

**SPECIFICATIONS FOR
PAD-MOUNTED TRANSFORMER INSTALLATIONS
(RED BOOK)**

**SUPPLEMENTING THE
GENERAL SPECIFICATIONS FOR
ELECTRIC INSTALLATIONS (BLUE BOOK)**

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These specifications, which protect the mutual interests of the Customer and the Company, will be revised, or amended as required in keeping with developments and progress of the industry. The latest revisions should always be used. Additional copies of this booklet and any revisions thereof may be obtained at the Company's Field Offices. Previous editions are outdated and invalid. Revisions are denoted by an arrow in the left margin or a shaded background.

This document (Red Book), the General Specifications for Electric Installations (Blue Book) and the Electric Meter Approved Equipment List can also be found on the Company's website at oru.com/contractorresources.

New Construction Services Field Offices:

Projects will be coordinated through the New Construction Services Field Offices at one of the following locations:

Blooming Grove
500 Route 208
Monroe, NY 10950
Telephone Number..... (845) 577 – 3324
Fax Number..... (845) 783 – 5504

Middletown
71 Dolson Avenue
Middletown, NY 10940
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Suite 32 – Second Floor, Route 17 North
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Fax Number..... (201) 327 – 4521

Spring Valley Operations Center
390 West Route 59
Spring Valley, NY 10977
Telephone Number..... (845) 577 – 3324
Fax Number..... (845) 577 – 3319

Call Before You Dig

For your safety and protection, the Utility Notification Service provides details on the location of underground electric wires, gas lines and communication cables. This service is provided to reduce the risk of personal injury, prevent damage to underground facilities, and avoid unnecessary repair costs and fines. Before you dig, please call:

Underground Utilities Call Center of New York:

811

NY Code 753 requires 2-10 working days' notice.

Garden State Underground of New Jersey:

811

NJ Code requires 3-10 working days' notice.

For Gas Emergencies, Please Call:

911 or 800-533-LEAK (5325)

High Voltage Proximity Clearances:

When work will take place in proximity to overhead high voltage lines, you have the responsibility of notifying the utility in writing at least five (5) normal working days before the job is scheduled. If the notification is made by regular postal mail, allow for ample delivery time to ensure the notice is received prior to the five (5) working day deadline. All correspondence for **Orange and Rockland Utilities, Inc. and Rockland Electric Company** is to be directed to your **New Construction Services Field Office**.

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ABBREVIATIONS:

NEC	- National Electrical Code, NFPA 70, Latest Edition
NESC	- National Electrical Safety Code, ANSI C2, Latest Edition UL
	- Underwriter's Laboratory
EPR	- Ethyl Propylene Rubber

**SPECIFICATIONS FOR
PAD-MOUNTED TRANSFORMER
INSTALLATIONS**

I. INTRODUCTION

This supplement provides specifications for a Customer requesting electric service from the Company to be supplied to a single phase or three phase pad-mounted transformer installation. It applies to a typical installation served by a single underground primary feeder circuit from an overhead line of a WYE primary voltage configuration. Installations served from an overhead line of a DELTA primary voltage configuration, as well as those requiring dual feeders, multiple transformers, primary or secondary switchgear, switching or emergency generators must be referred to the Company's Distribution Engineering Department for additional requirements, recommendations, and approval. Manufacturer's equipment drawings for installations, not normally covered in this specification, must be submitted to the Company's Distribution Engineering Department prior to fabrication or construction. (See Section III of these specifications for details).

Information concerning the service location, route of the primary service lateral and other data applicable to the specific installation will be furnished by the Company's New Construction Services Representative who will obtain technical data from the Engineering and Operating Departments. For this purpose, the Customer must furnish four engineer-scaled prints of the final site plan with approval by the governmental authorities having jurisdiction, showing all underground utilities (drains, sewers, etc) and roads, either existing or proposed. The drawing shall contain sufficient detail such as to locate doors, windows, fire escapes, decks, etc, either existing or proposed, in the area of the requested service location. Specific information furnished by the Company shall be subject to change if significant revisions are made in the design or

scheduling of the project by the Customer. These requirements do not cover the Customer's complete electrical installation design, but are concerned only with those items in which the Customer, Customer's consulting engineer, electrical contractor, equipment manufacturer, and the Company have a mutual interest. When supplemental information is required, the Customer shall direct all inquiries and correspondence to the New Construction Services Representative coordinating the installation.

II. **DEFINITIONS**

1. **Company** means Orange and Rockland Utilities, Inc, and Subsidiaries.
2. **Cost or Expense** shall include all labor, material, and other applicable charges, including overheads required for the work to be performed by Company personnel.
3. **Customer** is used to designate either a present or a prospective user of the Company's electric service.
4. **Electrical Installation** refers to the total electrical wiring and equipment installed on the Customer's premises.
5. **Ground** is a conducting connection between an electric circuit or equipment and earth, or some conducting body which serves in place of the earth.
6. **Hertz** is cycles per second of an alternating current supply.
7. **Line** is a system of poles, wires and equipment, or the equivalent below grade ducts, conduits, cables, etc, used for the distribution of electricity. It may be

located above or below ground on/in a street, highway, alley or on a private right-of-way.

8. **Multiple-Occupancy Building** is a structure (including row houses) enclosed within exterior walls of fire walls built, erected, and formed of component structural parts and designed to contain two or more individual dwelling or commercial units for permanent occupancy.
9. **Power Quality** is the concept of powering and grounding sensitive equipment in a manner that is suitable to the operation of that equipment.
10. **Recommended** means desired, but not mandatory.
11. **Service** means the conductors and equipment for delivering energy from the Company's distribution line to the wiring system of the premises served.
 - A) **Service drop** refers to that portion of the overhead conductors between the Company's distribution line and the first point of attachment on the Customer's facilities.
 - B) **Service entrance conductors from an overhead system** are the conductors between the terminals of the Customer's service equipment and a point, outside the building, where joined by connection to the service drop.
 - C) **Service entrance conductors from an underground system** are the conductors between the meter and the Customer's service equipment.
 - D) **Service equipment is the necessary Customer-owned equipment**, usually consisting of a circuit breaker or switch and fuses, and their accessories, located near the point of entrance of supply conductors to a building or other

structure, or an otherwise defined area, and intended to constitute the main control and means to cut off electric supply.

E) Service lateral is a system of underground conductors and equipment for delivering electricity from the Company's designated connection point of the distribution line to the first point of connection to the premise wiring.

F) Service point from an overhead system is the point of connection between the facilities of the Company and the first point of connection to the premise wiring.

G) Service point from an underground system is the point of connection between the service lateral and the first point of connection to the premise wiring.

12. Shall is defined as mandatory in nature

13. Short-term service is a service which is recurrent in nature for short periods each time, either periodically each year, intermittently during the year or at other irregular intervals.

14. Should is defined as desirable in nature, as contrasted with mandatory.

15. Temporary service is a non-recurring service intended to be used for a short time only, such as for construction or exhibit purposes. The temporary facilities will be removed at such time as permanent service is provided unless otherwise determined by the Company's Distribution Engineering Department.

III. CODES, STANDARDS AND WIRING ADEQUACY

The Customer's electric service equipment and its installation, including that for temporary service, shall be in accordance with the latest Company Standards for the installation, the latest edition of the National Electrical Code (NEC), National Electrical Safety Code (NESC) and all applicable ordinances and codes. When differences in Company Specifications or Standards or Governmental ordinances or Codes occur, the more stringent requirements shall govern the

installation. Any deviation from the preceding must be approved by the Company's Distribution Engineering Department and other agencies having jurisdiction over the installation.

Responsibility for design and construction in conformance with all codes rests with the Customer. This includes any necessary changes and associated costs resulting from non-compliance with the above-referenced codes and standards. When such changes are necessary, they shall be made before service is provided.

IV. APPROVAL AND INSPECTIONS

The Customer must submit plans to the Company before ordering equipment or starting work to ensure that the proposed design for the installation conforms to Company requirements. The Customer must furnish, for review by the Company, information as follows:

- A. Manufacturer's equipment drawings for the installation showing electrical one-line diagrams and characteristics of protective equipment, when applied; physical arrangement and clearances; and, particularly, the installation details for metering transformers.
- B. Manufacturer specifications for manual or automatic electrical transfer switches, when proposed to be installed.
- C. An overall electrical one-line diagram of the proposed service installation, including the number of sets, size, and type of service conductors and conduits, metering equipment, main disconnects, main breakers, and manual or automatic electrical transfer switches (when applicable).
- D. A final approved site plan drawing showing all underground utilities (drains, sewer, gas, electric, etc), roads and requested service entrance location. The drawing shall have sufficient detail to locate doors, windows, fire escapes, decks, and other building

features, either existing or proposed, in the vicinity of the requested service location.

Fabrication of equipment or project construction should not proceed without approvals from the Company and other agencies having jurisdiction.

The Company requires inspections of the primary service installation by an authorized Distribution Engineering Department Representative, for which inspection checklists will be provided. This includes the primary electric trench and the transformer ground grid. At the completion of each portion of the installation, the Customer's contractor is to submit the respective checklist using the contact information provided therein, and an inspection will be arranged.

For each inspection checklist properly submitted, the Company will perform the initial inspection at no charge. When a repeat inspection is necessary due to non-compliance or non-completion, a repeat inspection fee will be assessed to the responsible party. Further details will be provided in a project-specific inspection policy.

In addition to the Company inspections, it is the Customer's responsibility to arrange for an inspection by the Board of Fire Underwriters or the authority having jurisdiction. Before service can be provided, the Customer will furnish a certificate of satisfactory evidence as to the safe condition of wiring.

V. SCOPE OF CUSTOMER WORK

Unless otherwise specified, the Customer shall provide all materials, labor and equipment required for completion of the installation as specified herein and as called for in the drawings or as directed by the Company's authorized Distribution Engineering Department Representative. The Customer shall include items incidental to the work, not specifically mentioned herein, but necessary to

make the finished work fully complete and satisfactory in every respect.

In general, the Customer's work will consist of the following major items:

Installation or construction of:

1. Transformer pad
2. Duct or conduit work
3. Grounding
4. Primary cable installation (including terminations and connections)
5. Secondary cable installation (including terminations and connections)
6. Metering
7. Excavation and backfill
8. Grading

VI. TRANSFORMER PAD LOCATION

The Customer shall provide property and necessary rights-of-way (where applicable) on which to construct the transformer foundation. The location should be mutually agreed upon by the Company and the Customer. The transformer pad foundation shall be located at least 4 ft but not more than 10 ft behind the curb of an approved, 12-ft-wide (minimum) drivable surface (asphalt, concrete, Grass-Crete pavers, etc). Protective bollards, in the absence of curbs, and when otherwise deemed required by the Company, shall be supplied, installed, and maintained by the Customer, as per the applicable Figure.

Note regarding installations on residential properties:

The transformer pad must be located along the driveway leading to the dwelling or garage and installed /constructed so the front of the transformer faces the driveway. The

transformer pad foundation shall also be located in accordance with the applicable Figure and the following minimum horizontal clearances from other facilities:

- A. Twenty (20) ft from any fuel storage facility (above ground included)
- B. Ten (10) ft in from gas meter regulators, water pipes (wells and water sprinkler lines included) and any other liquid-filled pressurized pipe
- C. Five (5) ft from non-pressurized pipes (storm drains, sewer, etc)
- D. Five (5) ft from gas services.
- E. Five (5) ft from cable or communication lines, other pipes or low voltage lines not specified herein.
- F. Ten (10) ft from utility poles or light posts

VII. TRANSFORMER FOUNDATION

The Customer shall install, own, and maintain the pad foundation for the transformer. It is to be constructed according to the latest Company Standards for the installation.

At the time of the transformer pad inspection, curbs and bollards (when deemed required by the Company) must be in place. As well, the pad site must be within six (6) inches of final grade. The final grade shall be level with the driving surface and provide for standing clearance of at least ten (10) ft at the front of the transformer pad and at least four (4) ft on all other sides.

VIII. TRENCH AND CONDUIT WORK

The Customer shall furnish, own (unless otherwise specified), install and maintain all duct and conduit associated with the transformer installation in accordance with the applicable

Figures. The primary and secondary conduits shall enter the transformer installation as per the applicable Figure. All conduits are to be installed according to the latest NEC and NESC requirements. Underground primary conduits shall have a minimum cover as specified in the applicable Figures.

When installed parallel to electric, water and sewer facilities shall have a minimum horizontal clearance of ten (10) ft. Where electric crosses any facility, there shall be a minimum vertical clearance of one (1) ft.

Spare conduits, when installed, must be capped or plugged. A corrosion-resistant pull line of 200 pounds (minimum) breaking strength shall be installed in each conduit until needed. Metallic pull wires are not acceptable.

Riser Pole Requirements

Customer-installed riser conduits and 90-degree (90°) long radius sweeps shall be UL-approved rigid galvanized steel conduit or Schedule 80 rigid nonmetallic PVC conduit. **The long radius sweep and 10 ft riser conduit shall be of the same material for a given installation.** The Customer is also required to install a UL-approved PVC conduit coupling that will connect to the Company's Schedule 40 rigid nonmetallic PVC conduit.

Note 1: The minimum acceptable radius of a below grade two (2) inch diameter, 90-degree (90°) bend at any "rising" location is 24 inches. All riser conduit bends are to be of the long radius sweep design and must be installed to these specifications.

Note 2: The minimum radius of 90-degree (90°) bends at the riser pole and transformer pad entries is 36 inches for 15 kV construction and 48 inches for 35 kV construction.

Note 3: The riser pole conduit must extend ten (10) ft above final grade elevation from the pole base. The Company will complete the conduit installation on the riser pole with Schedule 40 rigid nonmetallic PVC conduit. Where rigid galvanized steel conduit is installed, the Customer shall provide and install a UL-approved steel-to-PVC conduit adaptor at the top of the riser pipe.

The remaining conduit between the 90-degree (90°) bend and the transformer installation must be of the same size, be either UL-approved rigid galvanized steel conduit, UL-approved Schedule 40 or 80 gray PVC conduit, or UL and Company-approved fiberglass conduit. Any individual couplings installed in a conduit system must provide a completely smooth surface with no gaps or ridges between the conduits.

The minimum conduit sizes, utilizing the primary cables discussed in Section X of this specification, are as follows:

1. Two inches (2") for one conductor, 15 kV construction.
2. Four inches (4") for one conductor, 35 kV construction.
3. Four inches (4") for two conductors, 15 kV or 35 kV construction.
4. Four inches (4") for three conductors, 15 kV construction.
5. Six inches (6") for three conductors, 35 kV construction.

Secondary conduit size and quantities are to be determined by the Customer's load, site conditions and the latest edition of the NEC. Upon review of the one-line diagram, the Company will verify the transformer sized for the application can accept the Customer's proposed service, and will advise the Customer if service modifications are necessary.

THE MAXIMUM NUMBER OF CONDUCTORS IN ANY GIVEN CONDUIT SHALL NOT

EXCEED FOUR (4), FOR A THREE PHASE, FOUR WIRE INSTALLATION, AND SHALL NOT EXCEED THREE (3) FOR A SINGLE PHASE, THREE WIRE INSTALLATION. THERE SHALL BE NO EXCEPTIONS.

IX. GROUNDING

The Customer shall furnish, own (unless otherwise specified), install and maintain a ground grid consisting of # 2/0 AWG bare stranded tinned copper with 5/8" x 8'-0" long copperweld ground rods as shown in the applicable Figures. **The ground grid installation is to be at 18 inches below final grade elevation.** All below-grade UL listed connectors to the ground rods are to be made with Wrench Lok connectors, cad welds, thermo-weld process, Ampact fired-on connectors, or other compression connectors that have been approved by the Company's Distribution Engineering Department. Two (2) NEC- and NESC-approved grounding connections shall be provided by the Customer to terminate the ground cable pigtails at the transformer grounding pads.

Metallic primary or secondary conduits (two maximum) at a riser pole shall be grounded with a minimum of # 2 AWG 600 V insulated copper conductor. The Customer shall supply and install approximately five (5) ft of # 2 AWG bare stranded tinned copper to each metallic conduit with an NEC-approved conduit clamp. The Company will complete the connection to the Company-installed 5/8" x 8'-0" copper-weld ground rod.

Metallic primary transformer pad entrance conduit(s) shall be grounded in the same manner as the riser pole conduit(s), except the conduit(s) shall be grounded to the transformer ground wire conductor (not a ground rod). The # 2 AWG 600 volt insulated copper conductor and NEC- and NESC-approved grounding connections shall be provided and installed by

the contractor to terminate the conduit ground wires at the transformer ground conductor. Grounding of metallic secondary conduit(s) at a transformer pad entrance shall be made by the Customer in the same manner as the primary metallic conduit(s). All installations shall be in accordance with the latest edition of the NEC, NESC, and Company Standards.

When two or more pieces of equipment, or pads supporting such equipment, are installed within 10 ft of one another, all ground grids must be bonded together with Company and NEC approved connectors.

X. PRIMARY CABLE

The Customer shall furnish, install, own and maintain the primary cable installation, unless the Customer qualifies for the Company's 091 Procedure (New Jersey), or unless otherwise determined. Customers in NJ are to reference Section XVIII and consult their New Construction Services Representative for specific details.

The Customer shall determine the cable length required for the installation, allowing additional cable for equipment such as a riser pole, transformer, junction box, switch pad or manhole.

All primary cables are to be manufactured and tested to meet the latest requirements of Insulated Cable Engineers Associated (ICEA), Association of Edison Illuminating Companies (AEIC) No. CS6-87, and appropriate Company specifications for 15 kV or 35 kV cable.

For 13,200Y/7,620 V voltage applications, the primary cable shall be 15 kV-rated, shielded, have 175 mils EPR insulation, a full concentric neutral and an overall insulating polyethylene jacket with three (3) equally-spaced extruded red stripes. The minimum

conductor size shall be # 2 AWG Aluminum. Cable is to be Kerite URD (SPS-HTK), Okonite Okoguard URD-J, or an ORU-approved equivalent.

For 34,500Y/19,900 kV voltage applications, the primary cable shall be 35 kV-rated, shielded, have 345 mils of EPR insulation, have a full concentric neutral and an overall insulating polyethylene jacket with three (3) equally-spaced extruded red stripes. The minimum conductor size, dependent upon the customer's load is # 1/0 AWG aluminum. Cable is to be Kerite URD (SPS-HVK), Okonite Okoguard URO-J, or approved equivalent.

Any deviation from the above must be approved by the Distribution Engineering Department.

Manufacturer's specifications for proposed cables must be submitted to Orange and Rockland Utilities, Inc, Distribution Engineering Department, for review and written approval prior to purchase and installation to ensure compatibility with the Company's distribution system.

Cable ends must be sealed at all times and resealed, when cut, to prevent contamination of the cable by moisture and dirt. An appropriate heat shrink seal is recommended.

Jacketed concentric neutral primary cable is to be installed in PVC conduit according to the latest NEC, NESC and Company requirements.

XI. PRIMARY CABLE TERMINATIONS

The Customer shall furnish (unless otherwise specified) all primary cable termination kits designed to fit the installed primary cable system.

The Customer shall install the primary cable termination material at the transformer when such work does not come within the Company's Labor Union responsibility. The Company's New Construction Services Representative will inform the Customer when this work is the responsibility of the Company. When service is provided from an underground distribution system, the Customer must consult the Company for the proper terminations. It is the Customer's responsibility to consult with the Company for the type of equipment designed for the job (for example, live front or dead front) so that appropriate material may be obtained to complete the installation on schedule.

The terminations at the riser pole or at live-front equipment shall be outdoor-type stress cones:

15KV Application: 3M Co Catalog # 7652-S-4-2 or Company-approved equivalent for # 2 Al conductor

35KV Application: 3M Co Catalog # 5646-1/0 or Company-approved equivalent for #1/0 AWG conductor

The terminations at a pad-mounted transformer or dead-front equipment are to be load-break type cable terminations:

For 15KV primary cable:

- Elastimold Load Break Elbow, Catalog # 166LR-A-5220 or Company-approved equivalent for #2 AWG conductor
- Elastimold Bushing Well Inserts, Catalog # 1601A4
- Elastimold Grounded Protective Dead End Cap(s) (when required)

Catalog # 160-DRG or Company-approved equivalent

For 35KV primary cable:

- Elastimold Load Break Elbow, Catalog # 376LR-K-240 or Company-approved equivalent for #1/0 AWG conductor
- Elastimold Bushing Well Insert, Catalog # 3701A4
- Elastimold Dead End Insulating Cap(s) (when required), Catalog # 370-DRG or Company-approved equivalent for #1/0 AWG conductor

For prevention of dirt and moisture contamination to the cable, cable sealing kits are required to be installed with Elastimold primary cable elbow terminations. 15 kV sealing kits for # 2 - 2/0 AWG conductor are to be 3M Co Catalog # 8452 or Company-approved equivalent; 35 kV sealing kits for # 1/0 AWG conductor are to be 3M Co Catalog # 8453 or Company approved-equivalent.

The terminations and bushing well inserts must be approved by the Company's Distribution Engineering Department for the specific installation.

The Company will install the primary cable termination kits at the Company's connection point (ORU riser pole, junction box, pad-mounted equipment, or manhole). The terminations kits are to be on site at the time of the final inspection, inside of the transformer, for inspection.

It is the Customer's responsibility to properly identify the primary cables on all ends in accordance with the latest issue of the NEC.

Upon completion of the primary cable installation for a secondary metered application, the

Company will high potential test each new primary cable. For primary metered applications, the Customer is responsible for high potential testing, to be performed either by the Company or privately. If done privately, the Company must receive the test results prior to energization. These tests will be conducted for all primary cable installed and terminated up to the service connection point (riser pole, pad-mounted equipment, junction box or manhole.) The Company does not assume any responsibility for cables and/or accessories which fail to pass the test. Successful high potential testing is required for the cables to be energized.

XII. SECONDARY CABLE AND BUS DUCT

The Customer shall furnish, install, own and maintain the secondary cable installation. The Customer's cable shall be insulated stranded cable terminated at the transformer with appropriate (NEC-approved) compression connectors. The secondary cable installation is to conform to the latest editions of the NEC and NESC. For proper application to transformer terminals, see the applicable Figure.

Identification of Cables: Where single conductors are utilized in place of triplex or quadraplex (ie: bundled by the manufacturer), each conductor (phases and neutral) must be clearly identifiable via manufacturer's marking or coloring of the conductor's outer jacket. Each cable's outer jacket must be unique in marking or color, so each individual phase and neutral can be clearly identified.

NOTE: FOR A THREE PHASE, FOUR WIRE INSTALLATION, THE MAXIMUM NUMBER OF CONDUCTORS SHALL NOT EXCEED FOUR (4) PER ANY GIVEN CONDUIT, FOR A SINGLE PHASE, THREE WIRE INSTALLATION, THE MAXIMUM

NUMBER OF CONDUCTORS SHALL NOT EXCEED THREE (3) FOR ANY GIVEN CONDUIT. THERE SHALL BE NO EXCEPTIONS TO EITHER OF THE ABOVE.

All bolted secondary wire connections to the transformer terminals are to be installed in accordance with the applicable Figure.

Secondary transformer terminals and connectors are to be insulated when electrical clearances are inadequate as determined by the Company's authorized Distribution Engineering Department Representative. See Section XIV for clearances. Secondary feeders must include one neutral conductor in each occupied conduit. The Company's pad-mounted transformers are not designed for overhead secondary bus duct construction. If the Customer intends to use secondary bus duct on secondary metered, Company-owned, pad-mounted transformers, the secondary service must enter the unit underground within the secondary area limits as defined in the applicable Figure. The Customer may elect to use overhead bus duct on primary metered installations with Customer-owned pad-mounted transformers. In case of failure of this non-standard transformer, time for restoration of service by the Company, if called upon by the Customer, will be extensive. The Customer shall be responsible for the equipment design and maintenance of the electrical system.

XIII. METERING

ALL METERING EQUIPMENT SHALL BE INSTALLED OUTDOORS UNLESS PRIOR APPROVAL IS GIVEN BY THE COMPANY.

Secondary Metering 208Y/120V, 240/120V

The Customer shall furnish, install, own and maintain a current transformer cabinet (when applicable) for secondary metered installations. Depending on the service size, the Customer or the Company will install the current transformers in the CT cabinet and the Company will wire the secondary CT connections.

Secondary Metering 480Y/277V

The Customer shall furnish, install, own and maintain a current transformer cabinet (when applicable) and voltage transformer cabinet (when applicable) according to the applicable Figures.

Depending on the service size, the Customer or the Company will install the current transformers in the CT cabinet and voltage transformers in the VT cabinet. The Company will wire the secondary CT connections and the primary and secondary connections on the voltage transformers.

The Company will furnish the meter, current transformer(s) and voltage transformer(s) as required for the specific installation. The Customer should arrange for a job meeting with the Company Metering Department through their New Construction Services Representative to determine locations, timing, and specific requirements for the metering installation.

NOTE: The Customer will supply and install a Company-approved meter pan and test block for a current transformer installation.

Primary Metering

When primary metering information is required, the Customer should direct all inquiries and correspondence to their New Construction Services Representative.

XIV. CLEARANCES

Electrical Clearances for Primary Voltages

The normal electrical clearances of live parts for service equipment, other than standard manufactured metal-clad switchgear are given in the following tabulation. Normal clearances shall be provided whenever practical.

Insulating barriers shall be provided between live parts and ground and between phases for live conductors and connectors when the tabulated clearances below cannot be obtained.

The insulating barrier material shall have thickness and a dielectric value to withstand full phase to phase service voltage and shall have adequate arc, heat and flame resistance as well as adequate physical strength.

<u>KV</u>	Normal Phase-to-Ground Clearance	Normal Phase to-Phase Clearance
5	2 ½"	5"
15	7½"	13"
35	20"	35"

Electrical Clearances for Secondary Voltage

0-600 V, minimum two (2) inch phase-to-phase or phase-to-ground

Physical or Safety Clearances

Refer to appropriate codes, regulations and standards including, but not limited to the following: Occupational Safety & Health (OSHA) regulations, latest editions of the NEC,

NESC, High Voltage Proximity Acts and Company Standards.

XV. ENERGIZATION PROCEDURE

The Company's Distribution Engineering Department will inspect each transformer upon notification that both the Customer and the Company have completed the installation. Such notification should be initiated, as indicated in Section IV of this document, and by contacting the New Construction Services Representative coordinating the project.

If the final transformer inspection is rejected by the Company's Distribution Engineering Department, the authorized engineering representative will notify the Customer's representative of the corrective action required for approval of the installation. A repeat inspection of the installation will be conducted upon completion of the corrective action required.

Upon receipt of both the Company approval notice and the Underwriter Inspection Certificate (certificate of satisfactory evidence as to the safe condition of the wiring), the installation will then be scheduled for energization by the Company.

XVI. BACKFILL AND GRADING

The Customer and/or contractor shall assume the responsibility of backfilling and grading the installation. Refer to the applicable Figure(s).

XVII. SPECIFICATIONS FOR CONCRETE

A. Concrete Work

All concrete construction work shall be in accordance with the recommendation of the American Concrete Institute as stated in their Bulletin ACI 318, latest revision and as specified herein.

B. Materials

1. Portland Cement:

Portland Cement shall conform to the latest edition of the "Standard Specification for Portland Cement" of the American Society for Testing Materials, Designation: C150, Type I, II and III.

2. Metal Reinforcement:

Wire for concrete reinforcement shall conform to the requirements of the Standard Specifications for Cold-Drawn Steel Wire for Concrete Reinforcement, ASTM: A-82, latest edition, and the applicable Company specification.

C. Concrete Quality

The equipment pads have been designed for concrete having a minimum ultimate compressive strength at 28 days of 3000 pounds per square inch. All concrete, except as otherwise noted or specified, shall be designed to meet or exceed this requirement.

All concrete exposed to weathering shall have a minimum air content

as shown in the American Concrete Institute (ACI) 318, latest edition, Section 4.2.5.

E. Forms and Details of Construction

Forms for all parts of the specified concrete work shall be so constructed that finished surfaces shall conform to the shape, size and dimensions as specified on the applicable Figure.

All forms are to be constructed and braced so that finished concrete surfaces shall be level, free from bulges, distortions or other variations.

Removal of forms shall be carried out in such a manner as to ensure the complete safety and integrity of the structure. In no instance shall the supporting forms be disturbed or removed until the concrete has cured sufficiently to adequately support its own weight and any other expected construction load placed thereon.

F. Concrete Finishing

1. General:

All exposed surfaces shall be smooth and even when completed. Any and all unsightly ridges or lips or exposed concrete shall be removed by tooling and rubbing. All loose stones and holes shall be cleaned out. The surfaces shall then be completely soaked with water (or appropriate liquid) and the defects repaired with concrete such as to provide a smooth, even surface to the satisfaction of the Company's authorized engineering representative.

2. Defective Concrete:

All concrete work not conforming to the preceding; including physical dimension, size and shape; as shown on referenced drawings, out of alignment or level; or showing a defective surface; shall be removed and completely replaced in a manner meeting with the approval of the Company's authorized engineering representative. Slight imperfections in appearance of the structure may be repaired ONLY when the Customer has obtained the permission of the Company's authorized engineering representative.

XVIII. COMPANY PROCEDURE NUMBER 091

**SUPPLEMENT TO SPECIFICATIONS FOR PAD-MOUNTED
TRANSFORMER INSTALLATIONS TO BE CUSTOMER-INSTALLED AND COMPANY-
OWNED AFTER ACCEPTANCE (NEW JERSEY CUSTOMERS, ONLY)**

A. General

This section pertains to a Customer desiring primary service on their premises to be owned and maintained by the Company, after the Customer has fulfilled certain requirements and installed their primary service in accordance with the attached specification.

The Company's New Construction Services Representative will explain, in detail, the requirements for a Customer to qualify for this procedure. The Customer shall provide all labor, construction equipment and necessary equipment required for completion of the installation as specified herein or as directed by the Company's

Distribution Engineering Department.

The Company will furnish the Customer with certain specified materials intended to provide service voltage at the secondary terminals of the transformer(s) for a secondary metered customer. For a primary metered customer, the Company will provide only certain specific material up to the metering enclosure. These materials will include, where necessary, primary cable*, conduit*, primary cable terminations, and primary switching equipment. The Company supplies ONLY those items included on a material list that will be provided as a supplement to this specification.

The Company does not provide the exact footage of material for the proposed construction. The Company does, however, supply sufficient material that will exceed the expected/anticipated requirements.

The Company-supplied material may only be obtained by the Customer or Customer's assigned representative at the designated Company supply depot during a normal business week, Monday through Friday, excluding Company holidays, between the hours of 10 AM and 2 PM.

The Customer shall provide an easement satisfactory to the Company consistent with Company Real Estate Department requirements before any installation will be authorized. The Company assumes no liability for acts of the Customer or Customer's contractor during the construction of this installation. After a successful final inspection, successful passing of the required high potential tests described in Section XI, and subsequent energization of the installation, the

Company will, at its own expense, operate and maintain the electric service installation up to the line side of the primary meter for a primary metered customer, and to the secondary terminals of the transformer(s) for a secondary metered customer.

The Company requires inspections of the primary service installation. Please refer to section IV for more information. In addition to the Company inspections, it is the Customer's responsibility to arrange for inspections by the Board of Fire Underwriters' or the Authority having jurisdiction, and to obtain and furnish a certificate of satisfactory evidence as to the safe condition of the wiring.

B. Material Requisitions and Returns

Upon notification from the Customer's New Construction Services Representative, the Customer or Customer's representative shall pick up materials necessary to complete the approved installation. All necessary materials will be provided at the designated Company supply depot according to a material list that will be provided for the installation. The Company will require a signed agreement of material quantities received for the installation.

All material not utilized to complete the project shall be returned to the issuing Company supply depot prior to energizing the service. The Customer or Customer's representative will be responsible for all material issued. The Customer shall be billed for any material not returned, as stated herein, or required material replacement other than those due to manufacturer's defects, after the quantities shown on the material list have been initially issued. Any primary cable required to be returned to the Company must have appropriate cable end seals installed before

the Company will accept delivery. Only full lengths (un-cut) and undamaged lengths of conduit will be accepted as returned material.

C. Primary Cable

The Company shall provide all primary cable to complete the installation as shown on the approved drawings. The Customer shall verify in the field the cable length required for the installation, allowing 50 ft, per conductor, of excess cable, from final grade level to be properly terminated, by the Company, on the designated riser pole. For other Company-designated attachment points, such as pad-mounted equipment, junction boxes, or manholes, the Customer shall allow 15 ft, per conductor, of excess cable to be terminated by the Company. Refer to the Company-approved drawing and Company-provided material list for cable lengths. Primary cable splicing will not be permitted. All primary feeders must be installed in one continuous run unless otherwise specified.

Cable ends must be sealed at all times and resealed, when cut, to prevent contamination of the cable by moisture and dirt. Appropriate heat shrink seal(s) will be issued to the Customer.

D. Primary Cable Terminations

The Company shall furnish all primary cable termination kits designed for use on the primary cable installed. The Customer shall install the primary cable termination material at pad-mounted equipment when such work does not come within the Company's Labor Union responsibility. It is the Customer's responsibility to consult

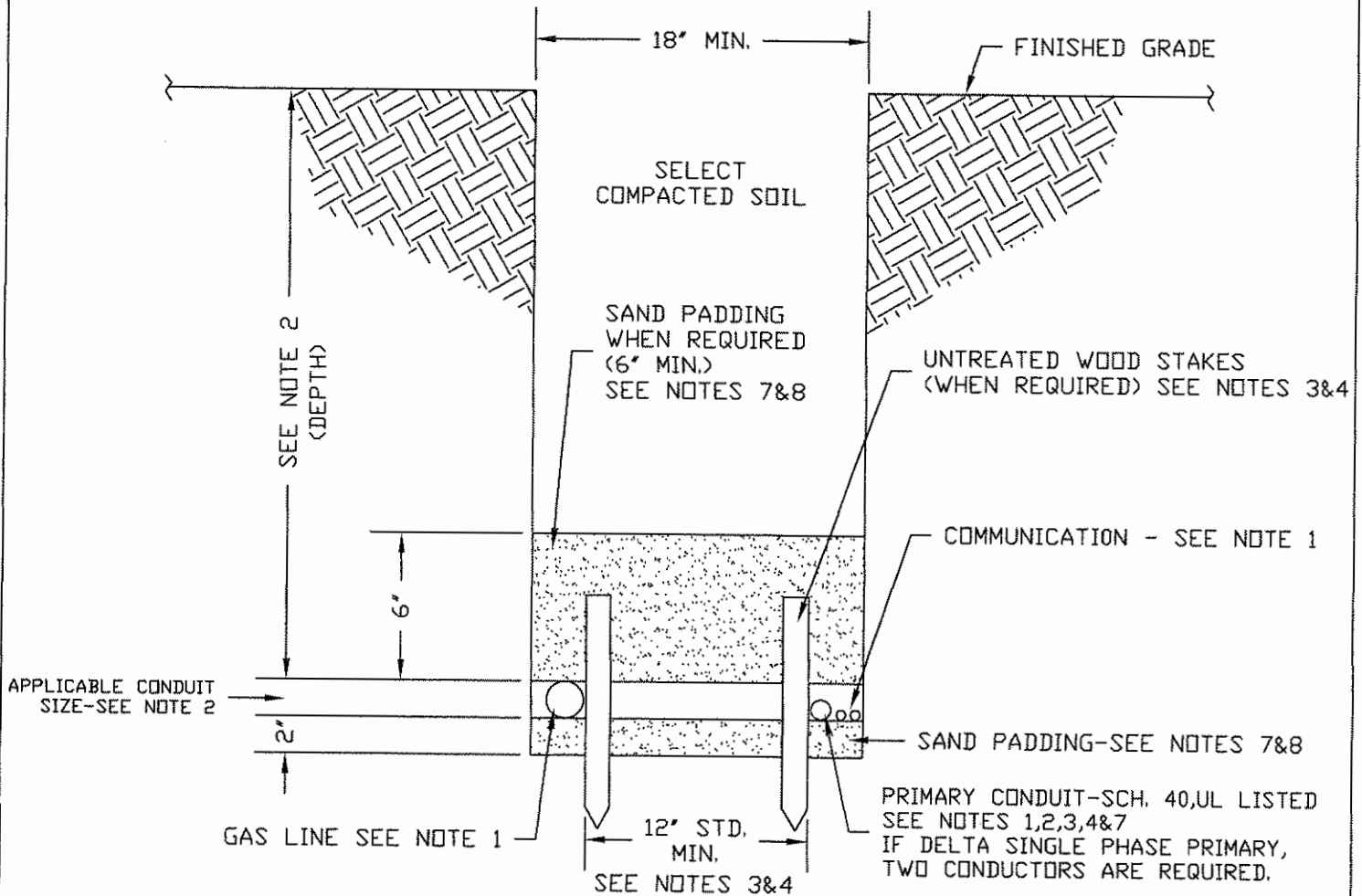
with the Company so that appropriate material may be obtained to complete the installation on schedule.

The Company will install the primary cable termination kits at the Company's connection point, which may be a riser pole, pad-mounted equipment, junction box or manhole. Upon completion of the primary cable installation, the Company will high-potential test the primary cable installation, as discussed in Section XI. The Company does not assume any responsibility for the cable and/or accessories which fail to pass the test due to poor workmanship or mishandling. If failures of this type occur, the Customer shall furnish replacement materials and labor, at the Customer's own expense, to provide a satisfactory installation. The Company will not energize the cable system until the installation has passed the required high potential testing.

E. Other Requirements

Please refer to previous sections in this specification that pertain to the Customer's installation (transformer foundation, specifications for concrete, grounding, metering, etc.), or contact the New Construction Services representative who is coordinating the installation.

LOCATION OF UNDERGROUND FACILITIES (JOINT UTILITIES) IN 5KV DELTA, 15KV OR 35KV TRENCH



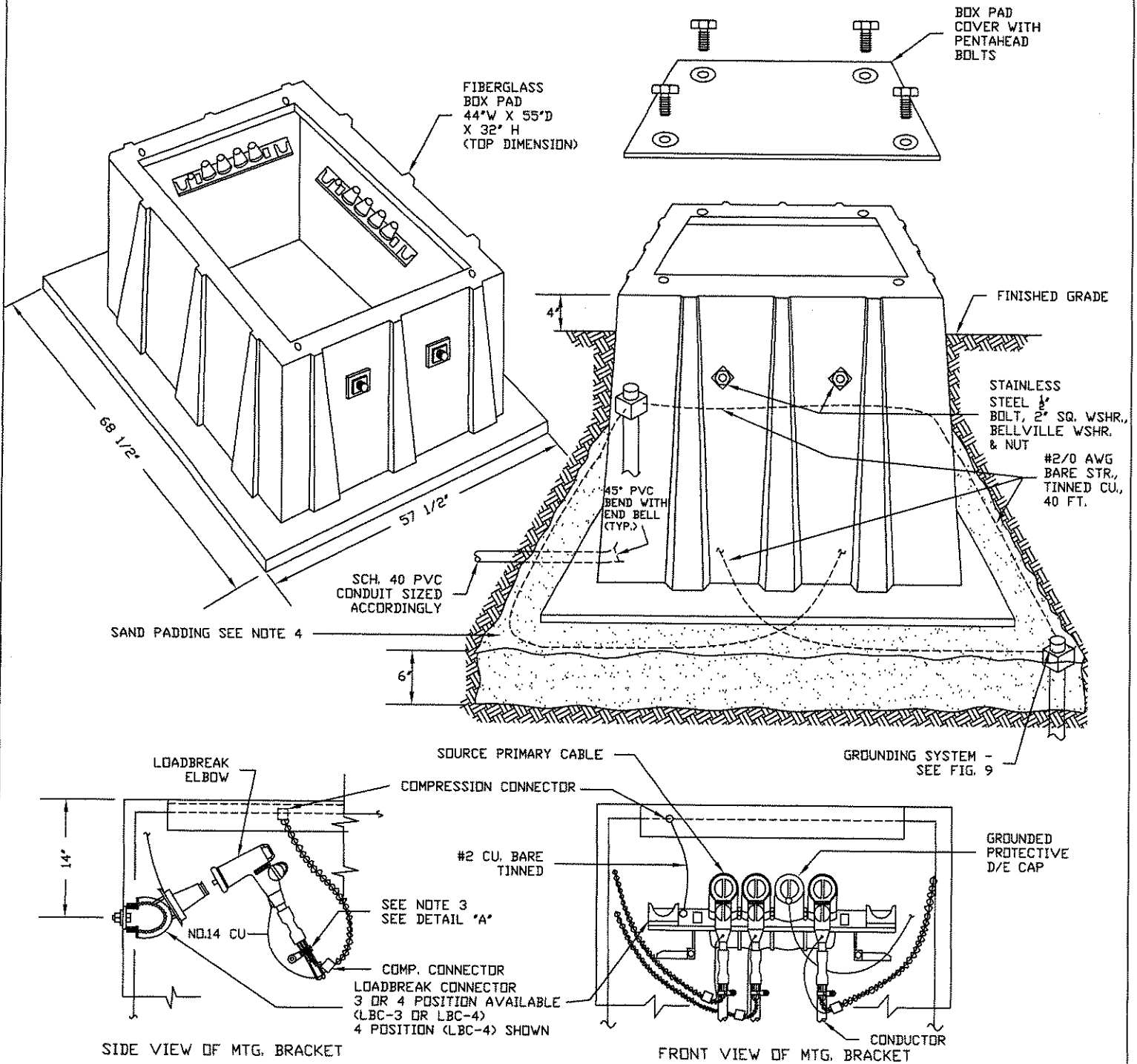
NOTES:

1. THE PRIMARY CONDUIT AND COMMUNICATIONS (TELEPHONE, CATV, ETC.) SHALL BE INSTALLED FIRST FOLLOWED BY GAS WHEN APPLICABLE. CONSULT THE APPLICABLE GAS UTILITY FOR THEIR INSTALLATION SPECIFICATIONS.
2. THE STANDARD MINIMUM DEPTHS AND PRIMARY CONDUIT SIZES ARE IN ACCORDANCE WITH THE FOLLOWING VOLTAGE CLASSES:

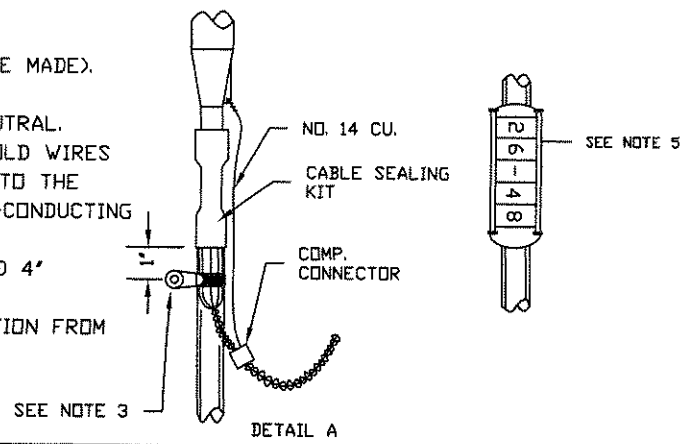
VOLTAGE CLASS	CONDUIT SIZE (# OF PHASES)	DEPTH
5KV DELTA	3" OR 4" (1Ø)	30"
15KV	2" (1Ø)	30"
15KV	4" (3Ø)	30"
35KV	4" (1Ø)	36"
35KV	6" (3Ø)	36"

3. ELECTRIC, COMMUNICATION AND GAS FACILITIES MUST BE STAKED WHERE REQUIRED TO MAINTAIN THE CLEARANCES STATED IN NOTE #4.
4. THE STANDARD MINIMUM CLEARANCE FOR UGND ELECTRIC AND COMMUNICATION FACILITIES SHALL BE TWELVE (12") FROM A GAS LINE. IF NOT PRACTICLE TO OBTAIN, THE ABSOLUTE MINIMUM SHALL BE SIX (6") AND RANDOMLY STAKED WITH UNTREATED WOOD STAKES.
5. 0-600V ELECTRIC SERVICE INSTALLATION SHALL BE IN ACCORDANCE WITH THE COMPANY'S REQUIREMENTS AND THE N.E.C.
6. NO CUSTOMER OWNED SECONDARY (0-600V) CONDUCTORS OR PRIVATE COMMUNICATION CABLES ARE PERMITTED IN THE TRENCH WHERE A RIGHT-OF-WAY HAS BEEN GRANTED TO THE COMPANY.
7. SAND IS REQUIRED WHEN:
 - a. GAS IS PRESENT.
 - b. ANY PORTION OF OR ENTIRE TRENCH IN ON ROCK OR SHALE.
 - c. THE PRIMARY CABLE(S) ARE DIRECT BURIED. A SPARE CONDUIT IS RECOMMENDED WITH THIS APPLICATION
8. IF REQUIRED BY THE COMPANY, OR OTHER AUTHORITY HAVING JURISDICTION, CONCRETE ENCASEMENT OF THE DUCT BANK MAY BE REQUIRED. SEPARATE SPECIFICATIONS WILL BE ISSUED.

30 BELOW GRADE PRIMARY CABLE JUNCTION, 15KV CLASS



- NOTES:
1. LEAVE 10' OF EXTRA SLACK PER CABLE (AFTER TERMINATIONS ARE MADE).
 2. INSTALL CONDUIT IN SAND PADDING BELOW BOX.
 3. INSTALL "ELBOW" TIE WRAP PRIOR TO TWISTING CONCENTRIC NEUTRAL. TIGHTEN THE TIE WRAPS WITH ONLY SUFFICIENT TENSION TO HOLD WIRES "IN PLACE". DO NOT OVER-TIGHTEN SUCH AS TO CAUSE DAMAGE TO THE CABLE BY EMBEDDING THE CONCENTRIC NEUTRAL INTO THE SEMI-CONDUCTING JACKET.
 4. BOX PAD TO BE INSTALLED ON 6" BED OF SAND. SAND TO EXTEND 4" BEYOND PERIMETER OF BOXPAD.
 5. INSTALL GRID COORDINATE AND PHASE ID TAGS AS PER INSTRUCTION FROM THE COMPANY REPRESENTATIVE.



SPECIFICATIONS & EXPLANATORY NOTES FOR TRANSFORMERS INSTALLED AT GROUND LEVEL

NOTES AND SPECIFICATIONS:

1. INSTALLATION SHALL BE IN ACCORDANCE WITH:
 - A. D&RU, INC. FILED TARIFF AND SPECIFICATIONS FOR:
 1. ELECTRICAL INSTALLATIONS
 2. NON-RESIDENTIAL PAD MOUNTED TRANSFORMER INSTALLATIONS
 - B. THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE
 - C. ALL APPROPRIATE CODES AND ORDINANCESANY DEVIATION FROM THE PRECEDING MUST BE APPROVED BY THE ELECTRICAL ENGINEERING DEPARTMENT OR D&RU, INC. AS WELL AS THE APPROPRIATE AGENCIES HAVING JURISDICTION OVER THE INSTALLATION (SEE ITEMS B AND C ABOVE.)
2. RESPONSIBILITY FOR DESIGN AND CONSTRUCTION IN CONFORMANCE WITH ALL CODES RESTS WITH THE OWNER.
3. SITE PREPARATION
 - A. SOIL BENEATH THE CRUSHED STONE AND SURROUNDING AREA TO BE COMPACTED TO 90% OF ORIGINAL DENSITY TO ELIMINATE SHIFTING OF TRANSFORMER AND PAD IF INSTALLATION IS LOCATED ON FILLED EARTH.
 - B. PROVIDE ADEQUATE WATER DRAINAGE AWAY FROM THE PAD INSTALLATION BY GRADING OR DRAIN TILE.
 - C. PROVIDE PROTECTION WITH VEHICULAR BUMPER POSTS IF EXPOSED TO VEHICULAR TRAFFIC. INSTALLATION MUST CONFORM TO PARAGRAPH 7, SKETCH G.
 - D. PROVIDE NECESSARY UNOBSTRUCTED ACCESS TO D&R OWNED FACILITIES TOGETHER WITH THE RIGHT TO REMOVE OBSTRUCTION IF NECESSARY FOR SUCH ACCESS. EASEMENT TO THE INSTALLATION MUST BE OBTAINED FROM PROPERTY OWNER.
 - E. ANY FENCE OR WALL INSTALLED AROUND THE TRANSFORMER INSTALLATION MUST BE INSTALLED IN ACCORDANCE WITH PARAGRAPH NO. 1 AND PARAGRAPH NO. 7 OF THIS SPECIFICATION.
 - F. CONCRETE TO TEST TO 3000 POUNDS PER SQUARE INCH COMPRESSION AT 28 DAYS WITH 6 x 6 x 6/6 WIRE MESH AS SHOWN IN FIG. 4.
4. GROUNDING
 - A. MINIMUM WIRE SIZE TO BE 2/0 AWG. STR. COPPER BETWEEN TRANSFORMER GROUND PADS AND TRANSFORMER GROUND BUS (RODS). GROUND BUS CABLE TO BE BARE STRANDED COPPER IN EARTH WITH A DEPTH OF 18" BELOW FINAL GRADE ELEVATION.
 - B. METAL ENCLOSURE, PRIMARY AND SECONDARY METAL CONDUITS TO BE GROUNDED WITH MINIMUM #2 AWG. BARE STRANDED COPPER.
 - C. BOND PRIMARY CONDUITS ON RISER POLE TO D&RU, INC. DRIVEN GROUND ROD(S) WITH A MINIMUM OF #2 AWG. STR. COPPER. CUSTOMER TO SUPPLY AND INSTALL CONDUIT GROUND CLAMPS, GROUND WIRE AND GROUND ROD CLAMP FOR BONDING GROUND WIRE TO THE D&RU, INC. DRIVEN GROUND ROD(S). (SEE FIG. 8).
 - D. ALL BELOW GRADE UL LISTED (FOR DIRECT BURIAL USE) SPLICES TO BE BY AN D&RU, INC. ELECTRICAL ENGINEERING DEPARTMENT APPROVED METHOD AND INSPECTED BY THE COMPANY'S ELECTRICAL ENGINEERING DEPARTMENT PRIOR TO BACKFILL. THEY INCLUDE: AMP WRENCH-LOK CONNECTORS, CADWELD OR THERMOWELD PROCESS, "AMPACT FIRED ON" CONNECTORS OR COMPRESSION CONNECTORS THAT HAVE BEEN APPROVED BY THE COMPANY'S ELECTRICAL ENGINEERING DEPARTMENT.
 - E. PRIMARY TERMINATIONS TO BE GROUNDED AS PER THE APPROPRIATE COMPANY SPECIFICATIONS AND/OR DRAWINGS.
 - F. ANY METAL FENCE INSTALLED WITHIN TEN FEET (10 FT.) OF THE TRANSFORMER INSTALLATION SHALL BE BONDED TO THE TRANSFORMER GROUND BUS (RODS) WITH #2 AWG. BARE STRANDED COPPER WIRE.
5. CABLES AND TERMINATIONS
 - A. PRIMARY PHASE CONDUCTORS
 1. PRIMARY CABLE TYPE AND CONSTRUCTION MUST BE SUBMITTED IN WRITING TO THE D&RU, INC. ENGINEERING DEPARTMENT FOR REVIEW AND APPROVAL BEFORE PURCHASE AND INSTALLATION TO INSURE COMPATIBILITY WITH THE COMPANY DISTRIBUTION SYSTEM AND EQUIPMENT.
 2. THE MINIMUM PRIMARY CONDUCTOR SIZE FOR 15KV PRIMARY VOLTAGE IS #2 AWG. THE MINIMUM PRIMARY CONDUCTOR SIZE FOR 35KV PRIMARY VOLTAGE IS 1/0 AWG. THE CONDUCTOR MAY BE EITHER COPPER OR ALUMINUM AS SPECIFIED BY THE LATEST EDITIONS OF A.E.I.C. NO. 5 AND THE I.C.E.A.

SPECIFICATIONS & EXPLANATORY NOTES FOR TRANSFORMERS INSTALLED AT GROUND LEVEL

5. CABLES AND TERMINATIONS (CONTINUED)

3. JACKETED CONCENTRIC NEUTRAL PRIMARY CABLE WITH A FULL NEUTRAL OR SHIELDED JACKETED PRIMARY CABLE WITH A SEPARATE NEUTRAL MUST BE INSTALLED IN METALLIC OR PVC SCHEDULE 40 CONDUIT AT A MINIMUM BURIED DEPTH DESCRIBED IN FIG. 1.

B. PRIMARY NEUTRAL CONDUCTORS

1. PRIMARY NEUTRAL CABLE IS TO BE THE SAME SIZE AS THE PHASE CONDUCTOR AND NO SMALLER THAN #2 AWG. COPPER FOR 15KV CABLES AND 1/0 AWG. COPPER FOR 35KV CABLES. PRIMARY NEUTRAL SHALL HAVE 600 VOLT INSULATION.
2. PRIMARY NEUTRAL MUST BE INSTALLED WITH PHASE CONDUCTORS ON ALL INSTALLATIONS AND TERMINATED IN ONE CONTINUOUS RUN. A SEPARATE PRIMARY NEUTRAL IS NOT REQUIRED IF THE PRIMARY PHASE CONDUCTORS ARE OF THE JACKETED CONCENTRIC NEUTRAL TYPE.
3. PRIMARY NEUTRAL IS TO TERMINATE ONLY ON THE:
 - a. HO BUSHING FOR WYE CONNECTED PRIMARY WINDINGS WITH "LIVE FRONT" DESIGN ON 3Ø UNITS.
 - b. XO BUSHING FOR DELTA CONNECTED PRIMARY WINDING WITH "LIVE FRONT" DESIGN ON 3Ø UNITS.
 - c. HO-XO BUSHING FOR THREE PHASE PHASE UNITS OF THE "DEAD FRONT" DESIGN.
 - d. X2 BUSHING FOR GROUNDED WYE PRIMARY SINGLE PHASE UNITS OF BOTH "LIVE AND DEAD FRONT" DESIGNS.
 - e. TRANSFORMER GROUND GRID FOR DELTA PRIMARY SINGLE PHASE UNITS OF BOTH "LIVE AND DEAD FRONT" DESIGNS.
4. PRIMARY NEUTRAL TO BE CONNECTED TO GROUND BUS (RODS) WITH 2/0 COPPER.

C. SECONDARY CONDUCTORS

1. ALL SECONDARY CABLE TRANSFORMER CONNECTIONS ARE TO BE MADE UTILIZING:
 - a. BRONZE BOLTS AND WASHERS ON COPPER TRANSFORMER TERMINALS AND CONNECTORS.
 - b. CADMIUM OR DURIM BOLTS AND WASHERS ON ALUMINUM TRANSFORMER TERMINALS AND CONNECTORS.
 - c. STAINLESS STEEL BOLTS AND WASHERS TO CONNECTORS RATED AL. OR AL/CU.
2. SECONDARY NEUTRAL TO BE CONNECTED TO GROUND BUS (RODS) WITH A MINIMUM OF 2/0 COPPER.

6. CONDUITS

- A. BELOW GRADE PRIMARY AND SECONDARY CONDUITS AT THE TRANSFORMER LOCATION MAY BE NEC APPROVED SCHEDULE 40 PVC FOR DIRECT BURIAL.
- B. PRIMARY CABLE RISER CONDUIT AND SWEEP AT THE RISER POLE MUST BE A MINIMUM OF 4" OR 6" GALVANIZED STEEL. (SEE SECTION VII OF TEXT).
- C. SIZE OF PRIMARY CONDUIT IS TO BE IN ACCORDANCE WITH FIG. 1, NOTE #2.
- D. SECONDARY CONDUITS ARE NOT TO EXTEND BEYOND DIMENSION I OF THE SINGLE UNIT 3Ø TRANSFORMER PAD AS SHOWN ON FIG. 14 MINIMUM SIZE - 2" I.D.
- E. CONDUITS NOT TO EXTEND ABOVE CONCRETE PAD FOR SINGLE UNTIL 3Ø TRANSFORMERS AS SHOWN ON FIG. 4.

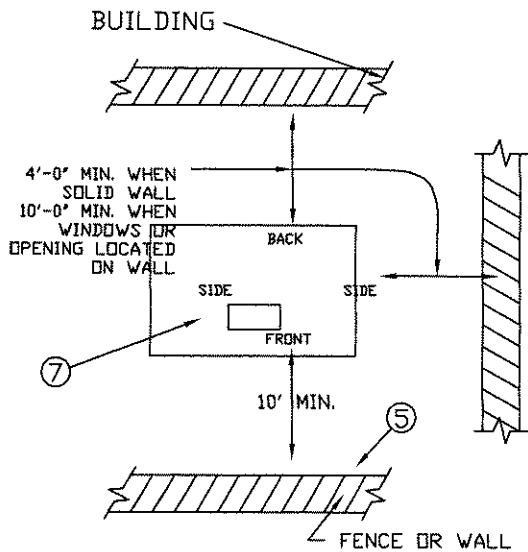
7. CLEARANCES

- A. THE TRANSFORMER INSTALLATION SHALL BE LOCATED AS FAR AS PRACTICAL FROM WINDOWS, DOORS, FIRE ESCAPES, ENTRANCES, GAS METERS, GAS REGULATORS, EQUIPMENT, LOADING RAMPS, AND VENTILATING DUCTS SO AS NOT TO PRESENT A PHYSICAL OBSTRUCTION. THE FOLLOWING ARE MINIMUM HORIZONTAL CLEARANCES BETWEEN:
 1. BACK AND SIDES OF PAD (FOR SINGLE UNIT TRANSFORMER INSTALLATIONS) AND ANY FENCE OR WALL - FOUR FEET (4'). SEE SKETCH A.
 2. BACK AND SIDES OF PAD AND WALL BELOW WINDOWS OR ANY OPENING - TEN FEET (10'). SEE SKETCHES A AND B.
 3. SIDES OF PAD AND DOORS, GRADE ELEVATION WINDOWS, OR ACCESS OPENINGS - TEN FEET (10'). SEE SKETCH C.
 4. SIDES OF PAD AND GAS METERS, OR GAS REGULATORS - TEN FEET (10'). SEE SKETCH D.
 5. SIDES OF PAD AND EQUIPMENT, AND VENTILATING DUCTS - TEN FEET (10'). SEE SKETCH C.
 6. FRONT OF PAD AND ANY FENCE, WALL OR EQUIPMENT - TEN FEET (10'). SEE SKETCH A.

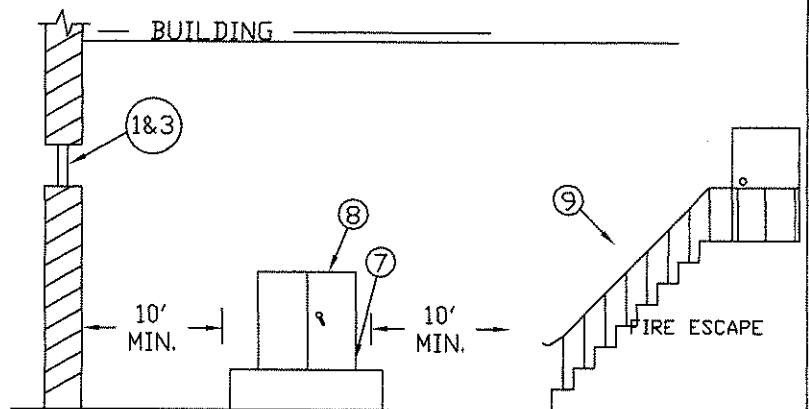
SPECIFICATIONS & EXPLANATORY NOTES FOR TRANSFORMER INSTALLED AT GROUND LEVEL

7. CLEARANCES (CONTINUED)

- 7. SIDE OF PAD AND ANY LOADING RAMP - FIFTY FEET (50'). SEE SKETCH E.
 - 8. SIDE OF PAD AND ANY RISER POLE - TEN FEET (10'). SEE SKETCH F.
 - 9. SIDES OF PAD AND ANY COMBUSTIBLE WALL OR OVERHANG - TEN FEET (10').
 - 10. SHRUBBERY SHALL NOT BE INSTALLED IN FRONT OF THE TRANSFORMER AND A MINIMUM CLEARANCE OF FOUR FEET (4') AWAY FROM LIMBS ON THE REMAINING THREE (3) SIDES.
- B. O&R ENGINEERING DEPARTMENT WILL DETERMINE TRANSFORMER LOCATION WHEN EGRESS IS FROM AUDITORIUM OR PUBLIC BUILDING. ANY PROPOSED INSTALLATION WHICH THE O&R ENGINEERING DEPARTMENT DEEMS CONTROVERSIAL SHALL BE REFERRED TO THE PROPER FIRE INSPECTION AGENCY FOR APPROVAL BEFORE CONSTRUCTION. SEE THE FOLLOWING SKETCHES.
- C. TRANSFORMER INSTALLATION IS NOT TO BE LOCATED: IN FRONT OF BUILDING DOORS, VENTILATION DUCTS OR ACCESS OPENINGS OR BENEATH BUILDING OVERHANG OR OVERHEAD WALKWAY.

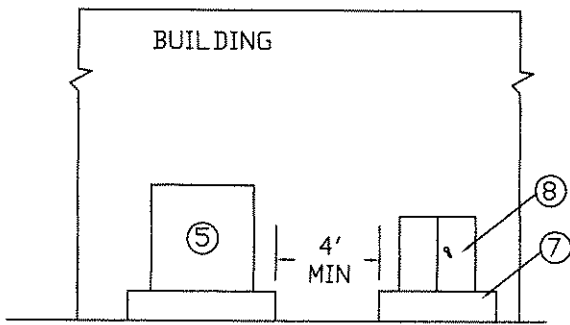


SKETCH A

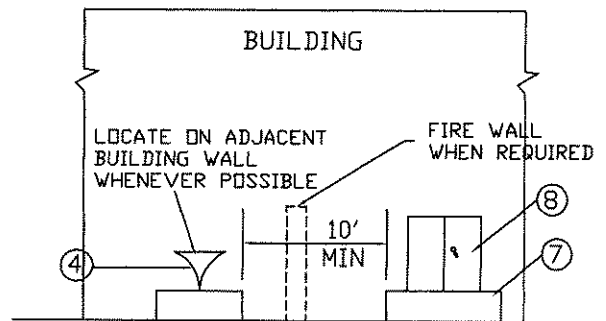


SKETCH B

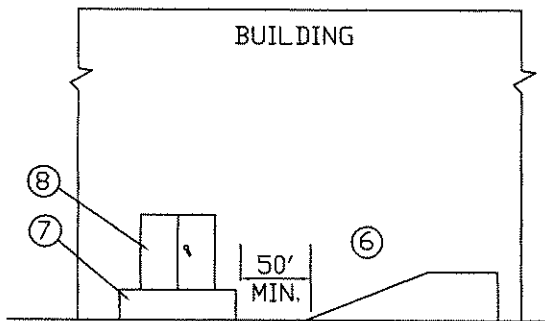
SPECIFICATIONS & EXPLANATORY NOTES FOR TRANSFORMER INSTALLED AT GROUND LEVEL



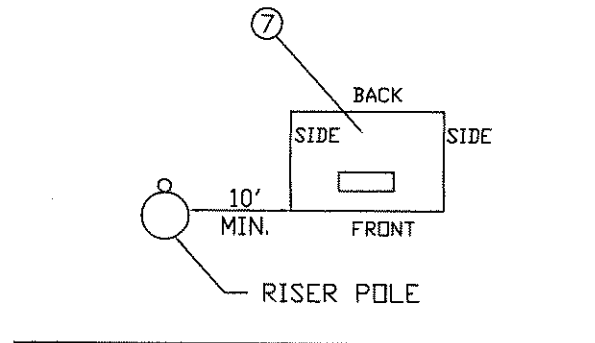
SKETCH C



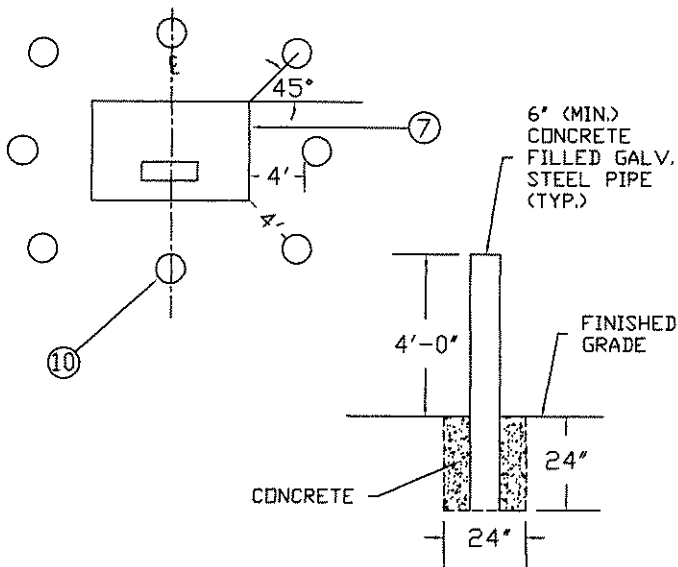
SKETCH D



SKETCH E



SKETCH F



SKETCH G

LEGEND:

1. WINDOW
2. DOOR
3. VENTILATING INTAKE OR EXHAUST DUCT
4. GAS METERS AND/OR REGULATORS
5. EQUIPMENT
6. LOADING RAMP
7. TRANSFORMER PAD
8. TRANSFORMER
9. FIRE ESCAPE
10. VEHICULAR BUMPER GUARDS (BOLLARDS)

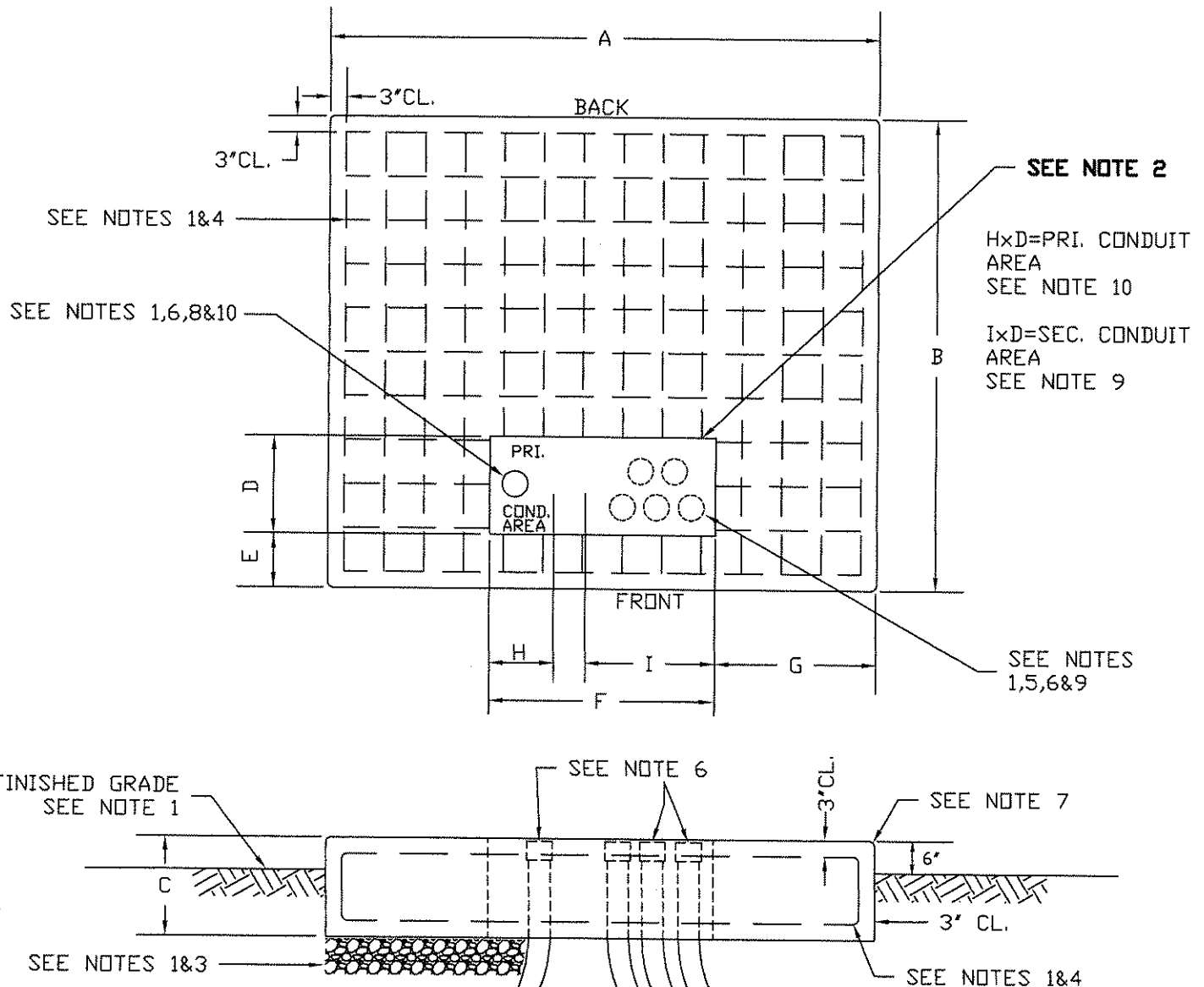
THREE PHASE PADMOUNT TRANSFORMER CONCRETE PAD SPECIFICATIONS

NOTES:

1. SEE FIG. 3 FOR ADDITIONAL REQUIREMENTS, SPECS. AND CLEARANCE REQUIREMENTS.
2. OPENING TO BE D X F DIMENSIONS (AFTER FORM IS REMOVED).
3. CRUSHED STONE $\pm 3'-0"$ BENEATH PAD.
4. $6" \times 6" \times 6/6$ WIRE MESH.
5. NUMBER OF SECONDARY CONDUITS TO CUSTOMERS EQUIPMENT TO SUIT LOAD AND SITE CONDITIONS.
6. CONDUITS NOT TO EXTEND ABOVE PAD.
7. PAD SHALL BE LEVEL AND ALL EDGES CHAMFERED.
8. WHEN REQUIRED, TWO (2) PRIMARY CONDUITS IN THIS AREA.
9. SECONDARY CONDUITS NOT TO EXCEED "I" DIMENSION.
10. PRIMARY CONDUITS SHALL BE WITHIN DIMENSION H.
11. ALL PAD DIMENSIONS ARE THE FINISHED PRODUCT, AFTER ALL FORMS ARE REMOVED.
12. WARNING: DO NOT PULL IN ANY PRIMARY OR SECONDARY WIRES. YOU MUST WAIT FOR THE TRANSFORMER TO BE DELIVERED.

PAD DIMENSIONS

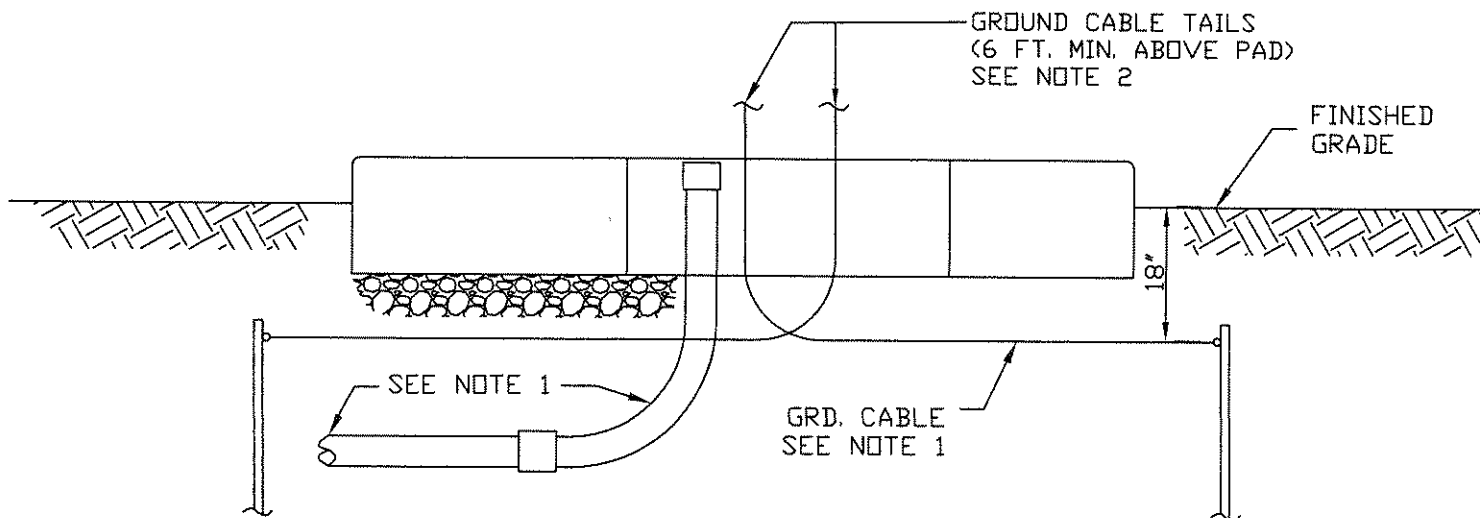
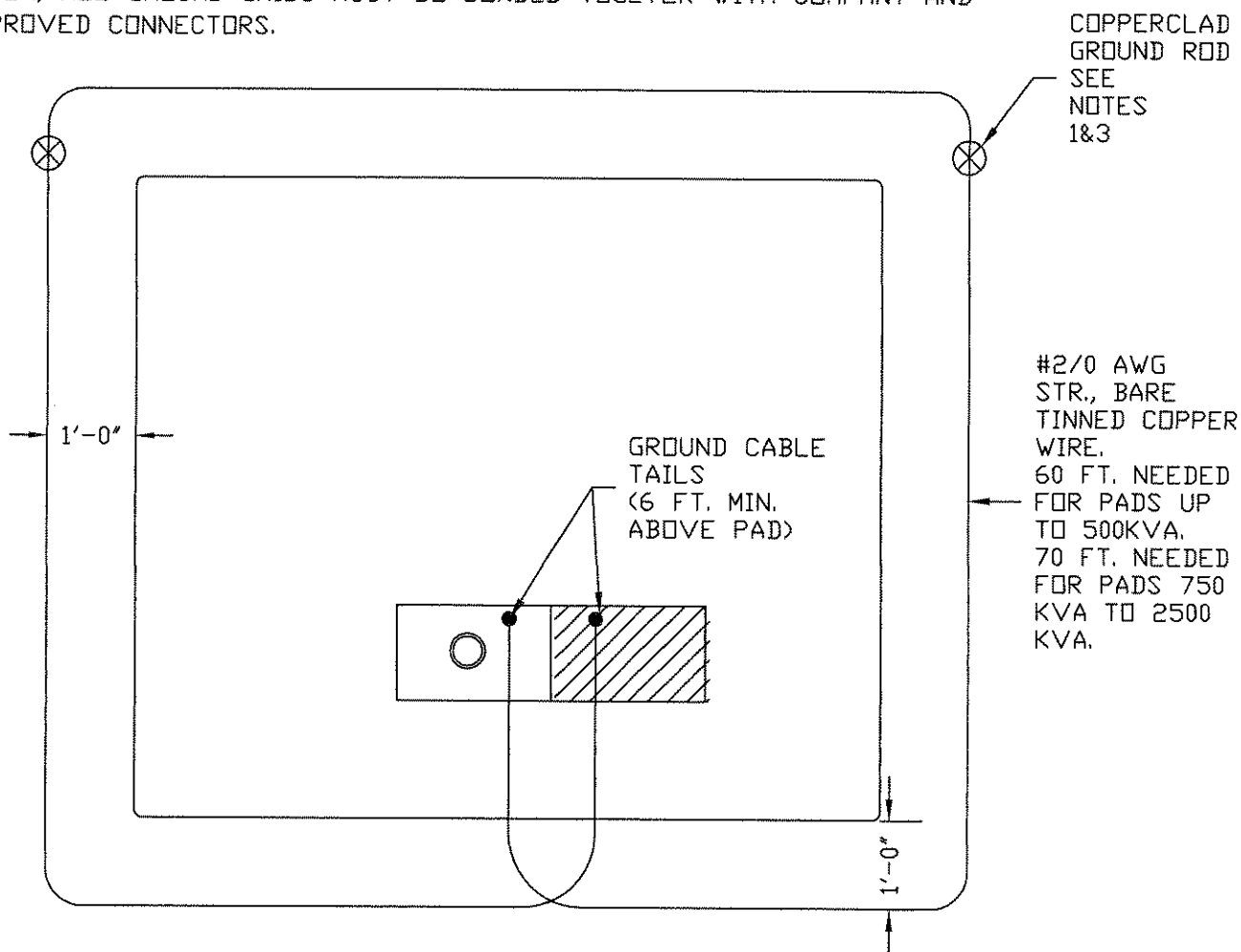
TRANSFORMER SIZE-KVA	A	B	C	D	E	F	G	H	I
75-500	8'-6"	7'-3"	12"	13"	16"	42"	24"	12"	18"
750-1000	9'-0"	7'-8"	12"	18"	10"	42"	30"	12"	24"
1500-2500	11'-0"	9'-2"	18"	18"	10"	42"	42"	12"	24"



PADMOUNT EQUIPMENT GROUND GRID

NOTES:

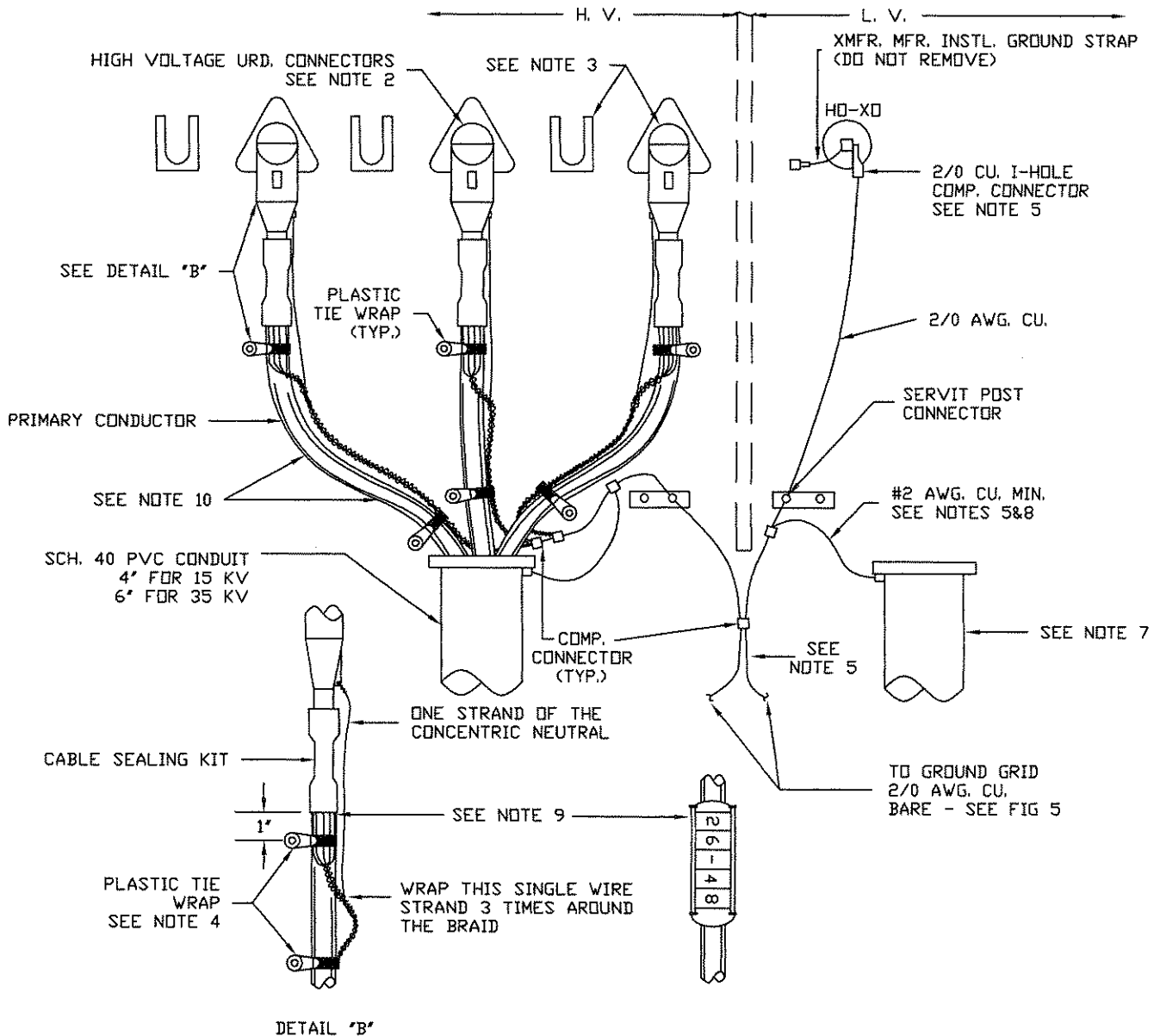
1. SEE FIG. 3 AND SEC. VIII, PAGE 8 OF TEXT FOR ADDITIONAL REQUIREMENTS AND SPECIFICATIONS.
2. TO TRANSFORMER OR EQUIPMENT GROUND PADS.
3. COPPERCLAD GROUND ROD - 5/8" NOMINAL DIAMETER X 8' LONG.
4. WHEN TWO OR MORE PIECES OF EQUIPMENT ARE INSTALLED WITHIN 10 FT. OF EACH OTHER, ALL GROUND GRIDS MUST BE BONDED TOGETHER WITH COMPANY AND N.E.C. APPROVED CONNECTORS.



3Ø RADIAL FEED PADMOUNT XFMR DEAD FRONT 15KV OR 35KV INSTALLATION

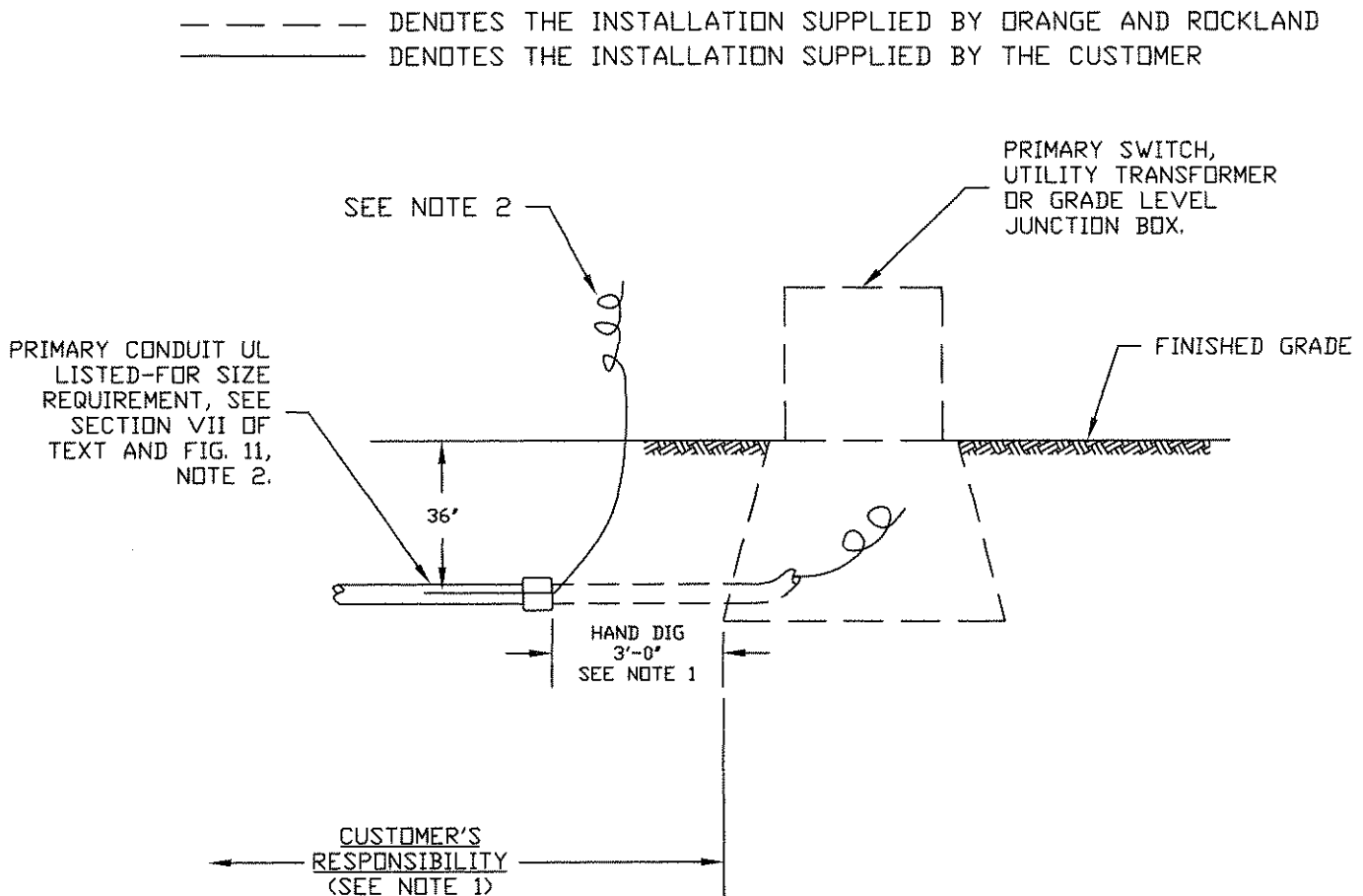
NOTES:

1. SEE FIGS. 3 AND 11 FOR ADDITIONAL REQUIREMENTS AND SPECIFICATIONS.
2. FOLLOW MANUFACTURER'S TERMINATOR INSTRUCTIONS, EXCEPT FOR GROUNDING, INSTALL AS SHOWN.
3. CABLE TO HAVE SUFFICIENT SLACK SUCH THAT THE CABLE TERMINATOR MAY BE INSTALLED ON A STANDOFF BUSHING PLACED IN THE APPROPRIATE PARKING STAND.
4. INSTALL THE TOP ELBOW TIE WRAP PRIOR TO TWISTING CONCENTRIC NEUTRAL, TIGHTEN THE TIE WRAPS WITH ONLY SUFFICIENT TENSION ON THE TIE WRAP TO HOLD THE WIRES IN PLACE. DO NOT OVER-TIGHTEN SUCH AS TO CAUSE DAMAGE TO THE CABLE BY EMBEDDING THE CONCENTRIC WIRES INTO THE SEMI-CONDUCTING JACKET.
5. PRIMARY NEUTRAL, GROUND GRID, HO-XD BUSHING, METAL CONDUIT GROUNDS AND XFMR TANK GROUNDS MUST BE INTERCONNECTED PRIOR TO FINAL INSPECTION.
6. IN ADDITION TO BEING SECURED WITH A PENTA HEAD BOLT, THE SECONDARY COMPARTMENT DOOR IS TO BE LOCKED WITH A PADLOCK HAVING A SHACKLE LENGTH OF 1 5/8" OR LESS.
7. SECONDARY CONDUIT(S) SIZED TO ACCOMMODATE CUSTOMER REQUIREMENTS.
8. GROUNDING CONDUCTOR REQUIRED FROM EACH GALVANIZED STEEL CONDUIT, IF INSTALLED.
9. INSTALL GRID COORDINATE AND PHASE I.D. TAGS AS PER INSTRUCTION FROM THE COMPANY REPRESENTATIVE.
10. THE RADIUS OF THE BEND IN THE CABLE SHALL NOT BE LESS THAN 12 TIMES THE OVERALL DIAMETER OF THE CABLE.



PRIMARY UNDERGROUND SERVICE SHOWING CUSTOMER'S RESPONSIBILITY

AT THE UTILITY'S UNDERGROUND CONNECTION POINT



NOTES:

1. ON ALL CUSTOMER INSTALLED UNDERGROUND SERVICES (0-34,500 VOLTS), THE CUSTOMER WILL BE RESPONSIBLE TO TRENCH UP TO THE COMPANY'S DESIGNATED CONNECTION POINT. THE CUSTOMER OR HIS CONTRACTOR WILL MACHINE DIG THE TRENCH TO WITHIN THREE FEET (3') OF THE COMPANIES SERVICE CONNECTION POINT, I.E.; PRIMARY SWITCH, UTILITY TRANSFORMER OR GRADE LEVEL JUNCTION BOX, AND "HAND DIG" THE LAST THREE FEET (3'), EXPOSING THE COMPANY'S SERVICE CONNECTION POINT FOUNDATION. WHEN THE CUSTOMER/CONTRACTOR INSTALLS THE SERVICE IN CONDUIT, THE CONDUIT SHALL BE TERMINATED THREE FEET (3') FROM THE BOTTOM FLANGE OF THE COMPANY'S BOX PAD.
 - A. ALL CUSTOMERS/CONTRACTORS SHALL HAVE THE EXISTING BELOW GRADE UTILITIES LOCATED AND MARKED BEFORE EXCAVATING. CALL THE APPROPRIATE "CALL BEFORE YOU DIG" NUMBER -FOUND ON PAGE 1.
2. THE CUSTOMER WILL FURNISH (UNLESS OTHERWISE SPECIFIED) AND INSTALL:
 - A. THE PRIMARY SERVICE CABLE(S) (LEAVE A 15' COIL, OF EACH CONDUCTOR, AT END OF CUSTOMER RESPONSIBILITY). THE CABLE(S) SHALL BE COILED NEATLY AND LEFT ON TOP OF GROUND FOR THE COMPANY TO COMPLETE THE INSTALLATION. PRIMARY CABLE(S) ARE TO BE AS SPECIFIED IN SECTION IX OF THE TEXT. ALL CABLE ENDS ARE TO HAVE HEAT SHRINK END CAPS INSTALLED.

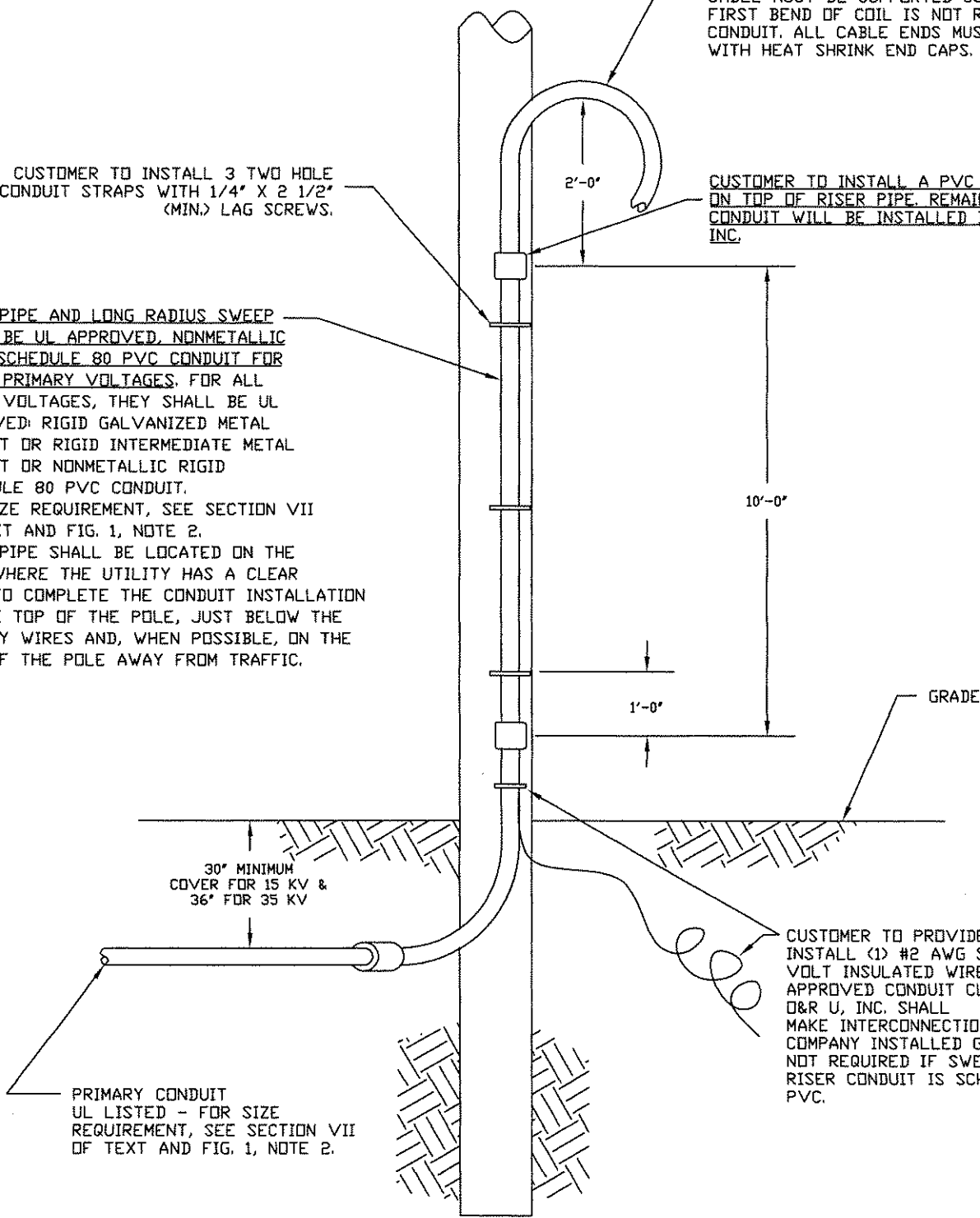
PRIMARY TERMINAL POLE RISER

40 FT. (MIN.) OF PRIMARY CABLE ABOVE TOP OF CONDUIT MUST BE PROVIDED FOR INSTALLATION AND TERMINATION BY D&RU. MINIMUM DIAMETER OF COIL IS TO BE 3'-0". CABLE MUST BE SUPPORTED SUCH THAT FIRST BEND OF COIL IS NOT RESTING ON CONDUIT. ALL CABLE ENDS MUST BE SEALED WITH HEAT SHRINK END CAPS.

CUSTOMER TO INSTALL 3 TWO HOLE CONDUIT STRAPS WITH 1/4" X 2 1/2" (MIN.) LAG SCREWS.

CUSTOMER TO INSTALL A PVC COUPLING ON TOP OF RISER PIPE. REMAINDER OF CONDUIT WILL BE INSTALLED BY D&R U, INC.

RISER PIPE AND LONG RADIUS SWEEP SHALL BE UL APPROVED, NONMETALLIC RIGID SCHEDULE 80 PVC CONDUIT FOR DELTA PRIMARY VOLTAGES. FOR ALL OTHER VOLTAGES, THEY SHALL BE UL APPROVED RIGID GALVANIZED METAL CONDUIT OR RIGID INTERMEDIATE METAL CONDUIT OR NONMETALLIC RIGID SCHEDULE 80 PVC CONDUIT. FOR SIZE REQUIREMENT, SEE SECTION VII OF TEXT AND FIG. 1, NOTE 2.
 RISER PIPE SHALL BE LOCATED ON THE POLE WHERE THE UTILITY HAS A CLEAR AREA TO COMPLETE THE CONDUIT INSTALLATION TO THE TOP OF THE POLE, JUST BELOW THE PRIMARY WIRES AND, WHEN POSSIBLE, ON THE SIDE OF THE POLE AWAY FROM TRAFFIC.



30" MINIMUM COVER FOR 15 KV & 36" FOR 35 KV

PRIMARY CONDUIT UL LISTED - FOR SIZE REQUIREMENT, SEE SECTION VII OF TEXT AND FIG. 1, NOTE 2.

CUSTOMER TO PROVIDE AND INSTALL (1) #2 AWG STR. CU., 600 VOLT INSULATED WIRE TO A UL APPROVED CONDUIT CLAMP. D&R U, INC. SHALL MAKE INTERCONNECTION TO THE COMPANY INSTALLED GROUND ROD. NOT REQUIRED IF SWEEP AND 10'-0" RISER CONDUIT IS SCHEDULE 80 PVC.

FIBERGLASS TRANSFORMER PAD & GROUND WIRE DETAIL - 15KV & 35KV CLASS

GENERAL NOTES:

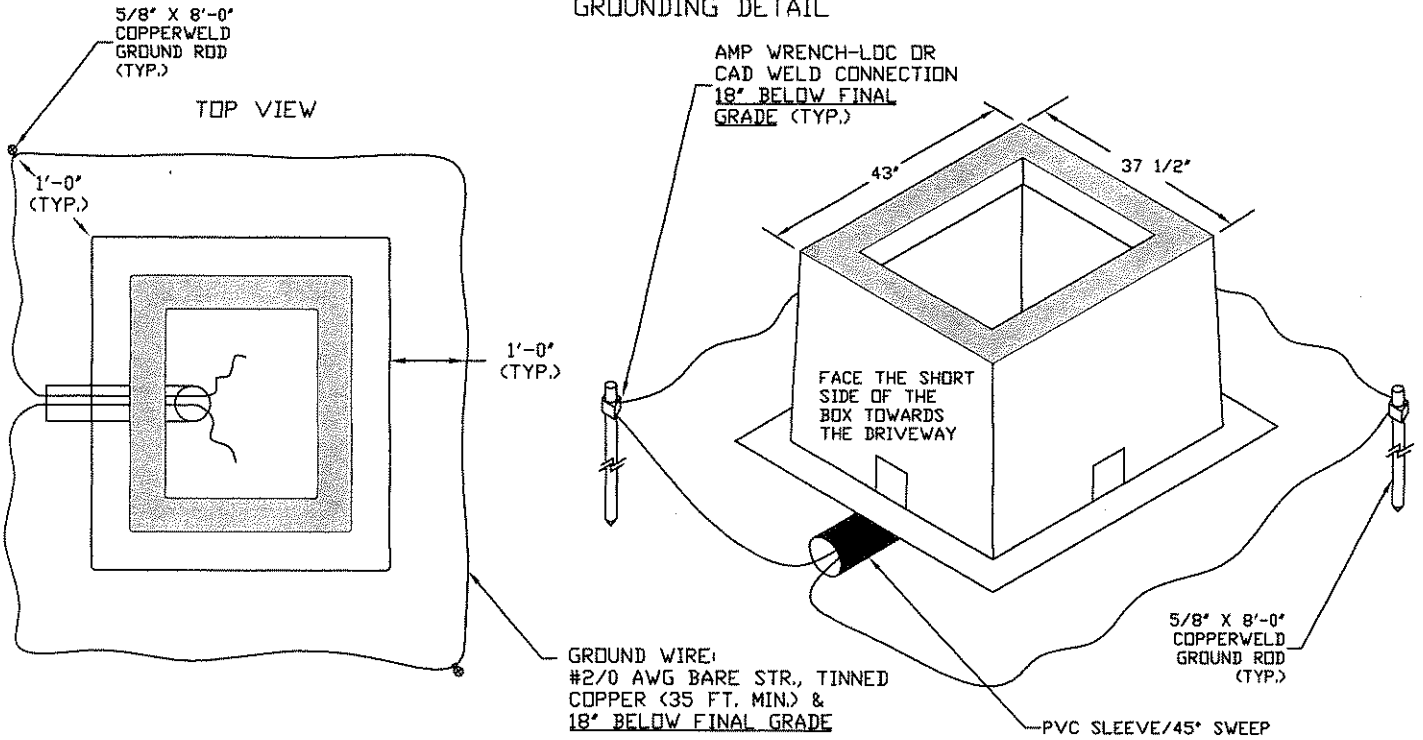
- THE FIBERGLASS TRANSFORMER PAD, SUPPLIED & INSTALLED BY THE CUSTOMER, MUST BE LOCATED BETWEEN 4'-0" & 10'-0" OF THE ACTUAL DRIVEWAY LEADING TO THE HOUSE AND/OR BARN. IT SHALL ALSO BE A MINIMUM DISTANCE OF 10'-0" FROM THE HOUSE AND/OR BARN.
- SEE SECTION V, PAGE 5 OF THE TEXT FOR MORE SPECIFIC RESTRICTIONS ON THE TRANSFORMER LOCATION.
- FOR SERVICES 200 AMP. & SMALLER, THE TRANSFORMER LOCATION MUST NOT BE GREATER THAN 250 FT. FROM THE METER AND PREFERABLY THE MAIN BREAKER.
- FOR SERVICES GREATER THAN 200 AMP., THE TRANSFORMER LOCATION MUST NOT BE GREATER THAN 150 FT. FROM THE METER AND PREFERABLY THE MAIN BREAKER.

SPECIFIED NOTES:

1. LEAVE 15 FT. OF SLACK OF PRIMARY & SECONDARY WIRES TO ENSURE EASE IN DISCONNECTING CABLES. SEAL ALL CABLE ENDS TO PREVENT MOISTURE AND DIRT CONTAMINATION.
2. SECONDARY WIRES MAY ALSO EXIT PAD AT THIS LOCATION.
3. BOX PAD TO BE PLACED ON 6" THICK BED OF SAND. SAND TO EXTEND 4" BEYOND PERIMETER OF BOX PAD.
4. GROUNDING BOND WIRE BETWEEN O&R AND TELEPHONE COMPANY, GROUNDING WIRE IS SUPPLIED BY TELEPHONE COMPANY AND O&RU, INC. MAKES THE CONNECTION.
5. GROUNDING WIRE BETWEEN O&R AND CATV COMPANY, GROUNDING WIRE IS SUPPLIED BY CATV COMPANY AND O&RU, INC. MAKES THE CONNECTION.
6. PRIMARY CABLE SPECIFICATIONS CAN BE FOUND IN SECTION IX OF THE TEXT.
SPECIFICATIONS FOR CONNECTORS FOR THE PRIMARY WIRE CAN FOUND IN SECTION X OF THE TEXT. ALL CONNECTORS ARE SUPPLIED BY THE CUSTOMER & INSTALLED BY O&R.
7. IF THE AMP WRENCH-LOK CONNECTION IS TO BE INSTALLED, DO NOT BREAK OFF BOLT HEAD OF CONNECTOR. IF APPLIED CORRECTLY, THE O&R REPRESENTATIVE WILL COMPLETE THE APPLICATION. LEAVE ENTIRE GROUNDING SYSTEM OPEN & EXPOSED FOR O&RU, INC. INSPECTION.

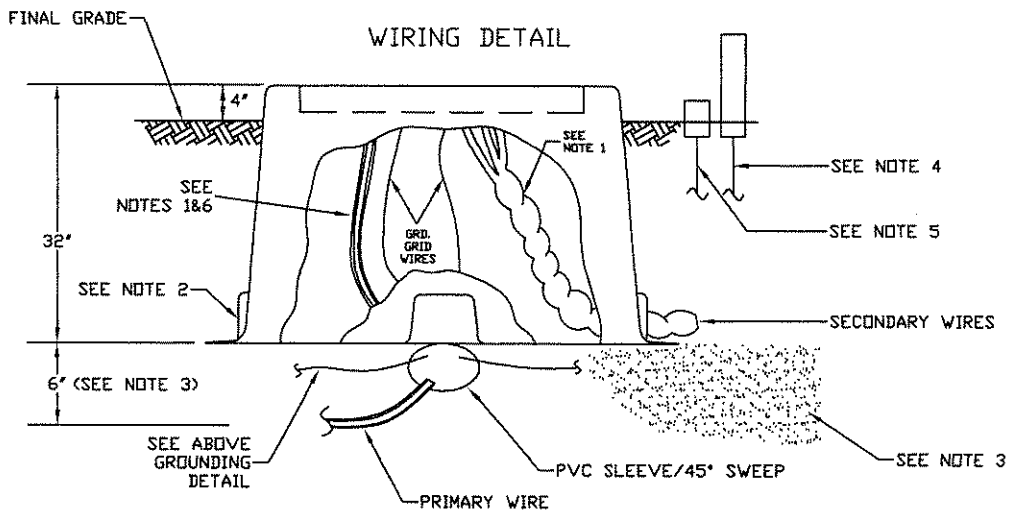
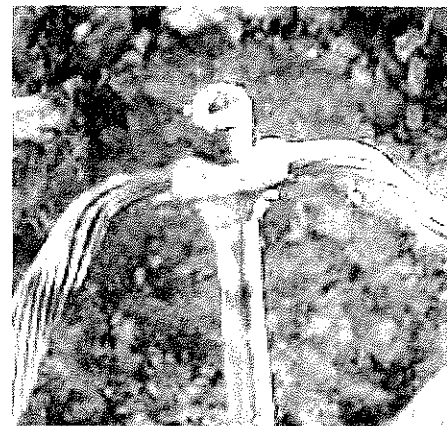
FIBERGLASS TRANSFORMER PAD & GROUND WIRE DETAIL - 15KV & 35KV CLASS

GROUNDING DETAIL



AMP WRENCH-LDC GROUND CONNECTION
SEE NOTE 7

CAD WELD GROUND CONNECTION



1Ø TRANSFORMER PAD INSTALLATION - 25KVA - 167KVA - 15KV CLASS

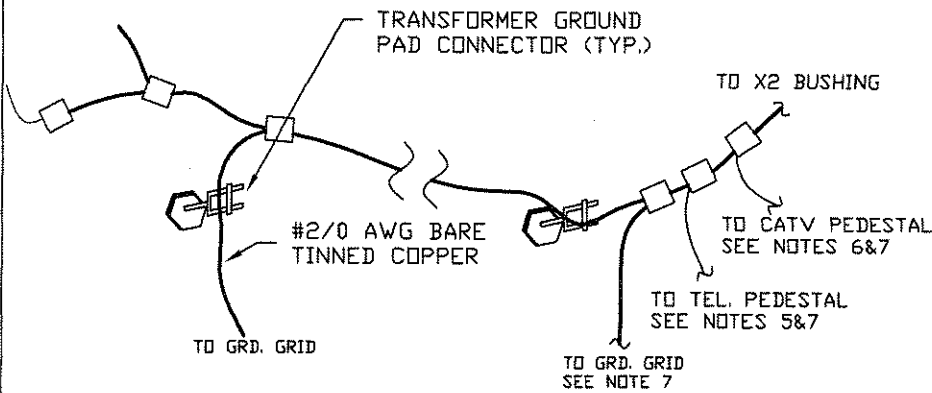
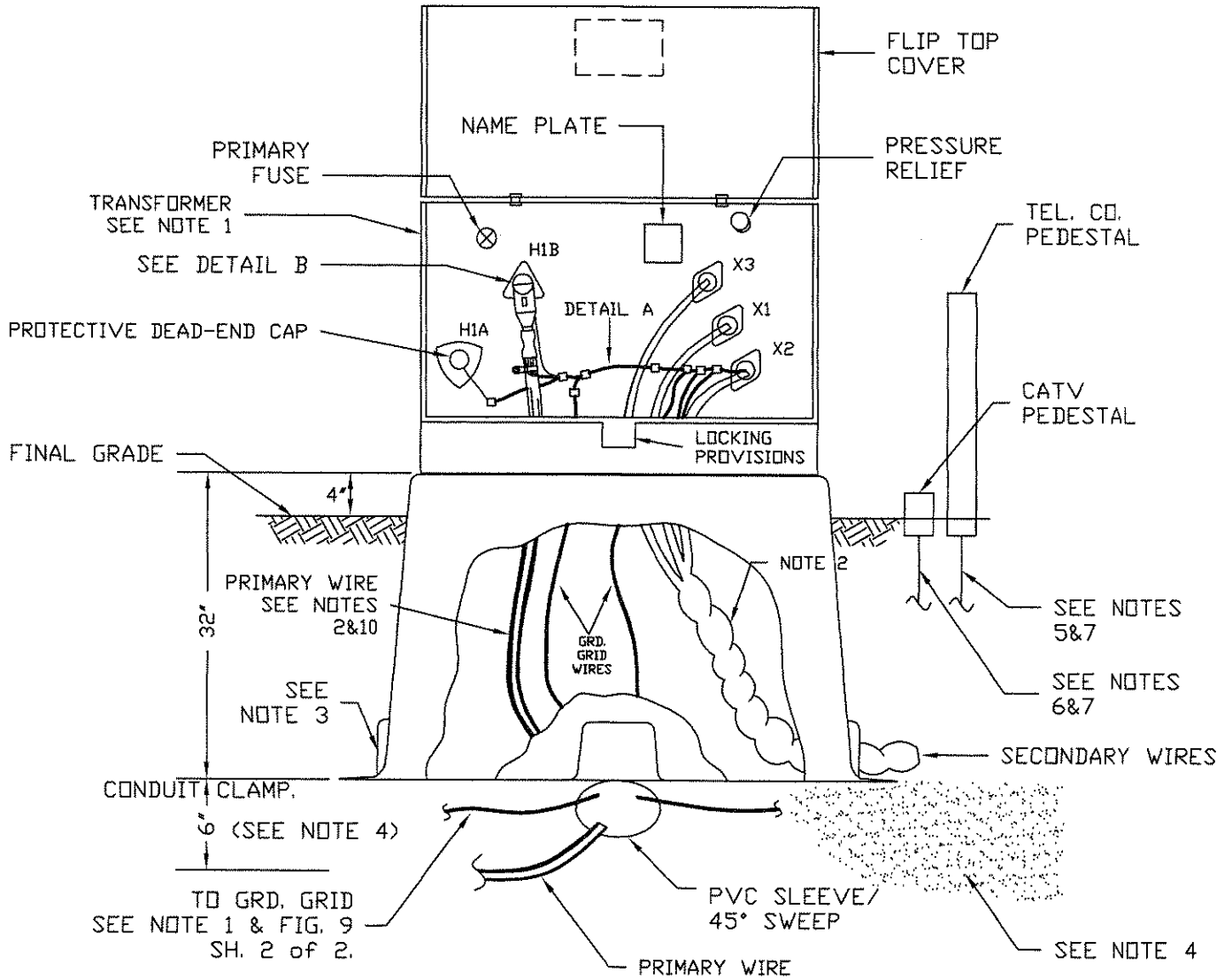
GENERAL NOTES:

- SEE SECTION V, PAGE 5 OF THE TEXT FOR MORE SPECIFIC RESTRICTIONS ON THE TRANSFORMER LOCATION.
- FOR SERVICES 200 AMP. & SMALLER, THE TRANSFORMER LOCATION MUST NOT BE GREATER THAN 250 FT. FROM THE METER AND PREFERABLY THE MAIN BREAKER.
- FOR SERVICES GREATER THAN 200 AMP., THE TRANSFORMER LOCATION MUST NOT BE GREATER THAN 150 FT. FROM THE METER AND PREFERABLY THE MAIN BREAKER.

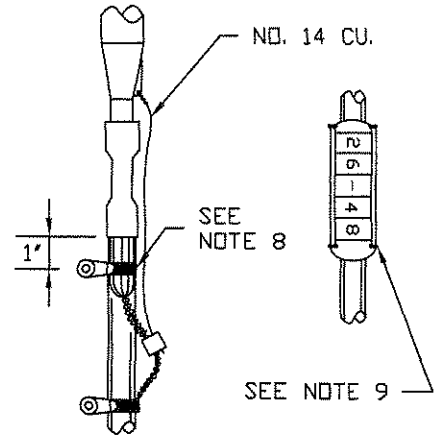
SPECIFIED NOTES:

1. SEE FIGURES 4 AND 12 FOR ADDITIONAL REQUIREMENTS AND SPECIFICATIONS.
2. LEAVE 10 FT. (AFTER TERMINATING ALL WIRES) OF SLACK TO ENSURE EASE IN DISCONNECTING CABLES.
3. SECONDARY WIRES MAY ALSO EXIT PAD AT THIS LOCATION.
4. BOX PAD TO BE PLACED ON 6" THICK BED OF SAND. SAND TO EXTEND 4" BEYOND PERIMETER OF BOX PAD.
5. GROUNDING BOND WIRE BETWEEN D&R AND TELEPHONE COMPANY, GROUNDING WIRE IS SUPPLIED BY TELEPHONE COMPANY AND THE CUSTOMER MAKES THE CONNECTION.
6. GROUNDING BOND WIRE BETWEEN D&R AND CATV COMPANY, GROUNDING WIRE IS SUPPLIED BY CATV COMPANY AND THE CUSTOMER MAKES THE CONNECTION.
7. PRIMARY NEUTRAL, GROUNDING GRID, X2 BUSHING, TRANSFORMER TANK GROUNDS, TELEPHONE COMPANY GROUND (IF PRESENT), AND CATV COMPANY GROUND (IF PRESENT) MUST BE INTERCONNECTED PRIOR TO ENERGIZATION.
8. INSTALL PLASTIC TIE WRAP PRIOR TO TWISTING CONCENTRIC NEUTRAL. TIGHTEN THE TIE WRAPS WITH ONLY SUFFICIENT TENSION TO HOLD WIRES IN PLACE. DO NOT OVER TIGHTEN SUCH AS TO CAUSE DAMAGE TO THE CABLE BY EMBEDDING THE CONCENTRIC WIRES INTO THE SEMI-CONDUCTING JACKET.
9. INSTALL GRID COORDINATE TAG AS DIRECTED BY D&R.
10. PRIMARY WIRE SPECIFICATIONS CAN BE FOUND IN SECTION IX, PAGE 9 OF THE TEXT. SPECIFICATIONS FOR CONNECTORS FOR THE PRIMARY WIRE CAN BE FOUND IN SECTION X, PAGE 11 OF THE TEXT. ALL CONNECTORS ARE SUPPLIED & INSTALLED BY THE CUSTOMER.

1Ø TRANSFORMER PAD INSTALLATION - 25KVA - 167KVA - 15 KV CLASS



DETAIL A

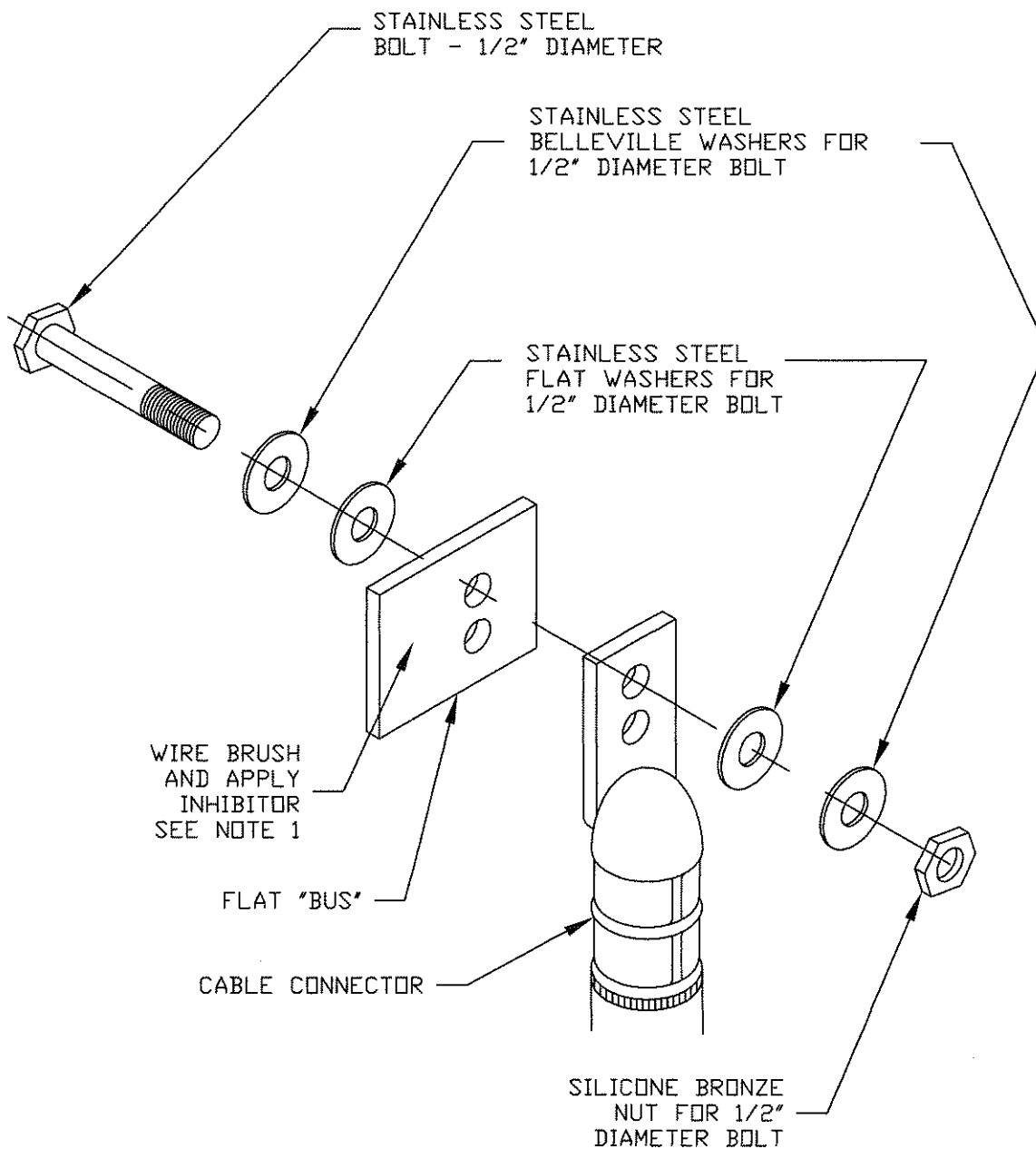


DETAIL B

COMPRESSION CONNECTOR TO CU. OR STEEL FLAT BAR INSTALLATION

NOTES:

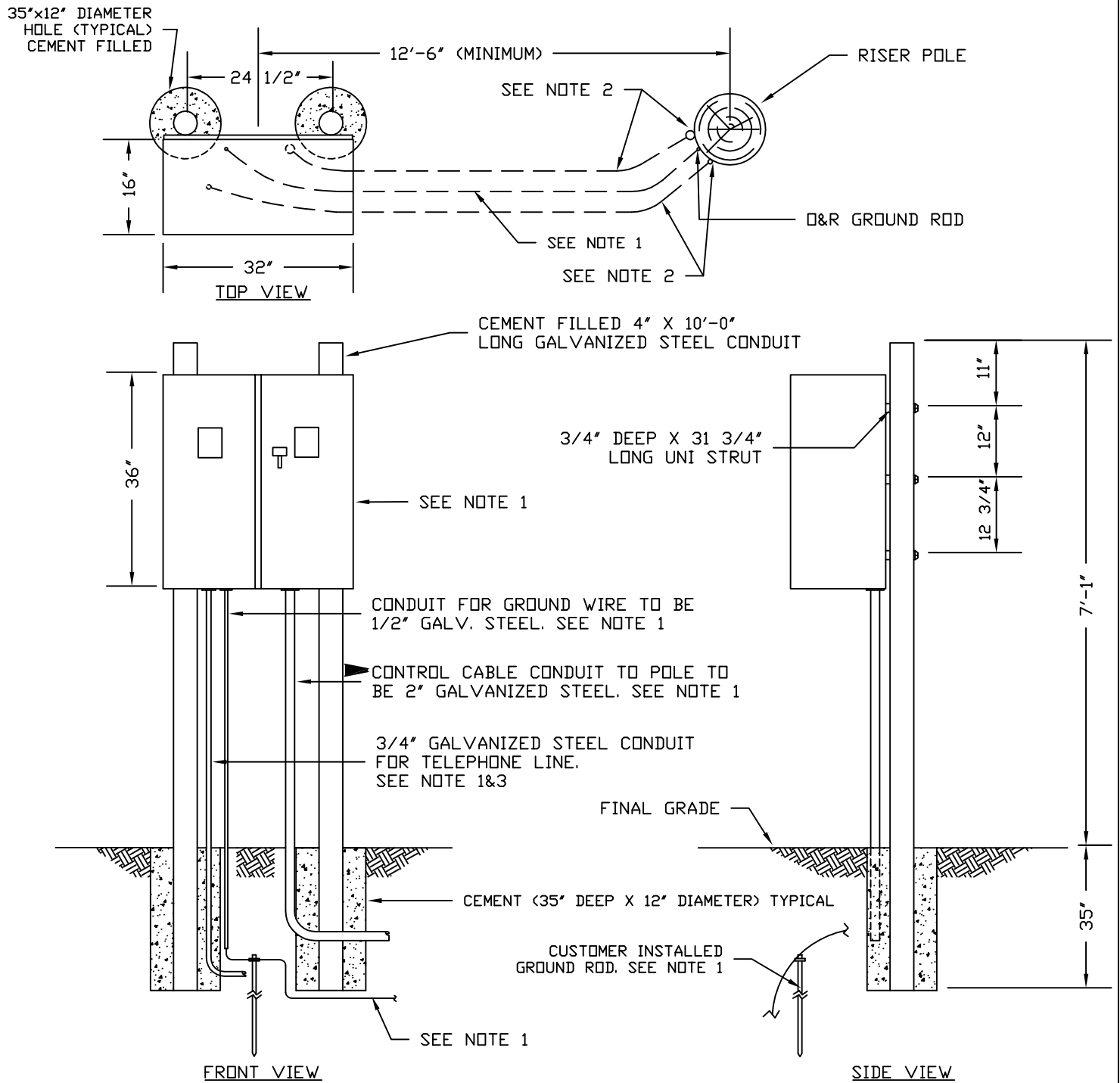
1. WIRE BRUSH CONNECTOR ONLY IF:
 - a. CONNECTOR IS NOT PLATED.
 - b. IN DOUBT AS TO PLATING EXISTANCE.
2. ONE BOLT, ASSOCIATED WASHERS AND NUT ARE REQUIRED FOR EACH HOLE OF A CABLE COMPRESSION CONNECTOR FASTENED TO A FLAT "BUS BAR" (NOTE: ADDITIONAL SET IS REQUIRED FOR CONNECTION SHOWN).



ASSEMBLY SEQUENCE:

- A. MATING SURFACES SHOULD BE FLAT, SMOOTH SURFACES FREE OF DIRT AND CONTAMINATION FOR MAXIMUM CURRENT TRANSFER. WIRE BRUSH "BUS" BEFORE ASSEMBLY. (SEE NOTE 1)
- B. LUBRICATE MATING SURFACES WITH A THIN COATING OF AN OXIDE INHIBITOR.
- C. ASSEMBLE AND TORQUE TO 45 FT. POUNDS.
- D. WIPE OFF EXCESS INHIBITOR.

PRIMARY METER CABINET INSTALLATION



GENERAL NOTES:

- ALL NECESSARY MATERIAL SHALL BE SUPPLIED & INSTALLED BY THE CUSTOMER UNLESS OTHERWISE NOTED.
- ALL CUSTOMER INSTALLED EQUIPMENT SHALL COMPLY WITH THE N.E.C. AS WELL AS ORANGE & ROCKLAND SPECIFICATIONS AND REQUIREMENTS.

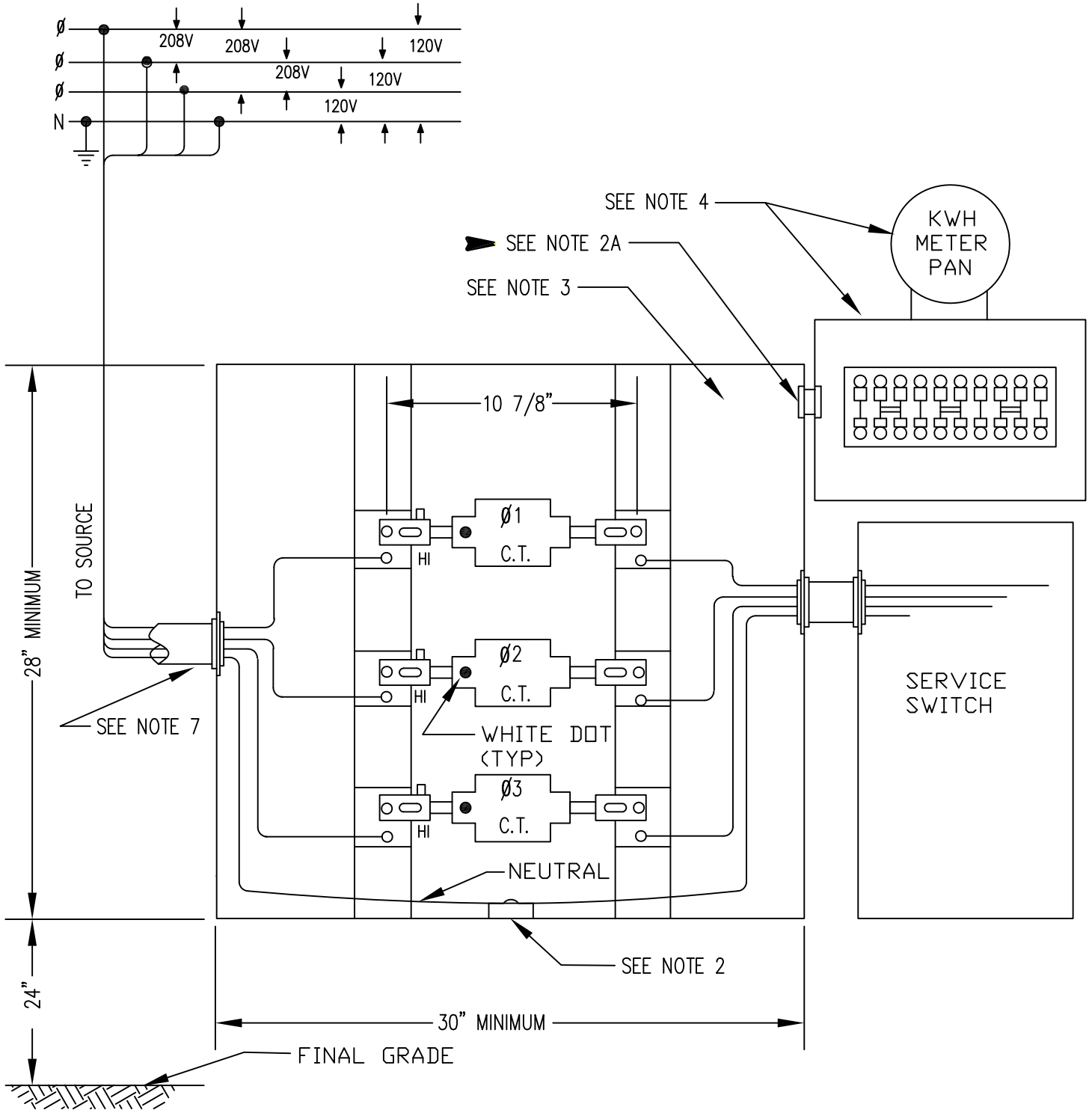
SPECIFIED NOTES:

1. THE METER BOX (METER DEVICES, CATALOG NUMBER 507U4163, OR APPROVED EQUIVALENT), METAL CONDUITS AND ALL INTERNAL DEVICES WITH METAL CASES SHALL BE GROUNDED WITH #2 AWG STRANDED COPPER (TINNED IF DIRECT BURIED) AND INTERCONNECTED TO THE CUSTOMER-INSTALLED 5/8" X 8'-0" COPPERWELD GROUND ROD AND ORANGE & ROCKLAND'S INSTALLED GROUND ROD AT THE BASE OF THE POLE.
2. CONDUIT (3/4" & 2" GALVANIZED STEEL) TO EXTEND UP POLE 10 FEET ABOVE GRADE AND TO BE BONDED TO THE ORANGE & ROCKLAND GROUND ROD WITH N.E.C.-APPROVED CONNECTORS.
3. WHEN APPLICABLE, 500KW OR GREATER OF DIVERSIFIED LOAD, A TELEPHONE CO. BOX AND ASSOCIATED EQUIPMENT MUST BE INSTALLED AS DIRECTED BY ORANGE & ROCKLAND.

METER INSTALLATION FOR 3 ϕ , 4W SERVICE 120/208 VOLT, MAXIMUM 1200A SERVICENOTES:

1. INSTALLATION SHALL BE IN ACCORDANCE WITH THE LATEST COMPANY SPECIFICATIONS AND THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, NFPA 70. THE INSTALLATION SHALL ALSO BE INSPECTED BY THE AUTHORITY HAVING JURISDICTION.
- ▶ 2. IF NOT ALREADY INSTALLED BY THE MANUFACTURER, THE CUSTOMER'S QUALIFIED ELECTRICIAN SHALL INSTALL A #10 LUG ON THE NEUTRAL GROUND PAD OF THE CURRENT TRANSFORMER CABINET FOR THE COMPANY'S USE.
- ▶ 2A. THE CONDUIT BETWEEN THE C.T. CABINET AND METER SOCKET/TEST SWITCH SHALL BE 2 INCH RGS(RIGID GALVANIZED STEEL) CONDUIT, IMC (INTERMEDIATE METAL CONDUIT) OR EMT(ELECTRIC METALLIC TUBING) AND SHALL NOT EXCEED 50 FT. IN LENGTH. PVC OR FLEXIBLE CONDUITS, L.B.'S OR CONDULETS ARE NOT PERMITTED.
3. C.T. METERING CABINET SHALL NOT BE SMALLER THAN 28"H X 30"W X 10"D. C.T.'S ARE SUPPLIED BY O&RU, INC.
4. THE QUALIFIED ELECTRICIAN SHALL SUPPLY & INSTALL ALL COMPANY APPROVED METERING CABINETRY, INCLUDING THE COMBINATION METER SOCKET AND TEST SWITCH. THE CENTER OF THE KWH METER PAN SHALL BE BETWEEN 4-1/2' TO 5-1/2' ABOVE FINAL GRADE. REFER TO "ORU.COM" WEBSITE FOR THE LATEST LIST OF APPROVED METERING EQUIPMENT. THE KWH METER WILL BE SUPPLIED AND INSTALLED BY THE COMPANY.
5. WIRING FROM THE SECONDARY SIDE OF THE C.T.'S TO THE TEST SWITCH SHALL BE INSTALLED BY THE COMPANY WITH THE SERVICE DE-ENERGIZED.
6. ALL METERING EQUIPMENT TO BE OUTDOORS. CUSTOMER TO SUPPLY AND INSTALL WHERE NECESSARY, PROPER WATER PROOFING ON OR IN THEIR EQUIPMENT.
7. SERVICE CONDUITS MAY ENTER AND EXIT AT THE BOTTOM OF THE C.T. CABINET.
- ▶ 8. REFER TO THE MOST RECENT EDITION OF THE GENERAL SPECIFICATIONS FOR ELECTRIC INSTALLATIONS (BLUE BOOK), SECTION VII, METERS AND METERING EQUIPMENT BELOW 600 VOLTS, FOR EQUIPMENT AND CONDUCTOR LABELING REQUIREMENTS.

METER INSTALLATION FOR 3Ø, 4W SERVICE 120/208 VOLT, MAXIMUM 1200A SERVICE



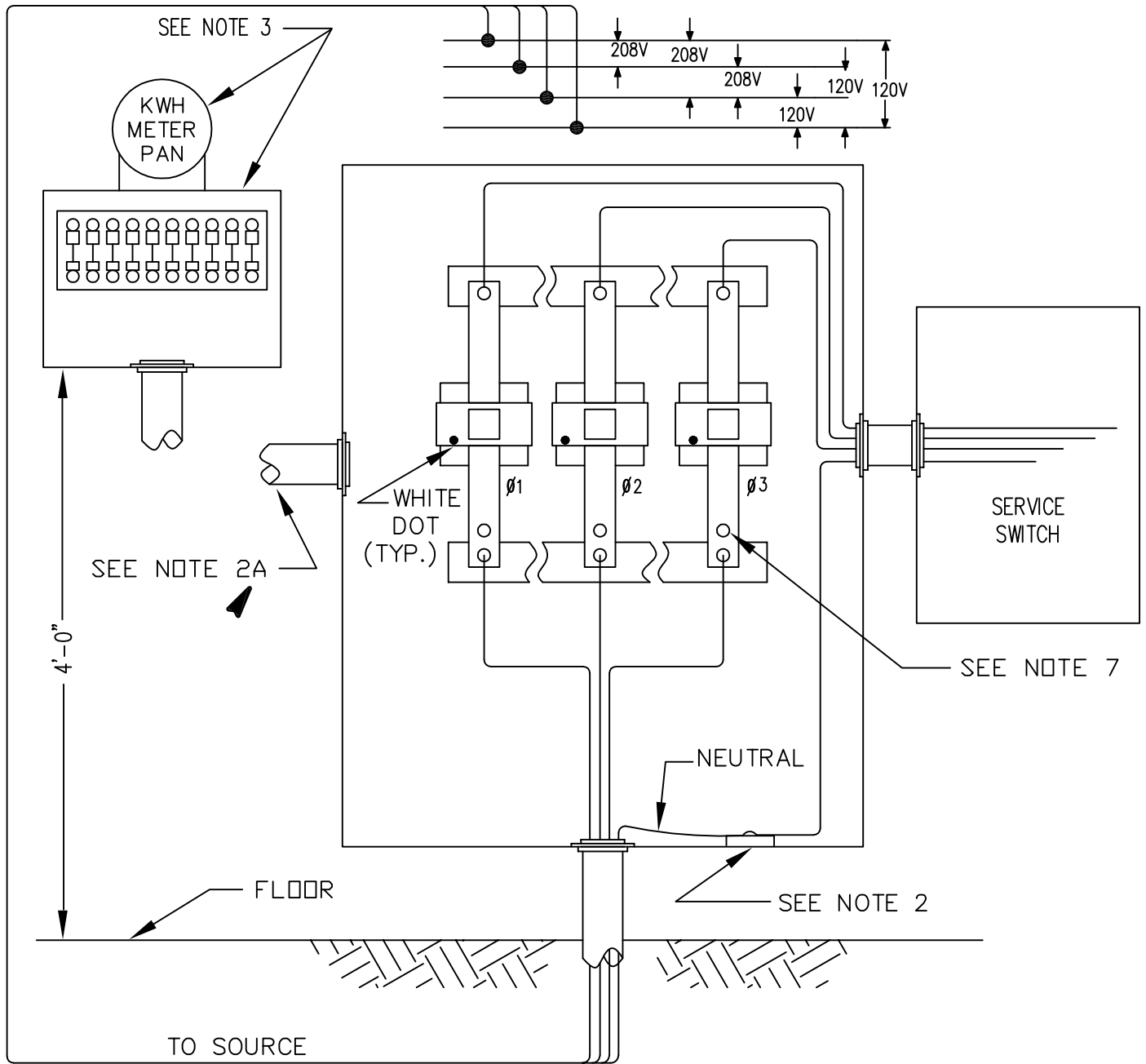
IMPORTANT: REFER TO THE MOST RECENT EDITION OF THE GENERAL SPECIFICATIONS FOR ELECTRIC INSTALLATIONS (BLUE BOOK), SECTION VII, METERS AND METERING EQUIPMENT BELOW 600 VOLTS, FOR EQUIPMENT AND CONDUCTOR LABELING REQUIREMENTS.

METER INSTALLATION FOR 3Ø, 4W SERVICE 120/208 VOLT, SERVICE 1200A AND ABOVE

NOTES:

1. INSTALLATION SHALL BE IN ACCORDANCE WITH THE LATEST COMPANY SPECIFICATIONS AND THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, NFPA 70. THE INSTALLATION SHALL ALSO BE INSPECTED BY THE AUTHORITY HAVING JURISDICTION.
- ▶ 2. IF NOT ALREADY INSTALLED BY THE MANUFACTURER, THE CUSTOMER'S QUALIFIED ELECTRICIAN SHALL INSTALL A #10 LUG ON THE NEUTRAL GROUND PAD OF THE CURRENT TRANSFORMER CABINET FOR THE COMPANY'S USE.
- ▶ 2A. THE CONDUIT BETWEEN THE C.T. CABINET AND METER SOCKET/TEST SWITCH SHALL BE 2 INCH RGS(RIGID GALVANIZED STEEL) CONDUIT, IMC (INTERMEDIATE METAL CONDUIT) OR EMT(ELECTRIC METALLIC TUBING) AND SHALL NOT EXCEED 50 FT. IN LENGTH. PVC OR FLEXIBLE CONDUITS, L.B.'S OR CONDULETS ARE NOT PERMITTED.
3. THE QUALIFIED ELECTRICIAN SHALL SUPPLY & INSTALL ALL COMPANY APPROVED METERING CABINETS, INCLUDING THE COMBINATION METER SOCKET AND TEST SWITCH. REFER TO "ORU.COM" WEBSITE FOR THE LATEST LIST OF APPROVED METERING EQUIPMENT. THE KWH METER WILL BE SUPPLIED AND INSTALLED BY THE COMPANY. PRIOR TO ORDERING YOUR METERING CABINET OR SWITCHGEAR WITH A METERING CUBICLE, THE MANUFACTURER SPECIFICATIONS MUST BE APPROVED BY THE COMPANY.
4. WIRING FROM THE SECONDARY SIDE OF THE C.T.'S TO THE TEST SWITCH SHALL BE INSTALLED BY THE COMPANY WITH THE SERVICE DE-ENERGIZED.
5. SERVICE CONDUITS MAY ENTER AND EXIT AT THE BOTTOM OF THE C.T. CABINET.
6. ALL METERING EQUIPMENT TO BE INSTALLED IN ONE LOCATION.
7. DRILL AND TAP 1/4 - 20 N.C. ON THE LINE SIDE OF EACH BUS BAR FOR POTENTIAL TAPS.
- ▶ 8. REFER TO THE MOST RECENT EDITION OF THE GENERAL SPECIFICATIONS FOR ELECTRIC INSTALLATIONS (BLUE BOOK), SECTION VII, METERS AND METERING EQUIPMENT BELOW 600 VOLTS, FOR EQUIPMENT AND CONDUCTOR LABELING REQUIREMENTS.

METER INSTALLATION FOR 3Ø, 4W SERVICE 120/208 VOLT, SERVICE 1200A AND ABOVE



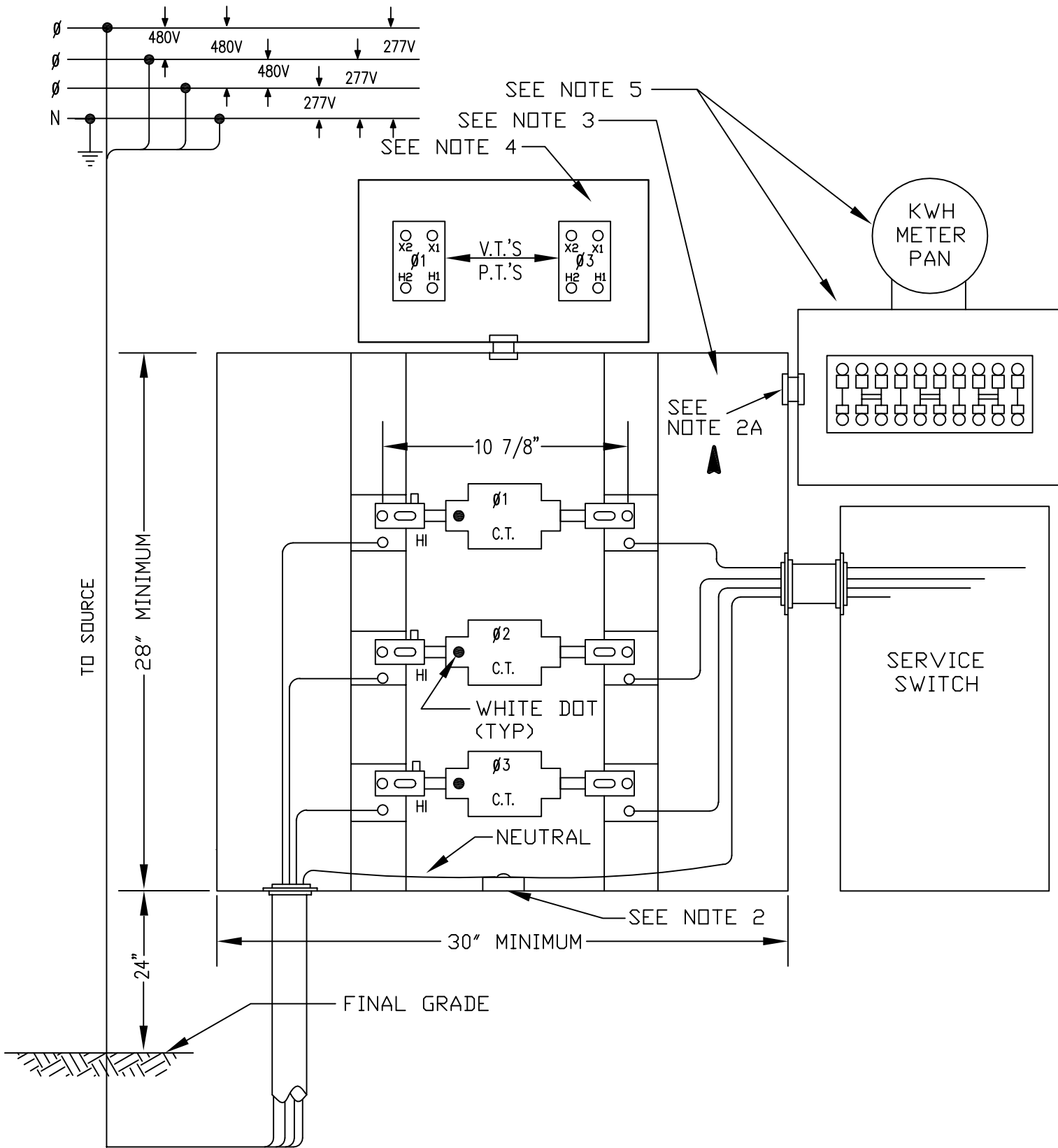
IMPORTANT: REFER TO THE MOST RECENT EDITION OF THE GENERAL SPECIFICATIONS FOR ELECTRIC INSTALLATIONS (BLUE BOOK), SECTION VII, METERS AND METERING EQUIPMENT BELOW 600 VOLTS, FOR EQUIPMENT AND CONDUCTOR LABELING REQUIREMENTS.

METER INSTALLATION FOR 3Ø, 4W SERVICE 277/480 VOLT, MAXIMUM 1200A SERVICE

NOTES:

1. INSTALLATION SHALL BE IN ACCORDANCE WITH THE LATEST COMPANY SPECIFICATIONS AND THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, NFPA 70. THE INSTALLATION SHALL ALSO BE INSPECTED BY THE AUTHORITY HAVING JURISDICTION.
- ▶ 2. IF NOT ALREADY INSTALLED BY THE MANUFACTURER, THE CUSTOMER'S QUALIFIED ELECTRICIAN SHALL INSTALL A #10 LUG ON THE NEUTRAL GROUND PAD OF THE CURRENT TRANSFORMER CABINET FOR THE COMPANY'S USE.
- ▶ 2A. THE CONDUIT BETWEEN THE C.T./V.T. CABINETS AND METER SOCKET/TEST SWITCH SHALL BE 2 INCH RGS(RIGID GALVANIZED STEEL) CONDUIT, IMC (INTERMEDIATE METAL CONDUIT) OR EMT(ELECTRIC METALLIC TUBING) AND SHALL NOT EXCEED 50 FT. IN LENGTH. PVC OR FLEXIBLE CONDUITS, L.B.'S OR CONDULETS ARE NOT PERMITTED.
3. C.T. METERING CABINET SHALL NOT BE SMALLER THAN 28"H X 30"W X 10"D. C.T.'S ARE SUPPLIED BY O&RU, INC.
4. V.T. / P.T. METERING CABINET SHALL NOT BE SMALLER X 12-1/2"H X 10"D WITH AN INTERNAL 3/4" PLYWOOD BACKING. V.T.'S/P.T.'S ARE SUPPLIED BY O&RU, INC.
5. THE QUALIFIED ELECTRIAN SHALL SUPPLY & INSTALL ALL COMPANY APPROVED METERING CABINTRY, INCLUDING THE COMBINATION METER SOCKET AND TEST SWITCH.THE CENTER OF THE KWH METER PAN SHALL BE BETWEEN 4-1/2' TO 5-1/2' ABOVE FINAL GRADE. REFER TO "ORU.COM" WEBSITE FOR THE LATEST LIST OF APPROVED METERING EQUIPMENT. THE KWH METER WILL BE SUPPLIED AND INSTALLED BY THE COMPANY.
6. WIRING FROM THE SECONDARY SIDE OF THE C.T.'S & V.T./P.T.'S TO THE TEST SWITCH SHALL BE INSTALLED BY THE COMPANY WITH THE SERVICE DE-ENERGIZED.
7. ALL METERING EQUIPMENT TO BE OUTDOORS.
WHERE NECESSARY, PROPER WATER PROOFING ON OR IN THEIR EQUIPMENT.
8. SERVICE CONDUITS MAY ENTER AND EXIT AT THE BOTTOM OF THE C.T. CABINET.
CUSTOMER TO SUPPLY AND INSTALL
- ▶ 9. REFER TO THE MOST RECENT EDITION OF THE GENERAL SPECIFICATIONS FOR ELECTRIC INSTALLATIONS (BLUE BOOK), SECTION VII, METERS AND METERING EQUIPMENT BELOW 600 VOLTS, FOR EQUIPMENT AND CONDUCTOR LABELING REQUIREMENTS.

METER INSTALLATION FOR 3Ø, 4W SERVICE 277/480 VOLT, MAXIMUM 1200A SERVICE

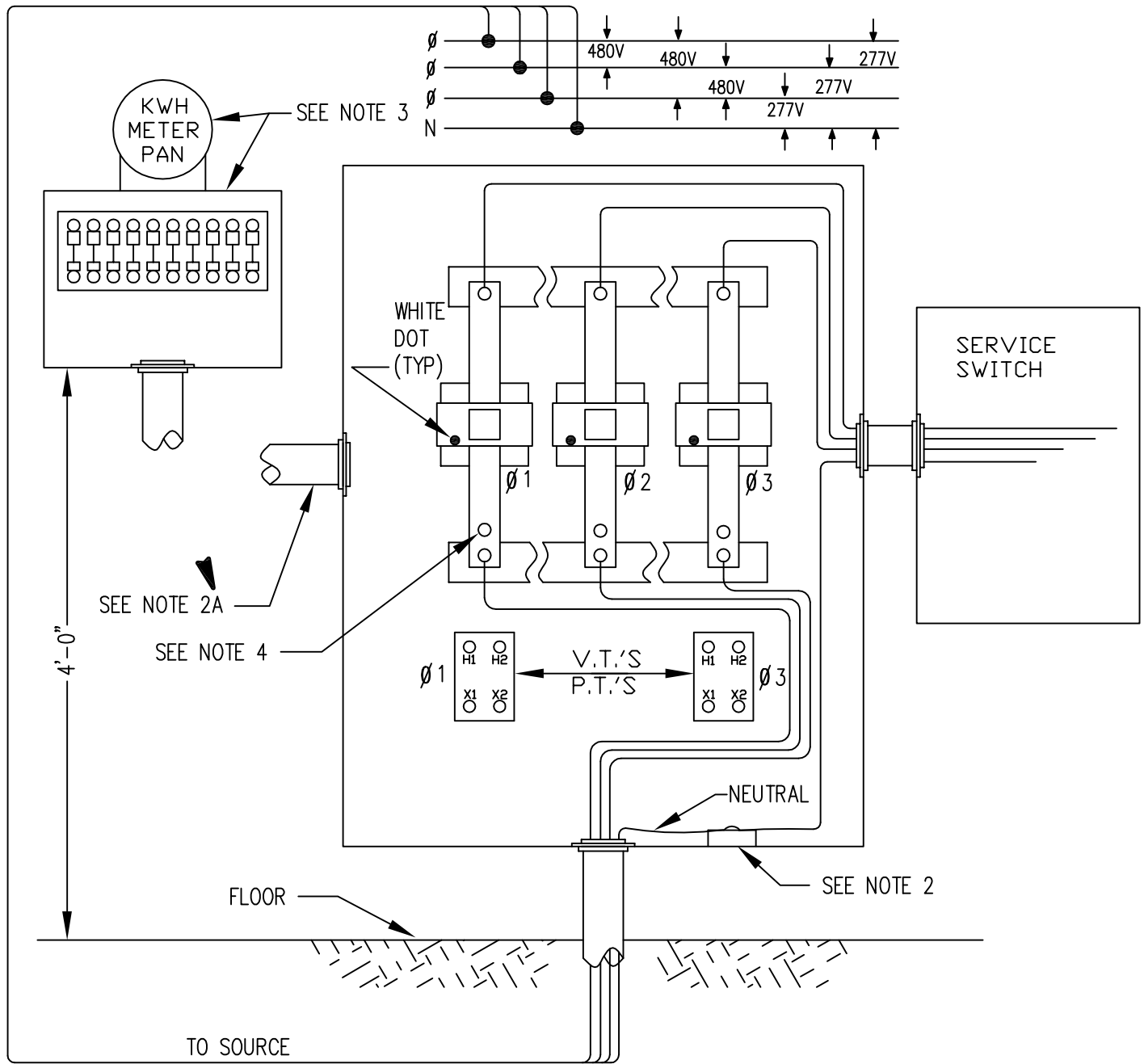


IMPORTANT: REFER TO THE MOST RECENT EDITION OF THE GENERAL SPECIFICATIONS FOR ELECTRIC INSTALLATIONS (BLUE BOOK), SECTION VII, METERS AND METERING EQUIPMENT BELOW 600 VOLTS, FOR EQUIPMENT AND CONDUCTOR LABELING REQUIREMENTS.

METER INSTALLATION FOR 3 ϕ , 4W, 277/480 VOLT, SERVICE 1200A AND ABOVENOTES

1. INSTALLATION SHALL BE IN ACCORDANCE WITH THE LATEST COMPANY SPECIFICATIONS AND THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, NFPA 70. THE INSTALLATION SHALL ALSO BE INSPECTED BY THE AUTHORITY HAVING JURISDICTION.
- ▶ 2. IF NOT ALREADY INSTALLED BY THE MANUFACTURER, THE QUALIFIED ELECTRICIAN SHALL INSTALL A #10 LUG ON THE NEUTRAL GROUND PAD OF THE CURRENT TRANSFORMER CABINET FOR THE COMPANY'S USE.
- ▶ 2A. THE CONDUIT BETWEEN THE C.T. CABINET AND METER SOCKET/TEST SWITCH SHALL BE 2 INCH RGS(RIGID GALVANIZED STEEL) CONDUIT, IMC (INTERMEDIATE METAL CONDUIT) OR EMT(ELECTRIC METALLIC TUBING) AND SHALL NOT EXCEED 50 FT. IN LENGTH. PVC OR FLEXIBLE CONDUITS, L.B.'S OR CONDULETS ARE NOT PERMITTED.
3. THE QUALIFIED ELECTRICIAN SHALL SUPPLY & INSTALL ALL COMPANY APPROVED METERING CABINETRY, INCLUDING THE COMBINATION METER SOCKET AND TEST SWITCH. REFER TO "ORU.COM" WEBSITE FOR THE LATEST LIST OF APPROVED METERING EQUIPMENT. THE KWH METER WILL BE SUPPLIED AND INSTALLED BY THE COMPANY. PRIOR TO ORDERING YOUR METERING CABINET OR SWITCHGEAR WITH A METERING CUBICLE, THE MANUFACTURER SPECIFICATIONS MUST BE APPROVED BY THE COMPANY.
4. DRILL AND TAP 1/4-20NC ON THE LINE SIDE OF EACH BUS BAR FOR THE V.T./P.T. TAPS.
5. WIRING FROM THE SECONDARY SIDE OF THE C.T.'S, V.T.'S/P.T.'S TO THE TEST SWITCH SHALL BE INSTALLED BY THE COMPANY WITH THE SERVICE DE-ENERGIZED.
6. SERVICE CONDUIT MAY ENTER AND EXIT AT THE BOTTOM OF THE C.T. CABINET.
7. ALL METERING EQUIPMENT TO BE INSTALLED IN ONE LOCATION.
- ▶ 8. REFER TO THE MOST RECENT EDITION OF THE GENERAL SPECIFICATION FOR ELECTRIC INSTALLATIONS (BLUE BOOK), SECTION VII, METERS AND METERING EQUIPMENT BELOW 600 VOLTS, FOR EQUIPMENT AND CONDUCTOR LABELING REQUIREMENTS.

METER INSTALLATION FOR 3Ø, 4W, 277/480 VOLT, SERVICE 1200A AND ABOVE

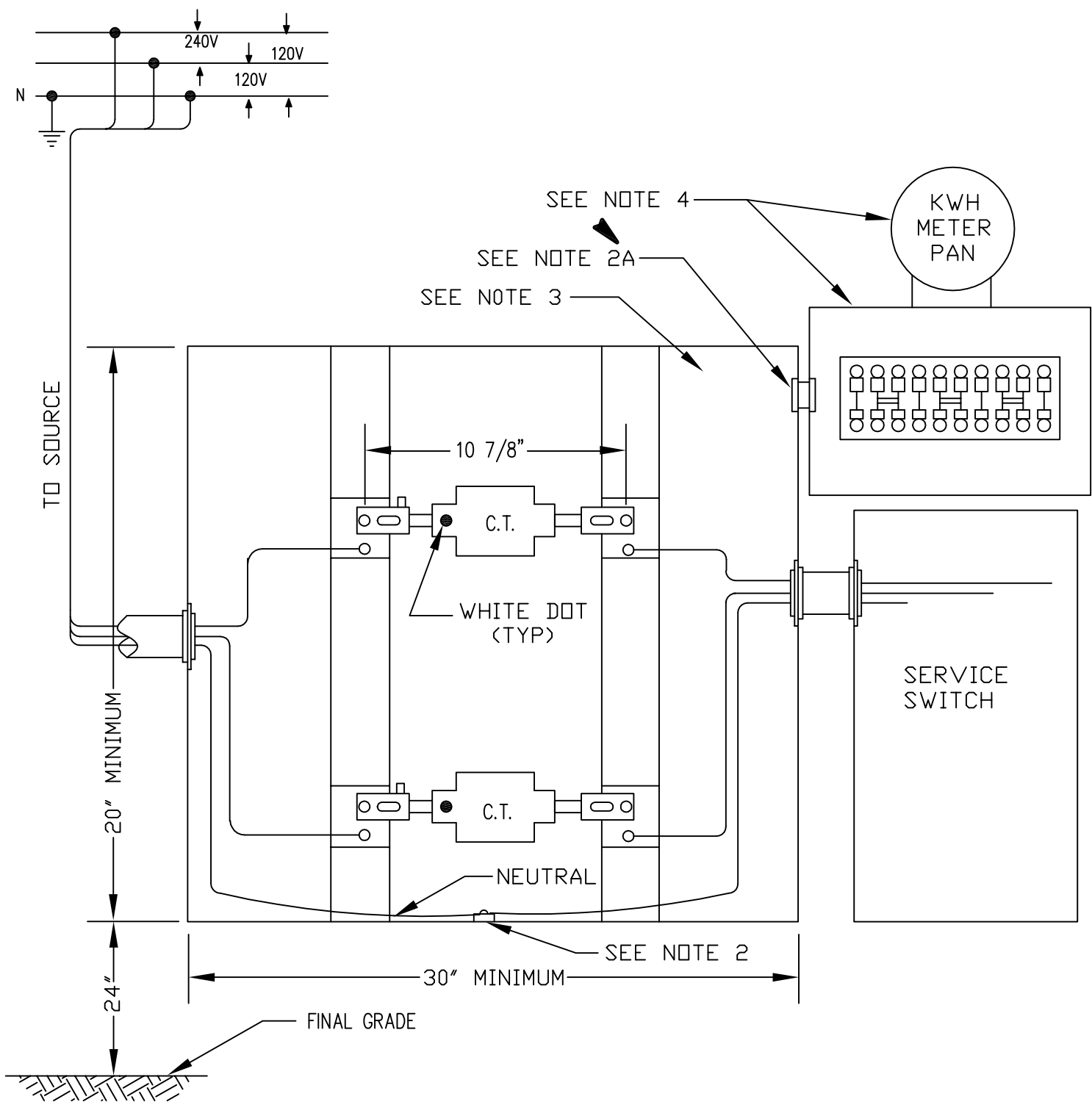


IMPORTANT: REFER TO THE MOST RECENT EDITION OF THE GENERAL SPECIFICATIONS FOR ELECTRIC INSTALLATIONS (BLUE BOOK), SECTION VII, METERS AND METERING EQUIPMENT BELOW 600 VOLTS, FOR EQUIPMENT AND CONDUCTOR LABELING REQUIREMENTS.

METER INSTALLATION FOR 3 ϕ , 4W SERVICE 120/240 VOLT, OVER 300 AMP.NOTES:

1. INSTALLATION SHALL BE IN ACCORDANCE WITH THE LATEST COMPANY SPECIFICATIONS AND THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, NFPA 70. THE INSTALLATION SHALL ALSO BE INSPECTED BY THE AUTHORITY HAVING JURISDICTION.
- ▶ 2. IF NOT ALREADY INSTALLED BY THE MANUFACTURER, THE CUSTOMER'S QUALIFIED ELECTRICIAN SHALL INSTALL A #10 LUG ON THE NEUTRAL GROUND PAD OF THE CURRENT TRANSFORMER CABINET FOR THE COMPANY'S USE.
- ▶ 2A. THE CONDUIT BETWEEN THE C.T. CABINET AND METER SOCKET/TEST SWITCH SHALL BE 2 INCH RGS (RIGID GALVANIZED STEEL) CONDUIT, IMC (INTERMEDIATE METAL CONDUIT) OR EMT (ELECTRIC METALLIC TUBING) AND SHALL NOT EXCEED 50 FT. IN LENGTH. PVC OR FLEXIBLE CONDUITS, L.B.'S OR CONDULETS ARE NOT PERMITTED.
3. C.T. METERING CABINET SHALL NOT BE SMALLER THAN 28"H X 30"W X 10"D. C.T.'S ARE SUPPLIED BY O&RU, INC.
4. THE QUALIFIED ELECTRICIAN SHALL SUPPLY AND INSTALL ALL COMPANY APPROVED METERING CABINETRY, INCLUDING THE COMBINATION METER SOCKET AND TEST SWITCH. THE CENTER OF THE KWH METER PAN SHALL BE BETWEEN 4-1/2' TO 5-1/2' ABOVE FINAL GRADE. REFER TO "ORU.COM" WEBSITE FOR THE LATEST LIST OF APPROVED METERING EQUIPMENT. THE KWH METER WILL BE SUPPLIED AND INSTALLED BY THE COMPANY.
5. WIRING FROM THE SECONDARY SIDE OF THE C.T.'S TO THE TEST SWITCH SHALL BE INSTALLED BY THE COMPANY WITH THE SERVICE DE-ENERGIZED.
6. ALL METERING EQUIPMENT TO BE OUTDOORS. CUSTOMER TO SUPPLY AND INSTALL WHERE NECESSARY, PROPER WATERPROOFING ON OR IN THEIR EQUIPMENT.
7. SERVICE CONDUIT MAY ENTER AND EXIT AT THE BOTTOM OF THE C.T. CABINET.
- ▶ 8. REFER TO THE MOST RECENT EDITION OF THE GENERAL SPECIFICATIONS FOR ELECTRIC INSTALLATIONS (BLUE BOOK), SECTION VII, METERS AND METERING EQUIPMENT BELOW 600 VOLTS, FOR EQUIPMENT AND CONDUCTOR LABELING REQUIREMENTS.

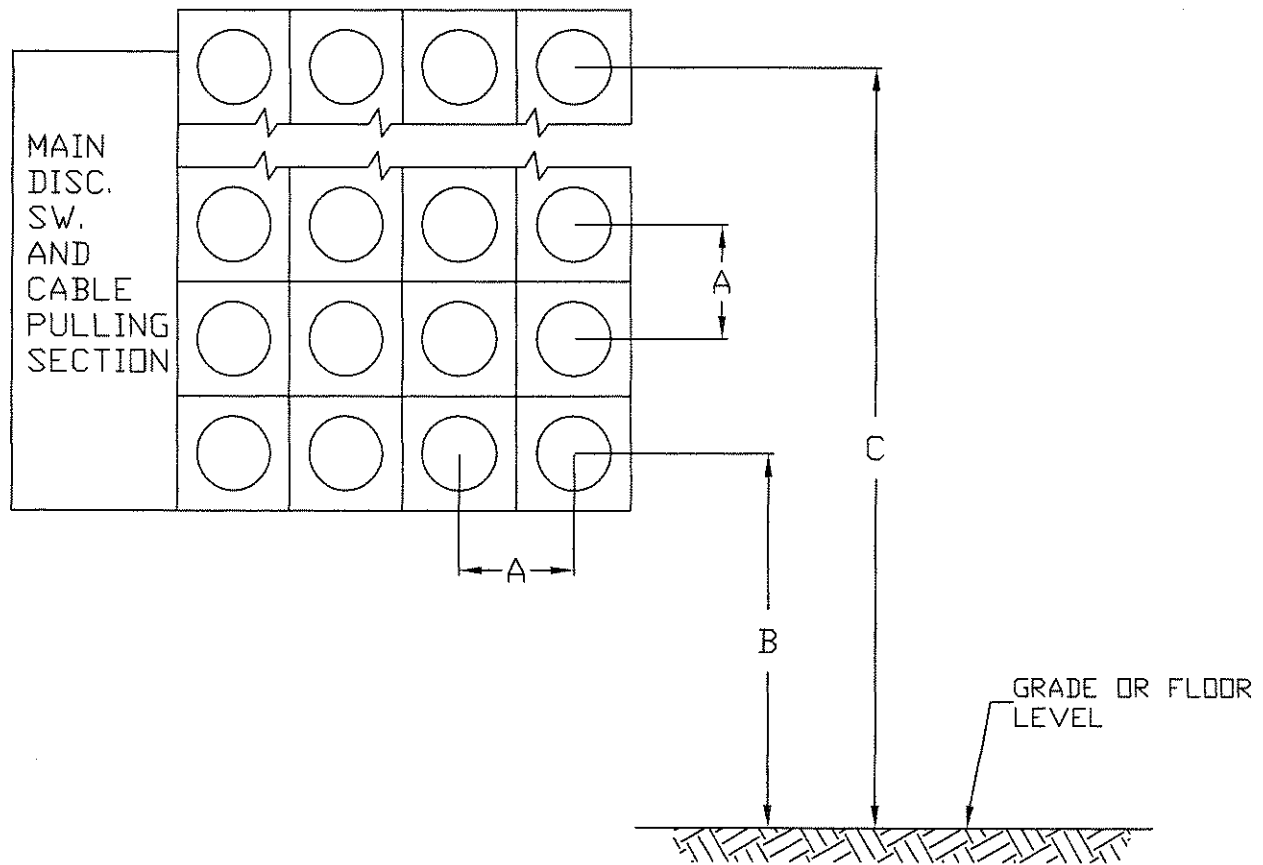
METER INSTALLATION FOR 1Ø, 3W SERVICE 120/240 VOLT, OVER 300 AMP.



IMPORTANT: REFER TO THE MOST RECENT EDITION OF THE GENERAL SPECIFICATIONS FOR ELECTRIC INSTALLATIONS (BLUE BOOK), SECTION VII, METERS AND METERING EQUIPMENT BELOW 600 VOLTS, FOR EQUIPMENT AND CONDUCTOR LABELING REQUIREMENTS.

GANGED METER INSTALLATION FOR 200 AMPERE (MAXIMUM) INDIVIDUAL SERVICES: 120/208V, 3Ø,

4 WIRE, OR 120/240V, 1Ø, 3 WIRE



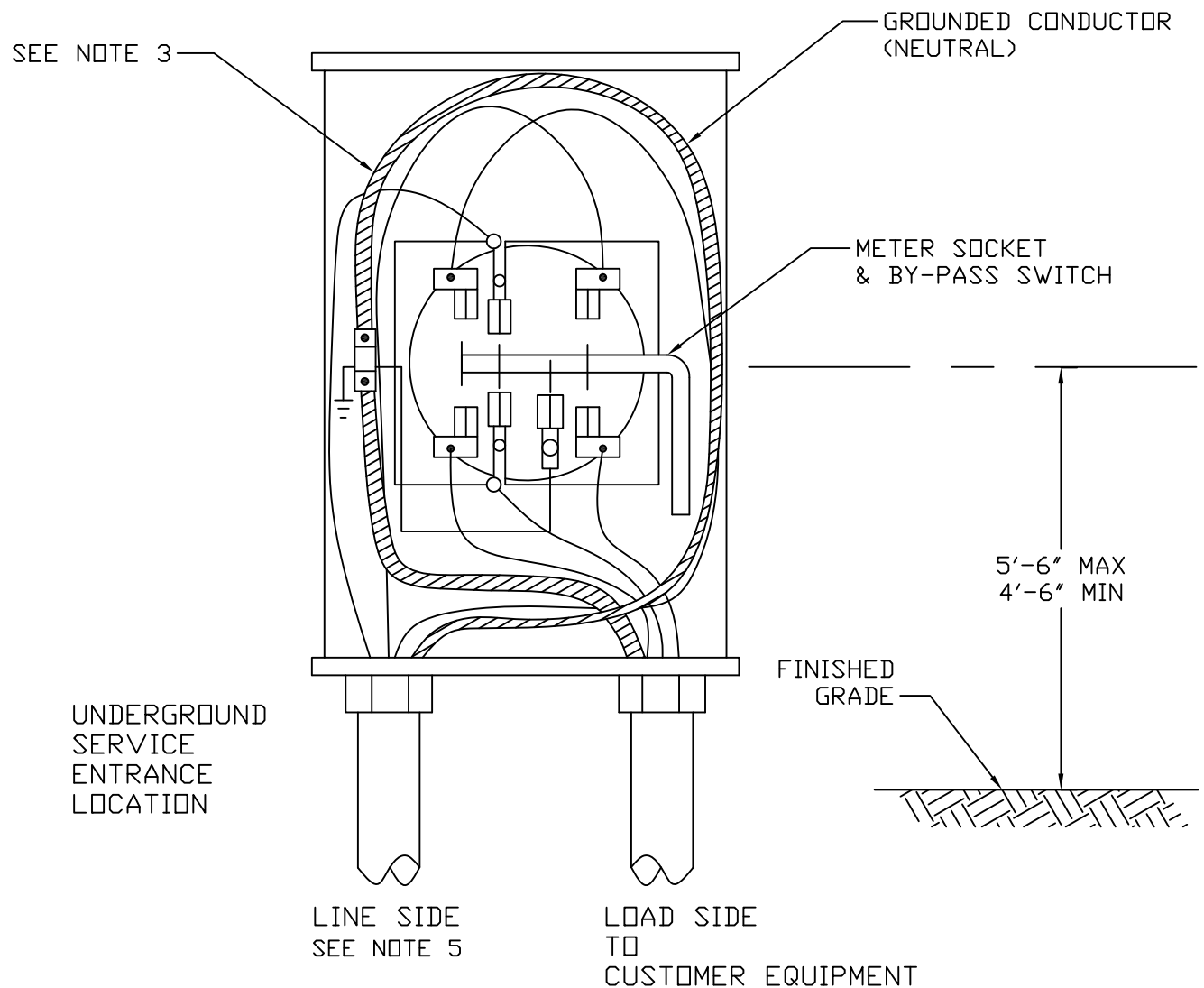
DIMENSION FOR GROUPED METERING EQUIPMENT

- A. MINIMUM HORIZONTAL AND VERTICAL SPACE BETWEEN METER CENTERS 9".
- B. MINIMUM DISTANCE LOWEST METER CENTER FROM: FLOOR OR GRADE LEVEL 30" (OUTDOOR).
- C. MAXIMUM DISTANCE HIGHEST METER CENTER FROM: FLOOR 72" (INDOOR) AND GRADE LEVEL 72" (OUTDOOR).

NOTES:

1. INSTALLATION TO BE IN ACCORDANCE WITH THE LATEST COMPANY SPECIFICATIONS AND THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, NFPA 70. THE INSTALLATION SHALL ALSO BE INSPECTED BY THE AUTHORITY HAVING JURISDICTION.
2. ALL METER SOCKET ENCLOSURES MUST BE O&RU, INC. APPROVED PRIOR TO PURCHASE. REFER TO 'ORU.COM' WEBSITE FOR THE LATEST LIST OF APPROVED METERING EQUIPMENT.
3. INDIVIDUAL COVERS AND LOCKING PROVISIONS FOR EACH METER SOCKET ARE REQUIRED.
4. A MAIN DISCONNECT SWITCH AND CABLE PULLING SECTION, COMPLETE WITH O&RU, INC. SEAL / LOCKING PROVISIONS, ARE REQUIRED FOR INSTALLATIONS WITH SEVEN (7) OR MORE METER ENCLOSURES.
5. FOR DISCONNECT METHODS FOR UP TO SIX (6) METER SOCKET ENCLOSURES SEE ART. 230-71 OF THE N.E.C.
6. CUSTOMER TO SUPPLY ALL EQUIPMENT. METERS SUPPLIED & INSTALLED BY O&RU, INC.
7. NOT TO BE USED FOR 277/480 VOLT SERVICES UNLESS SPECIFIC APPROVAL IS OBTAINED FROM THE COMPANY.
8. EACH METER MUST BE PERMANENTLY MARKED AS TO THE SPECIFIC PREMISE BEING SERVED.

METER INSTALLATION FOR SELF CONTAINED 3Ø, 4W, 120/208 VOLT OR 277/480 VOLT,
SERVICE 200 AMP. MAX.



NOTES:

1. INSTALLATION SHALL BE IN ACCORDANCE WITH THE LATEST COMPANY SPECIFICATIONS AND THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, NFPA 70. THE INSTALLATION SHALL ALSO BE INSPECTED BY THE AUTHORITY HAVING JURISDICTION.
2. ALL METER SOCKET ENCLOSURES TO BE SET LEVEL.
3. THE LINE SIDE CONDUCTORS SHALL BE LOOPED & CONNECTED TO THE TOP TERMINALS OF THE METER SOCKET TO MINIMIZE DAMAGE TO THE CABLE AND STRESS ON THE CONNECTORS.
4. ALL WIRES TO BE IDENTIFIED AT THE CONNECTION POINT AND IN THE METER ENCLOSURE.
5. FOR 277/480 VOLT SERVICES, A NON-FUSIBLE MAIN DISCONNECT MUST BE CONNECTED TO THE ENTRANCE CABLE (LINE SIDE OF METER SOCKET).
6. CUSTOMER TO SUPPLY ALL EQUIPMENT. METER SUPPLIED AND INSTALLED BY D&RU, INC.
7. THE METER SOCKET ENCLOSURE SHALL BE UL LISTED AND APPROVED BY D&RU, INC. REFER TO "DRU.COM" WEBSITE FOR THE LATEST LIST OF APPROVED METERING EQUIPMENT.
8. THE METER SOCKET ENCLOSURE SHALL BE COMPLETE WITH LOCKING JAWS AND A FULL RATED MANUAL BY-PASS SWITCH.
9. THE METER SHALL BE INSTALLED OUTDOORS.
- ▶ 10. IMPORTANT: FOR 480V SERVICES, REFER TO THE MOST RECENT EDITION OF THE GENERAL SPECIFICATIONS FOR ELECTRIC INSTALLATIONS (BLUE BOOK), SECTION VII, METERS AND METERING EQUIPMENT BELOW 600 VOLTS, FOR EQUIPMENT LABELING REQUIREMENTS.