Revenue Metering Requirements for Customer Facilities Connecting to the PSEG Long Island Transmission and Sub-Transmission System

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1. PURPOSE

The purpose of this document is to provide the revenue metering requirements for customer facilities connecting to the PSEG Long Island transmission and sub-transmission system.

2. GENERAL REQUIREMENTS

Four (4) sets of schematics, physicals, one lines, three lines, and catalogue cuts shall be submitted for PSEG Long Island approval at least three (3) months prior to the purchase, construction, and/or fabrication of any system or component thereof.

Revenue metering instrument transformer structures shall be designed and arranged to facilitate three (3) element metering, one (1) CT, and one (1) PT per phase. A neutral current transformer may be required with associated structure and equipment, as determined by PSEG Long Island.

No equipment other than that owned by PSEG Long Island shall be permitted to be connected within the revenue metering circuits. Splices and/or terminal blocks will not be allowed in the revenue metering circuits.

There shall be no provision for disconnect switch located on the line side of the revenue metering equipment. Revenue Metering shall be “hot sequence.” Any line side disconnect will be owned and operated by PSEG Long Island. Only PSEG Long Island shall have provision for operation of the disconnect equipment.

The PSEG Long Island revenue metering enclosure shall be located indoors within the control house of the interconnect substation or other location approved by PSEG Long Island.

PSEG Long Island shall be granted unrestricted access to the revenue metering and associated equipment at all times.

A minimum of ten (10) working days’ notice shall be provided to PSEG Long Island prior to installing any equipment or wiring.

All equipment and wiring shall be checked for proper connection and proof tested to the satisfaction of PSEG Long Island. Defects in customer furnished equipment, materials, and labor shall be corrected by the customer, at its expense, and the expense of any retests by PSEG Long Island shall be borne by the customer.

All transmission generation interconnection projects proposed to interconnect to the LIPA transmission system are required to have a stand alone/independent set of buy and sell LIPA revenue meters.

3. EQUIPMENT REQUIREMENTS

The customer shall be responsible for the procurement and installation of equipment as outlined herein.

PSEG Long Island shall be the sole supplier of all electric revenue meters and related accessories. The customer shall be responsible for supplying all revenue metering potential and current transformers, as well as bearing the cost of the electric revenue metering potential and current transformers, a spare set of transformers, electric revenue meters, and spare equipment as determined by PSEG Long Island, including but not limited to spare meters. Before the customer procures any revenue metering potential and current transformers, the customer must submit a cut sheet and related information for the instrument transformers to PSEG Long Island for approval. Instrument transformers must be on the PSEG Long Island pre-approved list.

The customer shall be responsible for all costs associated with replacement equipment, as determined by PSEG Long Island.

All equipment and material supplied by the customer shall be new and of recent fabrication and all electrical equipment shall be listed by the Underwriter's Laboratories, Inc. for the intended use. All items of similar type shall be of a single manufacturer.

All equipment and boxes shall have provision for a PSEG Long Island locking device and seal.

3.1 Revenue Metering Instrument Transformer Structures

Revenue metering current transformers and potential transformers for these service voltages shall be installed outdoors on substation-type structures or racks, designed by and provided by the customer.

Structure design shall be submitted to PSEG Long Island for review and coordination with the PSEG Long Island point of interconnection. Minimum dimensions and configuration details are provided in Attachment 1 of this document.

The design shall be such that the PSEG Long Island revenue metering shall be "hot sequenced," that is, the revenue metering transformers shall be installed and connected on the line side of any customer switches, breakers, or isolating devices or equipment.

The revenue metering current and voltage transformers shall be provided and installed by the customer.

PSEG Long Island will provide equipment installation orientation and polarity information for the metering transformers for the correct primary connections to these devices. Primary connections shall be made by the customer. Secondary wiring and associated conduit shall be installed by the customer. Secondary terminations shall be made by PSEG Long Island.

The customer shall provide galvanized steel NEMA - 3R junction boxes located at the base of each instrument transformer mounting structure. Boxes shall have back plates with “States” type shorting blocks for termination of the instrument transformer secondary wiring. Box covers shall be gasketed and provided with full-length hinges and three-point latch mechanisms with provision for padlocking. Terminal block insulation rating shall be not less than 600V and shall accommodate up to three (3) #9 AWG solid copper ring-type insulated connectors. Please refer to Attachment 2 for the transmission Form 9 wiring diagram.

3.2 Revenue Meter Enclosure

The customer shall provide and install a NEMA 3R freestanding metering enclosure with drip shield. The enclosure shall be rated code gauge steel, rigid, self-supporting with minimum dimensions of 36" wide x 36” deep x 84” high. The enclosure shall be painted ANSI gray and maintain a powder coating on all surfaces provided from the manufacturer.

The enclosure shall contain a hinged adjustable full size mid panel and equipment mounting panels on each interior side of the enclosure.

The front of the enclosure shall be provided with stainless steel hinge pins, and a full sized lockable, hinged door with three point latching system operated from one handle and having provision for a PSEG Long Island large shaft padlock.

The base of the enclosure will accommodate entrance of all instrument transformer secondary wiring and power cables.

The metering enclosure shall be provided with interior lighting and switch, strip heater with thermostat, and a 120VAC duplex receptacle. The customer shall provide 120VAC power from a reliable source external to the metering enclosure for these devices. The metering enclosure shall not be located greater than 100 running feet of control cable from the revenue instrument transformers.

Please refer to Attachment 3 for a meter enclosure diagram.

3.3 Wire and Cable

Insulated multi conductor control cable shall be provided for all secondary wiring of instrument transformers. The cable shall be 600V, 10 conductor #9 AWG, Class "C" stranding (19/25), soft drawn annealed copper with an overall 60 mil PVC jacket.

Each conductor shall be insulated with an extruded 20 mil wall of virgin high molecular weight polyethylene, melt index 0.2 to 0.4, 75 degree Celsius. A heat and moisture resistant polyvinyl chloride 60 mil jacket shall be over the polyethylene insulation.

Individual conductor color-coding shall be as follows: blue, black, red, orange, white with black trace, green, white, red with trace, green with trace, and orange with trace.

The cable shall be flame resistant and comply with IEEE 383 vertical tray flame test.

3.4 Equipment Protection and Safety

The customer shall provide, install, and maintain a fenced enclosure for the revenue metering transformer structure, equipment, and revenue meter enclosure. The fenced enclosure, grounding, signage, and other requirements shall be designed and installed in accordance with all applicable NESC, NEC, and local code requirements.

The fenced enclosure shall isolate the PSEG Long Island metering equipment from the customer's facility, while providing PSEG Long Island personnel and maintenance equipment unrestricted full access to the metering equipment.

3.5 Metallic Conduit, Fittings, and Hardware

Conduit shall be provided for all instrument transformer secondary wiring from the instrument transformer to the meter enclosure. Conduit entry into the meter enclosure shall be from the bottom of the enclosure.

Conduit shall be rigid metal, high grade standard weight steel galvanized by the hot dip process. In no case should deformed, split, or otherwise defective conduit be installed. Conduit couplings, unions, reducers, and all other required fittings shall be furnished and installed by the customer. Condulets shall not be permitted. Where it is necessary to use unions, galvanized Thomas and Betts "Erickson" couplings, or approved equal, shall be used. The fitting should be coated with a PSEG Long Island approved conductive sealant and screwed together to make a watertight connection.

All conduit, fittings, boxes and equipment shall be installed in accordance with this document and the applicable requirements of the NEC, "Specifications and Requirements for Electrical Installations" (Red Book), and local codes.

All hardware for mounting equipment, screws and bolts shall be stainless steel. All screws and bolts shall be supplied with stainless steel washers and lock washers. Anchor bolts shall be “Phillips Red Head Stud Anchor” type, or approved equal. Equipment shall be attached to walls and structures with clamps manufactured by “Kindorf” or “Unistrut” or an approved equal.

All conduits and equipment shall be rigidly supported by approved steel channels or angles, malleable iron one-hole straps, or combination thereof. All supports, hangers and straps shall be hot-dip galvanized. Conduit supports shall be installed in accordance with all applicable codes and standards.

Conduit terminations at equipment and boxes shall comply with the requirements of the NEC. Conduits which terminate in the open shall be provided with approved insulated metallic bushings.

All conduit, fittings, supports and equipment shall be grounded and bonded per the applicable requirements of the NEC, “Specifications and Requirements for Electric Installations" (Red Book), and local codes.

Field cuts shall be made square. All threads on conduits shall be cut accurately. Running threads shall not be permitted. All conduits shall be carefully cleaned before and after installation. All ends shall be reamed free of burrs and inside surfaces shall be free from any imperfections likely to damage the cable.

All exposed metal conduit, supports, fittings, and equipment with field cut edges or other breaks in the protective finish shall be touched up with two coats of a matching paint such as Subox, Galvanox, or approved equal.

Where conduits are direct buried, all backfill material shall be clean, free of large stone, cinders and ashes. Backfill within 12 inches of the conduit shall be free of stones greater than one inch in diameter.

3.6 Cables and Installation

All cables shall be continuous unless prior approval is granted by PSEG Long Island.

Cables must not be installed/pulled until all conduit, raceway, and supports are completely installed. Cables shall be pulled using non-organic pulling compounds and cable grips suitable for insulated cables. Maximum pulling tensions and sidewall pressures shall not be exceeded during pulling operations.

Cable handling and pulling operations shall not bend the cable less than 12 times its outer diameter. Cable forming shall be done in a manner that will not introduce sharp bends of the cable over conduit bushings. The radius bend in any cable shall not be less than the minimum bending radius allowed by the NEC or as recommended by the cable manufacturer.

The customer shall take care to prevent the intrusion of foreign materials when opening the sealed ends of conduit.

All cables shall be installed with sufficient length at each end to provide for final training and termination. All cables shall be neatly trained without interlacing in the equipment, enclosures, and pull boxes. Cables shall be clamped or secured in a manner to avoid tension on the cable and terminals.

Cables shall be protected from mechanical damage and from moisture at the unprotected ends.

Damaged or improperly installed/routed cables shall be replaced by the customer at its cost.

4. MAINTENANCE AND OPERATIONS REQUIREMENTS

4.1 General Requirements

All equipment furnished and installed under this specification shall be tested in accordance with this section, unless otherwise noted.

The customer shall perform all tests required by PSEG Long Island to demonstrate that the installed equipment complies with these requirements. All labor, equipment, and instruments required for these tests shall be furnished by the customer. If any equipment fails under test, the defects shall be rectified by removing, replacing, or readjusting the faulty equipment until the all requirements are met under test. PSEG Long Island reserves the right to check the customer test equipment and/or to furnish PSEG Long Island owned instruments at the customer's cost.

All test results that are customer- and manufacturer-performed shall be formally transmitted to PSEG Long Island for review and approval no later than ten working days after completion of the test.

4.1.1 Electrical Tests After Installation

All electrical equipment, including wire and cable, shall be tested after completion of installation in accordance with this document, or otherwise required by PSEG Long Island.

All wire and cable shall be subject to an insulation resistance test using a "megger" with the following DC voltage applied between the connected system and ground.

- 120/240V system: 500V test voltage for one (1) minute
- 480V system: 1000V test voltage for one (1) minute

The resistance measured shall not be less than ten (10) mega ohms.

4.1.2 Equipment and System Maintenance

The auxiliary power shall be maintained operational by the customer.

All material and work performed by the customer shall be maintained operational by the customer.

PSEG Long Island shall be the sole source in determining the correct performance of all equipment and systems and in setting the requirements for the replacement or repair of any customer equipment and/or system as related to the electric revenue metering.

5. TERMS AND DEFINITIONS

5.1 Acronyms

1) ANSI – American National Standards Institute
2) AWG – American Wire Gauge
3) CS – Construction Standard
4) DA – Design and Application
5) CT – Current Transformer
6) IEEE – Institute of Electrical and Electronics Engineers
7) NEC – National Electrical Code
8) NESC – National Electrical Safety Code
9) NEMA – National Electrical Manufacturers Association
10) PT – Potential Transformer
11) PVC – Polyvinyl Chloride
12) VAC – Volts Alternating Current

5.2 Terms

1) Spare – refers to any revenue metering equipment that, if failed, the customer is responsible to procure and install. A minimum of one matching spare set of CTs and PTs will be provided by the customer and available at all times for immediate replacement of any failed transformer.

6. REFERENCES

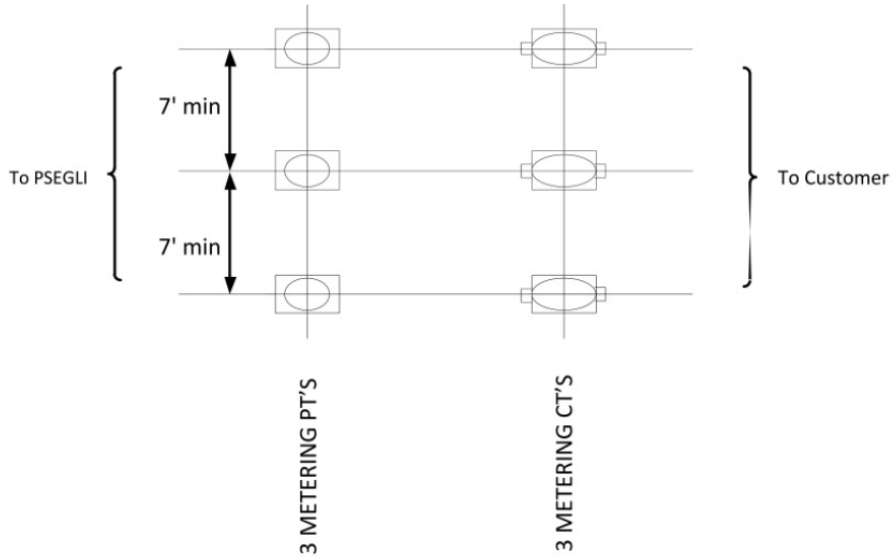
1) Requirements For Generating Facility Interconnection To The LIPA Transmission System

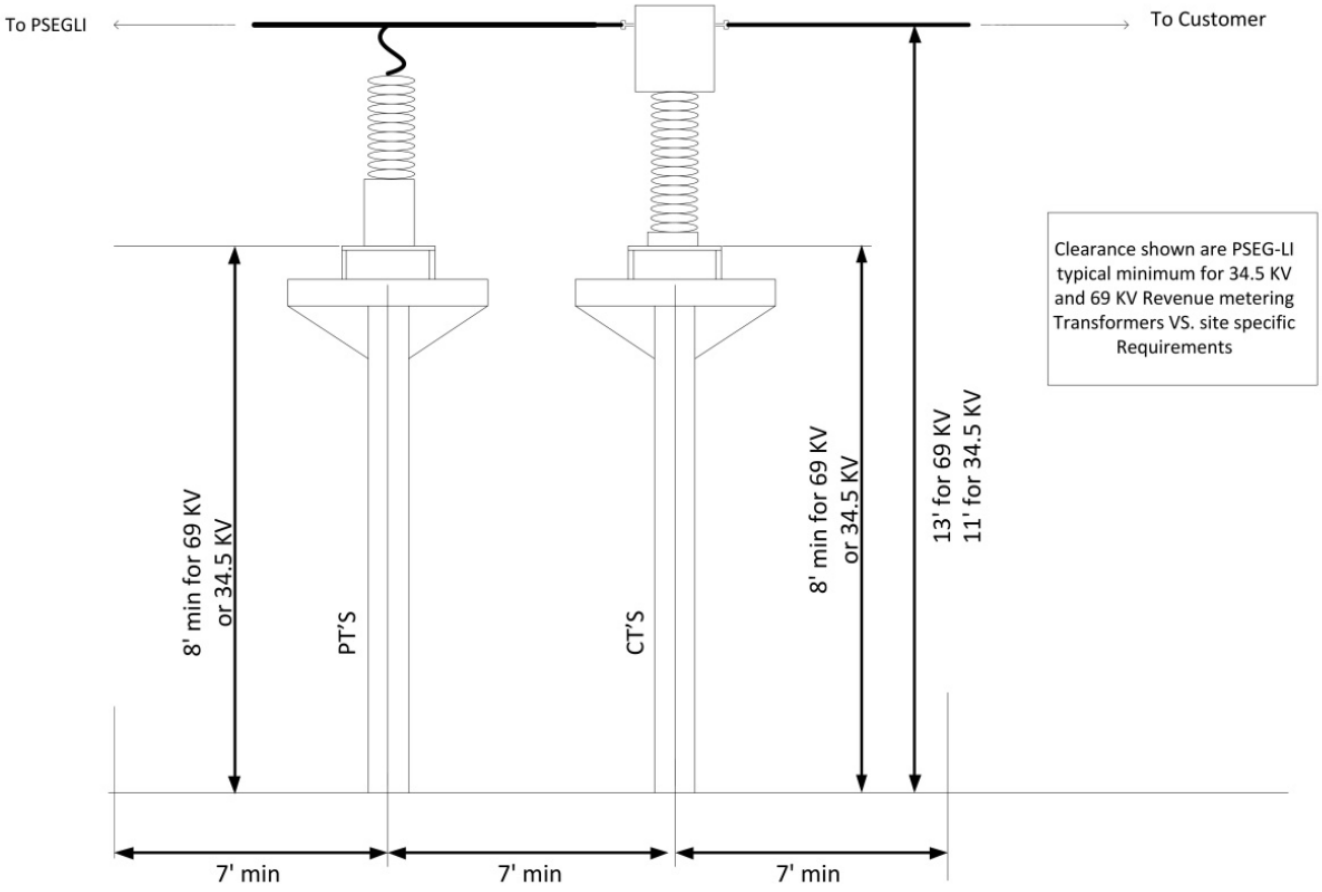
7. ATTACHMENTS

1) Minimum Dimensions and Configuration Details
2) Transmission Form 9 Wiring Diagram for Meter Enclosure
3) Meter Enclosure Diagram

ATTACHMENT 1

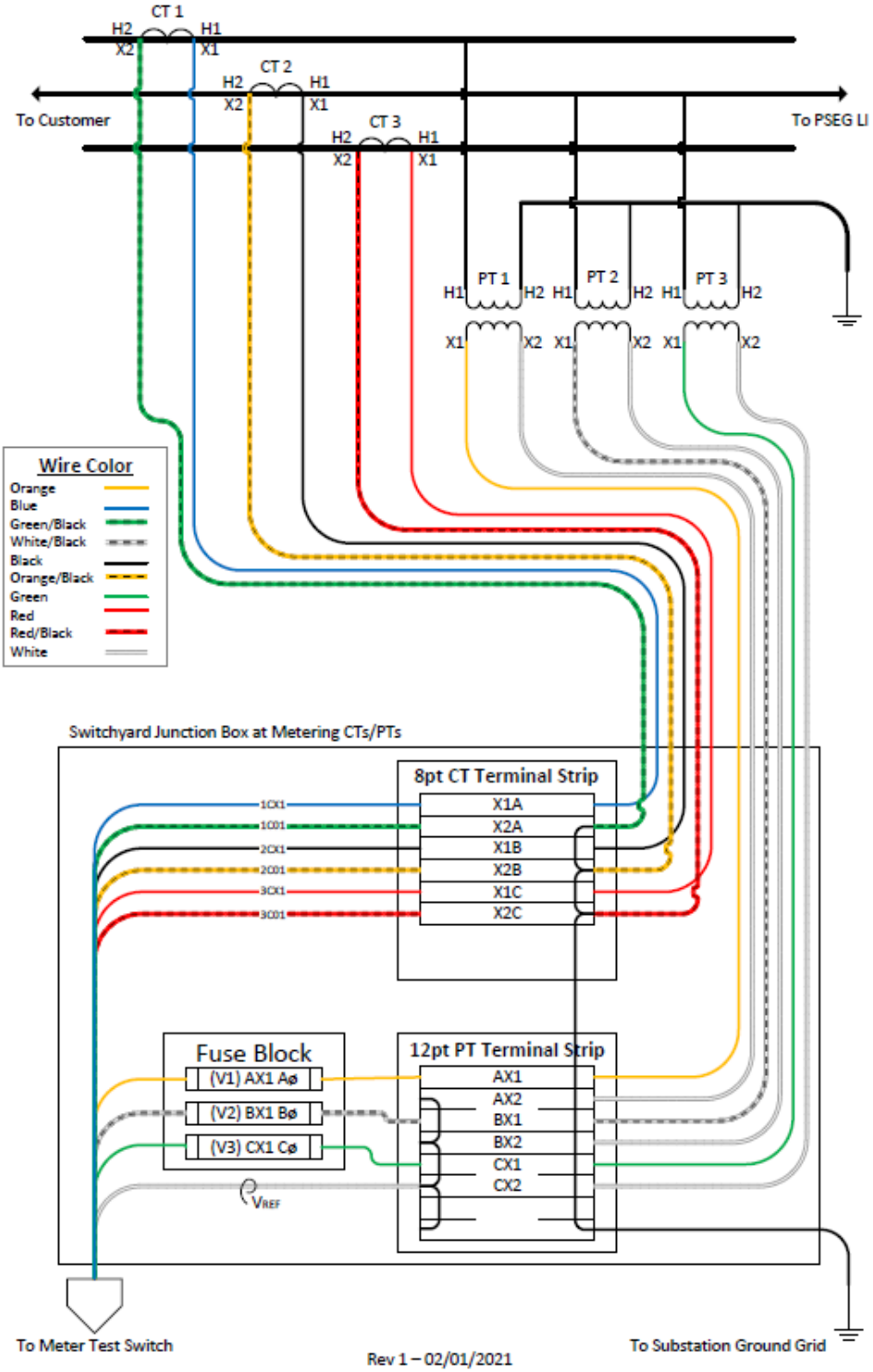
Minimum Dimensions and Configuration Details





ATTACHMENT 2

Transmission Form 9 Wiring Diagram for Meter Enclosure



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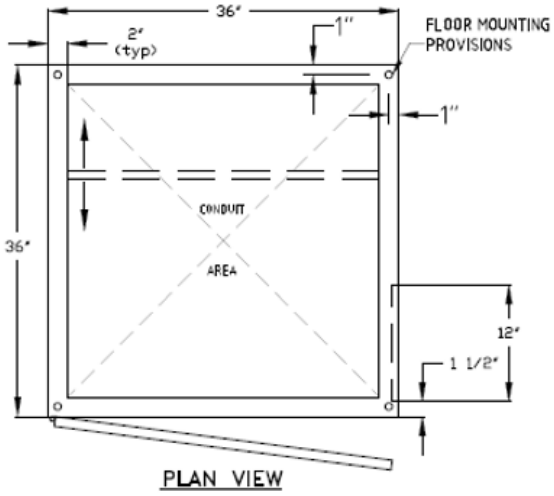
ATTACHMENT 3

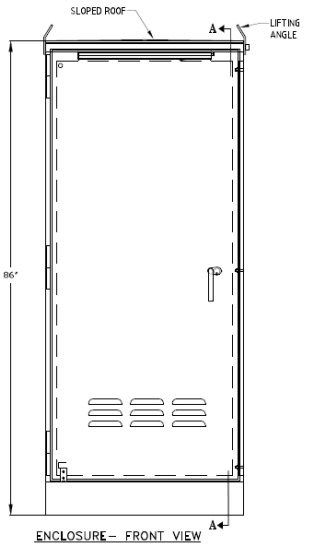
Meter Enclosure Diagram



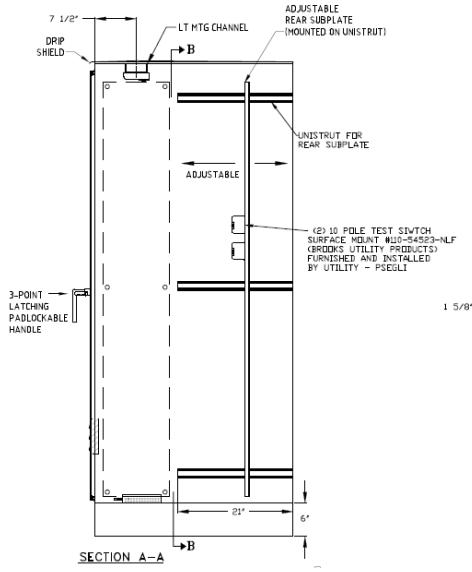
PLAN VIEW

NOTES:

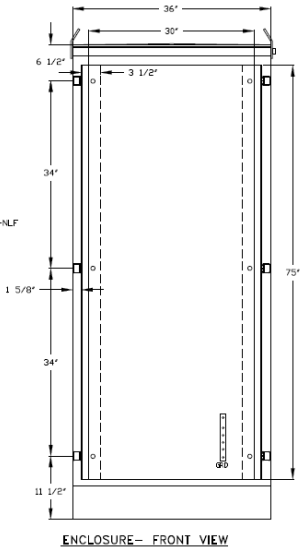
1. METER CABINET (86"H x 36"W x36"D) WITH 6" BASE-PAD MTD
2. ENCLOSURE: NEMA 3R, 12-GAUGE STEEL
3. OPEN BOTTOM WITH PROV. FOR BOLT MTG AT EACH CORNER
4. HEAVY DUTY EYE LIFTING ANGLE
5. EXTENEDED DRIP SHIELD OVER THE DOOR
6. DOOR EQUIPPED WITH 3-POINT LATCHING PADLOCKABLE HANDLE
   - STAINLESS STEEL HINGE / PINS
   - NEOPRENE TYPE OF GASKET AROUND
7. THREADED STUDS WELDED TO THE DOOR AND ENCLOSURE FOR GROUNDING WITH GROUNDING STRAPS.
8. FLUORESCENT FIXTURE LIGHT



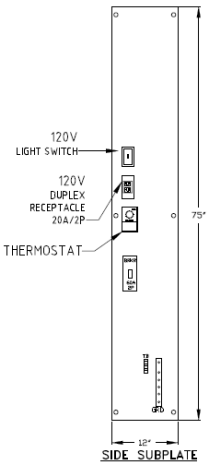
ENCLOSURE– FRONT VIEW



SECTION A–A



ENCLOSURE– FRONT VIEW



SIDE SUBPLATE