DIVISION 33

UTILITIES
This specification changes a portion of APWA Standard Specification Section 33 05 05. All other provisions of the section remain in full force and effect.

Add the following to Article 2.1 Pipe and Fittings

A. Buried Applications:
   6. Does not apply
This specification changes a portion of APWA Standard Specification Section 33 05 20. All other provisions of the section remain in full force and effect.

1.8 BACKFILL TRENCHES
   A. Trench Backfilling: One test per Lot
      1. Engineer may either Delete or Increase these testing requirements based on observed compaction effort and/or confidence in material used for Backfill.

2.1 BACKFILL MATERIALS
   D Asphalt bearing material allowed only in bottom half of base course and must be mixed 50% with road base. Asphalt bearing material not allowed in trench backfill.
   E Slag may be allowed to replace road base by the Engineer. Slag shall not be allowed in trench backfill.

2.2 ACCESSORIES
   D Tracer Wire. Any culinary water line, regardless of size, type, or installation, shall have a 14 gauge insulated copper tracer wire installed within 6” directly above the top of pipe. Tracer wire is to be installed with any non-metallic pipe, wire or conduit that is designed for utility use of any type.
      1. Wire is to be spliced in at all connections to other mains, and connections must be covered or coated with corrosion protection using gel caps or mastic pad.
      2. Where a new main ends, such as at a dead end or where it connects to an old main that does not have a tracer wire, the locating wire shall be properly grounded either by connecting directly onto the ductile iron pipe or by connecting onto a grounding rod. This connection shall also be covered or coated with corrosion protection as previously stated.
      3. Fire lines shall have tracer wire installed to the valve inside the building. Refer to drawings for further clarifications.

3.4 PIPE ZONE
   B Pipe zone backfill shall be SAND around ALL culinary water piping. ENGINEER may allow manufacturers recommendations for concrete or plastic sewer/storm sewer installations.

3.8 SURFACE RESTORATION
   A. Provide smooth, stable, temporary surfaces where Trenches pass through roadways, driveways or sidewalks
This specification changes a portion of APWA Standard Specification Section 33 05 25. All other provisions of the section remain in full force and effect.

Section 33 05 25

3.4 ASPHALT CONCRETE PATCH

C. Place asphalt concrete in lifts no greater than 3 inches, or less than 2 inches.
F. T-patch required for all final asphalt pavement restoration.
   1. Asphalt thickness will match the existing asphalt thickness plus 1 inch, with a minimum of 4 inches.
   2. If existing asphalt thickness is 6 inches or greater, then the asphalt patch will match the existing thickness.
   3. An additional one foot of asphalt will be removed around the entire perimeter of the excavated trench to create a one foot bearing shelf for the asphalt patch.
This specification changes a portion of APWA Standard Specification Section 33 08 00. All other provisions of the section remain in full force and effect.

PART 2 PRODUCTS

2.1 TESTING MATERIALS

A. Medium:
   1. Above 10 psi working pressure - Water
   2. Below 10 psi working pressure - Air or Water

PART 3 EXECUTION

3.2 ALIGNMENT AND GRADE TEST FOR GRADE SPECIFIC INSTALLATIONS.

3.3 PRESSURE TEST

   A. Air Test: Per manufactures recommendation - Gravity lines
   B. Hydrostatic Test - Pressure lines

3.6 PIPE TESTING SCHEDULE

   C. Sanitary Sewers
      4. Pressure Test for pressure pipeline and gravity pipeline systems

   E. Storm Drains
      4. Pressure Test for pressure pipeline and gravity pipeline systems
PART 1 GENERAL

1.3 PERFORMANCE REQUIREMENTS

A. Depth of Cover
   1. Due to Trench Safety requirements and the increased costs that go with trenches 5' and over for shoring, sloping, or shielding, the City requires a standardized trench depth of 4'6" for culinary water main lines.
   2. All culinary piping must have a minimum of 3 ft (36") of cover. (This also applies to service lines.) Actual design cover is required, unless approved on a case by case basis by the Engineer due to competing utilities found in the field.
   3. No piping should have more than 66 inches of cover unless approved by the Engineer, on a case by case basis. In approved cases, recommendations for how grade adjustment and return to design grade, will be accomplished, must be approved by the Engineer before proceeding.
   4. The construction drawings should represent the best information available as to the location and size of the existing lines. The location, depth, and size of the lines shall be verified prior to making the connection. The City must approve any change from the details shown on the drawing prior to installation.

1.4 SUBMITTALS

C. Record Documents: Submit documents, See Section 01 78 39 Include details of underground structures, connections, thrust blocks and anchors. Show interface and spatial relationship between piping and adjacent structures. Make certain that GPS shots have been taken before backfilling.

1.5 SITE CONDITIONS

E. Notification. The City and all affected water users must be notified at least 24 hours in advance of water shut-off. Door flyers (hangers) shall be left with all affected water users who are not at home. Water shall not be turned off before 9:00 a.m. or after 4:00 p.m. in residential areas. Affected businesses shall be contacted and the timing of being without service will be coordinated to minimize the impact upon their normal business functions.

F. Maintain Clean Pipe During Installation. The pipe shall be installed in accordance with the best current practices. All openings in the pipelines shall be closed with water-tight or rodent-proof plugs when pipe installation has stopped at the close of the day's work or when work has stopped for other reasons, such as
breaks or meal periods. If water accumulates in the trench, water-proof plugs shall remain in place until the trench is dry.

PART 2 PRODUCTS

2.6 TAPPING SADDLES (For taps 3/4 to 2")

A. Provide appropriate saddle for type of pipe to be tapped.
B. Provide saddles with designed corrosion protection that is in accordance with the soils surrounding the installation.
C. All Tapping Saddles to have iron pipe threads to receive a MIP threaded corporation stop. No CC threaded saddles or corps allowed!
D. All saddles to be designed to withstand the forces exerted during the tapping process and to the design pressure of the piping it is being attached to.

2.7 SERVICE CONNECTION

A. Corporation Stop to be of brass or bronze material with a Male Iron Pipe threaded end to be connected at the main by use of a Direct Tap or a Tapping Saddle, other end to be either compression or flare type fitting to connect service line to water main.
B. Service line to be of Type K Copper for the majority of 3/4" and 1" water services in Orem. Highly corrosive soil areas have been identified and an exception to use polyethylene tubing may be required. SEE MAP (If there is any question about your job being in one of these areas please contact the Water Section at Public Works.) Inserts must be used in poly tubing.
C. 1 ½" and 2" service lines to be of polyethylene tubing.
D. Inserts must be used in poly tubing
E. Whether Copper or poly tubing is used; one continuous section is required with no connections from the corporation stop to the meter assembly

PART 3 EXECUTION

3.2 PREPARATION

D. Clearly identify and promptly set aside defective or damaged pipe.
   1. Pipe Condition. All pipe shall be carefully inspected by the Contractor prior to installation. Any defective pipe shall not be used.
   2. Care and Handling of Pipe. Special care shall be taken to prevent damage to pipe and protective coatings. Proper equipment, tools and facilities shall be provided and used for safe and controlled construction procedures. Pipe placed in trenches shall be lowered in place by means of ropes, booms or any type of power equipment sufficient to handle each piece separately. In no case shall pipe be allowed to fall freely. Pipe may not be allowed to lie in the flow line of the curb and gutter.
   3. Pipe Cleanliness. All foreign matter or dirt shall be removed from the inside of the pipe before it is placed and it shall be kept clean during and after installation. Should the pipe become dirty, contaminated or flooded with trench water, it shall be cleaned in
accordance with methods specified in the latest edition of ANSI/AWWA C651 prior to disinfection.

3.3 LOCATING POTABLE WATER PIPE
A. Comply with Utah Drinking Water Act. As a minimum, locate potable water pipe at least 18 inches vertical and 10 feet horizontal edge to edge between water and sewer lines. Place water lines above sewer line.
   1. Where potable water piping crosses under sewer mainlines or over mainlines without at least 18" of clearance the following applies:
      a. The new utility that is invading the “Safe Zone” shall be in a protective casing of one full stick of Ductile Iron class 350 pipe that is centered at the existing utility crossing and sealed at each end to keep out (or in) any contaminants from a resulting breach of the sewage piping.
      b. Care shall be taken to minimize the disturbance around the existing utility. If the existing utility is damaged in the installation process it shall be repaired in such a manner that no repair joints will be in the trench line of the new line being laid.
      c. Inspection of crossing, casing, repairs etc. shall be done by a representative of the City Engineer. Any further precautions and or requirements deemed advisable or necessary by the Engineer shall be fully complied with. This may include but not limited to: replacement of existing utility piping for up to 10 ft on either side of crossing, installing a casing over the existing utility, or encasing the existing utility in concrete for a specified distance.

B. There shall be a 3 ft minimum horizontal clearance maintained between water lines and any paralleling utility.
C. Do not put potable water lines in the same Trench with sewer lines, storm drains, electric wire, electric conduit, fiber conduit, or gas.
D. Any water line 2" or larger shall not be installed under or within 20 ft of any structure.

3.4 INSTALLATION –PIPE AND FITTINGS
H. Disregard

3.5 INSTALLATION-CONCRETE THRUST BLOCKS
A. If hydrostatic tests are performed before concrete thrust blocks have cured, alternative temporary thrust restraints must be installed along with restraining glands (mega-lug type) at all potentially affected fittings. This also applies to final connections where System pressure will be energized against fittings before concrete thrust has had a chance to cure. See Chart in drawings.
B. Provide thrust blocks on all plugs, caps, tees, hydrants, tapping tees, and vertical or horizontal bends.
F. See chart in Standard Drawings for Thrust Block sizing

3.6 INSTALLATION-VALVES AND VALVE BOXES
B. Valve Boxes
4. Cast Iron Valve Box. The diameter of the valve box shall not be less than 5". The length of the valve box shall be such that it will permit adjustment from the depth of the valve operator nut to finished grade. In cases where the top of the valve nut is deeper than 5' below finished grade, an extension shall be used to bring access to within 4' of finished Grade. The extension shall be approved by the Engineer before it is installed.

3.7 INSTALLATION - TAPS

E. Service line taps to be made by Water Section personnel if tapping into a mainline already in service. All taps, of any size may be made by authorized “commercial tappers”. Excavation Contractors are responsible for taps made to new water mains that they have recently installed. ONLY CITY WATER EMPLOYEES OR “COMMERCIAL TAPPERS” UNDER DIRECTION OF THE WATER SECTION ARE ALLOWED TO TAP EXISTING WATER MAINS.

3.8 INSTALLATION - SERVICE LINES

A. Replacing Existing Water Service Line / Installing New Service Lines
   1. Replace Galvanized services with Copper Type K copper, Section 33 05 03, or Polyethylene Pipe, Section 33 05 06, as required based upon the corrosiveness of soil and geographic location in the Orem city limits.
   2. Soldered joints are not allowed.
   3. Verify depth of new installation, 42" of cover in roadway is required.
   4. Tracer wire is required where new trench is dug. In the case of pulling a service line, Type K Copper is required without tracer wire on the service.
   5. Sand bedding is required on all copper and poly service lines.
   6. Coordinate with PROJECT MANAGER for GPS data collection and inspection prior to backfilling TRENCH.
   7. Maximum service line length in a planned residential development is 30 ft. Maximum service line length in public streets shall be 40 ft.
   8. See Standard Drawings

B. Service Line Repair / Relocation
   1. Replace galvanized services with Type K Copper, Section 33 05 03, or Polyethylene Pipe, Section 33 05 06 as stated above.
   2. Match existing tubing size and type if replacing a piece of the original service for the repair or moving a portion of the service for installation of competing utilities.
   3. Use approved compression type or flare type couplings. Soldered joints are not allowed.
   4. Maintain appropriate depth.
   5. Provide Sand bedding on all excavated tubing.
   6. Coordinate with PROJECT MANAGER for GPS data collection and inspection prior to backfilling TRENCH.
   7. See Standard Drawings for details

C. Meter Box
   1. Install meter boxes behind curb in planter/ landscaped area if possible. Install behind side walk in landscaped area if curb- gutter- sidewalk are contiguous.
   2. Keep meters as close to mainline as is practical. Meters must be at least 10 ft from building. Meters or the lines feeding them are not allowed under
covered parking or any other structure. Meters are not allowed in Sidewalks, driveways, roadways or parking lots unless no alternative exists as per the Engineer. Any exception to the above will require mitigating actions to protect the meter and the public. (Traffic rated lids, concrete manholes for meter box, etc.)

3. Meter lids must be set to final grade. Plumbing inside of meter box must be 16 to 20 inches below meter lid.

4. Using Manifold System for Service Line and Meter Installation. Water meter manifold systems shall be used when installing multiple meters for residential and non-residential buildings as required in Article 21-1 of the Orem City Code (Water Services). Refer to Standard drawings.
   a. When using 2", 4", 6" or 8" water mains to supply meter manifold, please refer to 6.13.1.2 Chart A and 6.13.1.3 Chart B to calculate the number of service lines that can be tapped to the main line.
   b. Chart A. The number of services that can be tapped to a main line are shown in the following chart. These figures are based on the circular area (diameter) of pipe only. Formula: \(D^2 \times 0.785 = \) circular area/feet. Friction losses are not calculated in to determine the amount of services that can be used. Please refer to the following chart.

Example: You can tap seven 3/4" services to a 2" main line.

<table>
<thead>
<tr>
<th>Size of Main Line</th>
<th>3/4&quot;</th>
<th>1&quot;</th>
<th>1 1/2&quot;</th>
<th>2&quot;</th>
<th>3&quot;</th>
<th>4&quot;</th>
<th>6&quot;</th>
<th>8&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>7</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4&quot;</td>
<td>29</td>
<td>17</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6&quot;</td>
<td>65</td>
<td>39</td>
<td>15</td>
<td>8</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8&quot;</td>
<td>116</td>
<td>70</td>
<td>26</td>
<td>15</td>
<td>7</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>&gt; 8&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Requires Special Review and Approval by the City

Note: To determine a combination for various sizes of services that can be used for a particular main line size refer to Chart B shown on the next page.

c. Chart B. To use this chart calculate the total circular area of service lines to be used and compare that figure to the total circular area of the main line supplying the services.

Example: If you would like to tap four 3/4" services and two 1" services to a 2" main line calculate it as follows. Multiply \(.003 \times 4 = .012\), then multiply \(.005 \times 2 = .01\), add \(.012 + .01 = .022\) this would be the total circular area of the services. The total circular area of the 2" main line is \(.023\) so this combination of services would not exceed that of the main line. Any combination of services and service sizes will need to be calculated accordingly.
<table>
<thead>
<tr>
<th>Size of Pipe</th>
<th>Circular Area of Pipe Opening (D^2 x 0.785)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4&quot;</td>
<td>.003</td>
</tr>
<tr>
<td>1&quot;</td>
<td>.005</td>
</tr>
<tr>
<td>1 1/2&quot;</td>
<td>.013</td>
</tr>
<tr>
<td>2&quot;</td>
<td>.023</td>
</tr>
<tr>
<td>3&quot;</td>
<td>.049</td>
</tr>
<tr>
<td>4&quot;</td>
<td>.087</td>
</tr>
<tr>
<td>6&quot;</td>
<td>.196</td>
</tr>
<tr>
<td>8&quot;</td>
<td>.35</td>
</tr>
<tr>
<td>&gt; 8&quot;</td>
<td>Requires Special City Review and Approval</td>
</tr>
</tbody>
</table>
This specification changes a portion of APWA Standard Specification Section 33 12 16. All other provisions of the section remain in full force and effect.

PART 2 PRODUCTS

2.1 VALVES – GENERAL
   A. Underground
      2. Three inches (3) and larger: Flanged or Mechanical Joint ends as specified. Non-rising stem - stainless steel where deemed high corrosive soils. Two inch square operating nut. Stainless steel body bolts. AWWA C111
   B. Submerged or Above Sewage or Water
      1. Valve body bolts to be Stainless Steel

2.3 BUTTERFLY VALVES
   A. GENERAL
      1. Non-tapping valves 10” or larger shall be butterfly valves. The butterfly valves shall conform to the specification C504 of the American Water Works Association and shall have heavy duty cast iron body. The bearing shall be the nylon non-lubricating type. The valve shall have a leak-tight closure at 150 psi. The valve shall be for buried service with a sealed gear operator.
This specification changes a portion of APWA Standard Specification Section 33 12 19. All other provisions of the section remain in full force and effect.

PART 2  PRODUCTS

2.1  DRY BARREL HYDRANTS
   A. To be Waterous, Kennedy, Mueller, or pre-approved hydrant manufacturer meeting the following specifications:
      11. To be repairable without requiring excavation.
      12. Able to be raised without excavation
      13. Auxiliary valves to be located at mainline tee or 25 ft from hydrant in “end of line” installations.

PART 3  EXECUTION

3.2  INSTALLATION
   A. …As per International Fire Code, a 3 ft radial clear area is required around a HYDRANT. This includes fences, walls, mailboxes, vegetation, or any above ground obstacle that would hinder the operation or maintenance of the HYDRANT. See Standard Drawing

3.4  PAINT
   C. Paint color shall be red.
SECTION 33 12 33
WATER METER

This specification changes a portion of APWA Standard Specification Section 33 12 33. All other provisions of the section remain in full force and effect.

PART 2 PRODUCTS

2.0 WATER METER SIZING
   A. To be done by city staff, based upon fixture count.
   B. If Irrigation use only, to be determined by owners architect or engineer.
   C. Service line to be sized according to meter. Service line may need to be upgraded if a larger meter is required than the service line size that was stubbed in.
   D. Service line cannot be greater than 1 pipe size larger than the actual meter from the mainline to the meter.

2.1 METER
   A. Meter will be supplied by the CITY

PART 3 EXECUTION

3.1 INSTALLATION
   A. Installation of WATER METER valving and piping (meter setter) and the WATER METER box or vault is the responsibility of the property owner.
   B. Meter Setters. Meter setters shall be Ford or Mueller or an approved equivalent with state approved Dual Check valves. Dual check valves must conform to ASSE standard 1024 and be "in-line" serviceable.
      No setters having a meter bypass shall be allowed
   C. Meter Can. In driveway areas, meter cans and lids will require traffic rated lids and special City approval. Electrical grounding shall not be permitted inside meter cans or on street side of services. Meter box/can shall be of white PVC and conform to the sizes listed below.
   D. Water Meter Lids. Water meter lids shall be cast iron raised meter lid with approved lock down nut.
   E. Final Grade. The top of water meter lid final grade shall be within
      1/4" of final sidewalk grade or within 1" when located in surrounding sloped grade of grass and landscaped areas.
   F. Riser Materials. Riser materials shall be of approved pre-cast concrete riser materials.
   G. Service line piping from the Water Main to the Meter must be Type K copper. (Poly tubing if in corrosive soils area.) All service line piping on the customer’s side of the meter shall conform to International Plumbing Code.
   H. Thermal Expansion Tank and Intermittent T&P Valve. “Dual Check” valves are required on all water service lines to new buildings to prevent water from back-flowing into the City’s water lines. This creates a closed water system. Current plumbing codes call for the installation of expansion tanks and/or
intermittent relief valves to be installed on "closed" systems, please refer to the most current International Plumbing Code.

I. Stop and Waste sprinkler valves and tees must be placed at least 2ft from the meter box. Sufficient gravel drain rock shall be installed at stop and waste valve to contain all of the drain water.

J. METER BOX SIZING
1. 3/4” meter 20” diameter
2. 1” meter 20” diameter
3. 1 ½” and 2” meters 30” diameter
4. 3/4 or 1”(two in a can) 30” diameter
5. 3” and larger meters require vaults - Contact Water Section Personnel for dimensions.
SECTION 33 13 00
DISINFECTION

This specification changes a portion of APWA Standard Specification Section 33 13 00. All other provisions of the section remain in full force and effect.

PART 1 GENERAL

1.7 REGULATORY REQUIREMENTS
   B. Orem wants to insure and maintain the highest quality water service possible. All new water lines need to be disinfected so as not to jeopardize the integrity of the existing water system. Because of the diversity and complexity of each installation, a disinfection plan shall be required. The Contractor shall propose and coordinate the development of a disinfection plan with the City’s Project Manager that will conform to the latest edition of AWWA C651. The fees and costs of re-tested failed sections of pipe shall be the responsibility of the Contractor.

PART 3 EXECUTION

3.2 DISINFECTION OF WATER LINES
   A. Before pressure testing, fill waterline with water and chlorine to obtain a 50 ppm initial dosage. Let chlorinated water set in line for 16 to 24 hours. Make sure air has been expelled from line.
   B. Obtain a Free Chlorine sample of at least 25 ppm for 16 hours or 10 ppm for 24 hours, repeat chlorination process until this requirement has been met. Flush chlorinated water out of pipe until a residual of less than 1 ppm is obtained. Make sure measures are taken to mitigate any environmental issues.
   C. Perform pressure test as per Section 33 08 00. Upon passing the pressure test, flush at 2.5 ft per second until chlorine residual tests are at Water System residual for that location.
   D. Work with Water Section personnel to collect the first Bacteriological Tests from predetermined points in the new line. Repeat the above steps until a sample has passed.
   E. Work with Water Section personnel to collect the second Sample set.
   F. Upon passing two consecutive samples the new line can be connected to the culinary system.
   G. Quick kill Disinfection
      1. All water pipes shall be clean prior to disinfection. If in the opinion of the City, contamination is such that it cannot be removed by flushing, a preliminary measure of cleaning by mechanical means and then swabbing with 1% hypochlorite disinfecting solution (i.e. Quick Kill Method) shall be required prior to standard disinfection.
   H. Refer to AWWA C651

3.5 FIELD QUALITY CONTROL
A. All piping and fittings not covered by the above stated disinfection and testing processes shall be disinfected with a 1% chlorine solution, prior to being connected into the Water System. This applies to all connections after testing has been completed and all spot repairs made to active sections of the Water System.
SECTION 33 31 00
SANITARY SEWERAGE SYSTEMS

This specification changes a portion of APWA Standard Specification Section 33 31 00. All other provisions of the section remain in full force and effect.

2.1 PIPING AND FITTINGS
D. Saddles shall be one of the following: Backman Transit sewer saddles, Insert-a-T compression fitting, or B101 models.
   1. In areas where the City has determined that water is a problem, the B101 saddle with bowl wax shall be used and strapped to the pipe.

3.2 INSTALLATION – PIPE AND FITTINGS
F. Type of pipe allowed to have ¼” per foot grade for sewer lateral connections
   1. Concrete, see section 33 05 02
   2. Ductile Iron, see section 33 05 05
   3. Acrylonitrile-Butadiene-Styrene (ABS), see section 33 05 01
   4. Polyvinyl Chloride (PVC) SDR 35, see section 33 05 07
   5. Vitrified Clay, see section 33 05 10
G. Type of pipe allowed to have 1/8” per foot grade for sewer lateral connections
   1. Ductile Iron, see section 33 05 05
   2. ABS, cut into 10’ lengths and glued together with coupling, see Section 33 05 01
   3. PVC, 6” diameter and larger
H. Cast Iron or ABS wyes required for clean out.
   1. Clean out to be located behind walk, back of curb, or within 2’ of the property line, whichever is closest to the street right-of-way.
   2. A second cleanout will be installed a maximum distance of 5’ from the foundation wall.
   3. Fernco or Calder coupling may be used to connect PVC pipe to the cast iron wye or to other dissimilar type and sizes of pipe.
   4. Max distance between cleanouts is 75’
   5. Clean out required at any bend or combination of bends in excess of 45°.
   6. Clean out standpipe can be cast iron or ABS with cast iron or brass cap.
I. The sewer line(s) shall be located a minimum of 3’6” deep at the property line.

3.5 TAP CONNECTIONS – 6 INCHES AND SMALLER
E. Lateral connections are not allowed to public sewer manholes. If the sewer system is considered private, then lateral connections to the manhole are allowed.

3.6 TAP CONNECTIONS – LARGER THAN 6 INCHES
SECTION 33 41 00

STORM DRAINAGE SYSTEMS

This specification changes a portion of APWA Standard Specification Section 33 41 00. All other provisions of the section remain in full force and effect.

2.1 PIPING AND FITTINGS
A. Provide piping materials and factory fabricated piping products of sizes, types and classes indicated.
   1. Pipe used for Storm Drain or Irrigation transmission lines and having a diameter of 15" or larger shall be reinforced concrete pipe meeting requirements of ASTM C76.

2.5 CLEANOUTS AND MANHOLES
G. All storm drain manhole covers shall be a standard 24-3/4" size and labeled “Storm Drain.” Manhole covers not conforming to the standard size and markings shall be converted to the standard size and marking, (i.e. 24" or 25" lids must be converted to 24-3/4") as part of the work.

2.9 SUMPS AND PRETREATMENT MANHOLES
A. Sump: 5’ diameter precast concrete or 12 gauge galvanized metal
   1. Precast concrete to meet ASTM C 478 precast requirements. See also section 03 40 00.
   2. See City of Orem Standard Drawing SD-4 for details.
B. Pretreatment Manhole: 4’ diameter precast concrete manhole
   1. Precast concrete to meet ASTM C 478 precast requirements. See also section 03 40 00.
   2. See City of Orem Standard Drawing SD-4 for details.

3.3 INSTALLATION – CLEANOUTS, MANHOLES, SUMPS AND PRETREATMENT MANHOLES
E. (Section applies, except disregard concrete collar. Asphalt collar preferred)
F. Sumps are not allowed in soil sensitive areas having poor percolation as shown on City of Orem Standard Drawing SD-1.
G. Sumps are not allowed within the 3 year delineation (travel) zone of culinary wells. The 3 year delineation zone for drinking water source protection has been established by professional studies and has been approved by the Drinking Water Division of the Utah Department of Environmental Quality. The City of Orem has the responsibility to update and maintain the delineation zone maps. Refer to City of Orem Standard Drawing SD-2, Well Head Protection.
H. Sumps shall be constructed in conformance with the City of Orem Standard Drawing SD-4.
   1. They shall be staked in the field and indicated on the approved plans.
   2. In the area surrounding sumps, the original material shall be removed and the entire backfill done with imported drain rock.
3. Slag shall not be used as drain rock.
4. After backfilling is completed, the entire excavation shall be thoroughly flooded to insure that settlement is complete.
5. Grates shall be set in place and adjusted for final elevation and alignment.
6. The City of Orem may require a fabric barrier between drain rock and road base (or other material) when there is the possibility of silt and aggregate fines moving into the void space of the drain rock.

I. Pretreatment Manholes shall be constructed in conformance with the City of Orem Standard Drawing SD-4.
SECTION 33 47 00
PONDS

This specification changes a portion of APWA Standard Specification Section 33 47 00. All other provisions of the section remain in full force and effect.

Section 33 47 00
Page 719

3.1 CONSTRUCTION

F. Pond embankments shall have a slope no greater than 33% (3' horizontal to 1' vertical), unless otherwise approved in writing by the City Engineer.
G. Pond bottoms shall have a minimum slope of 2%.
H. Pond embankments that are to be established with turf grass shall have a slope no greater than 25% (4' horizontal to 1' vertical).