

DIVISION 33 – UTILITIES**33 05 00 – Restoration Standards for Underground Utilities**

1. All underground excavation operations performed on Campus to install, repair, upgrade or remove a utility structure (i.e. gas, water, storm sewer, sanitary sewer or drain pipe, tank, hydrant, heating conduit or telecommunication duct), shall not be deemed complete until restoration of the disturbed area is completed per this standard.
2. Restoration under this standard shall consist of the following items or steps as a minimum:
 - a. Backfill excavated area in a manner designed specifically to protect any underground utility structure in the area from possible damage incurred by the type of backfill material being used. (i.e. sand padding, blocking, pea gravel or cement encasement may be required to protect underground utility structures).
 - b. Tamp all backfill material in 12" lifts to minimize subsequent settling of excavated area.
 - c. Under roadways and sidewalks, final 24" of backfill material shall be tamped "crusher-run" stone, tamped in 12" lifts.
 - d. Roadway and sidewalk asphalt surfaces shall be paved with a hot-mix asphalt material of equal quality and density to that material removed during excavation, with the surface rolled and smoothed to minimize surface irregularities where new surface adjoins other paved surfaces. Installation shall achieve maximum bonding with the vertical edges of adjoining paved surfaces.
 - e. Concrete surfaces shall be formed and poured with material to match as nearly as possible the adjoining concrete surfaces in alignment, thickness, texture and color.
 - f. All curbing units shall be reinstalled in the same manner and alignment as the adjoining units. Replacement units shall match adjoining units in material, size, shape and color.
 - g. In lawn areas, final 8" of fill material shall be topsoil with added compost 15-20% minimum, raked and hydro-seeded using grass seed mix as specified and approved per submittal by Grounds Foreman. Include an alternate price for 12" of topsoil.
 - h. All spoil, rock, construction materials and unused backfill material shall be removed from the Campus and disposed of in an appropriate manner unless directed to be stored on campus by the Grounds Foreman.
 - i. Contractor shall be responsible for repair of any settlement occurring over excavation site for eighteen (18) months after restoration completed.
3. **NO** concrete truck washouts on campus, unless prior arrangements are made for each project with the Project Manager and approved by the Grounds Foreman.
4. Uni-base: pour crushed stone to fill large gaps in uni-base up to 4 inches below grade; use topsoil to fill to grade

33 05 13 – Manholes

1. Pre-cast structures to be used.
2. No bricks, use plastic or concrete rings to raise cover ring.
3. Use 30" traffic H20 rated manhole covers and rings.

33 10 00 – Water Utilities

1. Use left hand valves on water mains and Hydrant guard valves. (Red Top)
2. Use push-on joint PVC Pressure Class C900-DR-18 – 235 plastic for water mains up to a maximum of 12 inches diameter.
3. Back fill around water lines with 12 inches of ice control sand after laying line on 12 inches of ice control sand (NYSDOT # 703-06).
4. Provide Copperhead Solid #12 tracer wire with blue jacket, terminate in curb boxes.
5. Underground valve or metering vaults shall not be installed.
6. Water lines shall have a minimum of 5 feet of cover.
7. Use Kennedy Hydrant K-81 in Kennedy Yellow.

33 30 00 – Sanitary Sewer Utilities

1. Sanitary Cover shall be ADA compliant in walks and driveways, 30" Diameter and have "SANITARY SEWER" cast in it.
2. Sanitary lines must always be straight from manhole to manhole unless it has been approved by the RIT Facilities Management Services.
3. All pipe intersections shall be made within a manhole.
4. Design drawings shall include the profile of sanitary piping and crossing existing Utilities.
5. All piped materials shall be specified by the Engineer and approved per the RIT Facilities Management Services. Generally, sanitary sewer laterals to be SDR 21 in 20 foot lengths, and mains to be SDR 35.

6. Sanitary Utility Pumping Stations: All packaged lift and pumping stations shall be submitted to the RIT Facilities Management Services for review and approval.
7. Sanitary Utility Piping: Submit TV video of all piping to Utilities for review prior to acceptance.
8. New Manhole: Provide manhole boot connector for cast-in-place pipe to manhole connectors. Manhole boot connector shall provide a positive watertight connection with up to 20 degree omni-directional deflection and 1.00" of vertical or horizontal movement without loss of seal. Manhole boot connector shall be made from an EPDM compound with stainless steel hardware and meet requirements of ASTM C-923 "Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals" and ASTM C-1644 "Standard Specification for Resilient Connectors Between Reinforced Concrete On-Site Wastewater Tanks and Pipes."
9. Existing (core bored hole): Provide pipe to manhole connectors for cored holes in existing manholes. Pipe to manhole connector shall provide a positive watertight connection. Pipe to manhole connector shall be made from an EPDM compound or poly-isoprene rubber with stainless steel pipe clamp and compression band to seal against cored hole in concrete structure.

33 40 00 – Storm Drainage Utilities

1. All storm lines to be HDPE plastic (6 inches diameter and above to be smooth bore with corrugated exterior).
2. Galvanized or steel pipe is not to be used.
3. All structure covers in walkway and driveway areas are to be ADA compliant, 30" Diameter and have "STORM SEWER" cast in it.

33 44 16 – Trench Drains

1. Avoid the use of trench drains if at all possible. Use of trench drains requires Utilities Director approval.

33 44 31 – Catch Basins

1. Pre-cast catch basins only.
2. No bricks to be used to level grate.
3. Cast a concrete apron around grate – 6" min.
4. Set catch basin 2" low in lawn areas.
5. All catch basin covers and grates in walkway and driveway areas are to be ADA compliant.

33 51 00 – Natural Gas Distribution

1. Use HDPE plastic for gas lines.
2. Provide a 12 inch ice control sand envelope around gas line.
3. Provide Copperhead Solid #12 tracer wire with blue jacket, terminate in curb boxes.
4. Underground valve or metering vaults shall not be installed.
5. Gas lines shall have 3-4 feet of cover.

33 70 00 – Electrical Utilities

1. Utility line depth (also see drawing details):
 - a. Conduit for roadway or walkway lighting – 18 inch cover.
 - b. Conduit for 12KV – 5 inch PVC Sch. 40, concrete encased 6 inch all sides, 4 feet cover over concrete.
 - c. Conduit for Telecom/Data – 3 feet cover.
2. All conduits (Telecom, low voltage (600V) or medium voltage (12KV)) entering a building shall be pitched away from the building and shall immediately enter a pullbox in the building. Conduits leaving the pull box shall be higher so that any water entering the pull box via the exterior conduits cannot flow to conduits or equipment inside the building.
3. 15KV cable shall be General Cable, Kerite, Perelli (Prysmian), or Okonite and shall be 500Kcmil between manholes.
4. 15KV cable shall be EPR 133% insulation level (220 mil), MV-105, with 5 mil copper tape with a minimum of 20% overlap, and with flame retardant, moisture and sunlight resistant PVC jacket.
5. Use only Elastimold Series 600 Deadbreak bolt-together tee type splices in 12 KV manholes.
6. For underground 12 KV conduits, use 5 inch Schedule 40 PVC conduit. Transition to RGS sweeping elbow when rising above grade or entering a building. Encase with 6 inch of concrete on all four sides. Provide 4 feet of cover by backfilling in 12 inch lifts with compaction between lifts. Provide 8 inch of top soil in lawn area.
7. Always install double the number of conduits needed for 12KV service (if 4 are required, install 8 conduits)
8. Use only fiberglass and stainless steel hardware on 12KV wire racking materials in manholes.

9. Pull in a tracer wire of single conductor #10AWG solid copper insulated (THHN) wire in all 12 KV and Telecom conduits, terminate at top of manholes so that entry is not required Use type THHN stranded copper wire for low voltage class 1 (600v) electric service in underground conduits, and no smaller than #10 AWG.
10. Use 30 inch diameter H2O rated manhole rings and covers for all manholes, ADA compliant and cover shall have "ELECTRIC" cast in.
11. Use pre-cast rings (concrete or plastic) for all manhole risers...do not use brick.
12. For Lighting Circuits, use Schedule 80 PVC conduit for underground use. Transition to RGS sweeping elbow when rising above grade.
13. Use only scotch 33+ tape on class 1 and 2 systems.
14. Use Ideal or 3M (but not 3M Scotch Lock) wire nuts
15. For site power, splices are only permitted in poles or existing hand holes.
16. For site power with wire sizes #10awg and #12awg use 480/277 volt colors or 208/120 colors as needed.
17. Use Kistner Uni-bases for outdoor light poles – expose only 4 inch with 8 inch of top soil as shown on RIT detail – do not use leveling nuts to true poles (use washers or shims).
18. All light poles shall be powder coated black finish unless stated and approved otherwise by Owner.
19. Decorative site poles use AAL SP1 with 55 watt LED lamps. Hand hole in pole shall be 18 inch above base so that decorative base cover may be installed. A GFCI duplex outlet shall be 24 inch above base on all poles. Contact RIT for cut sheets.
20. All light pole bases to be installed with 4 inch of base exposed, and a minimum of 8 inch of top soil. Shims are to be used to level poles. Leveling nuts shall NOT be used.
21. Photo cells (with by-pass switch) shall be used for exterior lighting control. Time clocks shall not be used.
22. A minimum of 1 fc shall be between lighting poles.
23. Hand holes are to be avoided. No small round hand holes are to be installed. Quartzite or equal (subject to Owner approval) are to be used.
24. For lawn repairs due to trenching, boring, or other digging, include 8 inch top soil, dressing, and seeding to restore lawn to original conditions with 18 month warranty against settling.
25. For walk or road repairs due to trenching, boring, or other digging, include any pavement repair to original conditions with 18 month warranty against settling.
26. Outdoor Blue Lights
 - a. Specifications
 - i. Blue cubes from Laird Plastics (585-254-8110).
 - ii. 12 inch square Blue cube
 - iii. ¼ inch (.250) thick Blue plastic - color #2051
 - iv. 9 inch diameter hole.
 - v. Light fixture for top of pole (4 inch square) is a Pemco CRY2-X-70MH-120/277 top cap assembly without cube.
 - vi. Light fixture on wall mount bracket is a Pemco S410-A/125 - Powder Coat Black finish used with a Pemco CRY2-X-70MH-120/277 top cap assembly without cube.
 - vii. Use Kistner Uni-base, and 10 feet tall 4 inch square pole (power coated Black) by Flagpoles Inc.
 - viii. Use Ramtel Model RR733 phone in Ramtel Model 926-D enclosure.
 - ix. Contact RIT for cut sheets.
 - b. Install in or near quads and parking lots. New units shall be visible from at least one existing or new call box.

33 82 00 – Communications Transmissions and Distribution

1. Use Schedule 40 PVC conduit for underground use. Transition to RGS sweeping elbow when rising above grade. Provide 3 feet of cover.
2. Pull in a tracer wire of single conductor #10 AWG solid copper insulated (THHN) wire in all conduits, terminate at top of manholes so that entry is not required
3. Use 30 inch diameter manhole rings and covers for all manholes, ADA compliant and cover shall have "TELCOM" cast in.
4. Use pre-cast rings (concrete or plastic) for all manhole risers... do not use brick.
5. Reference Division 27 for further details.

END OF DIVISION 33