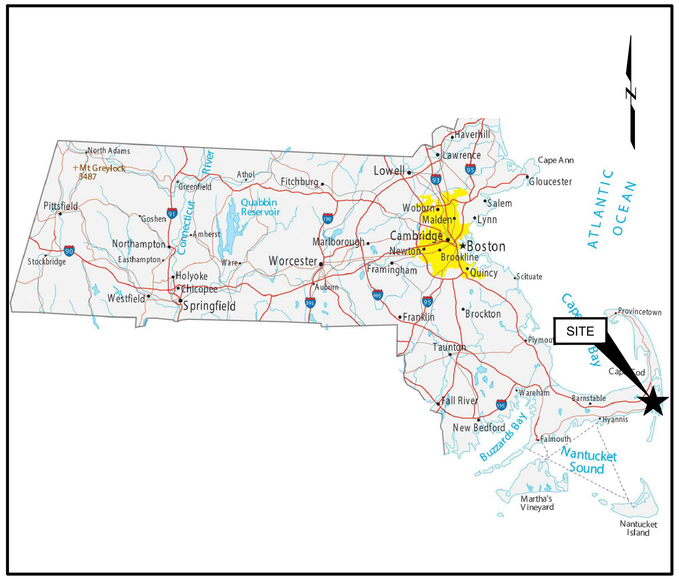
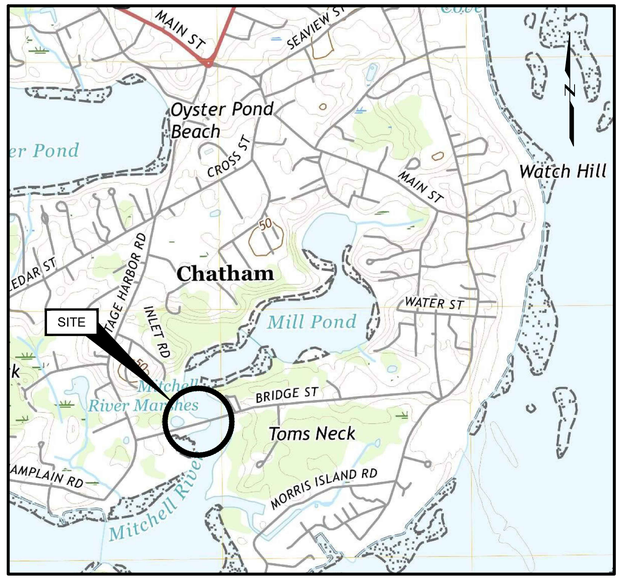
90 BRIDGE STREET REDEVELOPMENT
PIERS

TOWN OF CHATHAM
CHATHAM, MASSACHUSETTS
JANUARY 2025



SOURCE:
GISGEOGRAPHY.COM/MASSACHUSETTS-MAP

STATE / COUNTY MAP
NOT TO SCALE



SOURCE:
MAP TAKEN FROM WWW.NGMDB.USGS.GOV, 2018, ACCESSED NOVEMBER 19, 2020.

SITE LOCATION MAP
1" = 1000'

LOCATION:

90 BRIDGE STREET
CHATHAM, MASSACHUSETTS

PREPARED FOR:

TOWN OF CHATHAM
549 MAIN STREET
CHATHAM, MASSACHUSETTS

PREPARED BY:

GEI CONSULTANTS, INC.
124 GROVE STREET
FRANKLIN, MA 02038
(774)227-6001

GEI Consultants

FOR BID

NO.	DATE	ISSUE/REVISION	APP
0	1/15/2025	FOR BID	DBR

SHEET NO.
G-001

SHEET NO.
1 OF 20

GEI PROJECT NO. 2003247

---- b:\Working\chatham, town of\2003247 90 bridge street redevelopment\00_CAD\Design\Working\pier & site improvements\G-001_Cover Sheet.dwg - 11/13/2024

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8	S-101	UPWELLER PILE LAYOUT
9	S-102	UPWELLER PIER UNDERDECK PLAN
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ABBREVIATIONS

APPROX	APPROXIMATE
BLDG	BUILDING
CIP	CAST-IN-PLACE
℄	CENTER LINE
CLR	CLEAR
CU FT	CUBIC FEET
CY	CUBIC YARD
Ø	DIAMETER
DFE	DESIGN FLOOD ELEVATION
EF	EACH FACE
EW	EACH WAY
EL	ELEVATION IN FEET
HOWL	HIGHEST OBSERVED WATER LEVEL
HSS	HOLLOW STRUCTURAL SECTIONS
HDG	HOT DIP GALVANIZED
ID	INSIDE DIAMETER
LF	LINEAR FEET
LOWL	LOWEST OBSERVED WATER LEVEL
MAX	MAXIMUM
MHHW	MEAN HIGHER HIGH WATER
MHW	MEAN HIGH WATER
MLW	MEAN LOW WATER
MLLW	MEAN LOWER LOW WATER
MSL	MEAN SEA LEVEL
MTL	MEAN TIDE LEVEL
MIN	MINIMUM
NGVD	NATIONAL GEODETIC VERTICAL DATUM
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OC	ON CENTER
PL	PLATE
REF	REFERENCE
#6@6	REINFORCING BAR SIZE WITH SPACING IN INCHES
SIM	SIMILAR
SF	SQUARE FEET
SS	STAINLESS STEEL
STD	STANDARD
TEMP	TEMPORARY
T&B	TOP AND BOTTOM
TYP	TYPICAL
UG	UNDERGROUND
UON	UNLESS OTHERWISE NOTED

LEGEND

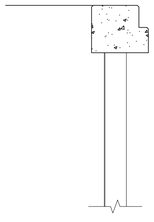
CONTOUR 15
SPOT GRADE 20.0
DRAIN MANHOLE (D)
CATCH BASIN
DRAIN LINE D
SEWER MANHOLE (S)
SEWER LINE S
WATER VALVE WV
WATER LINE W
HYDRANT
WATER MANHOLE (W)
UTILITY POLE
LIGHT
ELECTRIC MANHOLE (E)
TIMBER PILE
SIGN
GUARDRAIL

OVERHEAD ELEC.
TIMBER DECKING
BUILDING
CONCRETE
RIPRAP

MAINT. DREDGING SAMPLING LOCATION (2015) TC 1
PLANNING SAMPLE LOCATION (2019) SC-1
TERRESTRIAL BORING (2020) B1
VIBRACORE SAMPLING LOCATION (2020) V1
SAMPLING LOCATION (2021) S1

GRAPHICAL TIDAL DATUM

DFE EL. +16.69
FEMA 100 YR FLOOD EL. +15.69



MHHW EL. +4.58
MHW EL. +4.21
NAVD88 EL. +2.69
MLW EL. +0.26
MLLW EL. 0.0

NOTE:
DATUM TAKEN FROM STATION 8447505 STAGE HARBOR, CHATHAM, MA

FOR BID

Attention:
0 1"
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SHEET NAME
SHEET INDEX AND LEGEND

SHEET NO.
G-002

DESIGN CRITERIA - LOADS

T-PIER:	PEDESTRIAN LIVE LOAD	100 PSF
	H5 TRUCK	4 TON AXLE

UPWELLER PIER:

1. TIMBER APRON

PEDESTRIAN LIVE LOAD	100 PSF
H5 TRUCK	4 TON AXLE

2. UPWELLER BUILDING

DECK LIVE LOAD	250 PSF

3. UPWELLER FLOATS

WIND	70 MPH, 8 MINUTE DURATION AT 30 FT ELEVATION. NO BOATS TIED TO FLOATS
WAVES	HMAX = 5.6 FT, PERIOD = 3.3 SECONDS
MIN. DESIGN LOADING	540 LB/FT
PILE GUIDE MIN. DESIGN LOAD	16,200 LBS (UNFACTORED)
UNIFORM LIVE LOAD	50 PSF (UNFACTORED)
FLOTATION CRITERIA:	
DEAD LOAD ONLY - 20" FREEBOARD	
20 PSF UNIFORM LIVE LOAD - 8" MIN. FREEBOARD	
50 PSF UNIFORM LIVE LOAD - ZERO FREEBOARD	

4. CONCRETE FLOATS

WIND	70 MPH, 8 MINUTE DURATION AT 30 FT ELEVATION. NO BOATS TIED TO FLOATS
WAVES	HMAX = 5.6 FT, PERIOD = 3.3 SECONDS
MIN. DESIGN LOADING	540 LB/FT
PILE GUIDE MIN. DESIGN LOAD	16,200 LBS (UNFACTORED)
UNIFORM LIVE LOAD	50 PSF (UNFACTORED)
FLOTATION CRITERIA:	
DEAD LOAD ONLY - 20" FREEBOARD	
50 PSF UNIFORM LIVE LOAD - 8" MIN. FREEBOARD	
100 PSF UNIFORM LIVE LOAD - ZERO FREEBOARD	

5. GANGWAYS

UNIFORM LIVE LOAD	100 PSF

SITE EXPOSURE:

GROUND SNOW LOAD	50 PSF
ULTIMATE DESIGN WIND SPEED (3SEC GUST)	140 MPH
SIGNIFICANT WAVE HEIGHT	< 1.5 FT

OSHA REQUIREMENTS:

1. PURSUANT TO M.G.L. c.30, §39S, ANY PERSON SIGNING A CONTRACT TO WORK ON A PUBLIC BUILDING OR PUBLIC WORKS PROJECT ESTIMATED TO COST MORE THAN $10,000, MUST CERTIFY UNDER THE PAINS AND PENALTIES OF PERJURY THAT ALL EMPLOYEES EMPLOYED ON THE WORKSITE, OR IN WORK SUBJECT TO THE BID, HAVE SUCCESSFULLY COMPLETED AT LEAST TEN HOURS OF OSHA APPROVED TRAINING. PROOF OF OSHA CERTIFICATION OF ALL WORKERS ONSITE WILL BE REQUIRED BY THE TOWN PRIOR TO THE START OF WORK.

SURVEY CONTROL AND BASELINES:

1. EXISTING SURVEY CONTROL POINTS ARE SHOWN ON SHEET C-101. THE CONTRACTOR SHALL PROTECT EXISTING SURVEY CONTROL POINTS FROM DAMAGE FOR THE DURATION OF THE WORK.
2. THE CONTRACTOR SHALL ESTABLISH AND MAINTAIN PROJECT BASELINES AND CONTROL AS REQUIRED TO ENSURE ACCURATE LOCATION OF ALL ELEMENTS OF THE PROJECT.
3. EXISTING TOPOGRAPHIC INFORMATION IS BASED ON "PLAN SHOWING EXISTING CONDITIONS" PREPARED BY EAST SOUTHEAST SURVEYING LLC DATED NOVEMBER 07, 2020; AVAILABLE FROM TOWN UPON REQUEST.
4. EXISTING HYDROGRAPHIC INFORMATION IS BASED ON SURVEY COMPLETED BY STEELE ASSOCIATES MARINE CONSULTANTS, LLC DATED AUGUST 08, 2024; AVAILABLE FROM TOWN UPON REQUEST.
5. PROPERTY LINES ARE APPROXIMATE AND BASED ON REGISTRY OF DEEDS RECORD DOCUMENTS.
6. EXISTING SURVEY, AS SHOWN, IS BASED ON MASSACHUSETTS STATE PLANE COORDINATE SYSTEM (NAD 83).
7. SOUNDINGS AND ELEVATIONS ARE SHOWN IN FEET AND TENTHS BASED ON A MEAN LOWER LOW WATER DATUM. POSITIVE VALUES REPRESENT AN ELEVATION ABOVE THAT SAME PLANE.

SITE ACCESS AND STAGING AREAS:

1. CONTRACTOR STAGING AREA SHALL BE LOCATED WITHIN THE LIMITS AS SHOWN ON PLAN UNLESS AGREED OTHERWISE BY THE OWNER. NO LANDSIDE STAGING IS PERMITTED UNLESS AGREED OTHERWISE BY THE OWNER.
2. CONTRACTOR SHALL MAINTAIN A MINIMUM CLEAR WIDTH OF 20 FEET FOR ACCESS TO THE ROAD AT ALL TIMES.
3. CONTRACTOR SHALL COORDINATE WORK W/ OWNER AND ADJACENT MARINA. CONTRACTOR SHALL NOT OBSTRUCT MARINA ACCESS WITHOUT PRIOR APPROVAL.
4. CONTRACTOR SHALL NOTE CONSTRUCTION MAY BE OCCURRING ON ADJACENT PROPERTIES AND SHALL NOT INTERFERE WITH WORK OF OTHER CONTRACTORS AND SHALL COORDINATE WORK AT ALL TIMES.
5. NO MATERIALS OR EQUIPMENT SHALL BE STORED OUTSIDE LIMITS SHOWN UNLESS APPROVED BY ENGINEER.
6. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR SITE SECURITY. CONTRACTOR SHALL PROVIDE CHAIN LINK FENCING AROUND PERIMETER OF WORK AREA AND STAGING AREA TO PREVENT PUBLIC ACCESS AND PROVIDE PUBLIC SAFETY. THE FENCE SHALL BE A MINIMUM OF 6' HIGH AND CONSTRUCTED OF GALVANIZED STEEL CHAIN LINK WITH POSTS AT 8' ON CENTER. FENCE SHALL BE SUPPORTED BY CONCRETE BLOCKS TO RECEIVE POSTS.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR JOB SAFETY. ALL CONSTRUCTION ACTIVITY SHALL BE IN ACCORDANCE WITH OSHA STANDARDS AND LOCAL AND STATE REGULATIONS.
8. AREAS OUTSIDE THE LIMITS OF THE WORK DISTURBED OR DAMAGED BY THE CONTRACTOR SHALL BE RETURNED TO THEIR ORIGINAL CONDITION AT NO EXPENSE TO THE OWNER.
9. ALL EXISTING PAVEMENT DAMAGED WITHIN THE PROJECT LIMITS SHALL BE REPAIRED AT NO ADDITIONAL COST TO THE OWNER.
10. THE CONTRACTOR SHALL STAGE AND SEQUENCE CONSTRUCTION TO ENSURE STABILITY OF ABUTTER PROPERTIES.

SITE PREPARATION:

1. CONTRACTOR SHALL INSTALL ALL SIGNAGE PRIOR TO INITIATION OF CONSTRUCTION ACTIVITIES INCLUDE OWNER PROJECT SIGNAGE, DEP FILE NUMBER AND FEDERAL AND STATE MANDATED WORK PLACE SIGNAGE.
2. CONTRACTOR SHALL HAVE IN-PLACE TRASH AND SANITARY FACILITIES FOR THE WORK PLACE.
3. EXISTING PAVEMENT, STRUCTURES AND AMENITIES WITHIN THE PROXIMITY OF THE WORK SHALL BE PROTECTED TO PREVENT ACCIDENTAL DAMAGE BY CONSTRUCTION ACTIVITIES.
4. DISCOVERY OF INCONSISTENT SITE INFORMATION OR CONDITIONS ARE TO BE IMMEDIATELY CONVEYED TO THE OWNER AND ENGINEER PRIOR TO COMMENCING OR CONTINUING CONSTRUCTION.
5. THE CONTRACTOR SHALL NOTIFY DIG-SAFE AND APPLICABLE UTILITIES PRIOR TO COMMENCING ANY WORK ON SITE.
6. LOCATIONS OF EXISTING UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY EXACT LOCATIONS OF UTILITIES AS MAY BE REQUIRED. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES OCCURRING AS A RESULT OF THE CONTRACTOR'S FAILURE TO LOCATE AND PROTECT UNDERGROUND UTILITIES. ALL REPAIRS SHALL BE MADE AT THE CONTRACTOR'S EXPENSE.
7. CONTRACTOR SHALL MAINTAIN AND PROTECT ALL EXISTING UTILITIES AND DRAINAGE AT ALL TIMES. THE CONTRACTOR SHALL REPAIR ANY DAMAGE AND RESTORE TO THE PRE-EXISTING CONDITION AT NO COST TO THE OWNER.
8. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS AND BE RESPONSIBLE FOR PAYING ANY FEES OR COSTS FOR ANY POLE OR UTILITY ALTERATION OR RELOCATION REQUIRED TO PERFORM THE WORK.
9. CONTRACTOR SHALL SUPPLY AND INSTALL APPROVED FILTER FABRIC IN CATCH BASINS AND COVER AS REQUIRED TO PREVENT CONSTRUCTION RELATED FILL OR OTHER MATERIAL FALLING INTO CATCH BASIN.
10. CONTRACTOR SHALL CLEAN OUT ALL CATCH BASINS AND OTHER DRAINAGE STRUCTURES ON COMPLETION OF WORK.
11. CONTRACTOR SHALL SUPPLY ALL NECESSARY TEMPORARY UTILITIES FOR CONSTRUCTION INCLUDING WATER, POWER, LIGHTING, DATA AND TELEPHONE.
12. CONTRACTOR SHALL READ ALL REGULATORY PERMITS FOR THE PROJECT AND SHALL COMPLY WITH ALL ENVIRONMENTAL REQUIREMENTS AND PERMIT CONDITIONS.
13. CONTRACTOR SHALL CONFINE ALL TEMPORARY STOCKPILES OF EXCAVATED MATERIAL OR IMPORTED FILL USING HAY BALES AND FILTER FABRIC.
14. CONTRACTOR SHALL PROVIDE A CONFINED CONCRETE TRUCK WASHDOWN AREA AT A LOCATION TO BE APPROVED BY THE ENGINEER. WASHDOWN AREA SHALL INCLUDE PROTECTION TO PAVEMENT, A PERIMETER WALL AND A FILTER FABRIC LINER. NO RUNOFF CONTAINING CEMENT OR OTHER SUSPENDED SOLIDS WILL BE PERMITTED. ALL EXCESS CONCRETE SHALL BE DISPOSED AT THIS LOCATION OR OFF SITE. MATERIALS SHALL BE COMPLETELY REMOVED ON COMPLETION OF CONSTRUCTION AND DISPOSED OF AT AN APPROVED DISPOSAL LOCATION.
15. CONTRACTOR SHALL MAINTAIN EXISTING SILTATION CURTAIN AROUND THE WORK AREA AS REQUIRED BY PERMITS THROUGHOUT PROJECT DURATION. PILES SHALL REMAIN PROPERTY OF THE TOWN AND BE TRANSPORTED TO A LOCATION WITHIN THE TOWN.
16. ROADWAY SHALL BE FREE OF CONSTRUCTION DEBRIS AND KEPT CLEAN TO THE SATISFACTION OF THE OWNER. CONTRACTOR IS RESPONSIBLE FOR ROAD CLEANLINESS.

STRUCTURAL STEEL:

1. STEEL FABRICATION AND ASSEMBLY SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS, LATEST EDITION.
2. STEEL BOLTS FOR STEEL CONNECTIONS SHALL BE STAINLESS STEEL.
3. WELDING RODS SHALL CONFORM TO AWS E70XX GRADE.
4. ALL STAINLESS STEEL SHALL CONFORM TO ASTM SERIES 300 TYPE 316 ALLOY.

CONCRETE:

1. ALL REINFORCEMENT SHALL BE NEW DEFORMED STEEL BARS, GRADE 60 CONFORMING TO ASTM A615, HOT DIPPED GALVANIZED CONFORMING TO ASTM A-123, A-153, A-767.
2. REINFORCEMENT ACCESSORIES SHALL BE DIELECTRIC COATED STEEL OR APPROVED PLASTIC.
3. CONCRETE SHALL HAVE THE FOLLOWING SPECIFICATIONS:
   - MINIMUM COMPRESSIVE STRENGTH: 5,000 PSI AT 28 DAYS
   - AIR ENTRAINMENT SHALL BE MAINTAINED AT 7% ± 1
   - MAXIMUM SIZE OF AGGREGATE SHALL BE ¾ INCH.
   - MAX WATER TO CEMENTITIONS MATERIAL RATIO SHALL BE 0.40 UNLESS OTHERWISE NOTED.
   - CEMENT SHALL MEET ASTM C150, TYPE II
   - MASSDOT APPROVED ANTI-SHRINKAGE ASTM C-494
4. GROUT SHALL BE A HIGH STRENGTH, NON-SHRINK GROUT WITH SALTWATER RESISTANCE, SUCH AS FIVE STAR SPECIAL GROUT 120 OR EQUIVALENT.

HEAVY TIMBER:

1. UNLESS OTHERWISE SPECIFIED, ALL TIMBER TO BE USED INCLUDING BRACING, CURBS, CHOCKS, SPACERS SHALL BE TROPICAL HARDWOOD.
2. ALL TIMBER SHALL BE NEW AND SUPPLIED WITH NOMINAL DIMENSIONS UNLESS OTHERWISE NOTED. TIMBER SHALL BE FINISHED S4S UNLESS NOTED OTHERWISE.
3. ALL BOLTS, STEEL PLATES, AND RELATED HARDWARE USED IN TIMBER CONNECTIONS OR CONSTRUCTION SHALL CONFORM TO ASTM SERIES 300 TYPE 316 STAINLESS STEEL UNLESS OTHERWISE NOTED.

PIER PILES:

1. UNLESS OTHERWISE SPECIFIED, ALL PIER BEARING PILES SHALL BE TROPICAL GREENHEART CONFORMING TO WITH ASTM D25.
2. PILES SHALL BE INSTALLED TO THE CRITERIA SHOWN IN THE CONTRACT DOCUMENTS AND DRAWINGS.
3. ALL BEARING PILES SHALL BE DRIVEN TO 28 TON WORKING LOAD CAPACITY. IF THE REQUIRED WORKING LOAD CAPACITY IS REACHED BEFORE THE PILE TIP REACHES ELEVATION -15 MLLW OR DEEPER, DRIVING SHALL CONTINUE UNTIL THE PILE TIP IS BELOW ELEVATION -15 MLLW.
4. ESTIMATED PILE LENGTH IS 50'. CONTRACTOR SHALL MAKE THEIR OWN DETERMINATION OF PILE LENGTHS REQUIRED TO MEET THE PROJECT REQUIREMENTS.
5. ALL FENDER PILES SHALL BE INSTALLED TO A TIP ELEVATION -20 MLLW UNLESS AGREED OTHERWISE

UPWELLER FLOATS:

1. UNLESS OTHERWISE SPECIFIED, ALL TIMBER TO BE USED SHALL BE NO. 1 AND BETTER SOUTHERN PINE AS GRADED BY SPIB AND WITH DESIGN VALUES PER NFPA AWC NATIONAL DESIGN SPECIFICATION OR THE EQUIVALENT FOR DOUGLAS FIR AS GRADED BY WCLIB AND WWPA.
2. ALL TIMBER SHALL BE NEW AND SUPPLIED WITH NOMINAL DIMENSIONS UNLESS OTHERWISE NOTED.
3. ALL TIMBER TO BE TREATED WITH MICRONIZED COPPER AZOLE (MCA) SHALL BE TREATED TO A RETENTION OF 0.23 POUNDS PER CUBIC FOOT.
4. ALL DECKING FOR UPWELLER PIER AND FLOATING DOCKS SHALL BE COMPOSITE. ALL DECKING FOR T-PIER SHALL BE TIMBER.
5. MISC. HARDWARE: GALVANIZED STEEL PLATES AND ALL BOLTS AND RELATED HARDWARE SHALL BE FASHIONED FROM STEEL AND GALVANIZED AFTER FABRICATION AND IN ACCORDANCE WITH REQUIREMENTS OF ASTM A123, AND/OR A153. BOLTS AND NUTS SHALL CONFORM TO ASTM A307.
6. CONNECTION HARDWARE SHALL BE FABRICATED FROM ASTM-A36 GRADE STEEL WITH MINIMUM THICKNESS ¼".
7. ALL STRUCTURAL STEEL SHALL BE HOT DIP GALVANIZED CONFORMING TO ASTM A-123, A-153, A-767.
8. ALL FLOATS SHALL BE STRUCTURALLY DESIGNED FOR A UNIFORM LIVE LOAD OF 50 PSF (UNFACTORED).
9. UPWELLER FLOATS TO BE PUBLIC, AND ADHERE TO THE AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS FOR AN ACCESSIBLE FACILITY.

CONCRETE FLOATS:

1. UNLESS OTHERWISE SPECIFIED, ALL CONCRETE SHALL BE 6000 PSI.
2. ALL REINFORCEMENT SHALL BE NEW DEFORMED STEEL BARS GRADE 60 CONFORMING TO ASTM A-615, HOT DIPPED GALVANIZED CONFORMING TO A-123M AND / OR A-153 POST BENDING, OR CONTINUOUSLY GALVANIZED TO ASTM A-1094.
3. PILE GUIDES ON CONCRETE FLOATS SHALL BE DESIGNED BY THE FLOAT MANUFACTURER FOR A MINIMUM LOAD OF 15,000 LBS.
4. THE CONNECTION BETWEEN THE TIMBER FINGER FLOATS AND THE CONCRETE MAIN FLOATS SHALL BE DESIGNED BY THE FLOAT MANUFACTURER.

FOR BID

Attention:
0 1"
If this scale bar does not measure 1" then drawing is not original scale.

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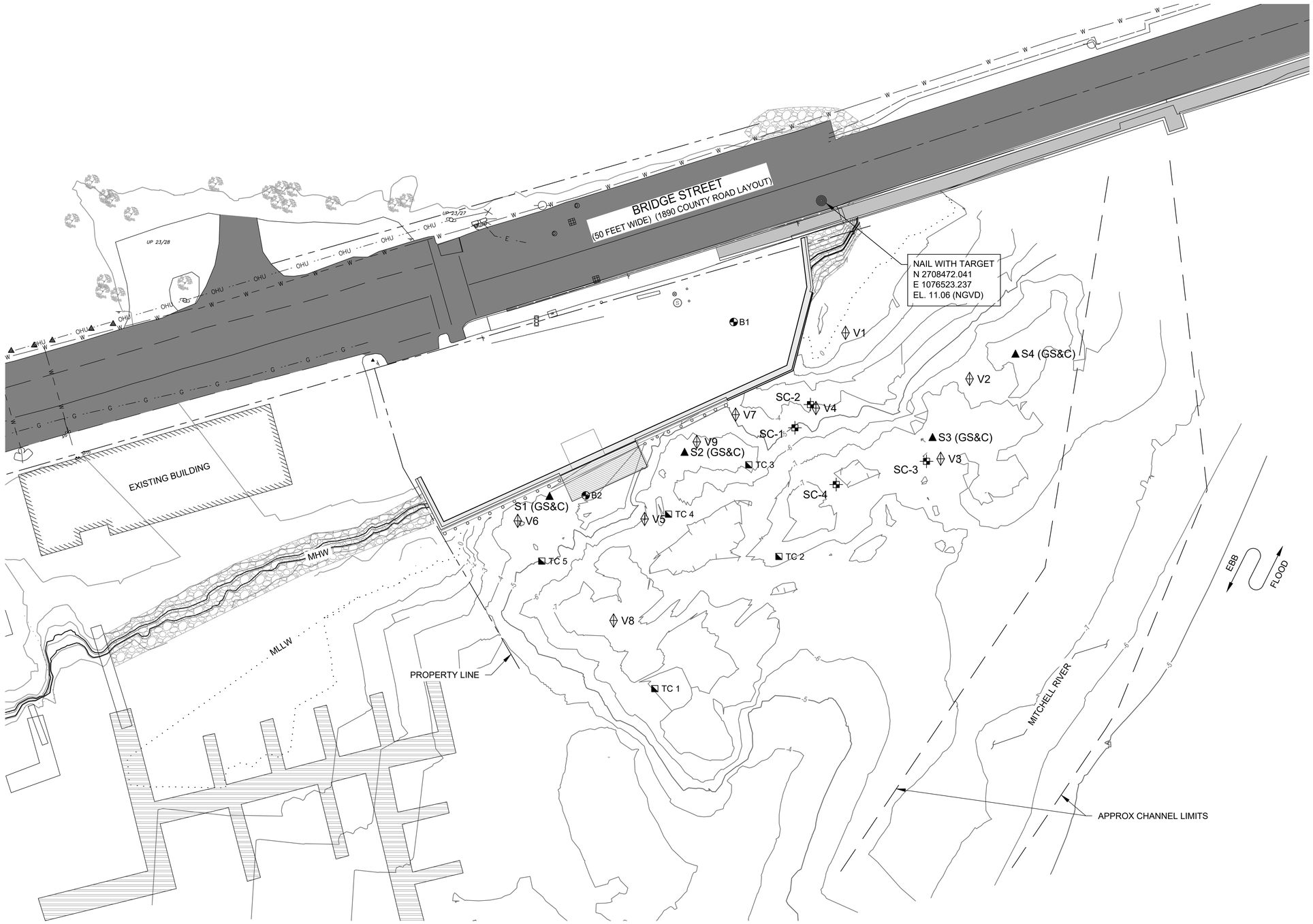
SHEET NAME: GENERAL NOTES

SHEET NO.: **G-003**



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0 20 40
1" = 20'-0"

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SHEET NAME
BORING & SAMPLING PLAN

SHEET NO.
B-101

BORING INFORMATION

LOCATION: Grassy area by structure
GROUND SURFACE EL. (ft): 9.4 **DATE START/END:** 7/17/2020 - 7/17/2020
VERTICAL DATUM: MLLW **DRILLING COMPANY:** Northern Drill Service, Inc.
TOTAL DEPTH (ft): 51.0 **DRILLER NAME:** T. Tucker
LOGGED BY: A. Juliano **RIG TYPE:** Mobile B-59 Truck Rig

BORING B1

PAGE 1 of 2

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch / 4.5 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.** NA / NA
DRILLING METHOD: Driven casing and washed with rotary tooling
WATER LEVEL DEPTHS (ft): ▼8.0 7/17/2020 9:44 am

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 No.	Sample Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		S1	0 to 2	24/7	8-7-4-8	Advance 4" dia. casing while drilling/sampling to a depth of 51 ft.	FILL	S1 (0-3"): GRASS AND TOPSOIL. S1 (3-7"): WIDELY GRADED SAND (SW); ~90% fine to coarse sand, ~5% fine to coarse subangular gravel, ~5% nonplastic fines, tan. S2 (0-13"): WIDELY GRADED SAND (SW); ~90% fine to coarse sand, ~5% fine to coarse subangular gravel, ~5% nonplastic fines, gray.
5	5	S2	2 to 4	24/20	15-15-10-12			
		S3	4 to 6	24/13	8-11-10-13		SAND AND SILT (POSSIBLE FILL)	S2 (13-20"): SILTY SAND (SM); ~85% fine to medium sand, ~15% nonplastic fines, gray. Shells observed. Slight organic-like odor. S3: WIDELY GRADED SAND WITH SILT (SW-SM); ~80% fine to coarse sand, ~10% fine subrounded to subangular gravel, ~10% nonplastic fines, gray. Shells observed. Slight organic-like odor.
0	10	S4	9 to 11	24/0	17-14-13-11	Redrive with 3" spoon.		S4: No Recovery. S4 [Redrive]: No Recovery.
-5	15	S5	14 to 16	24/16	4-5-8-9		SILT AND CLAY	S5 (0-3"): LEAN CLAY (CL); ~85% low to medium plasticity fines, ~15% fine to coarse sand, light gray. S5 (3-13"): WIDELY GRADED SAND WITH CLAY (SW-SC); ~90% fine to coarse sand, ~10% nonplastic fines, orange. S5 (13-16"): SILT (ML); ~90% low to medium plasticity fines, ~15% fine sand, gray.
-10	20	S6	19 to 21	24/12	7-10-12-11			S6: SILTY SAND (SM); ~85% fine to medium sand, ~15% nonplastic fines, light brown. Lenses of reddish-brown fine sand.
-15	25	S7	24 to 26	24/17	8-10-16-17	Qp = 3.5 tsf Sv = 0.4 tsf		S7: LEAN CLAY (CL); ~95% low to medium plasticity fines, ~5% fine sand, gray.

NOTES: 1. Elevation estimated from existing conditions plan in Stantec's Public Meeting No. 8 presentation. 9.17 M.L.W in shell drive. M.L.W datum - 2.42' = NAVD 88 datum.

PROJECT NAME: 90 Bridge Street Redevelopment
CITY/STATE: Chatham, Massachusetts
GEI PROJECT NUMBER: 2003247

GEI Consultants

GEI WORBURN STD 11 LOCATION:LAYER NAME 2003247 BORING LOGS.GPJ 10/30/20

LOCATION: Grassy area by structure
GROUND SURFACE EL. (ft): 9.4 **DATE START/END:** 7/17/2020 - 7/17/2020
VERTICAL DATUM: MLLW **DRILLING COMPANY:** Northern Drill Service, Inc.

BORING B1

PAGE 2 of 2

Elev. (ft)	Depth (ft)	Sample No.	Sample Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
-20	30	S8	29 to 31	24/7	10-13-14-24		SAND	S8: WIDELY GRADED SAND (SW); ~95% fine to coarse sand, ~5% nonplastic fines, brown and gray.
-25	35	S9	34 to 36	24/5	12-6-5-8	Qp = 3.0 tsf Sv = 0.3 tsf	CLAY	S9: LEAN CLAY (CL); ~90% low to medium plasticity fines, ~10% fine sand, gray.
-30	40	S10	39 to 41	24/18	8-7-8-8	Qp = 2.5 tsf Sv = 0.5 tsf		S10: LEAN CLAY (CL); ~95% low to medium plasticity fines, ~5% fine sand, gray.
-35	45	S11	44 to 46	24/24	3-7-9-12	Qp = 3.5 tsf Sv = 0.45 tsf		S11: Similar to S10.
-40	50	S12	49 to 51	24/14	6-9-4-4		SAND	S12 (0-2"): LEAN CLAY (CL); ~90% low to medium plasticity fines, ~10% fine sand, gray. S12 (2-14"): NARROWLY GRADED SAND (SP); ~85% fine to coarse sand, ~10% fine subrounded gravel, ~5% nonplastic fines, gray.
-45	55					Bottom of boring at depth 51 ft. Backfilled with cuttings.		
-50	60							
-55								

NOTES: 1. Elevation estimated from existing conditions plan in Stantec's Public Meeting No. 8 presentation. 9.17 M.L.W in shell drive. M.L.W datum - 2.42' = NAVD 88 datum.

PROJECT NAME: 90 Bridge Street Redevelopment
CITY/STATE: Chatham, Massachusetts
GEI PROJECT NUMBER: 2003247

GEI Consultants

GEI WORBURN STD 11 LOCATION:LAYER NAME 2003247 BORING LOGS.GPJ 10/30/20

BORING INFORMATION

LOCATION: Shell parking lot near dock
GROUND SURFACE EL. (ft): 9.4 **DATE START/END:** 7/17/2020 - 7/17/2020
VERTICAL DATUM: MLLW **DRILLING COMPANY:** Northern Drill Service, Inc.
TOTAL DEPTH (ft): 53.0 **DRILLER NAME:** T. Tucker
LOGGED BY: A. Juliano **RIG TYPE:** Mobile B-59 Truck Rig

BORING B2

PAGE 1 of 2

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch / 4.5 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.** NA / NA
DRILLING METHOD: Driven casing and washed with rotary tooling
WATER LEVEL DEPTHS (ft): ▼9.0 7/17/2020 1:42 pm

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 No.	Sample Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		S1	0 to 2	24/22	5-6-5-18	Advance 4" dia. casing while drilling/sampling to a depth of 53 ft.	FILL	S1 (0-8"): CRUSHED SHELLS AND SILTY SAND (SM); ~85% fine to coarse sand, ~15% nonplastic fines, gray. S1 (8-22"): SILTY SAND (SM); ~80% fine to coarse sand, ~15% nonplastic fines, ~5% fine to coarse subrounded to subangular gravel, brown.
5	5	S2	4 to 6	24/14	8-10-13-13	Drill rig chatter.	SAND AND SILT (POSS. FILL)	S2: WIDELY GRADED SAND WITH SILT (SW-SM); ~70% fine to coarse sand, ~10% fine subrounded to subangular gravel up to 1.5", ~10% nonplastic fines, gray. Shells observed.
0	10	S3	9 to 11	24/20	12-8-15-13			S3: SILT WITH SAND (ML); ~80% low plasticity fines, ~20% fine sand, gray.
-5	15	S4	14 to 16	24/17	8-6-10-10	Qp = 3.0 tsf Sv = 0.3 tsf	SILT AND CLAY	S4 (0-6"): LEAN CLAY (CL); ~85% low to medium plasticity fines, ~15% fine sand, brown. S4 (6-17"): LEAN CLAY (CL); ~90% low to medium plasticity fines, ~5% fine sand, gray.
-10	20	S5	19 to 21	24/13	5-9-9-10		SAND AND GRAVEL	S5: WIDELY GRADED SAND (SW); ~95% fine to coarse sand, ~5% nonplastic fines, brown.
-15	25	S6	24 to 26	24/15	5-5-13-10			S6: WIDELY GRADED SAND WITH GRAVEL (SW); ~80% fine to coarse sand, ~15% fine to coarse subrounded to subangular gravel up to 0.5", ~5% nonplastic fines, dark brown.

NOTES: 1. Elevation estimated from existing conditions plan in Stantec's Public Meeting No. 8 presentation. 9.17 M.L.W in shell drive. M.L.W datum - 2.42' = NAVD 88 datum.

PROJECT NAME: 90 Bridge Street Redevelopment
CITY/STATE: Chatham, Massachusetts
GEI PROJECT NUMBER: 2003247

GEI Consultants

GEI WORBURN STD 11 LOCATION:LAYER NAME 2003247 BORING LOGS.GPJ 10/30/20

LOCATION: Shell parking lot near dock
GROUND SURFACE EL. (ft): 9.4 **DATE START/END:** 7/17/2020 - 7/17/2020
VERTICAL DATUM: MLLW **DRILLING COMPANY:** Northern Drill Service, Inc.

BORING B2

PAGE 2 of 2

Elev. (ft)	Depth (ft)	Sample No.	Sample Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
-20	30	S7	29 to 31	24/15	8-13-14-13	Drill rig chatter.	SAND AND GRAVEL	S7: WIDELY GRADED GRAVEL WITH SAND (GW); ~60% fine to coarse subrounded to subangular gravel up to 1", ~35% fine to coarse sand, ~5% nonplastic fines, brown.
-25	35	S8	34 to 36	24/10	14-11-9-9			S8: WIDELY GRADED SAND WITH GRAVEL (SW); ~60% fine to coarse sand, ~35% fine to coarse subrounded to subangular gravel up to 1.5", ~5% nonplastic fines, brown.
-30	40	S9	39 to 41	24/10	8-7-4-5	Drill rig chatter.		S9: WIDELY GRADED SAND WITH GRAVEL (SW); ~65% fine to coarse sand, ~30% fine to coarse subangular gravel, ~5% nonplastic fines, gray.
-35	45	S10	44 to 46	24/8	2-2-3-3			S10: NARROWLY GRADED SAND (SP); ~90% fine to coarse sand, mostly medium to coarse sand, ~5% fine gravel, ~5% nonplastic fines, gray.
-40	50	S11	49 to 51	24/0	4-6-8-9	Redrive with 3" spoon. No recovery sand blow-in.		S11: No Recovery. S11 [Redrive]: No Recovery.
-45	55	S12	51 to 53	24/1	5-6-5-8			S12: Similar to S10.
-50	60							Bottom of boring at depth 53 ft. Backfilled with cuttings.
-55								

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PROJECT NAME: 90 Bridge Street Redevelopment
CITY/STATE: Chatham, Massachusetts
GEI PROJECT NUMBER: 2003247

GEI Consultants

GEI WORBURN STD 11 LOCATION:LAYER NAME 2003247 BORING LOGS.GPJ 10/30/20

FOR BID

Attention:
0 1"
If this scale bar does not measure 1" then drawing is not original scale.

DRAFT

Designed:	DBR
Drawn:	JSF
Checked:	DBR
Approved:	DBR
P.E. No:	
GEI Project	2003247

GEI Consultants
GEI CONSULTANTS, INC.
124 GROVE STREET
FRANKLIN, MA 02038
(774)227-6001

TOWN OF CHATHAM
549 MAIN STREET
CHATHAM, MA 02633

90 BRIDGE STREET REDEVELOPMENT PIERS

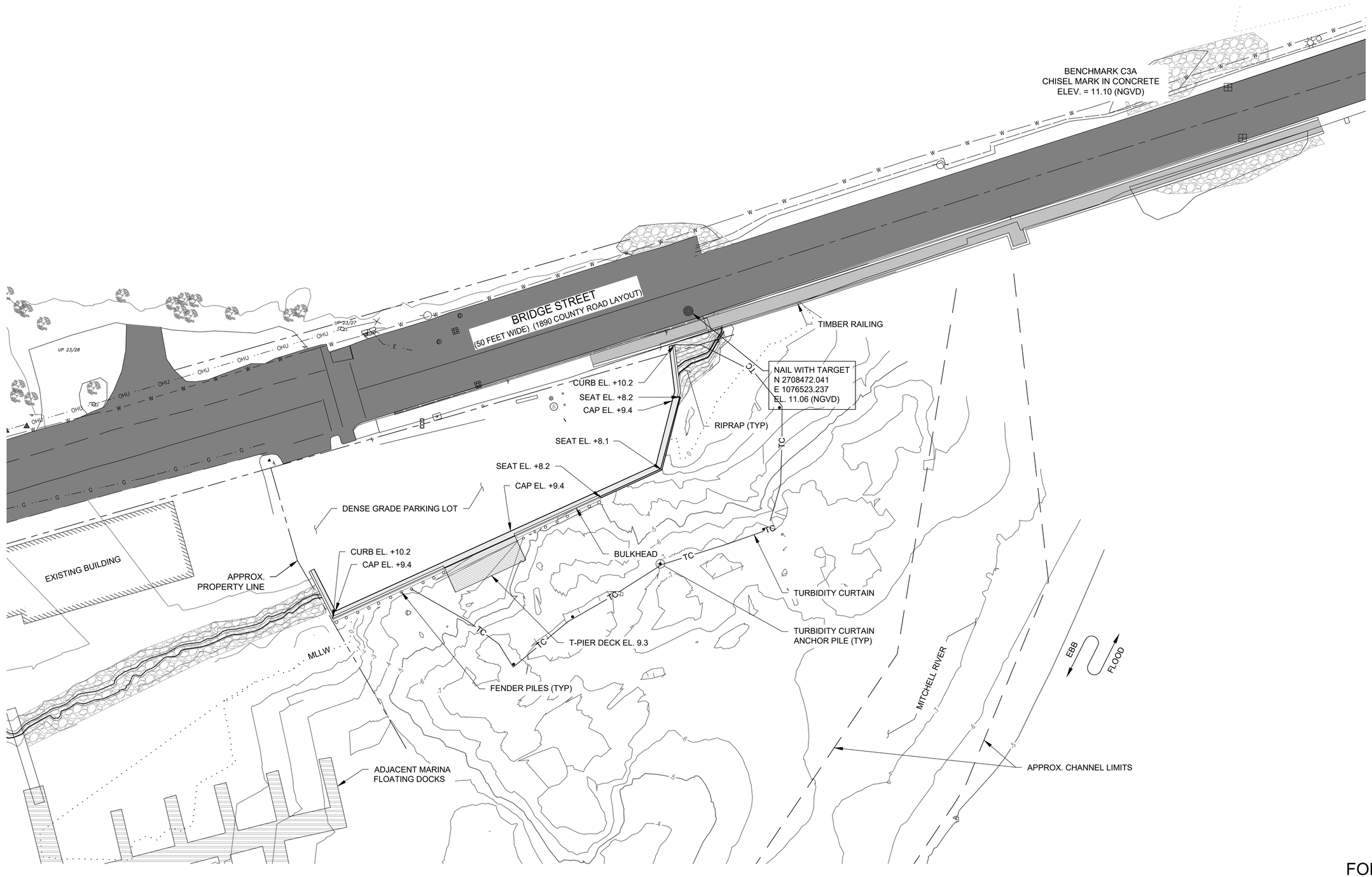
90 BRIDGE STREET
CHATHAM, MASSACHUSETTS, 02633

NO	DATE	ISSUE/REVISION	APP
0	1/15/2025	FOR BID	DBR

SHEET NAME: BORING LOGS

SHEET NO.: **B-501**

11/13/2024 12:26:55 PM b:\Working\chatham, town of\2003247 90 bridge street redevelopment\00_CAD\Design\Working\plan & site improvements\B-501 BORING LOGS.dwg



FOR BID

0 20 40
1" = 20'-0"

Attention:
0 1"
If this scale bar does not measure 1" then drawing is not original scale.

DRAFT

Designed:	DBR
Drawn:	JSF
Checked:	DBR
Approved:	DBR
P.E. No:	
GEI Project	2003247

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NO	DATE	ISSUE/REVISION	APP
0	1/15/2025	FOR BID	DBR

SHEET NAME: EXISTING CONDITIONS PLAN

SHEET NO.: **C-101**

BRIDGE STREET
(50 FEET WIDE) (1890 COUNTY ROAD LAYOUT)

UP 23/27

65' GANGWAY SEE DETAIL A S-508

10'X30' CONC. FLOAT SEE DETAIL A S-506

(3) - 14"Ø X 0.5" STEEL PIPE PILE W/ HDPE SLEEVE

CONCRETE EXTENSION

6'

UPWELLER BUILDING PIER DECK F.F.E. = 9.3'

72'

(7) - 12"Ø COMPOSITE PILES; HD PEARSON PILING OR EQUIV.

DECK EL = 9.3'

12'

4'-2"

10'X20' UPWELLER FLOAT SEE DETAIL A S-507

EX BULKHEAD

(8) - EX FENDER PILE

B S-508 35' GANGWAY SEE DETAIL

T-PIER EXTENSION; SEE SHEET S-110

UPWELLER PIER AND BUILDING FOOTPRINT

FINGER FLOAT SEE DETAIL E S-507

A S-506 10'X40' CONC. FLOAT SEE DETAIL

(3) - 14"Ø X 0.5" STEEL PIPE PILE W/ HDPE SLEEVE

EX FENDER PILE (11)

MLLW

16' GANGWAY SEE DETAIL E S-508

10'X40' CONC. FLOAT SEE DETAIL B S-506

25' PROPERTY LINE SETBACK

(4) - 14"Ø X 0.5" STEEL PILE W/ HDPE SLEEVE (TYP)

APPROX. PROPERTY LINE

FOR BID

0 10 20
1" = 10'-0"

Attention:
0 1"
If this scale bar does not measure 1" then drawing is not original scale.

DRAFT

Designed:	DBR
Drawn:	JSF
Checked:	DBR
Approved:	DBR
P.E. No:	
GEI Project	2003247

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TOWN OF CHATHAM
549 MAIN STREET
CHATHAM, MA 02633

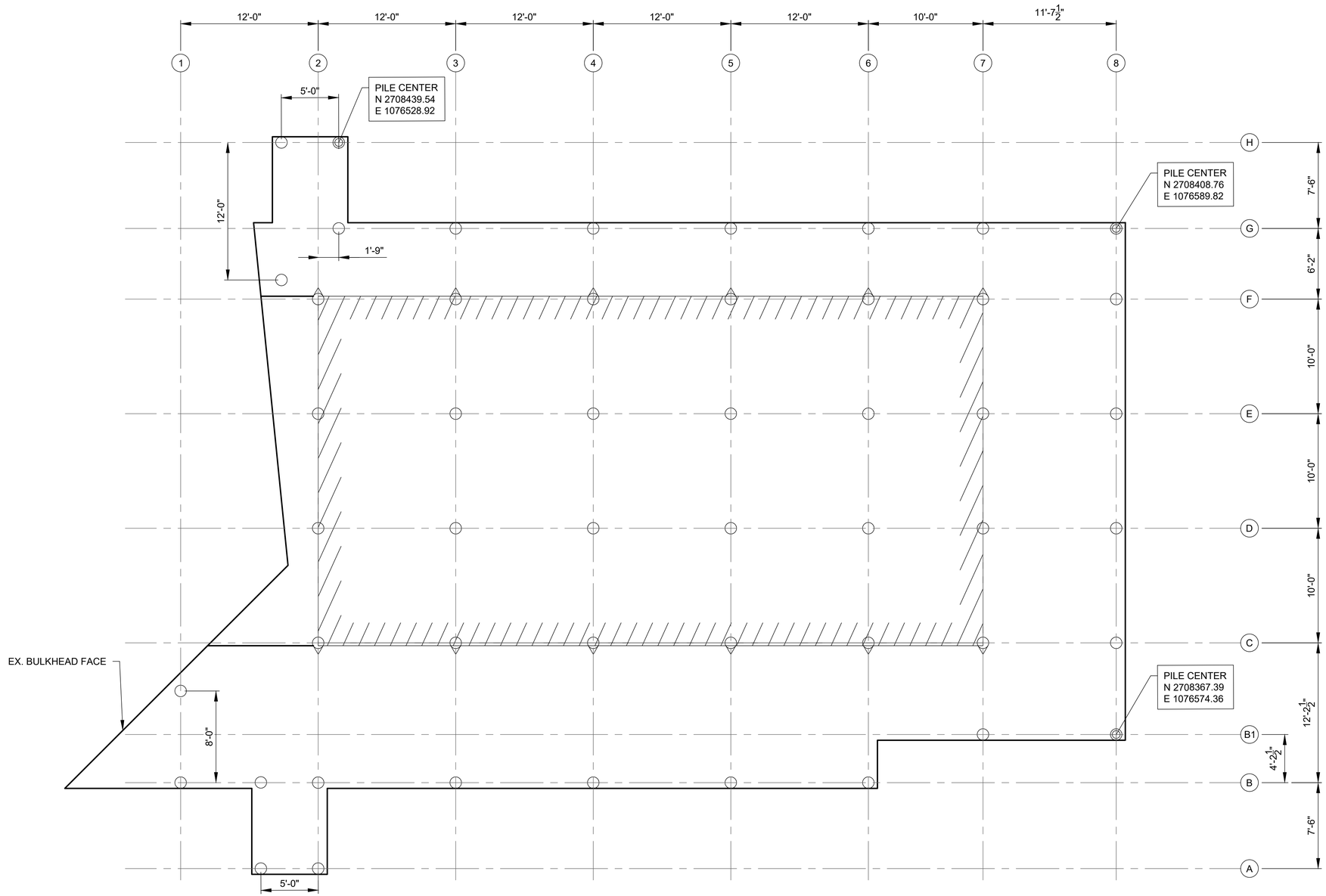
90 BRIDGE STREET REDEVELOPMENT PIERS

90 BRIDGE STREET
CHATHAM, MASSACHUSETTS, 02633

NO	DATE	ISSUE/REVISION	APP
0	1/15/2025	FOR BID	DBR

SHEET NAME
PROPOSED CONDITIONS MARINE WORK PLAN

SHEET NO.
C-102



FOR BID

0 5 10
1" = 5'-0"

Attention:
0 1"
If this scale bar does not measure 1" then drawing is not original scale.

DRAFT

Designed:	DBR
Drawn:	JSF
Checked:	DBR
Approved:	DBR
P.E. No:	
GEI Project	2003247

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90 BRIDGE STREET REDEVELOPMENT PIERS

90 BRIDGE STREET
CHATHAM, MASSACHUSETTS, 02633

NO	DATE	ISSUE/REVISION	APP
0	1/15/2025	FOR BID	DBR

SHEET NAME
UPWELLER PILE LAYOUT

SHEET NO.
S-101