

Taunton Municipal Airport – New Administration Building

Taunton, MA

City of Taunton

1098-06

Addendum No.04

August 9, 2019

Attention all bidders: All bidders are required to acknowledge receipt of this addendum on the filed sub-bid and general bid forms contained in the contract documents. All information included in this addendum is hereby included as part of the Contract Documents and is to be included in the bidder's scope of work and contract price at the time of bid. Failure to acknowledge this addendum may result in rejection of your bid.

General Information

Bidder questions that have not been answered yet will be answered in forthcoming addenda.

Attachments

-TMLP Specifications

Questions and Answers

- Q1** Referencing Section 337119 Electrical Underground Ducts and Manholes: a. Is Conduit with the Electrical Filed Sub-Bid? b. Is the Precast Concrete Handholes and Boxes with the Electrical Filed Sub-Bid?
- A1.** Yes, refer to detail 2 on E-011 for both parts of the question.
- Q2** Is Section 337121 Grounding and Bonding for Exterior Systems with the Electrical Filed Sub-Bid?
- A2.** Yes, refer to detail 2 on E-011.
- Q3** Drawing E-301 Note 8 describes the diesel standby generator as an add alternate. I cannot locate a specification section for alternates and there does not appear to be a line on the bid form to provide an alternate. Is this generator supposed to be an alternate?
- A3.** Correct, the generator is supposed to be an alternate.
- Q4** If the generator is an alternate, please provide clear scope on what should be in the base bid and what is part of the add alternate. Are the transfer switches part of the base bid or alternate? Is the conduit/wiring part of the base bid or alternate?
- A4.** Only the generator shall be included in the alternate pricing. All associated infrastructure shall be part of the base scope.
- Q5** Drawing E-401 shows light fixture types "A03" with integral occupancy sensors. There are also sensors located in the rooms with the "A03". Is it intended to have the redundant sensors?
- A5.** Redundant sensors are not required; however, contractor shall validate that full sensing converge of rooms is provided. Per detail 4 on Sheet E-802, the integral sensors to the fixture

shall be networked with the lighting control system, and subject to the requirements of section 26 09 26 for networked lighting controls and 26 09 93 Sequence of Operations for Lighting Control.

- Q6** Drawing E-301, can a panel schedule be provided for panel DP2?
A6. Panel schedule provided as part of Addendum 3.
- Q7** Drawing E-011 shows the paths of proposed conduit runs and drawing C-23 shows sections through various types of conduit groupings, but there is no indication of which conduit run applies to which detail - which conduits are concrete encased and which use bedding?
A7. All underground conduits shown on E-011 are direct buried unless noted otherwise. Service feeders are all noted as concrete encased; i.e. feeder from utility transformer to SRE, utility transformer to New Admin Building, and from utility pole to utility transformer. Contractor shall coordinate exact routing to determine quantity of conduits to be grouped together. Contractor to refer to corresponding detail on C-23 based on this quantity. For direct buried feeders, refer to detail 1/E-801.
- Q8** The electrical site plan and E-301 show work associated with the SRE Building. Please provide locations for the new electrical meter, new ATS, existing panel DP1, and new panel DP2. Since new wiring is to be installed between these pieces of equipment, we need to know the distances between them.
A8. Locations for new electrical infrastructure at SRE to be provided in forthcoming Addendum.
- Q9** Similar to question 8, please provide a location for the SRE Building telecom room as we are running new conduit to that location.
A9. Please refer to Construction Drawing A-692 for existing SRE Telecom room location.
- Q10** Plan E-011 notes for EC to run U/G AL conductor from pole to transformer, and the direction of the line does not lead to a utility pole. There is a utility pole located on the south side near PED Gate #2. Is this where we are supposed to run the conductor?
A10. The aforementioned existing pole (last before taking right onto runway) will be replaced with a new pole by TMLP. Primary conduits and conductors will run to this new pole. Pole to be coordinated between GC and TMLP.
- Q11** Where can we find TMLP specifications? The TMLP T&C's on-line does not have the information.
A11. See attached.
- Q12** The Instruction to Bidder lists Article 10: Alternates as 'Not Used' and there is no space on the sub-bid form for alternates, however, there are several locations on the electrical drawings that include an alternate for a diesel generator. Specifically note #8 on drawing E-301. Please confirm that the diesel generator is to be packaged as part of the base bid for the project and there are no alternates that need to be listed as part of the electrical sub-bid.
A12. Alternate 1 is for the Generator Unit. Infrastructure to the generator is part of the base bid. See attached for related spec, drawing, and bid form changes.
- Q13** Please provide a specification for water meter #2. Please confirm that the gas sub-meter is supplied by the owner as shown on P-801, detail 6.
A13. Both water meters to be provided by the Water Department.

- Q14** In section 085113 pg. 4 paragraph 1.7 it references that the mock-up will NOT remain as part of the work. On 5/A-563 it shows the mock-up area as being (2) W1 windows. Are 2 windows required for the mock-up? If so, can they stay installed and become part of the final construction? Also, it shows a storefront assembly on 5/A-563, is a storefront mock-up required? There is no mention of this in the specifications.
- A14.** Portions, if not all, of the mock-up may remain in place if there are no objections to the work by the Owner and Architect. If there are objections to any portion of the mock-up work, it must be removed and replaced to the Owner and Architect's satisfaction. Work within the scope of the mock-up shall not be constructed on the remainder of the project until the work on the mock-up is reviewed and approved by the Owner and Architect. Two windows are required for the mock-up along with the scope indicated on Detail 5/A-563. A storefront assembly is not required as part of the mock-up.
- Q15** Who is responsible for the testing of the windows/curtainwall/storefront? How many tests will be conducted on each of the windows/curtainwall/storefront?
- A15.** The Owner is responsible for third party testing of the windows, storefront, and curtainwall if they wish to have it performed. The scope of testing will be up to the Owner's discretion but will not test for performance requirements in excess of what has been specified.
- Q16** Drawing 9/A501 show conduit installed on top of the roof deck buried in the roof insulation. The detail states to "Refer to Electrical Drawings". Our scope of work listed drawings does not include the electrical drawings. 1) Please confirm Massachusetts Electrical Code allows this type of conduit installation. 2) If code does allow, please tell us how many back boxes we will need to cut the roof insulation around and how much conduit across the roof deck we will have to cut the roof insulation around?
- A16.** The roofing filed sub scope shall include the Electrical drawings under their list of "Related Requirements" 1. Massachusetts electrical code allows this type of conduit installation. 2. Roofer to coordinate insulation cuts with number of back boxes and conduit runs based on electrical drawings.
- Q17** Specification Section 01 50 00 Temporary Facilities and Controls, 1.14 A.3b requires the construction trailer to have a sound rating of 70 dB. Can the 70 dB be waived? If the rating cannot be waived, please provide a manufacturer, model number for a 70 dB trailer. Please advise.
- A17.** The 70dB sounds rating can be waived.
- Q18** Please confirm we are correct in our understanding that work and materials described in non-electrical specification or shown on non-electrical drawings, without also being described and listed in the electrical specifications, is for coordination purposes only and shall not be part of the electrical contractor's bid for this project.
- A18.** Electrical Contractors bids shall be coordinated with and in anticipation of the work and materials described in non-electrical specifications and non-electrical drawings.
- Q19** Per Structural Drawing S002, noting this building is designated as a Seismic Design Category "B", will seismic bracing be required for the fire protection scope 210001?
- A19.** Per the Mass State Building Code, seismic bracing is not required for Seismic Design Category B.

- Q20** Addendum #2 indicated that Specification Section 07 44 50 – Fiber Cement Siding is responsible for providing the flashing above the granite base on Drawing A-531 instead of Section 07 62 00 – Sheet Metal Flashing and Trim. Which trade is responsible for providing the sill flashing shown on Detail 2 Drawing A-535 & A-562?
- A20.** No, Addendum #2 indicates that division 04 43 13 is responsible for providing the flashing directly above the granite base - Not 07 44 50 or 07 62 00 as identified in the question. There is no sill flashing shown on Detail 2/A-535. The sill flashing shown directly above the granite base on Detail 2/A-562 is provided by division 04 43 13.
- Q21** Which trade is responsible for furnishing and installing the brake metal shown on Detail Drawings 6&7/A-532, 8/A5.33, 6/A-535, 3/A621 and 4, 5 &10/A-641?
- A21.** Break metal flashing in Detail 6&7/A-532 and 6/A-535 is by 08 44 13. Break metal flashing at the fiber cement panels in Detail 8/A-533, 3/A-621, and 4, 5, & 10 /A-641 is by 07 44 50.
- Q22** The Glulam specifications section 06.18.00 calls for FSC certified Glulams. Is it possible to have this requirement waived?
- A22.** Yes, refer to Addendum 2, Q10.
- Q23** Ref. Spec Section 093000-1.2.6: Is the tile trade contractor responsible for the furnishing and installation of the backer board behind the wall tile?
- A23.** Yes the tiling contractor is responsible for furnishing and installing the backer board behind tile. Refer to revised spec section 09 30 00, 2.1, A, 2 for backer board in Addendum 3, Q4.
- Q24** Ref. Sections 093000-2.4A, 3.6.B2, and 3.7.A3: Under materials, acrylic modified grout is called for. But under the floor and wall tile installation methods, epoxy grout is called for. Which is it?
- A24.** Refer to Addendum 3, Q52.
- Q25** Interior signage specs and drawings are contradictory in regards to sizes and materials. Please advise which is correct.
- A25.** Refer to drawings for dimensions of the exterior Cast Metal Letters and interior Window Plaque Signage. For Interior Plaque Signage materials, provide in Photopolymer; remove references to acrylic in drawings at these signs.

End of Addendum No. 04



Serving a Public Power Community

Mr. Bob Adams
Chairman
Taunton Municipal Airport Commission
4 Westcoat Drive
East Taunton, MA 02781

March 20, 2019

Re: New Administration Building, Taunton Municipal Airport

Dear Mr. Adams,

Per your request, TMLP has included specifications regarding the proposed new 3 phase permanent service at the above-mentioned location. Typically, the responsibilities are as follows:

Taunton Municipal Lighting Plant will be responsible for the following for the Permanent Service.

1. TMLP will install new pole #12 to be primary riser.
2. TMLP will dress primary cables w/ customer supplied Terminators on each pole.
3. TMLP will supply necessary transformer on customer installed pad. Secondary voltage and size to be determined. Metering will be at each building or at transformer.
4. TMLP to install approx. 1500' of 3 phase 1/0 spacer type cable on existing poles. The installation cost of this will be \$45,000.00.
5. TMLP to move existing street lights from aluminum standards to wooden poles, and remove aluminum poles and bases.
6. New service to SRE building may come out of same transformer.

The Customer will be responsible to supply and install and maintain the following for Permanent Service:

1. One set of 3-15 kV, 1/0 AL. underground cable from Pole to transformer pad w/ sufficient slack as needed per attached specs.
2. (3) Each of 15 kV load break elbows, parking stands, insulated caps, as per attached spec or approved equal. Contractor is responsible for dressing primary and secondary sides of transformer.

3. Primary, secondary, and fiber optic conduit as required. Primary cable and 4-4" Sch. 40 or DB PVC conduit to be concrete encased, 3" on all sides. 2" Sch. 40 PVC Fiber Optic Conduit to bypass transformer pad and express to telephone/data room for fiber optic service. Galvanized steel long radius seeps and 10' Galvanized pipe to be used on poles.
4. Transformer pad and grounding as per attached TMLP drawings. Pad shall be a minimum of 10' from a permanent structure and shall be accessible by TMLP equipment. Transformer pad to be pre-cast type TMLP spec. or approved equal. Protective bollards to be installed around transformer by contractor.
5. Secondary cable, properly sized, from TMLP supplied transformer to permanent service location.

If you have any questions, please contact Craig Foley (508)-824-3167 at this office.

Very truly yours,

**MUNICIPAL LIGHT COMMISSION
OF THE CITY OF TAUNTON**



**Craig Foley
Distribution Manager**

Specifications Included:

Trench detail
Manhole
Manhole racks
Frame and Cover
Transformer Pad
Grounding Grid
Protective Bollards
UG equipment
15 Kv Cable
15KV Splices

Bushing Covers 15, 25/35

R & D Utility Products

MADE IN U.S.A.



≈ 30

Bushing Covers: RD-BC15KV, RD-BC25/35KV

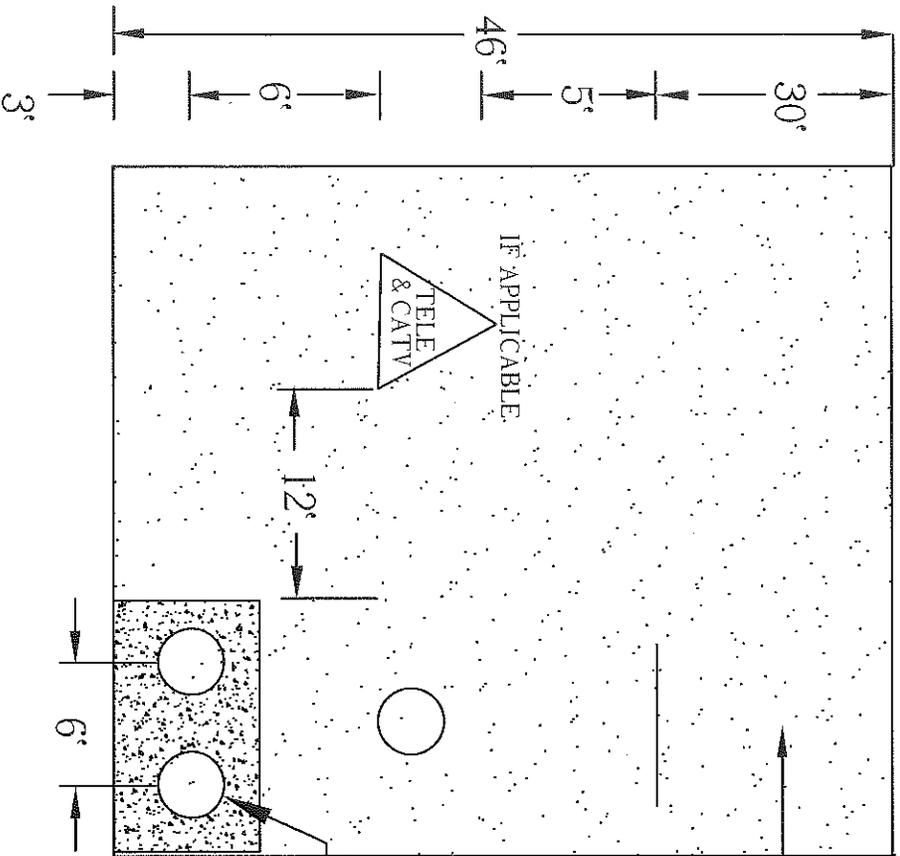
- Completely eliminates all drain wires
- Completely eliminates potential arc flash hazard
- 100% test indication of energized bushing without removing cover
- IP67 submersible rating
- Meets all requirements of ASTM F712
- Meets all pertinent IEEE386 requirements - Voltage withstand, sealing and mechanical make / break force.
- Designed for temporary and permanent installation applications.

Voltage Classes: 15kV 25/35kV

Material: UV Stabilized TPR Polymer

TMLP TRENCH DETAIL

NO SCALE



SELECTED BACKFILL
(No stones over 3' dia.)

ELECTRICAL WARNING TAPE

2' PVC FOR FIBER OPTICS TO BYPASS TRANSFORMER
EXPRESS TO TELE OR DATA ROOM

SPARE CONDUIT

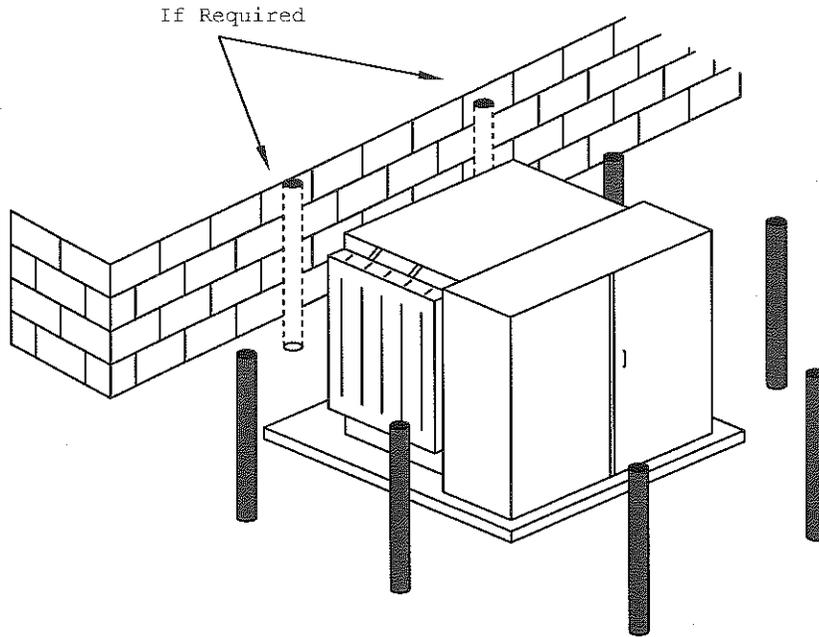
2-4' PVC 15KV PRIMARY CONDUITS
3' concrete around
conduit (10', all sides)



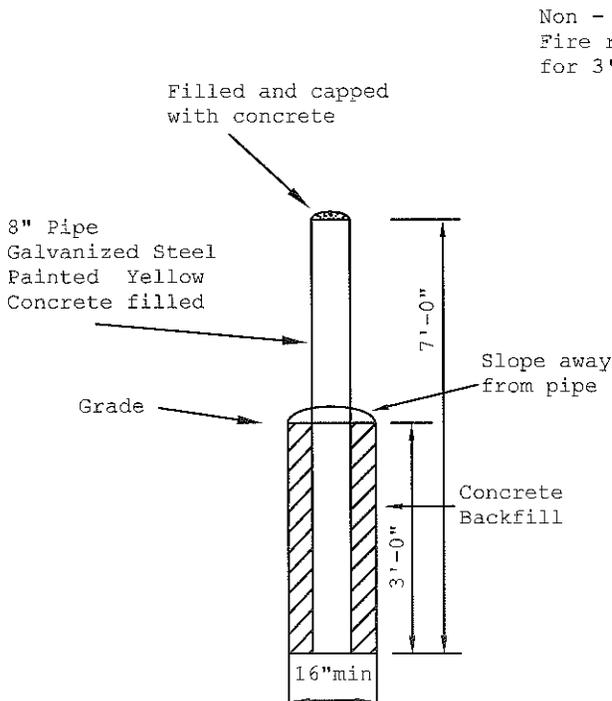
TAUNTON MUNICIPAL LIGHTING PLANT

THREE PHASE PAD MOUNTED TRANSFORMER PROTECTION

DWN BY CJB	CHK BY	DATE 5/26/09
R.N.	W.O.	SCALE: NONE



Area within protection pipes must remain clear for opening or equipment doors and maintenance



Non-combustible Fire rated wall or BLDG. for 3' Dimension

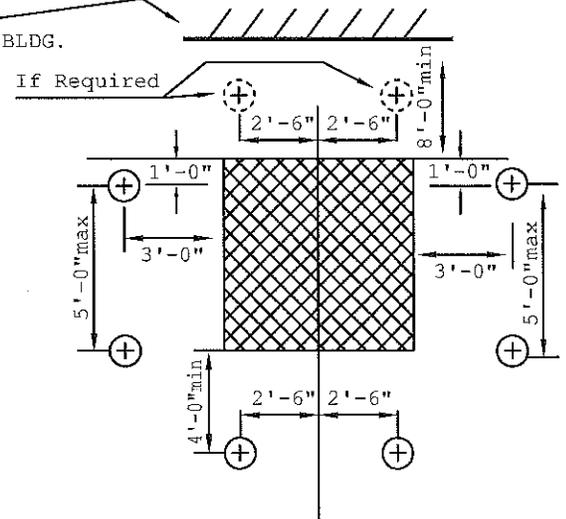
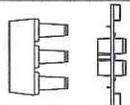


Illustration (not to scale)	Description	Voltage Class	ELASTIMOLD Part Number	Notes
	Elbow Connector	15kV 25kV 35kV	165LR-W5X Use Tables W1 and X1 275LR-W5X Use Tables W16 and X1 375LR-W5X Use Tables W3 and X2	N2,3,4,5 N2,3,4,5 N2,3,5
	Elbow Connector w/ Test Point	15kV 25kV 35kV	166LR-W5X Use Tables W1 and X1 276LR-W5X Use Tables W16 and X1 376LR-W5X Use Tables W3 and X2	N2,3,4,5,24 N2,3,4,5,24 N2,3,5,24
	Jacket Seal Elbow Connector	15kV 25kV	165LRJS-W5X Use Tables W1 and X1 275LRJS-W5X Use Tables W16 and X1	N2,19 N2,19
	Jacket Seal Elbow Connector w/ Test Point	15kV 25kV	166LRJS-W5X Use Tables W1 and X1 276LRJS-W5X Use Tables W16 and X1	N2,19,24 N2,19,24
	Repair Elbow Connector	15kV 25kV	167ELR-W5X Use Tables W5 and X1 273ELR-W5X Use Tables W5 and X1	N5,10,18 N5,10,18
	Repair Elbow Connector w/ Test Point	15kV 25kV	168ELR-W5X Use Tables W5 and X1 274ELR-W5X Use Tables W5 and X1	N5,10,18,24 N5,10,18,24
	Replacement Elbow	15kV 25kV	167RLR-W5X Use Tables W4 and X1 273RLR-W5X Use Tables W2 and X1	N5,11,13 N5,11,13
	Replacement Elbow w/ Test Point	15kV 25kV	168RLR-W5X Use Tables W4 and X1 274RLR-W5X Use Tables W2 and X1	N5,11,13,24 N5,11,13,24
	Direct Test Elbow Connector	15kV 25kV	167DLR-W5X Use Tables W4 and X1 273DLR-W5X Use Tables W2 and X1	N2,5,22 N2,5,22
	Direct Test Repair Elbow Connector	15kV 25kV	167DELR-W5X Use Tables W5 and X1 273DELR-W5X Use Tables W5 and X1	N5,10,18,22 N5,10,18,22
	Direct Test Repair Elbow Connector w/Test Point	15kV 25kV	168DELR-W5X Use Tables W5 and X1 274DELR-W5X Use Tables W5 and X1	N5,10,18,22,24 N5,10,18,22,24
	Fused Elbow (Full Range Current Limiting)	15kV 25kV	168FLR H-W0X 274FLR H-W0X See Product Guide PG-PC-H	
	Bolted Elbow w/ Tap	15kV	167LRT-W5X Use Tables W4 and X1	N17
	Bushing Insert	15kV 25kV 35kV 35kV	1601A4 2701A4 3701A4 3701A3	N4,8,20 N4,8,20 N6,21 N8,21
	Extended Bushing Insert	15kV 25kV	1601EA4 2701EA4	N8,20 N8,20
	Feed-Thru Insert	15kV 25kV 35kV	1602A3R 2702A1 3702A1	N16 N16 N6,16
	Insulated Cap	15kV	160DR	N9

Illustration (not to scale)	Description	Voltage Class	ELASTIMOLD Part Number	Notes
	Insulated Cap w/ Ground and Test Point	15kV 25kV 35kV	168DRG 274DRG 376DRG	N7 N7 N7
	Grounding Plug (1/0 AWG x 6' Ground Lead)	15kV 25kV	161GP 272GP	
	Grounding Elbow (1/0 AWG x 6' Ground Lead)	15kV 25/35kV	160GLR 370GLR	N12
	Feed-Thru	15kV 25kV 35kV 35kV	164FT 274FT 371FT 373FT	N6
	Feed-Thru Vertical	15kV 25kV 35kV	164FTV 274FTV 373FTV	
	Adjustable Bracket 2-point Feed-Thru	15kV 25kV 35kV	164FT2-AB 274FT2-AB 373FT2-AB	N23 N23 N23
	Adjustable Bracket 3-point Feed-Thru	15kV 25kV 35kV	164FT3-AB 274FT3-AB 373FT3-AB	N23 N23 N23
	Adjustable Bracket 4-point Feed-Thru	15kV 25kV 35kV	164FT4-AB 274FT4-AB 373FT4-AB	N23 N23 N23
	Feed-Thru Well	15/25kV	K1601WFT	
	Feed-Thru Well Vertical	15/25kV	K1601WFTV	
	Insulated Parking Bushing	15kV 25kV 35kV	161SOP 272SOP 372SOP	N20 N20 N21
		15kV 25kV	164SOP 274SOP	N20,23 N20,23
	Test Rod	ALL	370TR	
	Bushing Well Plug	15/25kV 35kV	276BWP M276BWP	
	Assembly Tool	ALL	200AT	N8

- N1. Copper lug for use on COPPER CONDUCTOR ONLY.
- N2. W5X indicates that the part number includes 02500X long bi-metal compression lug as standard. For an all-copper lug, replace W5X with W2X in Table X1 to specify the all-copper 02702X lug.
- N3. Also available as housing only. Specify: 165BLR-W; 275BLR-W; 375BLR-W; 166BLR-W; 276BLR-W; 376BLR-W.
- N4. Also available as elbow/insert combination. Specify: 165A4-WX; 275A4-WX; 166A4-WX; 276A4-WX.
- N5. Also available with 200ECS jacket seal included. Add - "S" suffix to part number.
- N6. Rated for single-phase applications only.
- N7. Equipped with insulated cuff.
- N8. Includes internal torquing feature using 200AT Assembly Tool.
- N9. Also available without probe. Specify "A" suffix - Example: 273DRGA.
- N10. Repair elbow has extended length contact and elbow housing resulting in a net gain of 3-1/4" in length.
- N11. Replacement elbow has extended length contact and elbow housing resulting in a net gain of 8-7/8" in length.
- N12. Rated for 25kV thru 35kV applications.
- N13. Includes long bi-metal contact 00400X.
- N14. 160CA Cable Size Adapter can only be used with elbow part numbers 165LR/166LR C size only.
- N16. Fully rotatable for 360° positioning. Includes bail assembly to secure feed-thru insert to bushing well.
- N17. Includes 02800X bi-metal contact.
- N18. Includes 02509X long bi-metal contact.
- N19. Includes built-in jacket seal. Also available as housing only — specify: 165BLRJS-W, 166BLRJS-W, 275BLRJS-W or 276BLRJS-W. Also available as elbow/insert combination — specify: 165JSA4-W5X, 166JSA4-W5X, 275JSA4-W5X or 276JSA4-W5X.
- N20. Includes a yellow seating indicator and vent ring.
- N21. Includes a black vent ring.
- N22. Direct Test Connectors, along with a 200TC-X series meter adapter, a properly rated voltage meter and Hot-line Stick provides a means for direct conductor voltage testing.
- N23. With stainless steel bracket.
- N24. Test Point Cap Cat# 156-7

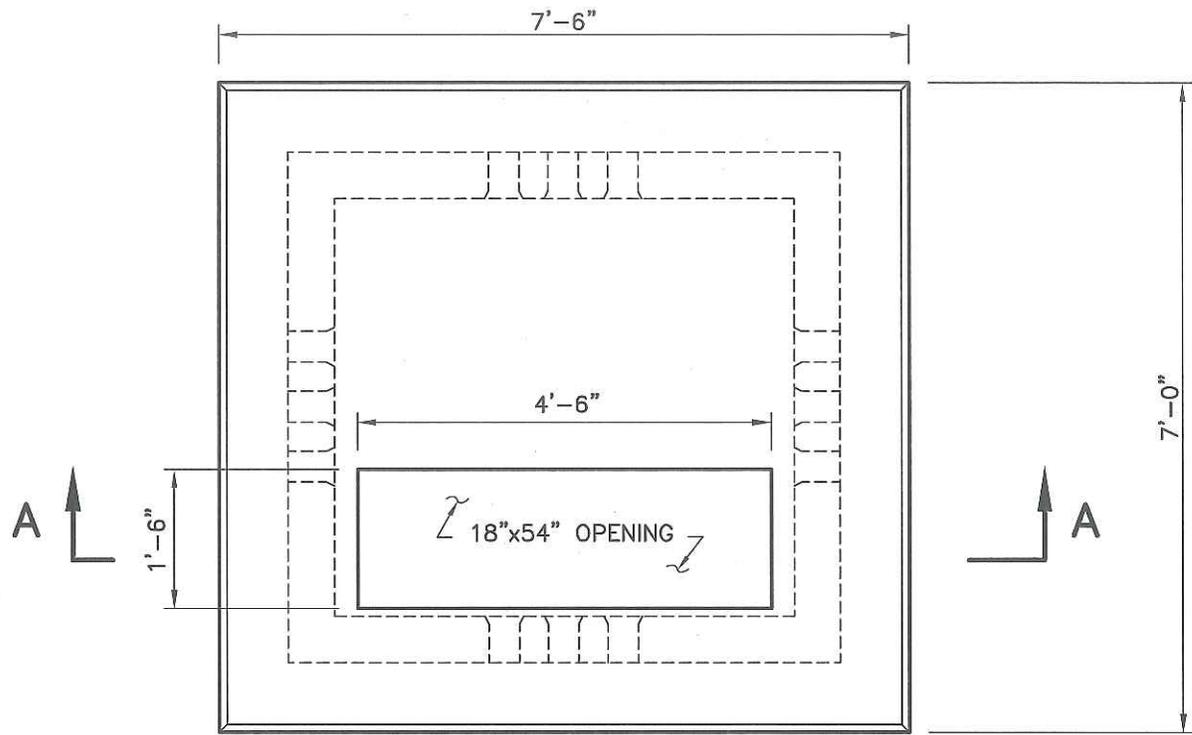


**CONTACTS, PROBES, PLUGS,
CABLE ADAPTERS AND JUNCTIONS
CONTINUED ON PAGE 7.**

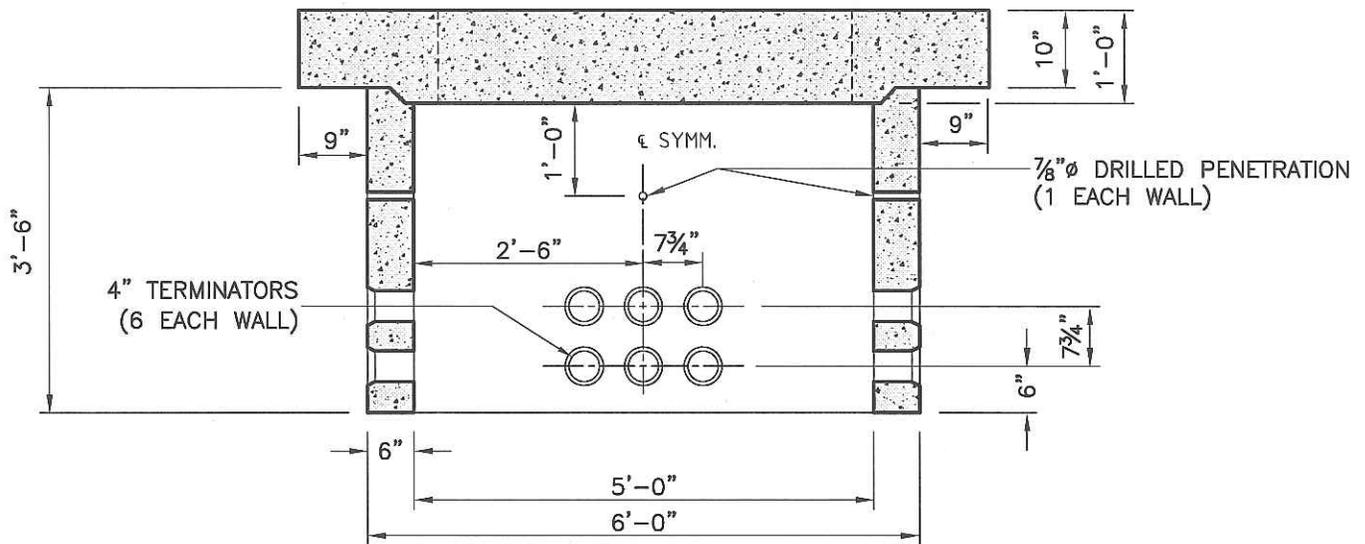
Refer to the W and X tables on pages 38 and 39 for sizing to cable insulation diameter and conductor size.

For cable shield adapters and jacket seals, see page 28.

Separable Connectors
200A Loadbreak



PLAN



SECTION A-A

TYPICAL WALLS ELEVATION

NOTES:

1. CONCRETE MIN. STRENGTH - 5,000 PSI @ 28 DAYS.
2. STEEL REINFORCEMENT - ASTM A615, GRADE 60.
3. MINIMUM STEEL COVER - 1-1/2 INCH TYPICAL.
4. DESIGN LOADING - AASHTO HS20-44.
5. DESIGN SPECIFICATIONS - ACI 318 & AASHTO LOAD FACTOR DESIGN METHOD.
6. TERMINATORS SHALL HAVE BELL ENDS FLUSH WITH INSIDE WALL.
7. CONSTRUCTION JOINT SHALL BE SEALED WITH 1" ∅ BUTYL RUBBER OR APPROVED EQUAL.



New England's Premier Precaster
 800-696-7432 (SHEA)
 www.sheaconcrete.com

NSTAR VAULT - 1000KVA

773 Salem Street-Wilmington, MA 153 Cranberry Hwy-Rochester, MA
 87 Haverhill Road-Amesbury, MA 160 Old Turnpike Rd-Nottingham, NH
 Mail to: PO Box 520-Wilmington, MA 01887

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NSTAR VAULT 1000KVA.dwg

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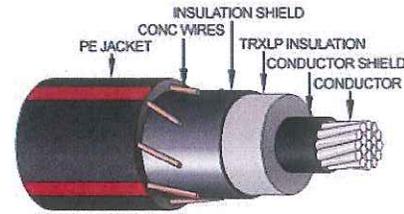




HENDRIX

Hendrix Wire and Cable Inc

HQ2000 .175" TRXLP 15 KV CONCENTRIC NEUTRAL UNDERGROUND CABLE 100% INSULATION THICKNESS COMPRESSED STRANDING AND SOLID CONDUCTORS



PHYSICAL DATA

ALUMINUM	CONDUCTOR		COPPER NEUTRAL		DIAMETER (PER ANSI/ICEA S-94-649-2000)				WEIGHTS			
	AWG or KCMIL	Number of Strands	Number of Wires	Size AWG	Conductor	Min. Over Insulation	Max. Over Insulation	Over Embedded Jacket	Conductor	Neutral	Total Without Jacket	Total With Embedded Jacket
FULL NEUTRAL	2	SOLID	10	14	.258	.610	.695	.978	61.1	130	356	477
	2	7	10	14	.283	.635	.720	1.003	62.3	130	370	487
	1	SOLID	13	14	.289	.645	.725	1.008	78.5	173	424	543
	1	19	13	14	.322	.675	.760	1.038	78.5	173	437	556
	1/0	SOLID	16	14	.325	.680	.760	1.043	97.2	210	494	615
	1/0	19	16	14	.362	.715	.800	1.078	99.1	210	510	632
	2/0	19	13	12	.406	.760	.845	1.157	124.9	276	616	760
	3/0	19	16	12	.456	.810	.895	1.207	157.5	340	730	874
ONE-THIRD NEUTRAL	4/0	19	20	12	.512	.865	.950	1.262	198.6	425	875	1030
	1/0	SOLID	6	14	.325	.680	.760	1.043	97.2	80	356	460
	1/0	19	6	14	.362	.715	.800	1.078	99.1	80	373	515
	2/0	19	7	14	.406	.760	.845	1.123	124.9	94	434	575
	3/0	19	9	14	.456	.810	.895	1.173	157.5	120	510	655
	4/0	19	11	14	.512	.865	.950	1.228	198.6	147	598	759
	250	37	13	14	.558	.920	1.005	1.288	234.7	174	684	889
	350	37	11	12	.661	1.025	1.110	1.462	328.6	238	913	1175
500	37	16	12	.789	1.150	1.235	1.562	469.4	341	1207	1498	
750	61	15	10	.968	1.340	1.425	1.884	704.0	508	1685	2057	
1000	61	20	10	1.117	1.485	1.575	2.069	938.7	683	2210	2516	

COPPER	CONDUCTOR		COPPER NEUTRAL		DIAMETER (PER ANSI/ICEA S-94-649-2000)				WEIGHTS			
	AWG or KCMIL	Number of Strands	Number of Wires	Size AWG	Conductor	Min. Over Insulation	Max. Over Insulation	Over Embedded Jacket	Conductor	Neutral	Total Without Jacket	Total With Embedded Jacket
FULL NEUTRAL	2	7	16	14	.283	.635	.720	1.003	205	232	642	700
	1	19	13	12	.322	.675	.760	1.072	259	300	504	570
	1/0	19	16	12	.362	.715	.800	1.112	326	370	923	993
	2/0	19	20	12	.406	.760	.845	1.157	411	462	1107	1176
	3/0	19	25	12	.456	.810	.895	1.207	518	578	1334	1402
	4/0	19	32	12	.512	.865	.950	1.262	653	740	1642	1708
ONE-THIRD NEUTRAL	1/0	19	9	14	.362	.715	.800	1.078	326	131	708	777
	2/0	19	11	14	.406	.760	.845	1.123	411	160	836	907
	3/0	19	14	14	.456	.810	.895	1.173	518	203	1002	1074
	4/0	19	11	12	.512	.865	.950	1.262	653	255	1227	1317
	250	37	13	12	.558	.920	1.005	1.322	772	301	1427	1546
	350	37	12	10	.661	1.025	1.110	1.504	1080	440	1904	2055
	500	37	17	10	.789	1.150	1.235	1.694	1544	623	2664	2823
	750	61	25	10	.968	1.340	1.425	1.884	2316	917	3794	3964
1000	61	33	10	1.117	1.485	1.575	2.105	3088	1211	4948	5127	



HENDRIX

Hendrix Wire and Cable Inc

**HQ2000 .175" TRXLP 15 KV CONCENTRIC NEUTRAL
UNDERGROUND CABLE 100% INSULATION THICKNESS
COMPRESSED STRANDING AND SOLID CONDUCTORS**

ELECTRICAL DATA

ALUMINUM	CONDUCTOR		COPPER NEUTRAL		Resistance DC OHMS Per 1000' @ 90° C	Inductive Reactance OHMS Per 1000'	AMPACITY - 20°C Ambient 100% LF, RHO-90			
	AWG or KCMIL	Number of Strands	Number of Wires	Size AWG			1/C Direct Buried	1/C Duct Buried	1/C Duct in Air	
FULL NEUTRAL	2	SOLID	10	14	.328	.032	170	115	100	
	2	7	10	14	.336	.030	170	115	100	
	1	SOLID	13	14	.260	.030	195	140	123	
	1	19	13	14	.265	.029	195	140	123	
	1/0	SOLID	16	14	.206	.028	230	155	135	
	1/0	19	16	14	.211	.028	230	155	135	
	2/0	19	13	12	.167	.025	270	185	162	
	3/0	19	16	12	.132	.024	295	210	184	
ONE-THIRD NEUTRAL							OHMS to Neutral Per 1000'	3/C Direct Buried 8" Spacing	3/C Triplex in Duct	3/C Duct In Air
	1/0	SOLID	6	14	.206	.102	230	165	145	
	1/0	19	6	14	.211	.099	230	165	145	
	2/0	19	7	14	.167	.097	250	190	167	
	3/0	19	9	14	.132	.094	280	215	189	
	4/0	19	11	14	.105	.092	320	245	215	
	250	37	13	14	.089	.089	345	270	237	
	350	37	11	12	.0635	.085	405	325	285	
	500	37	16	12	.0445	.082	460	385	338	
	750	61	15	10	.0296	.077	515	475	417	
1000	61	20	10	.0222	.074	565	540	475		

COPPER	CONDUCTOR		COPPER NEUTRAL		Resistance DC OHMS Per 1000' @ 90° C	Inductive Reactance OHMS Per 1000'	AMPACITY - 20°C Ambient 100% LF, RHO-90			
	AWG or KCMIL	Number of Strands	Number of Wires	Size AWG			1/C Direct Buried	1/C Duct Buried	1/C Duct in Air	
FULL NEUTRAL	2	7	16	14	.202	.030	225	160	140	
	1	19	13	12	.161	.029	260	185	162	
	1/0	19	16	12	.127	.028	295	210	185	
	2/0	19	20	12	.102	.025	330	240	210	
	3/0	19	25	12	.0802	.024	375	270	237	
	4/0	19	32	12	.0635	.023	430	305	268	
ONE-THIRD NEUTRAL							OHMS to Neutral Per 1000'	3/C Direct Buried 8" Spacing	3/C Triplex in Duct	3/C Duct in Air
	1/0	19	9	14	.127	.099	290	210	185	
	2/0	19	11	14	.102	.097	320	240	210	
	3/0	19	14	14	.0802	.094	350	275	241	
	4/0	19	11	12	.0635	.092	390	315	276	
	250	37	13	12	.0539	.089	415	340	298	
	350	37	12	10	.0385	.085	475	415	364	
	500	37	17	10	.0270	.082	525	480	420	
	750	61	25	10	.0180	.077	560	530	465	
100	61	33	10	.0135	.074	600	590	518		

TMLP SPECIFICATIONS
URD JACKETED CABLE, 15KV

1.0 GENERAL

- 1.1 The jacketed cable shall meet all applicable provisions of the attached Taunton Municipal Lighting Plant URD cable specification and IPCEA Publication S-66-524 except where they conflict with the requirements of this specification, in which case this specification shall apply
- 1.2 When references are made to the American Society for Testing Materials (ASTM) the requirements of the latest revision of the reference specification shall apply.

2.0 VOLTAGE RATING

- 2.1 The cable shall be rated for 15 KV operation.

3.0 INSULATION

- 3.1 The insulation shall be tree retardant cross-linked polyethylene meeting the requirements of IPCEA Publication No. S-66-524.
- 3.2 The average thickness of insulation shall be 175 mils. The minimum thickness at any point shall not be less than 157.5 mils.

4.0 CONDUCTOR SHIELD

- 4.1 The conductor shield shall be extruded and meet the requirements specified in section 2.4 of IPCEA Pub. S-61-524.
- 4.2 The average thickness shall not be less than 15 mils and the minimum thickness at any point shall not be less than 12 mils.

5.0 INSULATION SHIELD

5.1 5A layer of semi-conducting cross-linked polyethylene meeting the requirements of paragraph 4.1.1 of IPCEA S-66-524 shall be extruded over the insulation to serve as an electrostatic shield.

5.2 The material shall be suitable for exposure to sunlight and other atmospheric environments at temperatures of -55* C through +75* C.

5.3 The shield shall be applied so as to facilitate the removal of the shield without externally applied heat (free stripping).

5.4 The thickness of the shielding shall be in accordance with 7.1.4 of IPCEA S-66-524.

6.0 CONDUCTOR

6.1 The central conductor shall be in accordance with ASTM Specification B-231 for Class B Concentric stranded aluminum conductor.

6.2 The conductor size shall be : 1/0 Al.

6.3 The conductor shall have "strand fill" and shall meet the longitudinal water penetration resistance test (ICEA T-31-610).

7.0 CONCENTRIC NEUTRAL

7.1 A concentric neutral of annealed copper wires shall be spirally wound over the shielding with uniform spacing between wires. These wires shall meet the requirements of ASTM Specification B-3.

7.2 The wires shall be bare copper.

7.3 The minimum size of the individual neutral wires shall be #14 AWG. The minimum number of such wires shall be : 16 (full neutral).

7.3.1 The minimum size of the individual neutral wires for other conductors shall be as follows:

<u>Conductor Size</u>	<u>1/3 Neutral</u>	<u>Full Neutral</u>
1/0	n/a	16 - #14
4/0	11 - #14	n/a
500	16 - #12	n/a

7.4 The length of lay of the neutral wires shall not be more than 8 times the diameter over the concentric wires except as provided for 7.5 and 7.6 below.

7.5 The lay may be increased to not more than 10 times the diameter over the neutral wires provided one of the following conditions are met:

7.5.1 The number of wires in 7.3 is increased by at least 25%.

7.5.2 The cable design is such that equal spacing of the neutral wires will be maintained during installation.

7.6 As an alternative to the fabrication described in 7.1 through 7.5, the concentric neutral may, when so ordered by the purchaser, consist of copper annealed straps applied spirally over the insulation shielding to provide essential full coverage for mechanical protection.

7.7 These straps shall be of such dimensions to provide conductance not less than that in 7.3. The thickness of the straps shall not be less than 0.02". The lay shall be not more than seven times the diameter over the concentric straps.

8.0 JACKET

8.1 An insulating polyethylene layer meeting the requirements of 4.4.15 of IPCEA S-66-524 shall be extruded tightly over the insulation and neutral wires to serve as a protective covering. The minimum thickness shall not be less than 175 mils of TRXLP over the neutral.

8.2 The material shall be black polyethylene meeting requirements of IPCEA S-66-524, Section 4.3.2, except Class C, Category 5 and Grade J-5 shall be used.

8.3 The jacket shall be free stripping. It shall be applied so as to facilitate its removal without externally applied heat when splices, or terminators or grounding connections are made.

8.4 The jacket shall encapsulate the individual neutral wires. The jacket shall completely fill areas between neutral wires and meet requirements of 4.4.15.3 IPCEA Publication S-66-524.

9.0 TESTS

- 9.1 The jacket shall meet the requirements for cold bend test specified in 6.10.3 of IPCEA Publication S-66-524, except the test temperature shall be -36 deg. C.
- 9.2 Each length of cable shall meet the requirements of 4.4.15.5 of IPCEA Publication S-66-524.
- 9.3 Test reports shall be furnished to the customer.

10.0 QUALITY ASSURANCE

- 10.1 Each length of cable shall be tested in accordance with AEIC CS5-81 with the following exception:
 - 10.1.1 Apparent discharge in accordance with AEIC CS5-81 except with maximum discharge of 5 picocoulombs to full test voltage of 200 volts/mil.
 - 10.1.2 A.C. Voltage Withstand Test in accordance with AEIC CS5-81 except partial discharge to be monitored during A.C. test. If partial discharge appears, cable shall be rejected.
 - 10.1.3 D.C. Voltage Withstand Test in accordance with AEIC CS5-81 except at 500 volts/mil for 15 minutes.

11.0 MISCELLANEOUS

- 11.1 The cable shall have suitable marking on the outer surface of the jacket at regular intervals to indicate the name of the manufacturer, conductor size, type of insulation, type of conductor, voltage rating, and jacketing material.
- 11.2 Watertight seals shall be applied to all cable ends to prevent the entrance of moisture during transit or outdoor storage.