SECTION 5

SANITARY SEWER (SS)

5-1 GENERAL - All sewer pipe, fittings, manholes and other appurtenances shall be installed in accordance with the approved improvement plans, these Construction Standards, the latest edition of Caltrans Standard Specifications, as recommended by the manufacturer and as specified by the City Engineer. These Construction Standards and the manufacturer's guidelines shall be present at the construction site at all times.

5-2 CONNECTION TO EXISTING FACILITIES - Connection to existing City of Grass Valley sewer facilities may be made upon approval of the City Engineer.

A. System Tap - The Public Works Department will make all system taps as required on the plans. The Contractor shall pay for such work on a time and materials reimbursement basis. The Contractor shall be responsible for the following tasks associated with the tap, and any additional requirements as determined by the City Engineer:

1. Obtaining an Encroachment Permit from the Public Works Department, Engineering Division.

2. Coordinating the work with the Public Works Department, including provisions for materials and equipment required to complete the work.

3. Providing traffic control per the Public Works Department, Engineering Division requirements.

4. Excavating the work area, as agreed upon by the Public Works Department.

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

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

7. Installing the sewer lateral from the City provided tee to the cleanout or building.

8. 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 Public Works Inspector.

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

5-3 CONSTRUCTION STAKING - New sewer main construction 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 fifty (50) feet in tangent sections and every twenty-five (25) feet in curved sections, and every ten (10) feet in approved vertical curve sections.

5-4 CONCRETE CRADLES, ARCHES AND ENCASEMENTS - Concrete cradles, arches and encasements shall conform to the Construction Standard Details and the following:

A. Pipe Supports and Anchors - 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.

B. Cradles and Arches - Cradles and arches shall be constructed with the ability to adjust the pipe to the proper grade in order to avoid vertical joint pull. Cradles and arches shall be placed at the one-third and halfway points along each pipe segment where specified.

C. Concrete - Concrete for cradles, arches or encasements shall be placed uniformly along the pipe. 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. Water shall not be permitted to enter, seep, or run onto the concrete while curing

5-5 TRENCHING AND BACKFILL - Construction of sewer pipes and appurtenances shall be performed to the lines and grades shown on the approved project plans, as specified in the "Streets" section of these Construction Standards and in conformance with the following requirements:

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 the "Utility Trench Bedding, Backfill and Paving" detail. Excavations shall conform to all applicable Federal and State safety requirements. All work shall be conducted in such a manner as to prevent damage to new and existing facilities or adjoining property.

B. Bell Holes - 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.

C. Pipe Support - Pipes shall be placed on a firm bed of imported granular material conforming to the "Utility Trench Bedding, Backfill and Paving" detail. 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. Loose material shall be removed from the trench bottom and replaced with imported material.

D. Trench Backfill and Compaction - Initial backfill material shall be placed immediately after pipe joints have been completed, inspected and passed by the Public Works Inspector. The material shall be carefully placed, consolidated around the pipe zone and shall be brought up evenly on both sides. Sufficient care shall be taken to prevent movement or damage to the pipe during shovel slicing. Shovel slicing shall be witnessed by the Public Works Inspector prior to shading the pipe.

Trench backfill shall be placed and compacted in accordance with the "Streets" section of these Construction Standards. Compaction equipment shall not make direct contact with the pipe.

5-6 PIPE INSTALLATION - Sewer pipe (gravity and pressure) shall be installed in accordance with the following provisions:

A. Pipe Cleanliness - 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.

B. Placing Pipe - 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, to the 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.

C. Joining Pipe - Pipe sections shall be closely jointed to form a smooth flow line. Care shall be taken in placing the pipe and making field joints.

D. Manufacturer's Recommendations - 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.

E. Markings in Unpaved Areas - Mains in unpaved areas shall be marked every 125 lineal feet with a green composite utility marker have 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.

F. Ductile Iron Pipe Installation - DIP for sewer applications shall have an interior coating of ceramic epoxy 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 Domestic Water Supply System section of these Construction Standards. DIP sewer systems shall be constructed per the manufacturer's recommendations and the following:

1. The force main shall be constructed and tested in accordance with the water pressure pipe standards established in the Water Supply System section of these Construction Standards and the following deviations:

a. The main shall be pre-flushed and flushed again with a properly sized ball after the pressure test. Flushing shall occur in the presence of the Public Works Inspector.

b. 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 the Water Supply System section of these Construction Standards.

c. When it is necessary to cut an epoxy lined pipe all repairs shall be made prior to installation.

d. All DIP fittings for wastewater use shall have an interior lining of ceramic epoxy.

e. Tracing wire shall be installed per the Water Supply System section of these Construction 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 two (2) feet minimum from back of walk and marked per standards.

G. Transitions from Vitrified Clay Pipe - When specified on the approved Improvement Plans transitions between PVC or DIP and existing VCP pipe segments shall be made using an approved rubber repair coupling.

H. Boring - The equipment, method of operation and conductor pipe grades shall be approved by the City Engineer prior to initiating any boring. A minimum of 48 hours notice shall be given prior to the start of work. All boring operations shall conform to the approved plan and the following requirements:

1. 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. The conductor 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 conductor within allowable limits. The conductor 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 conductor shall be a minimum of 6 inches larger than the outside diameter of the conducted bell pipe or joint, as approved by the City Engineer. A minimum of 4 inches clearance shall be required between the conducted pipe and the casing, taking the skids into consideration.

3. Conductor pipe shall be supported by a minimum of three sets of synthetic skids per stick of pipe, or as required by the City Engineer. Pipe sections shall be joined outside of the conductor. 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.

4. The space between the conducted pipe and conductor shall be completely filled with clean, dry silica sand, blown into place. The method of placing sand in the void shall be approved by the City Engineer. Both ends of the casing shall be plugged with non-shrink grout a minimum of 12 inches into the casing.

5. When, in the opinion of the Public Works Inspector or the Geotechnical Engineer, the nature of the soil indicates the likelihood of ground loss which would result in a greater space between the outer surface of the conductor 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 conductor.

The jacking head shall cover the upper two-thirds of the conductor and project not more than ½-inch beyond the conductor 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 Public Works Department. Where voids are suspected, the Developer's Design or Geotechnical Engineer may direct the Contractor to drill the conductor and to pressure inject grout until refusal to repair the drilled hole. Grouting pressure shall not exceed 50 pounds per square inch at the nozzle.

I. Backfill Tape - A 3 or 4 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.

5-7 MANHOLE INSTALLATION - Manholes shall be installed in accordance with the Construction Standard Details and as specified herein:

A. Top of Manhole in Pavement - Unless otherwise noted on the approved plans, manholes shall be set flush with finish grade per the Standard Sewer Manhole detail.

B. Top of Manhole Off Roadway - Manholes placed in off-site, unimproved areas shall be constructed with the top of the casting cover a minimum of one (1) foot above the final surrounding grade. 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 for all manholes placed off the roadway.

C. Frame and Lid - The manhole frame and lid shall be sealed with an approved rubber gasket. Manhole lids and castings shall be 24-inch diameter bolt-down type with two cast-in-place bars and a gas detector probe hole. Lids shall 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 City Engineer.

D. Existing Manholes - 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. Any work on an existing sewer manhole shall require the manhole to pass a vacuum test as described in these Construction Standards. The work completed shall remain exposed until the vacuum test has been accepted by the Public Works Inspector.

E. Bases - Concrete manhole bases shall be pre-cast unless otherwise approved by the City Engineer. Pre-cast bases shall conform to the specifications in the Materials portion of this section. Unused channels shall be grouted with mortar to form a smooth bottom. Sewer main stubs from pre-cast manholes are not required unless specified otherwise.

F. Adjusting Manholes - The manhole neck and frame shall be adjusted to grade using pre-cast concrete grade rings or as approved by the Public Works Inspector. Use of metal grade rings is not permitted.

G. 60" and 72" Diameter Manholes – All 60" and 72" manholes shall have eccentric cone sections and steps. Steps must: be factory installed using sanitary wastewater and hydrogen sulfide degradation resistant epoxy as recommended by the manufacturer; be aligned in each section to form a continuous ladder within the assembled manhole; be equally vertically spaced between 10 and 14 inches between the top surfaces of the rungs; be uniform length; conform to ASTM C-478 and ASTM C-497 and OSHA requirements. Reinforced plastic steps shall be polypropylene coated with an inner deformed steel reinforcing rod (Grade 60/ASTM A-615).

H. Epoxy Coated Manholes - Sewer manholes in force mains, lift stations and where required by the City Engineer shall be epoxy coated. Manholes shall first pass a vacuum test, per these Construction Standards, prior to epoxy coating 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. 10-mil vinyl tape shall be used to secure and seal the polyethylene sheeting.

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 Concrete and 50 percent sand. The mortar mixture shall be manually worked into the dampened surface with sufficient pressure to

completely fill voids and imperfections. This process shall be continued until the entire manhole surface (base, barrel, cone, neck and joints) is smooth and free of imperfections.

Upon receiving the Public Works Inspector's approval of the sacking, the outlet channel(s) of the manhole to be epoxy coated, and the first upstream manhole, shall be mechanically plugged to prevent water flow. The newly sacked manhole shall be allowed to cure for a period of 28 days.

3. The epoxy coating and applicator's certification must be submitted to the Public Works 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:

a. Mask off the metal frame.

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

c. Apply a sealer/primer and allow to cure per the manufacturer's recommendations. Application may be withheld if, in the opinion of the Public Works Inspector, the walls of the manhole exceed the recommended moisture content.

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

e. Submit a report to verify the thickness and adherence of the coating by coring samples, to the satisfaction of the City Engineer.

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

g. "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.

h. After approval from the Public Works Inspector, remove the masking from the metal frame and use an approved poly urethane sealant to caulk the transition joint between the epoxy coating and the metal frame.

i. Use poly urethane sealant at the pipe interface and for all epoxy transitions.

j. Remove the plugs.

I. Manhole Backfill - Structural backfill shall be Class 2 Aggregate Base to a minimum depth of five feet surrounding all sewer manholes. Backfill shall be installed per the requirements of the "Streets" section of these Construction Standards.

5-8 SERVICE INSTALLATION - Sewer service laterals shall be installed in accordance with the Construction Standard Details and the approved improvement plans.

A. Marking Residential Sewer Services - The curb in front of residential sewer services shall be stamped with a "S."

B. Backflow Prevention – Backflow prevention devices are required for all:

1. New construction.

2. Replacements or repairs made to an existing sanitary sewer lateral.

3. Building Permit applicants who are remodeling more than twenty five percent (25%) of the structure area or where plumbing fixtures are added to the property.

4. Properties that have been damaged by the blockage of the City sanitary sewer main or the private lateral.

5. On all structures where a pump is used to lift sewage to the sanitary sewer system main line. The backflow relief device shall be located to protect the structure from damage in the event that the pump is pumping against a closed backflow device.

6. Existing buildings which have plumbing drain outlets at an elevation 12" or less above the ground surface of the next upstream manhole, where the elevation of any floor is at or below the invert of the adjacent City sanitary sewer main or is less than 12" above the ground surface of the next upstream manhole, or where a plug in the City sanitary sewer main will cause the hydraulic gradient to rise above the lowest floor level.

7. Property title changes.

C. A pop-off relief device and an approved backflow prevention device shall be installed on the sewer lateral at the property line per the Standard Details.

D. Tapping into a Lined Sewer Main - Installing a service into a lined sewer shall use a top hat connection for 6 inch main. For larger sized mains use Inserta Tee or approved equivalent.

5-9 TESTING OF INSTALLED IMPROVEMENTS - Sewer mains, services, manholes and appurtenances shall be tested by the following procedures:

A. Sewer Mains and Services - Sewer mains and services shall be tested after installation of any joint trench utility crossings and after subgrade elevations have been met. An air pressure test shall be performed by the Contractor in the presence of the Public Works Inspector, and the Public Works Department shall provide closed circuit TV inspection.

1. Air Pressure Test - Sewer mains and laterals shall be pressure tested in accordance with the following:

a. 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.

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

c. Minimum test time shall be 60 seconds.

d. Minimum air pressure shall be 3.5 PSI.

2. TV Inspection - TV inspection shall be performed by the Public Works Department. 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 Public Works Department as an official record.

a. 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 during the TV inspection:

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

ii. Offset joints.

iii. Joint separations.

iv. Cracked or otherwise damaged pipe.

v. Infiltration.

vi. Debris or other foreign objects.

B. Manholes - Sewer manholes shall pass a vacuum test after assembly of the manhole and installation of the pipe entering or exiting the manhole, but prior to backfilling. In cases where groundwater is anticipated to be encountered, the City Engineer may require a leak test to be performed.

1. Vacuum Test - The vacuum test shall consist of the following criteria and procedures:

a. The Contractor shall supply all test equipment and perform the test in the presence of the Public Works Inspector.

b. Lift holes shall be filled with non-shrink grout and allowed to cure prior to testing.

c. Pipe entering and exiting the manhole shall be plugged. Plugs shall be securely braced to prevent them from being drawn into the manhole. Unused channels shall be permanently plugged with a plastic or clay stopper, filled and grouted.

d. A liquid-filled vacuum gauge shall be used for testing. A vacuum of ten (10) inches of mercury shall be drawn to start the test. The amount of time required for the vacuum to drop to nine (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.

e. 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 the elapsed times are satisfactory.

2. Joint Mortaring - After passing the vacuum test, all joints shall then be mortared, inside and out. Outside mortared joints shall be allowed to dry prior to backfilling.

3. Damage During Construction - If damage to the manhole is evident any time during the construction, the Public Works Inspector may require repairs be made to the manhole which would require a new vacuum test prior to acceptance.

5-10 PUNCHLIST PROCESS - After the sewer manholes have been raised and finished to grade, the sewer system shall be balled and flushed in the presence of the Public Works Inspector. When all improvements are substantially complete, the Contractor shall provide a written request for a punchlist inspection of the improvements. With the assistance and presence of the Contractor, the sewer facilities punchlist shall be generated by the Public Works Inspector.

5-11 ABANDONING SEWER STUBS AND SERVICES - 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 City Engineer.

5-12 MATERIALS

A. Sewer Mains and Service Laterals - Unless noted on the approved plans or otherwise approved by the City Engineer, all sewer mains and service laterals shall be Polyvinyl Chloride SDR 26 Pipe..

1. PVC Pipe - PVC Pipe shall conform to the standards of ASTM D 3034.

a. Approved PVC pipe manufacturers include: Diamond Plastics Corporation, J-M Eagle, Vinyl Tech or approved equals.

2. Ductile Iron Pipe - DIP pipe and fittings shall be lined with Protecto-401 or equivalent and conform to the standards of AWWA C-151 pressure class 350 (ANSI A21.51) and AWWA C153. All ductile iron joints shall be push-on type with styrene butadiene rubber gaskets. Flange coupling adaptors shall be ductile iron conforming to ASTM A536 and have flange bolt circles that are compatible with ANSI/AWWA C225/A21.15. Restraint for the flange adaptor shall consist of a plurality of individually actuated gripping wedges to maximize restraint capability. Torque limiting actuating screws shall be used to insure proper initial set of the gripping wedges.

a. Approved DIP manufacturers include: Pacific States, Tyler, US Pipes, Griffin, or approved equals.

B. Manholes - Concrete for manhole bases shall be Type V Portland Cement Concrete conforming to ASTM C-150 specifications.

1. Barrels, Cones, Grade Rings and Lids - Manhole barrels, cones, grade rings and lids shall be Jensen Precast concrete per the following (or approved equal):

a. 48" Manhole Material:

i. Jensen Precast 12" barrel, BL485812S, or approved equal.

ii. Jensen Precast 18" barrel, BL485818S, or approved equal.

iii. Jensen Precast 24" barrel, BL485824S, or approved equal.

iv. Jensen Precast 36" barrel, BL485836S, or approved equal.

v. Jensen Precast 48" barrel, BL485848S, or approved equal.

vi. Jensen Precast 36" eccentric cone, CN48E36S, or approved equal.

vii. Jensen Precast 30" concentric cone, CN48C30S, or approved equal.

viii. Jensen Precast 24" concentric cone, CN48C24S, or approved equal.

ix. Jensen Precast 18" concentric cone, CN48C18, or approved equal.

x. Jensen Precast 3" grade ring, GR2432023, or approved equal.

xi. Jensen Precast 8-inch lid, 24-inch opening, FT4824C, or approved equal.

xii. Jensen Precast 8-inch lid, 36-inch opening, FT4836C, or approved equal.

b. 60" Manhole Material:

i. Jensen Precast 36" barrel, BL607236S, or approved equal.

ii. Jensen Precast 3" grade ring, GR364803, or approved equal.

iii. Jensen Precast 6" grade ring, GR364806, or approved equal.

iv. Jensen Precast flat lid with 24" opening, FT6024C, or approved equal.

v. Jensen Precast flat lid with 36" opening, FT6036C, or approved equal.

c. 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" opening, FT7224C, or approved equal.

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

2. Manhole Frame and Cover

a. D&L Foundry A-1021 (24”) Manhole Rings and Covers. .

3. Precast Bottom

a. Jensen Precast 6"- two way, MBS4824-2W-6P-BT, or approved equal.

b. Jensen Precast 8"- two way, MBS4824-2W-8P-BT, or approved equal.

c. Jensen Precast 6"- 90 degree left, MBS4824-90L-6P-BT, or approved equal.

d. Jensen Precast 6"- 90 degree right, MBS4824-90R-6P-BT, or approved equal.

C. Appurtenances

1. Concrete Joint Sealant - Ram-Nek, or approved equal.

2. Epoxy Coating - Hydro Pox 204, or approved equal.

3. 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 with two-side insulation.

4. Location Stakes - Carsonite CUM 375 with anchor barb kit, or approved equal.

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

6. Polyurethane Sealant - Sikaflex, or approved equal.

7. Silicone - 100 percent silicone with a 25-year life, or approved equal.

8. Rubber Repair Coupling - Fernco 1000 RC Series or 5000 RC Series coupling or equivalent.

D. Back Flow Prevention Devices- Approved backflow prevention device manufacturers include: Clean Check, Inc., Mainline Backflow Products and Oatey (for less than 3' depth), or approved equals.

E. Treatment Plant Equipment- The listed manufacturers currently offer the best available equipment efficiency and shall be used on all of the City's treatment facilities:

Equipment	**Manufacturer**
Submersible pumps/mixers	Flygt
Valves and Actuators	Keystone
Instrumentation	HACH
Variable Frequency Drives	Allen-Bradley
Programmable Logic Controllers	Allen-Bradley

F. Sewer Lift Stations

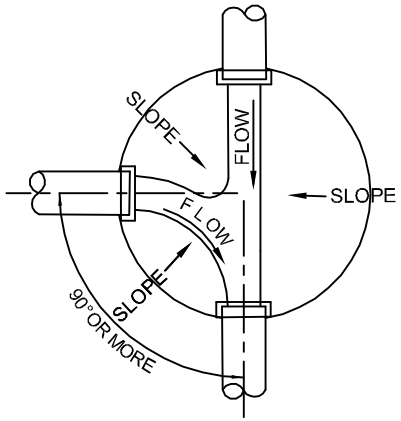
1. Sewer lift stations shall be Flygt TOP 6 Pump Stations with FLYGT pumps and FLYGT panels.

2. All control panels shall be covered with a canopy.

3. All lift stations shall include a bypass connection.

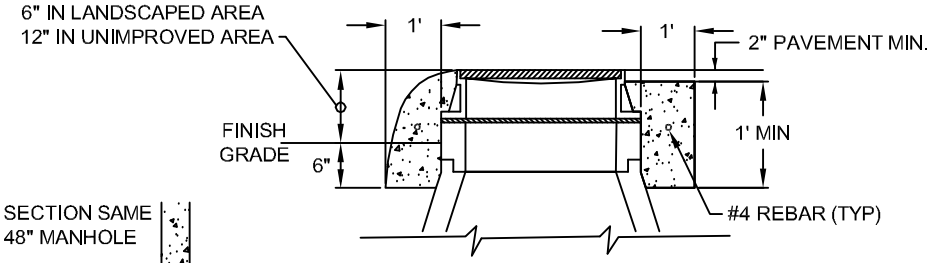
4. Generators shall be Generac Industrial Diesel Generator meeting the criteria of the specific lift station needs.

5. Automatic transfer switch shall be a Generac unit compatible with the industrial generator selected and meeting the criteria of the specific lift station needs.

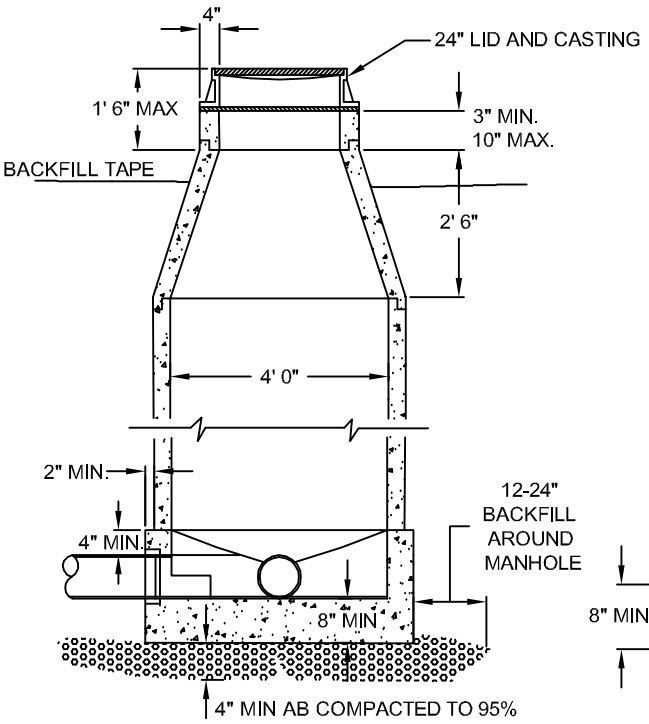


NOTES

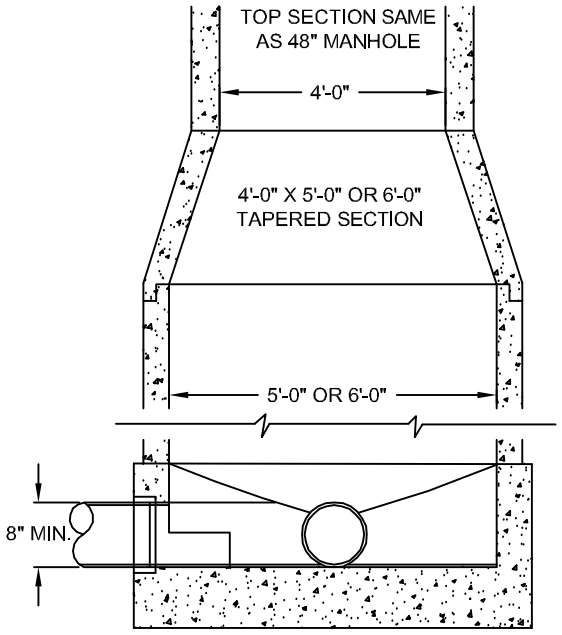
1. MANHOLE LIDS SHALL BE SEALED WITH AN APPROVED RUBBER GASKET.
2. ALL JOINTS SHALL BE SEALED WITH JOINT COMPOUND OR MORTAR INSIDE AND OUT.
3. UNUSED CHANNELS SHALL BE COMPLETELY FILLED WITH GROUT.
4. STUBS, IF REQUIRED, SHALL BE PLUGGED AND END MARKED ABOVE FINISHED GRADE WITH A REDWOOD 4 BY 4 POST PAINTED GREEN.
5. ECCENTRIC CONES FOR 60" AND 72" SHALL BE PLACED SUCH THAT THE OPENING IS OVER THE UPSTREAM INVERT.
6. FLOW LINES SHALL HAVE A 1/10 DROP OR AS INDICATED ON PLANS.
7. MANHOLES WITH DROPS SHALL BE EPOXY COATED PER THE SANITARY SEWER SYSTEM STANDARDS.



CONCRETE COLLAR DETAIL



48" MANHOLE



60" OR 72" MANHOLE

PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

STANDARD SEWER MANHOLE

APPROVED BY:

PUBLIC WORKS DIRECTOR / CITY ENGINEER

SCALE:	DRAWN BY:	DATE:	
NONE	CDH	FEB 27, 2012	SS - 1

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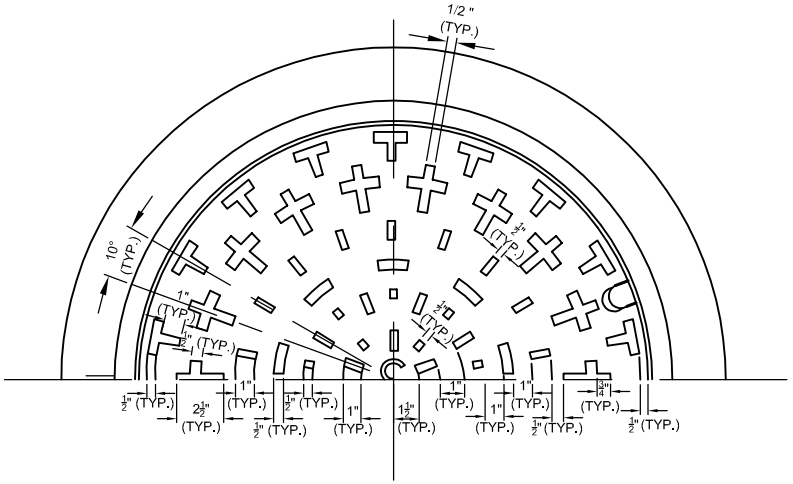
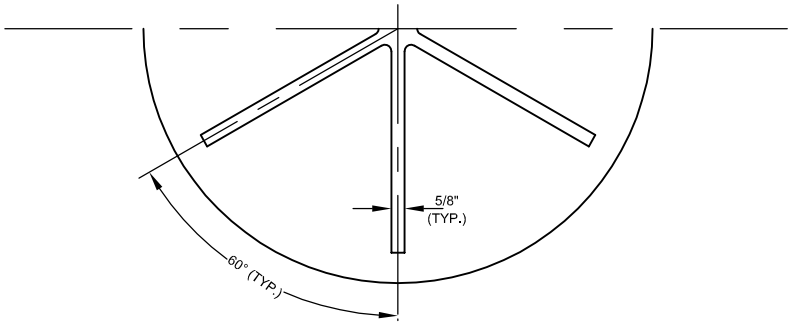
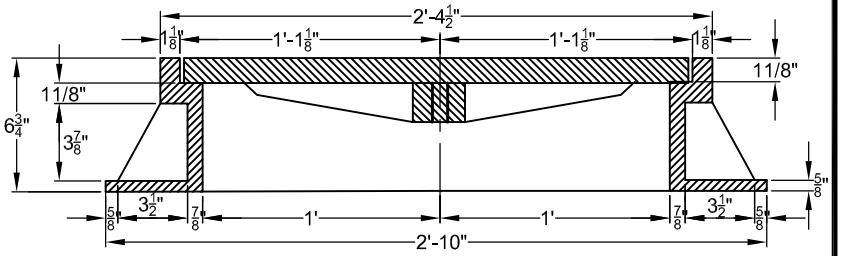


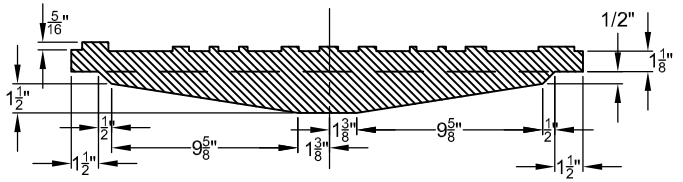
HALF PLAN OF UPPER COVER FACE



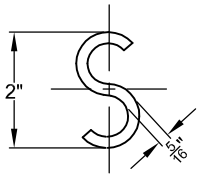
HALF PLAN OF LOWER COVER FACE



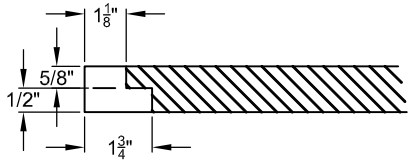
SECTION OF FRAME AND COVER



SECTION OF COVER



LETTER "S" ON COVER



SECTION OF PICK HOLE

CITY OF GRASS VALLEY
NEVADA CO., CALIF.

PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SEWER MANHOLE FRAME AND COVER

APPROVED BY:

PUBLIC WORKS DIRECTOR / CITY ENGINEER

SCALE:	DRAWN BY:	DATE:	
NONE	EAD	MAY 12, 2016	**SS - 2**

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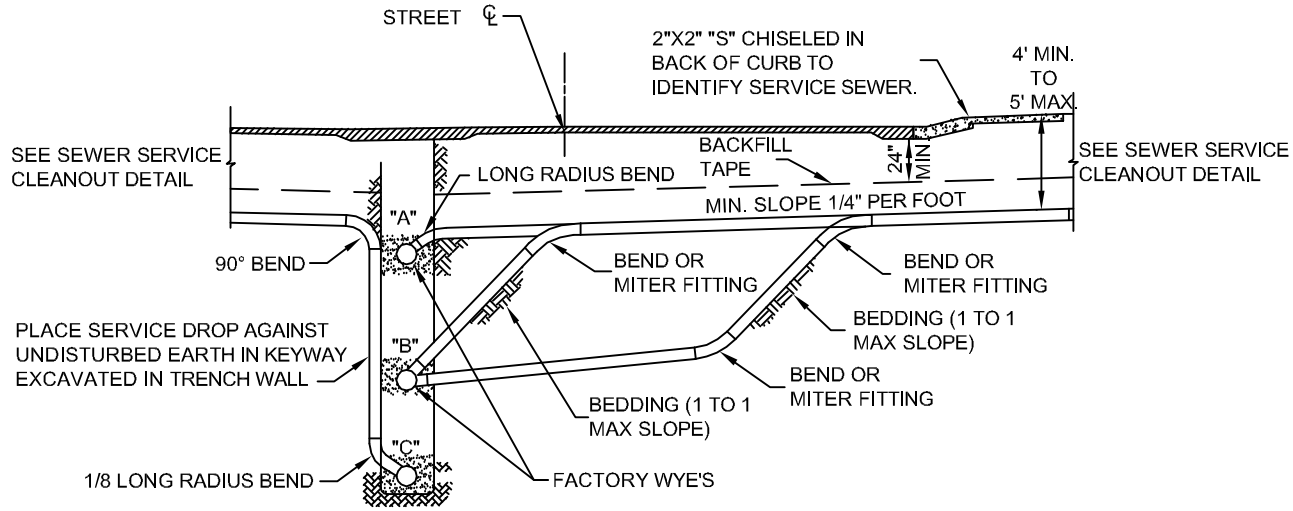
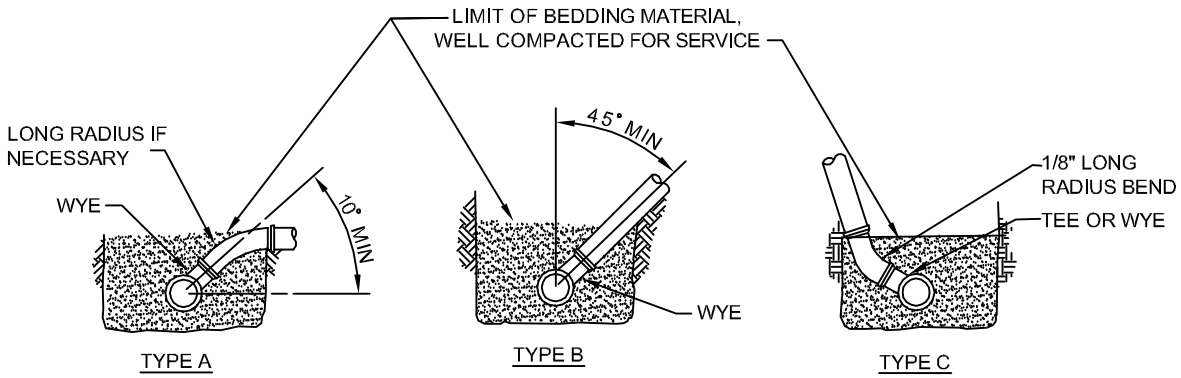


ELEVATION

GENERAL NOTES:

1. ALL SERVICE LINES SHALL BE 4" FOR RESIDENTIAL AND 6" FOR COMMERCIAL UNLESS OTHERWISE NOTED.
2. SERVICES SHALL HAVE SAME BEDDING AND BACKFILL AS LATERAL SEWER.
3. CONTRACTOR SHALL USE THE MOST APPROPRIATE TYPE CONNECTION (A, B, OR C) FOR THE PARTICULAR SITUATION ENCOUNTERED
4. SERVICE SEWER SHALL HAVE MINIMUM 4'-0" COVER AT PROPERTY LINE WHENEVER LATERAL DEPTH AND SERVICE SEWER SLOPE OF 1/4" PER FOOT (MINIMUM) PERMIT.
5. MIN. SPECIFIED COVER AT THE PROPERTY LINE SHALL BE MEASURED FROM EXISTING GROUND SURFACE OR EDGE OF ADJACENT ROADWAY, WHICHEVER IS LOWER.
6. MITER FITTING SHALL BE MAX. 45°.
7. MINIMUM DEPTH OF COVER SHALL BE INCREASED TO 4'-6" WHERE A WATER MAIN IS TO BE INSTALLED AT BACK OF SIDEWALK AS PART OF THE SUBDIVISION IMPROVEMENTS. IN SUCH CASES, THE SERVICE SHALL BE EXTENDED TO A MINIMUM OF 7' BACK OF SIDEWALK; CLEANOUT TO GRADE SHALL REMAIN WITHIN 3' OF BACK OF SIDEWALK.



CONNECTION DETAILS

PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SEWER SERVICES

APPROVED BY:

PUBLIC WORKS DIRECTOR / CITY ENGINEER

SCALE:	DRAWN BY:	DATE:	
NONE	CDH	FEB 27, 2012	**SS - 3**

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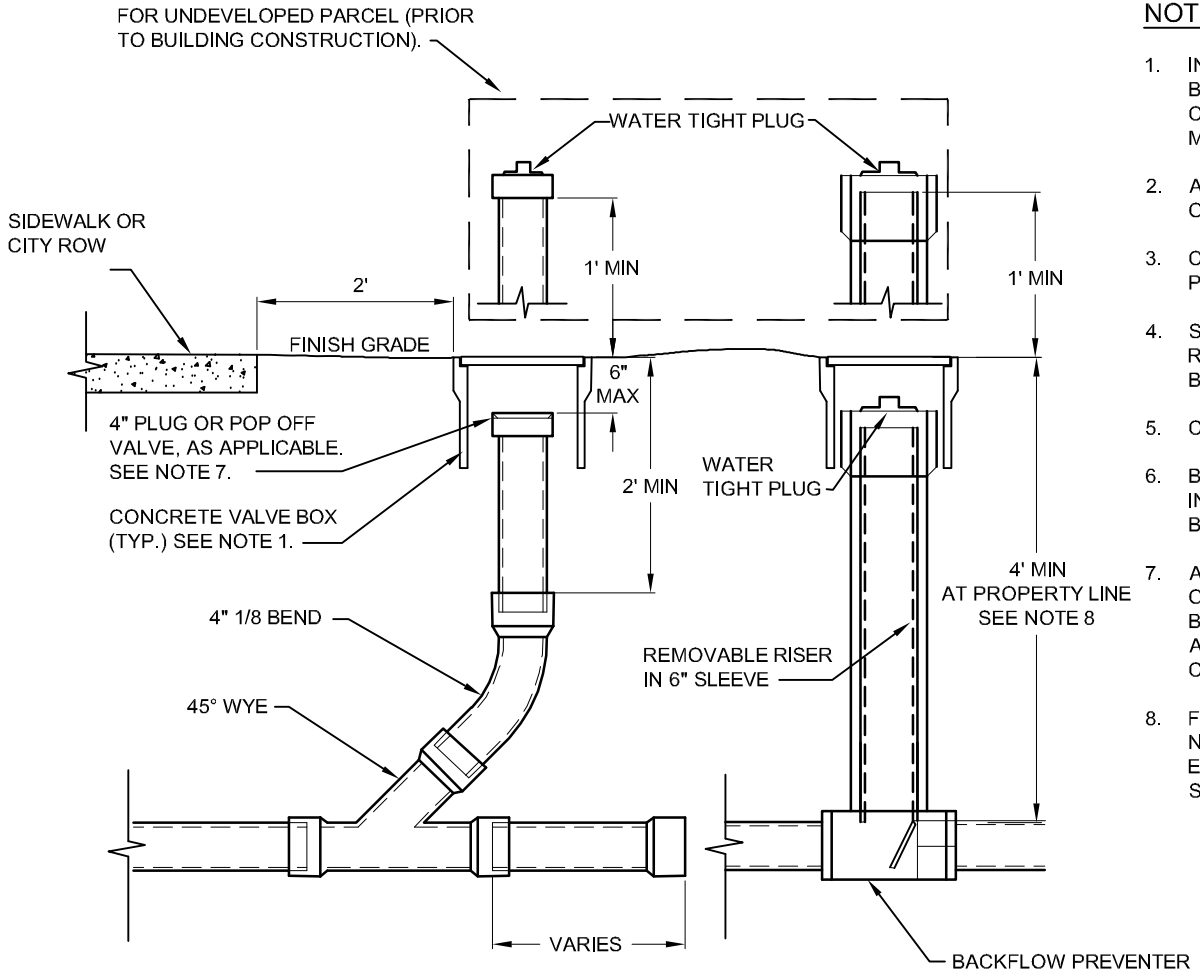

NOTES:

1. IN NON-TRAFFIC AREAS INSTALL A ROUND CONCRETE VALVE BOX & COVER MARKED "SEWER". IN TRAFFIC AREAS INSTALL A CHRISTY G5 BOX (OR APPROVED EQUAL) WITH A TRAFFIC RATED METAL LID MARKED "SEWER".
2. A THREE FOOT CAPPED STUB SHALL BE INSTALLED UPSTREAM OF THE BACKFLOW PREVENTER ON UNDEVELOPED PARCELS.
3. CLEANOUT BOX TO BE FREE OF ALL DIRT AND READY AT TIME OF PRE-FINAL INSPECTION.
4. SERVICES OVER 100' LONG AND COMMERCIAL SERVICES REQUIRE A MIN. 6" CLEANOUT WITH 6" FITTINGS. THE CLEANOUT BOX SHALL BE CONSTRUCTED PER THE DESIGN STANDARDS.
5. CONNECTION TO MAIN SHALL BE WITH A FACTORY WYE.
6. BUILDING CONTRACTOR SHALL SET BOX TO FINISH GRADE AND INSTALL AN ABS PLUG SET 6" BELOW THE SURFACE PRIOR TO BUILDING PRE-FINAL.
7. A POP OFF RELIEF VALVE SHALL BE INSTALLED IN THE CAP OF ONE CLEANOUT LOCATED ON THE STREET SIDE OF THE BACKFLOW PREVENTER. THE CLEANOUT SHALL BE LOCATED IN AN AREA LEAST LIKELY TO CAUSE DAMAGE TO PROPERTY OR CONTAMINATION OF SURROUNDING AREA IF ACTIVATED.
8. FOR EXISTING SERVICES, SEWER LINE DEPTH SHALL BE AS NEEDED TO MATCH EXISTING PIPE INVERT ELEVATION. CITY ENGINEER MAY INCLUDE SPECIAL REQUIREMENTS FOR SHALLOW SERVICES IN THE CITY RIGHT OF WAY.

PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SEWER SERVICE CLEANOUT

APPROVED BY:

PUBLIC WORKS DIRECTOR / CITY ENGINEER

SCALE:	DRAWN BY:	DATE:	
NONE	CDH	FEB 27, 2012	SS - 4

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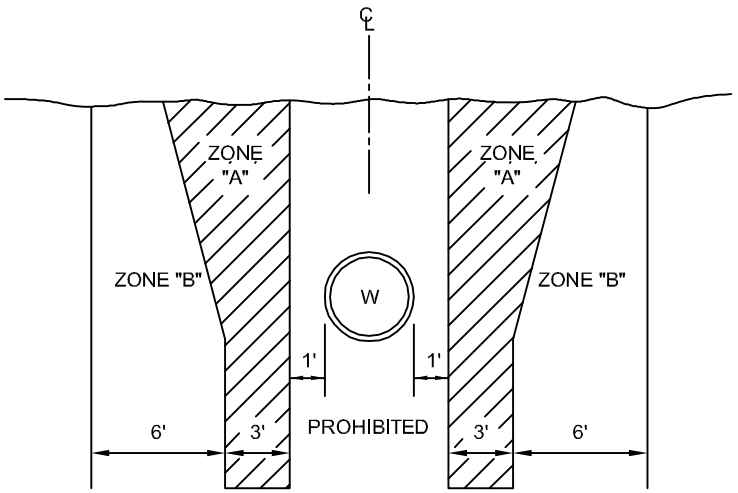
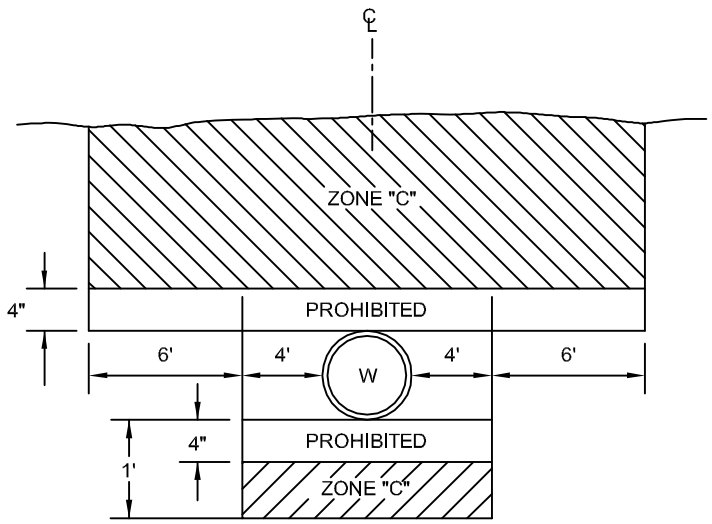


PARALLEL CONSTRUCTION



CROSSINGS

NOTES:

1. ZONE "A" SPECIAL PERMISSION (ALL ZONES REQUIRE REVIEW BY CITY ENGINEER).

2. ZONE "B" SPECIAL PIPE REQUIRED:
   - PVC SEWER PIPE WITH RUBBER RING JOINTS.
   - CAST OR DUCTILE IRON PIPE WITH COMPRESSION JOINTS.
   - IF THE SEWER PIPE DOES NOT MEET THE ABOVE REQUIREMENTS THE WATER LINE MUST BE CONSTRUCTED OF DUCTILE IRON PIPE WITH HOT DIP BITUMINOUS COATING OR CLASS 200 PVC PIPE.

3. ZONE "C" SPECIAL PIPE, NO JOINTS.
   - A CONTINUOUS SECTION OF DUCTILE IRON PIPE WITH HOT DIP BITUMINOUS COATING.
   - A CONTINUOUS SECTION OF CLASS 200 PVC PIPE.
   - ANY SEWER PIPE WITHIN A CONTINUOUS SLEEVE.
   - IF THE SEWER PIPE DOES NOT MEET THE ABOVE REQUIREMENTS THE WATER LINE MUST BE CONSTRUCTED OF A CONTINUOUS SECTION (NO JOINTS), DUCTILE IRON PIPE WITH HOT DIP BITUMINOUS COATING OR CLASS 200 PVC PIPE.

4. MINIMUM CLEARANCES ARE REQUIRED WHENEVER POSSIBLE. REDUCED SEPERATION WITHIN THE ZONES SHOWN ARE SUBJECT TO REVIEW AND APPROVAL.

CITY OF GRASS VALLEY NEVADA CO. CALIF.

PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SEWER AND WATER SEPARATION DETAILS

APPROVED BY:

PUBLIC WORKS DIRECTOR / CITY ENGINEER

SCALE:	DRAWN BY:	DATE:	
NONE	CDH	FEB 28, 2012	**SS - 5**

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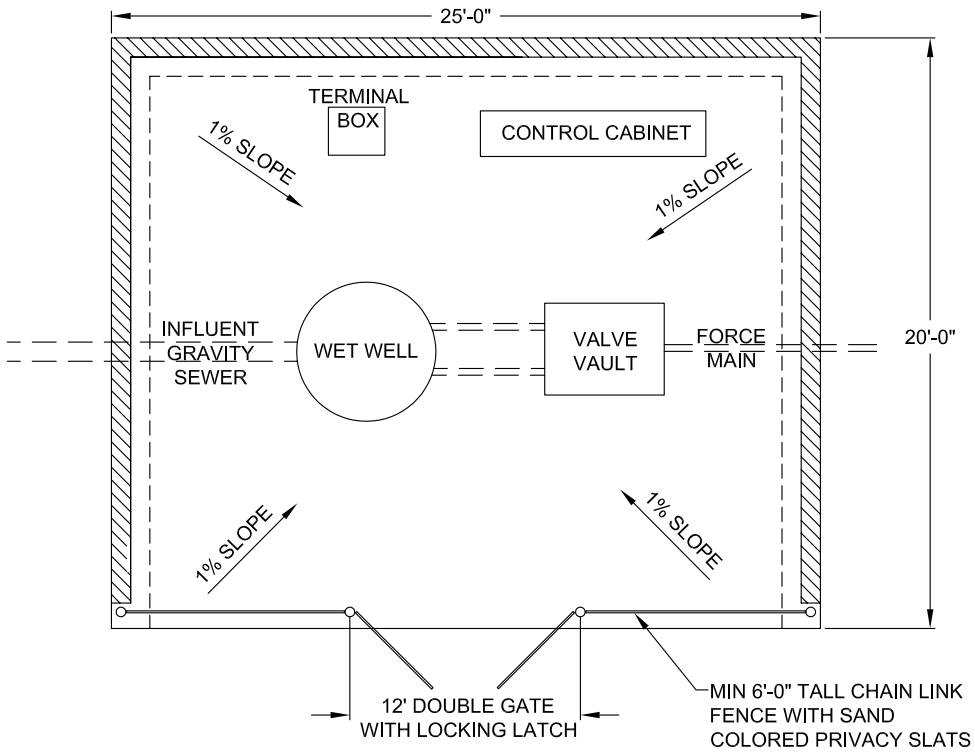
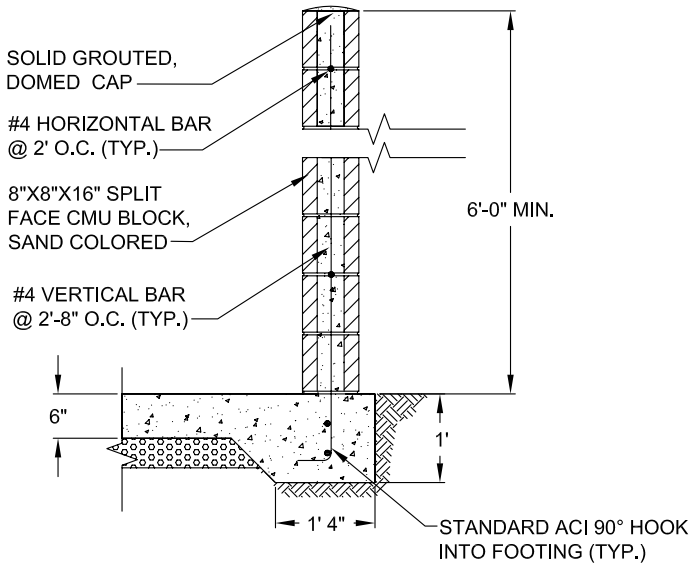


LIFT STATION SITE PLAN



BLOCK WALL AND FOOTING

NOTES:

1. MODIFICATIONS TO THE STANDARD LAYOUT MAY BE NEEDED AS SITE CONDITIONS DICTATE. ALL CHANGES ARE TO BE APPROVED BY THE CITY ENGINEER.

2. A DRAINAGE INLET PIPED TO OUTSIDE THE ENCLOSURE MAY BE REQUIRED AT THE DISCRETION OF THE CITY ENGINEER.

PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

STANDARD SEWER LIFT STATION SITE PLAN

APPROVED BY:

PUBLIC WORKS DIRECTOR / CITY ENGINEER

SCALE:	DRAWN BY:	DATE:	
NONE	BPJ	MAR 3, 2009	**SS - 6**

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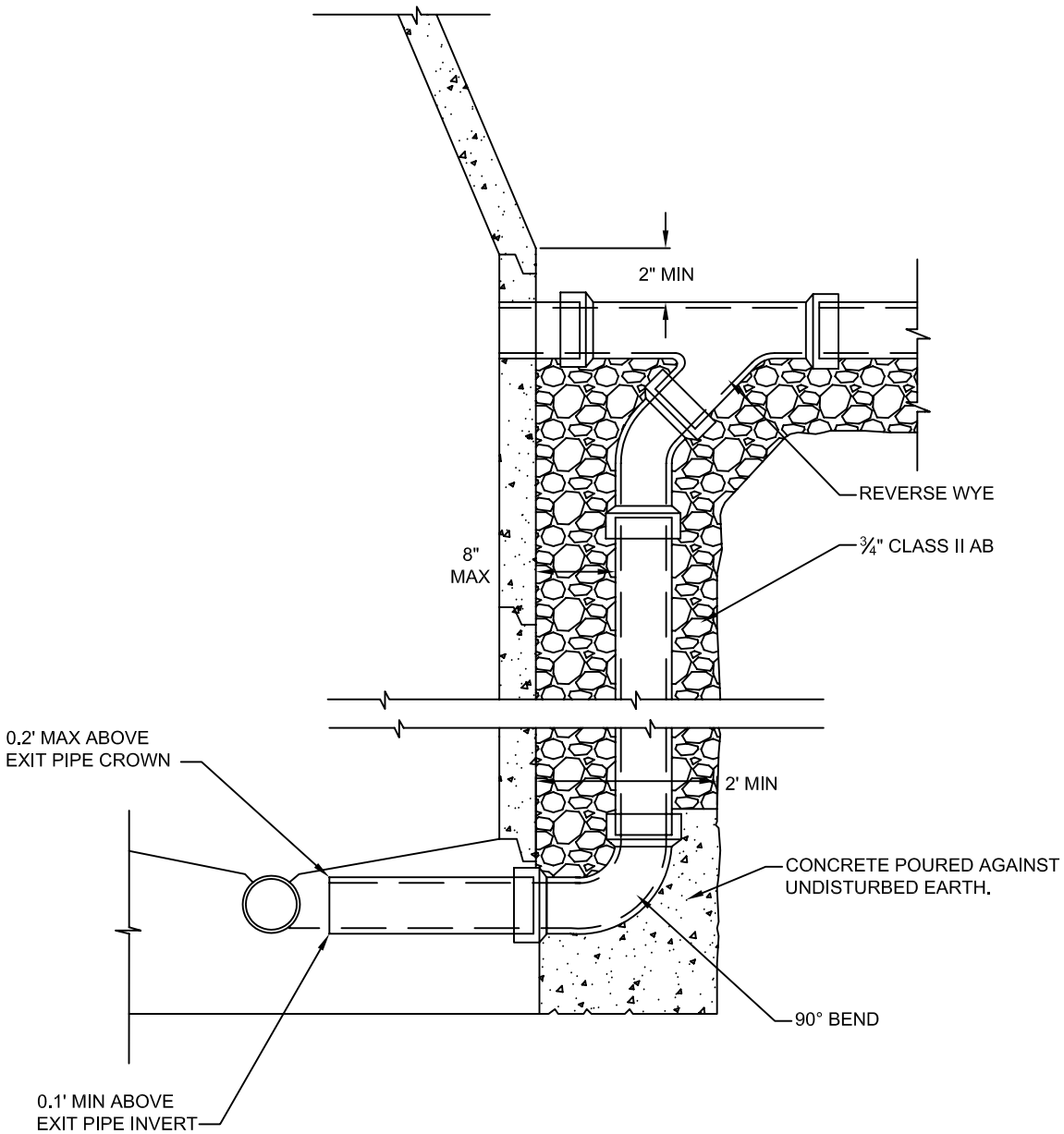

NOTES:

1. OUTSIDE DROP CONNECTION MAY ONLY BE USED WITH APPROVAL OF THE CITY ENGINEER.

2. MINIMUM DROPS. (IF NOT ATTAINABLE SEWER LINE SHALL BE REDESIGNED TO FALL DIRECTLY INTO MANHOLE):

   6" & 8" = 20" MIN DROP
   10" = 32" MIN DROP
   12" & LARGER = 36" MIN DROP

PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

OUTSIDE DROP CONNECTION

APPROVED BY:

PUBLIC WORKS DIRECTOR / CITY ENGINEER

SCALE:	DRAWN BY:	DATE:	
NONE	BPJ	FEB 9, 2010	**SS - 7**

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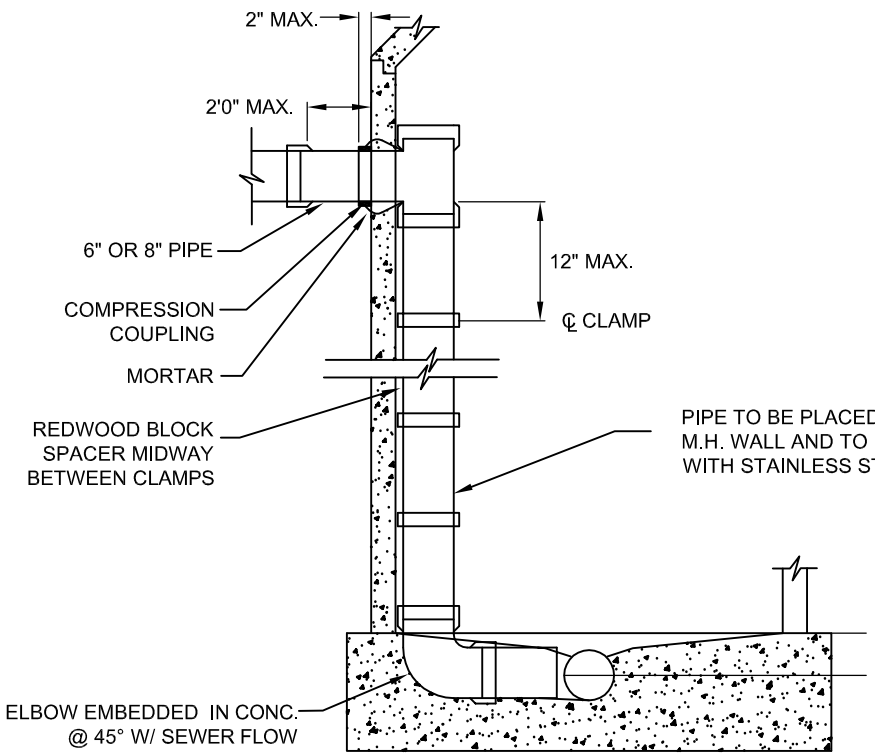
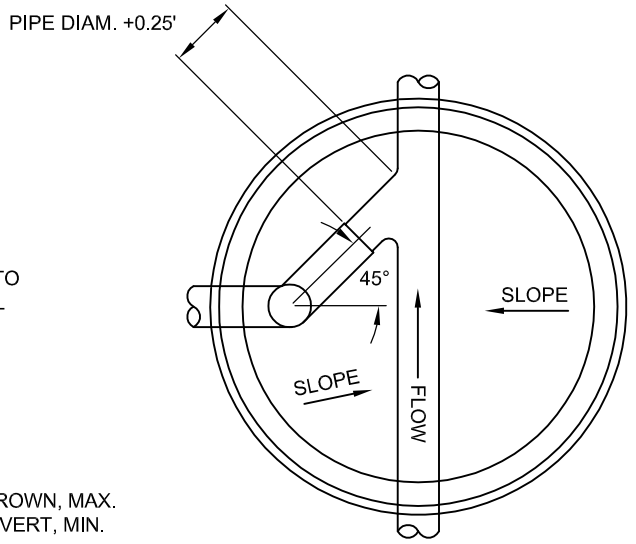


PROFILE



PLAN

NOTES:

1. REQUIRES CITY ENGINEER APPROVAL WHEN AN OUTSIDE DROP IS IMPRACTICAL.
2. ALL INSIDE DROP PIPING TO BE P.V.C. OR A.B.S.
3. CEMENT ALL JOINTS.
4. DROP CONNECTION PIPE AND FITTINGS TO BE SAME SIZE AS ENTERING PIPE.
5. 11/2:X12 GAUGE STAINLESS STEEL CLAMPS TO BE ANCHORED TO M.H. WALL WITH 2-1/2" CADMIUM PLATED BOLTS.
6. MANHOLES WITH INSIDE DROPS SHALL BE A MINIMUM 60" IN DIAMETER.

CITY OF GRASS VALLEY NEVADA CO. CALIF.

PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

INSIDE DROP SEWER MANHOLE

APPROVED BY:

PUBLIC WORKS DIRECTOR / CITY ENGINEER

SCALE:	DRAWN BY:	DATE:	
NONE	EAD	MAY 12, 2016	**SS - 8**

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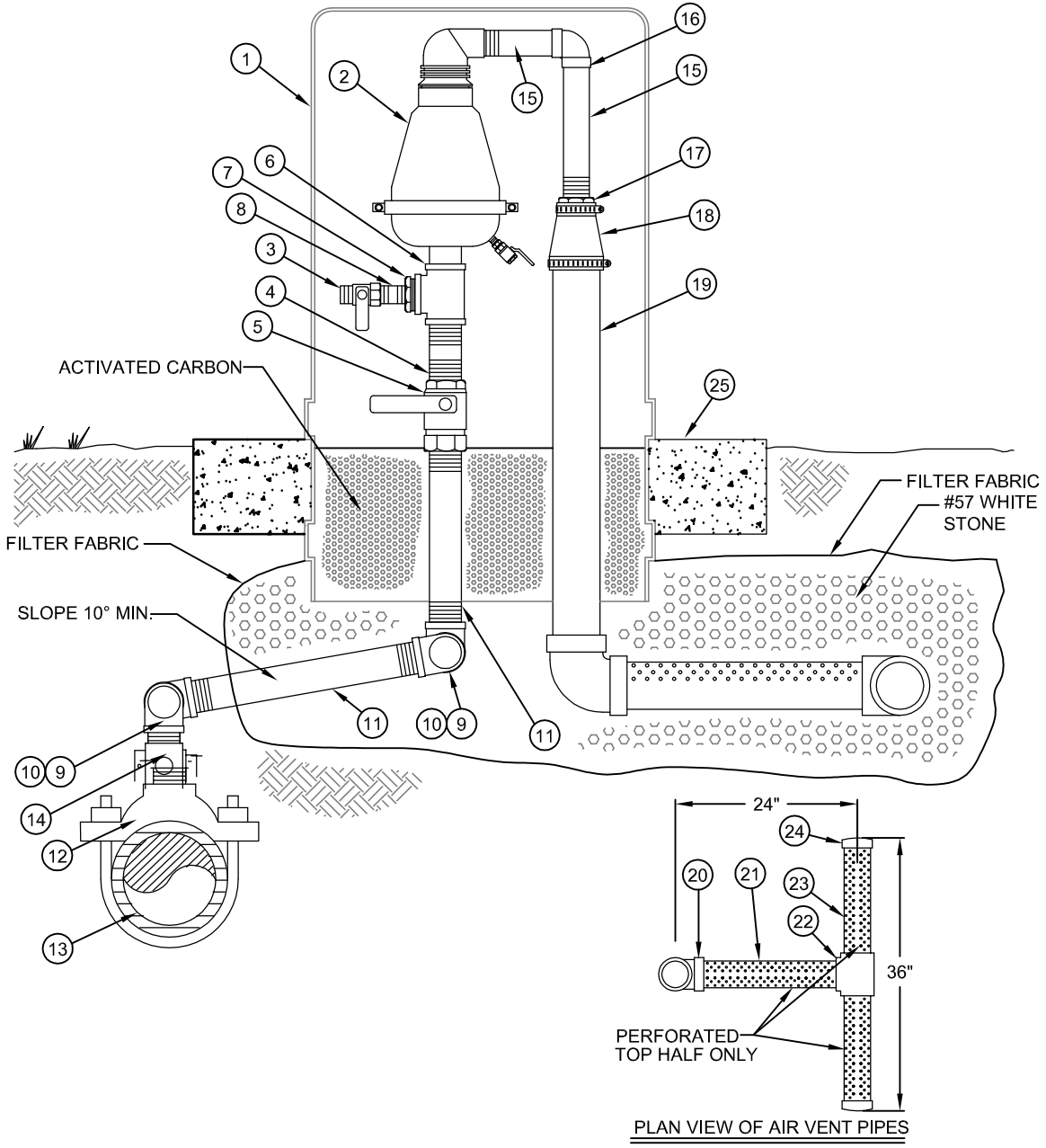

PLAN VIEW OF AIR VENT PIPES

MATERIALS		
ITEM	QUANT.	DESCRIPTION
1	1	ENCLOSURE
2	1	AIR RELEASE VALVE 2" NPT
3	1	1" CURB STOP, S.S.
4	1	2" x 4" NIPPLE, S.S.
5	1	2" BALL VALVE, S.S.
6	1	2" TEE, S.S.
7	1	2" X 1" REDUCER, S.S.
8	1	1" SHORT NIPPLE, S.S.
9	4	2" x 90° ELBOW, S.S.
10	2	2" SHORT NIPPLE, S.S.
11	2	2" PIPE, S.S. LENGTH AS REQUIRED
12	1	2" DOUBLE STRAP TAPPING SADDLE, S.S.
13	1	4" & LARGER PIPE, D.I. OR PVC
14	1	2" CORPORATION BRASS
15	2	1-1/2" PIPE, PVC, LENGTH AS REQUIRED
16	1	1-1/2" x 90° ELBOW, PVC
17	1	2" X 1-1/2" REDUCER, PVC
18	1	3" X 2" FLEX COUPLING
19	1	3" PIPE, PVC, LENGTH AS REQUIRED
20	1	3" x 90° ELBOW, PVC
21	1	3" PIPE, PVC, PERFORATED TOP HALF ONLY
22	1	3" TEE, PVC
23	2	3" PIPE, PVC, PERFORATED TOP HALF ONLY
24	2	3" CAP, PVC
25	1	CONCRETE SLAB AROUND ENCLOSURE

PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

STANDARD SEWER AIR RELEASE VALVE

APPROVED BY:

PUBLIC WORKS DIRECTOR / CITY ENGINEER

SCALE:	DRAWN BY:	DATE:	
NONE	EAD	MAY 12, 2016	SS - 9

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