

# RT-G: UNDERGROUND SERVICE GENERAL REQUIREMENTS

## 1. PURPOSE

This standard is to be used as the specification for the Applicant's portion of the Underground Distribution System for Nevada Power Company.

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## 3. TERMINOLOGY

The terms below are defined as follows:

- "Applicant" - The owner and/or developer of the land to be served by the underground electric system, and/or the entity installing a portion of the system.
- "Company" - Nevada Power Company (or NPC)
- "Engineer" - The Company's Engineer/Designer or their representative.
- "Inspector" - The Company's designated Inspector.
- "Work" - Labor and material required for the system to be installed.
- "Approved Equivalent"- An item approved by the Manager of Standards Department as acceptable to the Company as a substitute for a specified item.

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## 4. GENERAL SERVICE REQUIREMENTS

- A. The location of each point of service delivery must have Company approval before construction.
- B. In areas where the Company owns and maintains an underground distribution system, the Company will designate the point from which the Applicant will be served. This designated point will be considered the point of service connection.
- C. The Applicant shall ascertain from the Company if the underground system is in place to the premises to be served. The Applicant shall furnish the required trenching, backfill (per RT-1), and install the Company-supplied vinyl marking tape above the Company cables or duct. The point of service delivery shall typically be at or immediately adjacent to the building wall nearest the point at which the service cables enter the building. The point of service connection may be from a pole, handhole or pad mounted transformer.
- D. For commercial use, Applicant shall furnish and install ducts. For residential use, NPC shall furnish ducts and the Applicant shall install these ducts.
- E. The Applicant shall furnish, install and maintain at his expense, facilities for the termination of the underground service cables at the load, including any pullboxes, or other required equipment.
- F. A separate section at the Service Entrance Panel for terminating and pulling is required for all underground services as per RPM-1, 2, 3, 4, 5, 6, 43 and 45. This section shall be free of all earth and water pipe ground leads or connections, and shall not be used as a junction point to feed any other service.
- G. The service conduit shall not enter the side of the service entrance pulling section.
- H. All materials and equipment furnished by the Applicant for a service connection shall be installed in compliance with the current edition of the National Electric Code, local ordinances and the Company's Electrical Service Rules filed with the Public Utilities Commission of Nevada. The equipment, when exposed to the weather, shall be rain tight.
- I. Only personnel authorized by NPC will be permitted to connect an Applicant's service to (or disconnect from) the Company's underground distribution system.
- J. All underground structures shall be inspected by the NPC Inspector, and will not be released until final adjustments (including adjustments to the final grade) are completed and inspected by the NPC Inspector.

### 4.1 Rules and Regulations



All procedures and standards quoted herein must be in accordance with the Company's Tariffs, Rules and Regulations as approved by the Public Utility Commission of Nevada.

### 4.2 Changes

By mutual consent (in writing) changes, additions, or deletions from this Specification may be made without voiding this Specification.

### 4.3 Partial Conveyance of Underground Distribution Facilities

The Applicant will convey to the Company certain portions of the underground facilities which should have been completed and installed, if the Company elects to accept these facilities. Should this conveyance take place, the Company will assume responsibility for maintaining and operating these facilities. Conveyance of facilities shall in no way relieve the Applicant of liability due to use of defective materials, poor workmanship or damage by a third party.

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## 5. SCOPE OF WORK

### 5.1 Work by Applicant

The Applicant shall perform all work necessary to construct portions of the underground system in accordance with the Company layout drawings and as follows:

- a. Applicant shall furnish offset, final elevation, and property line stakes (and chisel marks on curb) at pullbox, manhole, pad and handhole locations.
- b. Applicant shall furnish excavation and approved backfill of trenches for the CIC or conduits.
- c. Applicant shall furnish/install transformer and equipment pads, including all hardware, handholes, pullboxes, manholes/vaults, and grounding as shown on Company drawings.
- d. Applicant shall be solely responsible for protecting the CIC, conduits and structures from superimposed loading created by construction equipment or otherwise. Applicant shall repair or pay for damage to the above material to meet the Company specification.
- e. Applicant shall ensure that excavated material is immediately removed from the site; underground facilities are installed promptly; temporary repairs are made in the area; and the area is restored, equal to or better than, its original condition.

### 5.2 Work by Company



The Company will perform the work necessary for a complete and working underground distribution system, including furnishing and installation of transformers, cable, cabinets, switches, pole risers, and all connections as provided for in the Company Rules and Regulations.

### 5.3 Extent of Work

- a. The extent of work and detailed information shall be shown on the approved layout drawing. During the progress of work, such additional detail drawings as the Engineer may consider necessary for clarification will be furnished to the Applicant, and these additional drawings shall be made part of the specification. The layout drawings shall be made part of the specification. The layout drawings must be approved by the applicant, and the applicable government agency.
- b. Where the interpretation of a specification or clarification of intent of any drawings is required, the determination of the Engineer will prevail.

## 6. PERFORMANCE AND INSPECTION OF WORK

- A. To enable proper inspection of materials and workmanship, Applicants shall inform the NPC Inspector at least 72 hours before commencing any item of construction or installation of material on main trenches, and 48 hours before work on service trenches. Materials and/or workmanship failing to meet the requirements of this Specification, or installed without prior notification to the Inspector, will be subject to rejection. Any work rejected shall be immediately corrected at the Applicant's expense. No work shall be embedded in concrete, backfilled, or otherwise covered or concealed until it has been approved by the inspector.
- B. All materials and workmanship shall be first quality in every respect; plumb and true; and according to the specific requirements of the layout drawings, Company Standards, and this Specification. All work shall be subject to inspection by the Inspector who may exercise such control as required to safeguard Company interests.

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- C. If any portion of the completed underground distribution system fails to operate satisfactorily due to defects in the Applicant's work, the defect and any damaged portion of the system shall be corrected at the Applicant's expense and to the satisfaction of the Inspector.



## 7. TRENCHING

### 7.1 Excavation \*

- a1. Applicant shall not begin trenching in residential developments until the following items are complete:
1. Sewer, gas, and water services (including meter loop), are stubbed into property.
  2. Curb and street light footing are installed.
  3. Property line chiseled on curb.
  4. Finish grade stakes provided (applicable for all types of developments).
  5. Approval obtained from the inspector (applicable for all types of developments).
- a2. Applicant shall not begin trenching in apartment or condominium developments until the following requirements are met:
1. Foundations and pads for all permanent structures shall be in place, including garages, storage buildings, equipment buildings etc.
  2. Building numbers shall be displayed in a manner satisfactory to the utility, properly identifying all permanent structures.
  3. Sewer, gas and water mains shall be installed, including drop inlets and fire hydrants.
  4. Grading shall be at sub – grade (within six (6) inches of final grade) or less.
  5. Final grade stakes shall be provided (applicable for all types of development).
  6. Approval shall be obtained from the NPC Inspector (applicable for all types of development).
- b. Excavation of trenches shall be as shown on approved company layout drawings and specifications, all conflicts with sewer, gas and water corrected, and a 3' separation from sewer, gas, and water maintained.
- c. Excavated trench shall be straight, free from water, and the bottom level. Blocking or shoring material shall be removed by Applicant during backfill procedures.
- d. Excavated material shall be placed a minimum of two feet from either edge of the trench to prevent material from falling into the trench.

### 7.2 Backfill \*

- a. Backfill shall be performed according to RT-1, and meet applicable governmental codes and ordinances.
- b. Natural backfill shall be free from stones, caliche, or lumps of material exceeding 3" and free from sod, frozen earth, and organic materials. Backfill #2 stranded bare copper wire in bottom of trench with natural soil to a depth of 3" prior to placing sand or concrete backfill.
- c. Sand per RT-1 shall be placed above and below the CIC or conduit in two backfill operations. It shall be compacted to 90% of the relative maximum density.

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- d. The Applicant shall place the sand in trenches immediately after the installation of the CIC or conduit. Under no circumstances shall the sand (per RT-1) be installed without prior notification of the inspector. When the trench contains two or more levels such as a joint trench, additional backfill operations shall be required. If any damage occurs to the CIC or conduit where such damage results from the failure of the Applicant to place backfill in accordance with the Company Specifications, the Applicant shall be responsible for the cost of repair.
- e. The Company will provide and the Applicant shall install a 6" wide Red Vinyl Marking Tape 15"-18" below finish grade and over the CIC or conduit.

**7.3 Compaction of Backfill \***

- a. Backfill shall be secured with mechanical tamping units (not the tire or track of a vehicle).
  - b. Backfill shall be placed in 6" layers.
  - c. Backfill shall be moistened as required to obtain compaction.
  - d. Compaction shall be 90% of the relative maximum density, as determined by method Nev. T101 or T102, or as directed by the NPC Inspector.
- \* State and Federal highway crossings are to be installed per their respective standards.  
 \*\* American Public Works Association.



**8. CONCRETE**

**8.1 General**

- a. All concrete poured in the field, unless otherwise permitted by the inspector, shall be ready – mix and shall conform to the latest issue of ASTM Specification C-94.
- b. Manholes, pullboxes, handholes, transformer pads, or enclosures shall be constructed and installed in accordance with the Company construction standards.
- c. Concrete for load bearing or supporting structures shall be per RS-G2 specification.
- d. Concrete for conduit encasement shall be per RC-3 specification.

**8.2 Materials**

- a. Rebar shall be free from any material or coatings that would reduce bond, and shall conform to the latest issue of ASTM Specifications A-15 and A-305.
- b. Welded wire fabric (mesh) shall be 4x4 – W4.0 x W4.0 or approved equivalent, and shall conform to the latest issue of ASTM Specifications A-82 and A-185.
- c. Cement shall be clean, fresh, Portland cement (Type V) or other approved by Company.
- d. Fly ash shall be Type F and shall meet the requirements of ASTM C618.
- e. Aggregate shall be clean, sound uniformly graded, and of proper size for the work being constructed, as approved by the Inspector.
- f. The water shall be clean and fresh.
- g. Any admixture used shall be of a type and brand which will not impair the quality of the concrete and which is approved by T & D Standards Department.

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### 8.3 Workmanship

- a. The forms shall be constructed of smooth material and be true to lines and dimensions as indicated by the drawings. Only approved form ties shall be used. Forms shall be tight, of adequate strength, and completely removed upon completion of the work or at such other time when the concrete will support the imposed loads.
- b. Where material is to be embedded in concrete, it shall be held securely in place, using templates if necessary, to prevent movement or displacement during concrete placement.
- c. Reinforcing shall be shaped and spaced as indicated on the drawings and fastened to prevent movement during concrete placement. All bars shall be securely tied at intersections. Laps shall not be less than 30 diameters. The thickness of concrete over bars and other reinforcement shall not be less than 1-1/2". Materials shall be measured accurately for each batch and mixed thoroughly until all the aggregate is coated with mortar.
- d. All combined ingredients shall be mixed for a minimum of 90 seconds.
- e. Forms shall be clean and wetted prior to placement of concrete. Concrete shall be placed by an approved means immediately after mixing and in layers that will satisfactorily consolidate. The size of any unit pour shall meet with the approval of the NPC Inspector, and pouring shall be continuous until each unit pour is completed. The concrete shall be worked into all corners and recesses until thoroughly consolidated.
- f. No finished surface shall contain honey comb or segregation. Defects shall be remedied as directed by the NPC Inspector. Uniformed interior surfaces shall be steel troweled to a smooth dense surface. Uniformed exterior surfaces shall be floated, steel troweled, and lightly broomed to obtain a non-skid surface.
- g. Surfaces shall be kept continually moist for a period of not less than seven days using either wetting or an approved curing method.

## 9. FACILITIES

### 9.1 Splice Boxes & Handholes



Approved standard precast boxes for electric underground use shall be furnished and installed according to Company construction standards, and the approved layout drawing.

### 9.2 Transformer & Equipment Pads

- a. Approved precast concrete pads for transformers and other equipment shall be furnished and installed in accordance with the Company construction standards.
- b. Field poured concrete pads for transformers and other equipment shall be installed in accordance with Company standards.

### 9.3 Manholes

- a. Manholes shall be installed as shown on the layout drawing and in accordance with the Company construction standards complete with CIC or conduit entrances, pulling eyes, sumps and associated hardware.
- b. Structural steel for the cover or roof reinforcement shall conform to ASTM Specification A-36. Plates and structural steel shapes shall either be hot dip galvanized for exposed applications or shop coated with an approved zinc paint for embedding applications.

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## 9.4 Grounding



A minimum of 8 grounds (made electrodes) are required per sliding mile for primary voltages. Depending on the standard application, one or more of the following maybe considered a suitable grounding electrode:

- A #2 stranded bare copper wire 100' in length placed in bottom of trench along with a 5 foot tail inside pad or vault
- If the trench is too short: 2-50' #2 stranded bare copper wires in the incoming and outgoing trenches along with 2-5' tails inside pad or vault.
- Only at the discretion of the NPC Inspector, a ½" x 8' copper clad ground rod can be installed.



**Note:** Backfill #2 stranded bare copper wire with natural soil to a depth of 3".

## 9.5 Construction or Temporary Power

All such power shall be provided at the expense of the Applicant and must be coordinated through the Districts.

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