESS DIMENSIONED OTHERWISE.

REINFORCEMENT: ALL REINFORCEMENT SHALL BE ASTM A615 GRADE 60.

EPOXY COATED REINFORCING BARS: ALL REINFORCEMENT SHALL BE EPOXY COATED AND SHALL BE INCLUDED IN THE ITEM "DEFORMED STEEL BARS (EPOXY COATED)."

CONSTRUCTION JOINTS: CONSTRUCTION JOINTS, OTHER THAN THOSE SHOWN ON THE PLANS, WILL NOT BE PERMITTED WITHOUT PRIOR APPROVAL OF THE ENGINEER.

CLOSED CELL ELASTOMER: THE COST OF FURNISHING AND INSTALLING CLOSED CELL ELASTOMER SHALL BE INCLUDED IN THE COST OF THE ITEM "CLASS 'F' CONCRETE."

STRUCTURAL STEEL NOTES:

1. ALL STRUCTURAL STEEL (LOW ALLOY) SHALL CONFORM TO AASHTO M270, GRADE 50 F2, Fy = 50,000 PSI
2. WELDING DETAILS, PROCEDURES, AND TESTING METHODS SHALL CONFORM TO ANSI AASHTO/AWS D1.5–(95)– BRIDGE WELDING CODE, UNLESS NOTED OTHERWISE ON THE PLANS.
3. ALL SHOP WELDS SHALL BE INSPECTED BY RADIOGRAPHIC OR ULTRASONIC TESTING AND FINISHED SMOOTH AND FLUSH WITH BASE METAL ON ALL SURFACES BY GRINDING IN THE DIRECTION OF THE APPLIED STRESS, LEAVING THE SURFACES FREE FROM DEPRESSIONS. CHIPPING MAY BE USED PROVIDED IT IS FOLLOWED BY GRINDING. THE GRINDING PROCESS SHALL NOT REDUCE THE THICKNESS OF THE BASE METAL BY MORE THAN 5% OF THE TOTAL THICKNESS.
4. THE STRUCTURE SHALL NOT HAVE NEGATIVE CAMBER AFTER THE APPLICATION OF THE FULL DEAD LOADS, INCLUDING BUT NOT LIMITED TO: REINFORCED CONCRETE DECK, AND GALVANIZED STAY–IN–PLACE FORMS.
5. THE STRUCTURAL STEEL FABRICATORS SHALL AT A MINIMUM BE CERTIFIED AS AN INTERMEDIATE BRIDGE MANUFACTURER PER THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC). THE STRUCTURAL STEEL FABRICATOR SHALL ALSO HOLD A FRACTURE CRITICAL ENDORSEMENT THROUGH AISC.
6. THE COST OF FURNISHING AND INSTALLATION OF BEARINGS AT EACH ABUTMENT SHALL BE PAID FOR UNDER THE ITEM "PEDESTRIAN BRIDGE SUPERSTRUCTURE."
7. NO FIELD WELDING TO FRACTURE CRITICAL MEMBERS SHALL BE ALLOWED.
8. THE REINFORCED CONCRETE DECK SHALL BE COMPOSITE WITH THE SUPERSTRUCTURE BY USE OF SHEAR STUDS, PAID FOR UNDER "PEDESTRIAN BRIDGE SUPERSTRUCTURE."

REV.	DATE	DESCRIPTION	SHEET. NO.
		REVISIONS	

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DESIGNER: M. HABEK
DRAFTER: M. HABEK
CHECKED BY: R. MEARS
DATE CHECKED: 7/24/19

benesch

PROJECT TITLE: PEDESTRIAN/UTILITY BRIDGE OVER DAVIS MILL POND

SCALE AS NOTED | PLOTTED: 7/24/2019

TOWN: GREENWICH, CONNECTICUT

DRAWING TITLE: BRIDGE SECTION AND NOTES

PROJECT NO.:
DRAWING NO.: 4
SHEET NO.:

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*

Davis Avenue Bridge
Greenwich, Connecticut

EXPLORATION NO.: B-2-1
SHEET: 1 of 2
PROJECT NO: 05.0046254.00
REVIEWED BY: J. Davis

Logged By: J. Bedoya
Drilling Co.: New England Boring
Foreman: R. Posa

Type of Rig: Truck
Rig Model: Mobile B53
Drilling Method: SSA/RW

Boring Location: See Plan
Ground Surface Elev. (ft.): 8.4
Final Boring Depth (ft.): 31
Date Start - Finish: 5/9/2018 - 5/9/2018

H. Datum: Project
V. Datum: NAVD 88

Hammer Type: Safety Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 3 & 4

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Core Barrel Size: NX

Groundwater Depth (ft.)			
Date	Time	Water Depth	Stab. Time
		Note 1	

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	STRATUM Description	Elev. (ft.)
		SS-1	0-2	24	6	1 2 2 9	4	SS-1 : Loose, brown, TOPSOIL	1		0.5	TOPSOIL	7.9
		SS-2	2-2.2	2	2	50/2"		SS-2 : Grey, fine to coarse SAND, little Silt	2			COBBLE AND BOULDER FILL	
5		SS-3	6-8	24	8	15 16 20 8	36	SS-3 : Dense, brown, fine to coarse SAND and SILT, some Gravel (Organic smell)			6		2.4
		SS-4	8-10	24	14	6 8 12 17	20	SS-4 : Medium dense, brown, grey, SILT, some Gravel, trace Silt				ORGANIC SILT	
10		SS-5	10-10.7	8	6	15 50/2"		SS-5 : Brown, fine to coarse SAND, little Gravel, trace Silt			10		-1.6
												GLACIAL TILL	
											14		-5.6
15		SS-6	15-15	0	0	50/0"		SS-6 : No Penetration	3				
20		SS-7	20-20	0	0	50/0"		SS-7 : No Penetration					
	2 2.25 1.5 2.75	C-1	21-26	60	53			C-1 : Moderately hard, moderately to highly weathered, moderately fractured, fine to medium grained, grey GNEISS with medium spaced, low angle fractures (RQD=63%, REC=88%)				BEDROCK	
25	2.5 2.25 2.75 3 2.5	C-2	26-31	60	60			C-2 : Moderately hard, moderately to highly weathered, moderately fractured, fine to medium grained, grey GNEISS with medium spaced, low angle fractures (RQD=87%, REC=100%)					
30													

REMARKS

1 - Test boring advanced with solid stem auger (SSA) from ground surface to 2.2 feet. Borehole advanced with rotary wash (RW) drilling methods from 2.2 feet to 10 feet, 3-inch casing telescoped to 15 feet and used to advance borehole to 21 feet. Rock coring performed with NX-sized double-tube core barrel from 21 to 31 feet. Core rate in minutes/foot. RQD=Rock Quality Designation. Groundwater not encountered prior to introduction of drilling fluid at 2.2 feet
2 - Increased drilling resistance from 2 to 6 feet and 10 to 20 feet
3 - Casing refusal at 14 feet. Casing advanced by rollerbitting ahead

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual.

Exploration No.: B-2-1

BORING B-2-1

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*

Davis Avenue Bridge
Greenwich, Connecticut

EXPLORATION NO.: B-2-1
SHEET: 2 of 2
PROJECT NO: 05.0046254.00
REVIEWED BY: J. Davis

Logged By: J. Bedoya
Drilling Co.: New England Boring
Foreman: R. Posa

Type of Rig: Truck
Rig Model: Mobile B53
Drilling Method: SSA/RW

Boring Location: See Plan
Ground Surface Elev. (ft.): 8.4
Final Boring Depth (ft.): 31
Date Start - Finish: 5/9/2018 - 5/9/2018

H. Datum: Project
V. Datum: NAVD 88

Hammer Type: Safety Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 3 & 4

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Core Barrel Size: NX

Groundwater Depth (ft.)			
Date	Time	Water Depth	Stab. Time
		Note 1	

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	STRATUM Description	Elev. (ft.)
	2.5										31	BEDROCK	-22.6
35								End of exploration at 31 feet below grade.					
40													
45													
50													
55													
60													

REMARKS

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual.

Exploration No.: B-2-1

BORING B-2-1 (CONT.)

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*

Davis Avenue Bridge
Greenwich, Connecticut

EXPLORATION NO.: B-2-2
SHEET: 1 of 1
PROJECT NO: 05.0046254.00
REVIEWED BY: J. Davis

Logged By: J. Bedoya
Drilling Co.: New England Boring
Foreman: R. Posa

Type of Rig: Truck
Rig Model: Mobile B53
Drilling Method: SSA/RW

Boring Location: See Plan
Ground Surface Elev. (ft.): 7.5
Final Boring Depth (ft.): 21
Date Start - Finish: 5/7/2018 - 5/7/2018

H. Datum: Project
V. Datum: NAVD 88

Hammer Type: Safety Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Core Barrel Size: NX

Groundwater Depth (ft.)			
Date	Time	Water Depth	Stab. Time
		Note 1	

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	STRATUM Description	Elev. (ft.)
		SS-1	0-2	24	14	3 4 7 14	11	SS-1 : Top 8": Topsoil Bottom 6": Brown, fine to coarse SAND, some Gravel, little Silt	1		0.75	TOPSOIL	6.8
		SS-2	2-3.3	15	9	30 47 100/3"		SS-2 : Top 3": Brown, fine to coarse SAND, little Silt, trace Gravel Bottom 7": White, fine to coarse SAND, some Gravel, little Silt (Decomposed Rock)				FILL	
5		SS-3	5-6.5	18	13	34 37 63 50/0"	R	SS-3 : Very dense, brown, fine to coarse SAND and SILT, little fine to coarse Gravel (Decomposed Rock)			3		4.5
												POSSIBLE DECOMPOSED ROCK	
10		SS-4	10-10	0	0	50/0"		SS-4 : No Penetration			11		-3.5
	3 2.75 2.75 5.5 6	C-1	11-16	60	60			C-1 : Moderately hard, slightly to highly weathered, moderately fractured, fine to medium grained, grey GNEISS with moderately spaced, moderately dipping fractures (RQD=60%, REC=100%)	2				
15												BEDROCK	
	3.5 3.5 4 3.75 3.5	C-2	16-21	60	60			C-2 : Moderately hard, slightly weathered, moderately fractured, fine to medium grained, grey GNEISS with moderately spaced, moderately dipping fractures (RQD=85%, REC=100%)					
20											21		-13.5
25								End of exploration at 21 feet below grade.					
30													

REMARKS

1 - Test boring advanced with solid stem auger (SSA) from ground surface to 3 feet. Borehole advanced with 4-inch casing and rotary wash (RW) drilling methods to 11 feet. Rock coring performed with NX-sized double-tube core barrel from 11 to 21 feet. Core rate in minutes/foot. RQD=Rock Quality Designation. Groundwater not encountered prior to introduction of drilling fluid at 3 feet
2 - Rollerbit refusal at 11 feet

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual.

Exploration No.: B-2-2

BORING B-2-2

REV.	DATE	DESCRIPTION	SHEET. NO.
		REVISIONS	

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DESIGNER: **M. HABEK**
DRAFTER: **M. HABEK**
CHECKED BY: **R. MEARS**
DATE CHECKED: **7/24/19**

benesch

PROJECT TITLE:
PEDESTRIAN/UTILITY BRIDGE OVER DAVIS MILL POND

SCALE AS NOTED | PLOTTED: 7/24/2019

TOWN: GREENWICH, CONNECTICUT

DRAWING TITLE: BORING LOGS – 1

PROJECT NO.:
DRAWING NO.: 5
SHEET NO.:

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT: NEU

PROJECT NAME: UNDERGROUND TRANSMISSION LINE PROJECT
LOCATION: SOUTHERN ROUTE, GREENWICH, CT.

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	NQ
SIZE I.D.	3.75"		1.375"	2.0"
HAMMER WT.			140 lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.
HOLE NO. **BS-6D**
GROUND WATER OBSERVATIONS
AT 1.5 FT. AFTER 0 HOURS
AT FT. AFTER HOURS
START DATE: 9/10/14
FINISH DATE: 9/10/14

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	3-2-1-2	0.00'-2.00'		TOPSOIL 0.50	
					BR. FINE-CRS. SAND, SOME SILT, TRACE GRAVEL	
	2	1-2-13-14	2.00'-4.00'		3.0	
					BR. FINE-CRS. SAND, SOME GRAVEL, LITTLE SILT	
5	3	8-10-10-60	5.00'-7.00'		7.0	
					BR. FINE-CRS. SAND, SOME SILT, LITTLE GRAVEL, FEW COBBLES	
					9.5	
10					CORED BEDROCK - GNEISS	
					RUN #1 9.5' - 14.5' RECOVERED 60" RQD=36%	
					RUN #2 14.5' - 19.5' RECOVERED 60" RQD=52%	
					RUN #3 19..5' - 24.0' RECOVERED 52" RQD=22%	
15						
20						
25					BOTTOM OF BORING @ 24.0' 24.0	
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: J. BREWER
INSPECTOR:
SHEET 1 OF 1 HOLE NO. **BS-6D**

BORING BS–6D

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT: NEU

PROJECT NAME: UNDERGROUND TRANSMISSION LINE PROJECT
LOCATION: SOUTHERN ROUTE, GREENWICH, CT.

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	NQ
SIZE I.D.	3.75"		1.375"	2.0"
HAMMER WT.			140 lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.
HOLE NO. **BS-11**
GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS
START DATE: 7/9/14
FINISH DATE: 7/9/14

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	3-7-9-9	0.00'-2.00'		TOPSOIL 0.4	
					GREY/BR. FINE-CRS. SAND, SOME SILT, LITTLE GRAVEL - FILL	
	2	3-4-4-4	2.00'-4.00'			
5	3	2-1-2-2	4.00'-6.00'			
					BR. FINE-MED. SAND, SOME SILT, TRACE GRAVEL 5.5	
					BR. FINE-CRS. SAND, LITTLE SILT & GRAVEL 7.0	
10					CORED BEDROCK - HARRISON GNEISS 9.0	
					RUN #1 9.0' - 14.0' RECOVERED 56" RQD=38%	
15					BOTTOM OF BORING @ 14.0' 14.0	
20						
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: J. BREWER
INSPECTOR:
SHEET 1 OF 1 HOLE NO. **BS-11**

BORING BS–11

REV.	DATE	DESCRIPTION	SHEET. NO.
		REVISIONS	

MANUAL REVISIONS TO THIS DOCUMENT ARE PROHIBITED. ALL REVISIONS MUST BE DONE TO ELECTRONIC MEDIA.

DESIGNER: **M. HABEK**
DRAFTER: **M. HABEK**
CHECKED BY: **R. MEARS**
DATE CHECKED: **7/24/19**

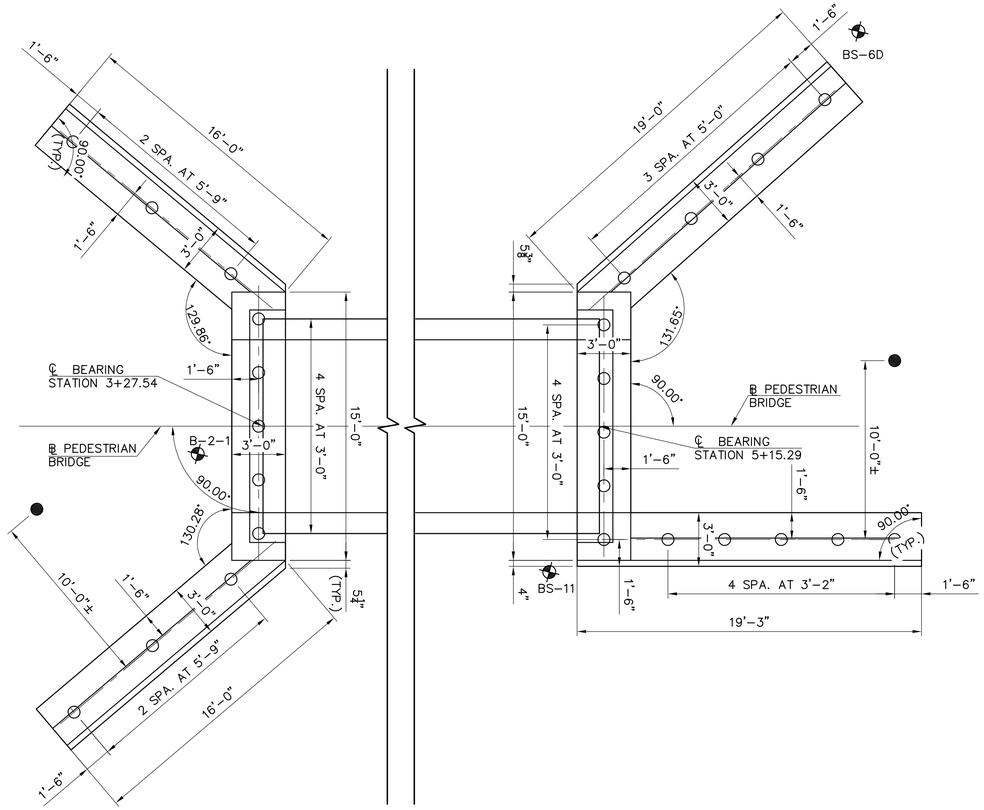
benesch

PROJECT TITLE: PEDESTRIAN/UTILITY BRIDGE OVER DAVIS MILL POND
SCALE AS NOTED
PLOTTED: 7/24/2019

TOWN: GREENWICH, CONNECTICUT
DRAWING TITLE: BORING LOGS – 2

PROJECT NO.:
DRAWING NO.: 6
SHEET NO.:

MICROPILE DESIGN IS CONCEPTUAL. FINAL MICROPILE DESIGN IS TO BE PROVIDED BY THE CONTRACTOR



CONCEPTUAL MICROPILE LAYOUT

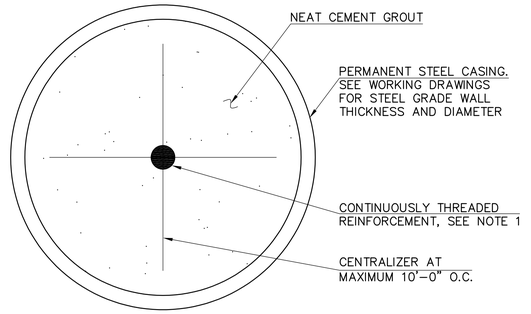
SCALE: 1" = 4'–0"

- ○ MICROPILE
- ● APPROXIMATE LOCATION OF MICROPILE VERIFICATION TEST
- ⌖ BORING

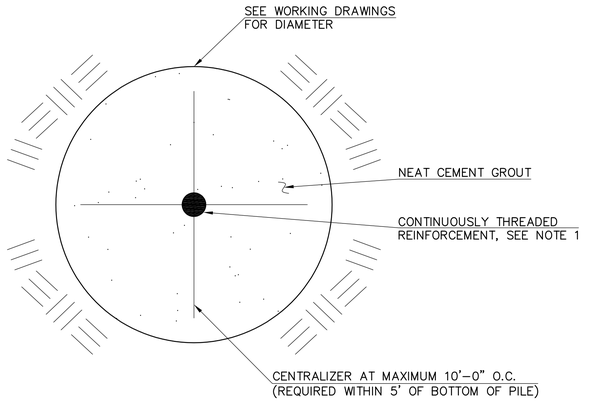
MAXIMUM DESIGN PILE LOAD:

STRENGTH (I): 105 KIPS

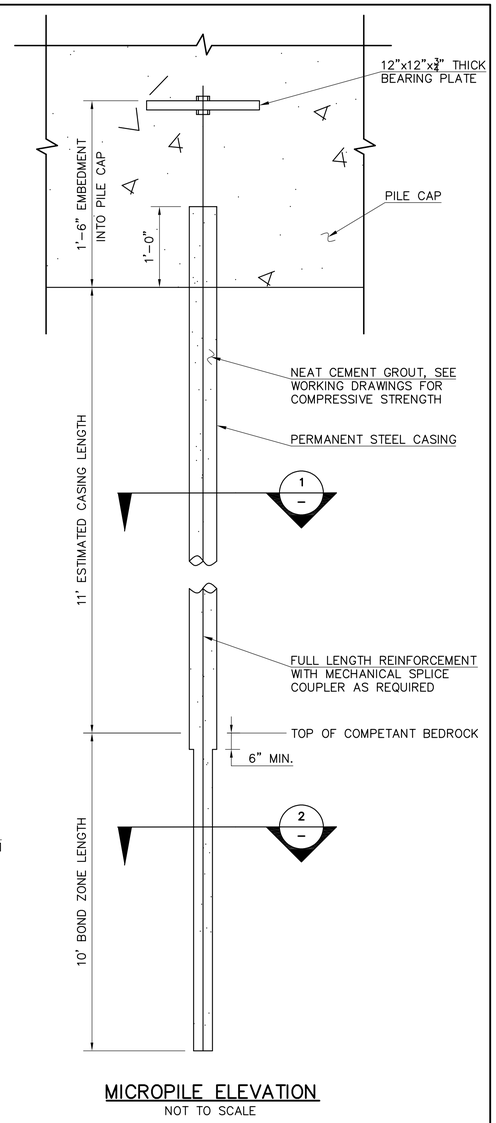
SERVICE (I): 88 KIPS



1/– CASED MICROPILE
NOT TO SCALE



2/– UNCASED MICROPILE
NOT TO SCALE



MICROPILE ELEVATION
NOT TO SCALE

MICROPILE DESIGN IS CONCEPTUAL. FINAL MICROPILE DESIGN IS TO BE PROVIDED BY THE CONTRACTOR

CONCEPTUAL MICROPILE DETAILS

NOTES:

1. SEE WORKING DRAWINGS FOR SIZE AND GRADE OF CONTINUOUSLY THREADED REINFORCEMENT. IF MULTIPLE REINFORCEMENT RODS ARE USED, INCLUDE SPACERS TO ASSURE BOND STRENGTH IS MAINTAINED.
2. NO SPLICING OF THE CASING OR CENTRAL REINFORCING WILL BE ALLOWED WITHIN THE TOP 10 FEET OF THE MICROPILE.
3. THE MECHANICAL SPLICE COUPLERS ON THE REINFORCEMENT SHALL DEVELOP 125% IN TENSION AND COMPRESSION OF THE SPECIFIED YIELD STRENGTH OF THE BAR BEING SPLICED.
4. FOR ADDITIONAL REQUIREMENTS AND INFORMATION REFER TO SPECIAL PROVISIONS "MICROPILES."

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DRAFTER: M. HABEK
CHECKED BY: R. MEARS
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benesch

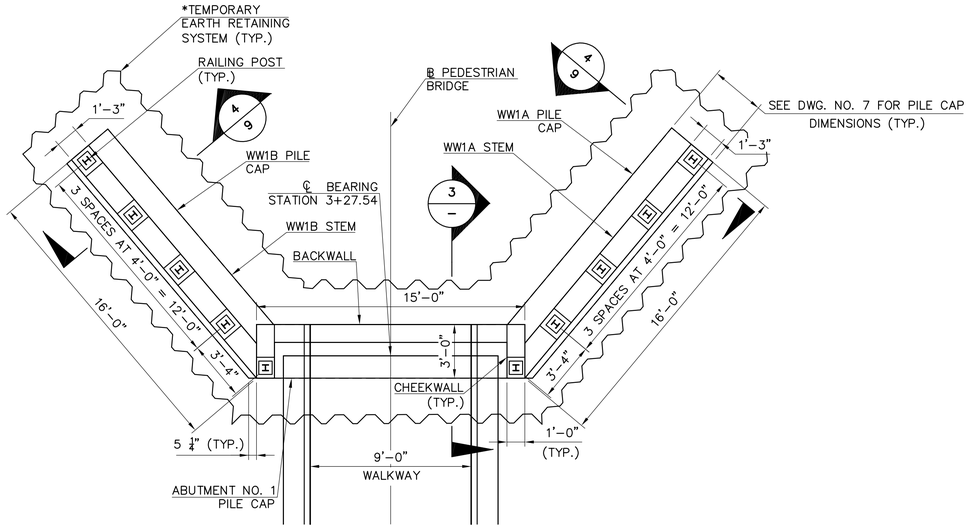
PROJECT TITLE: PEDESTRIAN/UTILITY BRIDGE OVER DAVIS MILL POND

SCALE AS NOTED | PLOTTED: 7/24/2019

TOWN: GREENWICH, CONNECTICUT

DRAWING TITLE: PILE FOUNDATION PLAN AND DETAILS

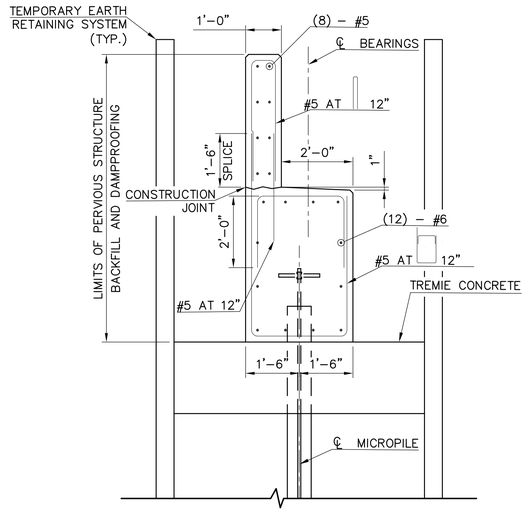
PROJECT NO.:
DRAWING NO.: 7
SHEET NO.:



PLAN – WW1B, ABUT. NO. 1, WW1A

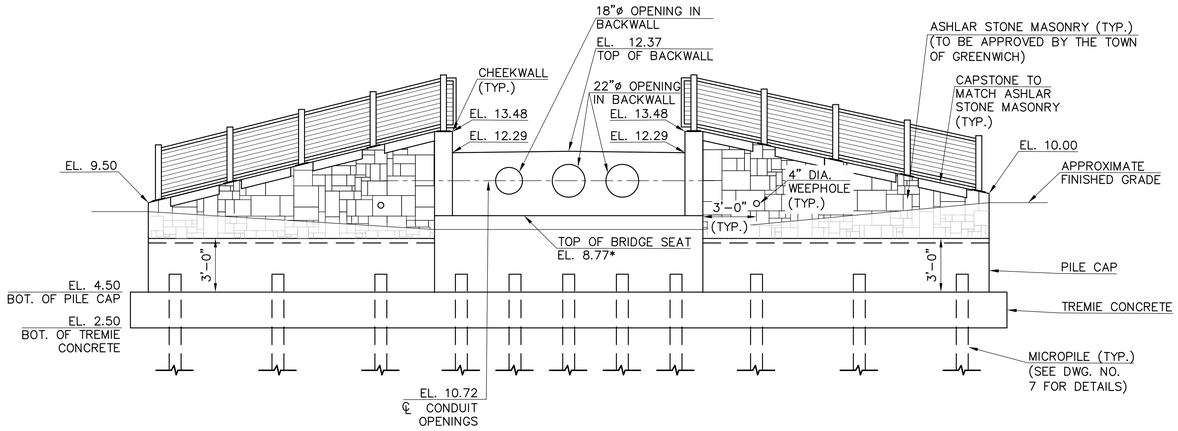
SCALE: 1" = 4'-0"

*TEMPORARY EARTH RETAINING SYSTEM (T.E.R.S.) TO BE CUT OFF 1' BELOW THE FINISHED GRADE. THE REMAINING T.E.R.S. SHALL BE PAID FOR UNDER THE ITEM "EARTH RETAINING SYSTEM LEFT IN PLACE."



3 — ABUTMENT

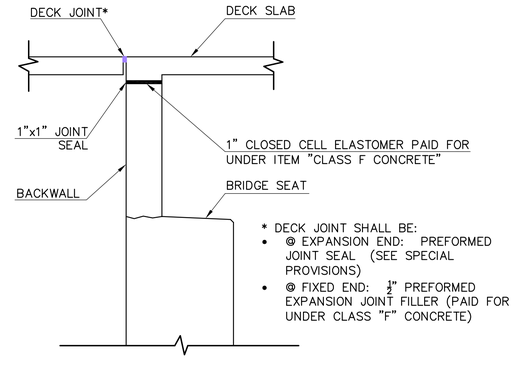
SCALE: 1" = 2'-0"



WW1B WW1A

DEVELOPED ELEVATION – WW1B, ABUT NO. 1, WW1A

SCALE: 1" = 4'-0"



PROPOSED BACKWALL DETAIL

SCALE: 1" = 2'-0"

NOTE: TRUSS MEMBERS NOT SHOWN FOR CLARITY.

NOTES

1. * BRIDGE SEAT ELEVATION SHALL BE COORDINATED WITH PREFABRICATED BRIDGE DESIGNER
2. MICROPILES ARE SHOWN SCHEMATICALLY ON THIS DRAWING – SEE DWG. NO. 7 FOR SPECIFICS
3. SEE BORING LOGS FOR APPROXIMATE SUBSURFACE ROCK PROFILE

REV.	DATE	DESCRIPTION	SHEET. NO.
		REVISIONS	

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DESIGNER: M. HABEK
DRAFTER: M. HABEK
CHECKED BY: R. MEARS
DATE CHECKED: 7/24/19

benesch

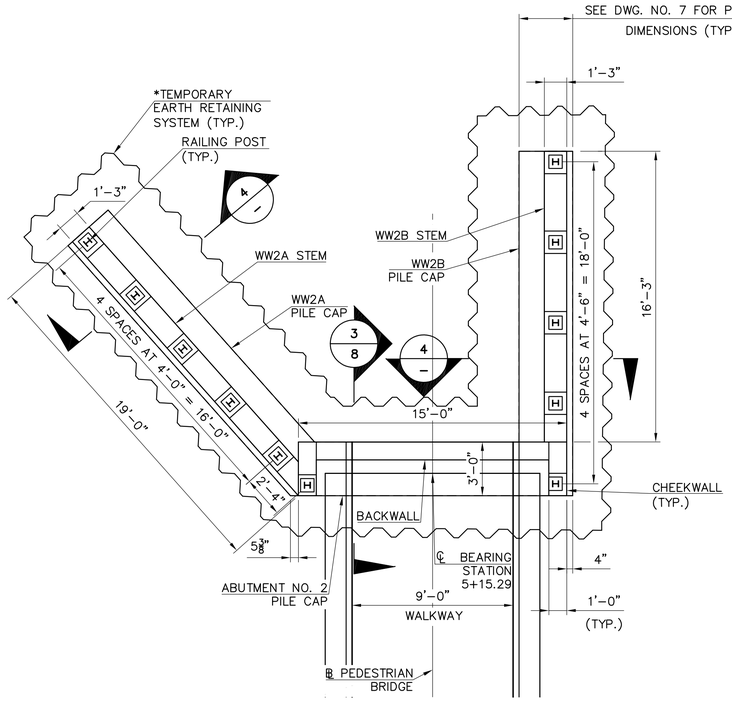
PROJECT TITLE: PEDESTRIAN/UTILITY BRIDGE OVER DAVIS MILL POND

SCALE AS NOTED | PLOTTED: 7/24/2019

TOWN: GREENWICH, CONNECTICUT

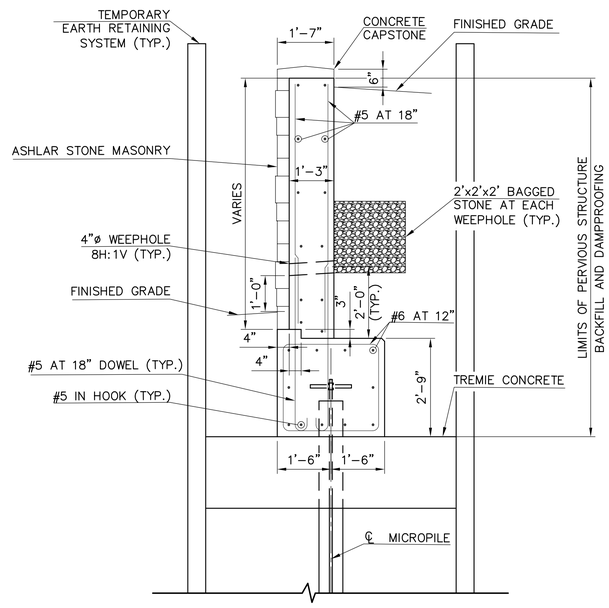
DRAWING TITLE: ABUTMENT NO. 1 AND WINGWALLS 1A/1B

PROJECT NO.:
DRAWING NO.: 8
SHEET NO.:



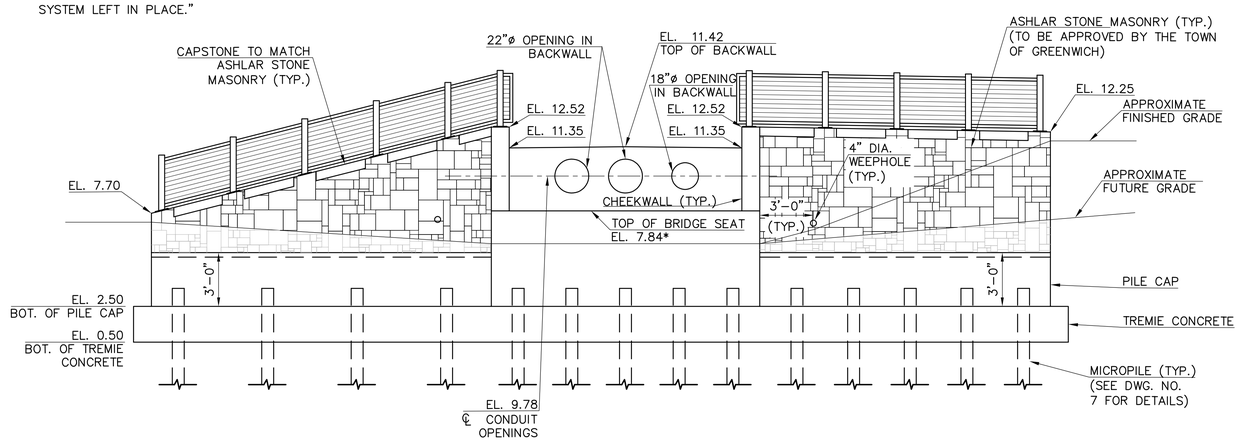
PLAN – WW2A, ABUT. NO. 2, WW2B

SCALE: 1" = 4'-0"



4
–
TYPICAL WINGWALL
SCALE: 1" = 2'-0"

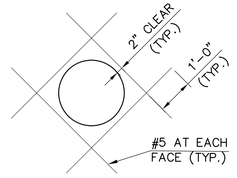
*TEMPORARY EARTH RETAINING SYSTEM (T.E.R.S.) TO BE CUT OFF 1' BELOW THE FINISHED GRADE. THE REMAINING T.E.R.S. SHALL BE PAID FOR UNDER THE ITEM "EARTH RETAINING SYSTEM LEFT IN PLACE."



WW2A WW2B

DEVELOPED ELEVATION – WW2A, ABUT NO. 2, WW2B

SCALE: 1" = 4'-0"



ADDITIONAL REINFORCEMENT AROUND PIPE OPENING

SCALE: 1" = 2'-0"

NOTES
1. * BRIDGE SEAT ELEVATION SHALL BE COORDINATED WITH PREFABRICATED BRIDGE DESIGNER
2. MICROPILES ARE SHOWN SCHEMATICALLY ON THIS DRAWING – SEE DWG. NO. 7 FOR SPECIFICS
3. SEE BORING LOGS FOR APPROXIMATE SUBSURFACE ROCK PROFILE

REV.	DATE	DESCRIPTION	SHEET. NO.
		REVISIONS	

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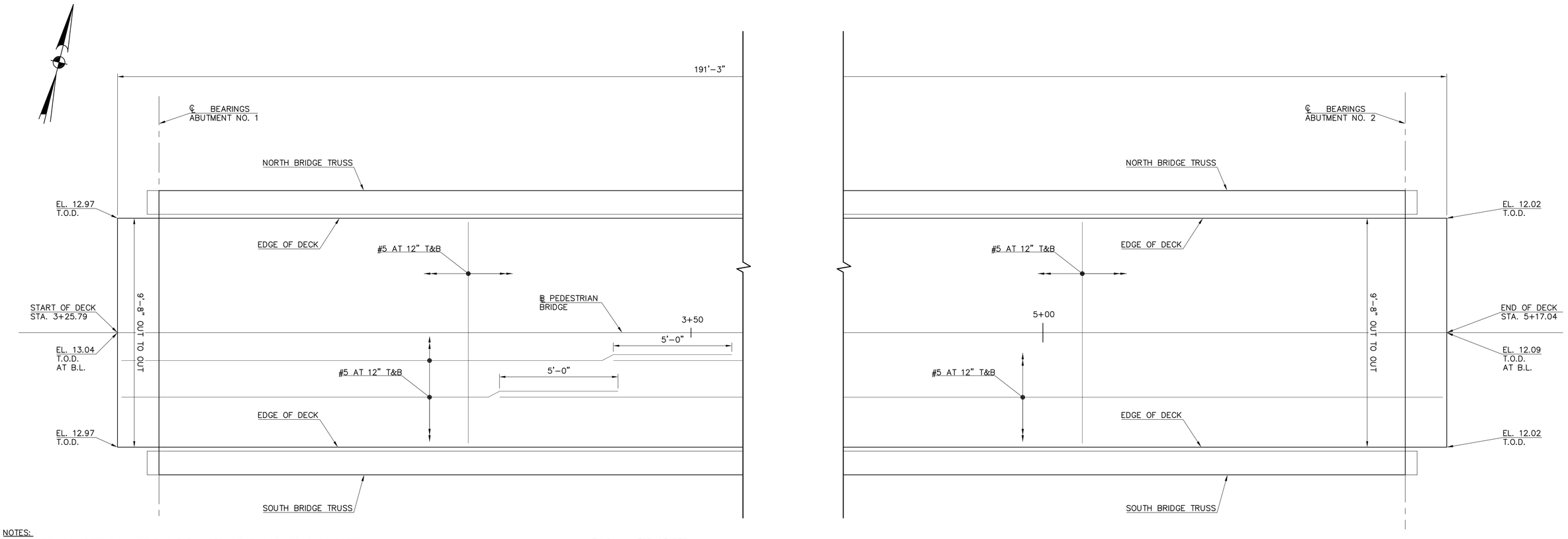
DESIGNER: M. HABEK
DRAFTER: M. HABEK
CHECKED BY: R. MEARS
DATE CHECKED: 7/24/19

benesch

PROJECT TITLE: PEDESTRIAN/UTILITY BRIDGE OVER DAVIS MILL POND
SCALE AS NOTED
PLOTTED: 7/24/2019

TOWN: GREENWICH, CONNECTICUT
DRAWING TITLE: ABUTMENT NO. 2 AND WINGWALLS 2A/2B

PROJECT NO.:
DRAWING NO.: 9
SHEET NO.:

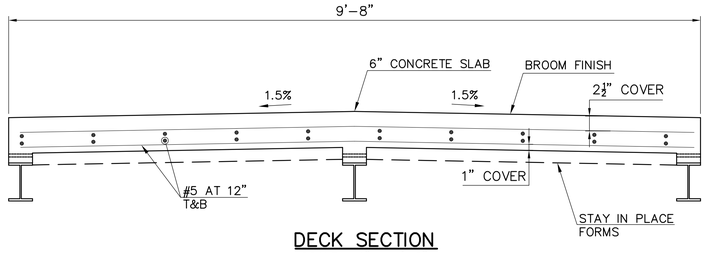


NOTES:

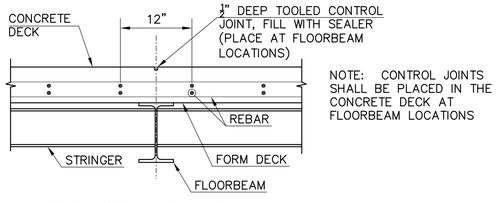
1. DECK CONCRETE SHALL BE PAID FOR UNDER THE ITEM "CLASS 'F' CONCRETE"
2. ALL REINFORCING STEEL IN THE CONCRETE DECK SHALL BE PAID FOR UNDER THE ITEM "DEFORMED STEEL BARS – EPOXY COATED"

T.O.D. = TOP OF DECK
B.L. = BASELINE

DECK PLAN
SCALE: 1" = 2'-0"

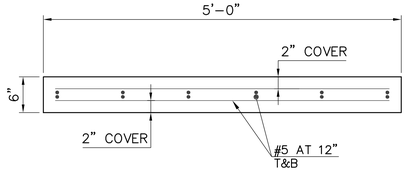


DECK SECTION
SCALE: 1" = 1'-0"



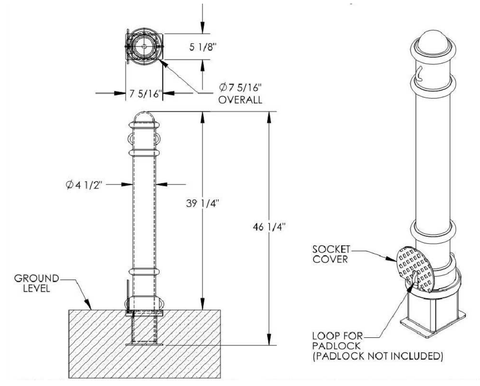
NOTE: CONTROL JOINTS SHALL BE PLACED IN THE CONCRETE DECK AT FLOORBEAM LOCATIONS

CONTROL JOINT DETAIL
SCALE: 1" = 1'-0"



CONCRETE PAD LONGITUDINAL SECTION
SCALE: 1" = 1'-0"

NOTE: CONCRETE PAD CROSS SLOPE SHALL MATCH CONCRETE DECK CROSS SLOPE.



BOLLARD DETAIL
SCALE: NTS

BOLLARD NOTES:
1. ORNAMENTAL STEEL BOLLARD SHALL BE MODEL NUMBER BOL-OR-40-BK (VESTIL MANUFACTURING) OR APPROVED EQUAL.
2. SEE GENERAL PLAN & ELEVATION FOR PROPOSED LOCATION OF BOLLARDS.

FINISHED SLAB ELEVATIONS

	INCREMENT LENGTH (FT)	START OF DECK	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	END OF DECK
NORTH EDGE*	19'-1 ½"	12.97	12.88	12.78	12.69	12.59	12.49	12.40	12.30	12.21	12.11	12.02
ALONG ℄	19'-1 ½"	13.04	12.95	12.85	12.76	12.66	12.56	12.47	12.37	12.28	12.18	12.09
SOUTH EDGE*	19'-1 ½"	12.97	12.88	12.78	12.69	12.59	12.49	12.40	12.30	12.21	12.11	12.02

*ELEVATIONS ALONG THE EDGES OF THE SLAB ARE BASED ON AN ASSUMED WIDTH OF 9'-8". IF THE ACTUAL WIDTH DIFFERS FROM THIS VALUE, THE ELEVATIONS SHALL BE ADJUSTED ACCORDINGLY

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DESIGNER: M. HABEK
DRAFTER: M. HABEK
CHECKED BY: R. MEARS
DATE CHECKED: 7/24/19

benesch

PROJECT TITLE: PEDESTRIAN/UTILITY BRIDGE OVER DAVIS MILL POND

SCALE AS NOTED | PLOTTED: 7/24/2019

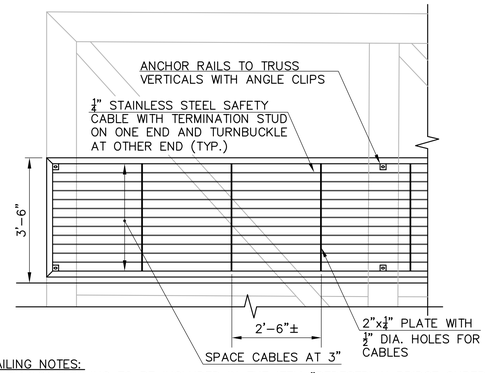
TOWN: GREENWICH, CONNECTICUT

DRAWING TITLE: DECK PLAN

PROJECT NO.:

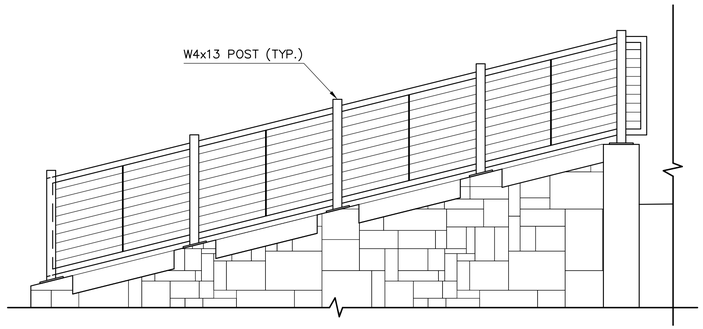
DRAWING NO.: 10

SHEET NO.:



BRIDGE RAILING NOTES:
1. COST OF BRIDGE RAILING TO BE INCLUDED IN THE ITEM "PEDESTRIAN BRIDGE SUPERSTRUCTURE"
2. DETAIL SHOWN IS SCHEMATIC. RAILS TO BE DESIGNED BY THE BRIDGE MANUFACTURER BASED ON THE ACTUAL SPANS.

SCHEMATIC BRIDGE RAILING ELEVATION
SCALE: 1" = 2'-0"

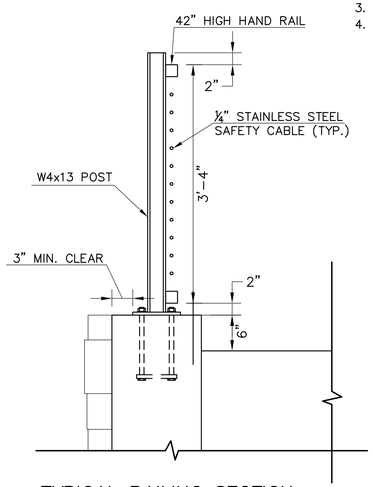


RAILING ELEVATION
SCALE: 1" = 2'-0"

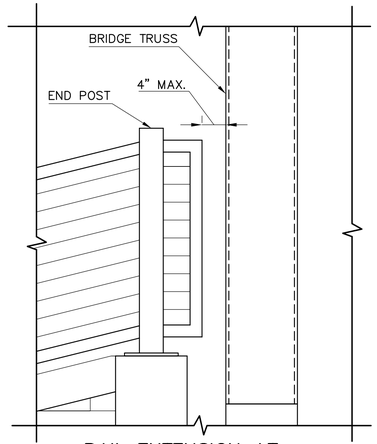
NOTES:
1. WINGWALL 1B SHOWN
2. RAILING TO BE PAID FOR UNDER "PEDESTRIAN BRIDGE SUPERSTRUCTURE"
3. W4x13 POSTS, ANCHOR PLATE, BASE PLATE, AND BOLTS TO BE PAID FOR UNDER "ORNAMENTAL METAL FENCE"
4. SEE "SCHEMATIC BRIDGE RAILING ELEVATION" FOR RAIL MEMBER SIZES AND CONNECTION DETAILS

WINGWALL RAILING NOTES:

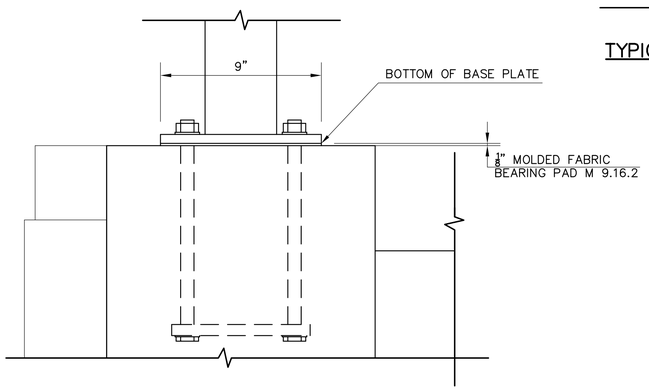
1. THE W4x13 POSTS, ANCHOR PLATES, AND BASE PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A572, GRADE 50.
2. BOLTS SHALL BE STAINLESS STEEL AND CONFORM TO THE REQUIREMENTS OF ASTM F593, GROUP 1, (AISI TYPE 304). NUTS SHALL BE STAINLESS STEEL AND CONFORM TO THE REQUIREMENTS OF ASTM F594, GROUP 1. WASHERS SHALL BE STAINLESS STEEL AND CONFORM TO THE REQUIREMENTS OF ASTM A167, TYPES 302 THROUGH 305.
3. THE FENCES SHALL BE CAREFULLY ADJUSTED PRIOR TO FIXING IN PLACE TO ENSURE CORRECT ALIGNMENT THROUGHOUT THEIR LENGTH. AFTER INSTALLATION, ALL RAILS AND POSTS SHALL BE FREE OF BURRS, SHARP EDGES AND IRREGULARITIES.
4. PAINT: SEE GENERAL NOTES.
5. ANCHOR BOLTS FOR THE ANCHORAGE ASSEMBLY SHALL BE STAINLESS STEEL AND CONFORM TO THE REQUIREMENTS OF ASTM F593, GROUP 1 (AISI TYPE 304). NUTS SHALL BE STAINLESS STEEL AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM F594, GROUP 1. WASHERS SHALL BE STAINLESS STEEL AND CONFORM TO THE REQUIREMENTS OF ASTM A167, TYPES 302 THROUGH 305.
6. 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 ALUMINUM POST AND RAILS ARE IN PLACE.



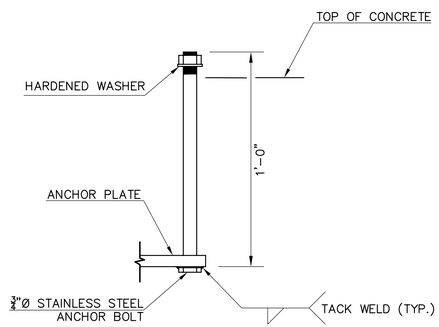
TYPICAL RAILING SECTION ON WINGWALLS
SCALE: 1" = 1'-0"



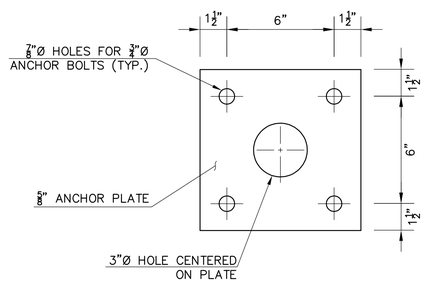
RAIL EXTENSION AT BRIDGE DETAIL
SCALE: 1" = 1'-0"



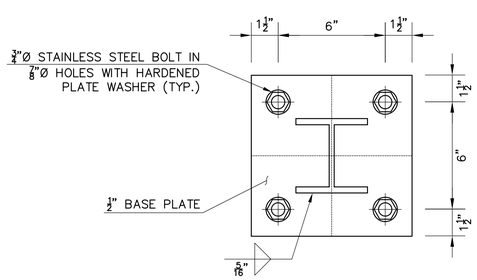
FENCE POST OVER WALL
SCALE: 3" = 1'-0"



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



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



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

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DESIGNER: C. SORENSEN
DRAFTER: C. SORENSEN
CHECKED BY: R. MEARS
DATE CHECKED: 7/24/19

benesch

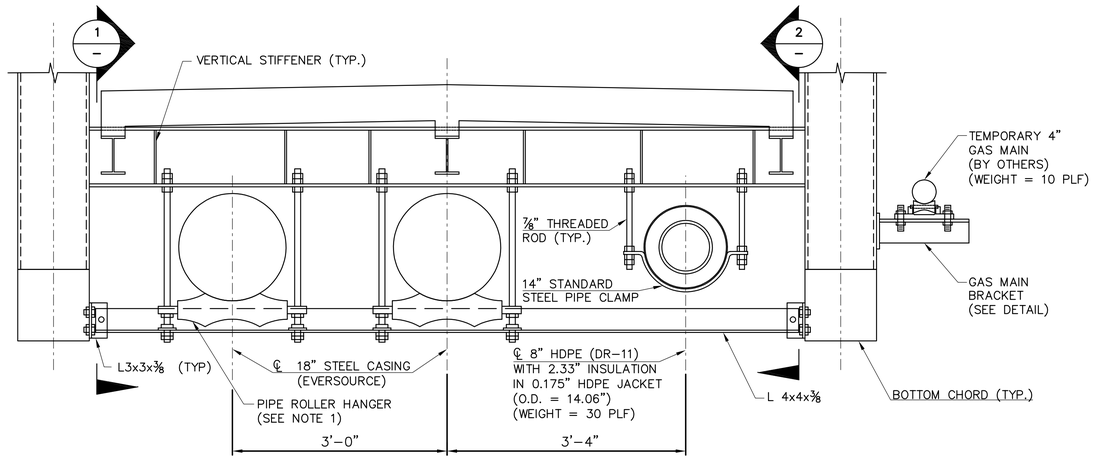
PROJECT TITLE: PEDESTRIAN/UTILITY BRIDGE OVER DAVIS MILL POND

SCALE AS NOTED | PLOTTED: 7/24/2019

TOWN: GREENWICH, CONNECTICUT

DRAWING TITLE: RAILING DETAILS

PROJECT NO.:
DRAWING NO.: 11
SHEET NO.:



UTILITY SUPPORT DETAIL

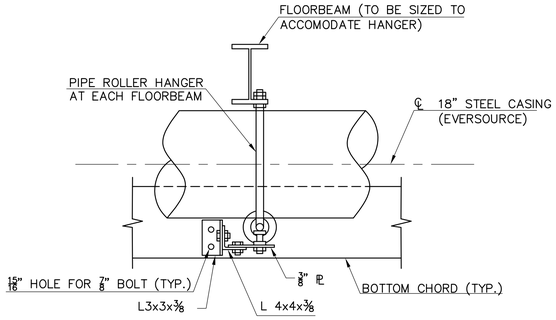
SCALE: 1" = 1'-0"

EVERSOURCE TRANSMISSION LINE NOTES:

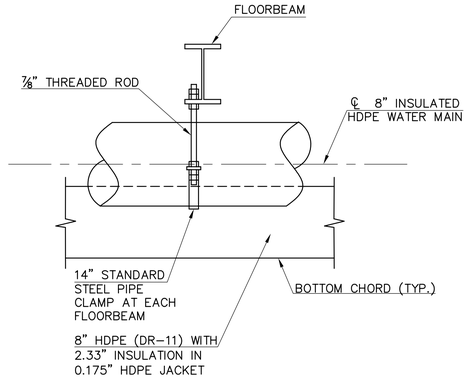
1. PIPE ROLLER HANGER SHALL BE "NON-CONDUCTIVE PIPE ROLLER – HANGER MOUNTED MODEL" BY LB&A, INC (SIZE 18H) OR APPROVED EQUAL.
2. PIPE HANGER ASSEMBLY SHALL BE CAPABLE OF SUPPORTING A SERVICE LOAD OF 260 LBS. PER LINEAR FOOT.
3. ALL VERTICAL LOADS FROM THE PIPE SHALL BE SUPPORTED BY THE FLOOR BEAMS AND NOT BY THE ANGLE (L4x4x3/8) USED OR BRACING.

UTILITY NOTES:

1. ELECTRIC TRANSMISSION: THE PIPE ROLLER HANGER ASSEMBLIES AND 18" STEEL CASINGS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. THE FURNISHING AND INSTALLATION OF THE CONDUITS / CABLE / GROUT WITHIN THE CASINGS SHALL BE PERFORMED BY OTHERS.
2. WATER: THE 8" HDPE PIPE AND ASSOCIATED MATERIALS (THREADED RODS, 14" STANDARD STEEL PIPE CLAMP ASSEMBLY, ETC.) SHALL BE FURNISHED AND INSTALLED BY OTHERS.
3. GAS: THE GAS MAIN BRACKET ASSEMBLY WILL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. THE GAS MAIN AND ASSEMBLY CLAMPS WILL BE INSTALLED BY OTHERS.



1 — SECTION
SCALE: 1" = 1'-0"



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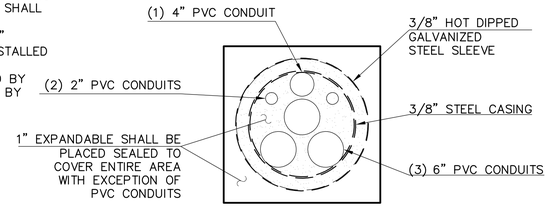

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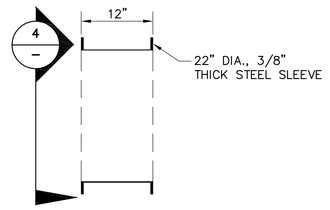
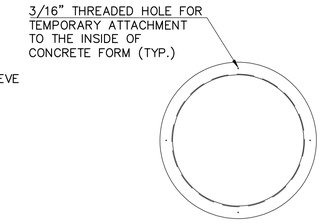


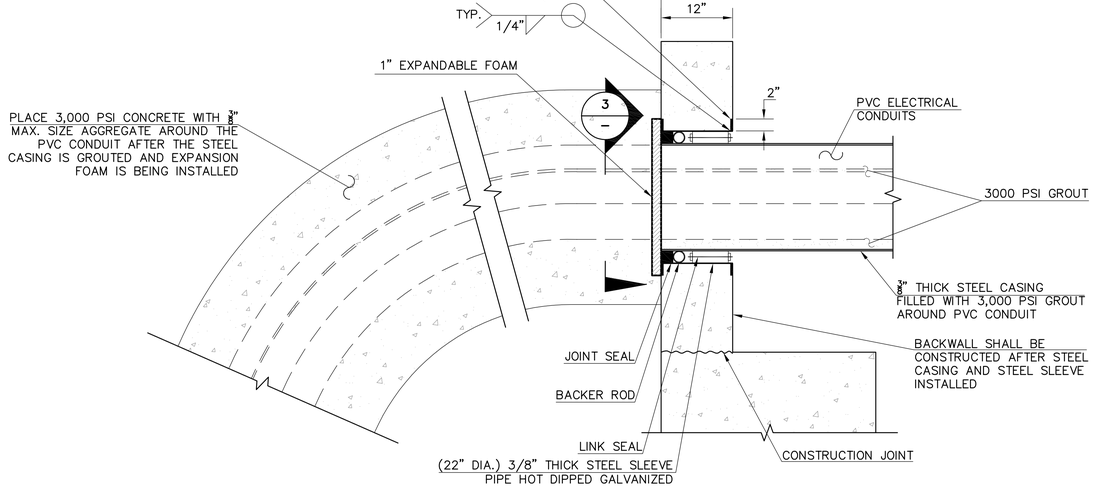
SLEEVE DETAIL
SCALE: 1" = 1'-0"



4 — SECTION
SCALE: 1" = 1'-0"

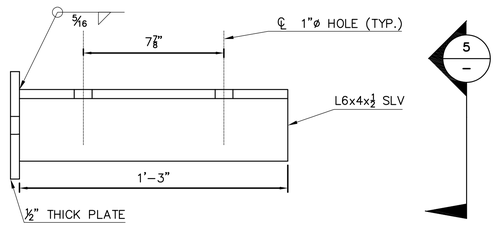
ALL CONDUIT RELATED WORK THIS SIDE OF BACKWALL, AS WELL AS INSTALLATION OF CONDUITS ACROSS THE BRIDGE AND GROUTING OF CONDUITS WITHIN CASING TO BE DONE BY OTHERS. CONTRACTOR TO COORDINATE AS REQUIRED

NOTE:
STEEL CASING SHALL NOT PASS BEYOND THE BACKSIDE OF BACKWALL.



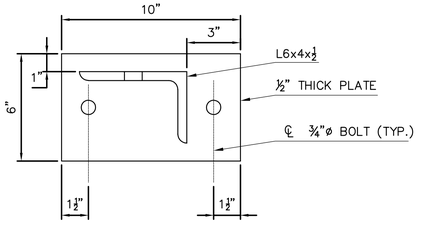
ABUTMENT ELEVATION AT ELECTRICAL ENTRY

SCALE: 1" = 1'-0"



ELEVATION

5



5 — SECTION

GAS MAIN BRACKET DETAILS

SCALE: 3" = 1'-0"

NOTE:

1. CONNECTION OF 1/2" PLATE TO BRIDGE STRUCTURE SHALL BE DETAILED BY PREFABRICATED BRIDGE MANUFACTURER BASED ON THE CONFIGURATION OF TRUSS VERTICALS. THIS CONNECTION SHALL BE MADE TO THE VERTICAL BRIDGE MEMBER ABOVE THE GUSSET PLATE CONNECTION TO THE BOTTOM CHORD.
2. GAS MAIN BRACKET TO BE REMOVED AFTER GAS MAIN HAS BEEN RELOCATED ON TO VEHICULAR BRIDGE AS PART OF A SEPARATE PROJECT. CONTRACTOR TO PROVIDE TOUCH UP PAINT TO THE OWNER.

REV.	DATE	DESCRIPTION	SHEET. NO.
		REVISIONS	

MANUAL REVISIONS TO THIS DOCUMENT ARE PROHIBITED. ALL REVISIONS MUST BE DONE TO ELECTRONIC MEDIA.

DESIGNER: M. HABEK
DRAFTER: M. HABEK
CHECKED BY: R. MEARS
DATE CHECKED: 7/24/19

benesch

PROJECT TITLE:
PEDESTRIAN/UTILITY BRIDGE OVER DAVIS MILL POND

SCALE AS NOTED | PLOTTED: 7/24/2019

TOWN: GREENWICH, CONNECTICUT

DRAWING TITLE: UTILITY DETAILS

PROJECT NO.:
DRAWING NO.: 12
SHEET NO.:

ATTACHMENT B

SUMMARY OF FLOOD IMPACT ANALYLSES: PEDESTRIAN/UTILITY BRIDGE OVER DAVIS MILL POND
(Correspondence from Town of Greenwich's Engineering Consultant)

benesch

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120 Hebron Avenue, Floor 2
Glastonbury, CT 06033
www.benesch.com
P 860-633-8341
F 860-633-1068

September 4, 2019

Ms. Kathleen Shanley
Eversource Energy
Manager – Transmission Siting
59 Prospect Street
Hartford, CT 06141

RE: **Greenwich Substation and Line Project: Indian Harbor/Davis Mill Pond Crossing Analysis Regarding the Pedestrian/Utility Bridge and 100-Year Flood**

Dear Ms. Shanley:

Alfred Benesch & Company, as the engineering consultant to the Town of Greenwich, hereby provides to Eversource Energy a Flood Impact Analysis Summary that details the analysis undertaken to demonstrate that the planned pedestrian/utility bridge over Davis Mill Pond will not be affected by a 100-year flood event as defined by the Federal Emergency Management Agency. The proposed pedestrian/utility bridge crosses over Davis Mill Pond which is just north of the Davis Avenue Vehicular bridge over Indian Harbor/Davis Mill Pond. This information is submitted to you in fulfillment of the request from the Connecticut Siting Council in its May 23, 2019 approval of the Development and Management Plan for the Indian Harbor Crossing

Sincerely,

Alfred Benesch & Company

Steven J. Drechsler, PE
Senior Project Manager/ Public Infrastructure Group Manager

FLOOD IMPACT ANALYSIS SUMMARY
PEDESTRIAN/UTILITY BRIDGE OVER DAVIS MILL POND
TOWN OF GREENWICH

The pedestrian/utility bridge that will be constructed over the tidally-influenced Davis Mill Pond within Bruce Park in the Town of Greenwich, Fairfield County (referred to in the Greenwich Substation and Line Project [GSLP] as the Indian Harbor crossing) have incorporated design loads to withstand riverine and coastal flood events into the contract construction documents. The planned bridge will connect pedestrian paths within Bruce Park (the current sidewalk connecting the two parts of the Park extends adjacent to the Davis Avenue bridge) and, in addition to an approximately 9-foot-wide pedestrian walkway, will support Eversource Energy's two new 115-kilovolt (kV) transmission cables (being constructed as part of the GSLP) and an 8-inch diameter Aquarion Water Company water main.

As described below, the bridge design incorporates the consideration of the latest Federal Emergency Management Agency (FEMA) flood mapping and the results of hydraulic modeling studies, which were performed to assess the potential effects of flooding (including storm surge from Long Island Sound) and the critical surge velocity that the bridge would have to be constructed to withstand.

As illustrated on the attached Figure 1, the planned pedestrian/utility bridge will be located between two existing highway bridges: specifically, it will be situated 50 feet upstream of the Davis Avenue vehicular bridge and 700 feet downstream of the I-95 bridge. Davis Mill Pond is fed from the north by Greenwich Creek and is an impoundment of the creek; the pond is tidally influenced and is connected to Indian Harbor via a dam/weir structure at the Davis Avenue bridge. Thus, the pedestrian/utility bridge will be situated at the upper end of tidal influence from Long Island Sound; Indian Harbor, an embayment that connects directly to the Sound, is located south of the Davis Avenue bridge.

In 2013, FEMA issued revised base flood elevation maps for Fairfield County, including the Town of Greenwich. The 2013 FEMA mapping identifies the area of the proposed location of the pedestrian/utility bridge (as well as adjacent areas within Bruce Park) as entirely within Special Flood Hazard Area Zone AE. FEMA Zone AE denotes an area expected to be subject to inundation by the 1% annual chance flood (100-year flood event), or base flood. The FEMA-designated base flood elevation (BFE) for the pedestrian/utility bridge area is 13 feet NAVD88. (Refer to Figure 2, excerpt from the FEMA Flood Insurance Rate Map dated July 8, 2013 from the Fairfield County Flood Insurance Study.) The bridge will not be within either a floodway or a FEMA Zone VE – that is, a coastal flood zone with a velocity hazard (wave action).

FEMA's hydraulic modeling of flood elevations at Davis Mill Pond (i.e., the 13 feet NAVD88) reflects the consideration of influences from both tidal backwater from Long Island Sound and upstream flows from Greenwich Creek. The flood elevation is the result of a storm surge of Long Island Sound which will inundate Bruce Park. The Davis Avenue Bridge acts as a buffer to reduce the impacts of a storm surge from the Long Island Sound.

The pedestrian/utility bridge, which will be a single 187.75-foot steel truss span with a concrete walkway, will cross the limits of the Davis Mill Pond water surface at the Connecticut Coastal Jurisdiction Line (CJL) elevation of 5.5 feet. The tidal range is about 7.5 feet; the estimated mean high-water elevation at the planned bridge is 4.6 feet. The pedestrian walkway elevation will vary between elevation 13.04 feet at

the west abutment and 12.10 feet at the east abutment. The low chord[1] of the bridge will range from 9.44 feet at the west abutment and 8.5 feet at the east abutment. Both abutments will be above the mean high water and CJL.

Eversource's 115-kV electric transmission cables will be placed within two 18-inch diameter steel casing pipes that will be supported under the pedestrian walkway. The steel casing pipes, and their support hangers will not project below the low chord[2] of the bridge span. The bridge will project approximately 4.5 feet below the FEMA 1% annual chance flood elevation of 13. feet.

To determine the critical flow velocity that would impact the bridge structure, a hydraulic analysis was performed utilizing various tide and riverine conditions. The critical flow velocity calculated at the upstream face of the bridge was 1.22 feet per second. The resultant force on the bridge structure projecting below the flood water surface is 9.3 pounds per linear foot of bridge span. A resultant force on the 18-inch diameter steel pipes that will be below the flood elevation was calculated to be 4.5 pounds per linear foot of exposed pipe.

Taking into account the results of the hydraulic modeling, the utility supports for the electric transmission cable casings were specified to be capable of resisting the lateral load of 4.5 pounds per linear foot (as noted above) and the proposed bridge truss was specified to be capable of withstanding the calculated 9.3 pounds per linear foot (as also noted above).

The contract documents for the construction of the bridge contain a performance specification for the pedestrian/utility truss bridge and associated utility support systems. This specification calls for the submittal of design calculations incorporating all loads imposed onto the bridge and utility support structures, including those from the 100-year storm event. The calculations shall be performed by a structural engineer licensed in the State of Connecticut and shall be submitted for review and approval by Eversource prior to fabrication and installation.

In summary, the impacts of the 100-year flood event at the location of the proposed utility/pedestrian bridge and associated utility supports crossing have been analyzed and the results of this analysis have been incorporated into the contract documents for the construction of this bridge. In accordance with these requirements, the proposed bridge would not be adversely impacted by the 100-year storm event.

[1] Low chord" refers to the lowest structural element of the bridge; see the engineering drawings in Attachment A.

0 1,000 2,000 4,000

SCALE IN FEET

PEDESTRIAN/UTILITY BRIDGE OVER INDIAN HARBOR
DAVIS AVENUE
GREENWICH, CT

LOCUS MAP

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
ALFRED BENESCH & COMPANY
120 HEBRON AVE, 2ND FL
GLASTONBURY, CT 06033

PROJ MGR: SLL	REVIEWED BY: SLL	CHECKED BY: SLL	FIG/DWG 1
DESIGNED BY: SRT	DRAWN BY: SRT	SCALE: 1 in = 2,000 ft	
DATE: NOVEMBER 2018	PROJECT NO: 05.0046254.01	REVISION NO: N/A	

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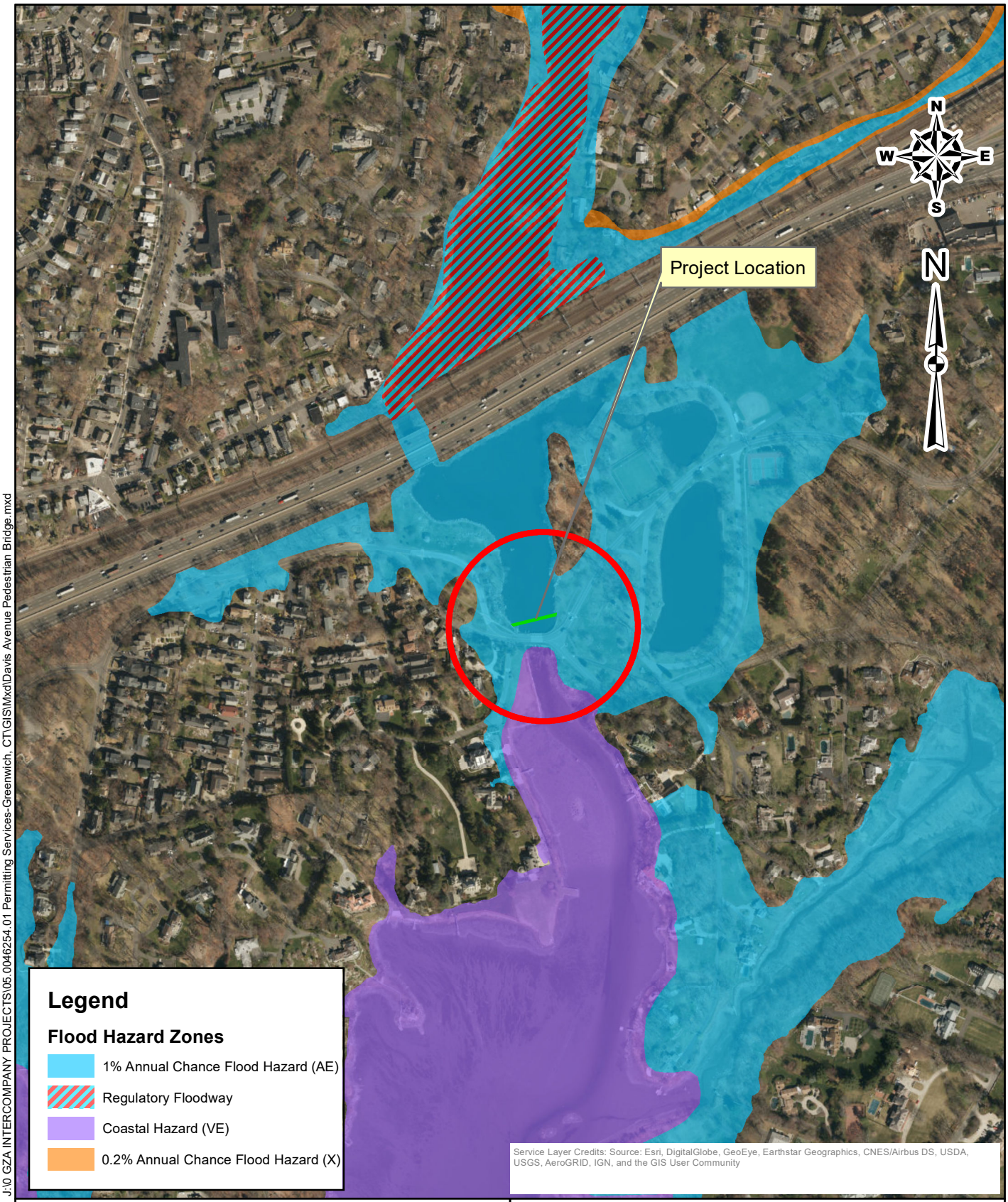

0 250 500 1,000

SCALE IN FEET

PEDESTRIAN BRIDGE OVER INDIAN HARBOR
DAVIS AVENUE
GREENWICH, CT

FEMA MAP

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
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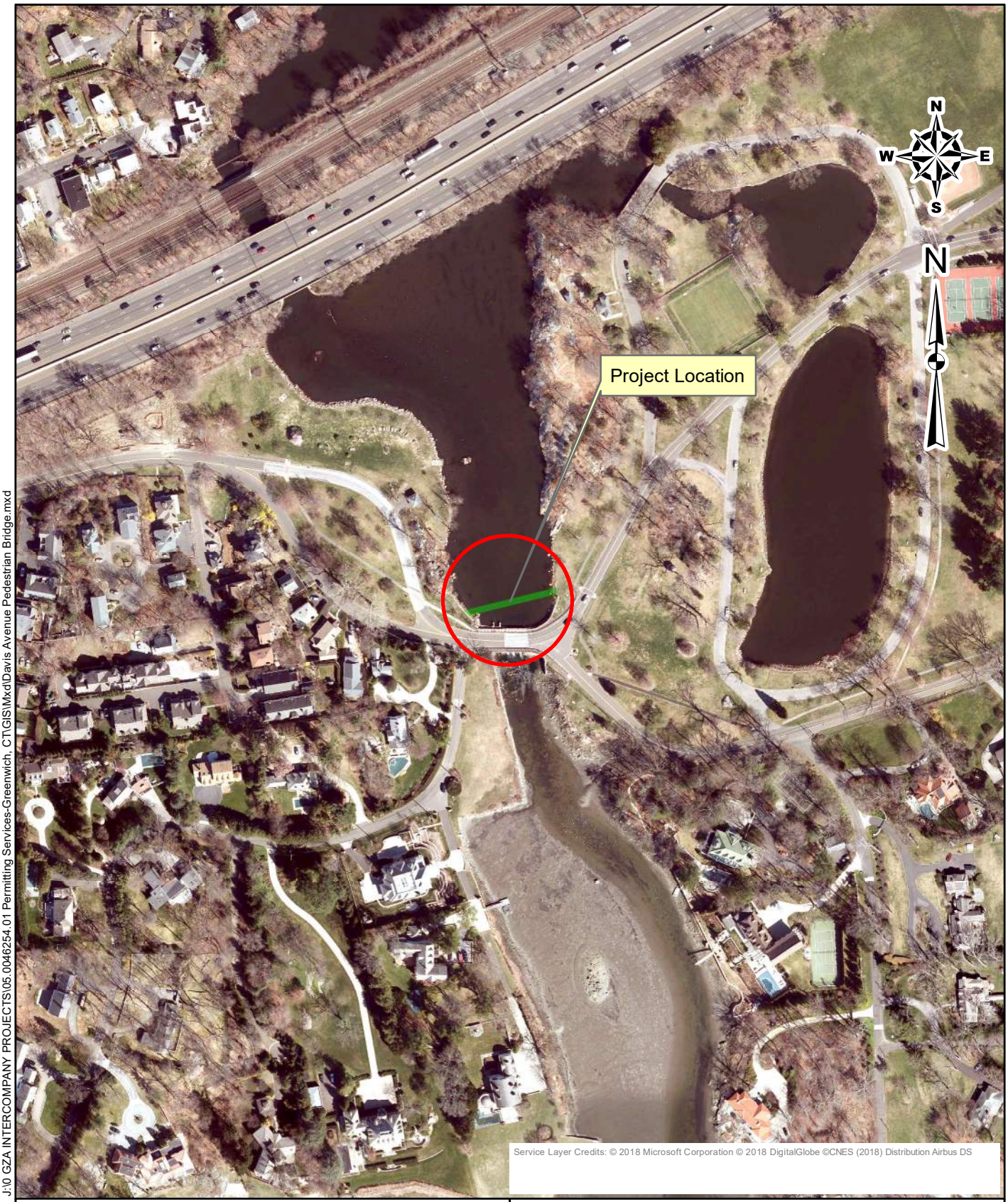
GLASTONBURY, CT 06033

PROJ MGR: SLL	REVIEWED BY: SLL	CHECKED BY: SLL	FIG/DWG 2
DESIGNED BY: SRT	DRAWN BY: SRT	SCALE: 1 in = 500 ft	
DATE: September 2019	PROJECT NO: 05.0046254.01	REVISION NO: N/A	



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0 125 250 500
SCALE IN FEET

PEDESTRIAN/UTILITY BRIDGE OVER INDIAN HARBOR
DAVIS AVENUE
GREENWICH, CT

AERIAL MAP

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
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PREPARED FOR:
ALFRED BENESCH & COMPANY
120 HEBRON AVE, 2ND FL
GLASTONBURY, CT 06033

PROJ MGR: SLL	REVIEWED BY: SLL	CHECKED BY: SLL	FIG/DWG 3
DESIGNED BY: SRT	DRAWN BY: SRT	SCALE: 1 in = 250 ft	
DATE: NOVEMBER, 2018	PROJECT NO: 05.0046254.01	REVISION NO: N/A	