SECTION 91

SANITARY SEWER SYSTEM CONSTRUCTION

91-1 GENERAL – Sewer pipe and fittings shall be installed in accordance with the requirements of these Construction Standards and as recommended by the manufacturer. These Construction Standards and manufacturer's guidelines shall be present at the construction site at all times.

91-2 CONNECTION TO EXISTING FACILITIES – Connection to existing City sewer facilities may be made upon approval of the Environmental Utilities Department.

A. The Environmental Utilities Department has the option of making any system tap as required on the plans. Should the Environmental Utilities Department elect to perform the tap, the Contractor shall pay for such work on a time and materials reimbursement basis. The Contractor shall be responsible for the following task associated with the tap, and as determined by the Environmental Utilities Department:

1. Coordinating the work requested with the Sewer Division and the Environmental Utilities Department inspector. This shall include discussions on provisions for materials and equipment required to complete the work.

2. Providing traffic control per the City's Public Works Department requirements.

3. Excavating the work area, as agreed upon by the Environmental Utilities Department.

4. Providing sheeting, shoring, and bracing as required.

5. Providing lighting as required if the tap is to be performed at night.

6. Backfilling, compacting, and pavement restoration of the excavation(s) upon tap completion.

B. Existing Sewer Stubs – The contractor shall excavate and connect to an existing sewer stub in the presence of the Environmental Utilities Department inspector. Existing stubs shall be air tested by contractor and CCTV'd by Environmental Utilities before connecting. If an existing stub is found damaged, the contractor shall remove and replace prior to connecting. Contractor shall incur all expenses. A note to this effect shall be placed on the improvement plans.

C. Sewer System Outfalls – Sewer system outfalls shall be mechanically plugged and grouted. The plug shall remain in place until final acceptance by the Environmental Utilities Department.

91-3 CONSTRUCTION STAKING – The sewer main shall be staked prior to installation. Such staking shall provide the station and offset to the sewer main, as well as the cut to the nearest one-tenth foot (0.10'). Stakes shall be provided at a minimum of every 50 feet in tangent sections and every 25 feet in curved sections, and every 10 feet in approved vertical curve sections.

91-4 EARTHWORK – Earthwork required to construct sewer facilities and appurtenances shall be performed to the lines and grades shown on the approved project plans and as specified in the following:

A. Excavations – Pipeline excavations shall be open-cut trenches, unless otherwise specified on the approved improvement plans, with vertical sides to the pipe crown as specified on Construction Standard Detail SS-1. Excavations shall conform to all applicable Federal and State safety requirements. The contractor shall appoint a designated "competent person" during construction.

B. Trench Width – The trench bottom width to 6 inches above top of pipe shall comply with Construction Standard Detail SS-1 or as approved by the Environmental Utilities Department.

C. Compaction – Compaction of the trench shall conform to Construction Standard Detail SS-1. Compaction test results shall be supplied to the Environmental Utilities Department upon request. Jetting of trenches is not allowed.

D. Weather – During inclement weather, trenches shall be excavated only as far as pipe can be laid and backfilled during the course of the day.

E. Existing Roadways – Trenching in existing roadways shall be limited to the length of pipe that can be laid that day. No open trenches shall be left overnight. Exposed trenches shall be plated or backfilled as approved by the Environmental Utilities Department inspector and the Development Services Department.

F. Excess Material – Excess material and materials determined unsuitable for backfill by the Environmental Utilities Department inspector shall be removed from the project site.

91-5 DEWATERING – Dewatering for the installation of structure and pipelines shall commence when groundwater is first encountered and shall be continuous until the excavation is backfilled. Best Management Practices, including but not limited to scouring and erosion measures, shall

be used to eliminate sediment-laden discharges in accordance with the approved SWPP.

91-6 PIPE BEDDING – Conform to Construction Standard Detail SS-1 and the following:

A. Bedding shall provide uniform and continuous support along the barrel of the pipe. The minimum depth of bedding material shall be provided under the bell. Blocking of the pipe is not permitted.

B. Loose material shall be removed from the trench bottom and replaced with imported material.

C. Where rocky, unyielding or unsuitable foundation material is encountered, the subgrade shall be over-excavated a minimum of 4 inches and replaced with imported bedding material.

D. Where the trench bottom is soft, yielding or unstable, the trench bottom shall be over-excavated and ¾-inch crushed rock shall be placed in the trench to provide a stable foundation, to the satisfaction of the Environmental Utilities Department inspector. The rock is in addition to the required pipe bedding used in the pipe zone.

E. Where a saturated trench condition is encountered, the trench wall and pipe shall be lined with a geotextile fabric as shown on Construction Standard Detail SS-1, and to the satisfaction of the Environmental Utilities Department inspector.

F. Bell holes shall be excavated per the manufacturer's recommendations. The minimum depth of bedding material shall be provided under the bell. Care shall be taken to ensure that the bell hole is no larger than necessary to accomplish proper joint assembly.

91-7 CONCRETE CRADLES, ARCHES & ENCASEMENTS and TRENCH DAMS – Concrete cradles, arches and encasements and trench dams shall conform to the Construction Standard Details W-23, W-24, and the following:

A. Concrete shall conform to the requirements of the construction standards.

B. The pipe shall be placed in proper position on temporary cradles or arches consisting of concrete block or bricks. When necessary, the pipe shall be rigidly anchored or weighted to prevent flotation when the concrete is placed.

C. Cradles and arches shall be constructed with an ability to adjust the pipe to proper grade in order to avoid vertical joint pull. Cradles and arches shall be placed at one-third and halfway points along each pipe segment where specified. Concrete placed beneath the pipe shall be sufficiently workable to fill the voids without excessive vibration. The concrete shall be allowed to cure and remain undisturbed for 24 hours prior to backfill and compaction of the trench.

D. Restrained pipe within casings, bridges, shall be fully extended or "stretched out" to remove the slack between the joints the entire length of the structure.

E. Water shall not be permitted to enter, seep, or run onto the concrete while curing.

F. Trench dams shall be constructed of controlled density fill or clay as shown on the drawings or as directed by the Environmental Utilities Department inspector. Trench dam excavations shall be made into native earthen materials to the dimensions shown on the drawings or as directed by the Environmental Utilities Department inspector. Clay materials shall be moisture conditioned to near-optimum moisture content prior to placement in the excavation and compacted to the required relative compaction.

91-8 **PIPE ZONE BACKFILL** – Pipe zone backfill shall conform to Construction Standard Detail SS-1 and the following:

A. Extreme care shall be taken when consolidating the backfill around the pipe zone. For pipe 12 inches in diameter and smaller, no more than on-half of the pipe shall be covered prior to shovel slicing the haunches of the pipe. For pipe greater than 12 inches in diameter, no more than 6 inches shall be covered prior to shovel slicing. Sufficient care shall be taken to prevent movement of the pipe and damage to the polyethylene encasement during shovel slicing. Shovel slicing shall be witnessed by the Environmental Utilities Department inspector prior to shading the pipe.

B. Compaction equipment shall not make direct contact with the pipe.

C. Where the pipe is to be installed below historic groundwater levels or where the trench is subject to inundation, crushed rock material shall be placed to the crown of the pipe. Additionally, geotextile fabric shall be installed per Construction Standard Detail SS-1.

91-9 PIPE INSTALLATION – The sewer system outfall(s) shall be mechanically plugged and grouted, and shall remain plugged until final acceptance. Sewer pipe (gravity and pressure) shall be installed in accordance with the following provisions:

A. The Contractor shall keep the pipe interior free from foreign materials and in a clean and sanitary condition until acceptance by the City. At times when pipe-laying is not in progress, the open pipe end shall be sealed with a tight cap or plug to prevent foreign matter from entering the pipe. Provisions shall apply to the noon-hour as well as overnight.

B. Trenches shall be in a reasonably dry condition when pipe is laid.

C. Care shall be taken, when lowering pipe into the trench, to protect the pipe from damage. Chains are not permitted. The pipe shall be laid carefully to the lines and grades shown without grade breaks, unless designed with such, or to minimum depths shown on the approved plans. If field conditions exist such that the pipe may not be laid to the specified grade, the approved plans will require revisions prior to proceeding with construction.

D. Pipe sections shall be closely jointed to form a smooth flowline. Care shall be taken in placing the pipe and making field joints.

E. Improvements installed without proper inspection shall be exposed and inspected as required by the Environmental Utilities Department inspector.

F. All installations shall follow manufacturer's recommendations unless otherwise noted on the approved plans. The manufacturer's installation guide shall be on the job site at all times.

G. A 12-inch wide metallic backfill tape with the warning "Buried Sewer Main" shall be placed in the trench lines of all mains and services, within 12 to 24 inches of the subgrade.

H. Mains in unpaved areas shall be marked every 125 lineal feet with a green composite utility marker having a decal stating "Caution Buried Sewer Pipeline." Appurtenances (such as manholes, valves, ARV's, test stations, etc.) and angle points shall also be marked. Mains in landscaped areas shall be delineated with a brass marker set in an 8-inch diameter concrete cylinder.

I. Vitrified Clay Pipe (VCP) Installation – Pipe-laying shall proceed upgrade with the bell end of the pipe placed upstream, and shall follow manufacturer's guidelines for installation.

J. Ductile Iron Pipe (DIP) Installation – DIP for sewer applications shall have an interior coating with "Protecto 401" (or approved equal) unless otherwise specified on the approved plans. The pipe shall be exothermically welded, electrically continuous as described herein. DIP shall be encased in polyethylene as specified in Section 81, Domestic Water Supply System Construction, of these Construction Standards. DIP sewer systems shall be constructed per the manufacture's recommendations and the following:

1. **Gravity Installations** – Transitions from DIP to VCP pipes shall be in accordance with Section 91-9.K of these specifications.

2. **Force Main Installations** – The force main shall be constructed and tested in accordance with the water pressure pipe standards established in Section 81, Domestic Water Supply System Construction, of these Construction Standards, with the following deviations:

2a. The force main will not require disinfecting or water quality testing. The main shall be pre-flushed again with a properly sized "pig" after the pressure test. Flushing shall occur in the presence of an Environmental Utilities Department Inspector.

2b. Backfill tape shall be 12-inch wide green plastic stating "Buried Sewer Force Main."

2c. Exothermic welds shall be made on the bell of the pipe as near to the edge as possible and on the weld pads provided on the spigot end of the pipe. Exothermic welds shall conform to Section 81, Domestic Water Supply System Construction, of these Construction Standards.

2d. When it is necessary to cut a "Protecto-401" treated pipe, the City's Wastewater Division shall make all repairs prior to installation. Coordinate through the Environmental Utilities Department inspector.

2e. All DIP fittings for wastewater use shall have an interior coating with "Protecto-401."

2f. Tracing wire shall be installed per Section 81, Domestic Water Supply System Construction, of these Standards. Above ground access to the tracing wire shall not exceed 500 linear feet along the main. Access shall be provided by raising and securing the tracing wire through a conduit into a valve box. This location shall be 2 feet minimum from back of walk and marked per standards.

K. Transitions between VCP and DIP – When specified on the approved Improvements Plans, transitions between VCP and DIP shall be made using one of the following two methods:

1. Manufactured "speed-seal" gasketed DIP spigot. The transition fitting shall be manufactured by the Environmental Utilities Department. The Contractor shall incur all expenses.

2. At a manhole. If a pre-cast manhole is to be used, a manufactured transition shall be used. If a cast-in-place manhole is used, a flex joint is not required.

L. Boring – Borings for installation of sewer lines shall be made per Detail W-22 and as follows:

1. The equipment, method and sequence of operation and casing pipe grades shall be approved by the Environmental Utilities Department. A minimum of 48 hours notice shall be given prior to the start of work. Excavation for the boring operation shall be the minimum necessary to satisfactorily complete the work. Bracing and shoring shall be adequate to protect workers and any adjacent structure or roadbed.

2. **Casing -** Welded steel casing pipe shall have a minimum wall thickness of a ¼-inch for pipe 24 inches in diameter and under, and 5/16-inch for pipe 27 inches through 36 inches in diameter. Casing material larger than 36 inches shall be engineered on a case by case basis.

3. **Installation of Casing** – The casing shall closely follow the boring operation. The bored hole shall not be more than one-tenth foot (0.10') larger in diameter than the outside diameter of the conductor. Guide rails shall be accurately set to line and grade to insure installation of the casing within allowable limits. The casing diameter shall be sufficient to allow adjustment of line and grade of the conducted pipe to meet allowable tolerances and to allow sand to be placed between the conductor and the conducted pipe.

   The inside diameter of the casing shall be a minimum of 10 inches larger than the outside diameter of the conducted pipe bell or joint, as approved by the Environmental Utilities Department. A minimum of 4 inches clearance shall be required between the conducted pipe and the casing, taking the skids into consideration.

4. **Placing Pipe in Casing** – Conducted pipe shall be fully restrained ductile iron with Protecto 401 interior coating, supported by a minimum of three sets of Calpico or equal synthetic skids per stick of pipe, or as required by the Environmental Utilities Department. Pipe sections shall be joined outside of the casing. The skids and casing entrance shall be lubricated prior to sliding the conducted pipe into place. The height of the skids may be adjusted to meet specified grades.

   The space between the conducted pipe and casing shall be completely filled with clean, dry silica sand, blown into place. Both ends of the casing shall be plugged with non-shrink grout a minimum of 12 inches into the casing. Both ends shall have a pipe of sufficient diameter placed through the mortar plug and parallel with the conducted pipe. One pipe shall be used for blowing the sand into the annular space. The other pipe shall remain open for venting. Prior to starting, the method of placing sand in the void shall be approved by the Environmental Utilities Department.

5. **Backfill of Voids** – When, in the opinion of the Developer's design engineer or geotechnical engineer, the nature of the soil indicated the likelihood of ground loss which would result in a greater space between the outer surface of the casing than allowed, the Contractor shall take immediate steps to prevent such occurrences by installing a jacking head extending at least 18 inches from the leading edge of the casing.

   The jacking head shall cover the upper two-thirds of the casing and project not more than ½-inch beyond the casing outer surface. Excavation shall not be made in advance of the jacking head. Voids greater than allowable shall be filled with sand, soil cement, grout, or as approved by the Environmental Utilities Department. Where voids are suspected, the Developer's design or geotechnical engineer may direct the Contractor to drill the casing, to pressure inject grout to refusal and repair the drilled hole. Grouting pressure shall not exceed 50 pounds per square inch at the nozzle.

6. Utilizing the City's drainage system for residual discharge from boring operations without the required measures is prohibited. This discharge is a violation of the City's Stormwater Ordinance and the Clean Water Act. Discharge fluid shall be recovered, contained and discharges at an appropriate location, or if the situation allows, fluid may be discarded into an open area with the pre-written approval of the property owner and approval from the Regional Water Quality Control Board (RWQCB) provided it meets RWQCB requirements and does not impact

sensitive areas such as wetlands, creeks or other natural water conveyances.

All street boring shall include adequate measures to mitigate sediment-laden water discharge. An acceptable measure is pumping the discharge fluid into a tanker and hauling it away. Other measures suggested by the Contractor will be considered by the City. The City stormwater or construction inspector shall inspect and monitor the discharge recovery, containment, and restoration process.

91-10 MANHOLE INSTALLATION – Manholes shall be installed in accordance with the Construction Standard Details and as specified herein:

A. Manholes shall be set flush with finish grade, unless otherwise noted on the approved plans.

B. Manholes placed in off-site, unimproved areas shall be constructed with the top of the casting cover a minimum of 1 foot above the final surrounding grade. A minimum 12-inch wide concrete collar with a #4 rebar ring shall be constructed around the casting and 6 inches below finish grade.

C. Manholes placed in landscape areas adjacent to City improvements shall be constructed with the top of the casting cover a minimum of 6 inches above the final surrounding grade. A minimum 12-inch wide concrete collar with a #4 rebar ring shall be constructed around the casting and 6 inches below finish grade.

D. VCP pipe entering a sewer manhole shall have a flex joint at the manhole base. A flex joint consists of a bell and spigot joint at the manhole with only bell ends cast into the manhole base, and a second bell and spigot joint located 12 inches to 24 inches outside of the manhole. Service “Y’s” shall not be installed directly onto a manhole.

E. Manhole lids and castings for 48 inch diameter barrels shall be 24-inch diameter. Manhole lids and castings for 60” barrels shall be 36 inch diameter. Lid shall be bolt-down type with two cast-in-place bars and a gas detector probe hole, and have no poke holes. Lids shall be bolted when a manhole is constructed outside a paved area, as specified on the approved plans, or as directed by the Environmental Utilities Department inspector. Manholes constructed outside of paved area shall use a GMI composite lid and frame.

F. Sewer mains or services entering an existing manhole shall be core drilled, without exception. The space between the pipe and the manhole shall be filled with non-shrink grout.

G. Any work on an existing sewer manhole shall require the manhole to pass a vacuum test as described in section 91-13 of these Construction Standards. The work completed shall remain exposed until the vacuum test has been accepted by the Environmental Utilities Department inspector.

H. Concrete manhole bases may be either pre-cast or cast-in-place. Pre-cast bases shall conform to section 91-16 of these Construction Standards. Cast-in-place manholes shall be constructed in accordance with the details provided in these Construction Standards and as follows:

1. Concrete shall be vibrated to reduce porosity for vacuum testing. Concrete shall be Class A, six sack mix conforming to ASTM C-150 Specifications with Type V cement for sulfate protection.

2. Belled pups set in the manhole base wall shall be set flush with the exterior of the wall. The “speed-seal” on the spigot end shall be cut off prior to setting.

3. Unless specified on the approved plans, there shall be a 0.10-foot drop constructed across the manhole base.

4. The top of the base shall be formed to accept the first barrel section Wet setting is not permitted. Ram neck shall be installed on this first joint after the Environmental Utilities Department inspector has approved the manhole base for stacking.

5. The concrete on cast-in-place bases shall cure a minimum of 24 hours before stacking the barrel sections.

6. The bedding shall consist of a minimum of 4 inches of compacted crushed rock.

7. Flow through manholes shall have the pipe laid continuously as a whole pipe with flex joints and a minimum 0.10-foot drop, or as approved. After the initial 24-hour curing period, the top half of the pipe shall be carefully cut off without cracking the bottom. The sides shall be mortared smooth.

I. Adjusting Manholes – The manhole neck and frame shall be adjusted to grade. Use of metal grade rings is not permitted. The finished manhole shall conform to Construction Standard Detail SS-2, or as approved by the Environmental Utilities Department.

J. Frame and Lid – The manhole frame and lid shall be sealed with an approved rubber gasket. Manholes constructed in streets shall have the lid bolt holes filled with silicone. Manholes constructed outside of the street or paved area shall be bolted down.

K. Epoxy Coated Manholes – Sewer manholes requiring an epoxy coating shall first pass a vacuum test, per Section 91-12 of these Construction Standards, and shall then be constructed as follows:

1. The exterior of the manhole shall be coated with an asphaltic material and wrapped in 8-mil polyethylene sheeting prior to backfilling. Use to 10-mil vinyl tape to secure and seal the polyethylene per Section 81 of these standards.

2. All voids and imperfections in the interior of the manhole shall be mortared or "sacked" smooth with a cement paste composed of 50 percent Portland cement and 50 percent sand. The mortar mixture shall be manually worked into the dampened surface with sufficient pressure to completely fill voids and imperfections. The surface shall then be finished smooth.

2a. This process shall be continued until the entire manhole surface (base, barrel, cone, neck and joints) is smooth and free of imperfections. <u>Note that it is not required to cover the entire interior surface area of the manhole, only where voids or imperfections exist.</u>

2b. Upon receiving the Environmental Utilities Department inspector's approval of the sacking, the outlet channel(s) of the manhole to be epoxied and the first upstream manhole shall be mechanically plugged to prevent water flow. The newly sacked manhole shall cure for a period of 28 days.

3. The epoxy coating and applicator's certification must be submitted to the Environmental Utilities Department for approval. The approved coating may be applied after the 28-day curing period has ended. An accepted method of epoxy application is as follows:

3a. Mask off the metal frame.

3b. Sandblast the interior concrete surfaces of the sewer manhole.

3c. Apply a sealer/primer approved by construction inspector and allow curing per the manufacturer's recommendations. Application may be withheld if, in the opinion of the Environmental Utilities Department inspector, the walls of the manhole exceed the recommended moisture content. A visqueen test may be performed to determine the absence of moisture.

3d. Apply an approved epoxy to obtain a minimum thickness of 80 mils and allow curing per the manufacturer's recommendations.

3e. Verify the thickness and adherence of the coating by coring samples, to the satisfaction of the Environmental Utilities Department inspector.

3f. Repair the sampled areas and allow the repairs to cure.

3g. "Spark test" the entire epoxy surface area. The electrode shall provide a minimum of 10,000 volts. Areas failing the spark test shall be removed, repaired and retested.

3h. After approval from the Environmental Utilities Department inspector, remove the masking from the metal frame and use "Sikaflex" (or approved equal) sealant to caulk to transition joint between the epoxy coating and the metal frame.

3i. Use "Sikaflex" (or approved equal) sealant at the concrete VCP interface and for all epoxy transitions.

3j. Remove the plugs.

3k. Calcium aluminate may be used in lieu of epoxy coating. Calcium aluminate is to be installed per manufacture specifications. When calcium aluminate is used, the contractor is to TV the line to ensure no grout entered the line during application.

91-11 SERVICE INSTALLATION – Sewer services shall be installed in accordance with Construction Standard Details SS-4 and SS-5.

A. Sewer services originating from sewer mains 14 feet in depth or greater shall have the crotch on the VCP "Y" fitting filled with concrete.

91-12 TESTING OF INSTALLED IMPROVEMENTS – Sewer mains, services, manholes and appurtenances shall be tested by the following procedures:

A. Sewer Mains and Services – Public and private sewer mains and services shall be air-tested per ASTM C828 by the Contractor and the Environmental Utilities Department shall provide closed circuit TV inspection, after installation of the joint trench utility crossings and subgrade elevations have been met. Additionally, pipeline segments beneath road bases to be lime-treated shall be tested before and after the lime treatment process.

B. Air Pressure Test – Sewer mains and laterals shall be pressure tested in accordance with the National Clay Pipe Institute recommended guidelines with the following amendment:

1. Minimum test time shall be 60 seconds.

2. For mains installed in an area where the water table is higher than the pipe, the test pressure shall be increased 0.5 PSI per foot of water over the pipe.

3. The test gauge shall be liquid-filled, capable of testing up to 15 PSI, and graduated to 1/10 PSI.

C. TV Inspection – TV inspection of sewer mains and services shall be performed by the Environmental Utilities Department, Wastewater Division. Costs for said inspection shall be borne by the Contractor. Preliminary inspections may be performed by outside contractors, but shall not be accepted by the Environmental Utilities Department as an official record.

1. The sewer system shall be completely cleaned by an approved method prior to TV inspection. The sewer system shall be rejected if any of the following conditions exist:

1a. Standing water or sags greater than ½-inch in depth.

1b. Standing water in services.

1c. Offset joints.

1d. Joint separations greater than ½-inch wide.

1e. Damaged pipe.

D. Manholes – Sewer manholes shall pass a vacuum test consisting of the following criteria and procedures:

1. The test shall be performed after assembly of the manhole and installation of the pipe entering or exiting the manhole, but prior to backfilling. The Contractor shall perform the test and supply all test equipment. An Environmental Utilities Department inspector shall witness the test results.

2. Lift holes shall be filled with non-shrink grout prior to testing.

3. Pipe entering and exiting the manhole shall be plugged. The plug shall be places on the flex joint outside of the manhole base. Securely brace the plugs to prevent them from being drawn into the manhole. Unused channels shall be permanently plugged with a plastic or clay stopper.

4. A vacuum of 10 inches of mercury shall be drawn to start the test. The amount of time required for the vacuum to drop to 9 inches shall be measured. The manhole will pass the test if the amount of elapsed time is greater than 60 seconds for a 48” manhole, 75 seconds for a 60” manhole, 90 seconds for a 72” manhole and 120 seconds for an 84” manhole. A liquid-filled vacuum gauge shall be used for testing. All detectable leaks shall be repaired with non-shrink grout while the vacuum is drawn.

5. If the manhole fails the initial test, necessary repairs shall be made with a non-shrink grout while the vacuum is still being drawn. Retesting shall proceed until elapsed times are satisfactory.

6. After passing the vacuum test, all joints shall then be mortared, inside and out. Outside mortared joints shall be allowed to dry 24 hours or as approved by the Environmental Utilities Department inspector before backfilling.

7. If damage to the manhole is evident any time during the construction, the Environmental Utilities Department inspector may require repairs to be made on the manhole which will require a new vacuum test prior to acceptance.

E. Manholes – Topside Improvements – When all water, recycled water and sewer infrastructures have passed air, vacuum, pressure and continuity test as well as CCTV inspection the EU inspector shall send a memo to the Development Services Inspector indicating that the project is ready for road bases and top side improvements only. This does not constitute approval for use of the infrastructure.

F. Tying Into the City System – A tie-in procedure shall be submitted and approved by the Environmental Utilities Department prior to the proposed work. The contractor shall allow for up to seven days for review of the procedures by the Environmental Utilities Department. The sewer system shall be tied into the City system within 10 working days upon completing and passing all the testing procedures. Tie-ins shall be conducted as specified in Section 91-2 of these Construction Standards.

91-13 PUNCHLIST PROCESS – After the sewer manholes have been raised and finished to grade, the sewer system shall have a final ball and flushed in the presence of an Environmental Utilities Department inspector. The system shall then have a final TV inspection to ensure the entire sewer system is intact for warranty. Final ball and flush can be done by city forces on a time and material basis at the request of the contractor.

When all improvements are complete, the contractor shall provide a written request for a punch list inspection of the improvements. With the assistance and presence of the Contractor, the wastewater facilities punchlist shall be generated by the Environmental Utilities Department inspector and Wastewater Collection Division.

91-14 REPAIRING INSTALLED IMPROVEMENTS – Sewer mains, services, manholes and appurtenances shall be repaired per these Construction Standards and by the following procedures:

A. Repairing Vitrified Clay Pipe

1. Damaged pipe shall be exposed and replaced in-kind by "bridging" the new pipe into place. Coupling devices shall not be used.

2. Sagging or misaligned pipe shall be exposed and corrected in place if possible. If the pipe is defective, then a new pipe shall be bridged in place.

3. After the correction has been completed, the excavation shall be backfilled and compacted to grade as specified. The repairs

shall then be retested per section 91-12 of these Construction Standards.

91-15 ABANDONING SEWER STUBS AND SERVICES – In new construction, sewer stubs and services to be abandoned shall be removed to the main or manhole of origination. Abandonment of existing sewer stubs shall be as directed by the Environmental Utilities Director.

91-16 MATERIALS

A. Approved Equal – The words "approved equal" shall mean any material deemed by the Environmental Utilities Department to be acceptable for use within the City's sewer system as compared to products of specified manufacturers. Contractors proposing to use materials which are not specifically named shall submit all necessary documentation to allow review of said material for use as an approved equal.

The submittal shall include a letter with:

1. **Product** – A description of the product and the appropriate materials specification section number. A sample of the product may be required for review and testing.

2. **Contact** – The name and telephone number of the contact person for the proposed product.

3. **Reference** – A list of a minimum of three agencies using the proposed product (include names and telephone numbers).

4. **Performance** – Information and reference for three locations with a performance record of three years in operation of the installation.

5. Address the letter to the Environmental Utilities Department Engineering Division, 2005 Hilltop Circle, Roseville, CA 95747, ATTN: EUD, Chairman of METAC. City staff may request a sample of the product for review.

6. The Contractor shall submit all material for review 35 days prior to contract award. All submittals shall include documentation verifying contract award date. Contractors shall allow two to four weeks review time by the Environmental Utilities Department.

B. Conditionally Approved Material – Materials or products that have met the reference and performance requirements shall be conditionally approved for a minimum trial period of 2 years. Upon completion of the two year period, the product may be approved, the evaluation period may be extended, or the product may be denied approval as determined by the Environmental Utilities Director. A list of conditionally approved products may be obtained from the Environmental Utilities Department.

C. Unapproved Materials – Materials not approved for use on the project shall be removed from the site within 24 hours if requested by the Environmental Utilities Department inspector.

D. Sewer Main and Services – Unless noted on the approved plans, all gravity pipe shall be Vitrified Clay Pipe Bell and Spigot (VCP), conforming to ASTM C700-C301, C828 Standards. The VCP shall be Extra Strength and shall not be dipped in solution or glazed to enhance air pressure tests.

All force main pressure pipe will be Ductile Iron Pipe (DIP) manufactured by Pacific States Company, US Pipe, Griffin, or approved equal. The interior of the DIP shall be coated with Protecto 401 from bell gasket seat to 8 inches of spigot end exterior. The Protecto 401 coated DIP shall be manufactured with an exothermic weld (cadweld) plate installed on the spigot end.

E. Manholes – Manholes, frames and covers are to be in accordance with details SS-2 and SS-3. All materials used in cast-in-place concrete or precast concrete shall conform to ASTM C-150 Specifications with Type V cement for sulfate protection.

1. Barrels, Cones, and Lids

1a. 48” Manhole Material:

i. Jensen Precast 36” eccentric cone, #CN48E36 or approved equal

ii. Jensen Precast 30” concentric cone, #CN48C30 or approved equal

iii. Jensen Precast 24” concentric cone, #CN48C24 or approved equal

iv. Jensen Precast 18” concentric cone, #CN48C18 or approved equal

v. Jensen Precast 12" barrel, #BL485812S or approved equal

vi. Jensen Precast 18" barrel, #BL485818 or approved equal

vii. Jensen Precast 24" barrel, #BL485824S or approved equal

viii. Jensen Precast 36" barrel, #BL485836S or approved equal

ix. Jensen Precast 48" barrel, #BL485848S or approved equal

1b. 60" Manhole Material:

i. Jensen Precast 36" concentric reducer cone, #CNR603636 or approved equal

ii. Jensen Precast 48" transition slab #TS604812 or approved equal

iii. Jensen Precast 36" barrel, #BL607236 or approved equal

iv. Jensen Precast flat lid with 24" opening, (either eccentric or concentric opening) #FT6024C or #FT6024E ++ or approved equal

v. Jensen Precast flat lid with 36" opening (either eccentric or concentric opening), #FT6036C or #FT6036E or approved equal

1c. 72" Manhole Material:

i. Jensen Precast 12" barrel section, #BL728612 or approved equal

ii. Jensen Precast 24" barrel section, #BL728624 or approved equal

iii. Jensen Precast 36" barrel section, #BL728636 or approved equal

iv. Jensen Precast flat lid with 24" concentrate opening, #FT7224C or approved equal

v. Jensen Precast flat lid with 36" concentric opening, #FT7236C or approved equal

2. Grade Rings

2a. Jensen Precast 3" grade ring (5" walls), #GR243403 or GR304003 or approved equal

2b. Jensen Precast 6" grade ring (5" walls), #GR243406 or GR304006 or approved equal

2c. Jensen Precast 6" grade ring (6" walls), GR364806 or approved equal

2d. Jensen Precast 3" grade ring (6" walls), #GR364803 or approved equal

3. Manhole Frame and Cover

3a. For 24" Openings: South Bay Foundry, #SBF 1920 RV-S, GMI Composite frame and cover 2600 Series, Saint-Gobian PAM, Rexus – CDRU60EHSEW, D&L Supply - #A-1021 with "sniffer plug" and "O" ring gasket, National Casting Corporation - NC 1021 or approved equal

3b. For 36" Openings: GMI Composite frame and cover 3800 Series or approved equal due to safety reasons.

4. Precast Bottom

4a. Jensen Precast 6"-two way, #MBS4824-2W-6C or approved equal

4b. Jensen Precast 8"-two way, #MBS4824-180-8C or approved equal

4c. Jensen Precast 6"- 90 degree left, #MBS4824-90L-6C or approved equal

4d. Jensen Precast 6"-90 degree right, #MBS4824-90R-6C or approved equal

4e. Jensen Precast 8" - 90 degree left, #MBS4824-90L-8C or approved equal

4f. Jensen Precast 8” - 90 degree right, #MBS4824-90R-8C or approved equal

4g. Jensen Precast 6”- clay, three way, #MBS4824-3W-6C or approved equal

4h. Jensen Precast 8”- clay, three way, #MBS4824-3W-8C or approved equal

4i. Jensen Precast 6”- clay, four way, #MBS48245W-4W-6C or approved equal

4j. Jensen Precast 8”- clay, four way, #MBS4824-4W-8C or approved equal

4k. Jensen Precast 6” – clay outlet, 4” cul-de-sac base, #MBS4824-6W-6CUL or approved equal

4l. Jensen Precast 8” – clay outlet, 4” cul-de-sac base, #MBS4824-6W8CUL or approved equal

4m. Jensen Precast 10” – two way, #MBS4824-2W-10C or approved equal

4n. Jensen Precast 12” – two way, #MBS4824-180-12C or approved equal

5. Precast Flat Lid

5a. Jensen Precast 6” lid, 24” concentric opening, #FT4824C or approved equal

5b. Jensen Precast 6” lid, 36” concentric opening, #FT4836C or approved equal

F. Appurtenances

1. **Air Release Valve** – APCO Model 450 or approved equal.

2. **Clay to Concrete Sealant** – Secca Flex or approved equal.

3. **Trench Dam** – Clay or Controlled Density Fill.

4. **Cleanout Caps** – ABS.

5. **Couplings** – For 4-inch lines, use Flex Seal Repair Coupling for ABS cap only, or approved equal. For 4- to 12- inch lines,

use Mission Rubber Repair Coupling or approved equal. Couplings may not be used in new construction.

6. **Flange Gaskets** – All flange gaskets to be neoprene rubber or red rubber, USSO Standard B.16.21 insulation flange kits—Calpico Type E full-face gasket and two-side insulation.

7. **Joint Sealing Compound** - Ram-Nek, Con Seal Compound or approved equal.

8. **Location Stakes** – Carsonite 4" x 5" CUM 375 with anchor barb kit or approved equal.

   8a. Caution stickers attached, #CW-112 and organization identification decal #P101, stating:

   "CITY OF ROSEVILLE—CALL BEFORE DIGGING (916) 774-5750".

   8b. For pressurized sewer mains, use decal #CPS-1977. For gravity sewer mains, use decal # CS-225.

9. **Mortar** – Non-shrink grout during manhole vacuum testing and as specified. Standard mortar mix for all other applications.

10. **Silicone** – 100 percent silicone with a 25-year life, or approved equal.

11. **MH Coatings** – Hydro Pox 204 or approved equal.
    --Calcium aluminate

12. **Wastewater Marking Tape** – Terra Tape Extra Stretch 450 Material, detectable, 12"-wide or approved equal. Non-Detectable for sewer force mains.

13. **Grease Interceptor** – Jensen Precast or approved equal.

91-17 ILLEGAL USE OF SEWER SYSTEM – If Stormwater enters the sewer system, the Contractor and/or Owner/Developer shall be charged according to Title 14.16.220 of the City of Roseville Municipal Code. Stormwater run-off shall be classified as "low-strength metered commercial users." The sewer unit shall be one sewer unit per 1,000 cubic feet discharge. The Environmental Utilities Department shall determine the volume of discharge.

91-18. CONDITIONALLY APPROVED

The following products are conditionally approved in the City for a period of 2 years conditional acceptance period, the product may be granted approved equal status and be added to the list of approved products in the City of Roseville Standards.

1. Old Castle Precast (U.S. Concrete)
- **a.** Sewer Manholes and Appurtenances
- **b.** Grease interceptors