13 - TRACTION POWER
INDEX OF DRAWINGS

DRAWING NUMBER	DRAWING TITLE
ETP-101	TRACTION POWER INDEX OF DRAWINGS
ETP-102	TRACTION POWER NOTES AND ABBREVIATIONS
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ETP-220	480V AC STANDBY POWER CONCRETE PAD AND CONDUIT DETAILS
ETP-601	TRACTION POWER SITE PLAN
ETP-810	TRACTION POWER DUCTBANK DETAILS
ETP-811	TRACTION POWER HANDHOLE DETAILS

DESIGNED BY:

STV INCORPORATED
280 TRUMBULL STREET, 14TH FL
HARTFORD, CT 06103

STATE OF CONNECTICUT PROFESSIONAL ENGINEER

David Breza
2025.01.17
11:21:09-05'00'

REV.	DATE	REVISION DESCRIPTION

DESIGNER/DRAFTER: K. KWONG/M. SHAUKAT CHECKED BY: E. FISH

SIGNATURE/ BLOCK:

stv
280 TRUMBULL STREET, 14' FLOOR
HARTFORD, CT 06103
(203) 375-0521

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER: 0301-0509
PROJECT DESCRIPTION: IMPROVEMENTS TO THE STAMFORD MAINTENANCE OF EQUIPMENT (MOE) FACILITY
TOWN(S): STAMFORD
DRAWING TITLE: TRACTION POWER INDEX OF DRAWINGS

DRAWING NO. ETP-101
SHEET NO. 13.01

LASTED SAVED BY: ShaukaM FILE NAME: C:\Users\Shaukam\State of Connecticut\0301-0509 - Design\F_Traction_Power\Contract_Plans\ETP-101 TRACTION POWER INDEX OF DRAWINGS.dgn
PLOTTED DATE: $DATE$

ABBREVIATIONS:

AFF	ABOVE FINISHED FLOOR
AWG	AMERICAN WIRE GAUGE
BKR	BREAKER
BLDG	BUILDING
BS	BUG AND STINGER
C	CLOSE
CAB	CABINET
CB	CIRCUIT BREAKER
CLF	CURRENT LIMITING FUSE
CONC	CONCRETE
CS	CONTROL SWITCH
CU	COPPER
DC-1	DC PANEL (RATINGS AS INDICATED)
DIA	DIAMETER
DMS	DIGITAL METERING SYSTEM
DWG	DRAWING
EL	ELEVATION
EPB	EMERGENCY PUSH BUTTON
ETR	EMERGENCY TRIP RELAY
FACP	FIRE ALARM CONTROL PANEL
FDR	FEEDER
FO	FIBER OPTIC
FOC	FIBER OPTIC CABLE
FU	FUSE (RATING AS INDICATED)
G&T	GROUND AND TEST DEVICE
GFCI	GROUND FAULT CIRCUIT INTERUPTER
HMI	HUMAN MACHINE INTERFACE
IPT	INTERPHASE TRANSFORMER
JB	JUNCTION BOX
KV	KILOVOLT
KVA	KILOVOLTAMPERE
LA	LIGHTNING ARRESTOR
MAX	MAXIMUM
MIN	MINIMUM
MC	MEDIA CONVERTER
MCT	MULTI-RATIO CT
MOC	MECHANISM OPERATED CONTACT
N.C.	NORMALLY CLOSED
N.O.	NORMALLY OPEN
NO.	NUMBER
NEG	NEGATIVE
PDP	AC PANEL (RATINGS AS INDICATED)
PNL	PANEL
POS	POSITIVE
PVC80	SCHEDULE 80 PVC CONDUIT
PWR	POWER
RCP	RECTIFIER CONTROL PANEL
RECT.	RECTIFIER
RGS	RIGID GALVANIZED STEEL CONDUIT
RTRC	REINFORCED THERMOSETTING RESIN CONDUIT
S, SUPV	SUPERVISORY
SP	SPARE
SS	SECTIONALIZING SWITCH
SUB	SUBSTATION
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
T	TRIP
TCS	TEST CONTROL SWITCH
TK	TRACK
TOC	TRUCK OPERATED CONTACT
TYP	TYPICAL
V	VOLTS
WH	WATTHOUR METER
X, Y	AUXILIARY RELAY
XDR	TRANSDUCER
XFMR	TRANSFORMER

GENERAL NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, NATIONAL ELECTRICAL SAFETY CODE, NFPA, OSHA REGULATIONS, AND ALL OTHER EXISTING CODES AND REGULATIONS OF AUTHORITIES (LOCAL, STATE AND FEDERAL).
2. DRAWINGS ARE ESSENTIALLY DIAGRAMMATIC. LOCATIONS OF EQUIPMENT ARE SHOWN TO SCALE WHERE POSSIBLE BUT MAY BE DISTORTED FOR CLARITY. IT IS NOT WITHIN THE SCOPE OF THESE DRAWINGS TO SHOW ALL NECESSARY BENDS, OFFSETS AND OBSTRUCTIONS. IT SHALL BE THE RESPONSIBILITY OF CONTRACTOR TO INSTALL HIS WORK TO COORDINATE WITH THE BUILDING STRUCTURE, SITE CONDITIONS AND RAILROAD R.O.W. CLEARANCES.
3. THE CONTRACTOR IS RESPONSIBLE FOR SCHEDULING DELIVERY, RECEIVING, UNLOADING, STORING, UNCRATING, SETTING IN PLACE, AND PROTECTING FROM DAMAGE, VANDALISM, THEFT OR WEATHER DURING CONSTRUCTION FOR ALL NEW EQUIPMENT PROVIDED BY THE CONTRACTOR OR PROVIDED BY OTHER PARTIES TO THE CONTRACTOR FOR INSTALLATION BY THE CONTRACTOR.
4. SUBMIT DETAILED SITE SPECIFIC INSTALLATION AND CONSTRUCTION STAGING PLANS TO THE ENGINEER FOR APPROVAL.
5. ALL EQUIPMENT/DEVICES PROVIDED BY THE CONTRACTOR SHALL BE NEW AND OF RECENT MANUFACTURE AND SHALL MEET THE REQUIREMENTS OF APPLICABLE ANSI OR NEMA SPECIFICATIONS. WHERE UNDERWRITERS LABORATORIES, INC. HAVE ESTABLISHED STANDARDS FOR MATERIALS, PROVIDE MATERIALS BEARING THE UL LABEL.
6. CONTRACTOR SHALL PREPARE AND FURNISH TO OWNER 'AS-BUILT' PLANS FOR ALL WORK INSTALLED.
7. ALL CONDUIT INSTALLED (SPARE OR UTILIZED) SHALL HAVE A MINIMUM, ONE (1) 14 AWG ZINC-COATED STEEL OR MONOFILAMENT PLASTIC PULL LINE WITH NOT LESS THAN 200LB TENSILE STRENGTH CHARACTERISTICS. LEAVE 12" (MINIMUM) OF SLACK AT EACH END OF CONDUIT.
8. FIRST 5' OF ANY EXCAVATIONS IN THE YARD SHALL BE SOFT DUG ONLY.

WIRING METHODS SCHEDULE	
WIRING METHOD	APPLICATION
SCHEDULE 80 PVC (PVC 80)	- FOR ALL UNDERGROUND RACEWAYS IN CONCRETE ENCASED DUCTBANK

REV.	DATE	REVISION DESCRIPTION

DESIGNER/DRAFTER: K. KWONG/M. SHAUKAT CHECKED BY: E. FISH

SIGNATURE/ BLOCK:

stv
280 TRUMBULL STREET, 14' FLOOR
HARTFORD, CT 06103
(203) 375-5021

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER: 0301-0509
PROJECT DESCRIPTION: IMPROVEMENTS TO THE STAMFORD MAINTENANCE OF EQUIPMENT (MOE) FACILITY
TOWN(S): STAMFORD
DRAWING TITLE: TRACTION POWER NOTES AND ABBREVIATIONS

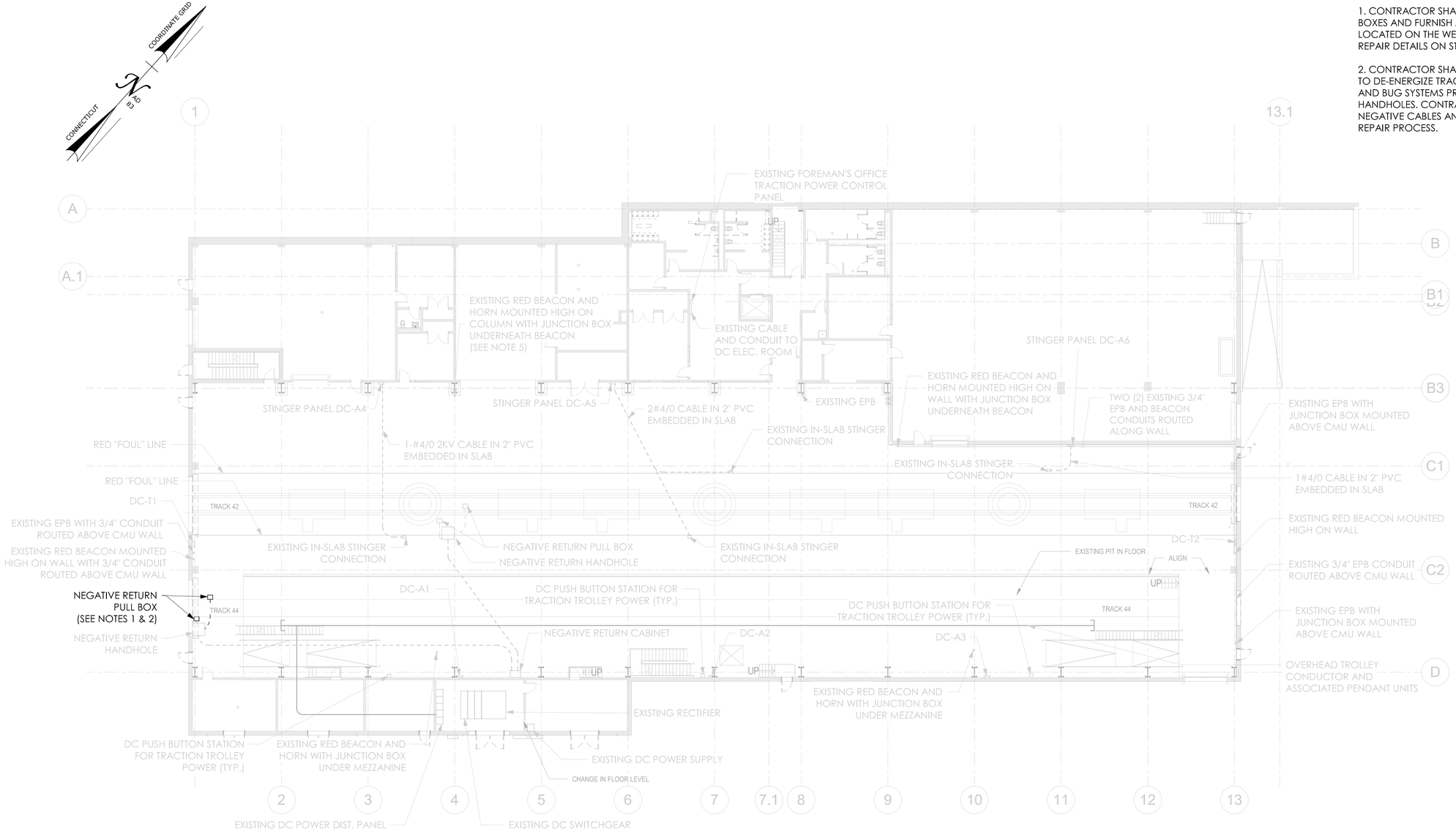
DRAWING NO. ETP-102
SHEET NO. 13.02

LASTED SAVED BY: ShaukaM **FILE NAME:** C:\Users\Shaukam\State of Connecticut\0301-0509 - Design\F_Traction_Power\Contract_Plans\ETP-102 TRACTION POWER NOTES AND ABBREVIATIONS.dgn
PLOTTED DATE: 10/12/2024

NOTES:

1. CONTRACTOR SHALL REPAIR EXISTING NEGATIVE PULL BOXES AND FURNISH AND INSTALL NEW PULL BOX COVERS LOCATED ON THE WEST SIDE OF TRACK 44. REFER TO REPAIR DETAILS ON STRUCTURAL DRAWING STR-500.

2. CONTRACTOR SHALL COORDINATE WITH MNR POWER TO DE-ENERGIZE TRACK 44 TRACTION POWER STINGER AND BUG SYSTEMS PRIOR TO REPAIRING THE EXISTING HANDHOLES. CONTRACTOR SHALL PROTECT THE EXISTING NEGATIVE CABLES AND CONNECTIONS DURING THE REPAIR PROCESS.



2 GROUND FLOOR - EXISTING DC TRACTION POWER EQUIPMENT PLAN

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

REV.	DATE	REVISION DESCRIPTION

Designer K. KWONG/M. SHAUKAT Checker E. FISH

0 8' - 0" 16' - 0" 32' - 0"

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

SIGNATURE/ BLOCK:

stv
280 TRUMBULL STREET, 14th FLOOR
HARTFORD, CT 06103
(203) 375-0521

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

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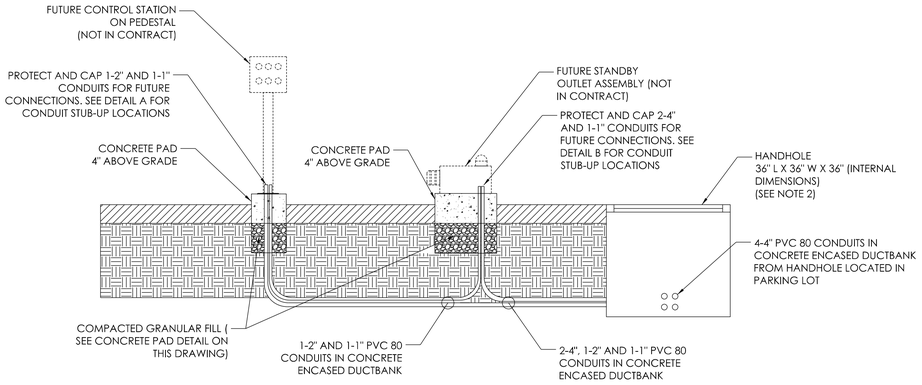
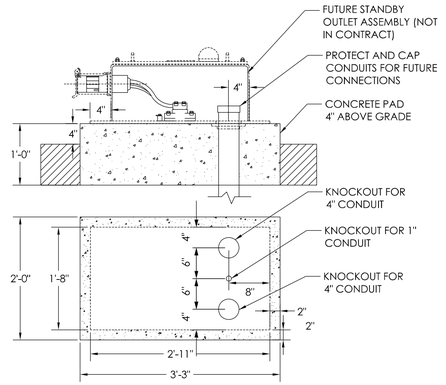
TOWN(S): STAMFORD, CT
DRAWING TITLE: EXISTING DC TRACTION POWER EQUIPMENT PLAN

DRAWING NO. ETP-111
SHEET NO. 13.03



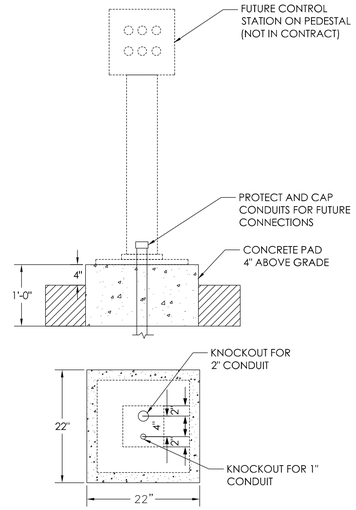
STANDBY POWER OUTLET AND CONTROL STATION
CONCRETE PAD AND HANDHOLE ELEVATION VIEW

(N.T.S)



DETAIL A
STANDBY POWER OUTLET
CONCRETE PAD AND CONDUIT KNOCKOUT AND STUB-UP DETAIL

(N.T.S)



DETAIL B
STANDBY POWER CONTROL STATION
CONCRETE PAD AND CONDUIT KNOCKOUT AND STUB-UP DETAIL

(N.T.S)

NOTES:

1. CONTRACTOR SHALL ENSURE CONDUITS STUB-UP AT THE LOCATIONS SHOWN IN DETAILS A AND B FOR FUTURE CONNECTIONS TO STANDBY POWER EQUIPMENT.

2. REFER TO ETP-811 FOR HANDHOLE REQUIREMENTS AND DETAILS.

3. REFER TO SITE STRUCTURAL DRAWING S-18 FOR CONCRETE PAD DETAILS.

REV.	DATE	REVISION DESCRIPTION

DESIGNER/DRAFTER: K. KWONG/M. SHAUKAT CHECKED BY: E. FISH

SIGNATURE/ BLOCK:

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

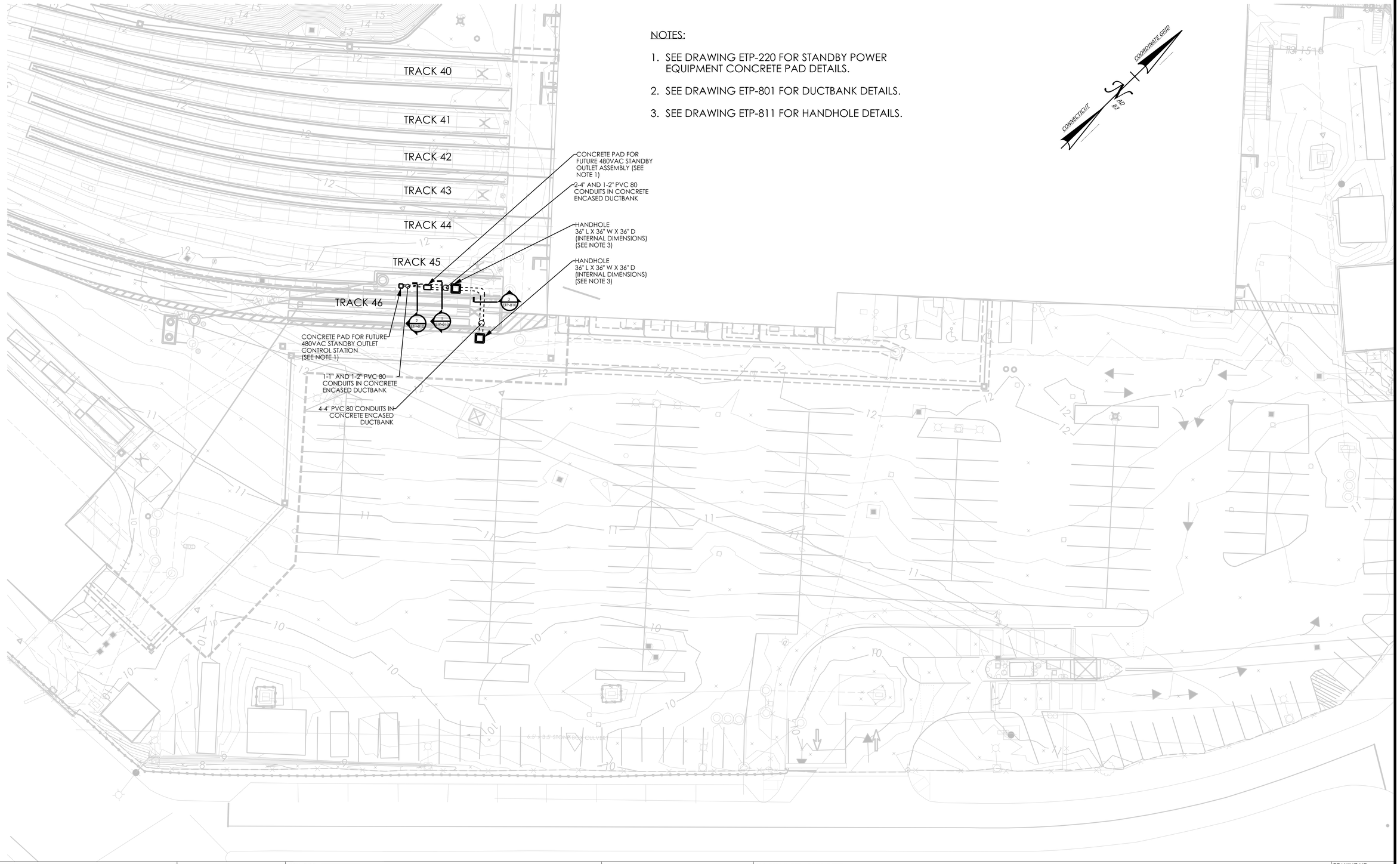
PROJECT NUMBER: 0301-0509
PROJECT DESCRIPTION: IMPROVEMENTS TO THE STAMFORD MAINTENANCE OF EQUIPMENT (MOE) FACILITY
TOWN(S): STAMFORD
DRAWING TITLE: 480V AC STANDBY POWER EQUIPMENT CONCRETE PAD AND CONDUIT DETAILS

DRAWING NO. ETP-220
SHEET NO. 13.04

LASTED SAVED BY: KwongK **FILE NAME:** C:\Users\kwongk\State of Connecticut\0301-0509 - Design\F_Traction_Power\Contract_Plans\ETP-220 480V AC STANDBY POWER EQUIPMENT CONCRETE PAD AND CONDUIT DETAILS.dgn
PLOTTED DATE: $DATE$

NOTES:

1. SEE DRAWING ETP-220 FOR STANDBY POWER EQUIPMENT CONCRETE PAD DETAILS.
2. SEE DRAWING ETP-801 FOR DUCTBANK DETAILS.
3. SEE DRAWING ETP-811 FOR HANDHOLE DETAILS.



REV.	DATE	REVISION DESCRIPTION

DESIGNER/DRAFTER: K. KWONG/M. SHAUKAT CHECKED BY: E. FISH

0 20' 0" 40' 0"
HORIZONTAL SCALE
1" = 20' 0"

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STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

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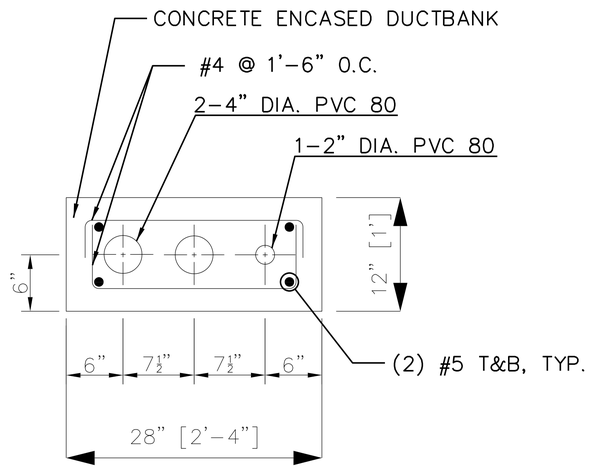
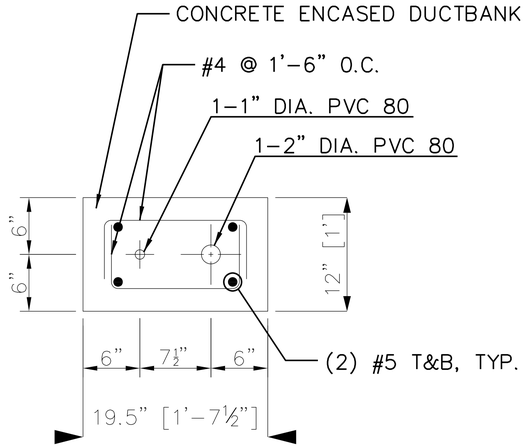
PROJECT DESCRIPTION: IMPROVEMENTS TO THE STAMFORD MAINTENANCE OF EQUIPMENT (MOE) FACILITY
TOWN(S): STAMFORD
DRAWING TITLE: TRACTION POWER SITE PLAN

DRAWING NO. ETP-601
SHEET NO. 13.05

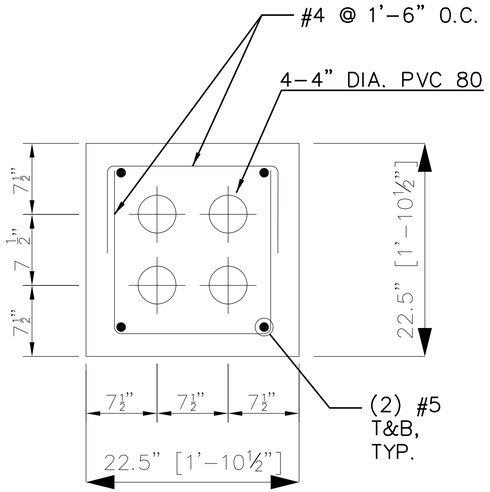
LASTED SAVED BY: ShaukaM **FILE NAME:** C:\Users\Shaukam\State of Connecticut\0301-0509 - Design\F_Traction_Power\Contract_Plans\ETP-601 TRACTION POWER SITE PLAN.dgn
PLOTTED DATE: $DATE$



DUCTBANK SECTION 1



DUCTBANK SECTION 2



DUCTBANK SECTION 3

NOTES:

1. REFER TO DRAWING ETP-601 FOR LOCATIONS OF DUCTBANK SECTIONS.
2. CONTRACTOR SHALL MAINTAIN A 36" MINIMUM COVER FROM TOP OF GRADE TO TOP OF DUCTBANK WHEN NOT GOING UNDER TRACK. MINIMUM 48" UNDER RAILROAD TRACK FROM BOTTOM OF TIE.
3. CONTRACTOR SHALL FURNISH AND INSTALL ELECTRONIC MARKER SYSTEM (EMS) WITH BALL MARKERS ALONG ALL UNDERGROUND DUCTBANKS, AND WARNING TAPE ABOVE ALL DUCTBANKS. SEE SPECIAL PROVISION ITEM #0119600A FOR PRODUCT DETAILS.

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TOWN(S): STAMFORD
DRAWING TITLE: TRACTION POWER DUCTBANK DETAILS

DRAWING NO. ETP-810
SHEET NO. 13.06

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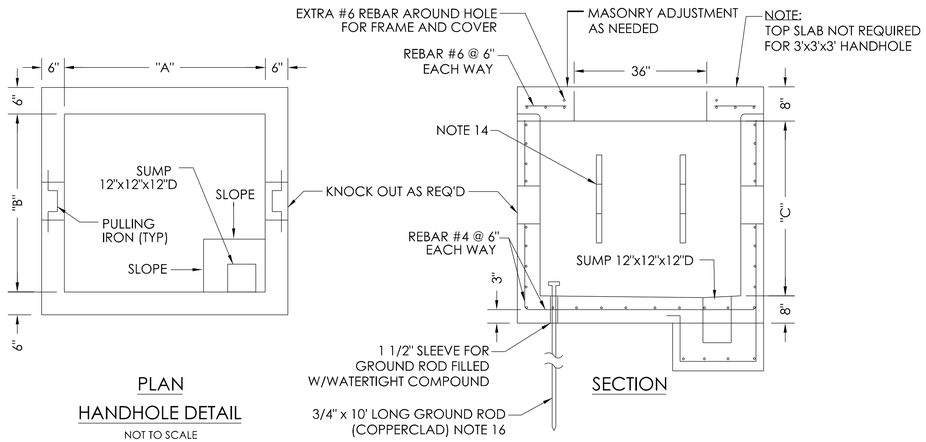
PLOTTED DATE: 10/11/2024



HANDHOLE DETAIL

NOT TO SCALE

NOTES:

1. HANDHOLE CONCRETE TO BE 4000 PSI PER SPECIFICATION.

2. HANDHOLE REBAR SHALL BE GRADE 60 ASTM-A615.

3. PULLING IRONS SHALL BE SET INTO CONCRETE WALLS OF HANDHOLES OPPOSITE DUCT ENTRANCES. PULLING IRONS SHALL BE HOT-FORGED STEEL , HOT-DIPPED GALVANIZED FOR CORROSION RESISTANCE. CABLE PULLING IRONS SHALL BE MANUFACTURED BY McGRAW EDISON, LINE CONSTRUCTION MATERIALS (OR APPROVED EQUAL). HANDHOLE MANUFACTURER TO SUBMIT DETAILS TO PROVIDE 6000 LB PULLING CAPACITY.

4. HANDHOLE AND ITS FRAME AND COVER SHALL SUPPORT H-20 ROADWAY LOADING.

5. ALL MOUNTING HARDWARE IN HANDHOLE TO BE STAINLESS STEEL.

6. HANDHOLE FRAME AND COVER MATERIAL TO BE GRAY CAST IRON, ASTM CLASS 30 MINIMUM.

7. HANDHOLE SUMP GRATING SHALL BE CAST IRON CONFORMING TO ASTM CLASS 50.

8. UPPER SIDE OF THE GRATING AND SEAT SHALL PRESENT TRUE PLANE SURFACES.

9. SUMP GRATING APPROXIMATE WEIGHT TO BE 50 LBS.

10. HANDHOLE AVERAGE WEIGHT FRAME TO BE 475 LBS AND COVER TO BE 375 LBS.

11. LOCATIONS OF PENETRATION ON WALLS SHALL BE SUBMITTED.

12. ALL THE METALLIC ITEMS SHALL BE GROUNDED USING 3/4"Øx10' GROUND RODS AND GROUND CONDUCTOR THROUGH WATER PROOF SLEEVES. ALL UNDERGROUND CONNECTIONS SHALL BE EXOTHERMIC WELDS.

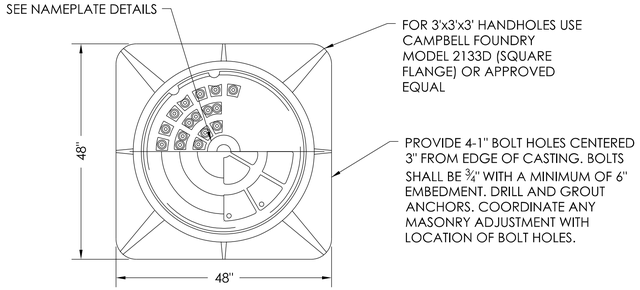
13. HANDHOLES SHALL BE PAINTED WITH BITUMINOUS DAMP-PROOFING ON ALL EXTERIOR SURFACES.

14. PROVIDE STAINLESS STEEL INSERTS AND NON-METALLIC SADDLE RACK (2-SADDLE TYPE RACK AS MANUFACTURED BY UNDERGROUND DEVICES, INC., OR APPROVED EQUAL). MINIMUM TWO PER HANDHOLE, COORDINATE WITH DUCT OPENINGS.

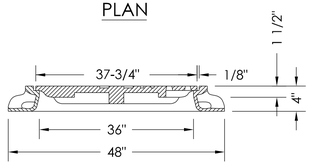
15. HANDHOLE FABRICATOR TO SUBMIT DETAILS SHOWING SUMP GRATING SUPPORT.

16. CONTRACTOR TO BOND #6 AWG (MIN.) COPPER WIRE FROM GROUND ROD TO HANDHOLE FRAME.

HANDHOLE SCHEDULE				
DESCRIPTION	INTERNAL DIMENSIONS			REMARKS
	WIDTH "A"	LENGTH "B"	DEPTH "C"	
480V STANDBY POWER AND CONTROL HANDHOLE	3'	3'	3'	SEE NAMEPLATE DETAILS ON THIS DRAWING



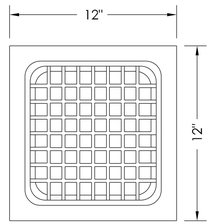
PLAN



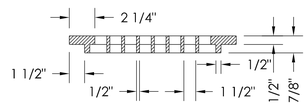
SECTION

HANDHOLE COVER

NOT TO SCALE



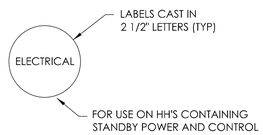
PLAN



SECTION

HANDHOLE SUMP GRATING

NOT TO SCALE



NAMEPLATE DETAILS

NOT TO SCALE

REV.	DATE	REVISION DESCRIPTION

DESIGNER/DRAFTER: K. KWONG/M. SHAUKAT CHECKED BY: E. FISH

SIGNATURE/ BLOCK:

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

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TOWN(S): STAMFORD
DRAWING TITLE: TRACTION POWER HANDHOLE DETAILS

DRAWING NO. ETP-811
SHEET NO. 13.07

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