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SECTION 321

ASPHALT CONCRETE PAVEMENT

321.8 PLACEMENT is changed to add:

321.8.11 Preservative Seal An asphalt emulsion surface sealer per Section 718.3 shall be required on streets other than arterials and shall be applied immediately prior to the end of the construction warranty period.

***SECTION 336**

PAVEMENT MATCHING AND SURFACING REPLACEMENT

336.1 DESCRIPTION: is changed to read:

Asphalt concrete pavement replacement shall be constructed in accordance with "T-Top" Trench Repair per Detail 200, as indicated on the plans, and as required by Sections 321 and 710.

Asphalt concrete shall be EVAC mix.

Permanent pavement replacement shall include crack and joint sealing per Detail 200 unless otherwise directed by Street Superintendent.

This item shall include the installation of pavement marking and reflective pavement markers to restore the surface to the condition prior to construction.

336.5 PAYMENT: is changed to add:

There will be no additional payment for the installation of pavement marking and reflective pavement markers.

***SECTION 340**

***CONCRETE CURB, GUTTER, SIDEWALK, SIDEWALK RAMPS, DRIVEWAY, AND ALLEY ENTRANCE**

340.2.1 Detectable Warnings is changed to add:

Refer to the *List of Approved Products* for approved detectable warning systems.

340.3 CONSTRUCTION METHODS is changed:

~~The last sentence of the second paragraph of this section shall read (applies to expansive soils only):~~

~~The subgrade shall then be compacted to relative density of 80% minimum to 90% maximum at a moisture content within 3% of optimum.~~

***SECTION 345**

ADJUSTING FRAMES, COVERS AND VALVE BOXES

345.5 ADJUSTING MANHOLE AND VALVE COVERS WITH ADJUSTING RINGS first paragraph is changed to read:

Adjusting rings may be used to raise manhole frames and covers in asphalt pavements. The amount of adjustment, thickness of seal or overlay, and cross slope will be considered when using adjusting rings. Each location where an adjusting ring is used must have a sufficient depth of asphalt to assure the proper installation and operation of the ring. For manholes serving public sewer mains 15-inch diameter and larger, rings shall be made of a composite material per City's List of Approved Products and installed per the manufacturer's specifications. "One-off" manholes (first manhole up-stream of 15-inch diameter and larger sewer mains) shall also use composite rings. Manholes serving sewer mains smaller than 15-inch diameter may use concrete, or composite rings installed per the manufacturer's specifications.

***SECTION 355**

UTILITY POTHoles-KEYHOLE METHOD

355.3 BACKFILL AND COMPACTION: is changed to read:

The Contractor shall use ½-sack CLSM as backfill in accordance with Section 728.

SECTION 360

TELECOMMUNICATIONS INSTALLATION

360.3 CABLE INSTALLATION:

(A) Trunk Lines (2), second sentence is changed to read:

The cable shall be placed within a steel casing at a minimum depth of 48 inches.

(B) Telecommunications cables other than "trunk lines" depth of placement is changed according to the following schedule:

<u>Location</u>	<u>Depth of Placement</u>
Arterial Street	48 Inches
Collector Street or Industrial Area	36 Inches
All Others	36 Inches

SECTION 401

TRAFFIC CONTROL

401.4 TRAFFIC CONTROL MEASURES is changed to add:

At areas where striping obliteration has occurred, the roadway surface shall be sealed with a slurry seal product approved by the City. Refer to the *List of Approved Products*. The product shall be thoroughly mixed with #30 mesh sand conforming to Section 701 at a rate of two pounds per gallon prior to application. Application shall be made on the area of striping obliteration by means of a squeegee.

Striping obliteration by grinding is not permitted.

SECTION 450

GUIDED BORE CONSTRUCTION

450.1 DESCRIPTION:

This work shall consist of installing a conduit by guided bore.

450.2 CONSTRUCTION:

Prior to construction, the contractor shall submit for approval a location plan and profile of the work in accordance with COC Detail C-112.

Only approved slurry boring methods shall be allowed. Water jetting shall not be substituted for slurry boring. All pneumatic boring shall be at a minimum depth of 36 inches below pavement surface.

Uncased guided bore holes shall be at a depth below finish grade no less than four times the diameter of the hole. Uncased guided bore holes shall be limited to a maximum of 12 inches. Bore holes in excess of 12 inches in diameter shall be cased, unless otherwise approved by the Engineer. Contractor shall stipulate the size of bore on the permit application.

Over drilling or final reaming of uncased guided bores should be limited to no more than one inch over the maximum cross section of the conduit bank, casing, or pipe. Annular spaces exceeding this requirement shall be pressure grouted.

Guided bore methods shall minimize over-reaming or over-drilling of holes. Fluids shall not cause scour of the bore hole beyond the previously noted tolerance. Controlled fluid boring is preferred and should utilize fluids to remove cuttings, stabilize and lubricate bore holes, soften soils for advancing bores, provide directional control of guided bores, and for cooling of drilling equipment. Uncontrolled jetting, where the primary purpose is to use fluid pressure to erode soil for creation of the final bore hole diameter, is prohibited. Methods which vary from these requirements shall require demonstration and shall have a history of successful use prior to acceptance. Any method utilized shall not disturb the soils outside the final bore hole diameter.

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Unless site specific soil information is available indicating otherwise, caving of soils around bore holes should be assumed. Pipe, case, or conduit banks should be advanced during final reaming.

Guided bores through unstable granular soils and granular utility backfill should be stabilized with a pressurized bentonite slurry drilling fluid having a consistency of at least one pound of bentonite to five gallons of water, or an approved equal. The flow rate and applied pressure shall be monitored. A sudden loss of pressure indicates that slurry may be intruding excessively into the backfill. Cased bores may be used in lieu of stabilization.

Equipment operators shall observe the bore hole and monitor cuttings for excessive soil removal. When evidence of excessive voids are found, bore holes shall be pressure grouted after placement of pipe, casing, or conduit banks.

SECTION 601

TRENCH EXCAVATION, BACKFILLING, AND COMPACTION

601.2.9 Shoring and Sheathing: is changed to add:

When vertical side walls are to be excavated and trench boxes are not used, the contractor shall do such trench bracing, sheathing, or shoring necessary to perform and protect the excavation as required for safety and conformance to governing laws. Shoring, sheeting, or other protective procedures reviewed by the Engineer or his designee for conformance to standards shall be required when the trench depth exceeds five feet. The contractor shall provide a shoring and bracing plan designed by his engineer for review for adherence to OSHA requirements. Spacing of shoring braces shall not exceed ten feet center to center.

601.2.10 Open Trench: the third paragraph is changed to add:

Steel plates shall be installed in accordance with Detail 211. Where the steel plates are restrained by temporary asphalt, they may be required to be spot-welded together for any period of time that the contractor is not present to adjust for their longitudinal movement due to traffic.

601.4.5: Final Backfill: the third paragraph is changed to read:

Backfill under street pavement shall be half-sack CLSM per Section 728 and be constructed per Detail 200, "T-Top" pavement replacement unless otherwise stated on the construction plans or special provisions. Pavement matching and surface replacement shall be in accordance with Section 336.

***SECTION 608**

***HORIZONTAL DIRECTIONAL DRILLING**

608.4.4 Bore Plan/Profile: is changed to add:

As reflected in the modified version of Table 608-2 below, the City of Chandler requires a Bore Plan/Profile to be submitted for all classifications of bore sizes in accordance with the City of Chandler Utility Permit Manual UDM-148. Regardless of the length of a bore the City of Chandler considers any installation of a 12" or greater pipe to be a Large bore classification.

TABLE 608-2			
SUBMITTAL REQUIREMENTS			
Required Record Document	Bore Size Classification		
	Small	Medium	Large
<u>1. Agency Approved Plans</u>	•	•	•
<u>2. Personnel Qualifications</u>	•	•	•
<u>3. Surface Survey</u>	-	•	•
<u>4. Bore Plan/Profile</u>	•	•	•
<u>5. Drilling Fluid Management Plan</u>	-	•	•
<u>6. Equipment & Site Setup</u>	-	-	•
<u>7. Drilling Fluid Pressure Calculations</u>	-	-	•
<u>8. Pipe Stress and Pullback Calculations</u>	-	-	•
<u>9. Bore Data</u>	•	•	•
<u>10. As-built</u>	•	•	•

As reflected in the modified version of Table 608-3 below, the City of Chandler requires 2 feet of vertical separation from the outside diameter of any proposed facility (or the outside of the largest reamer used to install the facility) to the outside of any existing utility, in accordance with City of Chandler Engineered Utility Bore Detail C-112. A concrete encasement around a utility qualifies as the outside of that utility.

TABLE 608-3	
MINIMUM SEPARATION FROM EXISTING UNDERGROUND UTILITIES	
Minimum Separation	Type of Underground Utility
<u>2 foot vertical</u>	<u>Outside of bore to outside of existing utility</u>
<u>6 foot horizontal</u>	<u>Running line to outside of wet utility</u>

~~The City requires a Bore Plan/Profile to be submitted per the City of Chandler Utility Permit Manual, UDM-148, Exhibit D – Plan review Checklist and EXHIBIT I – Directional and Hog Drilling – Bore and the Directional Drilling Checklist.~~

***SECTION 610**

WATERLINE CONSTRUCTION

610.3 MATERIALS: is changed to read:

Pipe shall be ductile iron pipe in accordance with Section 750 or polyvinyl chloride (PVC) in accordance with COC Supplement Section 751 - PVC Pressure Pipe.

610.4 CONSTRUCTION METHODS: is changed to add:

All pipe shall be bedded in accordance with COC Detail C-308 and installed in accordance with the latest revision of AWWA C600.

Polyvinyl Chloride pipe shall be installed in accordance with the AWWA Manual 23.

For all pipe materials, locator wire and marking tape shall be installed in accordance with COC Detail C-408.

City water valves shall only be operated by City staff. The City requires a minimum 48-hour notice for water system shutdowns. The Contractor is required to notify affected customers a minimum of 24-hours prior to shutdowns. Businesses may require after hours shutdowns. Shutdown of City system valves does not guarantee stoppage of continuous flow of water. The Contractor shall be responsible for dewatering and isolating the system; have all necessary equipment, materials, & personnel to perform the work; maybe required to utilize a pump to address any flows in the system; and is responsible to install 2-inch taps to relieve pressure in the system. Line stops are only permitted when flows after shutdown cannot be controlled with a pump. Shutdowns may require the use of valves outside the project limits.

A Maintenance of Plant Operations Plan (MOPO) may be required for review and approval by the City. The MOPO is required to be submitted to the City at the project preconstruction meeting. A MOPO requires sufficient detail on the required sequencing to ensure the continuous operation of the existing water system and numerous services that are fed by the system in the project limits. These include individual water services, fire hydrants, pipeline feeds, and fire department connections. The plan is required to include an exhibit identifying the system

SECTION 610

valves needed for isolation of water flows. This may include valves outside the project limits.

The MOPO shall at a minimum include plan sheets and written descriptions addressing the following:

- The timing and method for each waterline tie-in (sequencing and staging);
- The Contractor shall research and account for all City Geographic Information System, as-builts, and pothole information related to the water system in the project area;
- Existing and proposed valve locations;
- The method of keeping existing line functioning prior to connecting water services, fire hydrants, pipeline feeds, and fire department connections to the new waterline. This may include temporary tie-ins, temporary valving, and temporary thrust restraints. Line stops are only permitted when 100% shutdown cannot occur within the project limits;
- The detailed schedule for overall installation of the waterline and abandonment of existing waterline. The schedule shall align with the overall project schedule and sequencing plan;
- The timing and method of removal of temporary improvements necessary for providing continuous water service such as temporary tie-ins, temporary valving, and temporary thrust restraint;
- For projects with Federal funding, Buy America (Public Law 112-141, MAP 21; 23 USC 313; and 23 CFR 635.410) applies to all materials used in the project. The Contractor shall anticipate and accommodate additional lead times in the project schedule due to Buy America requirements.

610.7 VALVES: is changed to read:

All gate valves shall conform to the latest revisions of AWWA C509 or C515 standards.

Gate valves for buried service shall be the non-rising stem (NRS) type.

Direction of opening shall be counterclockwise (Open Left).

SECTION 610

The body and bonnet of the valves shall be constructed of ductile-iron per ASTM A536.

The marking "D.I." or "Ductile Iron" shall be cast in raised letters on the valve.

Valve body, bonnet, and stuffing box shall be coated and lined with fusion-bonded epoxy conforming to the AWWA C550 standard.

Valve stem diameters and minimum turns to open shall conform to Table 7 in AWWA C509-09 and AWWA C515-09.

The NRS-type valve stems shall be made of bronze or stainless steels. Bronze stems shall use copper alloys that contain less than 6% zinc and 6% aluminum. Stainless steel stems shall contain not less than 15% chromium and be from the 300 or 400 alloy series.

NRS stems must have a thrust collar that is integral with the stem in accordance with section 4.4.5.3 of AWWA C515-09. Thrust collars that are non-integral with the stem are not acceptable.

Valve wedge must be completely encapsulated with EPDM rubber, symmetrical in design, and seat equally well with flow in either direction.

Gate valves four inches and larger shall be equipped with male-type wedge guides and polymer guide covers. Wedges employing female-type designs are not acceptable.

All gaskets shall be pressure-energized type such as O-rings.

The top two stem O-rings must be replaceable while fully open and while subject to full rated working pressure. O-rings set in cartridges are not allowed.

Valves shall be equipped with stainless steel bolting that meets the requirements of ASTM F593 Standard Specifications for Stainless Steel bolts, Type 304, Alloy group 1, CW condition, and ASTM F594 Standard Specification for Stainless Steel Nuts, Type 304, Alloy group 1, CW Condition.

SECTION 610

Bolt head and nuts shall be hexagonal shaped with dimensions conforming to ANSI B18.2.1. Metric sized and recessed socket head bolts, are not allowed.

Operating nuts shall be 2 inches square.

Valves shall be NSF Certified to Standard 61.

All valves 2 inches to 48 inches:

Valves may be used in either the horizontal or vertical positions.

Valve gearing shall be in accordance with Table 9 of AWWA C515-09 or C509-09 Standard.

610.13 METER SERVICE CONNECTIONS: is changed to add:

(E) Service taps shall be installed using an all bronze double-strap tapping saddle or a tapped tee. Any tapping saddle for use on PVC pipe shall provide full support around the circumference of the pipe and a bearing area for 2 inches minimum along the axis of the pipe.

SECTION 616

RECLAIMED WATERLINE CONSTRUCTION

616.2 MATERIALS: is changed to read:

Valve boxes shall be in accordance with Section 345, this Section, Detail 391 and COC Detail C-406.

616.3 INSTALLATION: is changed to add:

Pipe will be bedded in accordance with COC Detail C-308 and identified in accordance with C-408.

SECTION 625

MANHOLE CONSTRUCTION AND DROP SEWER CONNECTIONS

625.2 MATERIALS is changed to add:

Composite manhole frame and cover per *City's List of Approved Products*.

Composite adjustment rings per *City's List of Approved Products*.

Corrosion-protective coating per *City's List of Approved Products*.

Pesticide coating per *City's List of Approved Products*.

625.3.1 Manholes is changed to add:

Manholes shall be 5-foot diameter with 30-inch frames and covers. Manholes serving public sewer mains 15-inch diameter and larger shall be installed with corrosion-protective materials per City's List of Approved Products. "One-off" manholes (first manhole up-stream of 15-inch diameter and larger sewer mains) shall also use corrosion-protective materials. For sewer mains less than 15-inch, manholes may be installed using standard concrete materials per Detail 420 with cast-in-place bases.

Corrosion protective manholes shall include composite frames and covers, composite adjustment rings, composite or polymer concrete cone and riser sections and cast-in-place bases. Refer to City's List of Approved Products. Corrosion-protective manholes shall be as specified on the plans and/or special provisions.

Manhole adjustment shall be constructed with a minimum of 12" and a maximum of 18" high adjusting rings per City Detail C-401.

Manholes serving public sewer lines 15-inch and smaller and not within arterial streets shall be coated with a latex insecticide coating applied in accordance with the manufacturer's recommendations. Refer to the City's List of Approved Products for allowable insecticide coating products. The coating shall be applied in accordance with US Environmental Protection Agency recommendations starting from the top of the manhole to a depth of 8 feet below. Minimum coating thickness shall be 0.25 mil.

SECTION 630

TAPPING SLEEVES, VALVES AND VALVE BOXES ON WATERLINES

630.2 GENERAL: is changed to add:

Potable water valve boxes shall conform to Detail 391, Type 'C', deep skirted lid type and COC Detail C-307.

Reclaimed water valve boxes shall conform to Detail 391, Type 'C', deep skirted lid type with a square surface box and COC Detail C-406.

630.3 GATE VALVES: is changed to add:

The connecting ends of valves may be flange, mechanical joint, push-on, or an appropriate combination. Valves which require transition gaskets to ductile iron pipe sizes may be furnished only in sizes 4 inches through 8 inches.

630.4.2 Tapping Sleeves Subsection (A) (2) (a) is changed:

Following the word Cast Iron, add

(Not allowed for use on PVC pipe).

SECTION 751

POLYVINYL CHLORIDE (PVC) PRESSURE PIPE

751.1 GENERAL:

These specifications apply to Polyvinyl Chloride (PVC) pressure pipe intended for use as potable, wastewater, and reclaimed water distribution pipelines, which carry water under pressure.

751.2 WORKMANSHIP:

Pipe shall be homogeneous throughout. It shall be free of voids, cracks, inclusions, or other defects. It shall be as uniform as commercially practical in color, density, and other physical properties. Pipe surfaces shall be free from nicks and scratches. Joining surfaces of spigots and other joints shall be free from gouges and imperfections that could cause leakage. The contractor shall supply the Engineer with certified third party test data establishing both the long-term compressive strength and the long-term modulus of elasticity of the PVC material.

751.3 MATERIAL:

4 inch through 12 inch PVC pressure pipe shall be designed, manufactured and tested in accordance with AWWA C900, latest edition. The barrel of furnished pipe shall conform to the outside dimensions of steel pipe (IPS) or cast-iron-pipe-equivalent (CI), and with the wall thickness of dimension-ratio (DR) Series 14. All approved PVC pipe shall carry a NSF rating.

The pressure rating for C900 pipe shall be 200 psi minimum.

16 inch and larger PVC pressure pipe shall be designed, manufactured, and tested in accordance with AWWA C905, latest edition. The barrel of furnished pipe shall have an iron-pipe-size-equivalent (IPS) outside diameter and wall thickness equal to the dimension-ratio (DR) Series 18.

The pressure rating for C905 pipe shall be 235 psi.

All PVC pipe furnished shall be integral bell with elastomeric gaskets. Plain ends with elastomeric gasket couplings will be allowed only for intermediate pipe

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lengths. PVC joints using elastomeric gaskets to achieve the pressure seal shall be tested as assembled joints and shall meet the laboratory performance requirements specified in ASTM D3139.

A Manufacturer's Affidavit for compliance to AWWA C900 and AWWA C905 shall be furnished. The manufacturer shall provide documentation of the long-term compressive strength of the pipe material, or the long-term hydrostatic design strength, which shall be certified by an independent third party.

All required manufacturing quality control inspection and testing shall be performed in the United States of America at the pipe manufacturer's plant or at an approved testing laboratory in the United States. The seal of the testing agency that verified the suitability of the pipe material for potable water service shall be marked on the pipe. In addition, markings on the pipe shall include the following:

Nominal size and OD base

Material code designation

Dimension ratio number

AWWA pressure class

AWWA designation number for this standard

Manufacturer's name or trademark and production record code.

Pipe shall be supplied within 270 days of its manufacture. A Manufacturer's written Verification of date of manufacture shall be provided.

751.4 APPLIED LOAD CALCULATIONS:

Assumption of soil arching shall not be used in calculation embankment loads over PVC pipe. The prism earth load formula shall be used to determine earth loads.

$$W_c = H_w B_c$$

Where:

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Wc = Embankment Load, lbs/ft

H = Depth of soil cover, ft

w = Soil Density, lbs/ft

Bc = Pipe outside diameter, ft

751.5 BEDDING:

Pipe bedding shall be in conformance with COC Detail C-308. Bedding shall consist of ABC in conformance to Section 702.

751.6 FITTINGS:

Fittings shall be ductile iron and conform to AWWA C110 or C153 for 250 psi minimum working pressure rating.

All fittings shall be cement lined in accordance with AWWA C104.

Fittings which require transition gaskets to ductile iron pipe sizes may be furnished only in sizes 6 inch through 8 inch.

PVC connections to asbestos cement or ductile iron pipe shall be ductile or gray iron adapters.

751.7 STORAGE:

Storage of PVC pipe shall be in accordance with the manufacturer's recommendation and guidelines. PVC pipe and fittings shall be stored in a dry, ventilated area that protects the pipe from UV radiation and the elements. Pipe stockpiled at the construction site shall not remain exposed to the elements and weather in excess of 24 hours, or as approved by the Engineer.

PVC pipe shall be delivered to the site and stored and handled in accordance with the manufacturer's instructions. During shipment and storage, the pipe ends shall be securely covered. PVC pipe shall be stored in a manner such that it is protected from exposure to sunlight and/or extreme heat.

751.8 THRUST BLOCKS:

Thrust blocks shall be installed per Section 610.14.