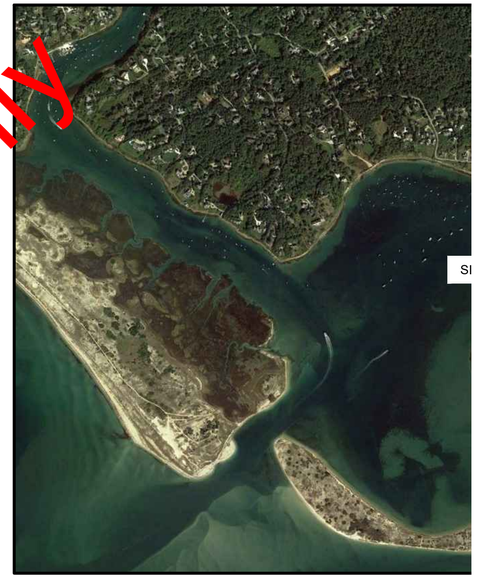
TRAP DOCK RECONSTRUCTION
CONSTRUCTION DRAWINGS

TOWN OF CHATHAM
CHATHAM, MA

SOURCE:
{GOOGLE EARTH}

STATE or COUNTY MAP
(NOT TO SCALE)



SOURCE:
{GOOGLE EARTH}

SITE LOCATION MAP
(NOT TO SCALE)

PREPARED FOR:

TOWN OF CHATHAM
549 MAIN STREET
CHATHAM, MA
(508)945-5100

PREPARED BY:

GEI CONSULTANTS, INC.
124 GROVE STREET
FRANKLIN, MA
(774)277-6001

GEI Consultants

R.W. SULLIVAN ENGINEERIN
529 MAIN STREET
BOSTON, MA
(617)523-8227

RWS

GEI PROJECT NO. 1900325
OCTOBER 1, 2019

\\geiconsulta B:\Working\TOWN

CODES:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
AMERICAN WELDING SOCIETY (AWS)
AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)
AMERICAN INSTITUTE OF TIMBER CONSTRUCTION (AITC)
AMERICAN CONCRETE INSTITUTE (ACI)
CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
MASSACHUSETTS STATE BUILDING CODE
THE COMMONWEALTH OF MASSACHUSETTS, DEPARTMENT OF PUBLIC WORKS "STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES" (1988) (MHD), & INTERIM SUPPLEMENTAL SPECIFICATIONS (MHD)

DESIGN CRITERIA - LIVE LOADS

PIER:	UNIFORM 250 PSF
	H20 TRUCK (16 TON AXLE)
	FORKLIFT (7.5 TON AXLE INCLUDING WEIGHT)
BUILDING (UNFACTORED):	UNIFORM 250 PSF ON SLAB
	WIND UPLIFT 500 PLF
	BUILDING DEAD LOAD 1000 PLF
MAX. CRANE SIZE:	50 TON CRANE OUTRIGGERS SHALL BE SET DIRECTLY ABOVE PILE CAPS
JIB CRANE:	MAX 2 TON CAPACITY HOIST. CRANE BOOM SHALL BE NO MORE THAN 12' OFF GROUND WITH A REACH OF 10' FROM THE CENTER

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-01. 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 AND SOUNDING INFORMATION IS BASED ON "PLAN SHOWING EXISTING CONDITIONS" PREPARED BY COASTAL ENGINEERING CO. DATED FEBRUARY 15, 2018.
4. PROPERTY LINES ARE APPROXIMATE AND BASED ON PLAN ENTITLED "PLAN SHOWING EXISTING CONDITIONS" PREPARED BY COASTAL ENGINEERING CO. DATED FEBRUARY 15, 2018.
5. CONTRACTOR SHALL RE-ESTABLISH BENCHMARK AT AN AGREED LOCATION PRIOR TO DISTURBANCE OF EXISTING.
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 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.
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 YACHT CLUB. CONTRACTOR SHALL NOT OBSTRUCT YACHT CLUB EASEMENT 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 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 PROVIDE SILTATION CURTAIN AROUND THE WORK AS REQUIRED BY PERMITS.

GEOTEXTILE FILTER FABRIC:

1. STABILIZATION/REINFORCEMENT GEOTEXTILE FABRIC
   -FABRIC SHALL BE AS MIRAFI FW700 AS MANUFACTURED BY TENCATE, US 315 BY US FABRICS,315W BY ADS GEOSYNTHETICS, OR APPROVED EQUAL.
2. ALL FILTER FABRIC SHALL HAVE MINIMUM 2' OVERLAP ON ALL SEAMS.

SHEETPILES:

1. ALL SHEET PILES SHALL BE STRUCTURAL FRP COMPOSITE SHEETS BY CRANE MATERIALS INTERNATIONAL WITH THE FOLLOWING PROPERTIES :

BULKHEAD NO.1 MODEL UC-95 TO MATCH EXISTING	
- MIN. ALLOWABLE MOMENT	48,750 FT-LB
- MIN. MOMENT OF INERTIA	497 IN^4/FT
- MIN. SECTION MODULUS	58.5 IN^3/FT
- MIN. WALL THICKNESS	0.540 INCHES
- MAX SECTION DEPTH	17 INCHES
BULKHEAD NO. 2 MODEL UC-75	
- MIN. ALLOWABLE MOMENT	31,667 FT-LB
- MIN. MOMENT OF INERTIA	266 IN^4/FT
- MIN. SECTION MODULUS	38 IN^3/FT
- MIN. WALL THICKNESS	0.400/0.430 INCHES
- MAX SECTION DEPTH	14 INCHES

2. TIE RODS SHALL BE HOT DIP GALVANIZED GRADE 75 ALL THREAD BAR WITH A MINIMUM DIAMETER OF 1" AND A MINIMUM YIELD CAPACITY OF 59.3 KIPS.

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 HOT DIP GALVANIZED AND SHALL CONFORM TO ASTM A 325 UNLESS OTHERWISE NOTED
3. ALL EXPOSED (NOT EMBEDDED IN CONCRETE) HARDWARE SHALL BE STAINLESS STEEL ASTM A-300 SERIES OR F593 OTHERWISE NOTED.
4. WELDING RODS SHALL CONFORM TO AWS E70XX GRADE.
5. STAINLESS STEEL PLATES, BARS AND SHAPES SHALL CONFORM TO ASTM SERIES 300 TYPE 316 AS NOTED.
6. ALL WALE MEMBERS, SPLICE PLATES, BRACKETS AND FASTENERS (STEEL TO BE EMBEDDED IN CONCRETE) SHALL BE CONFORM TO ASTM A36 AND SHALL BE HOT DIP GALVANIZED UNLESS NOTED OTHERWISE.
7. DAVIT SHALL BE FABRICATED OF STAINLESS STEEL. ALL ATTACHMENT HARDWARE SHALL BE STAINLESS STEEL.

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, A767.
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 [illegible]
   - MAXIMUM SIZE OF AGGREGATE SHALL BE 1 INCH.
   - MAX WATER TO CEMENT RATIO SHALL BE 0.40 UNLESS OTHERWISE NOTED.
   - CEMENT SHALL MEET ASTM C150 TYPE [illegible]
   - MIN. CEMENT PER CY SHALL BE 600 LBS
   - 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 AND WITH DESIGN VALUES PER NFPA NATIONAL DESIGN SPECIFICATION.
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 IN CONFORMANCE 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 OR DEEPER, DRIVING SHALL CONTINUE UNTIL THE PILE TIP IS BELOW ELEVATION -15.
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 MLW UNLESS AGREED OTHERWISE
6. ALL FENDER PILES SHALL BE FRP WITH THE FOLLOWING MINIMUM PROPERTIES:

- MIN. FLEXURAL STRENGTH	8,180 LB/IN^2
- MIN. MODULUS OF ELASTICITY	481,000 LB/IN^2
- MIN. DIAMETER	13 INCHES
- MAX. DIAMETER	14 INCHES
- MIN. COMPOSITE REINFORCING BARS	8 - #10 BARS
- MIN. MOMENT CAPACITY	150 KIP-FT

PROJECT SCHEDULE AND PHASING

1. PROJECT SCHEDULE

SUBSTANTIAL COMPLETION OF ALL ITEMS	APRIL 17, 2020
COMPLETION OF ALL WORK	MAY 1, 2020

2. PHASING REQUIREMENTS
   1- BULKHEAD SHALL BE INSTALLED PRIOR TO CONCRETE WALL CONSTRUCTION UNLESS APPROVED OTHERWISE.
   2- BULKHEAD AND ALL WALLS SHALL BE COMPLETED PRIOR TO ANY BACKFILL.
   3- ANCHOR WALL SHALL BE BACKFILLED FULL HEIGHT PRIOR TO BULKHEAD

THE FOLLOWING MATERIALS WILL SUPPLIED BY THE OWNER :

1. JIB CRANES
   1- CONTRACTOR WILL BE RESPONSIBLE FOR ALL OFFLOADING, STORAGE AND INSTALLATION

Sheet Number
G-01
G-02
B-01
C-01
C-02
C-03
C-04
C-05
C-06
C-07
C-08
C-09
C-10
C-11
C-12
E-00
E-01
E-02
E-03
E-04
E-05
P-00
P-01
P-02

CONTOUR
SPOT GRAD
DRAIN MANH
CATCH BAS
DRAIN LINE
SEWER MANH
SEWER LIN
WATER VAL
WATER LIN
HYDRANT
WATER MANH
UTILITY POI
LIGHT
ELECTRIC MAN
TIMBER PIL
SIGN
GUARDRAI
BORING
OVERHEAD EL
TIMBER DECK
BUILDING
SHELL DRIVE\
PAVED PARKIN
CONCRETI

COMMONWEALTH OF MASSACHUSETTS
RUSSELL J. TITMUSS
STRUCTURAL
No. 46514
REGISTERED
PROFESSIONAL ENGINEER
10/2/19

Attention:

0 1"

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

NO.	DATE	ISSUE/REVISION	APP
0	10/1/2019	BID SET	RJT

GEI Consultants

Designed:	KDB
Checked:	KDB
Drawn:	JSF
Approved By:	RJT

Town of Chatham
549 Main Street
Chatham, MA 02633

GEI Project 1900325

Trap

DRAW
ABBREVIATI

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TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*

Old Mill Boat Yard, Chatham, MA

EXPLORATION NO.: GZA-1
SHEET: 1 of 2
PROJECT NO: 18.0171465.00
REVIEWED BY:

Logged By: Chris Baker
Drilling Co.: New Hampshire Boring
Foreman: Mark D'Ambrosio

Type of Rig:
Rig Model:
Drilling Method:

Boring Location: See Plan
Ground Surface Elev. (ft.): 6.8
Final Boring Depth (ft.): 47
Date Start - Finish: 2/15/2013 - 2/15/2013

H. Datum:
V. Datum: MLW

Casing Type: HW
Hammer Weight (lb.):180
Hammer Fall (in.): 24
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: Split Spoon
Sampler O.D. (in.): 2"/1.5"
Sampler Length (in.): 30
Core Barrel Size

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

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen (in)	Sample Rec (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	16	6 3 3 4	6	S-1 : Top 6": GRAVEL Bottom 10": Loose, brown, fine to coarse SAND, trace Gravel, trace Asphalt, trace Shell Fragments, trace Silt (Fill)	1 2		0.5	GRAVEL	6.3
5		S-2	5-7	24	13	4 4 4 4	8	S-2 : Loose, brown, fine to coarse SAND, little Gravel, trace Brick, trace Shell Fragments, trace Silt (Fill)				FILL	
10		S-3	10-12	24	6	5 4 1 1	5	S-3 : Loose, gray, fine SAND, some Silt, trace Shell Fragments	3		9		-2.2
15		S-4	15-17	24	15	4 2 3 3	5	S-4 : Loose, gray, fine to coarse SAND, some Silt				SILTY SAND	
20		S-5	20-22	24	14	10 6 6 5	12	S-5 : Stiff, brown to gray SILT, some fine Sand					
25		S-6	25-27	24	22	4 5 4 6	9	S-6 : Stiff, gray SILT and CLAY			24		-17.2
30												SILT AND CLAY	

REMARKS
1 - Advanced boring using drive and wash drilling techniques from 0 to 47 feet.
2 - Used 4" ID casing from 0 to 45 feet.
3 - Driller noted change in wash color.

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

Exploration No.: GZA-1

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*

Old Mill Boat Yard, Chatham, MA

EXPLORATION NO.: GZA-W1
SHEET: 1 of 2
PROJECT NO: 18.0171465.00
REVIEWED BY:

Logged By: Kyle Maxfield
Drilling Co.: New Hampshire Boring
Foreman: Chris Cooley

Type of Rig:
Rig Model:
Drilling Method:

Boring Location: See Plan
Ground Surface Elev. (ft.): -1
Final Boring Depth (ft.): 42
Date Start - Finish: 2/15/2013 - 2/15/2013

H. Datum:
V. Datum: MLW

Casing Type: HW Steel
Hammer Weight (lb.):180
Hammer Fall (in.): 24
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: Split Spoon
Sampler O.D. (in.): 2"/1.5"
Sampler Length (in.): 30
Core Barrel Size

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

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen (in)	Sample Rec (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
	Push	S-1	0-2	24	4	1 1 1 1	2	S-1 : Very loose, black, fine to coarse SAND, trace Organic Silt	1 2				
	Push												
	Push												
	Push												
	Push												
5	2	S-2	5-7	24	2	2 1 2 4	3	S-2 : Very loose, gray, fine to coarse SAND, trace(-) Organic Silt					
	4												
	8												
	10												
	6												
10	14	S-3	10-12	24	12	3 6 6 9	12	S-3 : Medium dense, brown, fine to medium SAND, trace Inorganic Silt				SAND	
	15												
	20												
	20												
	30												
15	41	S-4	15-17	24	10	3 4 6 5	10	S-4 : Medium dense, brown, fine to medium SAND, trace Inorganic Silt					
	46												
	29												
	31												
	32												
20		S-5	20-22	24	14	3 4 4 4	8	S-5 : Top 8": Medium stiff, brown, Clayey SILT Bottom 6": Stiff, gray, INORGANIC SILT, trace fine to medium Sand			20		-21.0
											21	CLAYEY SILT	-22.0
												SILT	
25		S-6	25-27	24	17	3 8 6 5	14	S-6 : Medium dense, gray, fine to medium SAND, little (-) Inorganic Silt			26		-26.0
30												SAND	

REMARKS
1 - Boring performed using a skid rig mounted on a barge using drive and wash drilling techniques.
2 - Ground surface was as fixed below deck surface.

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

Exploration No.: GZA-W1

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*

Old Mill Boat Yard, Chatham, MA

EXPLORATION NO.: GZA-W2
SHEET: 1 of 2
PROJECT NO: 18.0171465.00
REVIEWED BY:

Logged By: Kyle Maxfield
Drilling Co.: New Hampshire Boring
Foreman: Chris Cooley

Type of Rig:
Rig Model:
Drilling Method:

Boring Location: See Plan
Ground Surface Elev. (ft.): -3.5
Final Boring Depth (ft.): 42
Date Start - Finish: 2/14/2013 - 2/14/2013

H. Datum:
V. Datum: MLW

Casing Type: HW Steel
Hammer Weight (lb.):180
Hammer Fall (in.): 24
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: Split Spoon
Sampler O.D. (in.): 2"/1.5"
Sampler Length (in.): 30
Core Barrel Size

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

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen (in)	Sample Rec (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
	Push	S-1	0-2	24	6	WOH 1 WOH WOH	1	S-1 : Very loose, gray, fine to coarse SAND, trace (-) Organic Silt	1 2				
	Push												
	Push												
	Push												
	Push												
5	Push	S-2	5-7	24	5	WOH WOH WOH WOH	0	S-2 : Very loose, gray, fine to medium SAND, trace Organic Silt, trace (-) Shells				SAND	
	Push												
	Push												
	2												
	15												
10	28	S-3	10-12	24	16	5 5 7 7	12	S-3 : Medium dense, gray to brown, fine to medium SAND, trace Inorganic Silt					
											14		-17.5
15		S-4	15-17	24	10	4 4 5 7	9	S-4 : Loose, gray to brown INORGANIC SILT, some fine to medium Sand				SANDY SILT	
20		S-5	20-22	24	20	3 3 4 4	7	S-5 : Medium stiff, gray, Clayey INORGANIC SILT, trace fine to medium Sand			20		-23.5
												CLAYEY SILT	
25		S-6	25-27	24	18	2 6	11	S-6 : 6" Very loose, gray, Clayey INORGANIC SILT, trace fine to medium Sand Bottom: medium dense, gray, fine to medium SAND, trace inorganic Silt			25.5		-29.0
30												SAND	

REMARKS
1 - Boring performed using a skid rig mounted on a barge using drive and wash drilling techniques.
2 - WOH = Weight of Hammer

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

Exploration No.: GZA-W2

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*

Old Mill Boat Yard, Chatham, MA

EXPLORATION NO.: GZA-1
SHEET: 2 of 2
PROJECT NO: 18.0171465.00
REVIEWED BY:

Logged By: Chris Baker
Drilling Co.: New Hampshire Boring
Foreman: Mark D'Ambrosio

Type of Rig:
Rig Model:
Drilling Method:

Boring Location: See Plan
Ground Surface Elev. (ft.): 6.8
Final Boring Depth (ft.): 47
Date Start - Finish: 2/15/2013 - 2/15/2013

H. Datum:
V. Datum: MLW

Casing Type: HW
Hammer Weight (lb.):180
Hammer Fall (in.): 24
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Core Barrel Size

Groundwater Depth (ft.)			
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		S-7	30-32	24	24	3 3 6 4	9	S-7 : Stiff, gray, Clayey SILT					
35		S-8	35-37	24	24	3 3 3 4	6	S-8 : Medium stiff, gray SILT and SAND				SILT AND CLAY	
40		S-9	40-42	24	20	7 3 4 6	7	S-9 : Medium stiff, gray SILT and CLAY			44		-37.2
45		S-10	45-47	24	20	9 5 9 10	14	S-10 : Medium dense, gray, fine SAND, some Silt	4			SILTY SAND	
								End of exploration at 47 feet.	5		47		-40.2
50													
55													
60													

REMARKS
4 - Driller noted change in drilling effort.
5 - Borehole backfilled with cuttings upon completion.

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

Exploration No.: GZA-1

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*

Old Mill Boat Yard, Chatham, MA

EXPLORATION NO.: GZA-W1
SHEET: 2 of 2
PROJECT NO: 18.0171465.00
REVIEWED BY:

Logged By: Kyle Maxfield
Drilling Co.: New Hampshire Boring
Foreman: Chris Cooley

Type of Rig:
Rig Model:
Drilling Method:

Boring Location: See Plan
Ground Surface Elev. (ft.): -1
Final Boring Depth (ft.): 42
Date Start - Finish: 2/15/2013 - 2/15/2013

H. Datum:
V. Datum: MLW

Casing Type: HW Steel
Hammer Weight (lb.):180
Hammer Fall (in.): 24
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: Split Spoon
Sampler O.D. (in.): 2"/1.5"
Sampler Length (in.): 30
Core Barrel Size

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

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen (in)	Sample Rec (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-7	30-32	24	24	3 3 3 3	6	S-7 : Medium stiff, gray, Clayey INORGANIC [illegible] fine to medium Sand					
35		S-8	35-37	24	24	3 3 4 2	7	S-8 : Medium stiff, gray, [illegible] SILT, little (-) fine to medium Sand				SAND	
40		S-9	40-42	24	22	3 5 4 4	9	S-9 : Stiff, gray, Clayey SILT, little (+) fine to medium Sand			42		-43.0
45								End of exploration at 42 feet.	3				
50													
55													
60													

REMARKS
3 - Boring terminated at 42± feet.

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

Exploration No.: GZA-W1

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*

Old Mill Boat Yard, Chatham, MA

EXPLORATION NO.: GZA-W2
SHEET: 2 of 2
PROJECT NO: 18.0171465.00
REVIEWED BY:

Logged By: Kyle Maxfield
Drilling Co.: New Hampshire Boring
Foreman: Chris Cooley

Type of Rig:
Rig Model:
Drilling Method:

Boring Location: See Plan
Ground Surface Elev. (ft.): -3.5
Final Boring Depth (ft.): 42
Date Start - Finish: 2/14/2013 - 2/14/2013

H. Datum:
V. Datum: MLW

Casing Type: HW Steel
Hammer Weight (lb.):180
Hammer Fall (in.): 24
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: Split Spoon
Sampler O.D. (in.): 2"/1.5"
Sampler Length (in.): 30
Core Barrel Size

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

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen (in)	Sample Rec (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-7	30-32	24	22	2 3 2 3	5	S-7 : Medium stiff, gray, Clayey INORGANIC SILT, trace fine to medium Sand					
35		S-8	35-37	24	22	3 3 5 5	8	S-8 : Stiff, gray, INORGANIC SILT, trace fine to medium Sand				SAND	
40		S-9	40-42	24	20	5 7 9 8	16	S-9 : Medium dense, gray, fine to medium SAND, little Inorganic Silt			42		-45.5
45								End of exploration at 42 feet.	3				
50													
55													
60													

REMARKS
3 - Boring terminated at 42± feet.

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

Exploration No.: GZA-W2

COMMONWEALTH OF MASSACHUSETTS
RUSSELL J. TITMUSS
STRUCTURAL
No. 46514
REGISTERED PROFESSIONAL ENGINEER
10/2/19

Attention:

0 1"

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

NO.	DATE	ISSUE/REVISION	APP
0	10/1/2019	BID SET	RJT

GEI Consultants

Designed:	KDB
Checked:	KDB
Drawn:	JSF
Approved By:	RJT

Town of Chatham
549 Main Street
Chatham, MA 02633

GEI Project 1900325

Trap

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SHEET NO.
3 OF 24

0 8 16
SCALE: 1/8" = 1'-0"

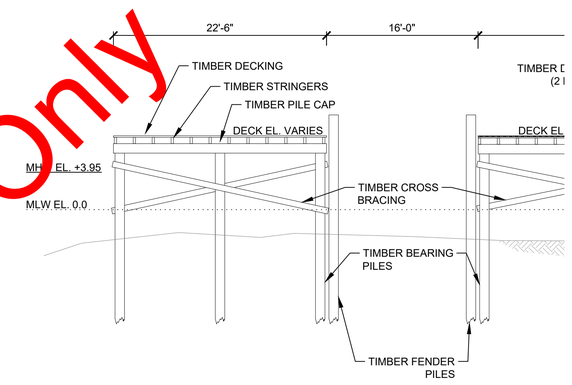
0 16 32
SCALE: 1/16" = 1'-0"

EXISTING SITE PLAN
SCALE: 1"=20'-0"

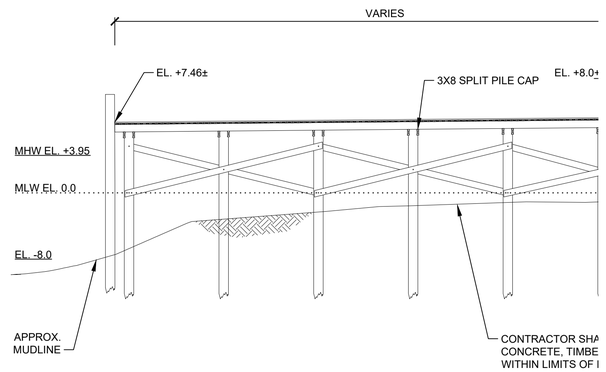
TIDAL DATUMS	
100 YR FLOOD	+15.43
HTL	+5.14
MHW	+3.95
NAVD88	+2.43
MLW	0.0

COMMONWEALTH OF MASSACHUSETTS
RUSSELL J. TITMUSS
STRUCTURAL
No. 46514
REGISTERED
PROFESSIONAL ENGINEER
10/2/19

NOTES:
1. ALL DIMENSIONS AND ELEVATIONS ARE APPROXIMATE AND SHALL BE FIELD CONTRACTOR
2. ALL UTILITY LOCATIONS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED B



A C-01 EXISTING PIER SECTIO
Scale: 1/8" = 1'-0"



B C-01 EXISTING PIER SECTIO
Scale: 1/8" = 1'-0"

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GEI Consultants

Designed:	KDB
Checked:	KDB
Drawn:	JSF
Approved By:	RJT

Town of Chatham
549 Main Street
Chatham, MA 02633

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SHEET NO.
4 OF 24

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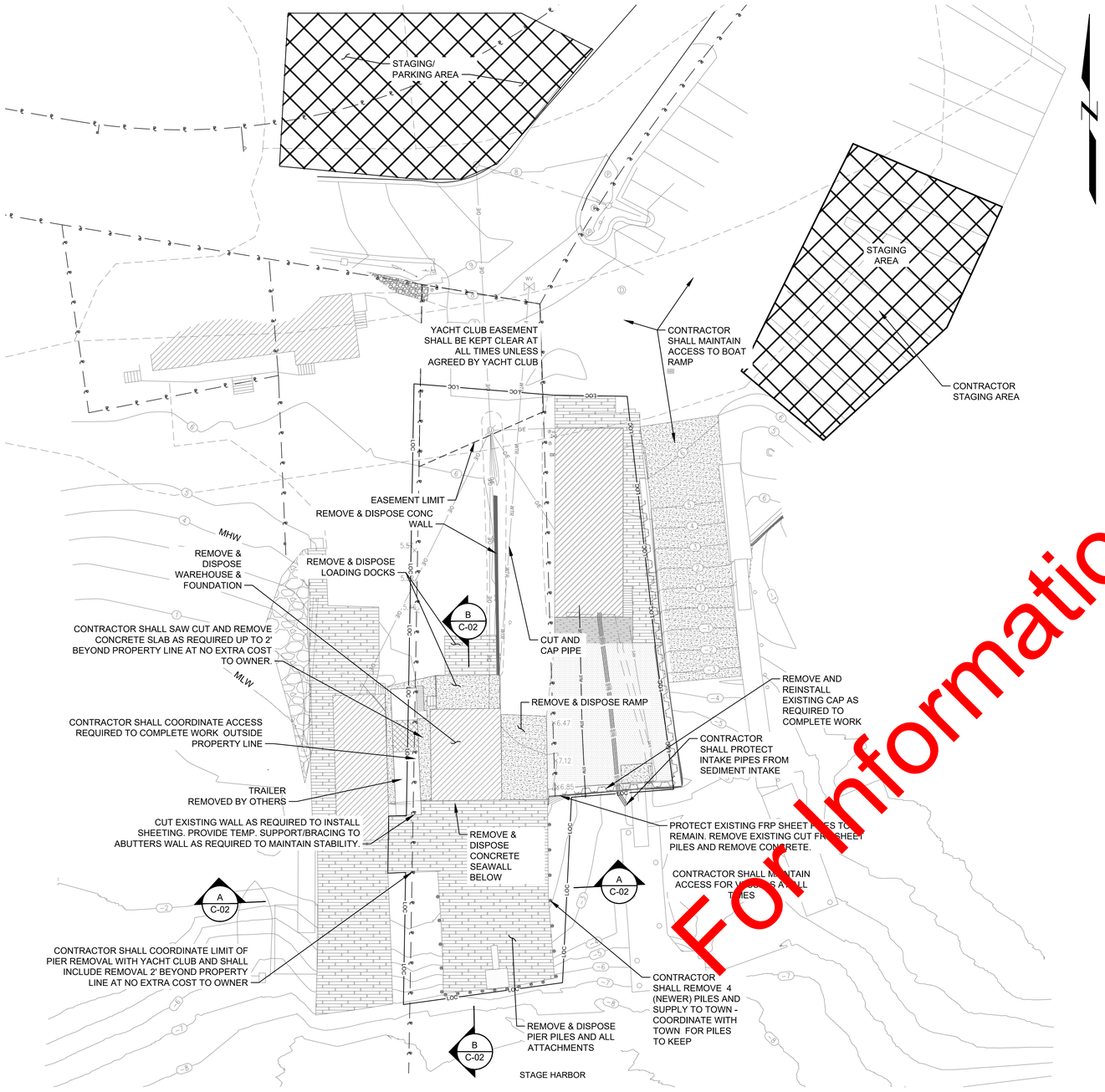
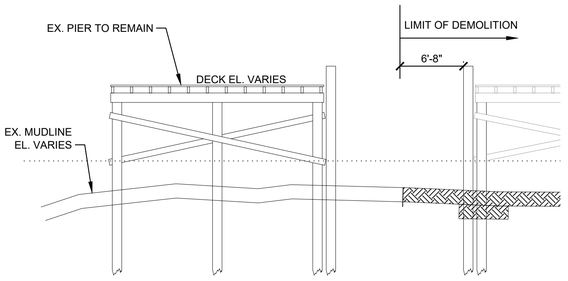
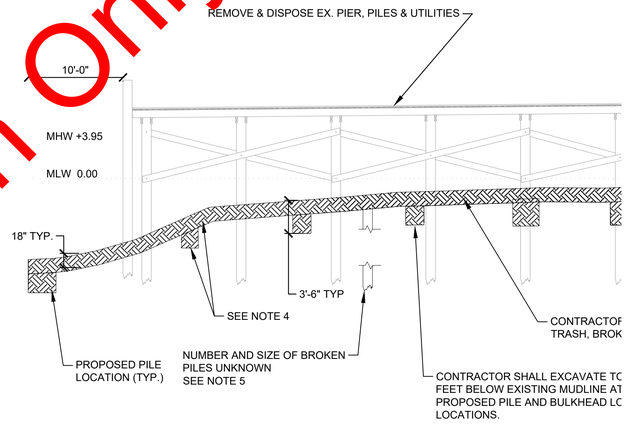


EXISTING SITE PLAN
SCALE: 1" = 20'



SEE NOTE

A C-02 PIER DEMOLITION - SEC
SCALE: 1/8" = 1'-0"



B C-02 PIER DEMOLITION - SEC
SCALE: 1/8" = 1'-0"

NOTES:
1. CONTRACTOR SHALL NOTE
PROPERTY AND SHALL COO
INTERFERE OR OBSTRUCT V
2. CONTRACTOR SHALL NOT O
3. CONTRACTOR SHALL COOR
SHALL OBTAIN APPROVAL FF
4. CONTRACTOR SHALL REMO
FOR AN AREA 5 FEET OUTSI
EXISTING MUDLINE. AT PRO
MINIMUM DEPTH OF 4 FEET E
EXPOSED WITHIN THE ABOV
REMOVED SHALL BE SCREE
SHALL BE DISPOSED AT APP
DEWATERED, SUITABLE FOR
WITHIN THE TOWN LIMITS, L
5. CONTRACTOR SHALL NOTE I
BE PULLED IN THEIR ENTIRE
6. CONTRACTOR SHALL NOTE I
ACCESS SHALL BE COORDIN
7. CONTRACTOR SHALL PROVI
EXISTING STRUCTURES TO F
REQUIRED TO LEAVE STRUC
CONSTRUCTION.

0 8 16
SCALE: 1/8" = 1'-0"

0 16 32
SCALE: 1" = 16'-0"

COMMONWEALTH OF MASSACHUSETTS
RUSSELL J. TITMUSS
STRUCTURAL
No. 46514
REGISTERED
PROFESSIONAL ENGINEER
10/2/19

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GEI Consultants

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Checked:	KDB
Drawn:	JSF
Approved By:	RJT

Town of Chatham
549 Main Street
Chatham, MA 02633

GEI Project 1900325

Trap

STAGING A

SHEET NO.
5 OF 24

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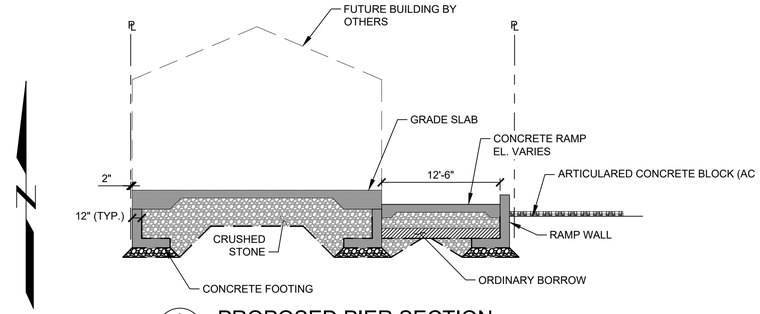
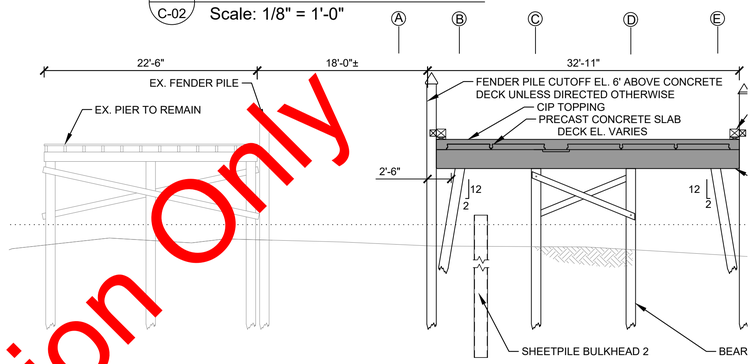
NOTE:
SEE C-12 FOR PIER UTILITIES.

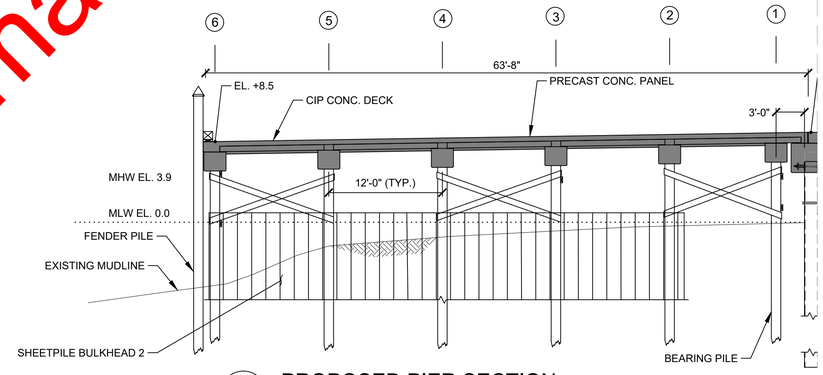
PROPOSED SITE PLAN



A C-02 PROPOSED PIER SECTION
Scale: 1/8" = 1'-0"



B C-02 PROPOSED PIER SECTION
Scale: 1/8" = 1'-0"



C C-02 PROPOSED PIER SECTION
Scale: 1/8" = 1'-0"

COMMONWEALTH OF MASSACHUSETTS
RUSSELL J. TITMUSS
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Chatham, MA 02633

GEI Project 1900325

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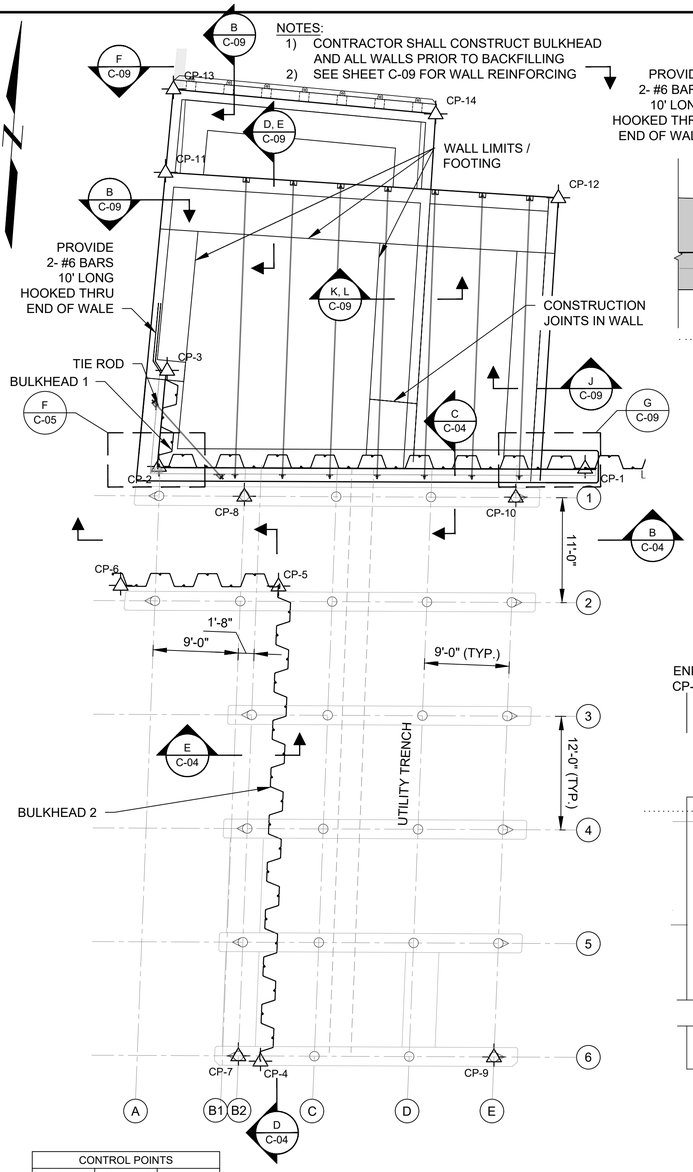
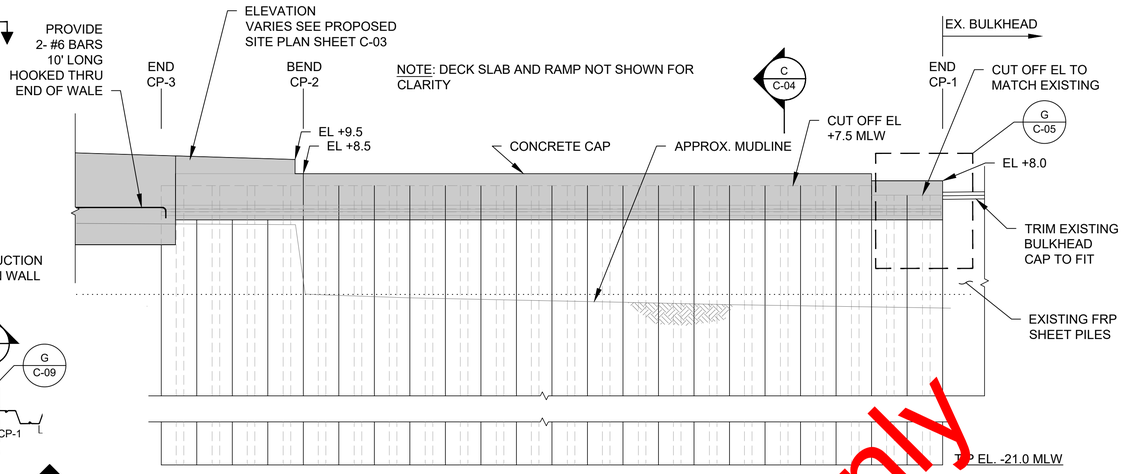
SHEET NO.
6 OF 24

NOTES:
1) CONTRACTOR SHALL CONSTRUCT BULKHEAD AND ALL WALLS PRIOR TO BACKFILLING
2) SEE SHEET C-09 FOR WALL REINFORCING



CONTROL POINTS		
POINT	NORTHING	EASTING
CP-1	2707226.38	1075131.74
CP-2	2707223.09	1075086.86
CP-3	2707233.28	1075086.94
CP-4	2707161.33	1075102.41
CP-5	2707211.48	1075100.43
CP-6	2707210.26	1075083.80
CP-7	2707161.71	1075100.04
CP-8	2707220.65	1075096.10
CP-9	2707163.68	1075126.95
CP-10	2707222.77	1075124.68
CP-11	2707254.11	1075085.15
CP-12	2707254.64	1075126.71
CP-13	2707262.95	1075085.30
CP-14	2707262.95	1075113.11

A C-04 PILE AND WALL LAYOUT
Scale: 1/8"=1'-0"



B C-04 BULKHEAD 1 - ELEVATION
Scale: 3/16" = 1'-0"

D C-04 BULKHEAD 2 - ELEVATION
Scale: 3/16" = 1'-0"

0 4 8
SCALE: 1/4" = 1'-0"

0 5 10
SCALE: 3/16" = 1'-0"

0 8 16
SCALE: 1/8" = 1'-0"

COMMONWEALTH OF MASSACHUSETTS
RUSSELL J. TITMUSS
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10/2/19

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Drawn:	JSF
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Chatham, MA 02633

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BULK

SHEET NO.
7 OF 24

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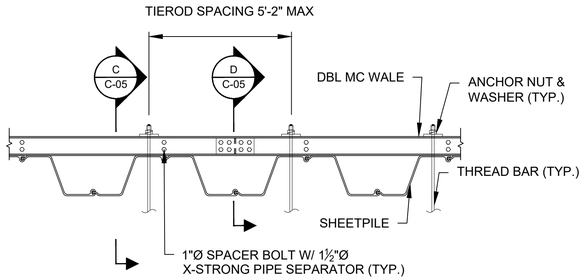
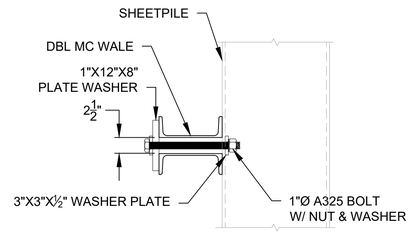
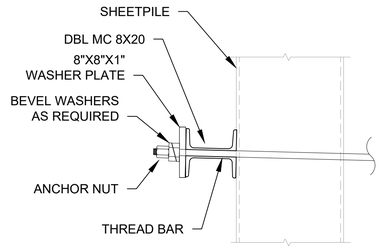


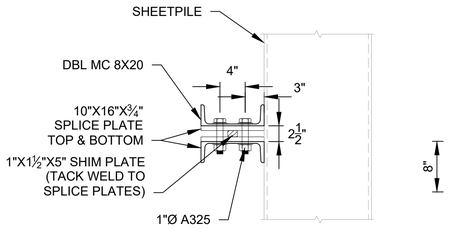
A C-05 WALE CONNECTION (TYP.)
Scale: 3/8"=1'-0"



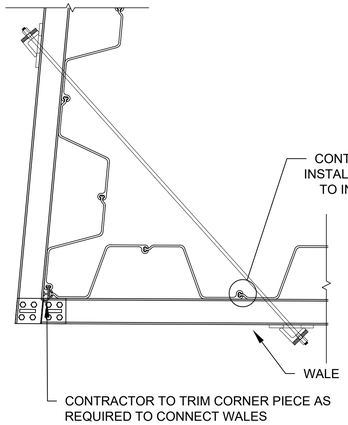
B C-05 WALE / SHEET CONNECTION
Scale: 1" = 1'-0"

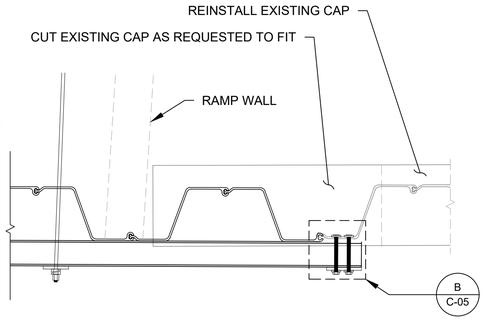


C C-05 TIEROD CONNECTION
Scale: 1" = 1'-0"



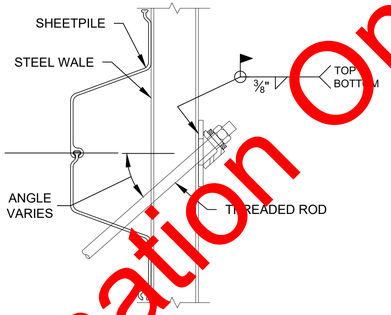
D C-05 WALE SPLICE - SECTION
Scale: 1" = 1'-0"



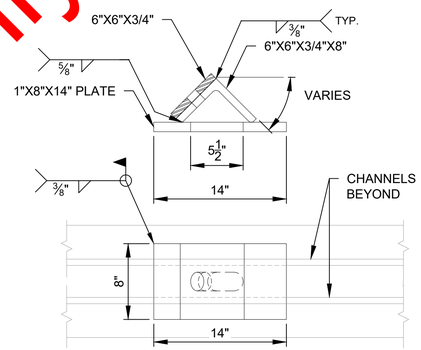


F C-05 SOUTHWESTERN CORNER DETAIL
Scale: ½"=1'-0"

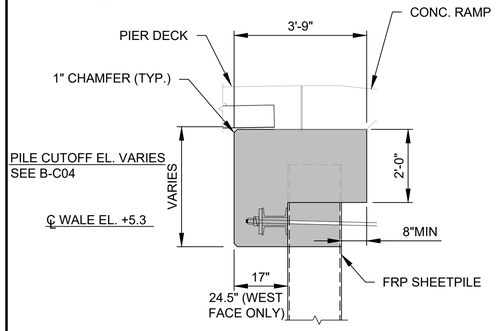
G C-05 EXISTING BULKHEAD CONNECTION
Scale: ½"=1'-0"



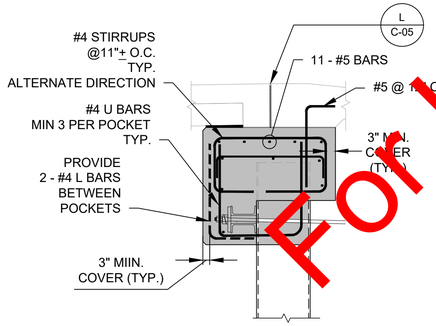
H C-05 DIAGONAL TIEROD CONN. (TYP.)
Scale: 3/4"=1'-0"



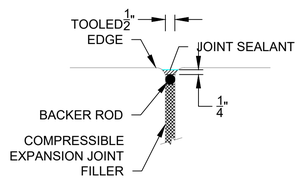
I C-05 ANGLE WASHER 45°
Scale: 1 1/2"=1'-0"



J C-05 CONC. CAP DETAIL
Scale: 1/2" = 1'-0"



K C-05 CONC. CAP REINF.
Scale: 1/2" = 1'-0"



L C-05 JOINT DETAIL
Scale: 3" = 1'-0"

0 1 2
SCALE: 3/4" = 1'-0"

0 2 4
SCALE: 1/2" = 1'-0"

0 1/2 1
SCALE: 3" = 1'-0"

0 8 16
SCALE: 1/8" = 1'-0"

0 1 2
SCALE: 1 1/2" = 1'-0"

0 10 20
SCALE: 1" = 10'

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

COMMONWEALTH OF MASSACHUSETTS
RUSSELL J. TITMUSS
STRUCTURAL
No. 46514
REGISTERED
PROFESSIONAL ENGINEER
10/2/19

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GEI Consultants

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Drawn:	JSF
Approved By:	RJT

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549 Main Street
Chatham, MA 02633

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SHEET NO.
8 OF 24

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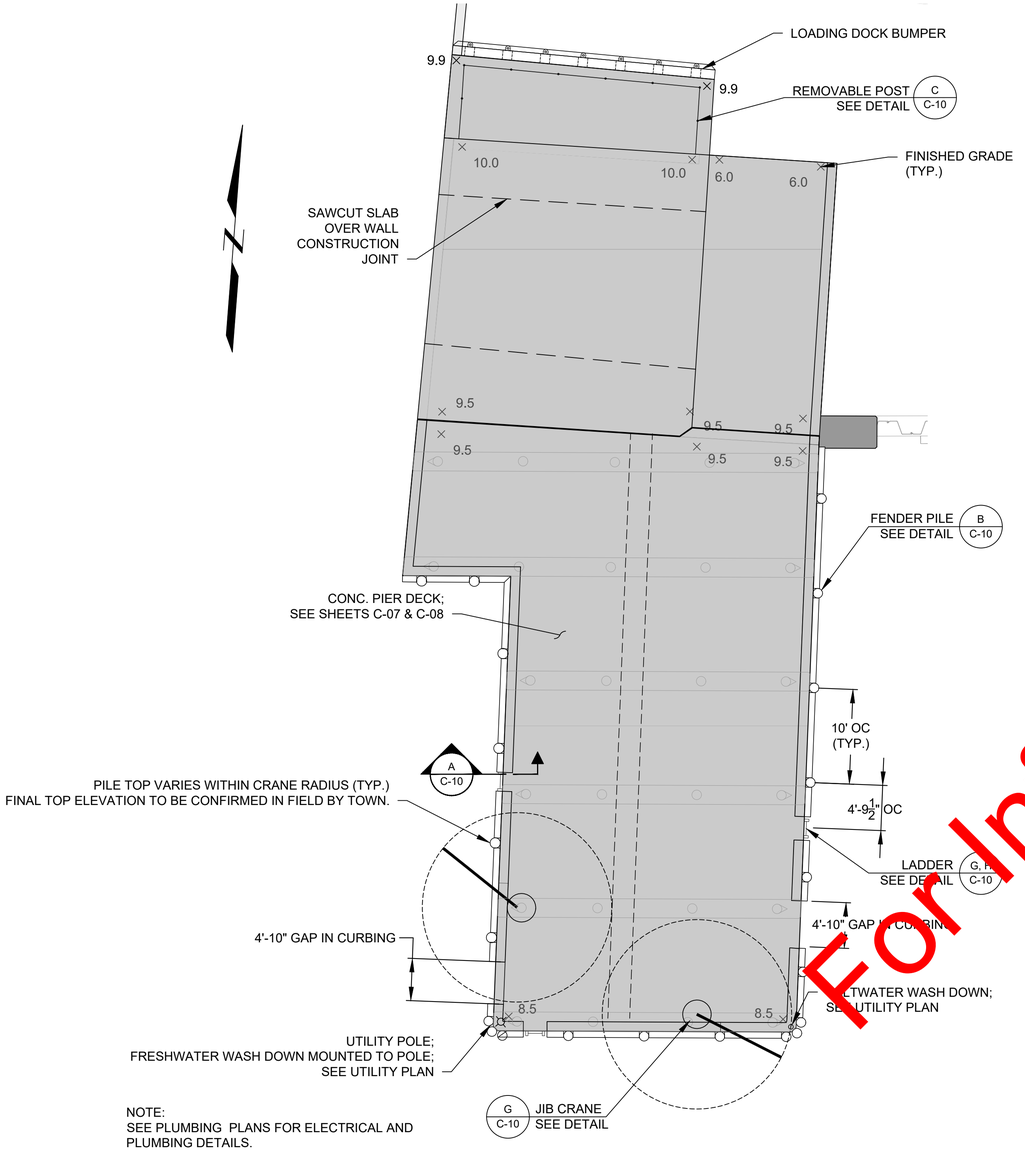
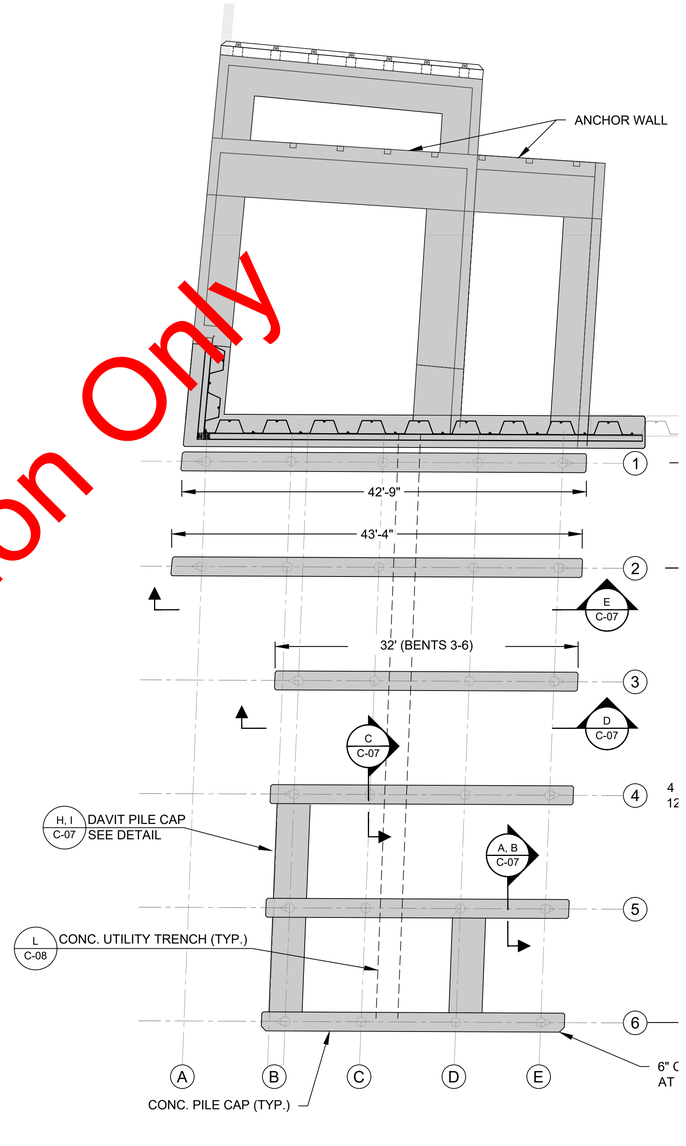


A C-06 PIER PLAN
SCALE: 1/8"=1'-0"



B C-06 PILE CAP PLAN
SCALE: 1/8"=1'-0"

0 8 16
SCALE, FEET

COMMONWEALTH OF MASSACHUSETTS
RUSSELL J. TITMUSS
STRUCTURAL
No. 46514
REGISTERED PROFESSIONAL ENGINEER
10/2/19

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GEI Consultants

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Checked:	KDB
Drawn:	JSF
Approved By:	RJT

Town of Chatham
549 Main Street
Chatham, MA 02633

GEI Project 1900325

Trap

PIER I

SHEET NO.
9 OF 24

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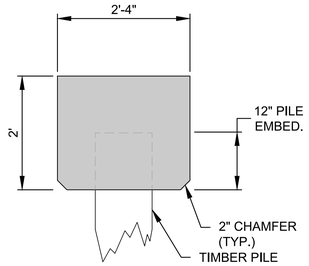
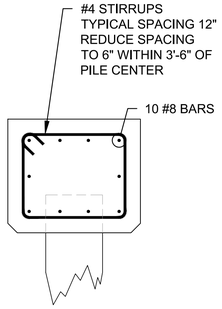
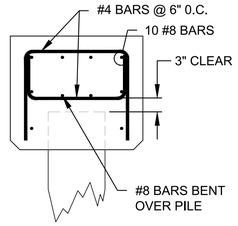


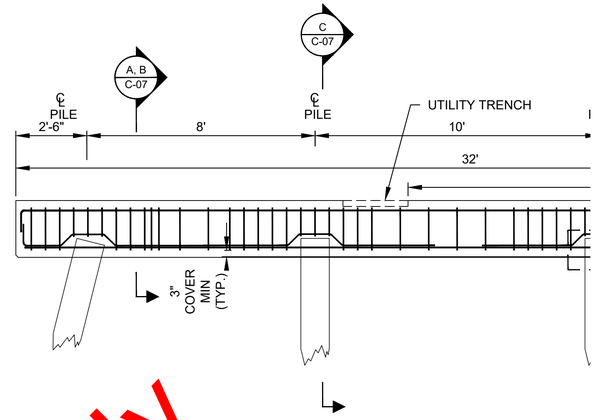
A C-07 CONC. PILE CAP (TYP.)
SCALE: 3/4"=1'-0"



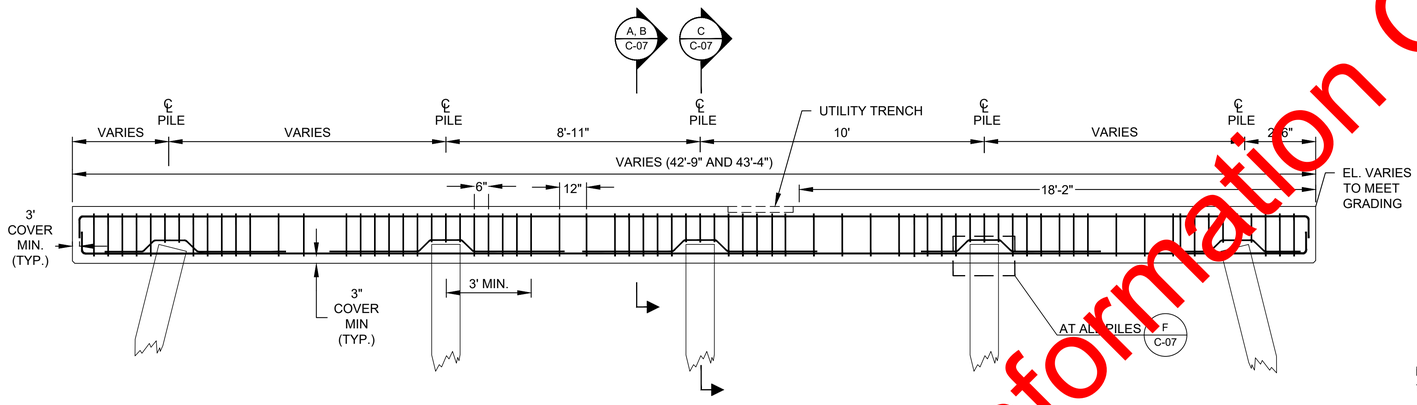
B C-07 CONC. PILE CAP REINF.
SCALE: 3/4"=1'-0"



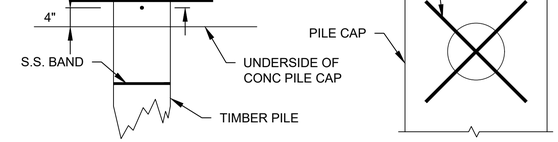
C C-07 CONC. PILE CAP REINF. @ PILE
SCALE: 3/4"=1'-0"



D C-07 CONC. PILE CAP NO
SCALE: 3/8"=1'-0"

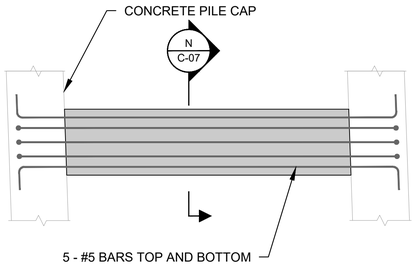


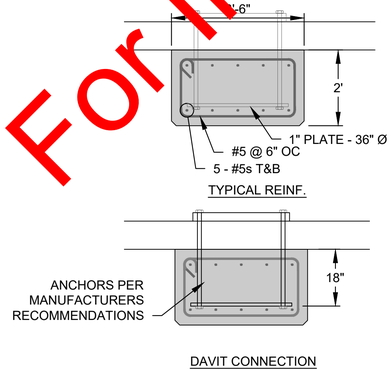
E C-07 CONC. PILE CAP NO. 2 AND 1 REINF.
SCALE: 3/8"=1'-0"



NOTE:
1. PILE SHALL BE BANDED PRIOR TO FINAL CUTOFF.
2. PILE CAP REBAR NOT SHOWN.

F C-07 PILE DETAIL
SCALE: 3/4"=1'-0"





PILE CAP REINF.
SEE DETAIL

H C-07 DAVIT P.C. REINF. - PLAN
SCALE: 3/8"=1'-0"

I C-07 DAVIT P.C. - SECTION
SCALE: 1/2" = 1'-0"

0 1 2
SCALE, FEET

0 2 4
SCALE, FEET

0 10 20
SCALE: 1" = 10'

COMMONWEALTH OF MASSACHUSETTS
RUSSELL J. TITMUSS
STRUCTURAL
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10/2/19

Attention:

0 1"

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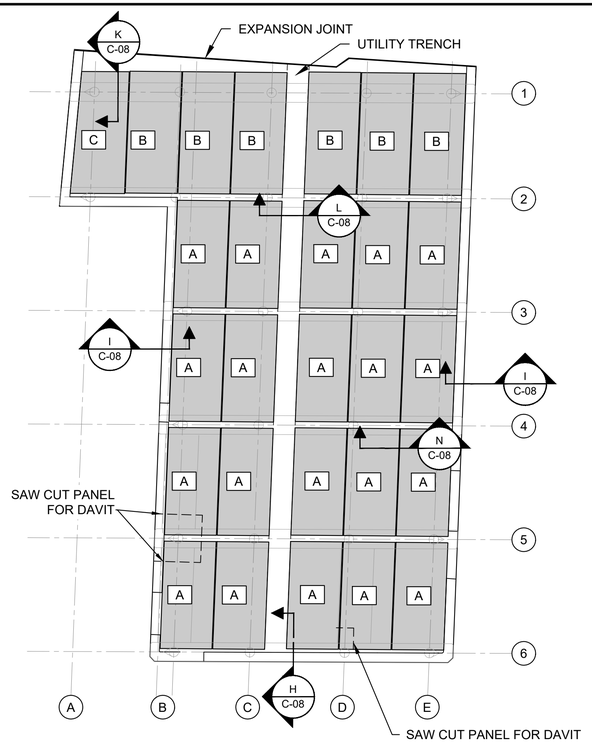
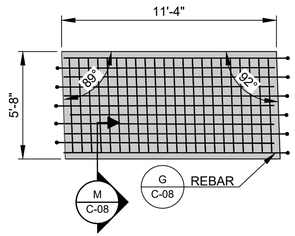
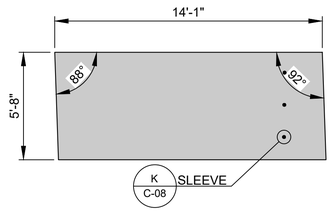


A C-08 CONCRETE DECK PANEL PLAN
SCALE: 1-1/2"=1'-0"



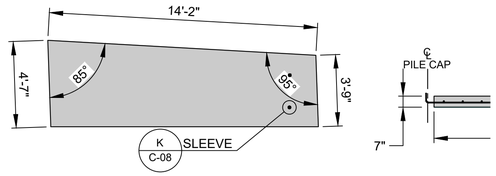
NOTE: NOTCHES FOR DAVIT NOT SHOWN

B C-08 DECK PANEL TYPE A
SCALE: 1/4"=1'-0"



NOTE: REBAR NOT SHOWN FOR CLARITY

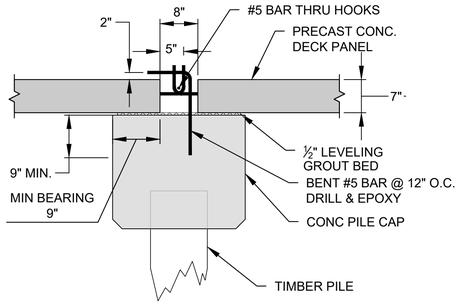
C C-08 DECK PANEL TYPE B
SCALE: 1/4"=1'-0"



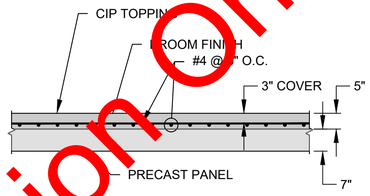
NOTE: REBAR NOT SHOWN FOR CLARITY

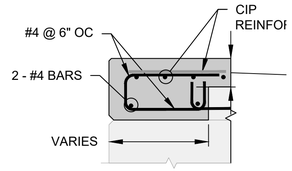
D C-08 DECK PANEL TYPE C
SCALE: 1/4"=1'-0"

E C-08



NOTE: CIP TOPPING NOT SHOWN

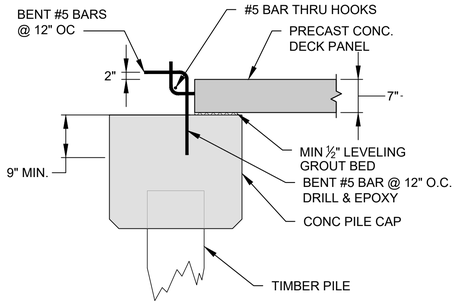




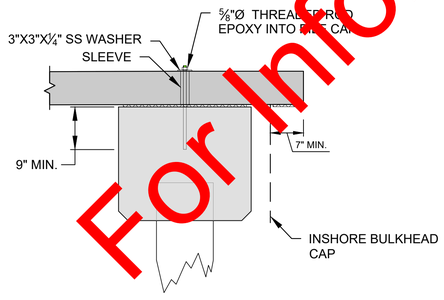
F C-08 DECK PLANK / PILE CAP CONN.
SCALE: 3/4" = 1'-0"

G C-08 SLAB TOPPING REINFORCING
SCALE: 1/2" = 1'-0"

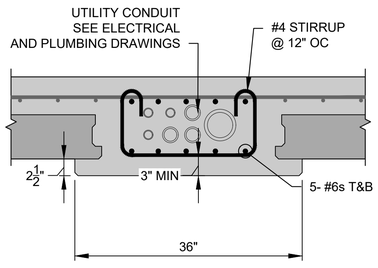
H C-08 NORTH/ END RE
SCALE: 3/4" = 1'-0"



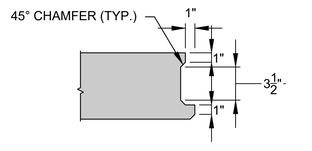
J C-08 DECK PLANK / PILE CAP CONN. @ OUTSHORE END
SCALE: 3/4" = 1'-0"



K C-08 DECK PLANK / PILE CAP CONN. @ BENT 1
SCALE: 3/4" = 1'-0"



L C-08 UTILITY TRENCH
SCALE: 1" = 1'-0"



M C-08 PRECAST SLAB DETAIL
SCALE: 1-1/2" = 1'-0"

0 1 2
SCALE: 1 1/2" = 1'-0"

0 1 2
SCALE: 3/4" = 1'-0"

0 2 4
SCALE: 1/2" = 1'-0"

0 2 4
SCALE: 3/8" = 1'-0"

0 4 8
SCALE: 1/4" = 1'-0"

0 10 20
SCALE: 1" = 10'

NOTE: ALL REBAR SHALL HAVE MINIMUM 3" COVER

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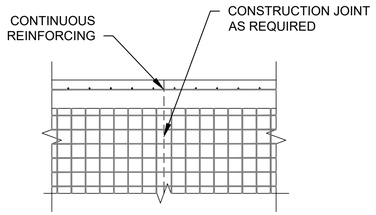
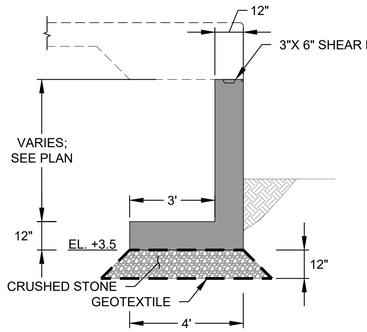
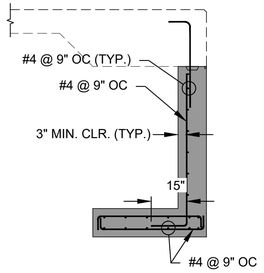


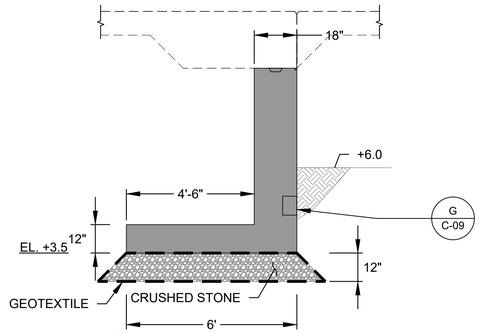
A C-09 CONSTRUCTION JOINT
SCALE: CUSTOM



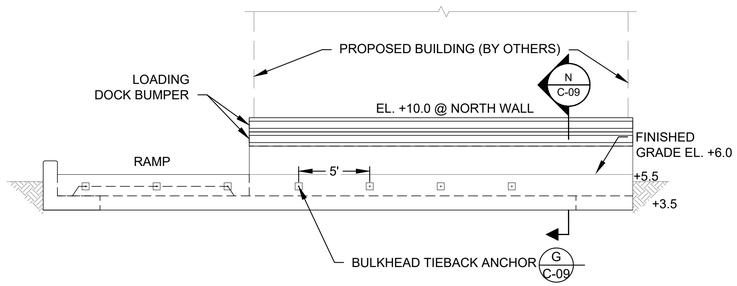
B C-09 CONC. WALL - SECTION
SCALE: 3/8"=1'-0"

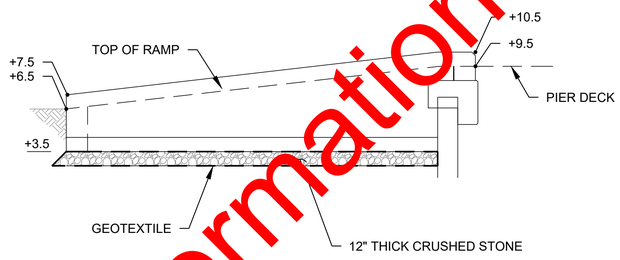


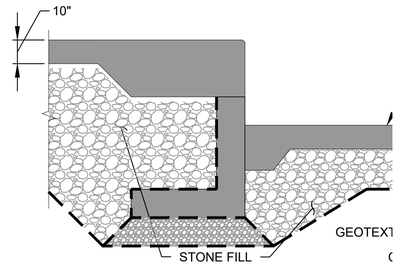
C C-09 CONC. WALL REINF.
SCALE: 3/8"=1'-0"

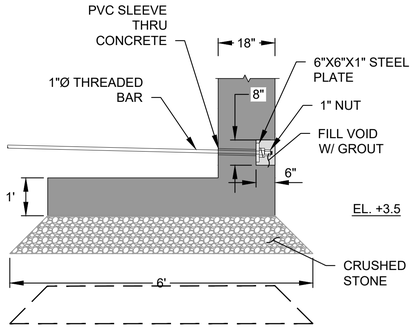


D C-09 ANCHOR WALL - SECTION
SCALE: 3/8"=1'-0"







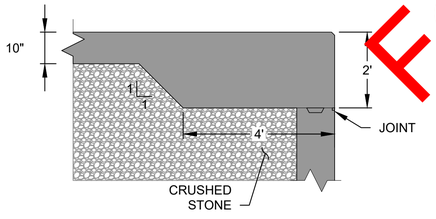


G C-09 TIEBACK ANCHOR - SECTION
SCALE: 1/2" = 1'-0"

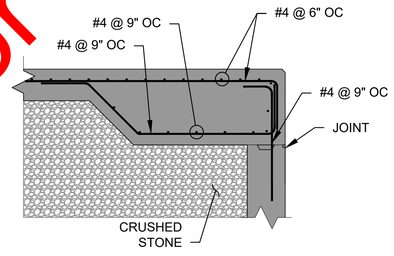
F C-09 NORTH WALL ELEVATION
SCALE: 3/16" = 1'-0"

J C-09 RAMP WALL ELEVATION
SCALE: 3/16" = 1'-0"
NOTE: RAMP NOT SHOWN

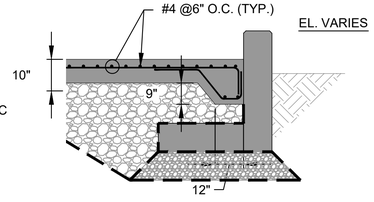
H C-09 SECTION A
SCALE: 3/8"=1'



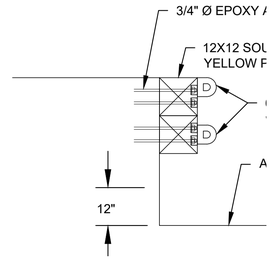
K C-09 WALL SLAB CONN.
SCALE: 1/2" = 1'-0"



L C-09 WALL SLAB CONN. REINF.
SCALE: 1/2" = 1'-0"



M C-09 WALL/ RAMP REINF.
SCALE: 3/8"=1'-0"



N C-09 LOADING DO
SCALE: 1/2" = 1'-0

0 2 4
SCALE, FEET

0 2 4
SCALE, FEET

0 5 10
SCALE, FEET

0 10 20
SCALE, FEET

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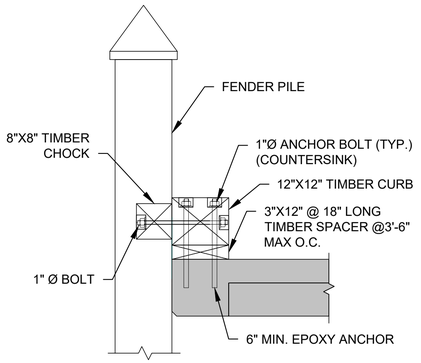
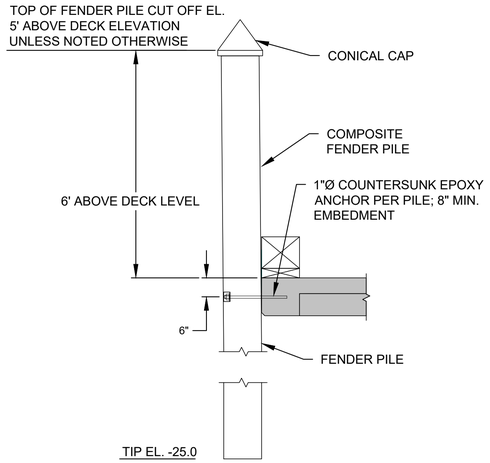
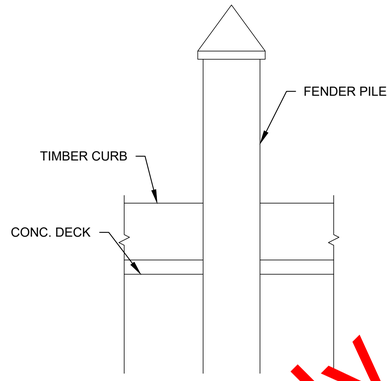


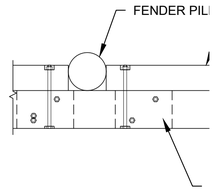
A C-10 **CURB DETAIL**
SCALE: 3/4"=1'-0"



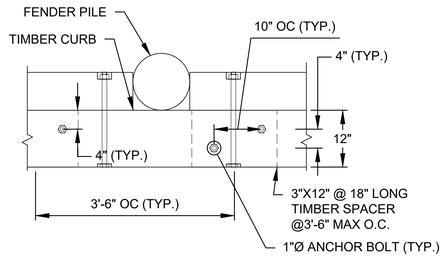
B C-10 **FENDER PILE DETAIL**
SCALE: 1/2" = 1'-0"



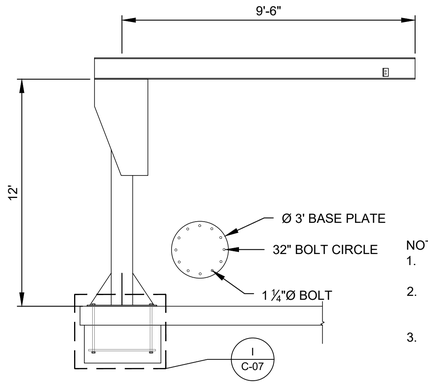
C C-10 **PILE CONNECTION**
SCALE: 3/4" = 1'-0"



D C-10 **WA**
SC

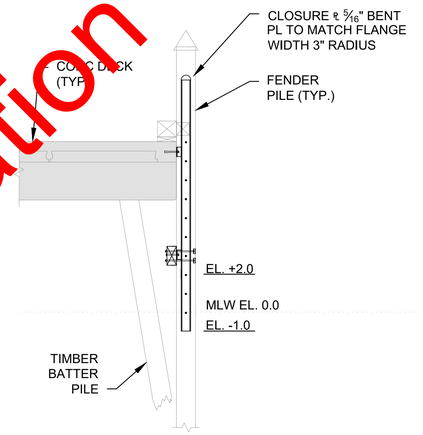


E C-10 **CURB ANCHOR TO DECK**
SCALE: 3/4"=1'-0"

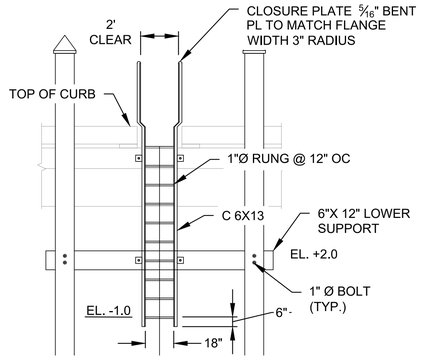


F C-10 **JIB CRANE DETAIL**
SCALE: NTS

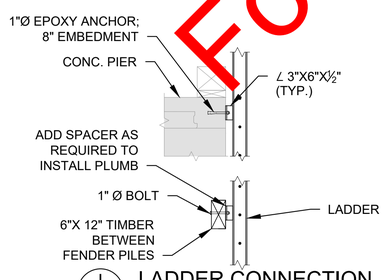
NOTE:
1. JIB CRANE AND MOUNTING BOLTS WILL BE PROVIDED BY THE OWNER.
2. CONTRACTOR SHALL OFFLOAD AND STORE ALL MATERIALS FOR INSTALLATION.
3. CONTRACTOR SHALL INSTALL CRANES AS NOTED ON PLANS, PROVIDING A WORKING CRANE.



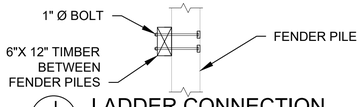
G C-10 **LADDER - SECTION**
SCALE: 1/4" = 1'-0"



H C-10 **LADDER - ELEVATION**
SCALE: 1/4" = 1'-0"



I C-10 **LADDER CONNECTION**
SCALE: 3/8" = 1'-0"



J C-10 **LADDER CONNECTION**
SCALE: 3/8" = 1'-0"

NOTE: LADDER SHALL BE HDG COATED STEEL. ALL MATERIALS BELOW ELEVATION +6 SHALL HAVE ADDITIONAL COATING INSTALLED OVER HDG. ADDITIONAL COATING SHALL BE CARBOMASTIC 615. CONTRACTOR SHALL PROVIDE SURFACE PREPARATION AS REQUIRED MY COATING MANUFACTURE.

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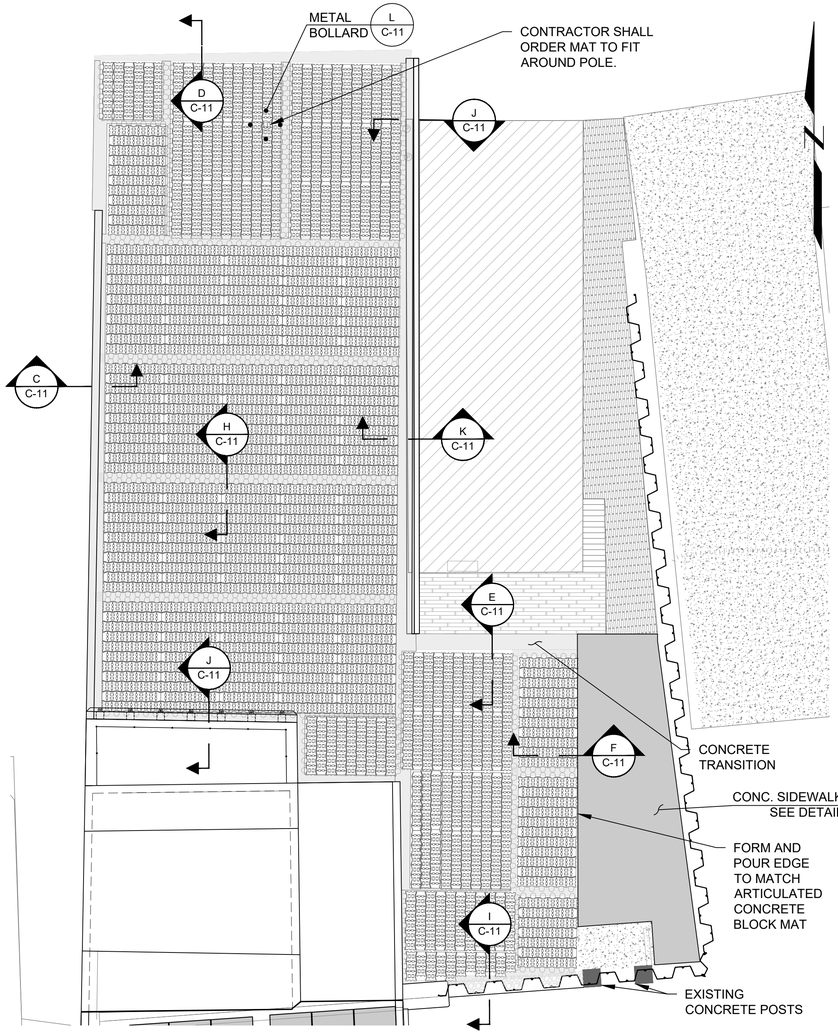
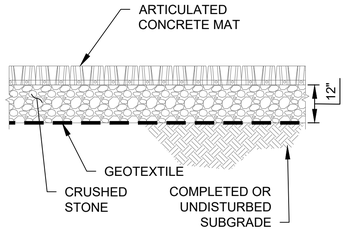
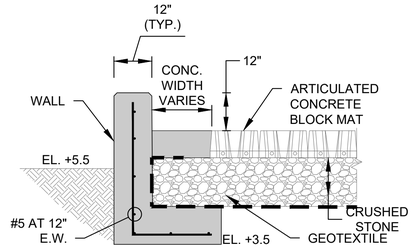


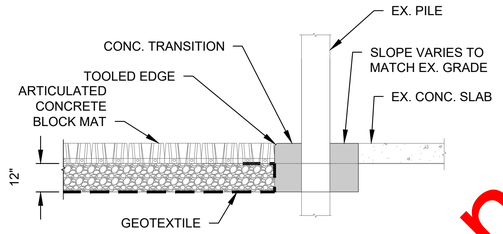
A C-11 SITE IMPROVEMENTS - PLAN
SCALE: 1"=10'-0"



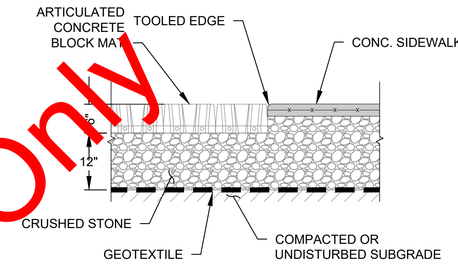
B C-11 TYPICAL ACB MAT DETAIL
SCALE: 1/2" = 1'-0"



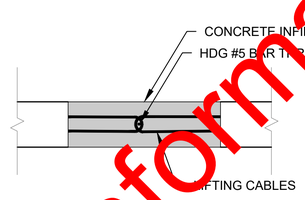
C C-11 ACB MAT EDGE DETAIL
SCALE: 1/2"=1'-0"



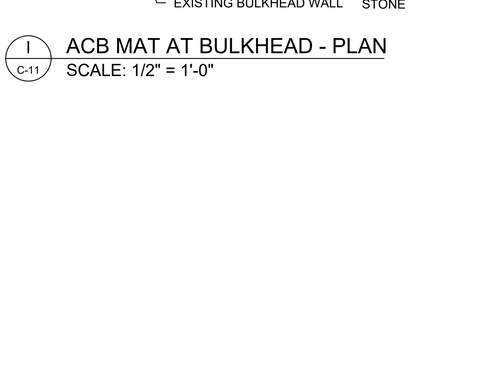
E C-11 CONCRETE TRANSITION DETAIL
SCALE: 3/8" = 1'-0"



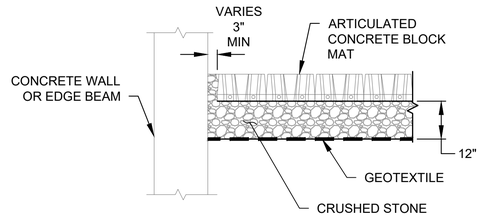
F C-11 ACB MAT / SIDEWALK DETAIL
SCALE: 3/4"=1'-0"



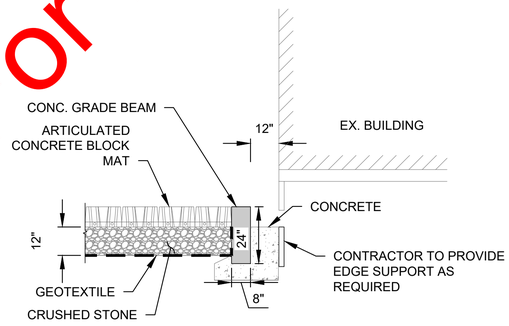
H C-11 CONNECTION DETAIL
SCALE: 3/4"=1'-0"



I C-11 ACB MAT AT BULKHEAD - PLAN
SCALE: 1/2" = 1'-0"



J C-11 ACB MAT AT BULKHEAD - SECTION
SCALE: 1/2" = 1'-0"



K C-11 ACB MAT AT BUILDING - SECTION
SCALE: 3/8" = 1'-0"

L C-11

0 2 4 SCALE: 1/2" = 1'-0"
0 10 20 SCALE: 1" = 10'
0 2 4 SCALE: 3/8" = 1'-0"

COMMONWEALTH OF MASSACHUSETTS RUSSELL J. TITMUSS STRUCTURAL No. 46514 REGISTERED PROFESSIONAL ENGINEER
10/2/19

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

NO.	DATE	ISSUE/REVISION	APP
0	10/1/2019	BID SET	RJT

GEI Consultants

Designed:	KDB
Checked:	KDB
Drawn:	JSF
Approved By:	RJT

Town of Chatham
549 Main Street
Chatham, MA 02633

GEI Project 1900325

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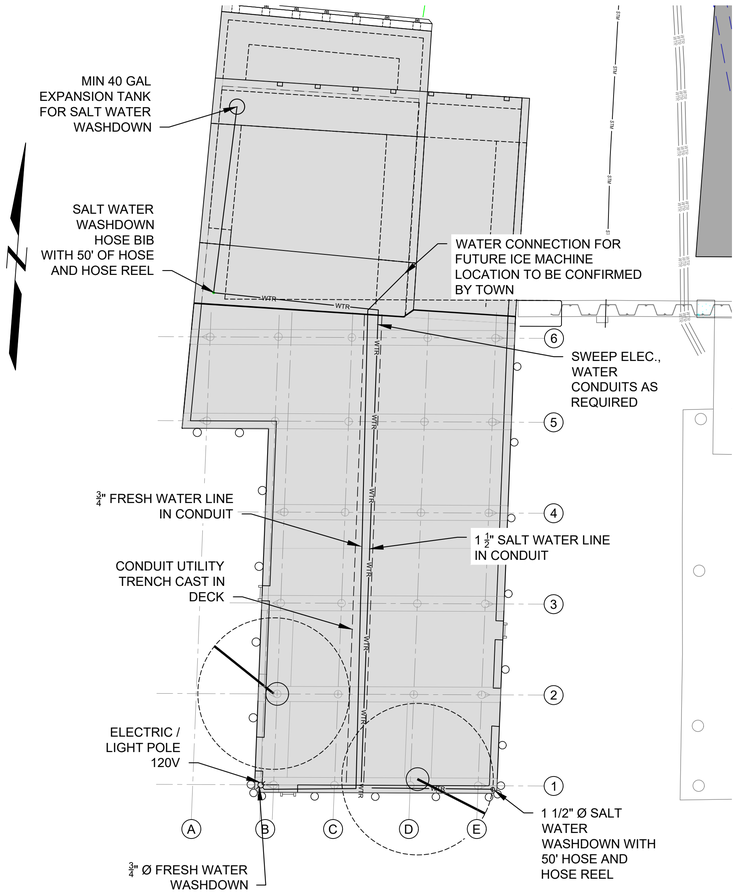
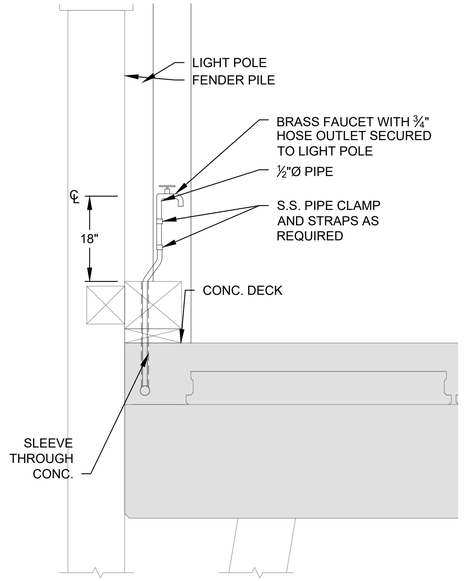
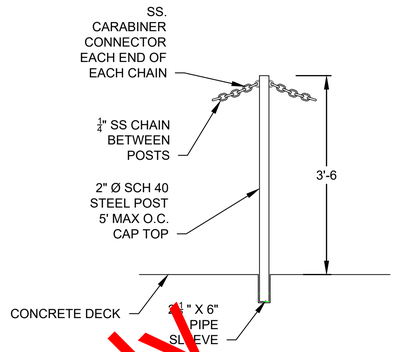


A C-12 PIER UTILITY LAYOUT
SCALE: 1"=10'-0"



B C-12 HOSE BIB DETAIL
SCALE: 3/4"=1'-0"



C C-12 REMOVABLE POST
SCALE: 1-1/2"=1'-0"

WATER SYSTEMS NOTES:

FRESH WATER SYSTEM
1. SYSTEM SHALL BE SUITABLE FOR WINTER SEASON BLOW OUT WITH COMPRESSED AIR OR AS DIRECTED BY TOWN.
2. WATER SYSTEM SHALL BE SLEEVED SUCH PIPING CAN BE REMOVED IF REQUIRED IN FUTURE.
3. SHALL INCLUDE MIN ¾" PIPING
4. CONTRACTOR SHALL CONNECT WATER SYSTEM TO WATER LINE SHOWN ON PLUMBING PLANS.
5. SYSTEM COMPONENTS SHALL BE RATED AND PRESSURE TESTED TO MEET MIN

SALT WATER WASHDOWN SYSTEM
1. SYSTEM SHALL BE SUITABLE FOR LIMITED OR NO USE IN THE WINTER, AND INCLUDE DRAIN DOWN/ BLOW OUT POINTS IN SYSTEM.
2. SYSTEM SHALL BE DESIGNED FOR MIN 50 GAL PER MIN
3. PIPING SYSTEMS SHALL BE SLEEVED TO ALLOW FUTURE REPLACEMENT AS REQUIRED.
4. SYSTEM SHALL INCLUDE AT MINIMUM THE FOLLOWING:
   - 3.2. SUBMERSIBLE PUMP SUITABLE FOR THE MARINE ENVIRONMENT
   - 3.3. 4" DIAMETER WELL
   - 3.4. MIN 40 GAL EXPANSION TANK
   - 3.5. 2" LINE BETWEEN THE PUMP AND EXPANSION TANK
   - 3.6. 1.25" LINE BETWEEN THE TANK AND WASH DOWN STATIONS

0 1 2
SCALE: 3/4" = 1'-0"

0 8 16
SCALE: 1/8" = 1'-0"

COMMONWEALTH OF MASSACHUSETTS
RUSSELL J. TITMUSS
STRUCTURAL
No. 46514
REGISTERED
PROFESSIONAL ENGINEER
10/2/19

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Chatham, MA 02633

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MEASUREMENT AND PAYMENT

MEASUREMENT AND PAYMENT

METHOD OF MEASUREMENT

A. MEASUREMENT FOR ELECTRICAL SYSTEM SHALL BE BY THE CONTRACT UNIT PRICE LUMP SUM.

B. MEASUREMENT FOR PIER UTILITIES SHALL BE BY THE CONTRACT UNIT PRICE LUMP SUM.

METHOD OF PAYMENT

A. PAYMENT FOR ELECTRICAL SYSTEM SHALL BE MADE BY THE UNIT PRICE LUMP SUM, COMPLETE IN PLACE. THIS PRICE AND PAYMENT SHALL CONSTITUTE FULL COMPENSATION FOR ALL SUPERVISION, SURVEY, TRANSPORTATION, TESTING, LABOR, MATERIALS AND EQUIPMENT FOR THE SATISFACTORY INSTALLATION OF ALL ELECTRIC WORK INCLUDING BUT NOT LIMITED TO CONDUITS, DUCK BANK, CONCRETE, FITTINGS, PANEL BOARD, ELECTRICAL METER, CONDUCTORS, CABLES, HANDHOLES, LIGHT SENSORS, PHOTOCELL, ENCLOSURES, LIGHT FIXTURES, AND ANY INCIDENTALS NECESSARY TO COMPLETE THE WORK SPECIFIED HEREIN AND AS SHOWN ON THE CONTRACT DRAWINGS.

B. PAYMENT FOR PIER UTILITIES SHALL BE MADE BY THE UNIT PRICE LUMP SUM, COMPLETE IN PLACE. THIS PRICE AND PAYMENT SHALL CONSTITUTE FULL COMPENSATION FOR ALL SUPERVISION, SURVEY, TRANSPORTATION, TESTING, LABOR, MATERIALS AND EQUIPMENT FOR THE SATISFACTORY INSTALLATION OF THE PIER UTILITIES INCLUDING BUT NOT LIMITED TO FRESH WATER WASHDOWN AND SALT WATER WASHDOWN STATIONS, WELL, PIPING, CONDUITS, HOSE BIBS, FITTINGS, TRENCHING, BACKFLOW PREVENTERS, EXPANSION TANKS, PUMPS, HOSES AND ANY INCIDENTALS NECESSARY TO COMPLETE THE WORK SPECIFIED HEREIN AND AS SHOWN ON THE CONTRACT DRAWINGS.

PAYMENT ITEM

ITEM	DESCRIPTION	UNIT
E-1	ELECTRICAL SYSTEM	LS
P-1	PIER UTILITIES	LS

LEGEND

'EP-2'	120/208V,3Ø,4W SURFACE MOUNTED PANEL, "EP-2" INDICATES PANEL DESIGNATION
TC	TIME CLOCK/SWITCH, RATING AND TYPE AS NOTED ON DRAWINGS
	DISCONNECT SWITCH (UNFUSED).
30AS 30AF	DISCONNECT SWITCH (FUSED), "AS" INDICATES AMPERE SWITCH RATING, "AF" INDICATES AMPERE FUSE RATING.
J	JUNCTION BOX, 4 11/16" SQUARE (UNLESS OTHERWISE NOTED)
PB	PULL BOX, SIZED AS REQUIRED PER THE NATIONAL ELECTRIC CODE
	CONDUIT TURNING UP
	CONDUIT TURNING DOWN
	CONDUIT TURNING UP / DOWN
	FLEXIBLE POWER CONNECTION TO EQUIPMENT AS NOTED
	FLEXIBLE POWER CONNECTION NOTES: "EWC" - INDICATES CONNECTION TO ELECTRIC WATER COOLER "MD" - INDICATES CONNECTION TO MOTORIZED DAMPER "B" - INDICATES JUNCTION BOX WITH BLANK COVER
N22A-2	HOME RUN, 3/4"C. WITH 2#12 AND 1#12 GND. CONNECTED TO A 20A-1P CIRCUIT BREAKER. "N22A" REPRESENTS PANEL NAME AND "2" INDICATES CIRCUIT NUMBER IN PANEL. WHEN MULTIPLE CIRCUITS ARE SHOWN, HASH MARKS INDICATE NUMBER OF PHASE AND NEUTRAL CONDUCTORS (GROUND CONDUCTOR IS NOT INDICATED IN HASH MARKS).
N22A-2,4	
	CONDUIT SLEEVE, SIZE AS NOTED ON DRAWINGS
	SPLICE
	BREAK SYMBOL, INDICATES CONTINUATION OF RACEWAY AND WIRING
	CAP SYMBOL, INDICATES CAPPED AND SEALED RACEWAY
	DELTA
HH	HANDHOLE
PB	PULLBOX
UP-1	UTILITY POLE
	FLOOD LIGHT
	SITE LIGHTING FIXTURE SINGLE
	SITE LIGHTING FIXTURE COUPLER
	DUPLEX RECEPTACLE WITH INTEGRAL GROUND FAULT CIRCUIT INTERRUPTER
	RECEPTACLE NOTES: "C" - INDICATES DEVICE TO BE MOUNTED ABOVE COUNTER SURFACE "WP" - INDICATES RECEPTACLE MOUNTED IN A WEATHERPROOF ENCLOSURE

WIRING METHODS

REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION

SERVICE FEEDERS	UNDERGROUND: XHHW-2 CONDUCTORS IN PVC SCHEDULE 80 ENCASED IN CONCRETE OR RIGID METAL CONDUIT ENCASED IN CONCRETE. ABOVE GRADE: XHHW-2 CONDUCTORS IN PVC COATED RIGID METAL CONDUIT (OR EMT IF ALLOWED BY ELECTRIC UTILITY COMPANY STANDARDS)
NORMAL SYSTEM FEEDERS	XHHW/XHHW-2 CONDUCTORS IN PVC SCH. 80
NORMAL BRANCH CIRCUITS	THHN/THWN/XHHW/XHHW-2 CONDUCTORS IN PVC SCHEDULE 80
LOW VOLTAGE SYSTEM (TELEPHONE, DATA, AND CATV) WIRING	TYPE CMR, CM, MPR AND MP CABLES

PROJECT GENERAL NOTES

1. THE CONTRACTOR SHALL FURNISH LABOR, MATERIALS, TOOLS AND OTHER EQUIPMENT REQUIRED TO INSTALL THE WORK SHOWN AND SPECIFIED. THE CONTRACTOR SHALL FURNISH AND INSTALL ITEMS NECESSARY FOR A COMPLETE ELECTRICAL SYSTEM. MATERIALS SHALL BE NEW AND SHALL BEAR THE REGISTERED UL MARK. WORK SHALL CONFORM WITH THE NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 70 (NEC), THE NATIONAL ELECTRICAL CODE (NEC), AND APPLICABLE FEDERAL, STATE AND LOCAL CODES. CONTRACTOR SHALL SECURE PERMITS AND PAY THE FEES REQUIRED TO CARRY OUT HIS WORK. THE CONTRACTOR SHALL FURNISH COPIES OF CERTIFICATES AND PERMITS TO THE ARCHITECT.
2. THE DRAWINGS AND SPECIFICATIONS INDICATE THE INTENT OF THE DESIGN AND SHALL BE CONSIDERED AS DIAGRAMMATIC ONLY. EXACT LOCATIONS FOR OUTLETS AND EQUIPMENT SHALL BE DETERMINED AT THE SITE, AS WORK PROGRESSES DIMENSIONS AND CONDITIONS SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR AT THE SITE. FINAL WORK SHALL BE DOCUMENTED ON AS BUILT RECORD DRAWINGS.
3. PIPING, CONDUITS AND EQUIPMENT OF ALL TRADES SHALL BE PROPERLY COORDINATED AND SET TO MAINTAIN THE CLEARANCES REQUIRED BY APPLICABLE FEDERAL, STATE AND LOCAL CODES.
4. CONDUIT RUNS CROSSING EXPANSION JOINTS SHALL HAVE EXPANSION OR EXPANSION DEFLECTION TYPE FITTINGS, AS REQUIRED VERIFY EXISTING JOINTS BY FIELD MEASUREMENTS. ALL EXTERIOR ROOF CONDUITS SHALL HAVE EXPANSION FITTINGS.
5. OUTDOOR ELECTRICAL EQUIPMENT SHALL BE NEMA 4X TYPE, UNLESS OTHERWISE NOTED.
6. RACEWAYS AND CABLE SHALL BE RUN CONCEALED IN FINISHED SPACES UNLESS OTHERWISE NOTED.
7. WIRING DEVICES SHALL BE MOUNTED IN ACCORDANCE WITH THE LATEST REQUIREMENTS OF THE ACCESSIBILITY CODE.
8. ALL RECEPTACLES INSTALLED IN UNFINISHED AREAS SHALL BE GFI TYPE, MOUNTED 4" ABOVE FINISHED FLOOR.
9. CONDUCTOR: COMMON OR SHARING OF NEUTRALS WILL NOT BE ALLOWED. NO MORE THAN (3) CIRCUITS (SIX CURRENT CARRYING CONDUCTORS) SHALL BE RUN IN A SINGLE CONDUIT.
10. THIS IS A STANDARD SYMBOL LIST. ALL DEVICE SYMBOLS AND ABBREVIATIONS MAY NOT NECESSARILY APPEAR ON THE FLOOR PLANS OR DETAIL SHEET. ONLY THOSE SYMBOLS INDICATED ON THE FLOORS PLANS ARE USED AND OTHERS SHOULD BE DISREGARDED.
11. MOUNTING HEIGHTS SHALL BE AS INDICATED ON ARCHITECTURAL DRAWINGS. THE MOUNTING HEIGHT DETAIL SHALL BE USED AS A GUIDE IN THE ABSENCE OF THE ARCHITECTURAL DRAWINGS.
12. FOR EXACT LOCATION OF LIGHTING FIXTURES, REFER TO ARCHITECTURAL AND CIVIL ENGINEERS DRAWINGS.
13. CURRENT CARRYING MATERIAL USED SHALL BE COPPER, INCLUDING PANELBOARD BUS MATERIALS AND TRANSFORMER WINDINGS.
14. FURNISH GROUNDING/ BONDING BUSHINGS ONTO ALL CONDUIT ENTERING/ LEAVING BOXES.
15. ALL GROUND CONDUCTORS SHALL BE GREEN AND NEUTRAL CONDUCTORS SHALL BE WHITE.
16. UNLESS NOTED OTHERWISE, ALL DATA AND TELEPHONE CABLING SHALL BE BY OTHERS. ELECTRICAL DRAWINGS INDICATE RACEWAY AND BACKBOX SYSTEMS ONLY AND INDICATE TEL/DATA OUTLET CONFIGURATIONS FOR REFERENCE ONLY.

EXISTING CONDITIONS DESIGNATIONS

X	EXISTING DEVICE SHALL BE REMOVED INCLUDING ALL ASSOCIATED RACEWAYS AND CIRCUITRY BACK TO ITS SOURCE
XM	EXISTING DEVICE SHALL REMAIN AND SHALL BE MAINTAINED
XR	EXISTING DEVICE SHALL BE RELOCATED
XL	NEW LOCATION OF EXISTING TO BE RELOCATED DEVICE
XN	EXISTING DEVICE TO BE REMOVED AND REPLACED WITH NEW MAINTAIN EXISTING CIRCUITRY FOR CONNECTION OF NEW DEVICE

LINE TYPE LEGEND

- EXISTING DEVICE, EQUIPMENT OR WIRING TO BE REMOVED
- EXISTING DEVICE, EQUIPMENT OR WIRING TO REMAIN
- NEW DEVICE, EQUIPMENT OR WIRING

DEMOLITION GENERAL NOTES

1. REFER TO THE ARCHITECTURAL DRAWINGS FOR THE FULL EXTENT OF THE SCOPE OF DEMOLITION. DISCONNECT AND MAKE SAFE ALL ELECTRICAL EQUIPMENT IDENTIFIED FOR REMOVAL ON THE ARCHITECTURAL, HVAC, PLUMBING AND FIRE PROTECTION PLANS. THE ELECTRICAL SCOPE MAY EXTEND BEYOND THE AREA DEFINED BY THE ARCHITECTURAL DEMOLITION LIMITS TO FULLY COMPLY WITH THE VARIOUS REQUIREMENTS DEFINED BY THESE NOTES.
2. THE ELECTRICAL DEMOLITION PLANS INDICATE GENERAL INTENT AND ARE NOT INTENDED TO SHOW ALL COMPONENTS AND ITEMS TO BE REMOVED OR RETAINED. THE ELECTRICAL CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMISSION OF THEIR BID TO BECOME FAMILIAR WITH THE ACTUAL WORKING CONDITIONS AND EXTENT OF WORK. DEVICES AND EQUIPMENT LOCATED ON WALLS AND/OR CEILINGS DESIGNATED TO BE REMOVED SHALL BE DISCONNECTED AND MADE SAFE. THE ELECTRICAL CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER'S REPRESENTATIVE AND ARCHITECT OF ANY UNANTICIPATED OR HIDDEN CONDITIONS ENCOUNTERED DURING DEMOLITION.
3. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OF ALL SYSTEMS OR BUILDING COMPONENTS DAMAGED DURING EXECUTION OF THE WORK. DAMAGE SHALL INCLUDE, BUT NOT BE LIMITED TO, THE DESTRUCTION OR DISPOSAL OF ITEMS INTENDED TO REMAIN OR BE SALVAGED.
4. THE ELECTRICAL CONTRACTOR SHALL CIRCUIT TRACE AND LABEL ALL EXISTING BRANCH CIRCUITS AND FEEDERS WITHIN OR ASSOCIATED WITH THE DEMOLITION SCOPE, PRIOR TO DE-ENERGIZING AND DISCONNECTION. ALL CIRCUITS WITHIN PANELBOARDS, LOAD CENTERS, MOTOR CONTROL CENTERS, AND SWITCHBOARDS IDENTIFIED FOR REMOVAL, SHALL BE TRACED AND FIELD LABELED TO ENSURE THAT NO AREA OUTSIDE THE DEMOLITION SCOPE LIMIT IS AFFECTED.
5. IN ANY AREA REQUIRING THE PERFORMANCE OF ANY TRADE'S WORK, THE ELECTRICAL CONTRACTOR SHALL CAREFULLY REMOVE AND STORE ANY OR ALL ELECTRICAL ITEMS IN PATH OF WORK, REINSTALLING AND RECONNECTING SAME AS REQUIRED, IN ACCORDANCE WITH THE PLANS AND/OR AS DIRECTED AFTER COMPLETION OF OTHER TRADES WORK IN THAT AREA.
6. THE ELECTRICAL CONTRACTOR SHALL IDENTIFY ALL BRANCH CIRCUITS, FEEDERS AND SYSTEM COMPONENTS WHICH ARE TO REMAIN WITHIN THE AREA OF DEMOLITION SCOPE. THERE SHALL BE NO INTERRUPTION OF SERVICE TO ANY AREA OUTSIDE THE SCOPE LIMITS WITHOUT WRITTEN APPROVAL FROM THE OWNER'S REPRESENTATIVE. EXISTING EQUIPMENT TO REMAIN SHALL BE LEFT IN A CODE COMPLIANT CONDITION.
7. THE ELECTRICAL CONTRACTOR SHALL TAKE INVENTORY OF ELECTRICAL ITEMS THAT ARE REMOVED AND PROVIDE A LIST TO THE OWNER FOR THEIR SELECTION OF ITEMS TO BE RETAINED. ALL ITEMS REJECTED BY THE OWNER SHALL BECOME THE PROPERTY OF THE CONTRACTOR, AND SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
8. IN ALL EXISTING OR NEW AREAS SPECIFIED OR SHOWN TO BE PAINTED, THE ELECTRICAL CONTRACTOR SHALL REMOVE ALL ELECTRICAL ITEMS AS REQUIRED, INCLUDING BUT NOT LIMITED TO, LIGHTING FIXTURES, DEVICE PLATES, DEVICES, ETC THE CONTRACTOR SHALL BE RESPONSIBLE FOR STORING THE REMOVED DEVICES IN A SAFE AND SECURE PLACE THE ELECTRICAL CONTRACTOR SHALL REINSTALL THE SAME DEVICES AFTER COMPLETION OF PAINTING. ANY ITEM NOT REMOVED AND PAINTED OVER SHALL BE SUITABLY CLEANED OR REPLACED WITH A NEW ITEM BY THE ELECTRICAL CONTRACTOR.
9. THE ELECTRICAL CONTRACTOR SHALL DE-ENERGIZE AND REMOVE ALL CONDUCTORS AND RACEWAYS WITHIN THE AREA OF DEMOLITION SCOPE TO THEIR POINT OF ORIGIN. ITEMS IDENTIFIED FOR DEMOLITION SHALL NOT BE ABANDONED IN PLACE. RACEWAYS THAT ENTER MASONRY WALLS AND FLOORS SHALL BE CUT FLUSH AT THE SURFACE FOR PATCHING BY OTHERS. ALL CIRCUIT BREAKERS ASSOCIATED WITH THE DEMOLITION SHALL BE DE-ENERGIZED, TRIPPED TO THE "OFF" POSITION AND RE-LABELLED AS "SPARE". NEW TYPED UPDATED CIRCUIT DIRECTORIES SHALL ALSO BE PROVIDED.
10. THE ELECTRICAL CONTRACTOR SHALL TEMPORARILY SUPPORT ALL ITEMS TO REMAIN THAT ARE AFFECTED BY THE DEMOLITION OF BUILDING STRUCTURAL COMPONENTS (WALLS, CEILINGS, PARTITIONS, ETC). CONTRACTOR SHALL TEMPORARILY SUPPORT ITEMS AND SHALL PROVIDE PERMANENT SUPPORTS WHEN FINALIZED STRUCTURES ARE IN PLACE.
11. ALL EXISTING ELECTRICAL EQUIPMENT THAT ARE TO BE RELOCATED SHALL BE STORED IN A SAFE MANNER UNTIL SUCH TIME AS TO BE REINSTALLED. ANY DAMAGE INCURRED TO EQUIPMENT SHALL BE RECTIFIED BY THE ELECTRICAL CONTRACTOR.
12. ALL REMOVED ITEMS SHALL BE LEGALLY DISPOSED OF UNLESS IDENTIFIED FOR REUSE. THE OWNER'S REPRESENTATIVE SHALL INSPECT ALL RETAINED ITEMS, PRIOR TO PLACEMENT IN THE IDENTIFIED STORAGE LOCATION BY THE ELECTRICAL CONTRACTOR.
13. THE WORK ON THIS PROJECT MAY BE PERFORMED IN PHASES. THE ELECTRICAL CONTRACTOR SHALL COORDINATE AND SCHEDULE HIS WORK AND ALLOW SUFFICIENT TIME AND COSTS TO ACCOMMODATE THE PHASING OF WORK. ANY ADDITIONAL COSTS INCURRED DUE TO LACK OF PROPER COORDINATION AND COMMUNICATION BY THE ELECTRICAL CONTRACTOR, WITH THE GENERAL CONTRACTOR, OTHER TRADES OR OWNER'S REPRESENTATIVE, SHALL BE ABSORBED BY THE ELECTRICAL CONTRACTOR WITHOUT ANY COSTS TO THE OWNER. COORDINATE PHASING REQUIREMENTS WITH THE ARCHITECT AND THE OWNER.
15. ALL DEMOLITION SCOPE ASSOCIATED WITH LOW VOLTAGE SYSTEMS, INCLUDING BUT NOT LIMITED TO, TELEPHONE, DATA, SECURITY, PAGING, CCTV, ETC SHALL BE INCLUDED IN THIS CONTRACT.

ELECTRICAL DRAWINGS LIST

DRAWING No	DESCRIPTION
E-00	ELECTRICAL LEGEND
E-01	ELECTRICAL SPECIFICATIONS I
E-02	ELECTRICAL SPECIFICATIONS II
E-03	ELECTRICAL SITE PLAN
E-04	ELECTRICAL SCHEDULES AND DETAILS
E-05	ELECTRICAL ONE LINE

BID SET

COMMONWEALTH OF MASSACHUSETTS
ALIREZA HEIDARIABHARI
ELECTRICAL
No. 45422
REGISTERED PROFESSIONAL ENGINEER

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Attention:

0 1"

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NO.	DATE	ISSUE/REVISION	APP
0	9/25/2019		

GEI Consultants

Designed:	ZL
Checked:	ARH
Drawn:	ZL
Approved By:	ARH

Town of Chatham
549 Main Street
Chatham, MA 02633

GEI Project 1900325

Trap Dock Reconstruction
Chatham, MA

ELECTRICAL
LEGEND

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PART 2 - PRODUCTS (CONTINUED)

2.10 CONDUIT FITTINGS:

A. GRSC:
- A.1. FITTINGS, INCLUDING COUPLINGS, SHALL BE THREADED UNLESS OTHERWISE APPROVED BY THE PORT.
- A.2. THREADLESS COUPLINGS AND CONNECTORS:
  - A.2.1. GRSC COUPLINGS AND BOX CONNECTORS MAY BE STEEL THREADLESS, COMPRESSION RING, OR SET SCREW TYPE FOR USE WITH CONDUITS 1 INCH AND SMALLER INSTALLED IN POURED CONCRETE LOCATIONS WHERE LIMITED WORKING SPACE MAKES THREADED FITTINGS IMPRACTICAL.
  - A.2.2. THREADLESS FITTINGS ARE NOT ACCEPTABLE FOR USE WITH GRSC CONDUITS EXCEPT AS ALLOWED ABOVE. THEY MAY, HOWEVER, BE USED WITH EMT TYPE CONDUITS.
- A.3. MYERS HUBS OR EQUAL SHALL BE USED WITH NEMA 2, 3, 3R, 4 AND 12 ENCLOSURES.
- A.4. THREADED LOCKNUTS:
  - A.4.1. SEALING TYPE MAY BE USED WITH NEMA 2, 3, 3R, 4 AND 12 ENCLOSURES AT BOTTOM PENETRATIONS.
  - A.4.2. EXTRA-HEAVY ELECTROGALVANIZED STEEL FOR SIZES UP TO 2 INCHES. LOCKNUTS LARGER THAN 2 INCHES SHALL BE ELECTROGALVANIZED MALLEABLE IRON.
- A.5. THREADED BUSHINGS:
  - A.5.1. 1 1/4 INCH AND LARGER, INSULATED, GROUNDING TYPE AS REQUIRED IN SECTION 260526.
  - A.5.2. ELECTROGALVANIZED MALLEABLE IRON WITH INSULATING COLLAR.
  - A.5.3. LOCKING TYPE AND PROVIDED WITH A FEED-THROUGH COMPRESSION LUG FOR SECURING THE GROUND CABLES.
- A.6. UNIONS SHALL BE ELECTROGALVANIZED FERROUS ALLOY TYPE. ACCEPTABLE MANUFACTURERS ARE APPLETON, UNF OR UNY; CROUSE-HINDS, UNF OR UNY; OR EQUAL.
- A.7. CONDUIT BODIES SHALL BE FERROUS ALLOY TYPE (MALLEABLE IRON), WITH CLAMP TYPE FASTENING COVERS.
- A.8. GASKETS SHALL BE NEOPRENE.

B. EMT:
- B.1. EMT IS NOT ALLOWED ON THIS PROJECT.

C. LIQUID-TIGHT, FLEXIBLE METAL CONDUIT (ONLY ALLOWABLE FOR LENGTHS < 6 FEET):
- C.1. FITTINGS FOR LIQUID-TIGHT CONDUIT SHALL HAVE A CADMIUM-PLATED MALLEABLE IRON BODY AND GLAND NUT WITH CAST-IN LUG, BRASS GROUNDING FERRULE, THREADED TO ENGAGE CONDUIT SPIRAL AND O-RING SEALS AROUND THE CONDUIT AND BOX CONNECTION AND INSULATED THROAT. USE 45-DEGREE AND 90-DEGREE FITTINGS WHERE NECESSARY.
- C.2. FITTINGS SHALL BE THREADED AND COMPRESSION TYPE FOR POLYVINYL JACKETED FLEX.

D. WEATHERPROOF CONNECTORS:
- D.1. PROVIDE THREADED CONNECTORS.

E. EXPANSION COUPLINGS:
- E.1. PROVIDE O.Z. TYPE EX COUPLINGS WITH JUMPER. GEDNEY, OR EQUAL.

F. SEAL OFFS:
- F.1. PROVIDE SEAL-OFFS WITH FILLER FIBER, COMPOUND, AND REMOVABLE COVER.

G. HDPE CONDUIT:
- G.1. HDPE COUPLINGS AND CONNECTORS SHALL BE UL LISTED AND SPECIFICALLY DESIGNED FOR HDPE APPLICATIONS.
- G.2. HDPE CONNECTORS AND JOINTS SHALL BE MADE BY A METHOD APPROVED BY THE PORT. PVC GLUE IS NOT PERMITTED ON HDPE.

2.11 GROUNDING:

A. PROVIDE A GREEN GROUND CONDUCTOR IN ALL CIRCUITS.

B. PROVIDE SUPPLEMENTARY GROUND BONDING WHERE METALLIC CONDUITS TERMINATE AT METAL CLAD EQUIPMENT (OR AT THE METAL PULL BOX OR EQUIPMENT) FOR WHICH A GROUND BUS IS SPECIFIED. ACCOMPLISH THIS BY EQUIPPING THE CONDUITS WITH A BUSHING OF THE GROUNDING TYPE CONNECTED INDIVIDUALLY TO GROUND BUS.

C. ALL GROUND WIRES SHALL BE SUITABLY PROTECTED FROM MECHANICAL INJURY.

2.12 ACCEPTABLE MANUFACTURERS:

PANELBOARD: CUTLER HAMMER OR ENGINEER APPROVED EQUAL FROM SQUARE "D", ABB, SEIMENS
DISCONNECT SWITCHES: SQUARE 'D', ABB, SIEMENS, CUTLER-HAMMER
CIRCUIT BREAKERS: SQUARE 'D', GE, SIEMENS, CUTLER-HAMMER, ABB
RACEWAY: WHEATLAND, TRIANGLE, REPUBLIC
WIRE/CABLE: SOUTHWIRE,
METAL CLAD CABLE: AFC
JUNCTION/PULL BOXES: APPLETON ELECTRIC, CROUSE HINDS,O.Z./GEDNEY
FIRE STOP MATERIAL: HILTI, 3M (NOTE: MATERIAL MUST BE ACCEPTABLE TO LOCAL AHJ)
FITTINGS, COUPLINGS, BUSHINGS,CONNECTORS: O.Z./GEDNEY, BURNDY, NEPCO, ABB
LIGHT SWITCHES: HUBBELL, LEGRAND, COOPER WIRING DEVICES
RECEPTACLES: HUBBELL, LEGRAND, COOPER WIRING DEVICES
GROUNDING COMPONENTS: ERICO, BURNDY
HANGERS: UNISTRUT/KINDORF B CHANNEL, H WASHER, C STRAP, MINIMUM 1/2-INCH ROD WITH CEILING FLANGE, OR EQUAL
PIPE STRAPS: TWO-HOLE GALVANIZED OR MALLEABLE IRON.
PRECAST HANDHOLES AND PULL BOXES: OLDCASTLE, CHRISTY, HANSON, HUBBELL, OR EQUAL.

PART 3 - EXECUTION

3.01 GENERAL:

A. ALL CONTROL WIRING ASSOCIATED WITH MECHANICAL EQUIPMENT IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR.

B. ALL DATA/VOICE/COMMUNICATION WIRING AND DEVICES SHALL BE INSTALLED BY OTHER CONTRACTORS AND IS NOT INCLUDED IN THIS CONTRACT.

C. OPENINGS AROUND ELECTRICAL PENETRATIONS THROUGH FIRE RESISTANCE RATED WALLS, PARTITIONS, FLOORS, OR CEILINGS SHALL BE FIRE STOPPED USING APPROVED METHODS.

D. PROVIDE DANGER LABELING AT ALL EQUIPMENT AND JUNCTION/PULL BOXES PER CODE.

E. ALL PANELBOARD COVERS SHALL BE REPLACED AT THE COMPLETION OF EACH DAYS WORK.

F. ELECTRICAL WORK, WIRE AND CABLE, MATERIALS, AND OTHER EQUIPMENT SPECIFIED IN THIS DIVISION SHALL BE PROTECTED AGAINST DAMAGE BY OTHER CONSTRUCTION ACTIVITIES, WEATHER CONDITIONS, OR ANY OTHER CAUSES AS A PART OF THIS WORK. EQUIPMENT FOUND DAMAGED OR IN OTHER THAN NEW CONDITION SHALL BE REJECTED AS DEFECTIVE.

F. THE CONTRACTOR SHALL REMOVE AND/OR RELOCATE ANY EXISTING ELECTRICAL WORK WHICH INTERFERES WITH THE NEW INSTALLATION. ALL EXPOSED ABANDONED CONDUIT AND WIRING SHALL BE REMOVED. THE CONTRACTOR SHALL CUT BACK ALL ABANDONED CONDUIT AND WIRING TO FLOOR, OR DEMISING WALL OF THE SPACE. THIS WORK MAY NOT BE REPRESENTED ON THE DRAWINGS, BUT SHOULD BE TAKEN INTO ACCOUNT BY THE CONTRACTOR IN HIS PROPOSAL.

G. ELECTRICAL CONTRACTOR SHALL MAINTAIN CONTINUITY OF CIRCUITRY FOR EXISTING EQUIPMENT AND DEVICES THAT ARE TO REMAIN. WHERE OUTLETS ARE REMOVED AND ARE NOT AT THE CIRCUIT DEAD END, EXTEND CIRCUITRY AS REQUIRED TO MAINTAIN INTEGRITY OF ORIGINAL CIRCUIT. WHERE A WIRING DEVICE IS TO BE REMOVED AND THAT WALL IS TO REMAIN THE ELECTRICAL CONTRACTOR SHALL REMOVE BRANCH CIRCUITRY FROM ITS SOURCE AND FILL-IN OUTLET BOX. BLANK PLATES WILL NOT BE PERMITTED.

H. CUTTING OR NOTCHING SHALL BE KEPT TO A MINIMUM AND SHALL ONLY BE DONE IN A PORT-APPROVED METHOD. STRUCTURAL MEMBERS SHALL NOT BE DISTURBED OR CUT IN ANY WAY WITHOUT SPECIFIC WRITTEN APPROVAL FROM THE PORT ON A CASE BY CASE BASIS. PATCH AND CORRECT FINISHED SURFACES DAMAGED BY ELECTRICAL WORK.

I. PRIOR TO ANY CHASING, CHOPPING, OR CORE DRILLING BEING PERFORMED, THE CONTRACTOR SHALL FIELD INVESTIGATE CONDITIONS AND COORDINATE WITH ALL APPROPRIATE TRADES TO ENSURE THAT WORK WILL BE IN HARMONY WITH OTHER WORK AND NOT AFFECT ANY EXISTING BUILDING SYSTEMS. THIS WORK MUST BE APPROVED BY TOWN PRIOR TO PROCEEDING.

J. NOTIFY PORT INSPECTORS PRIOR TO DE ENERGIZING OR ENERGIZING ANY CIRCUIT.

K. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THE SAFETY OF CONTRACTOR'S PERSONNEL WHEN WORKING ON PORT ELECTRICAL SYSTEMS.

I. FURNISH AND INSTALL WIRING FOR ADEQUATE LIGHT AND SMALL TOOLS POWER FOR THE PROJECT. THIS SHALL INCLUDE STRINGERS, LAMPS, OUTLETS, BREAKERS, AND FUSING, AS IS NECESSARY.

J. MOUNTING HEIGHTS: DISCONNECT SWITCHES OR ENCLOSED CB'S: 6'-6" TO HANDLE. PANELBOARDS: 6'-6" TO MCB OR TOP CIRCUIT BREAKER (IF NO MCB)TRANSFORMERS: (WHERE HUNG) - AS CLOSE AS POSSIBLE TO SLAB ABOVE BUT NO LESS THAN MANUFACTURERS CLEARANCE REQUIREMENTS.

K. WHERE PANELBOARDS, SWITCHES, CIRCUIT BEAKERS, TRANSFORMERS, ETC. ARE EXISTING TO BE REUSED THE CONTRACTOR SHALL CLEAN AND REFURBISH THE EQUIPMENT. THIS SHALL INCLUDE TIGHTENING ALL CONNECTIONS, REPLACING DEFECTIVE MECHANISMS, EXERCISING MECHANISMS AND PROVIDING ANY MISCELLANEOUS COMPONENTS SO THE EQUIPMENT IS IN FIRST CLASS WORKING ORDER.

L. PROVIDE SEISMIC RESTRAINTS FOR ALL EQUIPMENT, INCLUDING ALL STRUCTURAL STEEL MEMBERS, INSERTS, ANCHORS, WIRES AND THE REQUIRED ASSEMBLY THEREOF. ALL SEISMIC RESTRAINTS SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH ALL LOCAL CODES AND ORDINANCES HAVING JURISDICTION.

M. PROVIDE LABELING AT EACH OUTLET, DISCONNECT SWITCH, AND HARD WIRED EQUIPMENT INDICATING PANEL NUMBER AND CIRCUIT NUMBER. USE "BROTHER P-TOUCH" OR SIMILAR.

3.02 CONDUCTORS, CONDUITS AND RACEWAYS:

A. KEEP CONDUIT AND RACEWAYS CLOSED DURING CONSTRUCTION TO PREVENT ENTRANCE OF DIRT, MOISTURE, CONCRETE OR FOREIGN OBJECTS. RACEWAYS SHALL BE CLEAN AND DRY BEFORE INSTALLATION OF WIRE AND SHALL BE SO AT THE TIME OF FINAL ACCEPTANCE.

B. MAINTAIN GROUND CONTINUITY THROUGHOUT ALL SYSTEMS.

C. WIRE SHALL BE CONTINUOUS BETWEEN EACH END OF A CONDUIT. SPLICES AND TERMINALS ARE NOT PERMITTED WITHIN A CONDUIT RUN.

D. EACH MAIN AND BRANCH CIRCUIT SHALL HAVE ITS OWN DEDICATED NEUTRAL CONDUCTOR. DO NOT INSTALL SHARED OR COMMON NEUTRALS.

E. BRANCH CIRCUIT CONDUCTORS SHALL BE SIZED AND INSTALLED FOR A MAXIMUM VOLTAGE DROP OF 3%

F. SERVICE FEEDER CONDUCTORS SHALL BE SIZED AND INSTALLED FOR A MAXIMUM VOLTAGE DROP OF 2%

G. PULL WIRE AND CABLE INTO CONDUIT OR TRAYS WITHOUT DAMAGING OR PUTTING UNDUE STRESS ON THE CABLE INSULATION. UL LISTED PULLING COMPOUNDS ARE ACCEPTABLE LUBRICANTS FOR PULLING WIRE AND CABLE. GREASE IS NOT ACCEPTABLE. RACEWAY CONSTRUCTION SHALL BE COMPLETE, CLEANED, AND PROTECTED FROM THE WEATHER BEFORE CABLE IS PLACED.

H. CONDUIT RUNS BETWEEN PULL BOXES:
- H.1. LIMIT THE NUMBER OF DIRECTIONAL CHANGES OF THE CONDUIT TO A MAXIMUM TOTAL OF 270 DEGREES IN ANY RUN BETWEEN PULL BOXES.
- H.2. LIMIT THE NUMBER OF DIRECTIONAL CHANGES OF THE CONDUIT TO A MAXIMUM OF 180 DEGREES IN ANY RUN BETWEEN PULL BOXES FOR COMMUNICATIONS CONDUITS, UNLESS OTHERWISE APPROVED BY THE PORT.
- H.3. LIMIT CONDUIT RUNS TO 400 FEET, LESS 100 FEET FOR EACH 90 DEGREES OF CHANGE IN DIRECTION.
- H.4. AVOID BENDS AND OFFSETS WHENEVER POSSIBLE. HOWEVER, WHEN BENDS AND OFFSETS ARE NECESSARY THEY SHALL BE FACTORY BENDS OR BENDS MADE WITH A HICKEY OR CONDUIT BENDING MACHINE. HEATING, WELDING, OR BRAZING THE CONDUIT FOR BENDS IS NOT ACCEPTABLE.

I. JUNCTION AND PULL BOXES:
- I.1. WHERE REQUIRED FOR PULLING CABLE AND AS NECESSARY TO MEET NFPA NO. 70, PROVIDE CAST JUNCTION BOXES OR PULL BOXES. PULL BOXES USED FOR MULTIPLE CONDUIT RUNS SHALL NOT COMBINE CIRCUITS FED FROM DIFFERENT MCC'S, SWITCHBOARDS, OR SWITCHGEAR.

PART 3 - EXECUTION (CONTINUED)

J. CONDUIT TERMINATIONS:
- J.1. CONDUIT ENTERING SHEET STEEL BOXES OR CABINETS SHALL BE SECURED BY LOCKNUTS ON BOTH THE INTERIOR AND EXTERIOR OF THE DEVICE AND SHALL HAVE AN INSULATING GROUNDING OR BONDING BUSHING CONSTRUCTED OVER THE CONDUIT END.
- J.2. CONDUIT ENTERING TOP OR SIDES OF NEMA 3R, 4, AND 12 BOXES SHALL BE TERMINATED WITH A RAIN-TIGHT HUB HAVING AN INSULATED LINER.
- J.3. SURFACE-MOUNTED CAST BOXES AND PLASTIC ENCLOSURES SHALL HAVE THREADED HUBS.
- J.4. JOINTS SHALL BE MADE WITH STANDARD COUPLINGS OR SPECIFIED UNIONS.
- J.5. METAL PARTS OF PLASTIC OR COATED CONTROL STATIONS AND COATED BOXES SHALL BE BONDED TO THE CONDUIT SYSTEM.
- J.6. RUNNING THREADS SHALL NOT BE USED IN LIEU OF NIPPLES, NOR SHALL EXCESSIVE THREAD BE USED ON ANY CONDUIT.
- J.7. THE ENDS OF CONDUIT SHALL BE CUT SQUARE, REAMED, AND THREADED WITH STRAIGHT THREADS.
- J.8. MALE THREADS ON RIGID STEEL CONDUIT SHALL BE COATED WITH ELECTRICALLY CONDUCTIVE, ZINC RICH PAINT.
- J.9. STEEL CONDUIT SHALL BE MADE UP-TIGHT, WITH THREAD COMPOUND.

3.03 UNDERGROUND DUCTS AND RACEWAYS:

A. CONDUIT ENCASEMENT OR EMBEDMENT (STRUCTURES AND DUCT BANKS)
- A.1. CONCRETE SHALL BE BY OTHERS WITH 3/4 RED DYE. RED DYE MAY BE INSTALLED ONTO THE TOP OF THE CONCRETE ENCASEMENT.
- A.2. CONCRETE-EMBEDDED CONDUIT SHALL BE SEPARATED FROM THE EARTH BY AT LEAST 3 INCHES OF CONCRETE. CLEARANCES SHALL BE EQUAL TO THE CONDUIT DIAMETER, BUT NOT LESS THAN 1 1/2 INCHES. MAINTAIN CLEARANCES BETWEEN CONDUITS ENCASED IN SLABS. CLEARANCES OF LESS THAN 1 1/2 INCHES AT CONDUIT CROSSING AND TERMINATING LOCATIONS ARE ACCEPTABLE.
- A.3. PROVIDE CONDUIT EXPANSION/DEFLECTION FITTINGS WHERE EMBEDDED CONDUIT CROSSES BUILDING EXPANSION JOINTS, PASSES BETWEEN TWO ADJACENT STRUCTURES, OR PASSES BETWEEN A DUCT BANK AND STRUCTURE. LOCATE CONDUIT EXPANSION/DEFLECTION FITTINGS BETWEEN DUCT BANK AND MANHOLES OR PULL BOXES WHERE NOTED ON THE DRAWINGS.
- A.4. PLACE DUCT BANKS ON AN UNDISTURBED SOIL BASE WHEREVER POSSIBLE. WHERE DUCT BANKS PASS THROUGH BACKFILLED AREAS, THE SOIL BASE SHALL BE AS SPECIFIED ELSEWHERE IN THE CONTRACT DOCUMENTS. DUCT BANKS THAT RUN UNDER TRAFFIC AREAS SHALL BE STEEL REINFORCED.
- A.5. LOCATE PLASTIC SPACERS 5 FEET TO 8 FEET ON CENTER AS RECOMMENDED BY THE MANUFACTURER. TIE THE ENTIRE ASSEMBLY TOGETHER USING FABRIC STRAPS; DO NOT USE TIE WIRES OR REINFORCING STEEL THAT MAY FORM CONDUCTIVE OR MAGNETIC LOOPS AROUND DUCTS OR DUCT GROUPS. SECURE SPACERS TO EARTH AND TO DUCTS TO PREVENT CONDUIT FLOTATION DURING CONCRETING. CONDUIT RUNS SHALL BE WATERTIGHT.
- A.6. PROTECT CONDUIT ENDS FROM DAMAGE DURING CONSTRUCTION. WHEN USING PLUGS FOR PROTECTION, A 1/4_INCH HOLE SHALL BE DRILLED IN THE LOWER PORTION OF THE PLUG TO PROVIDE DRAINAGE.
- A.7. WHERE A CONDUIT IS SPECIFIED "SPARE" OR FOR FUTURE USE, INSTALL A NYLON CORD IN CONDUIT AND FASTEN AT EACH END.
- A.8. PULL LEATHER-WASHER-TYPE DUCT CLEANER, WITH GRADUATED WASHER SIZES THROUGH FULL LENGTHS OF DUCTS IMMEDIATELY AFTER CONCRETE IS POURED. AFTER THE CONCRETE HAS SET BUT BEFORE BACKFILLING, PULL A 4_INCH-LONG MANDREL HAVING A DIAMETER EQUAL TO THE CONDUIT'S INSIDE DIAMETER MINUS 1/2 INCH THROUGH EACH CONDUIT. THE MANDREL SHALL BE LEAD-COVERED OR PAINTED WHITE SO THAT IT WILL INDICATE ANY PROTRUSION ON THE INSIDE OF THE CONDUIT.

B. PRECAST HANDHOLES AND PULL BOXES INSTALLATION
- B.1. INSTALL PRECAST HANDHOLES AND PULL BOXES ON A SOLID RING OF BASE MATERIAL SUCH AS CONCRETE AROUND THE OUTER EDGE TO PREVENT SETTLEMENT. THE BASE MATERIAL SHALL INCLUDE OPENINGS THAT ALLOW DRAINAGE FROM THE BOX INTO THE SOIL. SET BOXES PLUMB AND ELEVATE SLIGHTLY ABOVE SURROUNDING GRADE TO PREVENT THEM FROM BECOMING THE WATER COLLECTION POINTS. SEAL CONDUIT ENDS TO PREVENT DEBRIS FROM ENTERING THE RACEWAY.

BID SET

COMMONWEALTH OF MASSACHUSETTS
ALIREZA HEIDARIABHARI
ELECTRICAL
No. 45422
REGISTERED PROFESSIONAL ENGINEER
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Attention:
0 1"
If this scale bar does not measure 1" then drawing is not original scale.

NO.	DATE	ISSUE/REVISION	APP
0	9/25/2019		

GEI Consultants

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Checked:	ARH
Drawn:	ZL
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Town of Chatham
549 Main Street
Chatham, MA 02633

GEI Project 1900325

Trap Dock Reconstruction
Chatham, MA

ELECTRICAL SPECIFICATIONS II

DWG. NO. E-02

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ELECTRICAL SPECIFICATIONS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS:

A. INSTALL ALL NEW WORK IN A NEAT WORKMANLIKE MANNER READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR.

B. CODES, PERMITS AND INSPECTIONS:
1. ALL WORK SHALL COMPLY WITH REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE, APPLICABLE STATE BUILDING CODE, TOWN, AND ALL AUTHORITIES HAVING JURISDICTION AND APPLICABLE NATIONAL, STATE AND LOCAL CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK SHALL BE INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS. FURNISH AND INSTALL UNDERWRITERS LABORATORIES INC. (UL) LABELED DEVICES THROUGHOUT THE PROJECT AREA. CONTRACTOR IS TO INFORM ENGINEER, ARCHITECT, AND BUILDING MANAGEMENT OF ANY EXISTING WORK OR MATERIALS WHICH VIOLATE ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED AT CONTRACTOR'S EXPENSE BY THIS CONTRACTOR AND AT NO EXPENSE TO THE OWNER.

C. SITE VERIFICATION:
1. PRIOR TO SUBMISSION OF THE BID, THIS CONTRACTOR SHALL VISIT THE JOB SITE TO ASCERTAIN THE ACTUAL FIELD CONDITIONS AS THEY RELATE TO THE WORK AS INDICATED ON THE DRAWINGS AND DESCRIBED HEREIN. DISCREPANCIES, IF ANY, SHALL BE BROUGHT TO THE ARCHITECT/ENGINEER'S ATTENTION PRIOR TO SUBMISSION OF HIS BID, AND IF NOT RESOLVED TO SATISFACTION, SHALL BE SUBMITTED AS A WRITTEN QUALIFICATION OF THE BID. SUBMISSION OF A BID SHALL BE EVIDENCE OF SITE VERIFICATION HAS BEEN PERFORMED AS DESCRIBED ABOVE.

D. CONTRACT DOCUMENTS:
1. PRIOR TO SUBMISSION OF A FORMAL BID, THIS CONTRACTOR SHALL REVIEW ALL DRAWINGS OF THE ENTIRE PROJECT INCLUDING GENERAL CONSTRUCTION, DEMOLITION, ARCHITECTURAL, MECHANICAL, PLUMBING AND SPRINKLER AND HE SHALL NOTIFY THE CONSTRUCTION MANAGER OF WORK REQUIRED IN THE BID WHICH IS INDICATED OR IMPLIED IN OTHER SECTIONS OF THE WORK.
2. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF WORK AND APPROXIMATE LOCATION OF EQUIPMENT. REFER TO ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS AND COORDINATE FINAL LOCATIONS OF SWITCHES LIGHT FIXTURES, RECEPTACLES ETC. WORK SHALL BE COORDINATED WITH OTHER TRADES TO AVOID CONFLICTS.
3. IF A CONFLICT OCCURS IN THE SPECIFICATIONS AND/OR ON THE DRAWINGS THAT HAS NOT BEEN ADDRESSED BEFORE THE BID, OR THE DOCUMENTS ARE UNCLEAR, THE MORE STRINGENT SITUATION SHALL APPLY.
4. ANY EQUIPMENT, SUPPORTS, PARTS, MATERIALS, ACCESSORIES, OR LABOR THAT IS NECESSARY FOR PROPER PERFORMANCE OF THE ELECTRICAL WORK, ALTHOUGH NOT SPECIFICALLY MENTIONED HEREIN OR SHOWN ON THE DRAWINGS, SHALL BE FURNISHED AND INSTALLED AS IF CALLED FOR IN DETAIL WITHOUT ADDITIONAL COST.

E. GUARANTEE:
1. ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE OF THIS WORK. FINAL ACCEPTANCE SHALL BE DEFINED AS THE TIME AT WHICH THE ELECTRICAL WORK IS TAKEN OVER AND ACCEPTED BY THE OWNER, AND IS UNDER CARE, CUSTODY, AND CONTROL OF THE OWNER. ENGAGE THE SERVICES OF VARIOUS MANUFACTURERS SUPPLYING THE EQUIPMENT FOR THE PROPER STARTUP AND OPERATION OF ALL SYSTEMS INSTALLED. INSTRUCT THE OWNER'S PERSONNEL IN THE PROPER OPERATION AND SERVICING OF THE EQUIPMENT.
2. THE CONTRACTOR SHALL PROVIDE AS A REQUIREMENT OF THE BID SUBMISSION A GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY W0RKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN THE GUARANTEE PERIOD. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY AND PAY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THIS CONTRACTOR.
3. THIS CONTRACTOR IS RESPONSIBLE FOR THE MAINTENANCE AND OPERATION OF ALL SYSTEMS UNTIL THE FINAL ACCEPTANCE OF THE WORK.

F. DEFINITIONS:
1. "ELECTRICAL CONTRACTOR", "THIS CONTRACTOR" - THE PARTY OR PARTIES HAVE BEEN DULY AWARDED THE CONTRACT FOR AND ARE THEREBY MADE RESPONSIBLE FOR THE ELECTRICAL WORK AS DESCRIBED HEREIN.
2. "THIS CONTRACT", "THE CONTRACT" - THE AGREEMENT COVERING THE WORK TO BE PERFORMED BY "THIS CONTRACTOR".
3. "APPROVED", "EQUAL", "SATISFACTORY", "ACCEPTED", "ACCEPTABLE", "EQUIVALENT" - ACCEPTABLE FOR USE ON THE PROJECT, AS DETERMINED BY THE ENGINEER BASED ON DOCUMENTS PRESENTED FOR SUCH DETERMINATION.
4. "THESE SPECIFICATIONS", "THIS SECTION, PART, DIVISION" (OF THE SPECIFICATION) - THE DOCUMENT SPECIFYING THE WORK TO BE PERFORMED BY "THIS CONTRACTOR".
5. "THE ELECTRICAL WORK", "THIS WORK", - ALL LABOR MATERIALS EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES, AND OTHER ITEMS REQUIRED FOR A PROPER AND COMPLETE INSTALLATION BY THE ELECTRICAL CONTRACTOR.
6. "ARCHITECT", "ENGINEER", "OWNER'S REPRESENTATIVE" - THE PARTY OR PARTIES RESPONSIBLE FOR INTERPRETING, ACCEPTING AND OTHERWISE RULING ON THE PERFORMANCE UNDER THIS CONTRACT.
7. "FURNISH" - PURCHASE AND DELIVER TO THE PROJECT SITE COMPLETE WITH EVERY NECESSARY APPURTENANCE AND SUPPORT, ALL AS PART OF THE ELECTRICAL WORK.
8. "INSTALL" - UNLOAD AT THE DELIVERY POINT AT THE SITE AND PERFORM EVERY OPERATION NECESSARY TO ESTABLISH SECURE MOUNTING INSTALLATION AND CORRECT OPERATION AT THE PROPER LOCATION IN THE PROJECT, ALL AS PART OF THE ELECTRICAL WORK.
9. "PROVIDE" - "FURNISH" AND "INSTALL".
10. "NEW" - MANUFACTURED WITHIN THE PAST TWO YEARS AND NEVER BEFORE USED.
11. "RELOCATE" - MOVE EXISTING EQUIPMENT/DEVICES/FIXTURE AND ALL ACCESSORIES AS REQUIRED, INCLUDING THE EXTENSION OF EXISTING OR PROVIDING NEW CIRCUIT/CONDUCTORS/WIRING AS REQUIRED.

PART 1 - GENERAL (CONT)

1.02 SCOPE OF WORK:

A. PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, AND CONTRACTOR'S SERVICES NECESSARY FOR COMPLETE, SAFE INSTALLATION OF ALL ELECTRICAL WORK IN FULL CONFORMITY WITH REQUIREMENTS OF NATIONAL ELECTRIC CODE AND APPLICABLE STATE BUILDING CODES AND OF ALL AUTHORITIES HAVING JURISDICTION. THE SCOPE OF WORK SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:
1. INSTALLATION OF LIGHT FIXTURES AND LAMPS INCLUDING EXIT AND EMERGENCY LIGHTING.
2. INSTALLATION OF WALL SWITCHES, RECEPTACLES, VOICE/DATA OUTLETS, ETC.
3. INSTALLATION OF NEW RACEWAY AND CONDUCTORS FOR LIGHTING AND POWER.
4. CUTTING, CHANNELING AND CHASING REQUIRED TO ACCOMMODATE THE ELECTRICAL INSTALLATION AND ROUGH PATCHING.
5. ADDITION OR MODIFICATION OF EXISTING ELECTRICAL DISTRIBUTION EQUIPMENT.
6. INSTALLATION OF CONDUIT, JUNCTION BOXES, PULL BOXES, ETC. REQUIRED FOR THE AFOREMENTIONED EQUIPMENT.
7. MAINTENANCE AND PROPER OPERATION OF EXISTING BASE BUILDING SYSTEMS WITHIN THE CONTRACT AREA IN ACCORDANCE WITH THE REQUIREMENTS OF TOWN.
9. TEMPORARY LIGHT AND POWER DURING CONSTRUCTION.
10. GROUNDING OF ALL EQUIPMENT AS REQUIRED BY CODE AND AS SPECIFIED.

1.03 COORDINATION WITH TOWN:

A. THIS CONTRACTOR IS TO OBTAIN A COPY OF THE BUILDING RULES AND REGULATIONS PRIOR TO BID SUBMISSION TO DETERMINE REQUIREMENTS AND THE EXTENT OF PREMIUM TIME WORK REQUIRED BY THE BUILDING. FOR THE PURPOSE OF THE CONTRACTOR'S BID ASSUME ANY NOISY WORK (E.G. CHOPPING, CORE DRILLING ETC.) AND BASE BUILDING SYSTEM INTERRUPTIONS PERFORMED OUTSIDE NORMAL BUSINESS HOURS.

B. THIS CONTRACTOR IS RESPONSIBLE FOR ADHERING TO THE BUILDING OWNER'S RULES AND REGULATIONS. ANY DISCREPANCIES BETWEEN THE CONTRACT DOCUMENTS AND THE BUILDING RULES AND REGULATIONS SHALL BE SUBMITTED IN WRITING TO THE ARCHITECT/ENGINEER FOR REVIEW, WITH BID SUBMISSION.

C. COORDINATE WITH TOWN FOR ANY SERVICE INTERRUPTION OF EXISTING SYSTEMS AND GIVE NOTICE AS REQUIRED BY BUILDING A MINIMUM OF TWO (2) DAYS PRIOR TO ANY WORK. CONTRACTOR IS TO NOTIFY CONSTRUCTION MANAGER/GENERAL CONTRACTOR BEFORE PERFORMING WORK ON PREMIUM TIME, IF SO DIRECTED BY OWNER OR TOWN, SO AS NOT TO DISTURB EXISTING TENANTS ON OTHER FLOORS.

1.04 SHOP DRAWINGS:

A. SUBMIT SHOP DRAWINGS CERTIFIED BY ALL TRADES THAT COORDINATION HAS BEEN ESTABLISHED. SUBMIT ALL CERTIFIED EQUIPMENT CUTS WITH CONSTRUCTION WIRING DIAGRAMS. SHOP DRAWINGS SUBMISSION SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:
1. DISTRIBUTION EQUIPMENT
2. OVERCURRENT PROTECTIVE DEVICES (SWITCHES AND BREAKERS).
3. LIGHTING FIXTURES.
4. WIRING DEVICES.
5. GROUNDING SYSTEM COMPONENTS.
6. CONDUITS, WIRE AND CABLES.

B. THE QUANTITY OF SHOP DRAWINGS SHALL AS A MINIMUM BE FOUR (4) COPIES OF 8 1/2"x 11" SUBMISSIONS AND FOUR (4) PRINTS OF ALL DRAWINGS. SPECIFIC JOB REQUIREMENTS MAY BE MORE STRINGENT AND CONTRACTOR IS RESPONSIBLE TO OBTAIN REQUIREMENTS FROM CONSTRUCTION MANAGER, GENERAL CONTRACTOR OR ARCHITECT.

C. WHERE ELECTRONIC SUBMISSIONS ARE ALLOWED BY ARCHITECT, SUBMIT PDF VERSIONS OF THE SHOP DRAWINGS.

1.05 MAINTENANCE MANUALS:

A. SUBMIT FOUR (4) LOOSE-LEAF BOUND OPERATING AND MAINTENANCE MANUALS WITH INDEX AND INDEX TABS TO INCLUDE THE FOLLOWING:
- A.1. OPERATING AND MAINTENANCE INSTRUCTIONS ON ALL SYSTEMS.
- A.2. MANUFACTURERS' CATALOG CUTS ON ALL EQUIPMENT.
- A.3. ALL ITEMS SUBMITTED FOR REVIEW IN SHOP DRAWING SECTION.

B. WHERE ELECTRONIC SUBMISSIONS ARE ALLOWED BY ARCHITECT, SUBMIT PDF VERSIONS OF THE SHOP DRAWINGS.

1.06 AS-BUILT DRAWINGS:

A. CONTRACTOR SHALL MAINTAIN RECORD DRAWING PRINTS ON JOB SITE AND RECORD, AT TIME OF OCCURRENCE, DEVIATIONS FROM CONTRACT DOCUMENTS DUE TO FIELD COORDINATION, BULLETINS, OR ADDENDA.

B. CONTRACTOR SHALL REVISE SHOP DRAWINGS TO CONFORM TO RECORD DRAWINGS AND SUBMIT AS-BUILT CONDITION (DEVICES, EQUIPMENT, CIRCUITRY, ETC.) DRAWINGS UPON COMPLETION OF THE PROJECT. FINAL SUBMISSION OF AS-BUILT DRAWINGS ARE TO BE SIGNED AND CERTIFIED BY INSTALLING CONTRACTOR THAT THIS IS THE AS-BUILT CONDITION OF THE WORK. AS-BUILT DRAWINGS SHALL BE PRODUCED ON AUTOCAD VERSION 2014 OR LATER.

1.07 SUBSTITUTIONS:

A. NO SUBSTITUTE MATERIAL OR MANUFACTURER OF EQUIPMENT SHALL BE PERMITTED WITHOUT A FORMAL WRITTEN SUBMITTAL TO THE ENGINEER WHICH INCLUDES ALL DIMENSIONAL, PERFORMANCE AND MATERIAL SPECIFICATIONS. ANY CHANGES IN LAYOUT, MECHANICAL CHARACTERISTICS, STRUCTURAL REQUIREMENTS, OR DESIGN DUE TO THE USE OF A SUBSTITUTION SHALL BE SUBMITTED TO THE ENGINEER AS PART OF THIS PROPOSAL. THE CONTRACTOR TAKES FULL RESPONSIBILITY FOR THE SUBSTITUTION AND ALL CHANGES RESULTING FROM SUBSTITUTION. ALL ITEMS SHALL BE SUBMITTED FOR REVIEW IN CONJUNCTION WITH THE SUBMITTAL OF THE ALTERNATE. ANY SUBSTITUTION MUST BE SUBMITTED WITH AN EXPLANATION WHY A SUBSTITUTION IS BEING UTILIZED. IF THE SUBSTITUTED ITEM DEVIATES FROM THE SPECIFIED ITEM, THOSE DEVIATIONS ARE TO BE IDENTIFIED ON A LINE BY LINE BASIS. IF THE SUBSTITUTE IS BEING UTILIZED FOR FINANCIAL REASONS, THE ASSOCIATED CREDIT MUST BE SIMULTANEOUSLY SUBMITTED.

B. ALL SUBSTITUTED EQUIPMENT SHALL CONFORM TO SPACE REQUIREMENTS AND PERFORMANCE REQUIREMENTS SHOWN ON CONTRACT DOCUMENTS. CONTRACTOR SHALL REPLACE ANY EQUIPMENT THAT DOES NOT MEET THESE REQUIREMENTS AT HIS OWN EXPENSE. ANY MODIFICATIONS TO ASSOCIATED SYSTEMS OR ADDITIONAL COSTS ATTRIBUTED TO THIS SUBSTITUTION SHALL BE AT THIS CONTRACTOR'S EXPENSE.

C. CONTRACTOR SHALL SUBMIT BID BASED ON SPECIFIED ITEMS AND SHALL SUPPLY AS AN ALTERNATE PRICE ANY SUBSTITUTIONS.

PART 2 - PRODUCTS

2.01 PANELBOARDS:

A. PANELBOARD SHALL BE CUTLER HAMMER PRL-4 NEMA 4X MARINA POWER APPLICATION PANEL BOARD OR ENGINEER APPROVED EQUAL FROM SQUARED-D, ABB, SIEMENS

B. BRANCH CIRCUIT PANELS SHALL BE BOLT_IN CIRCUIT BREAKER TYPE WITH COPPER BUSSING. PANELS SHALL BE FITTED WITH FLUSH LIFT LATCHES AND LOCKS KEYED ALIKE. DELIVER ALL PANEL KEYS AT COMPLETION OF THE PROJECT.

C. BRANCH CIRCUIT BREAKERS SHALL BE IDENTIFIED WITH INDIVIDUAL CIRCUIT NUMBERS ADJACENT TO EACH BREAKER AND WITH A TYPEWRITTEN CARD TO IDENTIFY THE LOAD CONTROLLED BY THAT BREAKER.

D. PANELS SHALL HAVE MAIN CIRCUIT BREAKERS, SIZED AS SCHEDULED, MOUNTED BEHIND DOOR AT TOP OF PANEL (BACK FEEDING OF BRANCH BREAKER IS NOT ACCEPTABLE).

E. WIRING GUTTERS SHALL BE A MINIMUM OF 4 INCHES WIDE EXCEPT WHERE FEEDER CONDUCTORS ENTER, WHERE A MINIMUM OF 6 INCHES CLEARANCE SHALL BE PROVIDED. FEEDER CONDUCTORS SHALL ENTER DIRECTLY IN LINE WITH LUG TERMINALS WHEREVER PRACTICABLE. PROVIDE SEPARATE FEEDER LUGS AND STUDS FOR EACH FEEDER CONDUCTOR.

F. PANELS SHALL HAVE DOOR-IN-DOOR CONSTRUCTION. FLUSH PANELS SHALL HAVE FLUSH DOORS WITH CONCEALED HINGES AND MOUNTING CLAMPS. SURFACE PANELS SHALL HAVE METAL FACE TRIMS WITH NO SHARP EDGES OR CORNERS. FACTORY FINISHED SURFACE PANEL TUBS SHALL MATCH FACE TRIM.

G. PANELS SHALL HAVE A GROUNDING BUS WITH TERMINATION CAPACITY FOR THE GROUNDING CONDUCTOR SIZED FOR THE BRANCH CIRCUIT EQUIPMENT GROUNDING CONDUCTORS AS SHOWN OR NOTED. ISOLATED GROUND BUS SHALL BE INSULATED FROM THE PANEL CABINET.

H. PROVIDE MOUNTING BRACKETS, BUS CONNECTIONS, AND NECESSARY APPURTENANCES REQUIRED FOR FUTURE INSTALLATION OF DEVICES.

2.02 DISCONNECT SWITCHES:

A. UNLESS OTHERWISE NOTED, DISCONNECT SWITCHES SHALL BE "QUICK-MAKE, QUICK-BREAK," HEAVY DUTY TYPE IN NEMA 1 ENCLOSURES FUSED OR UNFUSED AS INDICATED ON THE DRAWINGS. PROVIDE ALL FUSES AS REQUIRED. PROVIDE WEATHERPROOF NEMA 4X RATED DISCONNECT SWITCHES WHERE INSTALLED OUTDOORS OR IN INDOOR WET/DAMP LOCATIONS.

2.03 CIRCUIT BREAKERS:

A. FOR PANELBOARD APPLICATIONS, CIRCUIT BREAKERS SHALL BE BOLTED TO THE PANELBOARD BUS BARS. WHERE CIRCUIT BREAKERS ARE INSTALLED IN EXISTING PANELBOARD BREAKERS SHALL BE OF THE SAME MANUFACTURER AND BE COMPATIBLE WITH EXISTING PANELBOARD. FOR STAND ALONE APPLICATIONS, CIRCUIT BREAKERS SHALL BE IN A NEMA 1 ENCLOSURE.

C. CIRCUIT BREAKERS SHALL BE MOLDED CASE, THERMAL MAGNETIC OR SOLID STATE TYPE AS REQUIRED TO PROVIDE COORDINATION. BREAKERS SHALL HAVE SHORT CIRCUIT CAPACITY RATING TO WITHSTAND THE MAXIMUM SHORT CIRCUIT DUTY WHICH CAN BE EXPECTED AT THE BREAKER LOCATION IN THE ELECTRICAL SYSTEM. BREAKERS MOUNTED IN BRANCH PANELBOARDS SHALL BE OF THE BOLT-ON TYPE. MINIMUM SHORT CIRCUIT RATING FOR ANY CIRCUIT BREAKER: 1[illegible]000 AIC FOR 120V AND 208V BREAKERS.

D. ANY CIRCUIT BREAKERS MADE AVAILABLE DUE TO DEMOLITION SHALL BE DESIGNATED AS SPARE ON PANELBOARD DIRECTORIES AND PUT INTO THE OFF POSITION.

2.04 RACEWAYS:

A. ALL WIRES SHALL BE RUN IN CONDUIT AS SPECIFIED HEREINAFTER, AND EACH LENGTH OF CONDUIT SHALL BEAR THE MAKER'S TRADEMARK OR STAMP. THE PLANS INDICATE THE GENERAL LOCATION OF OUTLET BOXES AND CIRCUITING. THE CONDUIT RUNS FOR THESE CIRCUITS MAY BE MODIFIED AT THE TIME OF INSTALLATION TO ADAPT SAME TO BUILDING CONSTRUCTION.

B. FOR ALL SIZES OF CONDUIT LARGER THAN 1 1/4", USE STANDARD ELBOW; IN SMALLER SIZES, FIELD BENDS WILL BE PERMITTED INSTEAD OF USING MANUFACTURED ELBOWS BUT CARE MUST BE TAKEN NOT TO DAMAGE THE CONDUIT. THE RADIUS OF THE INNER CURVE OF ANY BEND SHALL NOT BE ANY LESS THAN THAT PERMITTED BY CODE.

C. CONDUIT SHALL BE SECURELY FASTENED IN PLACE AND HANGERS, SUPPORTS OR FASTENINGS SHALL BE PROVIDED AT EACH ELBOW AND AT EACH END OF EACH STRAIGHT RUN TERMINATED AT A BOX OR CABINET. WHERE RISER CONDUITS PIERCE FLOOR SLABS, THEY SHALL REST ON EACH FLOOR WITH APPROVED BEAM CLAMPS, PIPE STRAPS OR HEAVY IRON TIES WIRED TO THE STRUCTURAL MEMBERS SUPPORTING EQUIPMENT. SIZE AND TYPE OF ANCHOR SHALL BE BASED ON THE COMBINED WEIGHTS OF CONDUIT, HANGER AND CABLES. ALL HANGERS AND RODS SHALL BE PAINTED WITH ONE COAT OF ENAMEL.

D. INSTALL CONDUIT EXPANSION FITTINGS IN EACH CONDUIT RUN WHEREVER IT CROSSES AN EXPANSION JOINT AND WHEREVER THE CONDUIT LENGTH EXCEEDS 200 FEET.

E. UNLESS OTHERWISE INDICATED OR SPECIFIED, ALL WIRING SHALL BE INSTALLED CONCEALED IN CEILINGS, WALLS, SLABS, PIPE CHASES, AND FURRED SPACES WHEREVER POSSIBLE.

F. GALVANIZED RIGID STEEL CONDUIT (GRSC):HEAVY WALL CONSTRUCTION, MANUFACTURED IN CONFORMANCE WITH ANSI C80.1 AND LISTED AS UL 6 APPROVED.

G. PVC COATED RIGID STEEL CONDUIT AND FITTINGS: ANSI C80.1 HOT-DIPPED GALVANIZED RIGID STEEL CONDUIT WITH AN EXTERNAL 0.040" MINIMUM PVC PROTECTIVE COATING PER NEMA STANDARD RN 1. BOTH ENDS OF CONDUIT SHALL BE THREADED WITH THREAD PROTECTORS, FACTORY-INSTALLED. FITTINGS SHALL BE THREADED TYPE ANSI C80.4, HOT-DIPPED GALVANIZED, WITH A 0.055" MINIMUM PVC PROTECTIVE COATING. PVC COATING ON FITTINGS SHALL MATCH THE COATING ON THE PVC COATED CONDUIT.

H. LIQUID-TIGHT, FLEXIBLE METAL CONDUIT: CONDUIT SHALL HAVE A GROUND WIRE. ALUMINUM OR GALVANIZED FLEXIBLE METAL CONDUIT SHALL HAVE A POLYVINYLCHLORIDE CHEMICAL RESISTANT JACKET IN CONFORMANCE WITH THE REQUIREMENTS OF UL 360. ACCEPTABLE MANUFACTURERS ARE SEALTIGHT, OR EQUAL.

I. POLYVINYLCHLORIDE (PVC) CONDUIT: PVC CONDUIT SHALL BE TYPE II, IN CONFORMANCE WITH NEMA TC2 AND THE FOLLOWING:
- I.1. SCHEDULE 80, HIGH IMPACT.
- I.2. SUITABLE FOR USE WITH 90ºC RATED WIRE.
- I.3. CONFORM TO UL STANDARD 65L AND CARRY APPROPRIATE UL LISTING FOR ABOVE AND BELOW GROUND USE.
- I.4. WHERE INDOOR APPLICATIONS ARE NOT EXPOSED TO PHYSICAL DAMAGE, SCHEDULE 80 PVC CONDUIT IS SPECIFICALLY ALLOWED.

J. THREADED FITTINGS SHALL BE USED WITH RIGID CONDUIT.

K. EMPTY CONDUIT FOR NEW COMMUNICATION AND DATA OUTLETS IN PARTITIONS SHALL BE 1" THIN WALL RUN CONCEALED IN WALLS, TERMINATED AND BUSHED 6" INTO ACCESSIBLE HUNG CEILING AND DIRECTED TOWARDS PARTICULAR COMMUNICATION/DATA ROOM OR CLOSET. ELECTRIFIED FURNITURE SHALL RECEIVE 1 1/4" CONDUIT. PROVIDE PULLSTRING IN EACH CONDUIT.

L. ALL METAL CONDUIT TERMINATING IN A METAL ENCLOSURE SHALL HAVE AN INSULATED BUSHING. PROVIDE "GROUNDING" TYPE BUSHING WHERE REQUIRED.

PART 2 - PRODUCTS (CONTINUED)

2.05 WIRE AND CABLE:

A. THE TYPE, SIZE, AND NUMBER OF CONDUCTORS SHALL BE AS SPECIFIED ON THE DRAWINGS OR SCHEDULES. ALL CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH THE NEC TO LIMIT VOLTAGE DROP TO 3 PERCENT.

B. ALL CONDUCTORS SHALL BE SOFT 98% MINIMUM CONDUCTIVITY PROPERLY REFINED COPPER, TYPE THHN/THWN INSULATED. ALL CONDUCTORS SHALL HAVE 600 VOLT RATED INSULATION UNLESS OTHERWISE NOTED.

C. THE MINIMUM WIRE SIZE FOR BRANCH CIRCUITS SHALL BE NO. 12 AWG. REFER TO DRAWING NOTES FOR ADDITIONAL REQUIREMENTS.

D. UNLESS SPECIFIED OTHERWISE, ALL WIRES #12 AWG AND SMALLER SHALL BE SOLID, CONDUCTORS #10 AWG AND LARGER SHALL BE STRANDED.

E. COLOR CODING SHALL BE BUILDING STANDARD. WHERE NO BUILDING STANDARD EXISTS, FACTORY COLOR CODING SHALL BE AS FOLLOWS:
1. 120/208 VOLT SYSTEM: PHASE 'A' - BLACK, PHASE 'B' - RED, PHASE 'C' - BLUE, NEUTRAL - GREY, EQUIPMENT GROUND - GREEN.

G. INSTALL AND CONNECT UP COMPLETE CONDUCTORS FOR ALL CIRCUITS AND WIRING SYSTEMS

H. CONNECTORS SHALL BE ONE PIECE TOOL APPLIED COMPRESSION TYPE OF CORRECT SIZE AND UL LISTED FOR THE SPECIFIC APPLICATION. CONNECTORS SHALL BE TIN PLATED ELECTROLYTIC COPPER. CONNECTORS FOR WIRES NO. 10 AWG AND SMALLER SHALL BE SELF-INSULATING RING TONGUE OR LOCKING SPADE TERMINALS. CONNECTORS FOR NO. 8 AWG AND LARGER SHALL BE ONE HOLE LUGS UP TO SIZE NO. 3/0 AWG AND TWO HOLE OR FOUR HOLE LUGS FOR SIZE NO. 4/0 AND LARGER. MECHANICAL CLAMP OR SCREW TYPE CONNECTORS ARE NOT ACCEPTABLE.

I. 120-VOLT BRANCH CIRCUIT CONDUCTOR SPLICES: LIVE SPRING TYPE, SCOTCH LOK, IDEAL WING NUT; SELF STRIPPING TYPE, 3M SERIES 560; OR EQUAL.

J. ONLY USE IN LINE SPLICES AND TAPS WHERE SPECIFICALLY CALLED FOR ON THE DRAWINGS OR BY WRITTEN CONSENT OF THE PORT. SPLICES SHALL BE COMPRESSION TYPE, MADE WITH A COMPRESSION TOOL DIE APPROVED FOR THE PURPOSE, AS MADE BY THOMAS AND BETTS CORP., OR EQUAL. SPLICE SHALL BE COVERED WITH A HEAT SHRINKABLE SLEEVE OR BOOT.

K. NO CONDUCTORS SHALL BE PULLED INTO ANY CONDUIT RUN BEFORE ALL CONDUIT JOINTS ARE MADE UP TIGHTLY, AND THE ENTIRE RUN IS SECURED IN PLACE. WHEN REQUIRED TO EASE THE PULLING OF WIRES INTO CONDUIT, USE POWDERED SOAPSTONE, MINERALLAC #100 OR APPROVED EQUAL BY THOMAS AND BETTS.

L. TAG ALL FEEDERS IN ALL PULL BOXES, GUTTER SPACES, AND WIREWAYS THROUGH WHICH THEY PASS.

M. TERMINATE STRANDED CONDUCTORS #6 AWG AND LARGER AT SWITCHBOARDS, TRANSFORMERS, UPS SYSTEMS WITH COMPRESSION TYPE CONNECTORS. AT PANELBOARDS TERMINATE WITH MECHANICAL LUGS.

N. JOIN OR TAP STRANDED CONDUCTORS (#6 AWG AND LARGER) WITH PRESSURE INDENT TYPE CONNECTORS - BURNDY.

2.06 WIRING DEVICES:

A. WIRING DEVICES SHALL BE INDUSTRIAL GRADE UNLESS OTHERWISE NOTED. ALL DEVICES SHALL BE FLUSH MOUNTED UNLESS OTHERWISE NOTED.

B. SINGLE POLE SWITCHES SHALL BE 120/277 VOLTS, RATED AT 20 AMPERES, QUIET OPERATION TYPE. FINISH OF TOGGLE AND DEVICE PLATE AS DIRECTED BY ARCHITECT.

C. THREE WAY SWITCHES SHALL BE 120/277 VOLT, 20 AMPERES.

D. STANDARD RECEPTACLES SHALL BE 120 VOLT, 20 AMP, 2 POLE GROUNDING TYPE. MOUNT WITH GROUND OR NEUTRAL PIN ORIENTED DOWN.

E. SWITCH AND RECEPTACLE PLATES SHALL BE PLUMB AND SHALL FIT FLAT AGAINST THE WALL.

F. MULTIPLE DEVICES AT A COMMON LOCATION SHALL BE INSTALLED IN A COMMON MULTIGANG BOX WITH A COMMON FACEPLATE.

2.07 LIGHT FIXTURES:

A. ALL LIGHT FIXTURE AND POLES SHALL MATCH OTHERS IN THE EXISTING DOCK AREA AND BE COORDINATED CHATHAM HARBOR MASTER AND GEI. REFER TO LIGHTING SCHEDULE FOR QUANTITIES AND CATALOG NUMBER.

B. WHERE NECESSARY, INSTALL HEAT RESISTANT NON-RUBBER GASKETS TO PREVENT LIGHT LEAKS AND MOISTURE ENTRY INTO FIXTURE.

C. ALL LIGHT FIXTURES SHALL BE SUITABLE FOR HARSH MARINA ENVIRONMENTS

2.08 PULLBOXES, JUNCTION BOXES AND OUTLET BOXES:

A. PULLBOXES, JUNCTION BOXES AND OUTLET BOXES SHALL BE MANUFACTURED FROM STAINLESS STEEL/INDUSTRY STANDARD GAUGE SHEET STEEL.

B. PROVIDE PULL BOXES AND JUNCTION BOXES IN LONG STRAIGHT RUNS OF RACEWAY TO ASSURE THAT CABLES ARE NOT DAMAGED WHEN THEY ARE PULLED, TO FULFILL REQUIREMENTS AS TO THE NUMBER OF BENDS PERMITTED IN RACEWAY BETWEEN CABLE ACCESS POINTS, THE ACCESSIBILITY OF CABLE JOINTS AND SPLICES, AND THE APPLICATION OF CABLE SUPPORTS.

C. PULLBOXES AND JUNCTION BOXES SHALL BE SIZED SO THAT THE MINIMUM BENDING RADIUS CRITERIA SPECIFIED FOR THE WIRES AND CABLE ARE MAINTAINED.

D. SWITCH RECEPTACLE AND WALL OUTLET BOXES SHALL BE A NOMINAL 4 INCH SQUARE, 1 1/2 INCH OR 2 1/8 INCH DEEP AS REQUIRED BY CODE WITH A RAISED COVER, UNLESS OTHERWISE INDICATED ON THE DRAWING. PROVIDE 3/8 INCH FIXTURE STUD AS REQUIRED. GANGED OUTLET BOXES SHALL BE SUFFICIENT LENGTH TO SUIT CONDITIONS.

E. LIGHTING FIXTURE BOXES SHALL BE 4 INCH OCTAGON WITH 3/8 INCH FIXTURE STUD. FOR SUSPENDED CEILING WORK, PROVIDE A 4 INCH OCTAGON BOX WITH REMOVABLE BACKPLATE WHERE REQUIRED.

F. INCLUDE ALL REQUIRED JUNCTION/PULL BOXES AND OUTLET BOXES REGARDLESS OF INDICATIONS ON THE DRAWINGS (WHICH DUE TO SYMBOLIC METHODS OF NOTATION, MAY NOT SHOW ALL THAT ARE ACTUALLY REQUIRED).

G. PULL/JUNCTION BOX BARRIERS SHALL BE PROVIDED FOR SYSTEMS AS FOLLOWS:
- G.1. BETWEEN NORMAL AND EMERGENCY WIRING.

H. BARRIERS IN JUNCTION AND PULL BOXES SHALL BE OF CONDUCTIVE MATERIAL OF ADEQUATE THICKNESS FOR MECHANICAL STRENGTH BUT IN NO CASE LESS THAN 1/8". EACH BARRIER SHALL HAVE AN ANGLE IRON FRAMING SUPPORT ALL AROUND.

I. ALL EQUIPMENT, DEVICE BOXES, JUNCTION BOXES, PULLBOXES AND OUTLET BOXES SHALL BE INSTALLED SO AS TO ALLOW ACCESS TO THE BOX. IF NECESSARY AND APPROVED BY ARCHITECT, PROVIDE ACCESS DOOR OR COVERPLATES IN AREAS WHERE UNOBSTRUCTED ACCESS IS NOT POSSIBLE.

PART 2 - PRODUCTS (CONTINUED)

J. CAST FERROUS ALLOY BOXES (OUTSIDE LOCATIONS):
- J.1. HOT-DIPPED GALVANIZED CAST FERROUS ALLOY UNLESS OTHERWISE SPECIFIED.
- J.2. CONDUIT ENTRANCES SHALL BE INTEGRALLY CAST THREADED HUBS OR BOSSES AND SHALL PROVIDE FOR FULL 5-THREADED CONTACT ON TIGHTENING. DRILLING AND TREADING SHALL BE DONE BEFORE GALVANIZING.
- J.3. DEVICE COVERS SHALL BE SUITABLE FOR BOXES, WITH FULL-BODY NEOPRENE GASKETS TO FIT THE DEVICES AND BOXES USED.
- J.4. COVER PLATES SHALL BE HOT-DIPPED GALVANIZED CAST FERROUS ALLOY UNLESS THE PARTICULAR DEVICE REQUIRES A COVER THAT IS NOT MANUFACTURED IN THIS MATERIAL.
- J.5. TYPE 304 STAINLESS STEEL SCREWS SHALL BE PROVIDED FOR COVERS.
- J.6. WHERE TWO OR MORE DEVICES ARE LOCATED TOGETHER, OUTLET AND DEVICE BOXES SHALL BE GANG TYPE.
- J.7. DEVICE BOXES SHALL BE FD BOXES AS MANUFACTURED BY CROUSE-HINDS, APPLETON, OR EQUAL.

K. PULL BOXES(OUTSIDE LOCATIONS):
- K.1. BOXES BE FABRICATED FROM STAINLESS STEEL PLATING. THE THICKNESS OF THE STEEL PLATING SHALL CONFORM TO THE REQUIREMENTS OF JIC. FURNISH AND INSTALL A GROUNDING PAD DRILLED FOR TWO-BOLTED GROUNDING LUGS OR WITH A GROUNDING STUD WELDED TO THE INSIDE OF THE BOX.
- K.2. PROVIDE 316 STAINLESS STEEL HARDWARE.
- K.3. BOXES SHALL, AS A MINIMUM, MEET NEMA 12 AND JIC REQUIREMENTS AND SHALL BE NEMA 4X WHERE EXPOSED TO WEATHER OR WATER.
- K.4. GALVANIZED SHEET STEEL BOXES MAY BE USED IN PROTECTED AREAS WHERE ELECTRICAL METALLIC TUBING IS SPECIFIED. BOXES SHALL BE A MINIMUM OF 4 INCHES SQUARE.
- K.5. BOXES SHALL HAVE A RECESSED RING NEOPRENE GASKET, AND CHECKER PLATE COVERS.
- K.6. COVER FASTENERS SHALL BE 316 STAINLESS STEEL MACHINE SCREWS OF NOT LESS THAN 1/4-INCH DIAMETER. THE COVER SCREWS SHALL BE FLATHEAD SOCKET-TYPE RECESSED SCREWS, COUNTERSUNK BELOW THE LEVEL OF THE COVER.
- K.7. SEALS FOR ENTRY IN CORROSIVE LOCATIONS SHALL BE OBLONG CONDUIT BODIES FILLED WITH SOFT NON-SETTING COMPOUND.

L. FLOOR BOXES:
- L.1. HOT-DIPPED GALVANIZED CAST BOXES WITH A NEMA 4X RATING.
- L.2. BOXES SHALL HAVE A RECESSED RING NEOPRENE GASKET, AND CHECKER PLATE COVERS.
- L.3. COVER FASTENERS SHALL BE 316 STAINLESS STEEL MACHINE SCREWS OF NOT LESS THAN 1/4-INCH DIAMETER. THE COVER SCREWS SHALL BE FLATHEAD SOCKET-TYPE RECESSED SCREWS, COUNTERSUNK BELOW THE LEVEL OF THE COVER.
- L.4. SEALS FOR ENTRY IN CORROSIVE LOCATIONS SHALL BE OBLONG CONDUIT BODIES FILLED WITH SOFT NON-SETTING COMPOUND.

2.09 SUPPORTS AND FASTENINGS:

A. ALL SUPPORTS AND FASTENINGS NECESSARY FOR THE SUPPORT OF ELECTRICAL EQUIPMENT SHALL BE IN ACCORDANCE WITH THE BEST INDUSTRY PRACTICE AND AS SPECIFIED HEREIN.

B. ALL ANCHORS, NUTS, WASHERS, AND BOLTS SHALL BE RUST RESISTANT, PLATED TYPE, UNLESS SPECIFIED OTHERWISE. ANCHORS, NUTS, WASHERS, AND BOLTS FOR EXTERIOR USE SHALL BE STAINLESS STEEL.

C. BRACKETS AND MISCELLANEOUS HARDWARE SHALL BE RUST RESISTANT, PLATED TYPE, UNLESS SPECIFIED OTHERWISE.

D. BOLTS ASSOCIATED WITH LIGHTING FIXTURE INSTALLATION SHALL BE APPLIED WITH ANTI-SEIZE LUBRICANT SUCH AS NEVER-SEEZ, OR EQUAL, PRIOR TO INSTALLATION.

E. EXTERIOR CHANNEL-TYPE SUPPORT OR WHERE NOTED ON DRAWINGS SHALL BE HOT-DIPPED GALVANIZED. INTERIOR CHANNEL-TYPE SUPPORT SHALL BE HOT-DIPPED GALVANIZED OR ELECTRO-GALVANIZED PLUS ZINC CHROMATE FINISH. KINDORF, SUPERSTRUT, UNISTRUT, OR EQUAL.

F. CLAMPS, BRACKETS, AND SIMILAR HARDWARE UTILIZED WITH THE CHANNEL SUPPORT SYSTEM SHALL BE OF THE SAME MANUFACTURER AND BE SIMILARLY GALVANIZED.

G. FURNISH AND INSTALL ALL STEEL SUPPORTING MEMBERS, HANGERS, BRACKETS OR OTHER SPECIAL DETAILS REQUIRED AND NECESSARY FOR THE PROPER INSTALLATION OF ELECTRIC EQUIPMENT.

H. SUPPORT LESS THAN 2" TRADE SIZE, VERTICALLY RUN CONDUIT AT INTERVALS NO GREATER THAN 8 FEET. SUPPORT SUCH CONDUITS 2" TRADE SIZE OR LARGER, AT INTERVALS NO GREATER THAN THE STORY HEIGHT, OR 15 FT. WHICHEVER IS SMALLER.

I. WHERE THEY ARE NOT EMBEDDED IN CONCRETE, SUPPORT LESS THAN 1" TRADE SIZE, HORIZONTALLY RUN CONDUITS AT INTERVALS NO GREATER THAN 7 FT. SUPPORT SUCH CONDUITS, 1" TRADE SIZE OR LARGER, AT INTERVALS NO GREATER THAN 10 FT.

J. INCLUDE SUPPORTING FRAMES OR RACKS EXTENDING FROM SLAB TO SLAB FOR WORK INDICATED AS BEING SUPPORTED FROM WALLS WHERE THE WALLS ARE INCAPABLE OF SUPPORTING THE WEIGHT.

K. INCLUDE SUPPORTING FRAMES OR RACKS FOR EQUIPMENT, INTENDED FOR VERTICAL SURFACE MOUNTING, WHICH IS REQUIRED IN A FREE STANDING POSITION.

L. EXCEPT FOR BRANCH CIRCUITRY INSTALL ALL CONDUIT IN HUNG CEILING SPACE ON ACCEPTABLE HANGERS AND INSERTS. CONDUIT OR METAL CLAD CABLE FOR BRANCH CIRCUITRY SHALL BE SUPPORTED BY CLAMPS OR PIPE STRAPS SECURED TO THE CEILING SUPPORT SYSTEM , FROM STRUCTURAL MEMBERS OR FROM THE DECK. SUPPORT FROM CEILING TEES, CROSS TEES OR SUPPORT WIRES IS PROHIBITED.

M. DO NOT USE OTHER TRADES FASTENING DEVICES TO SUPPORT ELECTRICAL MATERIALS OR EQUIPMENT

N. SUPPORT CONDUIT WITHIN 18 INCHES OF OUTLETS, BOXES, PANELS CABINETS AND DEFLECTIONS.

BID SET

COMMONWEALTH OF MASSACHUSETTS
ALIREZA HEIDARIABHARI
ELECTRICAL
No. 45422
REGISTERED PROFESSIONAL ENGINEER

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

NO.	DATE	ISSUE/REVISION	APP
0	9/25/2019		

GEI Consultants

Designed:	ZL
Checked:	ARH
Drawn:	ZL
Approved By:	ARH

Town of Chatham
549 Main Street
Chatham, MA 02633

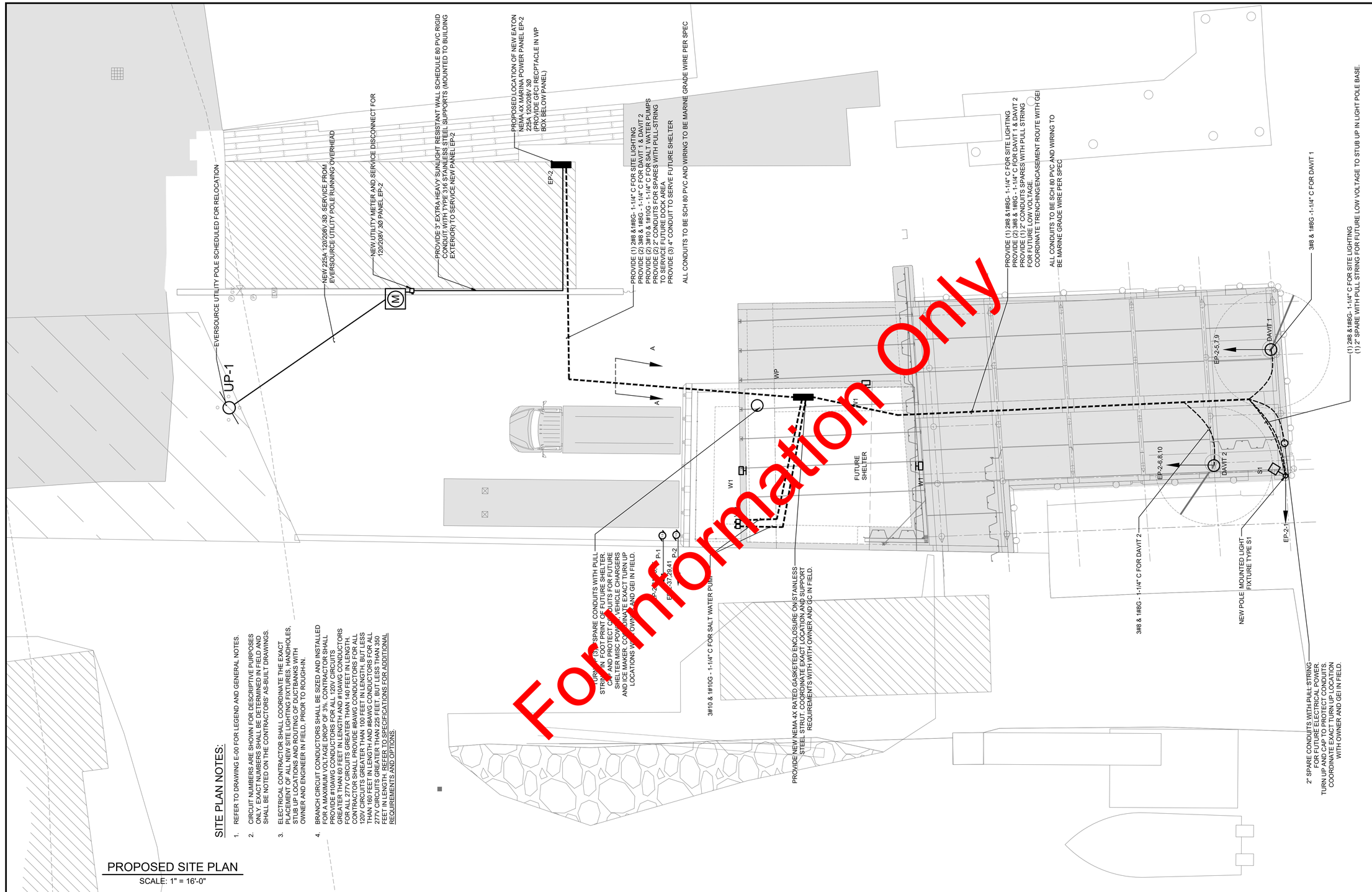
GEI Project 1900325

Trap Dock Reconstruction
Chatham, MA

ELECTRICAL SPECIFICATIONS I

DWG. NO. E-01

SHEET NO. 18 OF 24



SITE PLAN NOTES:

1. REFER TO DRAWING E-00 FOR LEGEND AND GENERAL NOTES.
2. CIRCUIT NUMBERS ARE SHOWN FOR DESCRIPTIVE PURPOSES ONLY. EXACT NUMBERS SHALL BE DETERMINED IN FIELD AND SHALL BE NOTED ON THE CONTRACTORS' AS-BUILT DRAWINGS.
3. ELECTRICAL CONTRACTOR SHALL COORDINATE THE EXACT PLACEMENT OF ALL NEW SITE LIGHTING FIXTURES, HANDHOLES, STUB UP LOCATIONS AND ROUTING OF DUCTBANKS WITH OWNER AND ENGINEER IN FIELD, PRIOR TO ROUGH-IN.
4. BRANCH CIRCUIT CONDUCTORS SHALL BE SIZED AND INSTALLED FOR A MAXIMUM VOLTAGE DROP OF 3%. CONTRACTOR SHALL PROVIDE #10AWG CONDUCTORS FOR ALL 120V CIRCUITS GREATER THAN 60 FEET IN LENGTH AND #10AWG CONDUCTORS FOR ALL 277V CIRCUITS GREATER THAN 140 FEET IN LENGTH. CONTRACTOR SHALL PROVIDE #8AWG CONDUCTORS FOR ALL 120V CIRCUITS GREATER THAN 100 FEET IN LENGTH, BUT LESS THAN 160 FEET IN LENGTH AND #8AWG CONDUCTORS FOR ALL 277V CIRCUITS GREATER THAN 225 FEET, BUT LESS THAN 350 FEET IN LENGTH. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS AND OPTIONS.

PROPOSED SITE PLAN

SCALE: 1" = 16'-0"

BID SET

ALIREZA HEIDARIABHARI ELECTRICAL No. 45422 REGISTERED PROFESSIONAL ENGINEER COMMONWEALTH OF MASSACHUSETTS

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GEI Consultants

Designed:	ZL
Checked:	ARH
Drawn:	ZL
Approved By:	ARH

Town of Chatham
549 Main Street
Chatham, MA 02633

GEI Project 1900325

Trap Dock Reconstruction
Chatham, MA

ELECTRICAL SITE PLAN

DWG. NO.
E-03

SHEET NO.
19 OF 24

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208 VOLT, 3 PHASE MOTOR TABLE

HP	FULL LOAD AMPS (1)	NEMA SIZE STARTER	CIRCUIT BREAKER (2)	MOTOR CIRCUIT PROTECTOR	FUSE SIZE		PHASE WIRE SIZE (5)	GROUND WIRE SIZE (6)	CONDUIT SIZE (7)
					NON-TIME DELAY (3)	TIME DELAY (4)			
1/2	2.4	1	15A-3P	7A-3P	10A	4A	12 AWG	12 AWG	3/4"
3/4	3.5	1	15A-3P	7A-3P	10A	5A	12 AWG	12 AWG	3/4"
1	4.6	1	15A-3P	7A-3P	15A	10A	12 AWG	12 AWG	3/4"
1 1/2	6.6	1	20A-3P	15A-3P	20A	10A	12 AWG	12 AWG	3/4"
2	7.5	1	20A-3P	15A-3P	25A	15A	12 AWG	12 AWG	3/4"
3	10.6	1	30A-3P	30A-3P	30A	20A	10 AWG	10 AWG	3/4"
5	16.7	1	40A-3P	30A-3P	50A	30A	10 AWG	10 AWG	3/4"
7 1/2	24.2	1	60A-3P	50A-3P	70A	40A	8 AWG	10 OR 8 AWG	3/4"
10	30.8	2	70A-3P	50A-3P	90A	50A	6 AWG	8 AWG	1"
15	46.2	3	100A-3P	70A-3P	150A	80A	4 AWG	8 OR 6 AWG	1 1/4"
20	59.4	3	125A-3P	100A-3P	175A	100A	2 AWG	6 AWG	1 1/4"
25	74.8	3	150A-3P	150A-3P	225A	125A	1 AWG	6 OR 4 AWG	1 1/2"
30	88.0	4	200A-3P	150A-3P	250A	150A	1/0 AWG	6 OR 4 AWG	2"
40	114.0	4	250A-3P	150A-3P	350A	200A	2/0 AWG	4 OR 3 AWG	2"
50	143.0	5	300A-3P	150A-3P	400A	250A	4/0 AWG	4 OR 3 AWG	2 1/2"
60	169.0	5	350A-3P	250A-3P	500A	300A	250 KCMIL	3 OR 2 AWG	2 1/2"
75	211.0	5	500A-3P	400A-3P	600A	350A	400 KCMIL	2 OR 1 AWG	3"
100	273.0	6	600A-3P	400A-3P	800A	450A	600 KCMIL	1 OR 1/0 AWG	4"

208 VOLT, 3 PHASE MOTOR TABLE NOTES:

(1) PER 2011 NEC, TABLE 430.250.
(2) PER 2011 NEC, TABLE 430.52 (GENERALLY 200%).
(3) PER 2011 NEC, TABLE 430.52 (GENERALLY 300%).
(4) PER 2011 NEC, TABLE 430.52 (GENERALLY 175%).

LEGEND OF FEEDER SIZES - COPPER CONDUCTORS

FEEDER TAG SYMBOL	CONDUCTORS (3-PHASE, 3-WIRE WITH GROUND) OR (1-PHASE, 3-WIRE WITH GROUND)	RACEWAY SIZE CONDUIT	CONDUCTORS (3-PHASE, 4-WIRE WITH GROUND)	RACEWAY SIZE CONDUIT	NOMINAL AMPERE RATING
80	3#3 & 1#8G.	1 1/4"			80
80N			4#3 & 1#8G.	1 1/4"	
90	3#2 & 1#8G.	1 1/4"			90
90N			4#2 & 1#8G.	1 1/4"	
100	3#1 & 1#8G.	1 1/2"			100
100N			4#1 & 1#8G.	1 1/2"	
125	3#1/0 & 1#6G.	1 1/2"			125
125N			4#1/0 & 1#6G.	2"	
150	3#1/0 & 1#6G.	1 1/2"			150
150N			4#1/0 & 1#6G.	2"	
175	3#2/0 & 1#6G.	2"			175
175N			4#2/0 & 1#6G.	2"	
200	3#3/0 & 1#6G.	2"			200
200N			4#3/0 & 1#6G.	2"	
225	3#4/0 & 1#4G.	2"			225
225N			4#4/0 & 1#4G.	2 1/2"	
250	3#250 KCMIL & 1#4G.	2 1/2"			250
250N			4#250 KCMIL & 1#4G.	3"	
300	3#350 KCMIL & 1#4G.	3"			300
300N			4#350 KCMIL & 1#4G.	3"	
350	3#500 KCMIL & 1#3G.	4"			350
350N			4#500 KCMIL & 1#3G.	4"	
400	3#600 KCMIL & 1#3G.	4"			400
400N			4#600 KCMIL & 1#3G.	4"	

FEEDER SIZE NOTES:

1. PROVIDE ADAPTER FOR FEEDERS GREATER THAN 500 KCMIL WHERE REQUIRED TO TERMINATE THE CONDUCTORS INTO THE EQUIPMENT CIRCUIT BREAKER LUGS.
2. REFER TO SPECIFICATIONS FOR ACCEPTABLE CONDUCTOR TYPES AND NEC SECTIONS 250, 310 AND ANNEX-C FOR ADDITIONAL INFORMATION. APPLY ALL APPLICABLE DE-RATINGS PER SITE CONDITION AND TEMPERATURE.
3. UNLESS OTHERWISE NOTED, ALL CONDUCTOR SIZES SHALL MATCH THE SIZES INDICATED ON THIS LEGEND FOR THE OVERCURRENT DEVICES SHOWN ON DRAWINGS OR SPECIFIED IN THE SPECIFICATIONS.
4. ALWAYS PROVIDE 4 WIRE CIRCUIT UNLESS EQUIPMENT OR DEVICE SERVED DOES NOT HAVE PROVISIONS FOR NEUTRAL CONNECTION.
5. THIS LEGEND DOES NOT INCLUDE CONDUCTOR INCREASE IN SIZE DUE TO VOLTAGE DROPS, CONTRACTOR IS RESPONSIBLE TO MEASURE OR ESTIMATE THE ROUTING PRIOR TO ANY INSTALLATION AND MEET THE MAXIMUM VOLTAGE DROP REQUIREMENTS (2% VD MAXIMUM FOR FEEDERS AND 3% FOR BRANCH CIRCUIT).

LIGHTING FIXTURE SCHEDULE

FIXTURE TYPE	DESCRIPTION	LIGHT FIXTURE ACCEPTABLE MANUFACTURERS AND CATALOG NUMBER		TYPE	LUMENS	COLOR	VOLTS	WATTS	NOTES
		MANUFACTURER	CATALOG NUMBER						
S1	LED HORIZONTAL TENON MOUNT AREA LIGHTING LUMINAIRE ON 18' 4" MARINE GRADE POLE W/GFCI & WEATHER-PROOF COVER	TECHLIGHT	LSBW-3-C-8-T4-C-1-SP-PMH (MARINE GRADE - COLOR TO MATCH EXISTING)	LED	11975	5000K	UNIV	122W	COLORS TO MATCH EXISTING POLES IN ADJACENT DOCK
		LYTE POLES	105-4012-18-GFCI-IUC						
W1	MEDIUM HEAT SINK LED WALL PACK	TECHLIGHT	LHMWP-1-C-M-T3-D-1-BZ	LED	11096	5000K	UNIV	108W	

NOTES: (NOTES 1-2 APPLY TO ALL APPLICABLE LIGHTING FIXTURES. THE REMARKS COLUMN SHALL NOTE ADDITIONAL REQUIREMENTS.)

1. FIXTURES SPECIFIED WITH CATALOG NUMBERS ESTABLISH QUALITY LEVEL FOR FIXTURES. EC SHALL PROVIDE SITE LIGHTING MODEL, FOR THIS PARTICULAR SITE, DEPICTING PERFORMANCE OF PROPOSED ALTERNATE FIXTURES.
2. VERIFY EXACT MOUNTING CONDITIONS AND PROVIDE APPROPRIATE ACCESSORIES AND HARDWARE TO ACCOMMODATE REQUIREMENTS. FOUNDATION OF POLE (POLE BASE) SHALL BE ENGINEERED BY STRUCTURAL ENGINEER OR PRE-CAST MANUFACTURER.

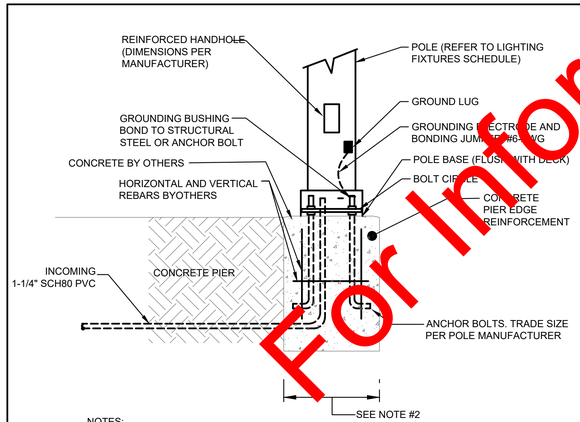
NEW PANEL SCHEDULE "EP-2"

VOLTS	120/208			MAINS	200A
PHASE	3Ø			BUSSING	200A
WIRE	4W				
A.I.C.	22K			MOUNTING	SURFACE

CIRCUIT	SERVICE DESCRIPTION	BREAKER	A	B	C	BREAKER	SERVICE DESCRIPTION	CIRCUIT
1	SITE LIGHTING	20A-1P	●			20A-1P	GFCI PANEL RECEPTACLE	2
3	SPARE	20A-1P		●		20A-1P	SPARE	4
5	DAVIT #1	20A-3P			●	20A-3P	DAVIT #2	6
7			●					8
9				●				10
11	SPARE	20A-1P			●	20A-1P	SPARE	12
13	SPARE	20A-1P	●			20A-1P	SPARE	14
15	SPARE	20A-1P		●		20A-1P	SPARE	16
17	SPARE	20A-1P			●	20A-1P	SPARE	18
19	SPARE	20A-1P	●			20A-1P	SPARE	20
21	SPARE	20A-1P		●		20A-1P	SPARE	22
23	SPARE	20A-1P			●	20A-1P	SPARE	24
25	SPACE		●				SPACE	26
27	SPACE			●			SPACE	28
29	SPACE				●		SPACE	30
31	SALT WATER PUMP 1	15A-3P	●			20A-3P	SPARE	32
33				●				34
35					●			36
37	SALT WATER PUMP 2	15A-3P	●			15A-3P	SPARE	38
39				●				40
41					●			42

BRANCH CIRCUIT SCHEDULE

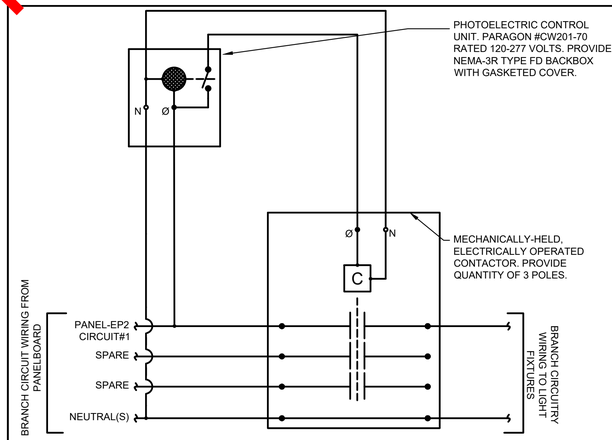
CIRCUIT BREAKERS	CONDUCTORS
120 VOLT & 277 VOLT 1Ø, 2W. CIRCUITS	
30A-1P	2#10 & 1#10G - 3/4"C.
40A-1P	2#8 & 1#10G - 3/4"C.
50A-1P	2#6 & 1#10G - 3/4"C.
60A-1P	2#6 & 1#10G - 3/4"C.
208 VOLT & 480 VOLT 1Ø, 2W. CIRCUITS	
20A-2P	2#12 & 1#12G - 3/4"C.
30A-2P	2#10 & 1#10G - 3/4"C.
40A-2P	2#8 & 1#10G - 3/4"C.
50A-2P	2#6 & 1#10G - 3/4"C.
60A-2P	2#6 & 1#10G - 3/4"C.
120/208 VOLT & 277/480 VOLT 1Ø, 3W. CIRCUITS ("+" INDICATES TO PROVIDE (2) PHASE CONDUCTORS & (1) NEUTRAL CONDUCTOR IN 1Ø CIRCUITS)	
20A-2P+	3#12 & 1#12G - 3/4"C.
30A-2P+	3#10 & 1#10G - 3/4"C.
40A-2P+	3#8 & 1#10G - 3/4"C.
50A-2P+	3#6 & 1#10G - 3/4"C.
60A-2P+	3#6 & 1#10G - 3/4"C.
208 VOLT & 480 VOLT 3Ø, 3W. CIRCUITS	
20A-3P	3#12 & 1#12G - 3/4"C.
30A-3P	3#10 & 1#10G - 3/4"C.
40A-3P	3#8 & 1#10G - 3/4"C.
50A-3P	3#6 & 1#10G - 3/4"C.
60A-3P	3#6 & 1#10G - 3/4"C.
120/208 VOLT & 277/480 VOLT 3Ø, 4W. CIRCUITS ("+" INDICATES TO PROVIDE (3) PHASE CONDUCTORS & (1) NEUTRAL CONDUCTOR IN 3Ø CIRCUITS)	
20A-3P+	4#12 & 1#12G - 3/4"C.
30A-3P+	4#10 & 1#10G - 3/4"C.
40A-3P+	4#8 & 1#10G - 3/4"C.
50A-3P+	4#6 & 1#10G - 1"C.
60A-3P+	4#6 & 1#10G - 1"C.



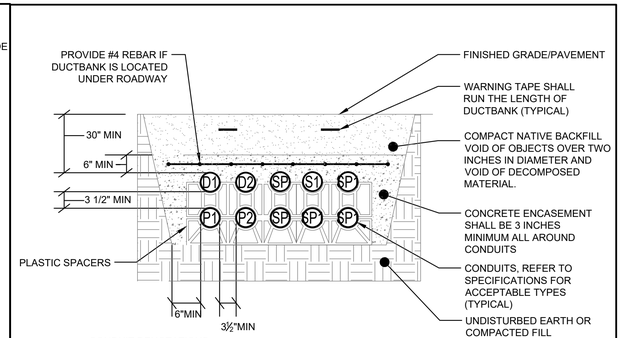
NOTES:

1. HEIGHT OF POLE BASE SHALL BE 3" ABOVE GRADE WHEN LOCATED ON PLANTED/LANDSCAPE AREA. HEIGHT SHALL BE LEVEL WITH THE ADJACENT PAVEMENT/FINISHED SURFACE WHEN LOCATED IN PAVED AREAS.
2. POLE BASE DIMENSIONS AND REBAR QUANTITIES AND SIZES SHALL BE DETERMINED BY OTHERS. RWS IS NOT RESPONSIBLE FOR STRUCTURAL DESIGN OR COMPONENTS OF THE POLE BASE.
3. REFER TO SITE PLAN CONDUIT LEGEND FOR CONDUIT TRADE SIZE.
4. THIS DETAIL IS INCLUDED FOR REFERENCE PURPOSES ONLY. THE ELECTRICAL CONTRACTOR SHALL USE THIS DETAIL TO CAPTURE ELECTRICAL SCOPE ONLY.

3 TYPICAL SITE LIGHTING POLE DETAIL FIXTURE TYPE "S1" NTS



2 PHOTOCELL WIRING DIAGRAM NTS



CONDUIT DENOTATIONS:

- D1 1-1/4" POWER FOR DAVIT 1
- D2 1-1/4" POWER FOR DAVIT 2
- P1 1-1/4" POWER SALT WATER PUMP 1
- SP 2" SPARE WITH PULL STRING
- SP 4" SPARE WITH PULL STRING
- S1 1-1/4" SITE LIGHTING
- P2 1-1/4" POWER SALT WATER PUMP 2
- SP 2" SPARE WITH PULL STRING
- SP 4" SPARE WITH PULL STRING
- SP 4" SPARE WITH PULL STRING

1 DUCTBANK DETAIL "A-A" - TEN CONDUITS NTS

BID SET

COMMONWEALTH OF MASSACHUSETTS
ALIREZA HEIDARIBHARI
ELECTRICAL
No. 45422
REGISTERED
PROFESSIONAL ENGINEER

R. W. Sullivan Engineering
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The Schrafft Center, 529 Main St., Suite 203
Boston, Massachusetts 02129-1107
Phone: (617) 523-8227 www.rwsullivan.com
RWS JOB # 190140

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

NO.	DATE	ISSUE/REVISION	APP
0	9/25/2019		

GEI Consultants

Designed:	ZL
Checked:	ARH
Drawn:	ZL
Approved By:	ARH

Town of Chatham
549 Main Street
Chatham, MA 02633

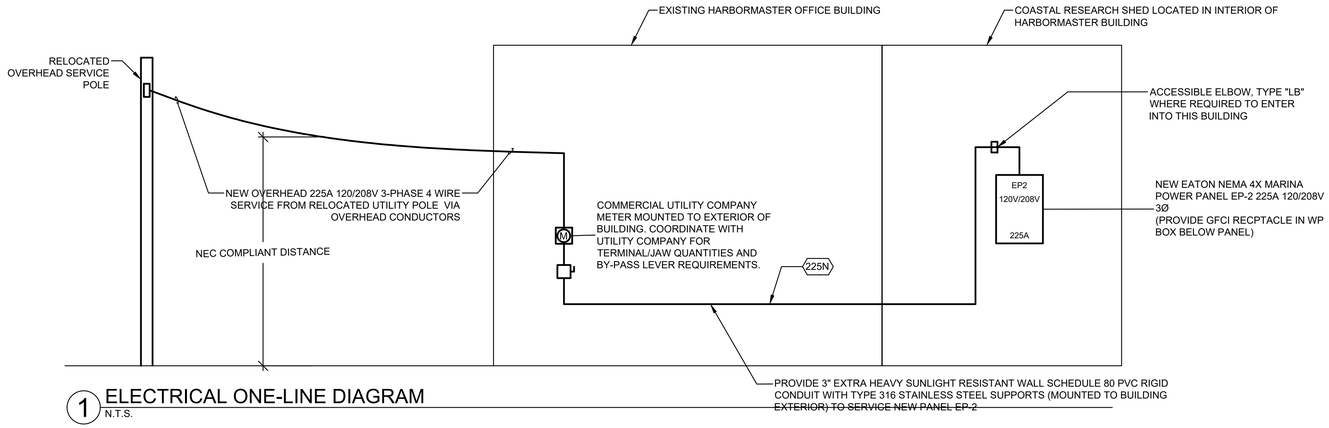
GEI Project 1900325

Trap Dock Reconstruction
Chatham, MA

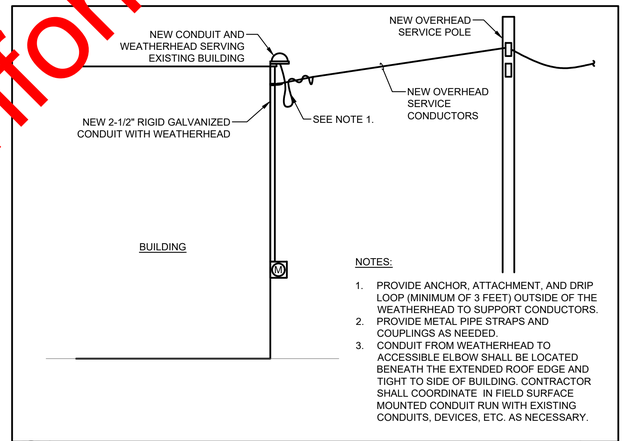
ELECTRICAL SCHEDULES AND DETAILS

DWG. NO. E-04

SHEET NO. 20 OF 24



1 ELECTRICAL ONE-LINE DIAGRAM
N.T.S.



NOTES:

1. PROVIDE ANCHOR, ATTACHMENT, AND DRIP LOOP (MINIMUM OF 3 FEET) OUTSIDE OF THE WEATHERHEAD TO SUPPORT CONDUCTORS.
2. PROVIDE METAL PIPE STRAPS AND COUPLINGS AS NEEDED.
3. CONDUIT FROM WEATHERHEAD TO ACCESSIBLE ELBOW SHALL BE LOCATED BENEATH THE EXTENDED ROOF EDGE AND TIGHT TO SIDE OF BUILDING. CONTRACTOR SHALL COORDINATE IN FIELD SURFACE MOUNTED CONDUIT RUN WITH EXISTING CONDUITS, DEVICES, ETC. AS NECESSARY.

4 TYPICAL WEATHER HEAD DETAIL NTS

LEGEND OF FEEDER SIZES - COPPER CONDUCTORS

FEEDER TAG SYMBOL	CONDUCTORS (3-PHASE, 3-WIRE WITH GROUND) OR (1-PHASE, 3-WIRE WITH GROUND)	RACEWAY SIZE CONDUIT	CONDUCTORS (3-PHASE, 4-WIRE WITH GROUND)	RACEWAY SIZE CONDUIT	NOMINAL AMPERE RATING
20	3#12 & 1#12G.	3/4"			20
20N			4#12 & 1#12G.	3/4"	
30	3#10 & 1#10G.	3/4"			30
30N			4#10 & 1#10G.	3/4"	
40	3#8 & 1#8G.	1"			40
40N			4#8 & 1#8G.	1"	
50	3#6 & 1#8G.	1"			50
50N			4#6 & 1#8G.	1"	
60	3#4 & 1#10G.	1"			60
60N			4#4 & 1#10G.	1 1/4"	
70	3#4 & 1#8G.	1"			70
70N			4#4 & 1#8G.	1 1/4"	
80	3#3 & 1#8G.	1 1/4"			80
80N			4#3 & 1#8G.	1 1/4"	
90	3#2 & 1#8G.	1 1/4"			90
90N			4#2 & 1#8G.	1 1/4"	
100	3#1 & 1#8G.	1 1/2"			100
100N			4#1 & 1#8G.	1 1/2"	
125	3#1/0 & 1#6G.	1 1/2"			125
125N			4#1/0 & 1#6G.	2"	
150	3#1/0 & 1#6G.	1 1/2"			150
150N			4#1/0 & 1#6G.	2"	
175	3#2/0 & 1#6G.	2"			175
175N			4#2/0 & 1#6G.	2"	
200	3#3/0 & 1#6G.	2"			200
200N			4#3/0 & 1#6G.	2"	
225	3#4/0 & 1#4G.	2"			225
225N			4#4/0 & 1#4G.	2 1/2"	
250	3#250 KCMIL & 1#4G.	2 1/2"			250
250N			4#250 KCMIL & 1#4G.	3"	
300	3#350 KCMIL & 1#4G.	3"			300
300N			4#350 KCMIL & 1#4G.	3"	
350	3#500 KCMIL & 1#3G.	4"			350
350N			4#500 KCMIL & 1#3G.	4"	
400	3#600 KCMIL & 1#3G.	4"			400
400N			4#600 KCMIL & 1#3G.	4"	
500	6#250 KCMIL & 2#2G.	(2) 3"			500
500N			8#250 KCMIL & 2#2G.	(2) 3"	
600	6#350 KCMIL & 2#1G.	(2) 3"			600
600N			8#350 KCMIL & 2#1G.	(2) 3"	
800	6#600 KCMIL & 2#1/0G.	(2) 4"			800
800N			8#600 KCMIL & 2#1/0G.	(2) 4"	
1000	9#500 KCMIL & 3#2/0G.	(3) 4"			1000
1000N			12#500 KCMIL & 3#2/0G.	(3) 4"	
1200	9#600 KCMIL & 3#3/0G.	(3) 4"			1200
1200N			12#600 KCMIL & 3#3/0G.	(3) 4"	
1600	12#600 KCMIL & 4#4/0G.	(4) 4"			1600
1600N			16#600 KCMIL & 4#4/0G.	(4) 4"	
2000	15#600 KCMIL & 5#250 KCMIL G.	(5) 4"			2000
2000N			20#600 KCMIL & 5#250 KCMIL G.	(5) 4"	
2500	18#600 KCMIL & 6#350 KCMIL G.	(6) 4"			2500
2500N			24#600 KCMIL & 6#350 KCMIL G.	(6) 4"	
3000	24#500 KCMIL & 8#500 KCMIL G.	(8) 4"			3000
3000N			32#500 KCMIL & 8#500 KCMIL G.	(8) 4"	
4000	30#600 KCMIL & 10#500 KCMIL G.	(10) 4"			4000
4000N			40#600 KCMIL & 10#500 KCMIL G.	(10) 4"	

BID SET

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ALIREZA HEIDARIABHARI
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REGISTERED PROFESSIONAL ENGINEER

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RWS JOB # 190140

Attention:
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GEI Consultants

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Drawn:	ZL
Approved By:	ARH

Town of Chatham
549 Main Street
Chatham, MA 02633

GEI Project 1900325

Trap Dock Reconstruction
Chatham, MA

ELECTRICAL
ONE LINE DIAGRAM

DWG. NO.
E-05

SHEET NO.
21 OF 24

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GENERAL NOTES

1. CONTRACTOR SHALL REFER TO THE PLUMBING SPECIFICATIONS.
2. NEW WORK DRAWN HEAVILY, EXISTING PIPING AND FIXTURES TO REMAIN ARE DRAWN LIGHTLY.
3. GENERAL NOTES, SYMBOLS LIST AND DETAILS ARE APPLICABLE TO ALL PLUMBING DRAWINGS.
4. DRAWINGS ARE DIAGRAMMATIC: DETERMINE LOCATIONS OF SYSTEMS AND COMPONENTS IN FIELD.
5. ALL PLUMBING WORK SHALL BE IN ACCORDANCE WITH THE MASS STATE PLUMBING CODE, THE MASS STATE BUILDING CODE AND THE DRAWINGS. NO WORK SHALL BE INSTALLED IN VIOLATION OF ANY GOVERNING CODES. ANY WORK SHOWN ON THE DRAWINGS WHICH IS IN VIOLATION OF SUCH CODES SHALL BE BROUGHT TO THE ATTENTION OF THE CONSTRUCTION MANAGER AND THE OWNER'S REPRESENTATIVE AND SHALL BE RESOLVED PRIOR TO THE INSTALLATION OF THE WORK INVOLVED.
6. MANUFACTURERS' MODEL NUMBERS ARE SPECIFIED SOLELY TO ESTABLISH STANDARDS OF QUALITY FOR PERFORMANCE AND MATERIALS.
7. ALL PRODUCT INSTALLATIONS SHALL ADHERE TO MANUFACTURERS' RECOMMENDATIONS.
8. RUN PIPING CONCEALED, UNLESS SPECIFIED OTHERWISE, AND CLEAR OF CEILING INSERTS.
9. PROVIDE CLAMPS, OFFSETS, EXPANSION JOINTS, ANCHORS AND GUIDES AS NECESSARY TO PREVENT STRESS ON PIPING.
10. THIS CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER CONTRACTORS IN ESTABLISHING PIPE RUNS AND SPACE CONDITIONS.
11. PRIOR TO THE START OF CORING ANY STRUCTURAL MEMBERS OR WALLS, PLUMBING SUBCONTRACTOR SHALL COORDINATE LOCATION OF PENETRATION WITH STRUCTURAL ENGINEER AND GENERAL CONTRACTOR. PLUMBING SUBCONTRACTOR SHALL PREPARE AND SUBMIT TO STRUCTURAL ENGINEER AND ARCHITECT A SET OF PENETRATION DRAWINGS DURING COORDINATION DRAWING REVIEW PERIOD. PLUMBING SUBCONTRACTOR MAY DEVIATE FROM LOCATIONS OF PENETRATIONS AS SHOWN ON PLUMBING DRAWINGS BUT MUST COORDINATE ALTERNATIVE LOCATIONS WITH STRUCTURAL ENGINEER.
12. PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING GENERAL CONTRACTOR INSTALLS ALL NECESSARY FIRE STOPPING OF SLEEVES, PIPING, ELECTRICAL PIPING, DUCTWORK, ETC. PENETRATING RATED PARTITIONS, FLOORS, AND CEILINGS FOR HIS/HER OWN WORK.
13. COORDINATE SYSTEM SHUTDOWNS WITH OWNER AND CONSTRUCTION MANAGER. PERFORM SHUTDOWNS ON PREMIUM TIME IF NECESSARY.
14. ALL WORK SHALL OCCUR AT OWNERS CONVENIENCE. NOTIFY OWNER WELL IN ADVANCE OF BEGINNING ANY PHASE WORK. COORDINATE WORK OF PHASING WITH CONSTRUCTION MANAGER.
15. PRIOR TO THE START OF WORK THE PLUMBING SUBCONTRACTOR SHALL COORDINATE THE REQUIREMENTS FOR AND THE LOCATIONS OF ALL EQUIPMENT PERTAINING TO THE PROJECT.
16. THE CONTRACTOR SHALL INFORM AND COORDINATE WITH THE OWNER ALL NECESSARY INTERRUPTIONS TO PLUMBING SYSTEMS AND SERVICE THAT MAY AFFECT THE NORMAL OPERATION.

PLUMBING LEGEND

SYMBOL	ABBR.	DESCRIPTION
	ETR	EXISTING TO REMAIN
	ETBR	EXISTING TO BE REMOVED
	CTE	PIPE CONNECT TO EXISTING
	BV	BALL VALVE
	DV	DRAIN VALVE
	CV	CHECK VALVE
	RPZ	REDUCED PRESSURE BACKFLOW PREVENTER
	HWBV	HOT WATER BALANCING VALVE
	VIV	VALVE IN VERTICAL
	HB	HOSE BIBB w/ VACUUM BREAKER
	WH	WALL HYDRANT w/ VACUUM BREAKER
		PIPE UNION
		PIPE RISER
		PIPE CAP OR PLUG
		PIPE CONTINUATION
		PIPE UP THROUGH SLAB ABOVE
		PIPE DOWN THROUGH FLOOR SHOWN
		PIPE RISE/DROP
	SA	SHOCK ABSORBER

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GEI Consultants

Designed:	TPM
Checked:	-
Drawn:	TPM
Approved By:	TPM

Town of Chatham
549 Main Street
Chatham, MA 02633

GEI Project 1900325

Trap Dock Reconstruction
Chatham, MA

PLUMBING
LEGEND

DWG. NO.
P-00

SHEET NO.
22 OF 24

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PLUMBING SPECIFICATIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. General Conditions and Special Conditions apply to this Section.

1.02 WORK INCLUDED

A. The work covered by this Section of the Specification consists of furnishing all materials, labor, supervision, equipment and appurtenances, tools, permits, and service to perform all Plumbing work, complete and place into approved operating conditions, including all tests and adjustments in strict accordance with these specifications and applicable drawings.

B. The principal work under this Section shall include, but will not be limited to, the following major items:
   1. Seawater washdown piping distribution.
   2. Valves
   3. Hangers, supports and sleeves.
   4. Core drilling.
   5. Plumbing equipment.

C. Related Work: the following work is not included in this section and is to be performed under the designated sections:

   1. Fire Protection Work.
   2. Heating, Ventilation and Air Conditioning Work.
   3. Electrical Work.
   4. Cutting and Patching.

1.03 SUBMITTALS

A. Submit complete shop drawings in accordance with the provisions of the General Conditions. Shop drawings shall include equipment, piping, valves, hangers, supports, insulation and plumbing fixtures.

B. Submit samples in accordance with the provisions of the General Conditions.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. The Plumbing subcontractor shall be responsible for his work until its completion and final acceptance and replace any work or materials that have been damaged, lost, or stolen without additional cost to the Owner.

B. Materials and fixtures shall be properly protected against obstruction and damage.

1.05 JOB CONDITIONS

A. The Plumbing subcontractor shall visit the site of the proposed work and shall fully acquaint himself with the conditions, character and extent of work required.

1.06 GUARANTEE

A. Submit guarantees in accordance with the provisions of the General Conditions.

1.07 RECORD DRAWINGS

A. Prepare and submit Record Drawings in accordance with the provisions of the General Conditions.

1.08 CODES, ORDINANCES AND PERMITS

A. All work and materials are to comply in every respect with the local building laws and Massachusetts State Plumbing Code, and such applicable building laws and regulations are to be considered as part of these specifications.

B. The Plumbing subcontractor is to give all requisite notices, file all requisite plans relating to his work with the proper authorities and is to secure all permits and pay all fees for same. If any work is performed and changes are necessary to conform to the ordinances, these changes shall be made at the Plumbing subcontractor's expense.

C. The drawings and specifications shall be followed when in excess of the minimum requirements of the code.

1.09 DRAWINGS AND SPECIFICATIONS

A. The drawings and these specifications are complementary each to the other, and any labor or materials called for by either, whether or not by both, shall be furnished and installed by this subcontractor.

B. The drawings are diagrammatic and indicate the various systems and piping. Due to the small scale of the drawings, it is not possible to indicate all offsets, fittings, devices and accessories which may be required. The Plumbing subcontractor shall examine the entire set of Contract Drawings and carefully investigate the structure and finish conditions affecting all his work and shall arrange such work accordingly for the complete satisfactory operation of all systems providing such fittings, valves, devices and accessories as may be required to meet such conditions. Work shall be performed in accordance with the best practices of the trade and to the satisfaction of the Architect and Owner at no additional cost to either.

1.10 COORDINATION OF TRADES

A. The Plumbing subcontractor shall provide Coordination Drawings as required by the Contractor.

1.11 OPERATING INSTRUCTIONS AND MAINTENANCE MANUAL

A. Instruct to the Owner's satisfaction such persons as the Owner designates, in the proper operation and maintenance of the systems and their parts.

B. This subcontractor shall submit to the Architect for approval, three (3) sets of operating and instructional manuals, spare parts lists, drawings, manufacturer's bulletins and other pertinent data of all equipment furnished under this contract. Each set shall be enclosed in a suitable hard cover binder.

C. Provide name, address and telephone numbers of the manufacturer's representative and service company for each piece so that service parts can be readily obtained.

1.12 CLEANUP

A. After completion of the work, all tools and other equipment shall be removed from the building. All excess materials shall be removed and the building left broom clean. All materials and equipment surfaces shall be cleaned and polished in accordance with the finish of the material.

1.13 IDENTIFICATION

A. All stenciling of piping, materials and equipment as outlined hereinafter for identification purposes shall be performed by this subcontractor.

B. The stenciling shall be painted on the apparatus in full view and shall be a color that is in sharp contrast with the background. Color coding to be in accordance with the standards.

C. Before stenciling is applied, the apparatus shall be thoroughly cleaned and painted, if possible.

D. Letters shall not be less than 1-1/2" in height. Arrows shall not be less than 9" long.

E. In lieu of stenciling, piping systems may be identified with approved snap-on covers designating services and direction of flow. Location of identification covers shall be near access panels wherever possible and on both sides of valves. The markers shall be as manufactured by W.H. Brady Co., Westline Products, Seton Nameplate Co., or approved equal.

1.14 TESTING OF PIPING SYSTEMS

A. All piping systems shall be subjected to testing with water or air as noted and shall hold tight at the pressure head stated for the time interval required without adding air or water. While any system is being tested, required head of pressure shall be maintained until all joints are inspected.

B. All tests shall be witnessed by the local inspector having jurisdiction and the Architect/Engineer, with 48-hour notice given these authorities.

C. All equipment, materials and labor required for testing any of the various systems or any part thereof shall be furnished by this Subcontractor.

D. Defective Work: if inspection or test shows defects, such defective work or material shall be replaced, inspection and tests shall be repeated. All repairs to piping shall be made with new material. No caulking of screwed joints or holes will be acceptable.

PART 2 - PRODUCTS

2.01 MATERIALS

A. CPVC PIPING (SCHEDULE 80)

   1. Shall be FlowGuard Gold or Corzan CPVC pipe/fittings system.

   2. Pipe and fittings shall be pressure rated CPVC as follows: shall meet or exceed the requirements of ASTM D 2846-06 and shall be certified by NSF International for use with potable water. Pipe to meet cell class of 24448 per ASTM D1784-11. Fittings to meet cell class of 23447 per ASTM D1784-11.

   3. pipe and fittings shall be manufactured in the United States from virgin CPVC vinyl compounds in conformance with ASTM D 1784-11.

   4. Solvent weld joints shall be made using CPVC cement conforming to ASTM F493-14 and a primer, conforming to ASTM F 656-10. Two-Step solvent welding process MUST be used. One step primer/cement SHALL NOT be acceptable. Solvent shall have an ultraviolet indicator so a UV light can be used to confirm solvent welding of joints after installation.

   5. All piping and fittings shall be the product of one manufacturer.

   6. The fabrication, installation, and testing shall be performed in strict compliance with the manufacturer's instruction sand additional requirements found here-in-after

B. Water Valves

   1. Ball valves shall be all bronze designed for 400 psi water, and designated lead free.

C. Hangers and Supports

   1. All piping shall be supported from the structure by means of approved hangers and supports. Piping shall be supported to maintain required grading and pitching of lines.

   2. Hangers for all piping shall be stainless steel clevis hangers and rods.

D. Sleeves and Escutcheons: approved sleeves for the passage of all systems passing through walls, floors and partitions shall be furnished and set by this subcontractor.

   1. Sleeves shall be one piece CPVC Schedule 40 piping.

PART 3 - EXECUTION

3.01 WATER PIPING

A. Furnish and install a new washdown piping system with hose bibb, valve and connections as required by applicable codes.

3.04 PLUMBING CONNECTED EQUIPMENT

A. Furnish and install washdown water piping, including pipe stands, supports and hangers, as well as trim and all final connections to equipment and appliances provided under other sections. Roughing for this equipment shall be as indicated on the drawings.

B. Furnish and install shutoff valves at each piece of equipment. Obtain exact roughing in dimensions from manufacturers of all service locations before connecting to or roughing for equipment.

C. Furnish and install backflow preventers, pressure reducing valves, vacuum breakers as required.

BID SET

COMMONWEALTH OF MASSACHUSETTS
PAUL D. SULLIVAN
MECHANICAL
No. 42798
REGISTERED PROFESSIONAL ENGINEER

R. W. Sullivan Engineering
MEP / FP Engineering, Code, Commissioning
The Schrafft Center, 529 Main St., Suite 203
Boston, Massachusetts 02129-1107
Phone: (617) 523-6227 www.rwsullivan.com
RWS JOB # 190140

Attention:

0 1"

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

NO.	DATE	ISSUE/REVISION	APP
0	9/25/2019		

GEI Consultants

Designed:	TPM
Checked:	-
Drawn:	TPM
Approved By:	TPM

Town of Chatham
549 Main Street
Chatham, MA 02633

GEI Project 1900325

Trap Dock Reconstruction
Chatham, MA

PLUMBING SPECIFICATIONS

DWG. NO.
P-01

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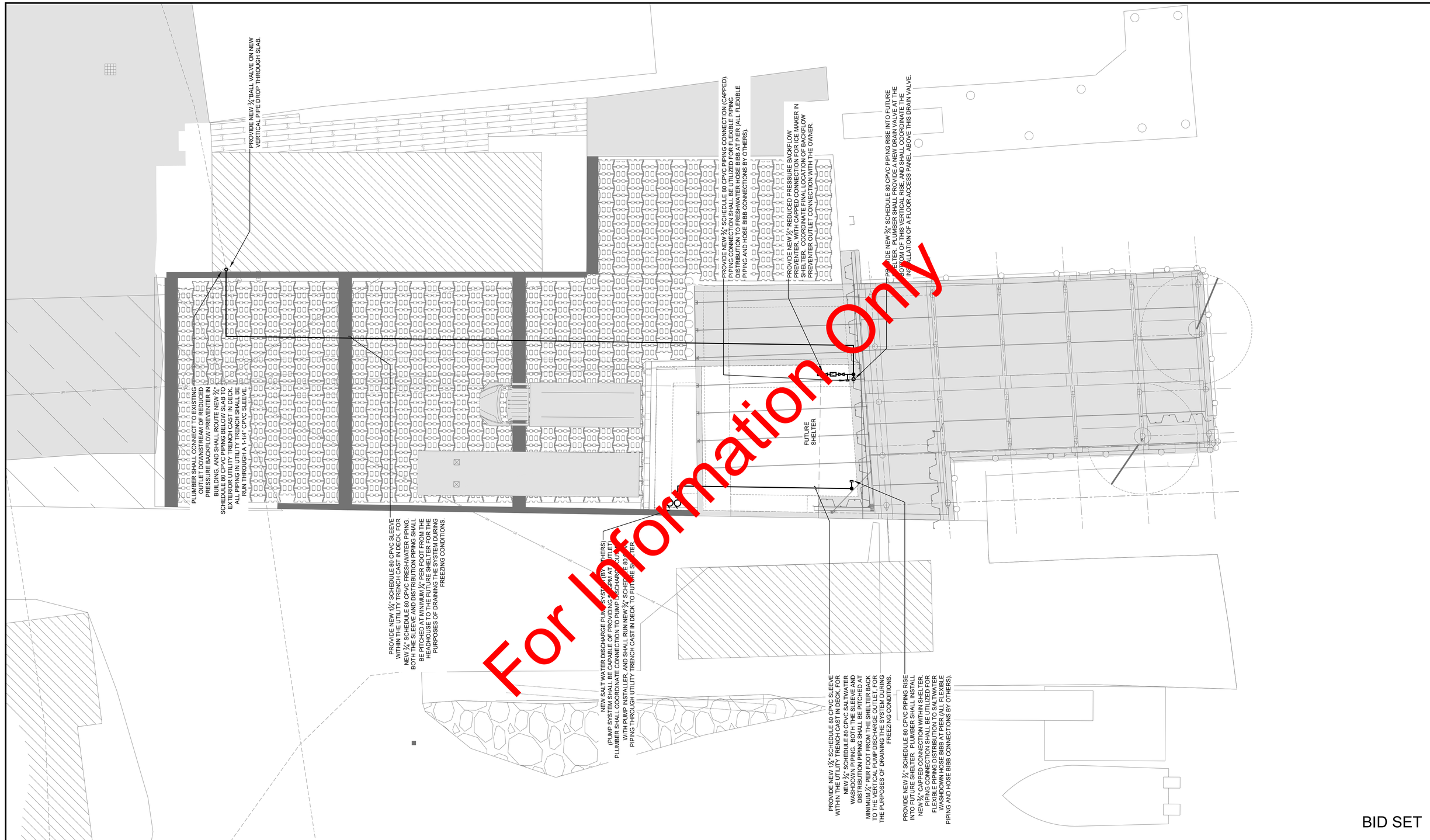

BID SET

PROPOSED SITE PLAN

SCALE: 1" = 16'-0"

COMMONWEALTH OF MASSACHUSETTS
PAUL D. SULLIVAN
MECHANICAL
No. 42736
REGISTERED
PROFESSIONAL ENGINEER

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Town of Chatham
549 Main Street
Chatham, MA 02633

GEI Project 1900325

Trap Dock Reconstruction
Chatham, MA

PLUMBING SITE PLAN

DWG. NO.
P-02

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