



**Specifications and Installation
Requirements
for
Underground Service for Residential
Developments**

December 12, 2005

NOVEC Requirements for Underground Residential Developments

1. Scope

This specification details NOVEC's requirements for Underground Residential Developments. Underground conduit installations shall be governed by this specification and any supplemental NOVEC specifications.

2. General

This specification describes excavation and backfill of trenches and the installation of conduit, sweeps, couplings, adapters, end bells, solvent cement (glue), pull string, pull boxes, manholes, ring risers, manhole frames and lids, transformer pads, box pads, secondary pedestals, handholes, meter risers, ground rods, ground rod connectors, bare copper ground wire, conduit plugs, warning tape, and stub markers.

Construction Requirements

3. Trench

Easement boundaries, street, lot, and trench lines shall be staked before any trenching is started. Construction plans specifying trench locations and depths shall be followed at all times. **NOVEC approval shall be required for any changes to construction plans.** Trench excavation shall include the excavation of any and all obstacles encountered, the removal and disposal of all debris including submerged and buried timber and piling, and all pumping that may be necessary for draining the excavation.

- a. Trench location shall be in as direct a line as possible from the distribution facility to the customer service entrance.
- b. The bed shall have a uniform pitch and the trench bottom shall be solid and relatively smooth, or undisturbed earth, well tamped, and free of any debris that may be detrimental to the conduit. Excavation shall be of a size and extent to permit proper installation of conduit and structures, as required.
- c. Minimum burial depths specified for all electric conduit shall be maintained during all phases of construction.
- d. The minimum burial depth shall be thirty (30) inches, measured vertically from the final grade to the top of the conduit for all conduit. Refer to NOVEC Installation Drawings [ID-CI](#). When conduit is located under roadways, cover shall be a minimum thirty-six (36) inches as required by the Virginia Department of Transportation (VDOT). Depth shall be measured from the top of the conduit to the top of the road surface. Refer to NOVEC Installation Drawing [ID-RC1](#).
- e. Sweeps in the conduit run shall be installed only by design. All changes require written NOVEC approval.

- f. Adherence to OSHA, VOSHA and/or any local, state and national codes or ordinances shall be maintained at all times.
- g. All areas disturbed by construction shall be restored to a condition equal to or better than that which existed before construction. Special care shall be taken to prevent damage to existing buried structures and facilities.

4. Joint Trenches

Whenever practical, NOVEC will allow gas, telephone, cable television, and/or any other wire service facilities in a joint trench with NOVEC facilities sized to accommodate all facilities. A joint use agreement is required between all utilities for a joint use trench. The joint trench shall be excavated and backfilled to NOVEC's and other joint trench occupants' specifications. Refer to NOVEC Installation Drawings [ID-JUT1](#). Customer-owned fuel lines, including natural gas, oil and propane lines are not permitted in the joint trench. Water, sewer, sanitary, or storm drain and other wet utility piping are not permitted in the joint trench. Non-NOVEC facilities shall **not** be installed underneath of any NOVEC equipment pads or pull boxes.

5. Bedding

Three (3) inches of bedding is required in the bottom of all trenches. Bedding is defined as dirt, sand or stone dust. Soil containing occasional rounded rocks ½" diameter or less is acceptable. Refer to NOVEC Installation Drawings [ID-CI](#).

6. Conduit

Depths to the top of conduit to final grade shall be a minimum thirty (30) inches. In the event proper depth of conduit cannot be achieved, or where foreign objects threaten to interfere with the installation of conduit, a Concrete Protective Cover of the conduit may be used. Written approval is required for the use of Concrete Protective Cover. For additional information on this subject, refer to the Concrete Protective Cover section of this document. When conduit is located under roadways, cover shall be a minimum thirty-six (36) inches as required by the Virginia Department of Transportation (VDOT). Depth shall be measured from the top of the conduit to the top of the road surface. Refer to NOVEC Installation Drawing [ID-RC1](#). Unique conditions will be addressed in the NOVEC construction plan.

- a. The number and size of conduit for each application shall be installed as shown in the construction plan.
- b. All conduits shall be gray, electrical grade, rigid, Polyvinyl Chloride (PVC) Schedule 40, heavy wall, sunlight resistant that conforms to NEMA TC2 Specifications and shall be permanently marked at regular intervals with the manufacturer's name or symbol, size, "SCH 40" and "PVC".

- c. All conduits shall be carefully aligned and laid to a uniform grade.
- d. No conduit shall be laid which is cracked, damaged, or contains any roughness which would injure the cable jacket.
- e. All joints shall be made with solvent cement in accordance with NOVEC specifications.
- f. Minimum radial separation between electrical conduit and gas facilities shall be twelve (12) inches.
- g. Conduit shall enter pull boxes, box pads and pedestals as shown on NOVEC Installation Drawings *ID-PBL*, *ID-PBS*, *ID-PSB*, *ID-PSB1* and *ID-PEB*.
- h. Conduits shall be terminated in pull boxes and manholes with end bells.
- i. A polyolefin pull string, including five (5) feet of slack shall be installed in each conduit and secured to conduit plugs at each end. Pull tape shall be required in lieu of pull string in all pulls in excess of 250 feet

7. Cutting Conduit

A fine-tooth saw should be used to cut conduit. The conduit must be cut straight and cleaned of burrs.

8. Solvent Cement Welding

- a. Clear or gray regular bodied PVC cement may be used on conduit four (4) inches and smaller in diameter. Clear or gray medium bodied or all weather PVC cement shall be used on conduit six (6) and eight (8) inches in diameter.
- b. The chemicals used in solvent welding of conduit are intended to penetrate the surface of both the conduit and the fitting, which after curing result in a complete fusion at the joint. The over-use or under-use of such chemicals shall be avoided as such use will result in leaky joints or a weakened conduit system.
- c. Inspect solvent cement container for date. Cement over 12 months old shall not be used.
- d. Surfaces to be cemented shall be cleaned by wiping off all dust, dirt and moisture from these surfaces.
- e. With a non-synthetic bristle brush or dauber, apply an even coating of cement to the outside of the conduit and the inside of the socket. Make sure that the cement is applied to the entire depth of the socket. If some evaporation of solvent from the surfaces to be joined is noted, reapply cement, before assembling.
- f. It must be emphasized that most joint failures are caused by dry joints where an insufficient coating of solvent cement is applied, or when solvent has evaporated due to high temperature conditions.
- g. **W o r k f a s t !!**
- h. In cold weather (below 40°F), use a primer to soften the joining surfaces before applying cement and allow a longer cure time. All weather or quick set cement may be used in lieu of primer when temperatures drop below 40°F.

- i. Slip conduit straight into the fitting with a slight twist until it bottoms. Hold the joint for 15 seconds (one minute in extreme cold weather) so that the conduit does not push out of the fitting. Do not twist or drive pipe after insertion is complete.
- j. Newly assembled joints should be handled carefully until the cement has cured the recommended set period. Set periods are related to the ambient temperature as follows:

60°F to 100°F	½ hour minimum
40°F to 60°F	1 hour minimum
20°F to 40°F	2 hour minimum
0°F to 20°F	4 hour minimum
- k. Clean off any bead or excess cement that appears at the outer shoulder of the fitting. Excess cement allowed to remain in contact with the material can cause weakening of the material and subsequent failure.
- l. Solvent cans should be kept covered and away from excess heat and flames when not in use. Quart cans are generally the largest practical size to use since the solvent dries rapidly. Use only solvent cement as furnished or recommended by the conduit manufacturer. Solvent cement thinner shall **not** be used for thinning cement which has thickened.
- m. Minimum trench widths may be utilized by assembling conduit above ground (allowing for weld cure period) and lowering the preassembled conduit bank into the trench.

9. Handling

To minimize accidental mechanical damage, conduit should not be left exposed in an open trench longer than is absolutely necessary. In transporting long lengths of conduit, provision should be made to support the full length to avoid damage due to excessive overhang.

10. Cover

A minimum of three (3) inches of cover, measured to the top of the conduit, is required to cover all conduits. Cover is defined as dirt, sand or stone dust. Soil containing occasional rounded rocks ½” diameter or less is acceptable. The material should fill the voids around the conduit.

NOVEC red “warning” tape shall be installed in the entire length of the trench directly over the conduit on top of the cover.

11. Backfill

- a. Spoils from the trench may be used as long as it is free of debris or other material that may damage the conduit system or cause settling.
- b. Backfill shall not contain ashes, cinders, shale, frozen material, loose debris, vegetation, or rocks larger than six (6) inches in any dimension.
- c. Trenches should be immediately backfilled following conduit system inspection and approval by NOVEC.
- d. Backfilling shall be accomplished in a continuous manner from one structure to the next, and shall not be placed over any open-ended (unplugged) conduits.
- e. All Backfill shall be mechanically compacted to the density of the surrounding undisturbed soil by means available to prevent settling. Mechanical compaction shall not be within twelve (12) inches of conduit.

12. Inspection

The conduit system shall be inspected at various stages of installation. Materials or workmanship failing to meet NOVEC standards will be rejected. No work shall be covered, backfilled, concealed or embedded in concrete until it has been inspected and approved by NOVEC. Materials delivered to the job site shall be inspected and damaged or imperfect materials shall not be used.

The inspection shall include, but not be limited to the following:

- a. All trenches and excavations.
- b. All material.
- c. All bedding, cover, and backfill material during or after installation as applicable.
- d. All equipment pads, pull boxes, ground rods and other facilities, after setting in place, but prior to backfilling.
- e. All conduit installations, including cemented joints, sweeps, bell-ends, pull tape and conduit plugs, prior to backfilling.
- f. All conduit terminations at transformer structures, pull boxes, switch locations, riser poles and other applicable locations.
- g. All backfilling operations around structures and conduit runs.
- h. Conduits shall be free of any obstructions and debris. Under no circumstances shall antifreeze or other chemicals be put into conduit.

Failure to obtain NOVEC approval of the installation before backfilling will require all or part of the conduit system to be exposed for inspection and approval.

13. Pads, Pull Boxes, Box Pads, Pedestals and Handholes

- a. All transformer and enclosure pads, pull boxes, box pads, pedestals and handholes shall be **level** and installed in accordance with NOVEC Installation Drawings.
- b. Four inches of rock dust or suitable material shall be placed on top of the final grade underneath of the transformer and single phase enclosure pads. Refer to NOVEC Installation Drawings *ID-PT1* and *ID-PE1*.
- c. A minimum of six (6) inches base course of # fifty-seven (57) gravel shall be placed under all pull boxes and shall be thoroughly compacted. Certain soil conditions may require removal below normal depth and subsequent additional clean fill or gravel added and compacted to insure sound base course. Installation shall be complete prior to commencing any cable pulling. Pull boxes shall be installed such that their covers will be three (3) inches above final grade. In no case shall final grade cover or hamper access to the pull box covers. Pull boxes shall only be placed within NOVEC easements. Covers shall be closed on pull boxes at all times except when cable is being pulled. Pull boxes are **not** traffic rated and shall not be driven across. Refer to NOVEC Installation Drawings *ID-PBL* and *ID-PBS*.
- d. A minimum of six (6) inches of base course of # fifty-seven (57) gravel shall be placed under all box pads. Refer to Installation Drawings *ID-PEB*, *ID-PSB* and *ID-PSB1*.
- e. Pedestals shall be installed in accordance with details shown in NOVEC Installation Drawing *ID-PD1*.
- f. Handholes shall be installed in accordance with details shown in NOVEC Installation Drawing *ID-HH1*. Handholes are **not** traffic rated and shall not be driven across.
- g. A retaining wall shall be installed where slopes exist that would undermine or cover equipment (i.e., transformers) due to sharp drop-off or rise of grade. Retaining wall design will require NOVEC approval and in no case shall the retaining wall hamper door openings or placement of such equipment.
- h. In no instance shall final grades impede proper access or operation of NOVEC distribution equipment.
- i. NOVEC approved protective guards, such as concrete-filled pipe, shall be required in areas where the facilities are subject to damage.
- j. All pad openings should be covered during the construction process except when work is being performed.

14. Manholes

NOVEC approved manholes are required in streets or when pull boxes cannot be utilized. Manholes shall be 10' x 13' x 8' concrete and shall have solid lids and frames. Manholes shall have a minimum of thirty (30) inches of compacted cover. Ring risers shall be installed as necessary to adjust manhole frame to final asphalt grade. Conduit shall be terminated in manholes with PVC end bells flush with the inside surface of the

structure wall. All knock-outs shall be grouted around after conduit installation to seal manhole. Refer to NOVEC Installation Drawing [ID-MH1](#).

15. Ground Rods

- a. An approved $\frac{3}{4}$ " X 8' copperclad ground rod and ground rod connector shall be installed in the opening of each transformer and single phase enclosure pad. The ground rod shall be level with the top of the pad. Refer to NOVEC Installation Drawings [ID-PT1](#) and [ID-PE1](#).
- b. An approved $\frac{3}{4}$ " X 8' copperclad ground rod, ground rod connector and #4 bare soft drawn solid copper ground wire shall be installed in each box pad. Four (4) inches of the ground rod shall extend above the soil inside of the box pad. Six (6) feet of wire shall be securely connected to the ground rod and coiled inside of the box pad. Refer to NOVEC Installation Drawings [ID-PSB](#), [ID-PSB1](#) and [ID-PEB](#).
- c. The large 4'x8' pull boxes shall have an approved $\frac{3}{4}$ " X 8' copperclad ground rod and ground rod connector installed. Four (4) inches of ground rod shall extend through drain slot into pull box. Refer to NOVEC Installation Drawing [ID-PBL](#).
- d. Two (2) approved $\frac{3}{4}$ " X 8' copperclad ground rods and ground rod connectors shall be installed in each manhole. Both ends of the manhole shall have a separate driven ground rod. Refer to NOVEC Installation Drawing [ID-MH1](#).
- e. Ground rods are not required in small 4'x4' pull boxes, pedestals or handholes.

16. Concrete Protective Cover

The concrete for conduit protective cover shall be 3,000 PSI with a maximum of $\frac{3}{4}$ " aggregate. Surfaces upon which concrete is to be placed shall be free of standing water, mud and debris. Absorptive surfaces against which concrete is to be placed shall be moistened. Concrete shall be placed to cover of at least six (6) inches on the top and both sides of the conduit. The fall of concrete should be broken before it drops on the conduit. Where concrete protection of conduit is used, six (6) inches of well dampened earth shall be placed over concrete protection in the trench 2 hours after the concrete is poured. Backfilling of the trench excavation may then be completed. Backfill should be placed uniformly in layers and each layer thoroughly compacted. Backfill should be compacted to the density of the surrounding undisturbed soil.

17. Sweeps, Couplings, End Bells and Adapters

All sweeps, couplings, end bells and adapters shall be PVC, Schedule 40, gray, electrical grade and conform to the same specifications as the conduit. The sweeps may be factory made or bent as required. The minimum radius for all sweeps three (3) inches and less in diameter is twenty (24) inches. The minimum radius for all four (4) inch and six (6) inch diameter sweeps is thirty-six (36) inches. The minimum radius for all eight (8) inch diameter sweeps is forty-eight (48) inches.

18. Pull String/Tape

A polyline (polyolefin pull line that won't rust, rot or mildew) pull string, including five (5) feet of slack shall be installed in each conduit and secured to the conduit plugs at each end. The pull string will be used to pull in a bull (pulling) rope that will be required for the actual cable pull. Pull tape shall be required in lieu of pull string in all pulls in excess of 250 feet.

19. Pole Riser

Conduit riser locations (quadrant) on the pole shall be designated and shown on the sketch. All risers shall be plugged above ground at the base of the pole until cable is pulled. Refer to NOVEC Installation Drawing [ID-RP1](#).

20. Meter Riser

All meter risers shall be slip fit to limit damage from settlement. Ditch must be tamped at meter base before backfilling. Sweep at bottom of meter riser shall be resting on compacted soil. Metal locknut and plastic bushing must be installed. Refer to NOVEC Installation Drawing [ID-RM1](#).

21. Streetlighting

Streetlights shall be installed and located where indicated on construction plans. Streetlight poles will be installed twenty-four (24) inches from handhole per NOVEC Installation Drawing [ID-HH1](#).

22. Conduit Stubs

All conduits that are extended to a location where they are not terminated (even temporarily) shall be plugged and marked with a conduit stub marker. Refer to NOVEC Installation Drawing [ID-CS1-UC](#). Conduit stubs for service laterals shall extend a minimum of five (5) feet into the lot away from the mainline trench, as shown on construction plan. This will allow for connection of the service conduit at a later date.

23. Other Utilities

Conduit, terminal enclosures or other structures belonging to other utilities shall be located so they do not interfere with electrical installations nor impede the operation or maintenance of electrical facilities.

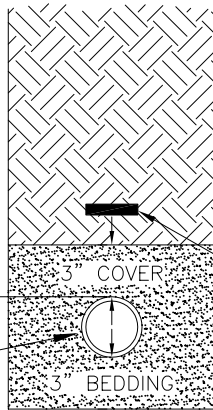
24. As-Builts

An “as-built” of the facilities documenting the separation distance between NOVEC facilities and all gas and wet utility crossings is required.

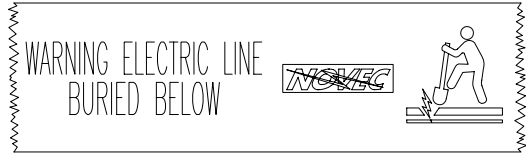
FINAL GRADE

30" MINIMUM
TOP OF CONDUIT

SINGLE
CONDUIT



TRENCH BACK FILL

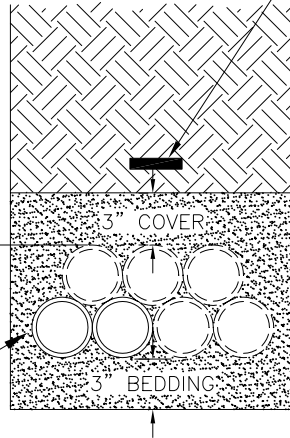


RED "NOVEC" WARNING
TAPE IS TO BE
INSTALLED ENTIRE
LENGTH OF TRENCH.

FINAL GRADE

30" MINIMUM
TOP OF CONDUIT

MULTIPLE HORIZONTAL/STACKED
CONDUIT



TRENCH BACK FILL

NOTES:

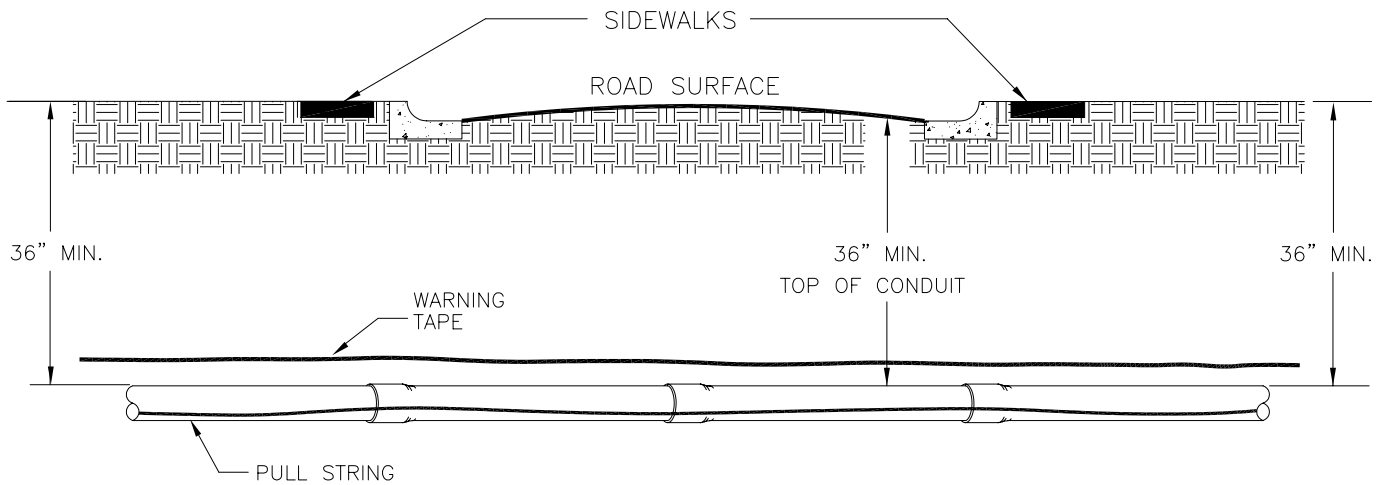
1. A MINIMUM RADIAL SEPARATION OF 12" IS REQUIRED BETWEEN NOVEC CONDUIT AND GAS FACILITIES.
2. NO SEPARATION IS REQUIRED BETWEEN NOVEC OWNED FACILITIES.
3. ALL CONDUIT SHALL BE INSTALLED WITHIN NOVEC EASEMENTS.
4. NUMBER AND SIZE OF CONDUIT SHALL BE DETERMINED BY DISTRIBUTION ENGINEERING.



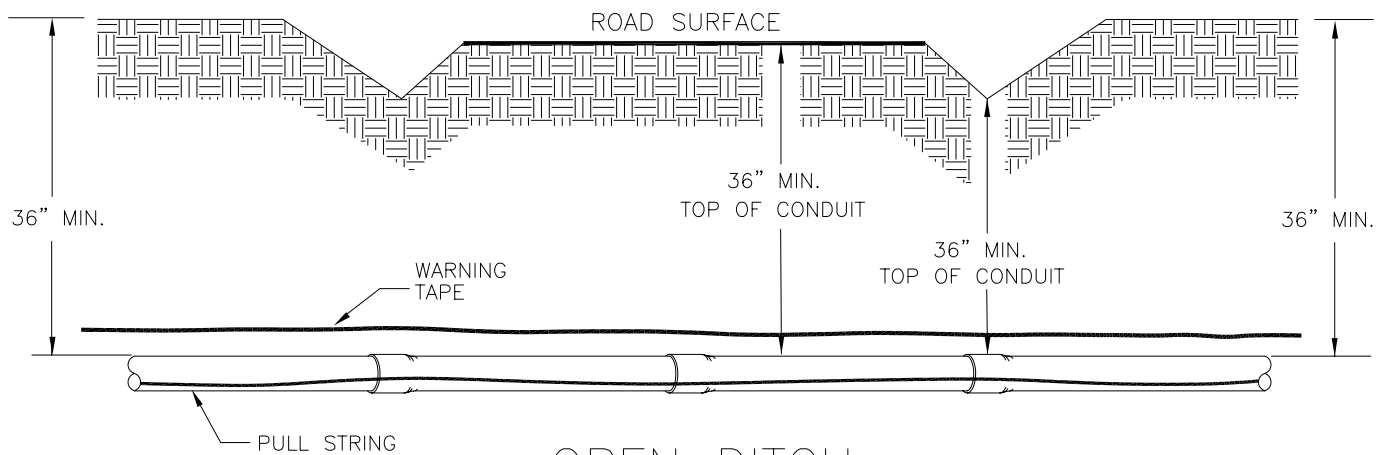
INSTALLATION DRAWING FOR
CONDUIT INSTALLATION

	By	Checked	Approved	Date
Original	KJB	MLH	SPEC. COMMITTEE	01/26/04
Revision	KJB	MLH	SPEC. COMMITTEE	11/29/04
Revision	KJB	MLH	SPEC. COMMITTEE	12/12/05
Revision				

ID-CI



CURB AND GUTTER



OPEN DITCH

NOTES:

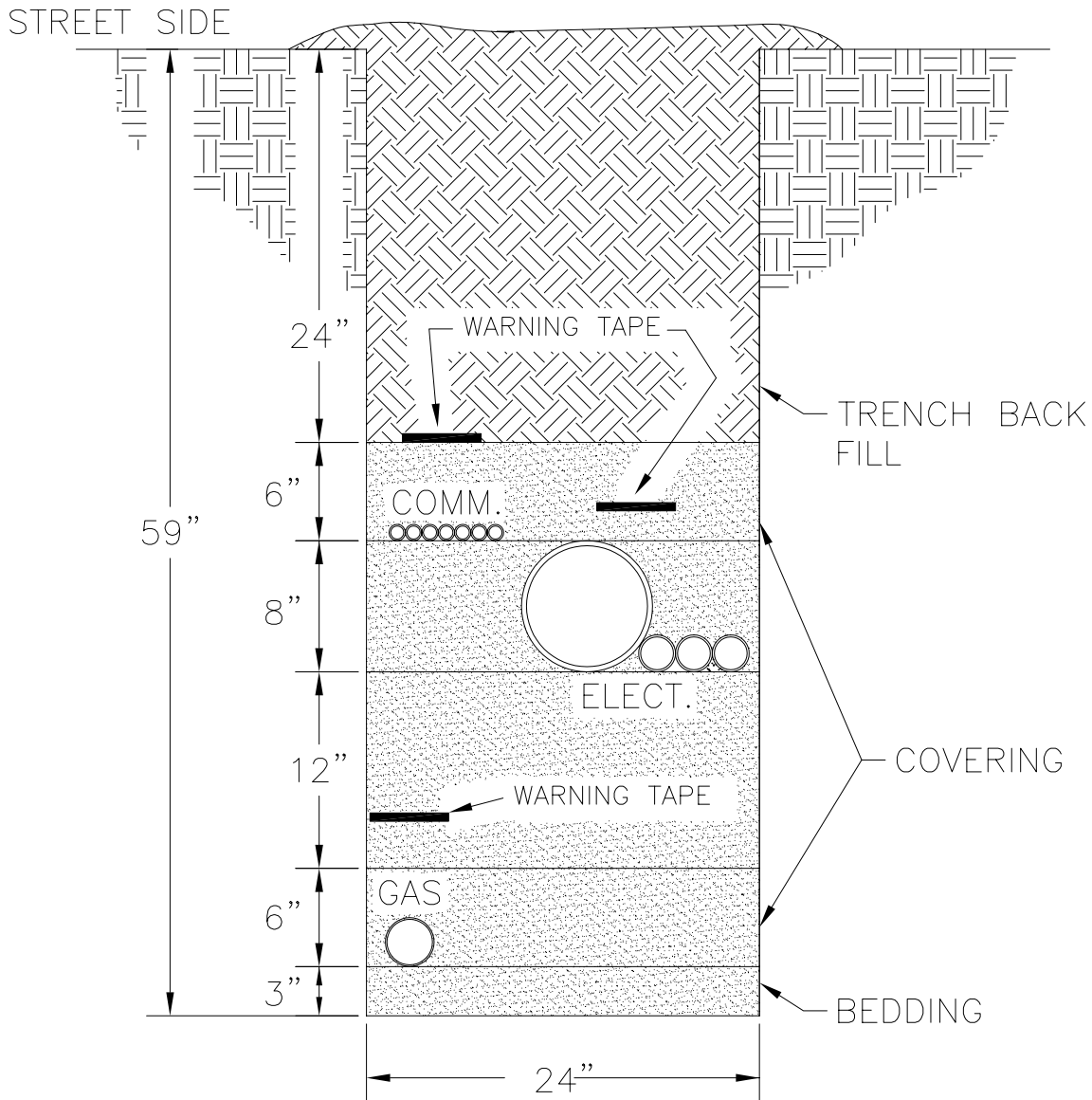
1. UNDER ROAD SURFACES THE COVER TO TOP OF CONDUIT SHALL BE A MINIMUM OF 36". OUTSIDE OF ROAD SURFACES THE COVER TO TOP OF CONDUIT SHALL BE A MINIMUM OF 36" TO FINISHED GRADE AND MUST ADHERE TO LOCAL, COUNTY AND/OR STATE ROAD CROSSING SPECIFICATIONS.
2. A MINIMUM RADIAL SEPARATION OF 12" IS REQUIRED BETWEEN NOVEC CONDUIT AND GAS FACILITIES.



INSTALLATION DRAWING FOR
CROSSING ROADS WITH
CURB AND GUTTER OR OPEN DITCH

	By	Checked	Approved	Date
Original	KJB	MLH	SPEC. COMMITTEE	01/26/04
Revision	KJB	MLH	SPEC. COMMITTEE	03/31/04
Revision	KJB	MLH	SPEC. COMMITTEE	11/29/04
Revision				

ID-RC1



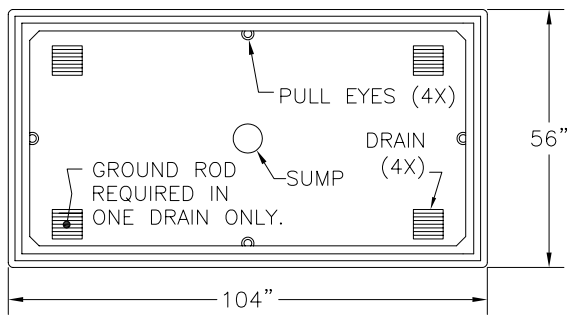
A 12 INCH SEPARATION BETWEEN NOVEC CONDUIT AND GAS FACILITIES SHALL BE MAINTAINED AT ALL TIMES.



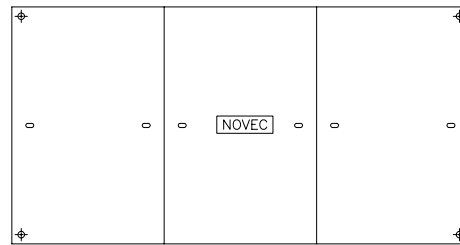
SAMPLE OF A
JOINT USE TRENCH

	By	Checked	Approved	Date
Original	KJB	MLH	SPEC. COMMITTEE	11/29/04
Revision	KJB	MLH	SPEC. COMMITTEE	12/12/05
Revision				
Revision				

ID-JUT1



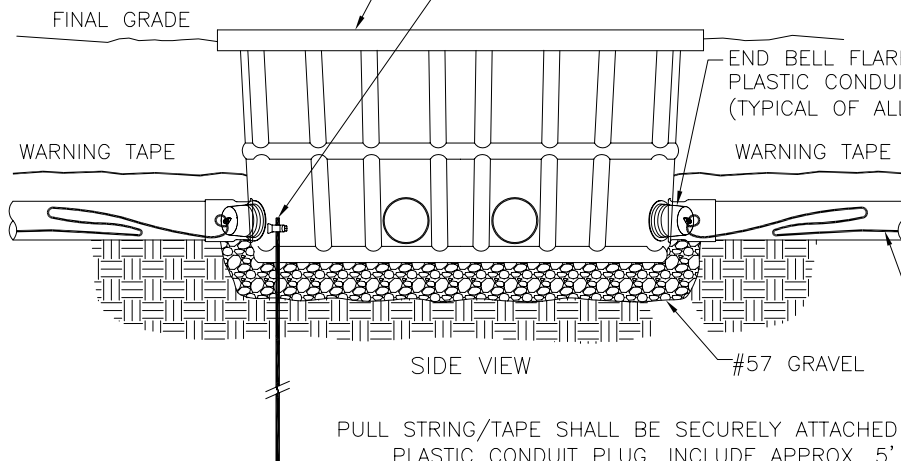
TOP VIEW



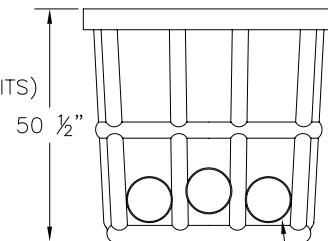
THREE PIECE COVER

THE TOP OF THE PULL BOX SHALL BE INSTALLED 3" ABOVE FINAL GRADE

3/4" x 8' COPPERCLAD GROUND ROD AND GROUND ROD CONNECTOR. 4" OF GROUND ROD WITH GROUND ROD CONNECTOR SHALL EXTEND UP THROUGH DRAIN SLOT INTO PULLBOX.



SIDE VIEW



END VIEW

KNOCKOUTS FOR 8" END BELL FLARES (TYPICAL)

NOTES:

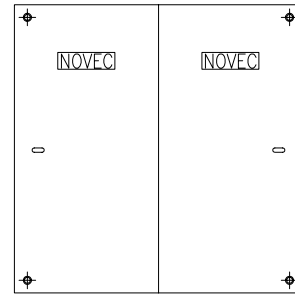
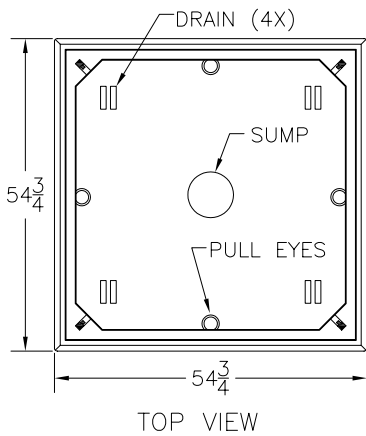
1. SET PULL BOX ON A LEVEL AREA, IN THE BOTTOM OF THE EXCAVATION, ON A 6" LAYER OF #57 GRAVEL FOR DRAINING PURPOSES.
2. BEFORE BACKFILLING AND COMPACTING, MAKE SURE COVERS ARE IN PLACE AND SECURE. LAYER 6" TO 8" OF BACKFILL AROUND THE PULLBOX. TAMP EACH INDIVIDUAL LAYER OF BACKFILL. CONTINUE THE LAYERING AND TAMPING UNTIL FINAL GRADE IS REACHED.
3. END BELL FLARES SHALL BE INSTALLED ON ALL CONDUITS IN PULL BOX AND SHOULD FIT FLUSH AGAINST THE INTERIOR WALL, SHALL BE PLUGGED AND SHALL HAVE PULL STRING/TAPE INSTALLED.
4. ANY CONDUIT AND RELATED EQUIPMENT INSTALLED BY THE BUILDER SHALL BE INSPECTED BY A NOVEC REPRESENTATIVE AND APPROVED BEFORE ANY BACKFILLING IS DONE. FAILURE TO DO SO WILL RESULT IN EXPOSING ANY AREA NOT INSPECTED.
5. NUMBER AND SIZES OF CONDUITS TO BE SPECIFIED BY THE DISTRIBUTION ENGINEERING DEPARTMENT.
6. ALL INSTALLED CONDUITS MUST BE UL RATED SCHEDULE 40 GRAY PVC.
7. LARGE PULL BOX (UP1048) SHALL BE USED WHEN PULLING FEEDER CABLE. SMALL PULL BOX (UP1047) SHALL BE USED WHEN PULLING DISTRIBUTION CABLE.
8. APPROXIMATE WEIGHT IS 1350 LBS.
9. NOT TRAFFIC RATED.



INSTALLATION DRAWING FOR
LARGE PULL BOX
(UP1048)

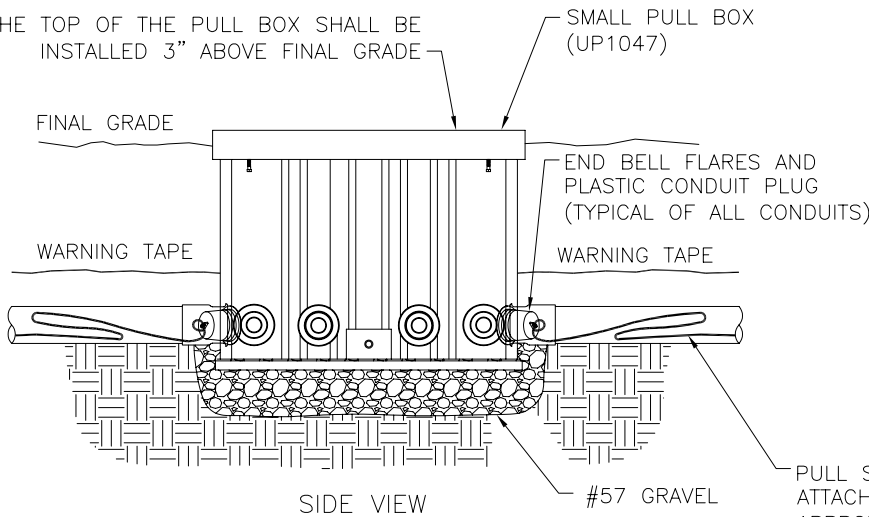
	By	Checked	Approved	Date
Original	KJB	MLH	SPEC. COMMITTEE	01/26/04
Revision	KJB	MLH	SPEC. COMMITTEE	03/31/04
Revision	KJB	MLH	SPEC. COMMITTEE	11/29/04
Revision	KJB	MLH	SPEC. COMMITTEE	12/12/05

ID-PBL



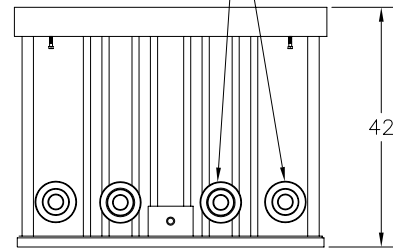
TWO PIECE COVER

THE TOP OF THE PULL BOX SHALL BE INSTALLED 3" ABOVE FINAL GRADE



SIDE VIEW

7" & 5" KNOCKOUTS TYPICAL OF ALL SIDES OF PULL BOX.



END VIEW

PULL STRING/TAPE SHALL BE SECURELY ATTACHED TO PLASTIC CONDUIT PLUG. INCLUDE APPROX. 5' OF ADDITIONAL PULL STRING/TAPE TO FACILITATE FUTURE CABLE PULLING. (TYPICAL OF ALL CONDUITS)

NOTES:

1. SET PULL BOX ON A LEVEL AREA, IN THE BOTTOM OF THE EXCAVATION, ON A 6" LAYER OF #57 GRAVEL FOR DRAINING PURPOSES.
2. BEFORE BACKFILLING AND COMPACTING, MAKE SURE COVERS ARE IN PLACE AND SECURE. LAYER 6" TO 8" OF BACKFILL AROUND THE PULLBOX. TAMP EACH INDIVIDUAL LAYER OF BACKFILL. CONTINUE THE LAYERING AND TAMPING UNTIL FINAL GRADE IS REACHED.
3. END BELL FLARES SHALL BE INSTALLED ON ALL CONDUITS IN PULL BOX AND SHOULD FIT FLUSH AGAINST THE INTERIOR WALL, SHALL BE PLUGGED AND SHALL HAVE PULL STRING/TAPE INSTALLED.
4. ANY CONDUIT AND RELATED EQUIPMENT INSTALLED BY THE BUILDER SHALL BE INSPECTED BY A NOVEC REPRESENTATIVE AND APPROVED BEFORE ANY BACKFILLING IS DONE. FAILURE TO DO SO WILL RESULT IN EXPOSING ANY AREA NOT INSPECTED.
5. NUMBER AND SIZES OF CONDUITS TO BE SPECIFIED BY THE DISTRIBUTION ENGINEERING DEPARTMENT.
6. ALL INSTALLED CONDUITS MUST BE UL RATED SCHEDULE 40 GRAY PVC.
7. LARGE PULL BOX (UP1048) SHALL BE USED WHEN PULLING FEEDER CABLE. SMALL PULL BOX (UP1047) SHALL BE USED WHEN PULLING DISTRIBUTION CABLE.
8. APPROXIMATE WEIGHT IS 680 LBS.
9. NOT TRAFFIC RATED.



INSTALLATION DRAWING FOR
SMALL PULL BOX
(UP1047)

	By	Checked	Approved	Date
Original	KJB	MLH	SPEC. COMMITTEE	01/26/04
Revision	KJB	MLH	SPEC. COMMITTEE	03/31/04
Revision	KJB	MLH	SPEC. COMMITTEE	11/29/04
Revision	KJB	MLH	SPEC. COMMITTEE	12/12/05

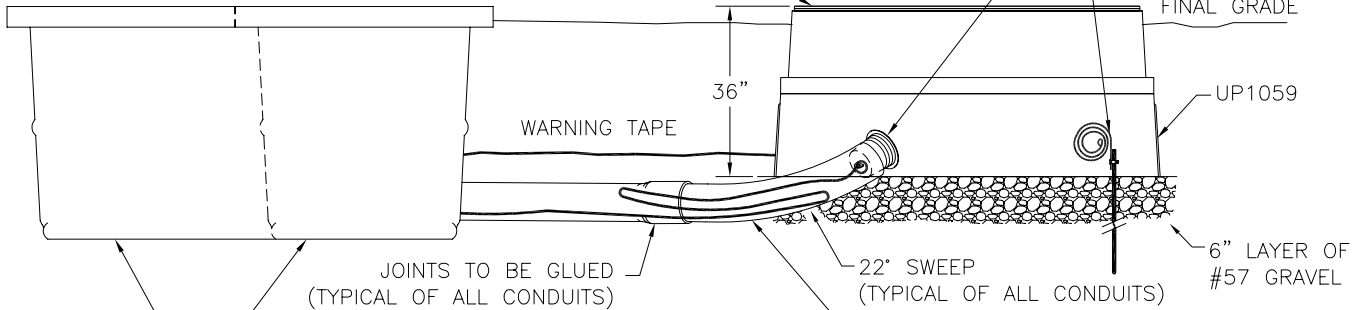
ID-PBS

3/4" x 8' COPPERCLAD GROUND ROD, GROUND ROD CONNECTOR AND #4 BARE SOFT DRAWN SOLID COPPER GROUND WIRE. THE GROUND ROD SHALL BE 4" ABOVE BOTTOM OF PAD IN A CORNER OF THE BOX PAD. THE GROUND WIRE SHALL BE SECURELY CONNECTED TO THE GROUND ROD WITH 6' OF WIRE COILED ABOVE THE SOIL INSIDE THE BOX PAD

THE TOP OF BOX PAD SHALL BE INSTALLED 3" ABOVE FINISHED GRADE

PLASTIC CONDUIT PLUG (TYPICAL OF ALL CONDUITS)

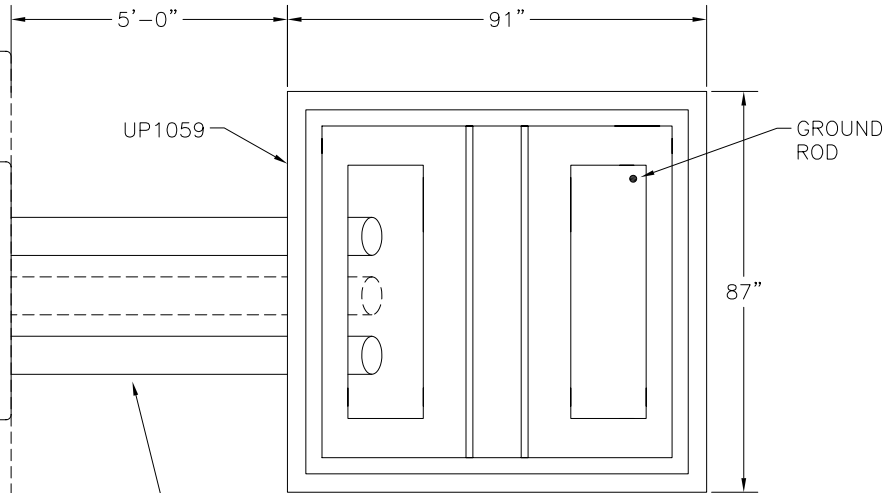
FINAL GRADE



SIDE VIEW

PULL STRING/TAPE SHALL BE SECURELY ATTACHED TO PLASTIC CONDUIT PLUG. INCLUDE APPROX. 5' OF ADDITIONAL PULL STRING/TAPE TO FACILITATE FUTURE CABLE PULLING. (TYPICAL OF ALL CONDUITS)

LARGE PULLBOX (UP1048) CAN BE PLACED IN EITHER DIRECTION DEPENDING ON CONSTRUCTION PLAN LAYOUT. (SEE ID-PBL)



TOP VIEW

AS MANY CONDUITS AS NECESSARY CAN BE INSTALLED BETWEEN PULL BOX AND FIBERGLASS BOX PAD, PULL BOX CAN BE CUT TO ACCOMMODATE THE ADDITIONAL CONDUITS.

ALL PULLING SHALL BE DONE WITHIN THE PULL BOX. THE SHORT RUNS IN THE SWITCH BOX PAD ARE TO BE PUSHED IN AFTER THE CABLE HAS BEEN PULLED INTO THE PULL BOX.

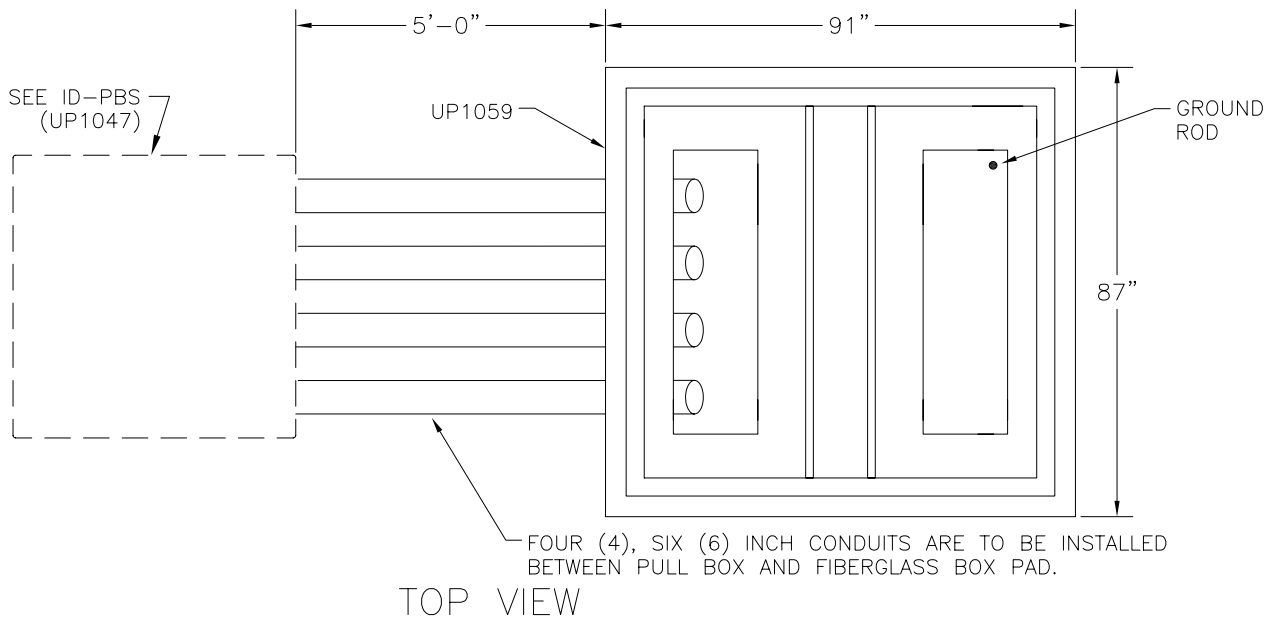
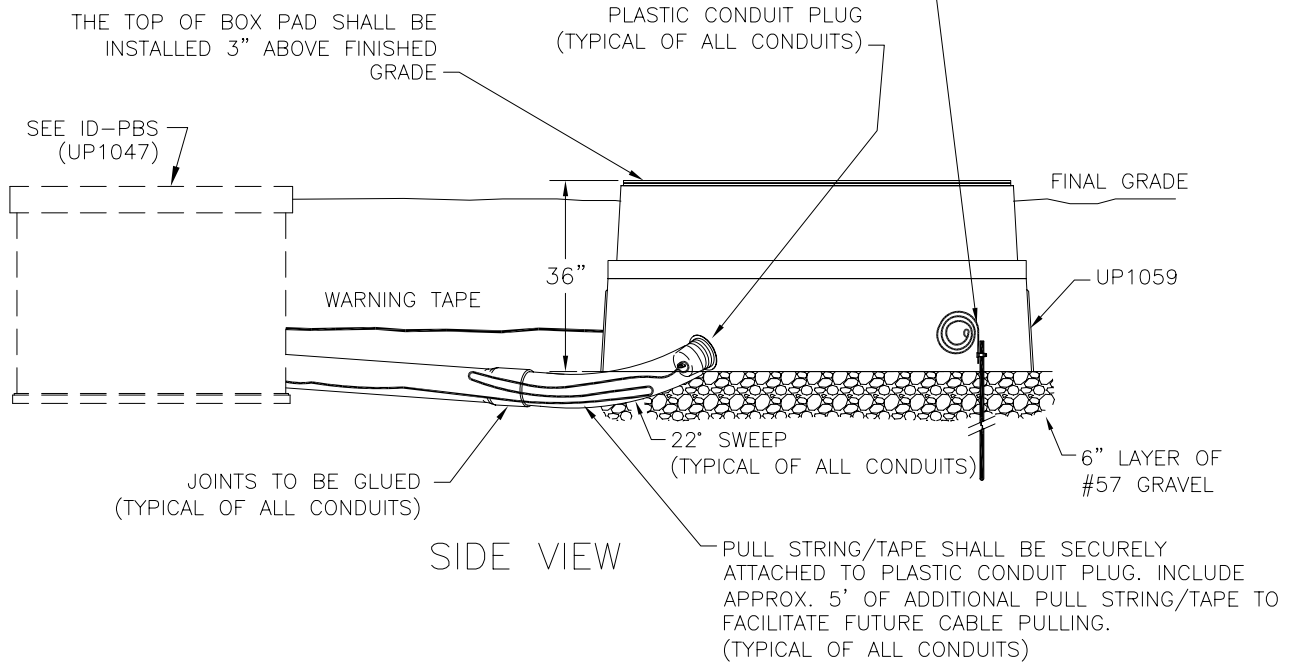


INSTALLATION DRAWING FOR SWITCH GEAR BOX PAD TO LARGE PULLBOX

	By	Checked	Approved	Date
Original	KJB	MLH	SPEC. COMMITTEE	01/26/04
Revision	KJB	MLH	SPEC. COMMITTEE	03/31/04
Revision	KJB	MLH	SPEC. COMMITTEE	11/29/04
Revision	KJB	MLH	SPEC. COMMITTEE	12/12/05

ID-PSB

3/4" x 8' COPPERCLAD GROUND ROD, GROUND ROD CONNECTOR AND #4 BARE SOFT DRAWN SOLID COPPER GROUND WIRE. THE GROUND ROD SHALL BE 4" ABOVE BOTTOM OF PAD IN A CORNER OF THE BOX PAD. THE GROUND WIRE SHALL BE SECURELY CONNECTED TO THE GROUND ROD WITH 6' OF WIRE COILED ABOVE THE SOIL INSIDE THE BOX PAD



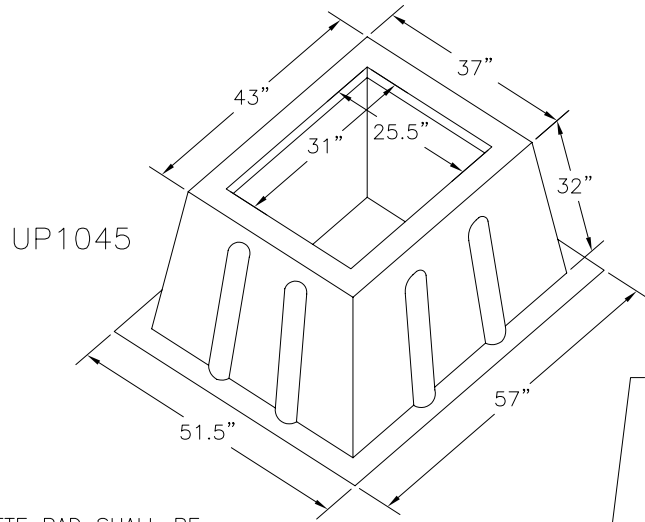
ALL PULLING SHALL BE DONE WITHIN THE PULL BOX. THE SHORT RUNS IN THE SWITCH BOX PAD ARE TO BE PUSHED IN AFTER THE CABLE HAS BEEN PULLED INTO THE PULL BOX.



INSTALLATION DRAWING FOR
SWITCH GEAR BOX PAD
TO SMALL PULLBOX

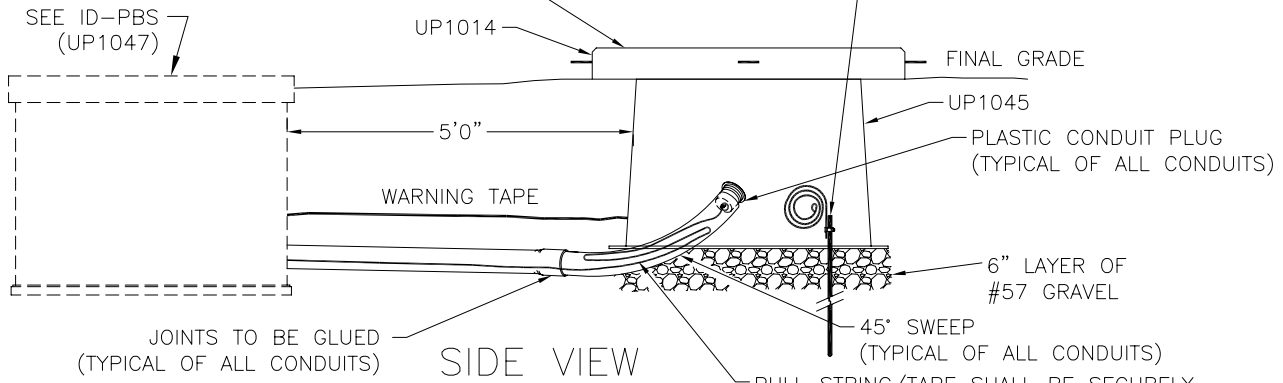
	By	Checked	Approved	Date
Original	KJB	MLH	SPEC. COMMITTEE	01/26/04
Revision	KJB	MLH	SPEC. COMMITTEE	03/31/04
Revision	KJB	MLH	SPEC. COMMITTEE	11/29/04
Revision	KJB	MLH	SPEC. COMMITTEE	12/12/05

ID-PSB1

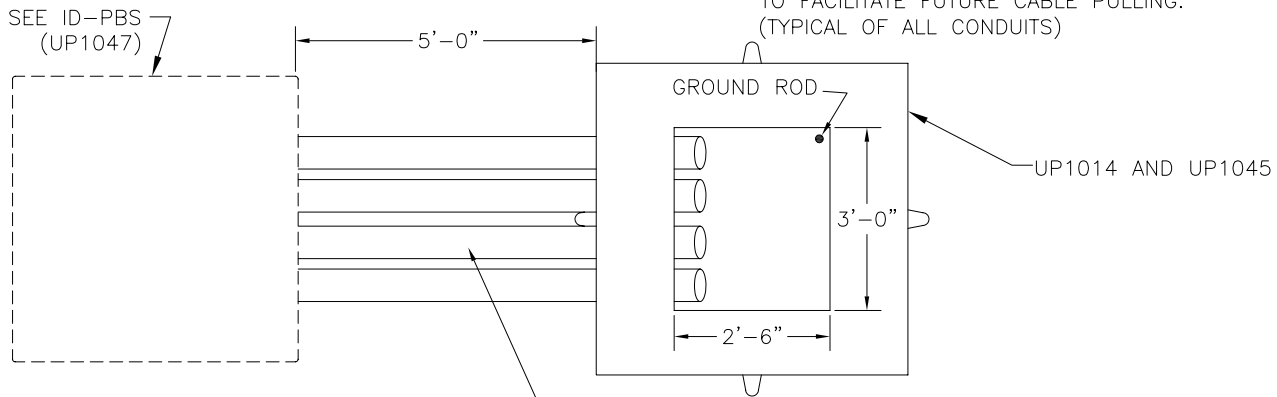


CONCRETE PAD SHALL BE SUPPORTED BY FINAL GRADE.

3/4" x 8' COPPERCLAD GROUND ROD, GROUND ROD CONNECTOR AND #4 BARE SOFT DRAWN SOLID COPPER GROUND WIRE. THE GROUND ROD SHALL BE 4" ABOVE BOTTOM OF PAD IN A CORNER OF THE BOX PAD. THE GROUND WIRE SHALL BE SECURELY CONNECTED TO THE GROUND ROD WITH 6' OF WIRE COILED ABOVE THE SOIL INSIDE THE BOX PAD.



PULL STRING/TAPE SHALL BE SECURELY ATTACHED TO PLASTIC CONDUIT PLUG. INCLUDE APPROX. 5' OF ADDITIONAL PULL STRING/TAPE TO FACILITATE FUTURE CABLE PULLING. (TYPICAL OF ALL CONDUITS)



FOUR (4), SIX (6) INCH CONDUITS ARE TO BE INSTALLED BETWEEN PULL BOX AND FIBERGLASS BOX PAD.

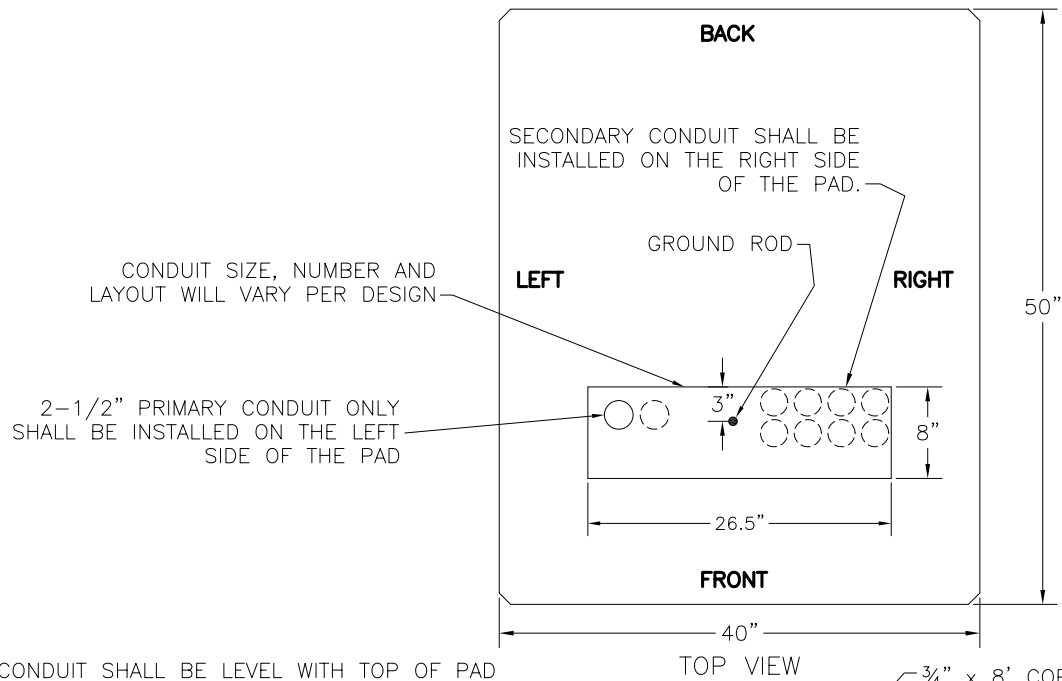
ALL PULLING SHALL BE DONE WITHIN THE PULL BOX. THE SHORT RUNS IN THE ENCLOSURE BOX PAD ARE TO BE PUSHED IN AFTER THE CABLE HAS BEEN PULLED INTO THE PULL BOX.



INSTALLATION DRAWING FOR 3 PHASE ENCLOSURE BOX PAD AND CONCRETE PAD

	By	Checked	Approved	Date
Original	KJB	MLH	SPEC. COMMITTEE	01/26/04
Revision	KJB	MLH	SPEC. COMMITTEE	03/31/04
Revision	KJB	MLH	SPEC. COMMITTEE	11/29/04
Revision	KJB	MLH	SPEC. COMMITTEE	12/12/05

ID-PEB



CONDUIT SHALL BE LEVEL WITH TOP OF PAD (ADDITIONAL CONDUIT MAY NEED TO BE ADDED TO BRING TO PROPER HEIGHT.)

PLASTIC CONDUIT PLUG (TYPICAL OF ALL CONDUITS)

PAD TO BE INSTALLED ON 4" OF ADDITIONAL ROCK DUST OR SUITABLE BACKFILL.

FINAL GRADE

JOINTS TO BE GLUED (TYPICAL OF ALL CONDUITS)

3/4" x 8' COPPERCLAD GROUND ROD AND GROUND ROD CONNECTOR. THE GROUND ROD SHALL BE LEVEL WITH TOP OF THE PAD AND INSTALLED WITH 3" OF RADIAL CLEARANCE FOR ACCESSIBILITY WHENEVER POSSIBLE.

WARNING TAPE

WARNING TAPE

90° SWEEP (TYPICAL OF ALL CONDUITS)

JOINTS TO BE GLUED (TYPICAL OF ALL CONDUITS)

PULL STRING/TAPE SHALL BE SECURELY ATTACHED TO PLASTIC CONDUIT PLUG. INCLUDE APPROX. 5' OF ADDITIONAL PULL STRING/TAPE TO FACILITATE FUTURE CABLE PULLING. (TYPICAL OF ALL CONDUITS)

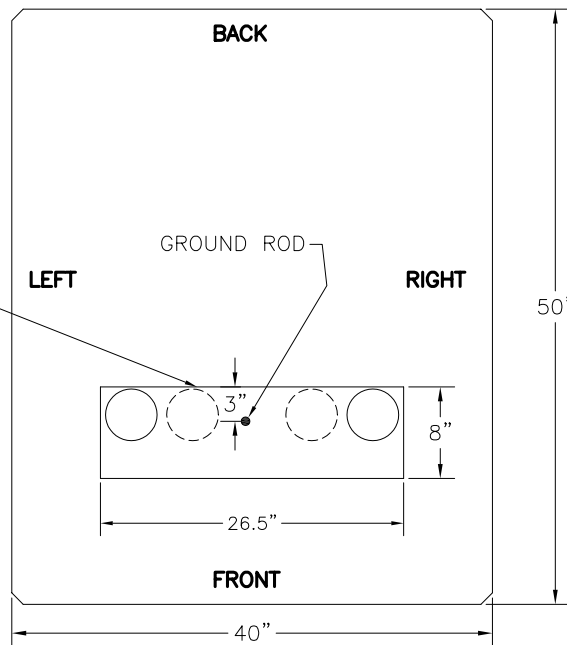


INSTALLATION DRAWING FOR CONDUIT AND SINGLE PHASE TRANSFORMER PAD

	By	Checked	Approved	Date
Original	KJB	MLH	SPEC. COMMITTEE	01/26/04
Revision	KJB	MLH	SPEC. COMMITTEE	11/29/04
Revision	KJB	MLH	SPEC. COMMITTEE	12/12/05
Revision				

ID-PT1

CONDUIT SIZE, NUMBER AND LAYOUT WILL VARY PER DESIGN



TOP VIEW

CONDUIT SHALL BE LEVEL WITH TOP OF PAD (ADDITIONAL CONDUIT MAY NEED TO BE ADDED TO BRING TO PROPER HEIGHT.)

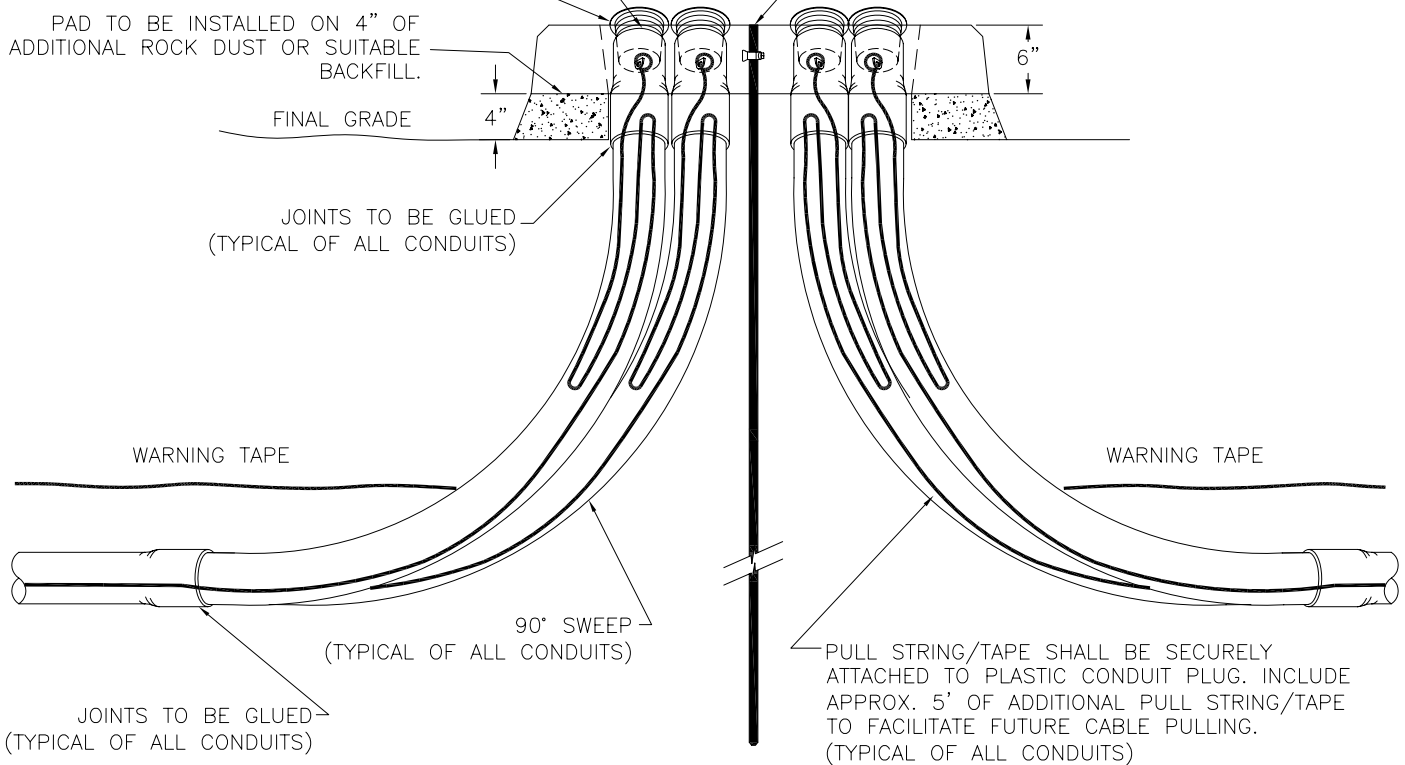
PLASTIC CONDUIT PLUG (TYPICAL OF ALL CONDUITS)

PAD TO BE INSTALLED ON 4" OF ADDITIONAL ROCK DUST OR SUITABLE BACKFILL.

FINAL GRADE

JOINTS TO BE GLUED (TYPICAL OF ALL CONDUITS)

3/4" x 8' COPPERCLAD GROUND ROD AND GROUND ROD CONNECTOR. THE GROUND ROD SHALL BE LEVEL WITH TOP OF THE PAD AND INSTALLED WITH 3" OF RADIAL CLEARANCE FOR ACCESSIBILITY WHENEVER POSSIBLE.

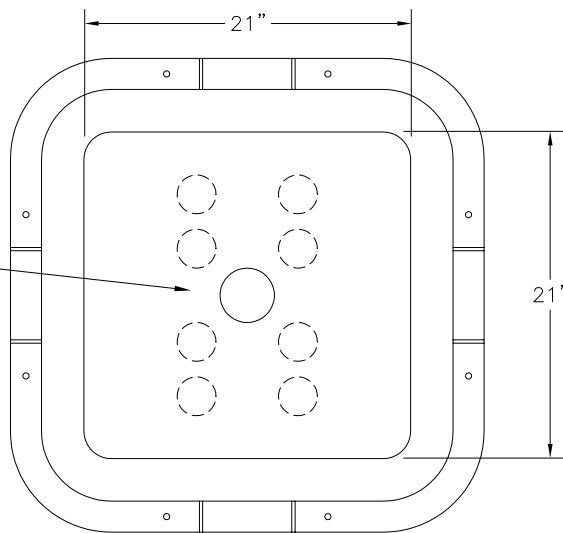


INSTALLATION DRAWING FOR CONDUIT AND SINGLE PHASE ENCLOSURE PAD

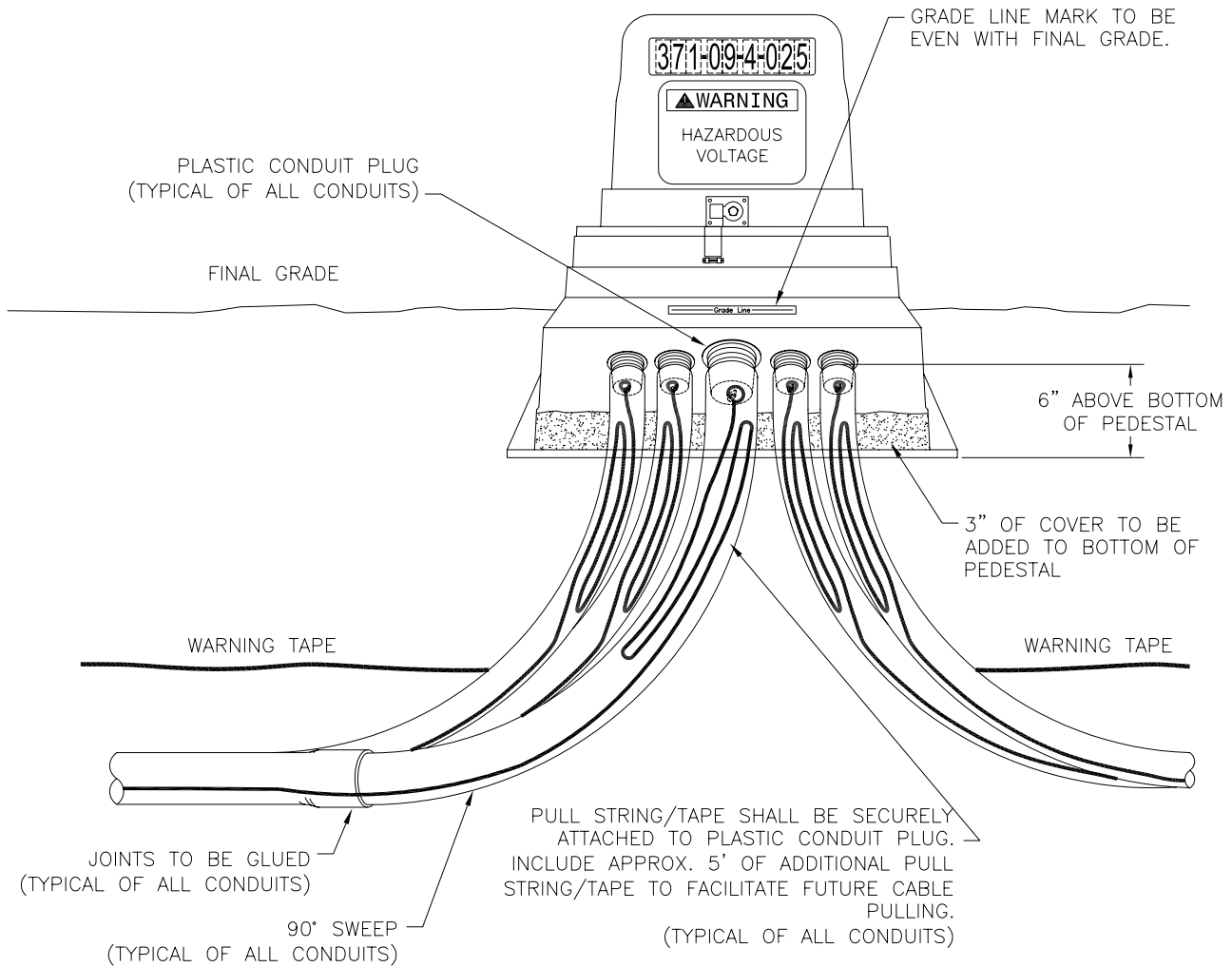
	By	Checked	Approved	Date
Original	KJB	MLH	SPEC. COMMITTEE	01/26/04
Revision	KJB	MLH	SPEC. COMMITTEE	11/29/04
Revision	KJB	MLH	SPEC. COMMITTEE	12/12/05
Revision				

ID-PE1

CONDUIT SIZE, NUMBER AND LAYOUT WILL VARY PER DESIGN

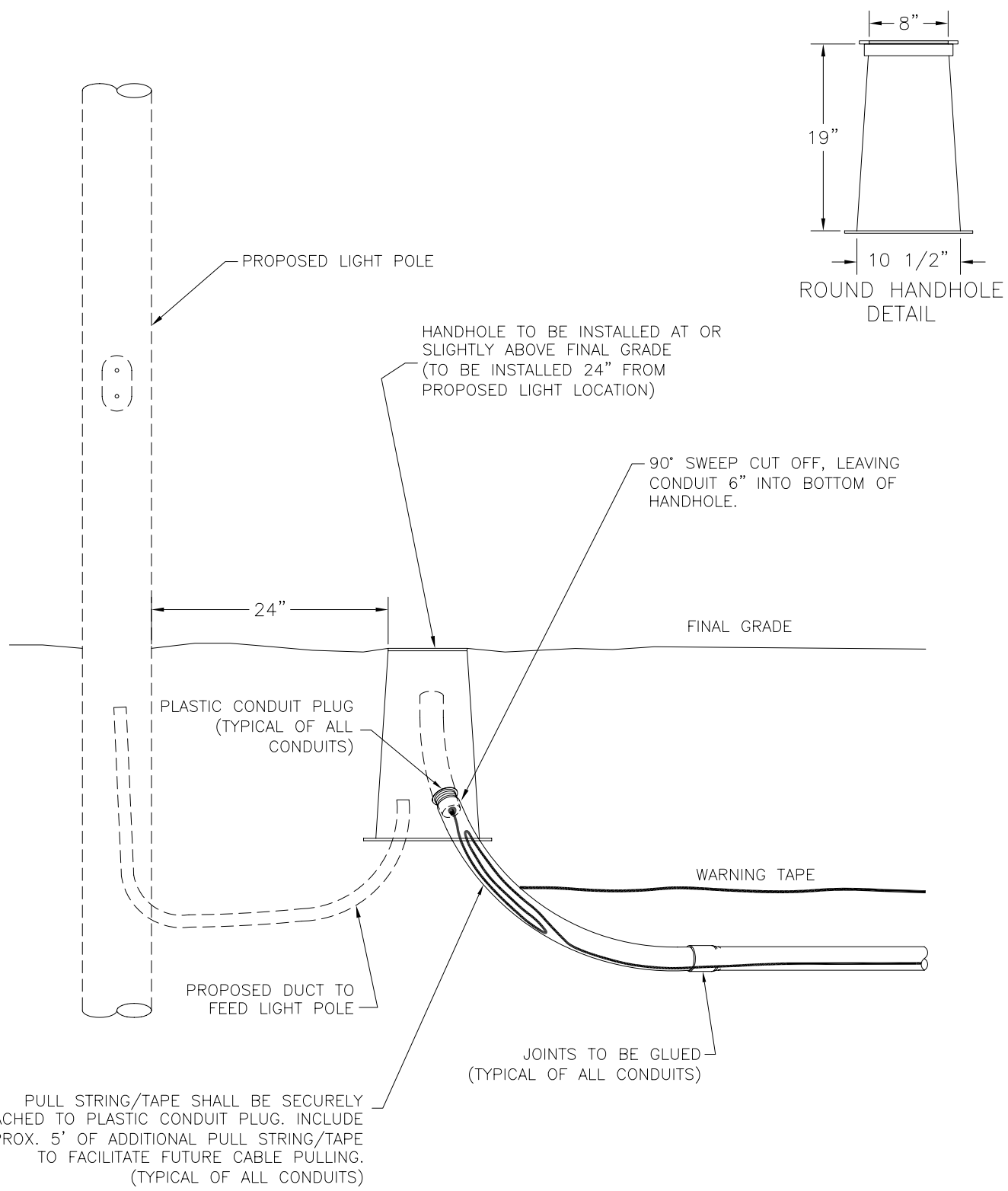


TOP VIEW



INSTALLATION DRAWING FOR
CONDUIT AND PEDESTAL

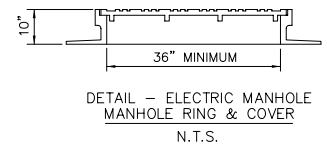
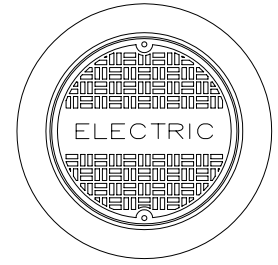
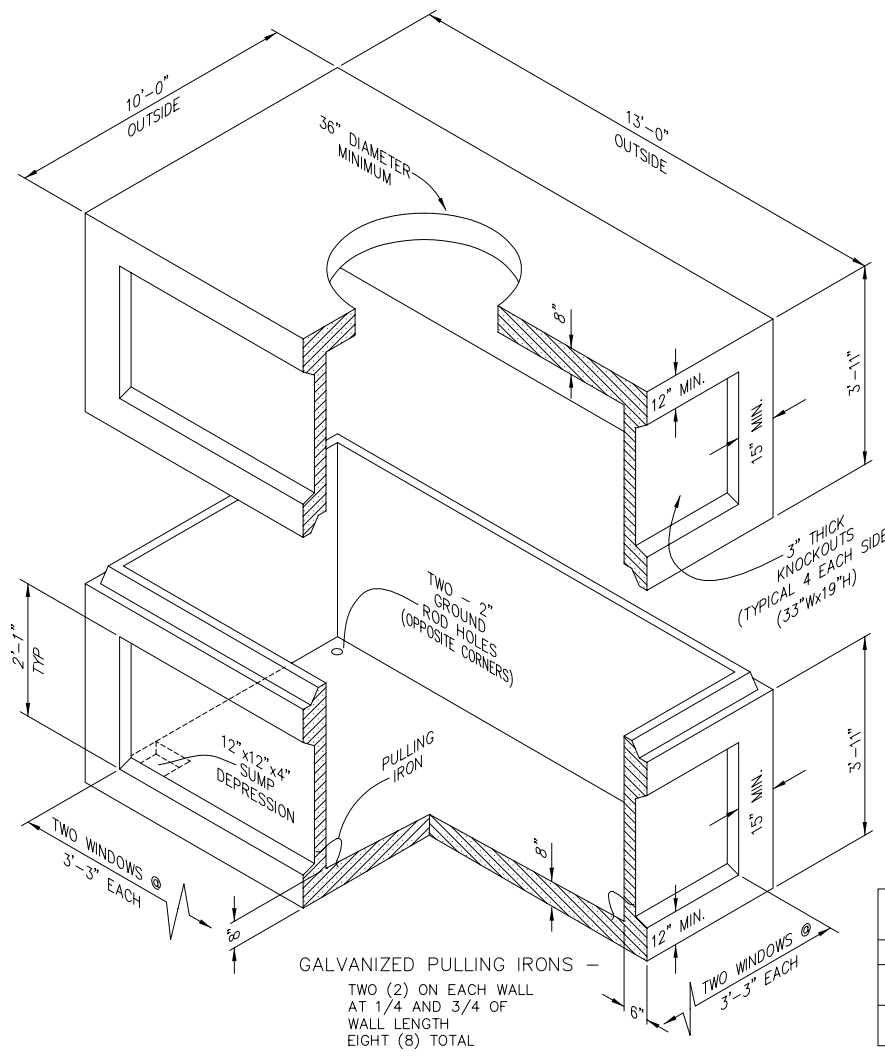
	By	Checked	Approved	Date
Original	KJB	MLH	SPEC. COMMITTEE	01/26/04
Revision	KJB	MLH	SPEC. COMMITTEE	11/29/04
Revision	KJB	MLH	SPEC. COMMITTEE	12/12/05
Revision				



INSTALLATION DRAWING FOR
HANDHOLE
(UK7002)

	By	Checked	Approved	Date
Original	KJB	MLH	SPEC. COMMITTEE	01/26/04
Revision	KJB	MLH	SPEC. COMMITTEE	05/04/04
Revision	KJB	MLH	SPEC. COMMITTEE	11/29/04
Revision	KJB	MLH	SPEC. COMMITTEE	12/12/05

ID-HH1



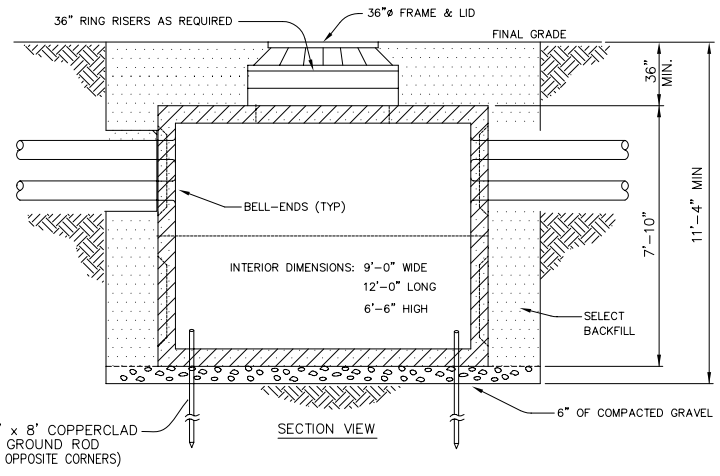
UTILITY MANHOLE DETAIL			
SCHEDULE	WIDTH	LENGTH	HEIGHT
INTERIOR DIMENSIONS	9'-0"	12'-0"	6'-6"
EXTERIOR DIMENSIONS	10'-0"	13'-0"	7'-10"

MANHOLE FABRICATION NOTES:

- (2) 2" GROUND ROD HOLES TO BE PROVIDED AT DIAGONAL CORNERS.
- 7/8" PULLING IRONS ALL SIDES AS NOTED.
- SLOPE FLOOR 1" TOWARD SUMP HOLE IN CORNER.
- TO BE REINFORCED FOR H-20 BRIDGE LOAD (MINIMUM).
- RING RISERS AS REQUIRED.
- NOMINAL INSIDE DIMENSIONS OF 9'Wx12'Lx6.5'H.

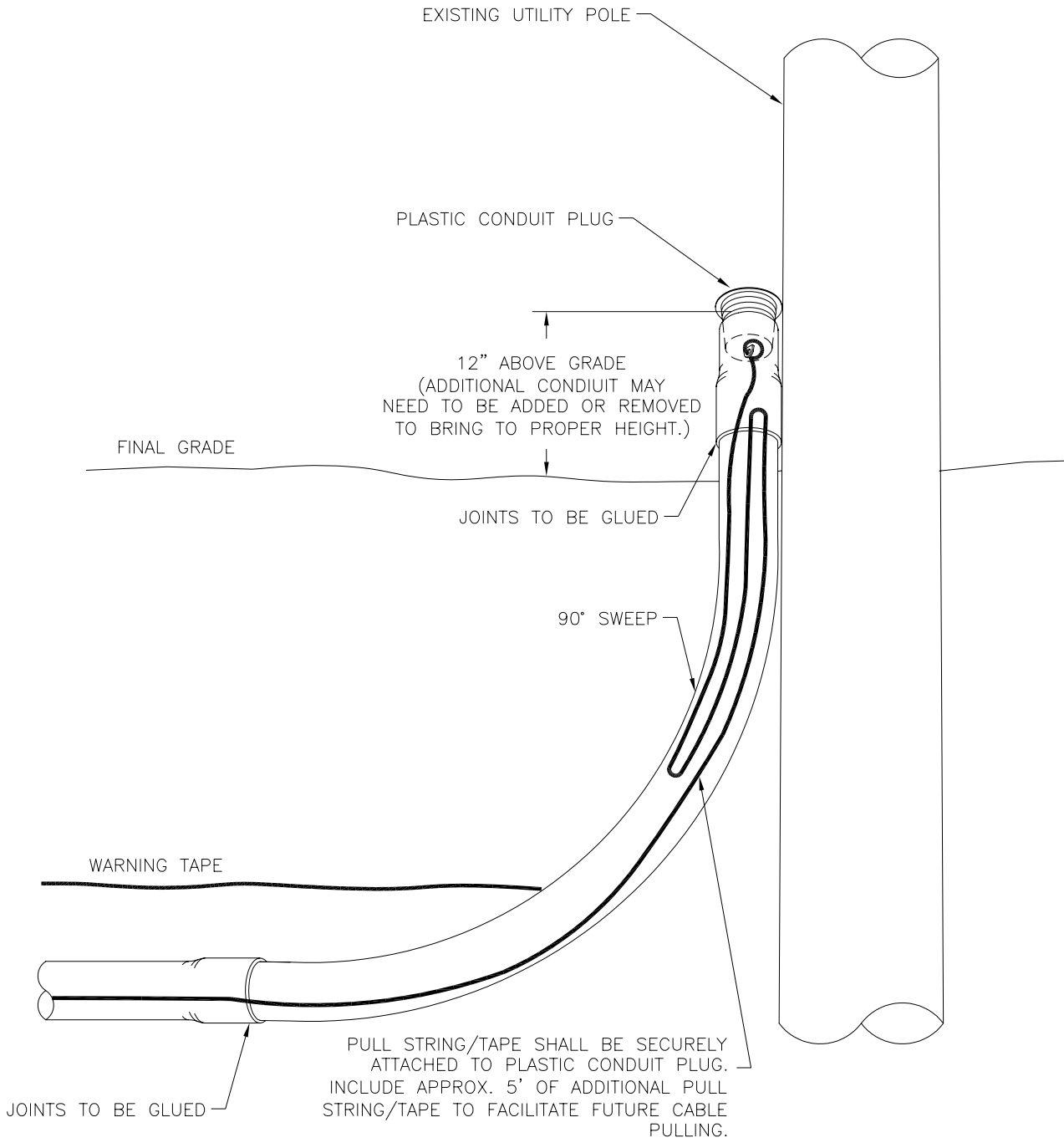
MANHOLE INSTALLATION NOTES:

- USE END BELL FLARES AND GROUT SMOOTH AROUND CONDUITS AFTER MANHOLE WALL PENETRATION TO CREATE A WATER TIGHT SEAL.
- MANHOLE FRAME/LID SHALL BE ADJUSTED USING MORTAR & COMBINATION OF 6" & 9" COLLARSTO SUIT SURFACE TREATMENT & ELEVATION.
- INSTALL (2) 3/4" x 8' GROUND RODS IN OPPOSITE CORNERS.



INSTALLATION DRAWING FOR
9'x12' MANHOLE

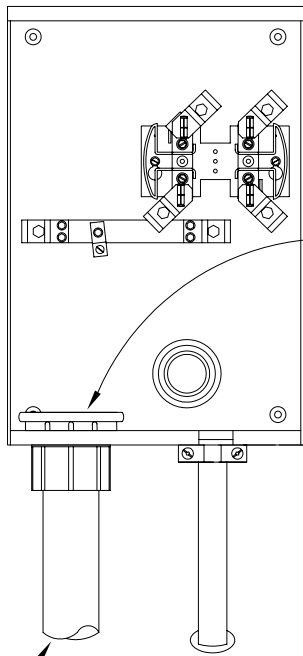
	By	Checked	Approved	Date
Original	KJB	MLH	SPEC. COMMITTEE	01/26/04
Revision				
Revision				
Revision				



INSTALLATION DRAWING FOR
CONDUIT POLE RISER

	By	Checked	Approved	Date
Original	KJB	MLH	SPEC. COMMITTEE	01/26/04
Revision	KJB	MLH	SPEC. COMMITTEE	11/29/04
Revision	KJB	MLH	SPEC. COMMITTEE	12/12/05
Revision				

ID-RP1



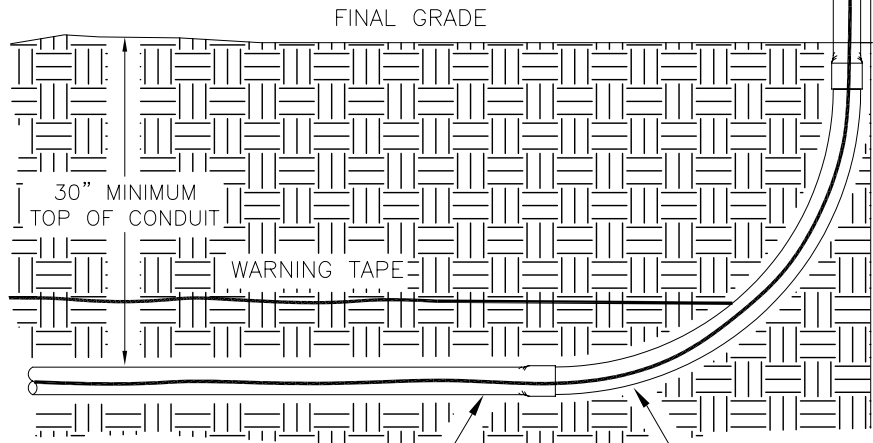
PLASTIC INSULATING BUSHING AND METAL LOCKNUT MUST BE INSTALLED

PULL STRING/TAPE TO BE SECURELY ATTACHED TO METER BASE. INCLUDE APPROX. 5' OF ADDITIONAL PULL STRING/TAPE TO FACILITATE FUTURE CABLE PULLING.

INNER CONDUIT MUST EXTEND INTO OUTER METER CONDUIT A MINIMUM OF 12" AND A MAXIMUM OF 18" (NOT TO BE GLUED)

CONDUIT INSTALLED ON LEFT SIDE OF METERBASE

MINIMUM RADIAL SEPARATION BETWEEN ELECTRICAL CONDUIT AND OTHER UTILITIES SHALL BE TWELVE (12) INCHES. (UNLESS A JOINT USE AGREEMENT HAS BEEN ESTABLISHED)



CONDUIT & SWEEP SHALL BE RESTING ON UNDISTURBED OR COMPACTED SOIL.

NOTES:

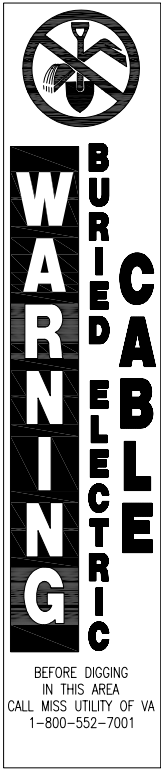
1. METER BASE FURNISHED BY NOVEC, INSTALLED BY CUSTOMER.
2. UM8025 (2-1/2" METER CONDUIT, 2" 90° SWEEP, 2" CONDUIT)
UM8030 (3" METER CONDUIT, 2-1/2" 90° SWEEP, 2-1/2" CONDUIT)
UM8035 (3" SPECIAL METER CONDUIT, 3" 90° SWEEP, 3" CONDUIT)
3. **DITCH MUST BE TAMPED AT METER BASE BEFORE BACK FILLING.**
4. ALL CONDUIT SHALL BE GRAY SCHEDULE 40 UL RATED PVC.
5. **DITCH MUST BE BACK FILLED BEFORE METER BASE IS MADE UP.**



INSTALLATION DRAWING FOR METER BASE AND RISER PIPE

	By	Checked	Approved	Date
Original	KJB	MLH	SPEC. COMMITTEE	01/26/04
Revision	KJB	MLH	SPEC. COMMITTEE	10/13/04
Revision	KJB	MLH	SPEC. COMMITTEE	11/29/04
Revision	KJB	MLH	SPEC. COMMITTEE	12/12/05

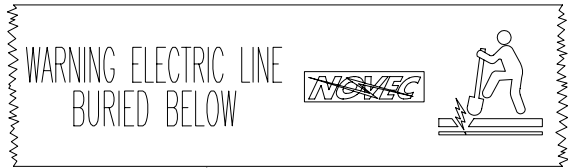
ID-RM1



WARNING STICKER DETAIL

WARNING

RED TRI-VIEW STUB MARKER



WARNING TAPE

FINAL GRADE

RED "NOVEC" WARNING TAPE TO BE BROUGHT STRAIGHT UP AND OUT OF THE GROUND OVER ALL STUB LOCATIONS.

24"

ANCHOR ROD

PLASTIC CONDUIT PLUG

PULL STRING/TAPE SHALL BE SECURELY ATTACHED TO PLASTIC CONDUIT PLUG. INCLUDE APPROX. 5' OF ADDITIONAL PULL STRING/TAPE TO FACILITATE FUTURE CABLE PULLING.



INSTALLATION DRAWING FOR CONDUIT STUB

	By	Checked	Approved	Date
Original	KJB	MLH	SPEC. COMMITTEE	01/26/04
Revision	KJB	MLH	SPEC. COMMITTEE	11/29/04
Revision	KJB	MLH	SPEC. COMMITTEE	11/07/05
Revision	KJB	MLH	SPEC. COMMITTEE	12/12/05

ID-CS1-UC



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