WASTEWATER COLLECTION SYSTEM DESIGN CRITERIA AND STANDARD SPECIFICATIONS for the SECURITY SANITATION DISTRICT ENTERPRISE

SECURITY SANITATION DISTRICT
231 SECURITY BOULEVARD
COLORADO SPRINGS, CO 80911

WASTEWATER COLLECTION SYSTEM DESIGN CRITERIA AND STANDARD SPECIFICATIONS

FEBRUARY 2020

IMPLEMENTATION OF THE WASTEWATER COLLECTION SYSTEM DESIGN CRITERIA AND STANDARD SPECIFICATIONS DOES NOT GUARANTEE, WARRANT, OR ASSURE THAT ALL FACILITIES DESIGNED AND CONSTRUCTED AS A RESULT THEREIN, WILL OPERATE AND FUNCTION AS INTENDED, NEEDED OR DESIRED BY THE OWNER OR BE IN COMPLIANCE WITH ALL APPLICABLE CODES, ORDINANCES, RULES, REGULATIONS AND REQUIREMENTS OF OTHER GOVERNMENTAL AND/OR REGULATORY AGENCIES OR THE SECURITY SANITATION DISTRICT

ADOPTED BY THE BOARD OF DIRECTORS OF THE SECURITY SANITATION DISTRICT, ACTING BY AND THROUGH ITS WATER ACTIVITY ENTERPRISE ON THIS 19TH DAY OF FEBRUARY, 2020.

Dick Gilham

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PART I

DESIGN CRITERIA AND STANDARD SPECIFICATIONS

CHAPTER 1

GENERAL INFORMATION

1.01 Authority. These Specifications are promulgated by the Security Sanitation District, acting by and through its Water Activity Enterprise (District). The interpretation, enforcement, and revision of these Specifications are hereby delegated to the General Manager of the District.

1.02 Effective Date of Specifications. These Specifications shall be in effect immediately upon adoption by the District Board and shall supersede all former standard specifications for installation of wastewater collection system components and other related infrastructure within the District's service area.

1.03 Revisions, Amendments or Additions. These Specifications may be revised, amended or added to. Such revisions, amendments and additions shall be binding and in full force and effect when adopted in the manner set forth in Section 1.02.

1.04 District Control. These Specifications will apply to the installation, operation and maintenance of all wastewater collection facilities and other related infrastructure under the control of the Security Sanitation District.

1.05 Organization and Interpretation of Specifications. These Specifications are composed of design criteria and provisions, material specifications, installation specifications and standard drawings. The interpretation of any section or of differences between sections, when appropriate, shall be made by the General Manager of the District and his/her interpretation shall be binding and controlling in its application.

1.06 Implementation. Implementation of the Wastewater Collection System Design Criteria and Standard Specifications does not guarantee, warrant, or assure that all facilities designed and constructed as a result therein, will operate and function as intended, needed, or desired by the owner or be in compliance with all applicable codes, ordinances, rules, regulations and requirements of other governmental and/or regulatory agencies or the Security Sanitation District.

1.07 Definitions. As used in these Specifications, or in any of the drawings where these Specifications govern, unless the context shall otherwise require, the following words defined shall have the meanings herein ascribed:

A. District Board. The Board of Directors of the District duly elected or appointed in accordance with applicable statutory requirements.

B. General Manager or Manager. The Manager of the District or their designated representative.

C. Engineer. The Engineer or consultant of the District, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.

D. Collection System. Sewer mains and/or wastewater pipelines, together with all necessary appurtenances, including without limitation, necessary manholes, cleanouts, taps, service pipes, and associated materials, easements, property and equipment collecting sanitary sewage from individual customers and/or properties.

E. Wastewater Main or Sanitary Sewer Main. That portion of the wastewater system which collects sewage from users and conveys that sewage to the District wastewater treatment plant, excluding service lines, but including all necessary appurtenant infrastructure such as manholes.

F. Service Line. The sewage collection pipeline extending from the customer or property where wastewater is generated down to and including the connection to the wastewater pipeline or sanitary sewer main.

G. Applicant for System Extension. Any person, association, corporation, entity, or government agency desiring sanitary sewer service for premises under their control, often a subdivider, a developer or an owner.

H. Main Extension. Extensions to the existing collection system network.

I. Contractor. In the context of these Specifications a person or persons, partnership or corporation employed by an applicant for the purpose of installing wastewater system extensions or replacements.

J. Inspector. The authorized representative of the District assigned to the project.

K. Standard Drawings. District Standard Drawings are a part of these Specifications.

L. District. The Security Sanitation District responsible for overseeing the wastewater system's operations.

M. Premises. Land, property, building, buildings or other locations and/or facilities where wastewater is generated.

1.08 Abbreviations. All references to documents or specifications shall be the latest edition or revision thereof:

A. ASTM American Society for Testing and Materials

B. ANSI American National Standards Institute

C. NSF National Sanitation Foundation

D. OSHA Occupational Safety and Health Administration

E. USGS United States Geological Survey

F. DIP Ductile Iron Pipe

G. PVC Polyvinyl Chloride Plastic Pipe

1.09 Enforcement. In the event of the violation or non-compliance with these Wastewater Collection System Design Criteria and Standard Specifications, and in addition to all other remedies set forth herein, the District may enforce these regulations by seeking damages and injunctive relief and enforcement of any provision of these regulations. Proper jurisdiction and venue shall be in the El Paso County District Court. In the event of any such action for damages or to enforce these regulations, the District shall also be entitled to recover its reasonable attorney's fees, engineering fees, expert witness fees, and other costs and expenses incurred in the enforcement of these regulations. Those amounts shall also constitute utility fees and charges due to the District and shall constitute a lien upon the property serviced in accordance with Colorado Revised Statutes §§ 32-1-1001, 1006.

1.10 Indemnity. The property owner and developer shall hold harmless and indemnify the District for any costs, fees, claims, damages, and expenses that the District may incur as a result of their own respective violation or noncompliance with any of the provisions of all of these regulations. Those amounts shall also constitute utility fees and charges due to the District and shall constitute a lien upon the property serviced in accordance with Colorado Revised Statutes §§ 32-1-1001, 1006.

1.11 Variance. A variance as to the requirements of any of these entire regulations under Parts I through V, may be granted by the District Manager or Board of Directors after due consideration by the District for good cause shown including, without limitation, the particular hardship and unique circumstances of the customer which are not brought about as a result of the customers acts or omissions. The variance applicant has the burden of proof on the above issues and to establish that the requested variance will not harm or otherwise interfere with the operation of the District's wastewater collection system. The granting of any variance shall be at the sole discretion of the District based upon the facts and circumstances of each request. Any variance granted shall not establish a precedent for any future variance request.

CHAPTER 2

DESIGN OF WASTEWATER SYSTEMS

2.01 General.

A. The design and preparation of Construction Documents shall be accomplished by a Professional Engineer licensed in the State of Colorado.

B. The design and preparation of Construction Documents shall be accomplished by competent personnel with experience in such work.

2.02 Planning Considerations. The land use and population densities approved for the District shall be used to determine wastewater facility design parameters. Where approved development plans do not exist, the following criteria shall be used unless specific approval for other criteria has been given by the District.

A. Design Period: The wastewater collection and conveyance systems shall be designed for the estimated ultimate tributary population. The tributary areas shall be studied to determine the area for each projected land use.

B. Population densities including public use lands:

1. Single-family units at 3.2 persons per unit.

2. Multi-family and condominiums at 2.5 persons per unit.

3. Four (4) single-family units per acre.

4. Sixteen (16) multi-family cluster housing or condominiums per acre.

C. Per capita flows: Wastewater collection and conveyance systems shall be designed on the basis of not less than the following criteria values unless other values are specifically authorized by the District. The design professional responsible for developing planning and design documents shall inquire of the District as to the specific values for use in each specific project prior to commencing work.

1. One hundred (100) gallons per person per day.

2. Three hundred (300) gallons per capita per day peak flow for submains and laterals.

3. Two hundred fifty (250) gallons per capita per day peak flow for main trunk, interceptor or outfall sewers.

4. Commercial land uses at 1400 gallons per acre per day with a peak factor of 2.

5. Industrial land uses at 1600 gallons per acre per day with a peak factor of 3.

6. Public use, park and open space at 1000 gallons per acre per day with a peak factor of 2.

2.03 Pipe Sizing.

A. Minimum Size

1. No public sewer shall be less than 8 inches in diameter.

2. No service line shall be less than 4 inches in diameter. B. Pipe Size Selection

B. Pipe Size Selection

1. Pipe sizing shall be based on the maximum depth of flow being 75 percent of the pipe diameter under peak flow conditions.

2.04 Depth of Cover. In general, sewers shall be designed deep enough to drain basements and to prevent freezing and provide protection from damage from loads applied at the ground or pavement surface. No public mains shall be less than 5 feet deep measured from the top of pipe unless special protection is required. Special protection shall consist of:

A. Less than 5 feet but more than 3 feet of cover requires ductile iron pipe, or SDR-26 PVC pipe with reinforced concrete arch.

B. SDR-35 PVC plastic pipe material may be used where the depth of cover is more than 5 feet except as otherwise provided for locations where depth of cover exceeds 14- feet.

C. Less than 3 feet of cover requires site-and project-specific designs. Consultation with the District prior to proceeding is required.

D. No building sewer shall be less than 5 feet deep in traffic areas without similar special protection listed above except that concrete driveways may be substituted for protection of service lines.

E. PVC pipe, ASTM D3034, SDR-35 shall not be used where the depth of cover is more than 14 feet. Special analysis and design shall be accomplished to design suitable materials and/or other protection for the pipe. In general, SDR-26 PVC pipe with protective bedding may be suitable for depths of cover between 14 and 25 feet. Refer to Part III of these Specifications for the requirements for pipeline embedment.

2.05 Minimum Pipe Slopes. All sewers shall be designed to transport average sewage flows at a minimum mean velocity of 2 feet per second based on a Manning's roughness factor of 0.013. The slope between manholes shall be uniform. In no case shall the slope be less than the following for sewer mains and services:

Minimum Pipe Slope

A. Services.

Pipe Diameter	Slope
4 Inch diameter	2% or 1/4 inch per foot
4 Inch diameter	Ductile iron pipe - 1% or 1/8 inch per foot
6 Inch diameter	1% or 1/8 inch per foot

B. Mains.

Pipe Diameter	Slope
8 Inch diameter	0.50%
10 Inch diameter	0.35%
12 Inch diameter	0.26%
15 Inch diameter	0.20%
18 Inch diameter	0.15%

2.06 High Velocity Protection.

In the case of sewers where the slope is more than 15 percent, special provisions as determined by the District shall be made to prevent excessive erosion of material surfaces or displacement by impact. Such high velocity protection shall be shown on detailed construction drawings and approved by the District on a case-by-case basis.

2.07 Alignment.

A. Sewers in Streets.

1. Standard location for sewers, unless some major interference prevents, is along the centerline of the street and/or right-of-way located midway between curb and gutter on each side of the traveled surface.

2. On streets running north and south where it is not possible to locate the pipe on centerline, the sewer line shall be placed no more than 10' (ten feet) west of the centerline of the street.

3. On streets running east and west where it is not possible to locate the pipe on centerline, the sewer line shall be placed no more than 10' (ten feet) south of the centerline of the street.

4. On streets shaped as a "U" or on streets having unusually sharp turns, the sewer line will conform to the above specifications as near as is practical, but the final locations shall be as determined by the Engineer or other District representative. Curvilinear sewer mains shall not be allowed without prior approval of the District. Designs must attempt to minimize the use of manholes and maximize the operability and maintainability of the collection system.

5. In no case shall the sewer line be installed closer than 5-feet to the lip of the pan or gutter.

6. Manholes and all other portions of the collection system shall be located and constructed so as to prevent stormwater and groundwater entrance.

7. Proposed sewer lines which may conflict with the placement of other underground facilities, will require prior approval of the sewer placement location by the controlling agencies whose facilities are affected. Locations other than those specified will require specific approval of the District.

B. Sewers in Easements.

1. All sewer easements shall be in form and substance as required by the District and must be a minimum of 20' (twenty feet) in width and must be prepared in accordance with the District's rules, regulations, policies and procedures.

2. No sewer shall be located less than 5' (five feet) from the edge of the easement.

3. All sewer lines in easements between lots shall be constructed with ASTM D3034 SDR-26 PVC pipe per Chapter 4, 4.01.

2.08 Pipe Alignment in Manholes.

A. Intersections. All pipes shall have free discharge into the collection system. The basic design criteria to be applied will result in the hydraulic grade line (HGL) of flows into a manhole being higher than the HGL at the outlet of the manhole.

1. The pipes entering the manhole will be set at an elevation to match the maximum allowable depth of flow (75% of pipe diameter) with the HGL at the manhole outlet pipe under maximum allowable depth of flow with an allowance for headloss in the manhole channel.

2. Unless the design conditions obviously dictate otherwise, head loss in the manholes will be accounted for by setting all manhole inverts with a 0.1 foot drop except for changes in alignment in excess of 30° shall have a 0.3 foot drop in the invert through the manhole. Refer to other design criteria herein where comparative HGL elevations will govern the design.

3. Where two or more pipes enter the manhole, the pipe elevation and/or HGLs shall be established to match.

a. Unless dictated otherwise by a detailed hydraulic analysis, the flowline of two or more pipes entering a manhole will be at least 0.3 feet above the flowline of the pipe flowing out of the manhole.

4. Changes in direction at intersections shall not be greater than 90 degrees

5. When the intersecting pipe is smaller in diameter than the pipe exiting the manhole, the crown or inside-top of the intersecting pipe shall match the crown or inside-top of the main pipe entering the manhole unless detailed hydraulic computations indicate the intersecting pipe should be higher to match hydraulic grade lines with head loss. In no case shall the difference in elevation between the flowline of the pipe exiting the manhole and the flowline of the intersecting sewer be less than 0.3

feet.

B. Increasing Size. When sewers are increased in size with no intersecting sewers, the invert of the larger sewer shall be lowered sufficiently to maintain the same energy gradient.

2.09 Manhole Location.

A. Manholes shall be installed at the end of each line, at all pipeline intersections, changes in grade, size, alignment and at intervals not greater than 400 feet.

B. Manholes must be located to allow unassisted and unrestricted access by District maintenance vehicles. Lines and manholes located in areas where access, in the opinion of the District, is not possible or may cause safety concerns will not be approved for construction.

2.10 Manhole Design Details.

A. Manhole Sizes.

1. Inside diameter not less than 5 feet on lines 8 inches through 30 inches in diameter.

2. Inside diameter not less than 6 feet on lines 36 inches through 54 inches in diameter.

3. Six (6) foot diameter manholes will be required for any manholes with four (4) penetrations.

4. See Drawing No. WW-3.

5. Special consideration at the sole discretion of the District shall be applied for manholes greater than 25-feet in depth.

6. If pipelines larger than 60 inches in diameter are necessary or other special conditions exist, special design considerations will be necessary as determined by the District in its sole discretion.

7. Apex manholes will not be allowed unless otherwise approved on a case by case basis.

B. Drop Manholes.

1. External drop manholes will be permitted only in extreme and special conditions where approval has been granted by the District.

2. As a general criteria, a minimum difference in elevation of 1.5 feet between the inlet and outlet is required before considering use of drop manhole design.

3. The maximum amount of vertical drop allowable in a drop manhole shall be 10 feet.

4. Where an external drop manhole is required, the external drop section must be totally encased in reinforced concrete and placed on an adequate foundation. See Drawing No. WW-4.

5. Where drop manholes are required, design of an internal drop shall be accomplished using the Reliner(TM) product or an acceptable equivalent. All metallic hardware shall be type 316 stainless steel. See Drawing No. WW-5.

6. All drop manholes must be completely lined with coal tar epoxy 45 mils thick or an equivalent acceptable form of protective coating.

    a. ICS Devoe Dextor™

    b. Amine-cured epoxy, Raven Lining Systems, Inc., "Raven 405"

C. Manhole Channels.

1. The flow channel shall be made to conform to the slope and shape of the sewer pipe entering and exiting the manhole.

2. The channel shall be formed from cast-in-place concrete to a cross-section matching the circular pipes.

3. The channel shall be constructed with vertical walls from a point one-half the pipe diameter above the channel flowline as shown in the standard drawings.

4. At intersections with other lines, channels shall be formed with a curve to minimize turbulence.

5. The flow channel shall be constructed to have a minimum depth equal to the pipe diameter. Refer to standard drawings.

D. Manhole Gaskets.

1. The pipes entering and exiting the manhole shall be equipped with a manhole gasket placed around the pipe and cast in the base.

2. A precast base shall use a pre-manufactured rubber gasket in the precast base section such as a Kor-N-Seal® boot or approved equivalent pre-manufactured pipe fitting.

3. Manholes constructed on existing pipelines with a site-cast, cast-in-place base shall be constructed with waterstop gaskets.

    a. Volclay RX-101; two circumferential gaskets/waterstops, 4 inches apart, at each pipe embedment

    b. Cast-in-place bases must cover the waterstop a minimum of 6-inches.

E. Rings and Covers.

1. The ring and cover shall be constructed of cast iron for traffic bearing conditions and cast aluminum or cast iron for non-traffic bearing conditions.

2. All manholes located outside of dedicated street or alley rights-of-way will be designed and constructed with a locking type cover and the ring bolted to the concrete cone.

3. Grade adjustment rings between the ring and cover and the concrete cone cap shall not exceed 6 inches in total height.

4. The District shall specify the use of special manhole cones with identity logos, impressions or castings.

F. Cone and Barrel Sections.

1. Watertightness. Precast concrete manhole joints shall be made watertight. Manholes of brick or segmented block shall not be used in the sanitary sewer system. Refer to Part I, Chapter 4 of these Regulations for material specifications.

   a. Each precast manhole segment shall be joined with a rubber "O" ring, Ram- Nek, Con-Seal or similar approved material. Each segment shall be full bed and double wrapped.

   b. No exterior coating is required on the manhole. If ground water is present, the manhole exterior must be coated with a high build epoxy water proofing.

   c. All exterior MH joints shall be double wrapped with 12" wide elastomeric joint wrap overlapped 4" at the joint.

      1) Henry Company RUB'R NEK® External Concrete Joint Wrap or approved equal.

   d. If site conditions require a high build epoxy water proofing material should be placed on the exterior of the entire manhole surface.

      1) ICS Devoe Devtar 5A

      2) Waterproofing materials shall be applied to clean, dry surfaces in accordance with the coating manufacturer's written instructions/ recommendations and the following:

         a) Preparation
            (1) Examine surfaces to receive waterproofing to assure conditions are satisfactory for application of materials
            (2) Remove dirt, dust, sand, grit, mud, oil, grease and other foreign matter
            (3) Brush down surfaces to remove all loose scale, fins, dust, etc.
            (4) Complete surface preparation in accordance with manufacturer's recommendations

b) Application
(1) General
(a) Apply in three (3) coats with high pile rollers or by spray equipment
(i) Minimum air pressure: 90 psi
(ii) Spray apply in a fine mist
(b) Provide adequate forced ventilation when applying coating in enclosed spaces
(c) Do not use benzol or other volatile solvents for thinning coating
(2) First coat
(a) Apply only when surface of concrete is dry and at a suitable temperature for adequate penetration
(b) Thin as recommended by manufacturer
(c) Apply for maximum penetration
(d) Absorbed by concrete within 5 to 30 minutes of application so no continuous film remains on surface
(3) Second coat: Cover surface with 5 mil film
(4) Third coat: Produce a high gloss 5 mil film
(5) Cure material as recommended by manufacturer
(6) Do not cover with backfill until installation is accepted by inspector

e. Where ground water is present or, in the opinion of the District, ground water could be present, all exterior joints shall receive a 3/8" to 1/2" thick coating of cement grout. The joint shall be double wrapped with 12" wide elastomeric joint wrap overlapped 4" at the joint covering and adhered to the joint area extending a minimum of 6 inches each side of the joint.

G. Stub Outs from Manholes.

1. Stub outs from manholes shall generally not be allowed except for lines which are known to be extended for future construction/development and shall not exceed 40 feet.

a. When stub outs are allowed, installation must provide for future excavation of the stub out to adjust pipe to the proper grade.

2. Whenever practical, designs to complete the manhole run shall be submitted to the District Manager for review to insure proper grade and alignment for future construction/development.

a. Future extension of stub outs shall be of like material using the same pipe slope and alignment.

b. Any stub outs from manholes shall be plugged with a watertight and airtight glue cap fitting. Whenever practical, capped end shall be marked for future location reference.

H. Design Features for Deep Manholes.

1. Manholes which are more than sixteen (16) feet from the finished cover to the pipe invert shall be considered deep manholes subject to special design. The items given below shall be given special attention and subject to approval by the District.

   a. Structural integrity of precast or cast-in-place concrete structures shall be verified and certified by the responsible design professional for all manholes in excess of 16-feet in depth.

      1) Specific attention shall be given to concrete thickness, reinforcing design and concrete strength.

   b. Deep manholes shall be designed and constructed to be in accordance with OSHA regulations which may require resting platforms and allow for access of manhole utilizing confined space entry equipment.

I. Underdrain.

1. Where an underdrain must be used, the underdrain must be carried under or around the manhole base.

   a. Underdrain must have a minimum of 4-feet of horizontal separation, edge of pipe to edge of pipe.

   b. Underdrain must be placed a minimum of 1.5-feet below the sewer line, flow line of sewer pipe to top of underdrain pipe.

2. In no case shall any underdrain, sump pump or trench drain be connected to the public wastewater system.

3. Components of an underdrain system shall not penetrate or be attached to any part of the wastewater collection system of the District.

4. All underdrain piping shall be white to preclude accidental cross-connection of the drainage systems.

J. Service Connection to Manholes.

1. No sewer service lines will be allowed to connect to manholes.

2. No sewer service shall connect to the main line closer than 5' to the exterior of a manhole.

2.11 Relation to Water Mains and Water Supplies.

A. Wastewater pipelines shall be located a minimum of 10 feet horizontally from existing or proposed water mains, edge of pipe to edge of pipe. Wastewater pipelines shall be a minimum of 18 inches clear distance vertically below the water main.

1. If this clear distance is not feasible, the crossing must be designed and constructed so as to protect the water main from potential cross connections and minimize the potential for structural damage to either pipeline.

2. Install in accordance with the Colorado Department of Public Health and Environment (CDPHE) Design Criteria for Wastewater Treatment Works, Section 3.2.12 most recent revision and these Specifications, whichever is more stringent.

3. Minimum protection shall consist of the installation of an impervious and structural sewer.

    a. Where the sewer pipe is above the water main, regardless of separation, one length of ductile iron pipe, or approved equivalent, at least 18 feet long centered over the water main and jointed to the sanitary sewer pipe with a manufactured adapter specifically for such jointing shall be installed. It shall include rubber gasketed fittings with stainless steel tightening bands. The joints shall be enclosed in a reinforced concrete collar at least 6 inches thick and extending at least 6 inches either side of the joint.

        1) PVC pipe may be used if placed in a steel or ductile iron pipe casing or sleeve at least 20 feet in length, centered over the water main.

    b. Where the sewer is beneath the water main but less than 18 inches clear distance vertically, the sewer pipe of any material shall be encased in a steel or ductile iron pipe casing or sleeve. The casing pipe shall extend a distance of 10 feet on either side of the water main crossing.

    c. The above-described protection from potential cross connections shall apply to service lines as well as sanitary sewer mains where the above described protection and special installation is required.

    d. There shall be no physical connection between a public or private potable water supply system and a wastewater pipeline or appurtenance thereto which would permit the passage of any sewage or polluted water into the potable supply.

    e. While no general statement can be made to cover all conditions, it is generally recognized that sewers must be kept remote from public water supply wells or other water supply sources and structures in accordance with the applicable Health Department Standards.

B. Sanitary sewer service pipelines shall be located no less than 10-feet horizontally, edge of pipe to edge of pipe, from water service pipelines within public right-of-way or easements, regardless of vertical separation.

2.12 Stream and Drainage Channel Crossings.

A. All stream and drainage channel crossings shall be specified wastewater pipeline water encased in a steel or ductile iron casing pipe where the installation is below the flow line of the stream or drainage channel.

B. Crossings less than 4 feet below existing or proposed channel bottoms shall be supported by reinforced concrete caissons constructed in accordance with the approved special design. Crossings of stream channels which cannot be demonstrated to be stable and not subject to any degradation shall be constructed with reinforced concrete caissons regardless of depth below existing stream channel flow line.

C. Where the pipeline crossing will be above the stream or drainage channel flow line, special approval and design will be required by the District. All details of the design shall be submitted to the District for review and approval.

2.13 Railroad, Highway and Street Crossings.

A. All work shall be accomplished in accordance with the appropriate permit issued by the responsible agency having jurisdiction over the work.

B. Crossings under railroads, highways, and certain specified streets shall consist of polyvinyl chloride (PVC), higher density polyethylene (HDPE), ductile iron or epoxy coated steel pipe (carrier pipe) laid inside a steel or ductile iron pipe conduit (casing pipe), which is placed beneath the track or roadway.

1. The steel conduit pipe (casing pipe) shall be jacked horizontally through the ground on the grade of the sewer, with due allowance for the bells or joints of the carrier pipe.

2. As the pipe is jacked along, the earth shall be excavated from the face and removed so that it will not be necessary to force the pipe through solid ground.

3. Specifications for materials and installation of the railroad or highway agency shall govern.

C. The District reserves the right to require a casing pipe be placed when crossing under a county, town, or city street.

D. The casing pipe diameter for 16-inch and smaller carrier pipes shall be a minimum of 8 inches larger than the carrier pipe and the casing pipe diameter for larger than 16-inch diameter carrier pipe shall be a minimum of 12 inches larger than the carrier pipe.

1. The District may permit alteration of this design criterion when HDPE pipe is used for the carrier pipe.

E. After the casing conduit has been completed, the carrier pipe shall be placed inside and supported in exact position and grade with a support at intervals specified in the accepted construction details and behind each bell or coupling. A minimum of three points of support shall be installed to prevent displacement by floating.

F. Each end of the casing pipe shall be enclosed tight around the carrier pipe and the casing pipe. The closure shall consist of a prefabricated rubber boot with stainless steel tightening bands specifically for sealing casing pipe ends.

G. The owners use of the Collection System shall be subject to the terms of whatever necessary easements or licenses that are obtained by the District from third parties.

2.14 Service Lines (Building Sewers).

A. Service lines and stub outs from main sewers shall be extended to each property at a point no less than 10 feet inside the property line and generally 10 feet above the low lot corner with a maximum depth of 12 feet inside the property line.

B. Stub outs from a sewer main may be made to an unoccupied lot provided it is part of an officially platted and recorded subdivision.

1. Stubs shall be extended to 10 feet inside property line and plugged with a watertight, and airtight glue cap fitting. Capping shall be sufficient to perform air testing of the pipeline. Records of the depth and location of the end of the service stub shall be recorded by the party responsible for construction and submitted to the District for future reference.

C. Four-inch diameter service lines shall have a maximum length of 200 feet.

D. Service line connection to public wastewater pipelines or mains shall be accomplished with an in-line, factory-fabricated wye fitting with gasketed bell joints on the upstream extent of the wye branch and run. Spigot end or gasketed bell end may be used on the downstream end of the wye fitting.

E. Connection of service lines to existing wastewater pipelines or mains installed with materials other than PVC shall use tee saddle fittings specifically manufactured for the pipe materials used.

F. A two-way 4-inch diameter cleanout shall be installed on ALL private sewer service lines. Cleanout shall be located outside building foundation. See Drawing No. WW-8.

G. Additionally, a two-way 4-inch diameter cleanout shall be installed on the service lines where the total length exceeds 100 feet and at 75-foot intervals thereafter up to a maximum of 200 feet in length and at each horizontal directional change. A cleanout shall be installed on private sewer services at all changes in direction requiring bends exceeding 22 ½ degrees.

1. Cleanouts shall have a proper waterproof cap.

2. For cleanout access, a prefabricated formed wye with a riser pipe shall be installed to the finished grade.

3. A minimum of 10-inch long cast iron riser box with "SEWER" cast in the lid shall be placed over the cleanout access, flush with finished grade.

a. Required for all cleanouts on commercial property.

b. Required for all cleanouts placed in areas subject to traffic loading.

H. Service lines projected to be longer than 200 feet in length shall have pipe 6 inches in diameter or as otherwise required by the District. Provisions for cleanouts shall also apply to pipelines 6 inches in diameter.

I. No service line within the District's service area will serve more than one property or customer. Each house, building or business shall have an individual connection to the sewer main and service line from the main to the structure served.

J. All service lines for commercial buildings or multi-family buildings shall be no less than 6-inches in diameter.

K. Any service line requiring 3 or more bend fittings between the sewer main line and building served shall be constructed with a cleanout at intervals specified above. If 3 or more bend fittings are required in a service line with a length less than 100 feet, a cleanout shall be installed at the midpoint of that section at District's discretion.

L. After acceptance by the District, the maintenance of all service lines shall be the sole responsibility of the property owner served by the line.

2.15 Encasement and Casings.

A. General: Concrete encasements shall be installed under the following conditions.

1. Where sewer lines are at a depth too shallow to sustain traffic load or any other load to which they are subjected. The depth may range from 0 to 3 feet, depending on the loading conditions.

    a. A concrete cap or arch may be used in lieu of complete encasement when approved by the District Manager.

2. At locations where infiltration is likely to be high.

3. At locations where horizontal movement of the sewer mains may be experienced, such as in stream beds with less than 5-feet of cover.

4. At potable water supply crossings where it is inappropriate to use pipe casings.
5. At any location designated by the District Manager and/or Engineer.

B. Design Considerations.

1. All concrete encasements shall be reinforced in accordance with the District's standard details and shall be of a length to completely span the condition encountered.

2. Unless so designed, encasements are for the purpose of pipeline protection and are not to be considered a structural beam. Therefore, special attention to a good foundation and compaction effort for the encasement must be provided.

C. Pipe Casings.

1. Pipe casing shall be used where required under road or railroad rights-of-way by the governing agency. All pipe casings shall be constructed to conform with the District's standard details, the Colorado Department of Transportation Standards, and the requirements of any other applicable approving agency.

2. Pipe casing shall be used where minimum vertical clearances from potable water pipelines cannot be attained. Refer to other criteria established in these Regulations and criteria.

2.16 Pump Station Design Parameters.

A. Design of pump stations within the District's collection system shall be accomplished on a case by case basis. Pump stations shall not be used wherever gravity sewer service is available. Preliminary considerations and a rationale for the need of the pump station shall be reviewed in detail with the District Manager prior to proceeding with preliminary and final design. As general guidelines for planning purposes, any pump station considered by the District must include, but is not necessarily limited to the following design features:

1. Dry pit or wet well submersible pumping equipment.

2. Multiple pumps.

3. Standby power generation.

4. Ventilation, heating and dehumidification equipment.

5. Automatic controls.

6. Remote alarm system for operating functions integrated with the District's I & C or SCADA system.

7. Emergency overflow storage

8. Other features and details of design, construction and operation as specified by adopted guidelines, criteria and policy.

2.17 Owner/Developer Costs.

A. Plans and Specifications. All costs associated with the design of sanitary sewer mains and services in accordance with District Rules and Regulations for undeveloped property shall be at the expense of the Owner/Developer.

B. Construction. All costs associated with the furnishing and installation of wastewater pipelines and services in accordance with District Rules and Regulations shall be at the expense of the Owner/Developer.

C. Plan Review and Construction Administration. The Owner/Developer of property shall pay all District costs including administrative, legal, and engineering fees in regard to plan review, preconstruction and construction progress meetings, field inspections, installation compliance, punch list preparation and all other construction expenses related to the development of the property.

1. The Owner/Developer must execute an Inclusion Agreement and/or a Subdivision Public Improvements Agreement (SPIA) with the District to initiate the Plan Review and Construction Administration process.

2. An initial and any supplemental monetary deposit to secure payment of costs incurred by the District in the above activities, in an amount estimated by the District, shall be made by the Owner/Developer prior to any work or action being taken by the District in accordance with the Inclusion Agreement and/or a Subdivision Public Improvements Agreement (SPIA).

3. The amount and form of monetary deposit shall be as established by the District Manager.

CHAPTER 3

PLAN SUBMITTAL REQUIREMENT

3.01 Plans and Specifications.

A. Two (2) copies of preliminary plans and other documents shall be provided to the District for review, comment and record.

B. Upon submittal of plans and other documents suitable for final approval, the following must be provided:

1. Three (3) copies of all plans and specifications for facilities to be installed under these rules and regulations shall be furnished to the District.

2. AutoCad files of the final approved plan set in .dwg format.

3. One set of the final approved plan set, the final plat and Utility Service Plan in Portable Document Format (PDF) files.

3.02 Plan Content. As a minimum, the following information shall be required on all plans.

A. Plan View

1. Streets, rights-of-way and utility easements

2. Location and size of the sewers

3. Locations and distance between manholes

4. Pipe slope

5. Other wastewater pipeline appurtenances

6. Size and location of service stubs

7. Location of all existing or proposed underground utilities and structures located within 30 feet horizontally or vertically of the centerline of the proposed sewer extension.

8. The scale is optional; however, 1"=50' is commonly used.

B. Profile View

1. Vertical and horizontal grids shall show the existing ground surface (dotted) and proposed surface (solid).

2. Proposed sewer with elevations of manhole rims and pipes at the manhole

3. Distance and pipe slope between manholes and elevations of utility crossings.

4. All underground infrastructure crossing or in proximity to the proposed wastewater pipeline

C. Detail drawings: Special detail drawings, made to scale, shall clearly show the nature of design and construction of the following:

1. Special wastewater collection system appurtenances such as non-standard manholes and elevated sewers.

2. Special joints and utility or storm sewer crossings.

3. Stream and drainage channel crossings with elevations of normal high and low water levels.

3.03 Supporting Data. Submit with the plans and specifications all necessary supporting data to fully describe the proposed installation. This data shall include but not necessarily be limited to the following.

A. A copy of the recorded plat of the subdivision in which the improvements are proposed to be installed

B. Copies of dedicated and recorded rights-of-way and easements in which improvements are proposed to be installed

C. Copies of necessary permits from other governmental or private agencies having jurisdiction in the area of the proposed work.

D. Should a site application for a collection system extension be required by the Colorado Department of Public Health and Environment, the individual party responsible for construction of the facility shall also be responsible for obtaining this site approval with prior review and approval of the District.

E. The detailed calculation of the daily and peak wastewater treatment demand.

3.04 As-Constructed Data. Upon completion of construction and prior to acceptance by the District, "as-constructed" plans and other pertinent documents to include a copy of the field markups or "redline" construction documents shall be submitted to the District for record.

A. Two (2) copies shall be completed with all "as-constructed" information.

1. Provide a certification by the party responsible for construction that all data thereon is accurate and represents actual "as-constructed" conditions.

2. As-constructed documents shall include all plans showing all public and private infrastructure in the development or otherwise appurtenant to the property served by the wastewater pipeline.

B. "As-constructed" plans shall be submitted within two weeks of completion of the sanitary sewer construction in any identifiable phase of a development.

1. No authorization to connect to the system or discharge to the system will be allowed until the "as-constructed" documents have been received and accepted by the

District.

C. An electronic file or files of all "As-constructed" record documents and drawings shall be provided to the District.

1. All drawings shall be in an AutoCAD 2012.dwg or newer format.

2. All documents shall have horizontal and vertical coordinate systems conforming to the District's standards for its geographical information system (GIS).

a. NAVD 1988

b. NAD 1983, Colorado State Plane coordinate system, Central zone, ground coordinates, using a combination factor specified by the District.

D. All plans, specifications and supporting documents including as-constructed documents shall be prepared by or under the direct supervision of a professional engineer licensed to practice in the State of Colorado. All plans and specifications shall bear the seal and signature of said licensed professional engineer.

3.05 Sewage System and Trench and Foundation Drains.

A. In no case shall any trench drains, foundation drain or other drainage fixture be connected to the District's system which may introduce any wastewater other than sanitary sewage into the system.

B. All piping material incorporated into the District's sanitary sewage system shall **not** be white. At the time of the preparation of these specifications, the predominant pipe color is green.

C. All trench or foundation drainage piping shall be white to preclude accidental cross-connection of the drainage systems.

D. All foundation drainage laterals connecting to an underdrain near or within the sanitary sewer trench shall be three (3) inches in diameter.

CHAPTER 4

PIPE AND MANHOLE MATERIALS

4.01 PVC Pipe and Fittings (Polyvinyl Chloride).

A. Conformance.

1. ASTM D3034; Standard Dimension Ratio (SDR) shall be maximum of 35 for 4" through 15" diameter pipe.

2. ASTM D3034; SDR-26 for 4" through 15" diameter pipe where directed.

3. ASTM F679; PS46 and PS115; for 18" through 36" diameter pipe.

B. Joints.

1. ASTM D3212; Bell and spigot, push-on with single rubber gasket.

2. Jointing of dissimilar pipe materials shall be accomplished with a specially manufactured rubber connection with stainless steel tightening bands (Mission Rubber Company, Fernco or Ford Meter Box Co.).

C. Length of Joints.

1. The length of pipe joints for flexible conduits shall not exceed 14 feet for pipe slopes less than one percent.

D. Color.

1. All sanitary sewage piping material shall be Green in color.

E. Criteria for Acceptance. Pipe which has any of the following visual defects will not be accepted.

1. Improperly formed pipe such that pipe intended to be straight has an ordinate, measured from the concave side of the pipe exceeding 1/16 inch per foot of length.

2. Pipe which is out-of-round to prohibit proper jointing.

3. Improperly formed bell and spigot ends or bells which are less than 1-1/2 inches in length.

4. Pipe which is fractured, cracked, chipped or damaged in any manner.

5. Pipe that has been damaged during shipment or handling.

6. Pipe or fittings not properly marked as required by the following specifications.

7. Pipe or gaskets which show obvious evidence of exposure to sunlight by being faded.

F. Marking of Material. The following shall be clearly shown on the exterior of the pipe:

1. Manufacturer's name.

2. ASTM designation.

3. Appropriate SDR number.

4. Homemark.

G. Material Handling and Storage.

1. Avoid damage to pipe from impact, bending, compression or abrasion during handling and storage.

2. Store pipe on flat surface which provides even support for the pipe barrel with bell end overhanging.

3. Do not stack pipe higher than 5 feet.

4. Do not store pipe and fittings in direct sunlight for extended periods (greater than three weeks). Any discoloration of the pipe material shall be evidence of ultraviolet damage and shall be reason for rejection and removal from the project.

5. Ship rubber gaskets in cartons and store in a clean area away from grease, oil, ozone producing electric motors, heat and the direct rays of the sun.

6. Use only nylon protected sling to handle pipe. The use of hooks, bare cables or chains will not be permitted.

7. Shop submittals for pipe material to be incorporated into the project must include date of manufacture for all pipe.

H. Trench and foundation drain piping used in the District shall be white in color to better assure that there is no accidental connection between the two separate drainage systems.

I. PVC pipe shall not be installed at depths in excess of fourteen (14) feet without specific approval of the District and design of appropriate pipe material, bedding and installation.

1. SDR-35 may be installed when depths are 5 feet to 14 feet of earth cover.

2. SDR-26 may be installed with 25 feet or less of earth cover.

4.02 Ductile Iron Pipe.

A. Conformance.

1. ANSI 21.51/AWWA C151; ASTM A536, Grade 60-42-10; Thickness Class 50 or Pressure Class 350, unless otherwise required for internal or external loading.

2. Fittings shall conform to ANSI 21.10 for flanged, mechanical joints and push-on joints, AWWA C110 or C153.

B. Joints.

1. Mechanical Joint: ANSI A21.11

2. Push-On: ANSI A21.11

3. Flanged: ANSI B16.1, 125 lb. drilling

4. Rubber Gaskets: AWWA C111 (ANSI A21.11)

C. Protective Coatings and Linings.

1. Exterior Coating: Manufacturer's standard bituminous coating approximately 1 mil thick.

2. Interior Lining:

a. Type: Ceramic Epoxy

b. Thickness: 40 mils DFT

c. Design Basis: U.S. Pipe Protecto 401™ or equivalent

D. Polyethylene Wrapping. All ductile iron pipe shall be installed with an 8-mil thick polyethylene wrapping.

1. Conform to AWWA C105 latest revision.

E. Criteria for Acceptance. In addition to any deficiencies covered by the reference specifications above, any of the following visual defects will not be accepted.

1. Improperly formed pipe such that pipe intended to be straight has an ordinate, measured from the concave side of the pipe exceeding 1/16 inch per foot of length.

2. Pipe which is out-of-round to prohibit proper jointing.

3. Pipe which is fractured, cracked, chipped or damaged in any manner.

4. Pipe that has been damaged during shipment or handling.

5. Pipe which has lining which is fractured, cracked, chipped or damaged in any manner and would not provide satisfactory service under the conditions intended.

F. Marking of Material & Certification of Manufacturer.

1. All materials shall be marked with the name of the manufacturer of origin.

2. Manufacturer will provide a certification to the District that all products supplied to the project site are in conformance with these specifications.

G. Material Handling and Storage.

1. Handle pipe fittings and accessories using lifting hoist or skidding to avoid shock or damage.

2. Do not drop such materials.

3. Do not allow pipe unloaded on skidways to be skidded or rolled into pipe previously unloaded.

4. Protect the pipe coatings and linings from damage during delivery and handling.

4.03 Manholes. Except as otherwise specifically approved by the District, manholes shall be precast concrete and manufactured in accordance with the referenced specifications.

A. Conformance.

1. Precast concrete in conformance with ASTM C478.

B. Size of Manholes.

1. Manhole Sizes

Diameter of Main	Size of Sewer Inside Manhole
8 inches through 30 inches	5-feet
36 inches through 54 inches	6-feet
Manhole with four (4) penetrations	6-feet
60 inches and larger	Special Design
Greater than 25 feet of depth	Special Design

2. Special design and construction details shall be prepared for any manhole exceeding 25 feet in depth.

C. Inverts.

1. All manhole inverts shall be full depth inverts matching the pipe diameter of the existing pipe.

2. Manhole inverts shall be placed in all manholes including dead-end manholes.

D. Cement.

1. All cement used in manhole construction shall be Type II or Type IILA. All concrete shall have a 28-day compressive strength of at least 3,000 pounds per square inch (psi).

E. Barrel Joints.

1. Rubber gasketed joints for pre-cast manhole sections shall be an R-4 joint and designed in accordance with ASTM C443.

2. Manhole joints shall be joined with flexible plastic/rubber gaskets constructed of Ram-Nek, Rubber-Nek, Con-Seal or equivalent. Each segment shall be full bed and double wrapped.

3. Exterior joints shall be double wrapped with 12" wide elastomeric joint wrap completely adhered to the exterior of the manhole.

a. Refer to watertightness material specification

4.04 Cast-In-Place Concrete.

A. All cast in place concrete utilized in wastewater pipeline construction shall have a minimum compressive strength of 3000 psi at 28 days unless specifically required otherwise by the project.

B. Aggregates.

1. Conform to ASTM C33, maximum size shall be 3/4-inch nominal diameter.

C. Cement.

1. Portland Cement in accordance with ASTM C150, Type II or IILA will be used for all concrete.

D. Admixtures.

1. Air entraining admixtures will be permitted in conformance to ASTM C260.

2. Maximum entrained air shall be 6.5% and minimum shall be 5.0%.

3. Water reducing and retarding admixtures may be utilized with the specific approval of the District. Such admixtures shall be in conformance with ASTM C493.

4. Fly ash or calcium chloride are not permitted for use.

E. Water/Cement Ratio.

1. Maximum water cement ratio shall be 0.42.

F. Slump.

1. 1" minimum, 3" maximum for all concrete to be incorporated in sanitary sewerage facilities.

4.05 Castings.

A. Cast Iron.

1. Conformance: ASTM A48

2. Applicable Items: Manhole rings and covers with non-slip surface with "SEWER" or "SSD" cast in the cover. Combined weight will not be less than 290 pounds. Ring shall be a minimum of 4 inches in height and 24" minimum diameter clear opening.

3. Manhole covers shall provide for a lift hole, ½-inch in diameter located approximately midway between the center and edge of the cover. Notches at the edge of the cover are not acceptable.

4.06 Steps.

A. Steps shall NOT be installed in manholes.

4.07 Cement Mortar.

A. Conformance: ASTM A270, Type M.

4.08 Cement Grout.

A. Cement.

1. Portland Cement in accordance with ASTM C150, Type II or II LA

B. Sand.

1. Clean, well-graded, natural sand in accordance with ASTM C33

C. Proportioning.

1. One part Portland Cement, 2½ parts sand, by weight, with minimum water required for placement and hydration

4.09 Non-Shrink Grout.

A. Approved commercial factory mix product made especially for intended use. Utilize non-metallic chemical grout for non-shrink applications.

1. Sika

4.10 Waterproofing Material.

A. If required.

1. ICS Devoe "Devtar 5A"

2. External concrete joint wrap; elastomeric protective film wrap; Henry Company Sealants Division, "RUB'R-NEK® External Concrete Joint Wrap".

4.11 Tracer Wire.

A. To be placed on all sanitary sewer mains and service lines.

B. #12 AWG HS-CCS high strength copper clad steel conductor with 30 mil green insulation jacket.

C. Tracer Wire Design Basis: Copperhead Industries, LLC.

1. Connectors: SnakeBite™ Locking Connectors by Copperhead Industries, LLC. .

CHAPTER 5

PIPE INSTALLATION

5.01 Subgrade Preparation.

A. See Part II, Earthwork Standard Specifications of these regulations.

5.02 General Requirements.

A. Construction of wastewater facilities must be accomplished by competent personnel with experience in such work.

B. A pre-construction meeting must be arranged by the contractor and/or the developer's representative and held prior to the start of any work. The District representatives and/or District Engineer, Contractor, and Owner or Owner's Engineer must be represented at this meeting, which shall be held at the office of the District.

C. All contractors must notify the District at least 48 hours prior to start of construction.

D. Approved plans and a copy of these specifications must be kept on the job site by the contractor at all times.

5.03 Pipe Laying.

A. Prior to the start of any work where sewer mains to be installed connect to existing District sewer systems, the nearest downstream manhole to the point of tie-in shall be plugged with a plumber's plug on the outlet side by the contractor.

1. This plug shall remain in place until final acceptance by the District. Its purpose is to prevent any mud, water, or other materials from entering the existing line during construction.

2. The contractor shall be responsible for pumping and cleaning these manholes and removing the plug when so instructed by the District Manager.

B. Begin pipe laying at the lowest point, unless directed otherwise by the District, and install the pipe with the spigot ends pointing in the direction of flow.

C. Unless required or directed otherwise by the District, lay all pipe straight between changes in alignment and at uniform slope between changes in grade or slope.

D. As each length of pipe is placed in the trench, the joint shall be completed in accordance with the pipe manufacturer's recommendations and the pipe shall be brought to the correct line and elevation. The offset at the invert shall be less than 1% of the inside pipe diameter.

E. If approved, the length of joints for curvilinear sewer shall be determined by the radius using joint deflection or radius of curvature not exceeding the manufacturer's recommendations, 3-degree couplings with an integral rubber gasketed bell, or a

combination of both.

1. Refer to the approved plans for location of required 3-degree bends.

F. Secure the pipe in place with Class B bedding material tamped under and around the pipe. Refer to bedding and backfill requirement for thickness of bedding layers.

G. Do not walk on small diameter conduit or otherwise disturb any conduit after jointing has been completed.

H. All foreign matter or soil shall be removed from the inside of the pipe before it is lowered into its position in the trench and shall be kept clean at all times during and after laying.

I. All openings along the line of the sewer shall be securely closed and during suspension of work at any time, suitable pipe plugs or closures shall be placed to prevent water, soil or other materials from entering the pipeline.

5.04 Fittings, Couplings, Wyes and Saddles.

A. Fittings, couplings, wyes and saddles shall be the same material as the pipeline or as specifically manufactured for a particular installation.

B. Jointing of dissimilar materials shall be permitted only with approval of the District representative.

1. Jointing of such dissimilar materials shall be through the use of fittings, couplings, wyes, saddles, adapters or adhesives specifically manufactured for such transitions.

5.05 Service Lines.

A. Prepare subgrade in accordance with Part III of these regulations.

B. Installation of any and all service lines whether from the main line to the property line or from property line to the building, must be inspected by the District, who shall be notified by the contractor at least 24 hours prior to installation.

C. The type of service line connection fitting to be utilized when connecting to an existing main line shall be at the discretion of the District.

D. Service line connections in new mains shall be constructed with an in-line wye fitting with the branch oriented in the top one-half of the sewer main.

1. Connections made in the lower half or at mid-point of the main shall have prior approval of the District and may require the installation of a backflow prevention device on the service line.

E. Connection of service lines to existing mains with installed materials other than PVC.

1. Tee saddles with rubber gaskets to be placed between the saddle and the main line of pipe, secured in place with stainless steel bands are required when a new

connection to an existing main with installed materials other than PVC is required.

2. Connection to the main line piping with a tee shall be made by cutting a hole using the appropriate hole template, tapping machine or hole saw no more than ¼-inch larger in diameter than the template outline.

3. A 45° or 22-1/2° bend shall be used from the tee fitting to attain the desired elevation and slope for the service line piping.

4. The tee saddle shall be furnished with an integral rubber gasketed bell.

5. A one-way service line cleanout shall be installed outside of the building foundation. Each cleanout shall be constructed with sweep oriented downstream.

6. All service lines will be connected

F. All service line piping between the main line and the property line of the property to be serviced shall be pipe in accordance with these specifications with integral rubber gasketed push-on joints and shall be connected to the building sanitary piping 5-feet from the building foundation at the cleanout located outside the building.

1. In general, no change in horizontal alignment will be permitted between the connection at the main line and the property line of the property being serviced.

G. Service line connections shall be separated by a minimum of 3 feet measured center to center along the main.

H. Plug all service line stubs with watertight and airtight glue cap fitting unless the service line will be immediately connected to a building sewer.

I. Where new street construction is proposed immediately following construction of sanitary sewer facilities, extend the service line to 10 feet inside the property line, install the appropriate plug and mark with a vertical wood marker extending above the surface and having dimensions of 2" x 4" minimum. All sanitary sewer service pipelines shall be installed at a maximum of 12-feet in depth.

J. Conform to the installation requirements for sewer mains for the installation of sewer service lines in the public right-of-way or easement. Class B bedding shall be required.

K. Record the horizontal position/location of the sewer service and at the time curb and gutter is constructed and provide for the letter "S" to be pressed into the concrete at the curb head directly over the sewer service pipe.

L. The Contractor and/or Developer shall provide complete as-constructed information on each service line connection installed. As a minimum this information shall include the following:

1. Location of the connection to the main referenced to the nearest manhole or other permanent improvement

2. The location of the end of the service line stub

3. The direction of the service line as it relates to surrounding permanent surface improvements

4. Size/pipe diameter

5. The material of construction

6. Date and name of the installer

7. All such information shall be provided to the District's representatives for incorporation into the District's permanent records.

M. Connection of service lines and service line construction shall be accomplished by experienced, qualified personnel with adequate equipment. The District's representative shall have authority to reject work and may not permit work to be accomplished unless done by qualified personnel with suitable tools and equipment.

N. Inspection by the District representative shall be required of each service connection prior to commencing any backfill.

5.06 Manholes.

A. Precast concrete manhole base.

1. Precast flat slab base with integral precast barrel section.

a. Conform to all requirements of ASTM C478, the District's standard specification and any project specific specification and details accepted by the District for a particular installation

b. Flat slab bases shall have the same minimum thicknesses and reinforcing requirements as specified for cast-in-place concrete manhole bases.

2. Where preformed rubber "boots" such as Kor-N-Seal® boots are used in precast manhole bases, manhole gaskets on the pipe are not required.

B. Cast-in-place concrete manhole base.

1. Cast-in-place manhole base construction shall be permitted only with specific plan review and acceptance by the District. In general, precast manhole bases will always be used in the District.

2. Prepare the subgrade and excavation in accordance with the specifications.

3. The pipes entering the base shall be cut to length to match the inside of the manhole barrel and set to grade. Sewer pipe shall not be laid through the manhole base and the concrete base and/or invert placed around the pipe unless project specific specification and details have been accepted by the District for a particular installation.

4. Manhole gaskets shall be placed over the pipe and centered between the end of the pipe and the outside of the cast-in-place base.

5. For manholes 16-feet or less in depth, provide reinforcing, grade 60 reinforcing bar, No. 4 at 12 inches on center each way. Place steel at 8-inches on center each way on manholes in excess of 12 feet in depth.

6. For manholes deeper than 16-feet, provide reinforcing, grade 60 reinforcing bar, No. 6 at 12-inches on center each way, two (2) layers placed 3-inches above subgrade and 3-inches below the manhole channel flow line.

7. Where intersecting pipelines or pipelines requiring deflections at manholes require that the invert of the manhole be shaped to match the pipe cross sections, such construction shall be accomplished in accordance with the detail drawings of these specifications. Form the flow line configuration of intersecting pipes to allow for free uninterrupted flow of sanitary sewage through and out of the manhole. All channel inverts shall be finished smooth by steel troweling. All inverts shall be placed and finished with a single pour of cast-in-place concrete. Placement of grout and/or other material to repair and/or reshape the manhole invert shall not be permitted unless specifically approved by the District's representative.

8. Cast-in-place bases for manholes shall be constructed in a manner to provide for a smooth level surface on which vertical barrel sections shall be placed. Completely watertight joints shall be made utilizing preformed flexible gasket material or a precast concrete base section may be utilized. The manhole shall be constructed such that no single section varies from true vertical by more than two percent of the section length.

9. Place concrete against undistributed soil to the depth, thickness and other dimensions shown on detailed drawings.

    a. 16-feet or less in depth: Minimum of 8-inches thick below the manhole channel flow line.

    b. Greater than 16-feet deep: Minimum of 12 inches thick below manhole channel flow line.

10. Finish and cure the cast-in-place concrete for a minimum period of 24 hours prior to placing precast manhole sections on the cast-in-place base.

11. Maintain ground water below the bottom of the cast-in-place concrete for a minimum period of 24 hours following placement of concrete by maintaining pumping equipment or other dewatering operations in operation below the subgrade of the manhole base.

12. Concrete shall contain a minimum of 564 lbs of Type II Portland cement per cubic yard (6 sack mix), be placed with a maximum slump of 2 inches with maximum size course aggregate of ¾-inch (ASTM C33).

13. Provide segmental precast concrete barrel sections a maximum of 4 feet in length with preformed flexible gasket material between each barrel section as jointing material or install rubber gaskets in precast R-4 joint grooves per manufacturer's recommendations.

C. Provide waterproofing of all manhole joints.

1. All exterior MH joints shall be double wrapped with 12" wide elastomeric joint wrap.

   a. Henry Company RUB'R NEK® External Concrete Joint Wrap or approved equal.

2. Where ground water is present, or in the opinion of the District, ground water could be present, all exterior joints shall receive a 3/8" to ½" thick layer of cement grout extending a minimum of 4" each side of all manhole segment joints. Work the cement grout in the joint to completely fill all voids. Following installation of exterior joint grout, install a double wrap of 12" wide elastomeric exterior joint wrap, overlapping a minimum of 4" and adhered to manhole.

3. If ground water is present, apply chemically cured high-build epoxy waterproofing to the precast manhole structure after installation of cement grout and prior to backfilling. During construction of all waterproofing measures, ground water shall be maintained below the subgrade elevation in the manhole excavation during the time sufficient for all materials to properly cure, no less than 24 hours.

D. Provide one, one (1) foot high barrel section beneath a reducing concentric cone section to bring the manhole ring and cover to within 6 inches of desired grade and elevation.

E. Ring and Cover Elevation Adjustment.

1. Provide precast concrete 2-inch-high grade adjustment rings or HDPE manhole adjustment rings to bring the ring and cover to the desired elevation.

2. A minimum of one (1) 2-inch adjustment ring is required with a maximum of three (3) grade adjustment rings being permitted.

3. The ring shall be adjusted with precast concrete rings or HDPE manhole rings a maximum of 6 inches in height. Cement grout shall be placed to adjust the ring to conform to the surface. A collar consisting of paving material shall be placed around the adjusting rings and the ring of the manhole up to a point 2 inches below finished grade. Additional paving material shall then be placed over the concrete and match the surrounding pavement surface. Tack coat material shall be placed between new and existing asphaltic surfaces, the manhole casting and the concrete collar.

F. All manholes constructed in the District shall have the ring and cover elevations set at final street grades or at a point not more than 6 inches above the existing ground in non-traffic areas unless directed otherwise by the District. The Developer/Contractor shall be responsible for adjusting the manhole rings and covers to the final elevations.

G. In areas where street paving will be placed, the manhole ring adjustment shall be accomplished in a two-step process prior to placement of pavement. The manhole ring shall be constructed 0.3 to 0.5 feet below finished pavement surface elevation. Pavement shall then be placed in accordance with the applicable rules, regulations and specifications. Following completion of paving, the sanitary sewer manhole rings will be raised by the Developer/Contractor to finished grade in accordance with the specifications of the District.

H. All rings and covers shall be placed so finished grade is ¼-inch below finished pavement surface.

5.07 Tracer Wire.

A. All sanitary sewer mains and service lines shall have a minimum 12 AWG high strength copper clad steel conductor with 30 mil green insulation jacket installed.

B. Tracer wire shall extend to the surface at all manholes and cleanouts.

CHAPTER 6

TESTING OF PIPELINES AND APPURTENANCES

6.01 Infiltration.

A. Each segment of pipeline including manholes or other major appurtenances shall not show any evidence of infiltration.

B. Should evidence of infiltration be determined, repair and/or replacement of pipelines, manholes or other appurtenances shall be at the Contractor's and/or Developer's expense. Satisfactory repair and replacement shall be accomplished prior to the consideration of acceptance of any facility by the District.

1. If deemed necessary by the District in its sole discretion, infiltration testing shall be accomplished near the end of the warranty period by the Contractor and/or the Developer.

2. Final acceptance will be conditioned upon the required specifications being satisfied.

C. The Contractor and/or Developer will furnish all labor, equipment and materials required to accomplish such testing.

6.02 Air Test.

A. All segments of sanitary sewer mains shall be subjected to an air pressure test.

B. The Contractor may conduct an initial air test of the sewer main line after compaction of the backfill but prior to the installation of any service lines. Such tests shall be considered for the Contractor's convenience in quality control of the project construction. Final consideration for acceptance of the sanitary sewer by the District shall be based on satisfactory completion of testing with all service line stubs installed.

C. Preparation of Tests

1. Flush and clean the sewer line prior to testing in order to wet the pipe surfaces and produce more consistent results.

2. Plug and brace all openings in the main sewer line and the upper end of any connections.

3. Check all pipe plugs with a soap solution to detect any air leakage. If leaks are found, release the air pressure, eliminate the leaks and start the test procedure over again.

D. Procedure of Test:

1. Add air until the internal pressure of the sewer line is raised to approximately 5.0 psi gage at which time the flow of air shall be reduced and the pressure maintained between 4.5 and 5.0 psi gage for a sufficient time to allow the air temperature to come to equilibrium with the temperature of the pipe.

2. Where ground water levels are above the conduit, increase the test pressures given below to compensate for the pressure on the conduit from the ground water.

E. After the temperature has stabilized the pressure shall be permitted to drop to 4.5 psi gage at which time a stop watch or a sweep second hand watch shall be used to determine the time lapse required for the air pressure to drop to 4.0 psi gage.

F. If the time lapse is less than that shown in the table, the Contractor shall make the necessary corrections to reduce the leakage to acceptable limits.

G. If the time lapse exceeds that shown in the table, the pipe shall be presumed to be within acceptable limits for leakage.

Pipe Dia.(in.)	Minimum Time (min:sec)	Length For Minimum Time (ft.)	Time for Longer Length (L, ft.) (sec)	LENGTH (ft.)			
				100	200	300	400
4	1:53	597	0.190L	1:53	1:53	1:53	1:53
6	2:50	398	0.427L	2:50	2:50	2:50	2:51
8	3:47	298	0.760L	3:47	3:47	3:48	5:04
10	4:43	239	1.187L	4:43	4:43	5:56	7:54
12	5:40	199	1.709L	5:40	5:42	8:33	11:24
15	7:05	159	2.671L	7:05	8:54	13:21	17:48
18	8:30	133	3.846L	8:30	12:49	19:14	25:38
21	9:55	114	5.235L	9:55	17:27	26:11	34:54
24	11:20	99	6.837L	11:24	22:48	34:11	45:35
27	12:45	88	8.653L	14:25	28:51	43:16	57:42

Safety: The air test may be dangerous if proper precautions are not taken. All plugs must be sufficiently braced to prevent blowouts and the pipeline must be completely vented before attempting to remove the plugs.

As a safety precaution, pressurizing equipment shall be provided with a regulator setting of 5 psi to avoid over pressurizing and damaging an otherwise acceptable line.

6.03 Alignment Testing.

A. Each section of pipeline on a linear alignment between manholes will be subject to testing by lamping by the District's representatives to determine where proper alignment has been accomplished and whether any displacement of the pipe has occurred during construction.

B. The Contractor and/or Developer shall provide suitable assistance to the District's representative in accomplishing alignment testing. The Contractor and/or Developer shall be responsible for repairing any alignment, displaced pipe or other defects discovered during this testing in accordance with these specifications.

C. For pipelines installed at grades less than 1%, a minimum of 90% of the full pipe cross section shall be visible at the opposite end of the segment being observed.

D. For pipelines installed at grades greater than 1%, a minimum of 75% of the full pipe cross section at the opposite end of the segment shall be observed.

E. The determination of the acceptability of the pipeline alignment by lamping shall rest solely with the District's representative and his decision shall be final.

F. Pipelines not meeting the requirements of the alignment tests shall be completely excavated removed and re-laid on prepared bedding material, backfilled and compacted in accordance with these specifications and then subjected to infiltration, air pressure and alignment testing.

6.04 Deflection Tests.

A. Proper construction in accordance with these specifications and the manufacturer's recommendations should result in a vertical deflection of the pipe less than 5% of the internal diameter. At the option of the District, the Contractor and/or Developer may be required to perform testing to determine conformance with this requirement.

B. Should the District determine that deflection testing is required, the Contractor and/or Developer shall provide all necessary equipment, labor and other facilities. Data supplied by the pipe manufacturer's representative for dimensional quality shall be utilized.

C. Should the vertical deflection of the pipe be found to exceed 5% of the internal diameter, the Contractor will remove the pipe, install proper bedding, replace the pipeline material and properly place and compact all backfill material in accordance with these specifications. Any areas removed and replaced shall be subject to infiltration, air pressure and alignment testing.

6.05 Manhole Vacuum Test.

A. All manholes shall be subjected to a vacuum test prior to acceptance by the District.

B. Manholes shall be vacuum tested using the following procedures:

1. The Contractor and/or Developer shall provide all necessary equipment, labor and other facilities.

2. Temporarily plug all pipes entering the manhole.

3. The test head gauge shall be placed at the top of the manhole or in accordance with the manufacturer's recommendations.

4. A vacuum of 10-inches of mercury shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9-inches of mercury.

5. The manhole shall pass if the time for the vacuum reading to drop from 10- inches of mercury to 9-inches of mercury meets or exceeds the values indicated in the table below.

6. If the manhole fails the initial test, necessary repairs shall be made, and the manhole shall then be retested until a satisfactory test is obtained.

7. Minimum test times for various diameter manholes for depths 8-feet and greater (ASTM C1244).

Manhole Depth	Manhole Diameter (ft)		
(ft)	4	5	6
		Time (seconds)	
8	20	26	33
10	25	33	41
12	30	39	49
14	35	46	57
16	40	52	67
18	45	59	73
20	50	65	81
22	55	72	89
24	59	78	97
26	64	85	105
28	69	91	113
30	74	98	121
32	79	104	129
34	84	111	137
36	89	117	145
38	94	124	153
40	98	130	161

6.06 Internal Video Inspection.

A. All sewer main construction in the District shall be inspected with internal video camera and recording equipment.

1. Coordination with the District shall be required as to cleaning and/or flushing prior to any internal video inspection.

B. All costs of the internal video inspection shall be borne by the Contractor and/or Developer.

C. A CD or DVD must be furnished to the District and/or their designated representative for review and acceptance.

D. The individual and/or company and permanent video recording shall be subject to the acceptance and approval of the District.

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PART II

EARTHWORK STANDARD SPECIFICATIONS

CHAPTER 1

GENERAL INFORMATION

1.01 Authority. These Specifications are promulgated by the Security Sanitation District Enterprise (District). The interpretation, enforcement, and revision of these Specifications is hereby delegated to the General Manager of the District.

1.02 Effective Date of Specifications. These Specifications shall be in effect immediately upon adoption by the District board and shall supersede all former standard specifications for earthwork within the District.

1.03 Revisions, Amendments or Additions. These Specifications may be revised, amended or added to. Such revisions, amendments and additions shall be binding and in full force and effect when adopted in the manner set forth in Section 1.02.

1.04 District Control. These Specifications will apply to the installation of water and wastewater facilities under the control of the District.

1.05 Organization and Interpretation of Specifications. These Specifications are composed of written Standards of Engineering Practice, Material Specifications and Standard Drawings. The interpretation of any section or of differences between sections, when appropriate, shall be made by the Superintendent of the District and his/her interpretation shall be binding and controlling in its application.

1.06 Definitions. Refer to Part I of the Specifications for definitions.

CHAPTER 2

TRENCHING, BACKFILLING AND COMPACTING

2.01 General Provisions.

A. Unless otherwise indicated on the drawings, all excavations shall be made by open cut.

B. Provisions for installation of sanitary sewer pipelines and appurtenances in other than open cut conditions shall be specifically detailed in the drawings and contract documents for the project.

C. The Contractor and/or Developer shall be responsible for obtaining all permits necessary to accomplish the work. This includes all permits by any local general purpose governing agency relative to excavation and construction within public right- of-way, permits required by state highway agencies, permits required by railroad and other utility agencies and permits required by the State of Colorado, Water Quality Control Division including necessary site approvals, if appropriate.

D. All work to be accomplished shall be done under the review and inspection of District representatives.

   1. Notification to the District shall be made by the Contractor and/or Developer indicating proposed schedules and times of work.

   2. Work accomplished without notification and review of the District's representatives may not be acceptable to the District.

   3. It shall be the responsibility of the Owner/Developer to adequately demonstrate to the District that all facilities have been constructed in accordance with the rules and regulations of the District.

E. All rules and regulations of the District shall be applicable to all construction and operation of sanitary sewerage facilities within the boundaries of the District and those which are proposed for acceptance by annexation to the District. These rules and regulations shall be supplemented by all rules and regulations of the State of Colorado, Water Quality Control Division, in so far as they do not conflict with these rules and regulations. Any conflict shall be governed by an interpretation and ruling by the Manager, whose decision shall be final.

F. Earthwork shall include all clearing, grubbing, grading, excavation, fill, backfill, excess excavation, bedding material, borrow material, compaction and surface restoration as may be required to complete the work.

2.02 Job Conditions.

A. Protection of Existing Facilities.

1. Surface Improvements.

The Contractor shall protect from damage or restore to their original condition all surface improvements encountered during trenching or construction. Said improvements shall include but not be limited to the following: surfacing; sidewalks; curbs; valley gutters; trees and shrubs; other surface vegetation; driveways; mailboxes; utilities; signs; or other improvements.

2. Underground Utilities and Obstructions,

The Contractor shall protect from damage any underground pipes, utilities or structures encountered during construction. Restore any damaged underground obstructions to their original condition at no cost to the District unless evidence of other arrangements satisfactory to all parties is presented to the District.

Before commencing work, obtain information concerning location, type and extent of concealed existing utilities on the site and adjacent properties. Consult records and personnel of local utility companies, municipal utility department and telephone company. File Notice of Excavation with these agencies prior to commencing work.

3. Underground obstructions known to exist, except service lines, are to be shown on the drawings or otherwise referred to in the construction documents. The locations shown may prove to be inaccurate and other obstructions not shown may be encountered. In any case, it shall be the responsibility of the Contractor to protect or restore all underground obstructions encountered.

B. Sheeting, Shoring, and Bracing.

1. Except where trench banks are cut back on a stable slope, provide and maintain all shoring necessary to protect adjoining grades and structures from caving, sliding, erosion or other damage and suitable forms of protection against bodily injury all in accordance with applicable codes and governing authorities.

2. Comply with the most recent standards adopted by the Occupational Safety and Health Administration (OSHA).

3. Do not remove any shoring unless the pipe strength is sufficient to support the trench loads based on trench width measured to the back of sheeting. Remove shoring as excavations are backfilled in a manner to protect the construction or other structures, utilities or property. Do not remove any shoring after backfilling.

C. Blasting.

1. In general, blasting will be allowed in order to expedite the work if a permit by the local authority having jurisdiction is granted and a copy presented to the District.

2. All explosives and appurtenances shall be transported, handled, stored and used in accordance with the laws of the local, state and federal governments, as applicable.

3. All blasting shall be controlled so as not to injure any existing structure or facility. The protection of life and property and all liability for blasting shall be placed solely on the person or persons conducting the blasting operation.

4. The hours of blasting shall be fixed by the Inspector in accordance with the permit of the local authority.

5. Owners or occupants of nearby structures or facilities, must be notified by the Contractor at least 72 hours in advance of blasting, in writing. The notice shall state the date, the time of blasting and who is responsible for the blasting. The District shall be notified a minimum of 48 hours in advance of any blasting.

6. Blasting shall be controlled to avoid making any excavation unduly large or irregular and so as not to shatter the rock on the bottom or sides of any excavation or surface upon or against which concrete is to be placed. If, in the opinion of the District, blasting is liable to damage rock foundations or supports, concrete, other utilities or structures, all blasting shall be terminated and excavation shall be continued by hammering, boring, wedging or other methods.

D. Drainage.

1. Maintain the excavations and site free from water throughout the work. Remove any water encountered in the trench to the extent necessary to provide firm subgrade, to permit joints to be made dry at the final grade and to prevent entrance of water into the pipeline.

2. Accomplish drainage of excavations by the use of sumps and gravel blankets, well points, drain lines or other means approved by the District.

E. Interruption of Service.

1. Coordinate interruptions of utility services with the District or utility owner as appropriate.

2. Make connections to the existing system requiring the interruption of service during the time designated by the District or utility owner.

3. Obtain permission to cut and replace existing service lines to facilitate trenching. Notify affected users a minimum of two hours in advance of, and restore service within four hours after any interruption. Repair all lines at no cost to the District unless otherwise provided for.

F. Detours and Other Traffic Controls.

1. When construction operations are located within streets, make provisions at cross streets and walks for free passage of vehicles and pedestrians by bridging or other approved methods. Do not block streets or walks without prior approval.

2. Maintenance of access through the construction site by the traveling public shall be maintained by the contractor unless a street closure is approved in writing by the District or other governing authority. Access to all abutting residences and properties shall be maintained to the maximum extent possible. It shall be the responsibility of the Contractor and/or Developer to coordinate access to all adjacent private properties with the respective owners.

3. To protect persons from injury and to avoid property damage, adequate barricades, construction signs, safety flasher lights and guards as required shall be placed and maintained during the progress of the construction work and until it is safe for traffic to use the roadway.

4. All material piles, equipment and pipe that may serve as obstructions to traffic shall be enclosed by fences or barricades and shall be protected by proper lights.

5. All safety and traffic rules and regulations of local authorities shall be observed. All barricading and detours shall be coordinated as appropriate with the City of Fountain, El Paso County and/or the Colorado Department of Transportation and shall be in accordance with their regulations. Controls shall be in accordance with the "American Traffic Safety Services Association Guide," latest edition.

6. Should the District be contacted regarding a failure to properly barricade a construction area and the responsible Contractor cannot be contacted, the District shall set the necessary barricades at the Contractor's expense.

7. The Contractor shall carry on the work in a manner that will cause the least interruption in traffic and may close to through travel, not more than two (2) consecutive blocks, including the cross street intersected when so approved by the District. The Contractor shall post, where directed by the District, suitable signs indicating that a street or a portion of a street is closed and necessary detour signs for the proper maintenance of traffic.

G. Sequencing.

1. Pipeline installation shall follow trench excavation within 50 lineal feet.

2. Trench backfill shall follow pipe installation within 50 lineal feet.

3. Approved cleanup shall follow trench excavation with 200 linear feet.

2.03 Guarantee

A. Upon completion of installation of wastewater facilities, the Developer shall request an inspection of the facilities to establish a date of initial acceptance by the District.

B. The date of initial acceptance may establish the commencement date of the warranty period contingent upon the number of active, connected service lines to the main or pump station.

C. The Contractor and Developer shall guarantee all materials and workmanship for a period of two years from the date of written acceptance by the District. Materials

shall be of high quality and all work shall be performed in a workmanlike manner, all in accordance with industry standards and the District specifications. Initial acceptance shall be made by the District's official written confirmation of acceptance. Any nonconforming materials or work shall be promptly remedied by the Contractor and Owner within the warranty period.

D. The guarantee shall include the maintenance of acceptable trench backfill for a period of two years from initial acceptance. Acceptable trench backfill shall include maintenance of an acceptable surface configuration matching surrounding grade or conforming to the finished street cross section. Removal and replacement of finished street surfacing due to excessive settlement shall be the responsibility of the Contractor and/or Developer within the two-year warranty period.

2.04 Products

A. Embedment Materials. All sanitary sewer mains are to receive Class A or Class B embedment extending from 6 inches below the bottom of the pipeline to 12 inches over the pipeline.

1. Concrete. The pipeline embedment with concrete shall utilize concrete having a 28-day compressive strength of a minimum of 3000 psi and other characteristics as set forth in these Specifications.

a. Class A Embedment shall consist of a plain or reinforced concrete cradle with a minimum depth of 4-inches.

b. Concrete arches shall only be accomplished with District approval. The arch shall be accomplished in accordance with the requirements of Part II, Section 2.07, B., 2.

c. Complete concrete encasement can only be accomplished with prior approval of the District.

2. Granular Material. Well-graded, crushed stone or gravel meeting the requirements of ASTM C33, Gradation 67 (3/4" to No.4).

3. Class B Bedding.

a. Class B Bedding to be used for all pipe embedment unless otherwise directed.

b. Natural or manufactured rock or reclaimed concrete.

c. ¾-inch imported rock, crushed or naturally angular shape.

d. Imported, well-graded, coarse aggregate in conformance with the requirements of ASTM C33, Gradation 67 with the following gradation:

Sieve Size	Total Percent Passing by Weight
1"	100
¾"	90-100
½"	----
⅜"	20-55
No. 4	0-10
No. 8	0-5

e. Recycled concrete products meeting the requirements of ASTM C33, Gradation 67.

f. Imported, well-graded coarse aggregate in conformance with the requirements of ASTM C33, Gradation 8 with the following gradation:

Sieve Size	Total Percent Passing by Weight
½"	100
⅜"	85-100
No. 4	10-30
No. 8	0-10
No. 16	0-5

4. Class C Bedding: Select backfill.

a. Class C bedding to be used as embedment material only as directed by the District.

b. Select backfill from 6" below pipe to 12" above the pipe.

1) Graded gravel

Sieve Size	Total Percent Passing by Weight
1"	100
¾"	85-100
⅜"	50-80
No. 4	35-60
No. 40	15-30
No. 200	5-10

a) No clay or lumps of organic matter.

b) Liquid limit not greater than 25 and plasticity index not greater than 5 for fraction passing No. 4 sieve.

2) Natural sands/gravels.

3) Select on-site excavated materials. B. Backfill Materials.

5. Suitable Material. Soil obtained from the excavation that is free of frozen material, stumps, roots, brush, other organic matter, debris and other items. In addition, suitable material shall meet the following requirements:

6. Upper Portion of Trench. Material placed within one (1) foot of pavement subgrade or finished surface in unimproved areas shall be soil free from rocks, greater than 3 inches in nominal diameter.

7. Other Portions of Trench. Material within 6 inches below and 12 inches above the pipe shall contain particles of a size to conform to the embedment class required. From a point 12 inches above the pipeline to within one (1) foot of the pavement subgrade or finished surface in unimproved areas, maximum size of any rock in the trench backfill shall be 3 inches nominal diameter.

8. Public Highways. Provide and install material in conformance with the Colorado Department of Transportation requirements where they do not conflict with other provisions of these regulations. Should a conflict exist, submit a request for clarification to the District in writing prior to proceeding with work.

2.05 Preparation of Trenching.

A. Construction Staking. All work shall be constructed in accordance with lines and grades shown on the drawings and as established by the Engineer-of-Record and/or District. These lines and grades may be modified by the Engineer-of-Record only after reapproval by the District.

1. Line and grade stakes shall be set for each manhole or other appurtenance and at each 25-foot station along the pipeline. Laser beam equipment shall be utilized for alignment of the pipeline, construction stakes shall be set at each manhole and 25 feet, 50 feet and 75 feet and each 100 feet thereafter proceeding upstream from the manhole. The Contractor shall check the elevation at each grade stake and at intervals between stakes from a string line placed between the grade stakes. Should a variance from the design elevation be found, the pipeline shall be removed to a point where vertical and horizontal alignment is satisfactory and reconstructed in accordance with these specifications.

2. All facilities, equipment and assistance shall be furnished by the Contractor and/or Developer to facilitate checking alignment and grade of the pipe by the District's representative and workmen involved in the construction. District representative may elect to use District owned equipment to verify alignment and grade.

B. Pavement Removal. Before trenching begins, remove any pavement, curbs, gutters, sidewalks and other surface improvements necessary to install the pipeline and appurtenances.

1. Remove bituminous pavement to clean, straight lines at locations necessary to accommodate the work. Width of removal for pipelines shall be kept to a minimum as dictated by trenching operations and shall conform to the requirements of the local governing agency having responsibility for street surface operation and maintenance. Make pavement cuts with spade-bitted air hammer, saw or other approved method so to provide a straight and square edge. Should a cut edge become damaged during the course of construction, the edge will be recut prior to

placement of surfacing material.

2. Remove concrete surfacing materials to neatly sawed edges with sawcuts made to a minimum depth of 1-1/2 inches or as otherwise required to neatly remove surfacing materials.

3. Make sawcuts in straight lines and at right angles to the alignment of sidewalks or curb and gutter. If the sawcut should fall within 30 inches of an existing construction joint, expansion joint or edge, the concrete shall be removed to the joint or edge.

C. Clearing. Remove all stumps, roots, brush, other vegetation and debris from areas that will be disturbed by the construction operations.

D. Sod Removal. In lawn areas, cut and roll back sod before trenching. Store sod for reinstallation after completion of backfilling operations.

E. Topsoiling. Strip existing topsoil from areas to be disturbed by construction operations. Stockpile in areas designated by the Engineer-of-Record. Keep topsoil segregated from non-organic trench excavation materials and debris.

2.06 Excavation - Open Cut.

A. Caution in Excavation. The Contractor shall proceed with caution in the excavation and preparation of the trench so that the exact location of underground utilities and structures, both known and unknown, may be determined, and he/she shall be held responsible for the repair of such structures when broken or otherwise damaged.

B. Exploratory Excavation. In the opinion of the District, it is necessary to explore and excavate to determine the location of underground utilities and structures that may interfere with construction, the Contractor shall make the explorations and excavations for such purposes.

C. Limitation of Disturbed Area. The area disturbed by construction activities shall be confined within the construction limits as shown on the plans. The length of trench to be opened at any one time shall be limited in accordance with the requirements of Part C, Section 2.02.g of these specifications.

D. Drainage and Protection.

1. The sides of the trench shall be sloped or braced and the trench drained so that workmen can work safely and efficiently. All work must be done in a dry trench and no water will be permitted to be discharged down the pipe previously laid.

2. The discharge from pumping shall be laid to an approved natural drainage channel or other location to prevent drainage into the sanitary sewer facilities and damage to public or private property.

3. All pipe trenches or structure excavation shall be kept free from water during pipe laying and other related work. The method of dewatering shall provide for a completely dry foundation at the final lines and grades of the excavation.

4. Dewatering shall be accomplished by the use of well points, sump pumps, rock or gravel drains placed below subgrade foundations or subsurface pipe drains. All water shall be handled and disposed of in a suitable manner in accordance with Colorado law and without being a menace to public health or causing public inconvenience. No water shall be drained into other work being completed or under construction.

5. Discharge from dewatering shall be subject to the regulations and permit requirements of the Colorado Department of Public Health and Environment. The Contractor shall be solely responsible for full compliance with those requirements.

6. The dewatering operation shall continue until such time as it is safe to allow the water table to rise in the excavations. Pipe trenches shall contain enough backfill to prevent pipe flotation. When pipe is installed in a casing or tunnel longer than thirty (30) pipe diameters, the pipe inside and casing or tunnel shall be secured so flotation does not occur when the pipe is empty.

7. Water shall not be allowed to rise until any concrete has set and the forms have been removed. Water shall not be allowed to rise unequally against unsupported structural walls.

8. Pile material suitable for backfilling in an orderly manner a sufficient distance from banks of the trench to avoid overloading and prevent slides or cave-ins.

9. Remove and waste excavated materials not suitable or not required for backfilling from the site. All surplus excavation shall be removed from the job site and disposed of properly. If the surplus excavation is disposed of on private property, written permission shall be obtained from the owner of the property and a copy given to the District Inspector.

E. Excavation to Grade.

1. Accurately grade trench bottoms to provide uniform bearing and support for each section of pipe on undisturbed soil at every point along its entire length.

2. Provide a smooth uniform surface in the pipe subgrade where bedding material will be placed. If the subgrade material is over-excavated more than 2 inches, backfill shall be accomplished with compacted granular material in accordance with the bedding requirements.

F. Limiting Trench Widths.

1. Excavate trenches to provide adequate working space and pipe clearance for proper pipe installation, jointing and embedment.

2. Provide a minimum clearance of 6 inches on each side of the pipe for a pipe 12 inches in diameter or less and 8 inches for pipe between 14 inches and 30 inches in diameter. The maximum allowable width of trench at one (1) foot above the top of the pipe shall not be greater than the outside diameter of the pipe plus 24 inches for all sizes.

G. Bell Holes.

1. Dig bell holes and depressions for joints after the trench bottom has been brought to final grade. Bell holes and depressions shall be only of such length, depth and width as required for properly making the particular type of joint. The use of earth mounds for bedding the pipe and adjusting for grade shall not be allowed.

H. Preparation of Pipe Bearing Areas.

1. Shape the pipe subgrade or bedding material to provide a continuous uniform bearing support at all points along its length except at required bell holes.

I. Pipe Clearance in Rock.

1. Where rock excavation is necessary, over excavate the trench bottom a minimum of 6 inches below the bottom of the pipe for pipe 24 inches in diameter or less and 9 inches for pipe larger than 24 inches. Backfill over depths with granular material specified.

J. Excavation for Structures.

1. Except as otherwise dictated by construction conditions, the excavation shall be of such dimensions as to allow for the proper installation and removal of concrete forms, or precast structures, and to permit the construction of the necessary pipe connections. Care shall be taken to ensure that the excavation does not extend below established grades. If excavation is made below such grades, the resulting excess excavation shall be filled in with approved material deposited in horizontal layers not more than 6 inches in thickness, after being compacted, as directed by the District.

K. Unstable Pipe Subgrade.

1. If the bottom of the excavation at subgrade is found to be soft or unstable or to include ashes, cinders, refuse, vegetation or other organic material, or large pieces or fragments of inorganic material that, in the opinion of the inspector, cannot satisfactorily support the pipe or structure, the Contractor shall further excavate and remove such unsuitable material to the width and depth specified by the Inspector. Before the pipe or structure is installed, the subgrade shall be made as specified by the District.

2. Where the bottom of the trench at subgrade is found to consist of material that is unstable to such a degree that, in the opinion of the District, it cannot be removed and replaced with an approved material which will support the pipe or structure properly, the Contractor shall be required to construct a special foundation or support for the pipe or structure, consisting of pilings, timbers, or other materials, as specified by the District.

2.07 Pipe Embedment

A. Placement of Embedment Material.

1. Embedment material shall be placed in the trench on prepared subgrade in accordance with the requirements of these specifications. The embedment material shall be brought to a density beneath the proposed pipeline as required herein.

2. The embedment material shall be shaped to conform to a cylindrical surface with a radius equal to the radius of the outside of the pipe with a width sufficient to allow 60% of the width of the pipe barrel to be uniformly supported by the bedding.

3. Bedding material shall then be placed in two lifts, each being compacted to the densities specified herein to a depth of 1 foot above the top of the pipe.

B. Embedment Classes.

1. Class A - Concrete Cradle.

The pipe shall be bedded in a monolithic cradle of plain or reinforced concrete as specified on drawings, having a minimum thickness of one-fourth the inside pipe diameter or a minimum of 4 inches under the barrel and extending up the sides for a height equal to one-fourth the outside diameter. The cradle shall have width at least equal to the outside diameter of the pipe barrel plus 8 inches. Backfill above the cradle and extending to 12 inches above the crown of the pipe shall be compacted carefully.

2. Concrete Arch.

The pipe shall be embedded in carefully compacted granular material having a minimum thickness of one-fourth the outside diameter between barrel and bottom of trench excavation and extending halfway up the sides of the pipe. The top half of the pipe shall be covered with reinforced concrete arch having a minimum thickness of one-fourth the inside diameter of the crown and having a minimum width equal to the outside pipe diameter plus 8 inches.

3. Class B - Granular Bedding.

Granular material imported to site and meeting pipe embedment requirements in Part III Section 2.04. Place as described in Part III - Section 2.07 and compact.

4. Class C.

To be used as trench backfill material only, not acceptable for pipe embedment.

5. Class D - Impermissible bedding condition.

2.08 Trench Backfilling and Compacting

A. Place backfilled material above embedment materials in a manner to prevent damage or misalignment of the pipeline. Place in lifts of a thickness necessary to acquire the specified backfill density or in conformance with other regulatory requirements. Backfilled material shall conform to the requirements of Part III Section 2.04 of these specifications.

B. Backfill Density Requirements. Unless otherwise specified or required by local governing authority, all backfill should be placed in a manner to achieve the density specified below in accordance with ASTM D698.

1. State Highway.

   100% of maximum in paved and shoulder areas

   95% of maximum in all other areas

2. Paved roadways, sidewalks and other areas to receive pavement.

   95% of maximum density for entire trench depth

3. Gravel roadways.

   95% of maximum density for entire trench depth

4. Sodded or lawn areas over a dedicated easement or right-of-way.

   95% of maximum density

5. Zone 6" below to 12" above pipe.

   95% of maximum density for all pipelines

6. Where another governing agency having jurisdiction over work within a road right-of-way has specifications requiring a greater backfill density, the requirements of the more stringent specification shall apply.

C. Method of Compaction.

1. In general, backfill shall be mechanically compacted by means of tamping rollers, sheep foot rollers, pneumatic tire rollers, vibrating rollers and other mechanical tampers.

2. Compaction by jetting shall not be permitted unless material is of suitable granular material as determined by the District. In no case will compaction by jetting be permitted in state highways or paved or gravel roadways.

2.09 Backfill for Structures.

A. Backfill and fill within 3 feet adjacent to all structures and for full height of the walls shall be selected non-swelling material. It shall be relatively impervious, well graded, and free from stones larger than 3 inches. Material may be job excavated, but selectivity will be required.

B. No backfilling will be allowed in freezing weather except by permission of the District. No additional backfill will be allowed over any frozen material already in the trench.

C. All water required for backfill and compaction operations must be provided by the

Contractor including furnishing all required personnel, valving, hose and other equipment needed to deliver the water to the desired location on the project.

2.10 Field Quality Control.

A. Density Testing and Control. Density testing as required by the District representatives shall be the responsibility of the Contractor and/or Developer. Results of such density testing shall be reported directly to the District by the testing agency. All reports shall be submitted with the seal and signature of a registered professional engineer experienced in the testing of soil materials.

B. Soil Compaction Tests.

1. Conduct in accordance with the requirements of ASTM D698 or AASHTO T99, "Standard Method of Test for Moisture Density Relations of Soils Using a 5.5 lb. Rammer and a 12-inch Drop." Use method A, B, C or D as appropriate on soil condition and judgment of the testing laboratory. Samples tested shall be representative of materials to be placed (or altered). Obtain optimum moisture density curve for each type of material or combination of materials encountered or utilized. Use test results as a basis for compaction control. Testing includes Atterberg Limits, grain size determination and specific gravity.

2. Density Control.

Conduct tests for density control during compaction operations in accordance with the requirements of:

ASTM D6938 - Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

ASTM D1556 - Test Method for Density and Unit Weight of Soil by the Sand Cone Method

OR

ASTM C2167 - Test Method for Density and Unit Weight of Soil In-Place by the Rubber-Balloon Method

C. Test Frequency.

1. The District representative shall determine the location of all density testing to be accomplished. As a minimum, three tests at three (3) different levels for every 1,000 lineal feet of trench shall be performed (9) total tests for every 1,000 lineal feet of trench.

2. Three (3) tests at least three (3) different levels shall be accomplished within 2 feet of each manhole.

3. The tests shall be taken approximately one foot above the pipe, mid-trench depth and within the top one foot of the trench. The Contractor and/or Developer shall excavate backfilled material to the depths directed by the District representative to

accommodate the testing and backfill test holes in accordance with these regulations.

2.11 Surface Restoration.

A. Fine grade all areas disturbed by the construction operations after completion of backfilling and compacting. Areas which are to receive pavements, surfacing, topsoil or landscaping shall be graded as required to allow installation of the specific surface treatment. Grade all other areas to match the existing ground line.

B. Replace suitable topsoil to the depth of stripping over all areas disturbed by the construction that do not receive other surface treatment. Do not compact topsoil during stripping, stockpiling or placing.

C. The Contractor shall restore all pavement, sidewalks, curbing, gutters or other surface structures removed or disturbed as part of the work to a condition meeting the standards of the governing agency, and shall furnish all incidental labor and materials. No permanent pavement shall be restored until, in the opinion of the District or agency having control, the condition of backfill is such as to properly support the pavement.

D. If any pavement, street, landscaping, shrubbery, sod, native grass areas, rock, fences, poles or other property and surface structures have been damaged, removed or disturbed by the Contractor, whether deliberately or through failure to carry out the requirements of the controlling agency or the specific directions of the District, or through failure to employ usual and reasonable safeguards, such property and surface structures shall be replaced or repaired, to the satisfaction of the owner, at the expense of the Contractor.

2.12 Surface Improvement Repair and Restoration.

A. Replace and repair any surface improvements damaged or removed. Meet the requirements specified for the particular type of improvements to be repaired or replaced.

B. All surface improvements shall meet the requirements of the local governing agency and/or the requirements shown on the contract drawings as approved by the District.

2.13 Cleanup.

A. Upon completion of the work, all rubbish, unused materials, concrete forms, debris from excavation, scrap pipe materials and other like materials shall be removed from the jobsite.

B. All excess excavation shall be disposed of as specified and the areas shall be left in a state of order and cleanliness.

PART III - FATS, OILS AND GREASE CONTROL REQUIREMENTS

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PART III

FATS, OILS AND GREASE CONTROL REQUIREMENTS

CHAPTER 1

GENERAL INFORMATION

1.01 Definitions.

A. Affected Properties. Affected properties are properties located within the District upon which the following uses or activities occur and which are subject to the District's permitting system for control of Fats, Oil and Grease (FOG):

1. Non-residential properties on which occurs preparation and/or sale of food to the general public, including but not limited to restaurants, cafes, fast food outlets, pizza outlets, delicatessens, sandwich shops, and any and all other kinds and types of food vending establishments in which any food preparation (including heating or defrosting in or by means of any kind of oven or heating device) takes place on the premises, whether or not such facilities are located in a separate building or structure that is occupied by other businesses;

2. Schools, churches, boarding houses with communal kitchen facilities;

3. Nursing homes, and day care centers which have kitchens and engage in the preparation of food; and

4. Non-residential properties on which occurs vehicle parking or storage, automotive service or repair, machine shops, and/or mechanics providing service to the general public, including but not limited to service stations, truck stops, gasoline stations, automotive/car care centers, auto body shops, automotive dealerships, car washes, motorcycle shops, machine shops, welding shops, tractor/farm implement dealerships, truck/bus dealerships, bus barns, or any other facility that generates sand, grit and/or petroleum byproduct waste that would discharge into the wastewater collection system.

B. Fixture Unit Equivalent (FUE). A value which permits the comparison of different sized fixtures based on the drainage load produced.

One (1) FUE = Discharge flow rate of 0.5 gpm.

C. Grease Interceptor. A unit of at least 1000 gallons capacity designed to retain grease from one or more fixtures and which shall be located remote from the fixtures being served, typically outside the building being served. This is the preferred unit of choice by the District.

D. Grease Trap. A unit designed to retain grease from one to a maximum of four fixtures and which may be located inside the building being served.

1. The smallest Grease Trap permitted shall have a minimum grease retention capacity of 100 pounds and shall provide a hydraulic retention time of at least 15 minutes at the design flow rate.

2. No Grease Trap shall be installed which has a rated capacity of less than 30 gpm.

3. The use of larger capacity Grease Traps is encouraged whenever possible in that larger traps work more efficiently. In resolving any question of capacity of the Grease Trap, any uncertainties shall be resolved in favor of the larger capacity Grease Trap.

1.02 Permitting.

A. The District will initiate the FOG control requirement of the Sewer Use Regulations by conducting inspections of any Affected Property or potential Affected Property with or without notice and will consider such factors as, but not limited to, onsite cooking capabilities, types and method of cooking and emission or discharge of sand, grit or petroleum based liquid waste.

B. A FOG Permit may be required and/or issued at the sole discretion of the District in the name of the owner of the business that qualifies the property as an Affected Property when one or more of the following conditions applies:

1. The Affected Property has an existing grease or sand and oil interceptor with a nominal volume of 1,000 gallons or more.

2. The Affected Property has been found by the District to have contributed non-domestic waste such as grease and/or oil to the District's wastewater management system which are or have been in violation of the District's Sewer Use Regulations.

3. The Affected Property has the potential, in the sole opinion of the District, to discharge wastes which may be in violation of the District's Sewer Use Regulations.

4. An Affected property shall be responsible for full compliance with these FOG Regulations whether or not the District decides in its sole discretion to require or issue a FOG Permit.

C. A FOG Permit conveys no property right or interest capable of being transferred to third parties, and creates no rights which are either appurtenant to the land or which constitute a covenant running with the land.

D. The holder of a FOG Permit shall inform the District Manager prior to:

1. Transfer of ownership of the business that qualifies the property as an Affected Property.

2. Change in the trade name under which the business that qualifies the property as an Affected Property is operated;

3. Change in the nature of the food preparation services or sale of the business in which name the FOG Permit is issued;

4. Change in the nature of the equipment used for such food preparation services or other activities on the Affected Property that will affect the output of grease, oil, sand grit or petroleum-based liquids from such business;

E. Upon any change listed in Paragraph 1.01, D., the District may require an amendment or modification to any term or condition of the FOG Permit.

F. A FOG Permit may initially be issued for a one (1) year period. Thereafter, a FOG Permit may be issued for up to five (5) years and will specify whether a Grease Trap, Grease Interceptor or Sand/Oil Interceptor is required, the type thereof, and the criteria for location, sizing, installation and maintenance of such interceptor or trap.

G. The fee for an initial 1-year FOG Permit and a five (5) year renewal FOG Permit shall be in accordance with the fees established by the District.

H. Any holder of a FOG Permit that receives a notice of noncompliance with a FOG Permit, during the initial one (1) year period pursuant to these regulations, shall be assessed an additional FOG Permit fee at the time of renewal, which additional fee per year shall continue to be assessed until the holder of the FOG Permit complies with all conditions of the FOG Permit and the notice of non-compliance for a one (1) year period, said additional fee to be established by the District.

1.03 FOG Inspections.

A. The District may undertake regular unannounced inspections of businesses holding a FOG Permit or Affected Properties which do not hold a FOG Permit to determine compliance with the requirements of the FOG Permit or these regulations.

B. If any inspection reveals non-compliance with a FOG Permit or any provision of this Regulation, corrective action will be required within a reasonable amount of time, in no case greater than 5 business days, or further enforcement action in compliance with these regulations may be instituted. Such non-compliance may include, but is not limited to:

1. Poor maintenance of grease, oil, sand or petroleum based liquid removal equipment;

2. Failure to timely correct previously noted areas of non-compliance;

3. Inability to access or open a Grease Trap or Grease and Sand/Oil Interceptor; or

4. Inability to inspect a grease, sand or oil collection device due to overabundance of grease or sand, grit or oil accumulation.

C. Inspection results will be reported in written form on a form provided by the District Manager.

1.04 General FOG Control Requirements.

A. A Grease Interceptor or Grease Trap shall be required when, in the discretionary judgment of the District, it or they are necessary for the proper handling of liquid wastes containing grease or solids which may be harmful to, or cause obstruction of the publicly owned wastewater collection system, or interfere with the operation of the publicly owned treatment works. The District will determine in its sole discretion whether a Grease Interceptor or Grease Trap must be installed. As a general presumption, grease interceptors will be required for all Affected Property as described in this Article.

B. An adequate Grease Interceptor or Grease Trap shall be installed as specified on the wastewater drainage system from any Affected Property which may contribute grease, fats, or oils which may be detrimental to the District's wastewater management system, including by not necessarily limited to the following:

1. Non-residential customer or property participating in the preparation and/or sale of food to the general public.

2. Restaurants, cafes, fast food outlets, pizza outlets, delicatessens, sandwich shops, and any and all other kinds and types of food vending establishments in which any food preparation (including heating or defrosting in or by means of any kind of oven or heating device) takes place on the premises, whether or not such facilities are located in a separate building or structure that is occupied by other businesses.

3. Schools, churches, boarding houses with communal kitchen facilities.

4. Nursing homes, assisted living, day care centers and other establishments which have kitchens and engage in the preparation of food.

C. The adequacy of the Grease Interceptor or Grease Trap shall be determined by compliance with the design, sizing, and other requirements of this regulation.

1. All drains from the kitchen, food preparation, and dishwashing areas shall be connected to a grease interceptor or grease trap. Fixtures to be connected include, but are not limited to, scullery sinks, pot and pan sinks, dishwashing machines, soup kettles, and floor drains located in areas where grease containing materials may exist.

2. Only when deemed necessary by the District, garbage disposals (garbage grinders) shall be required to be connected to an approved grease interceptor.

3. Toilets, urinals and similar fixtures shall not waste through a Grease Interceptor or Grease Trap. Such fixtures shall be plumbed directly into the building sewer and waste system.

D. A variance as to the requirement for a grease interceptor or grease trap on any non-residential structure, may be granted by the District Manager or Board of Directors after due consideration by the District for good cause shown including, without limitation, the particular hardship and unique circumstances of the customer which are not brought about as a result of the customers acts or omissions. The variance applicant has the burden of proof on the above issues and to establish that the requested variance will not harm or otherwise interfere with the operation of the District's wastewater collection system. The granting of any variance shall be at the sole discretion of the District based upon the facts and circumstances of each request. Any variance granted shall not establish a precedent for any future variance request.

1.05 Design and Sizing.

A. The design and sizing of Grease Interceptors and Grease Traps shall be in accordance with the International Plumbing Code (IPC), and this Regulation, and shall be designed, sized, installed, maintained and operated so as to accomplish their intended purpose of intercepting the grease and solids from the Affected Property's wastewater and preventing the discharge of such grease and solids to the District's wastewater treatment system.

1. The edition of the plumbing code currently utilized by the local building permitting authority shall be applicable.

B. The size, type and location of each Grease Interceptor and Grease Trap shall be approved by the District, in accordance with these Regulations. Except where otherwise specifically permitted, no wastes other than those requiring separation shall be discharged into any Grease Interceptor or Grease Trap. One set of plans, including complete mechanical and plumbing sections shall be submitted to the District for approval prior to construction. Such plans shall include the size, type and location of each interceptor or trap. Such approval shall not exempt the user from compliance with any applicable code, ordinance, rule, regulation or order of any governmental authority. Such approval shall not be construed as or act as a guarantee or assurance that any discharge is or will be in compliance with any applicable code, ordinance, rule, regulation, or order or any governmental authority. Any subsequent alterations or additions to such facilities shall not be made without due notice to and prior approval of the District.

C. Design.

1. All waste shall enter the Grease Interceptor or Grease Trap through the inlet pipe only.

2. Grease Interceptors and Grease Traps shall be so designed and located as to be readily accessible for cleaning, and shall have a water seal of not less than six (6) inches for Grease Interceptors and two (2) inches or the diameter of the outlet, whichever is greater, for Grease Traps.

3. Grease Interceptors shall be constructed in accordance with the design specifications contained herein, shall be approved by the District and shall have a minimum of two (2) compartments with fittings designed for grease retention. There shall be a minimum of two (2) manholes to provide access for cleaning and

inspection of all fixtures and compartments of the interceptor, a minimum of one (1) per ten (10) feet of interceptor length. In the case of smaller, or circular interceptors, where it is not practical to install two manholes, a single manhole shall be located so as to permit entrance to the first compartment, and inspection of the second. All areas of the second compartment shall be accessible for cleaning. Manhole covers shall be gastight in construction having a minimum opening dimension of twenty (20) inches. In areas where traffic may exist, the interceptor shall be designed to have adequate reinforcement and cover, meeting HS-20 load specifications.

4. Grease Traps shall be equipped with a flow control or restricting device installed in a readily accessible and visible location ahead of the Grease Trap. Flow control devices shall be designed and rated such that the flow through such a device shall at no time be greater than the rated capacity of the Grease Trap. No flow control devices having adjustable or removable parts will be permitted.

5. A flow control device will not be required preceding a Grease Interceptor.

6. Grease Interceptors and Grease Traps shall be so designed that they will not become air bound if closed covers are used. The tank and the discharge line shall each be vented, and the vents shall not tie together less than 42 inches above the tank lid elevation.

7. An effluent sampling box shall be provided on the discharge of each Grease Interceptor or Grease Trap where so required by the District.

8. If an existing Grease Trap does not meet the design and sizing criteria as set forth in these Regulations, the Grease Trap shall be replaced with a properly designed and sized Grease Trap or Grease Interceptor. A schedule for compliance by the owner of the Affected Property shall be determined by the District.

9. Upon change of ownership of any existing facility which would be required to have a Grease Trap or Grease Interceptor under these Regulations, the applicant for sanitary sewer service shall have the burden to demonstrate that a properly sized and functioning Grease Trap or Grease Interceptor is installed.

D. Sizing Criteria.

1. Grease Interceptors: When determining the minimum size of Grease Interceptor required, the following shall be considered:

   a. The minimum acceptable volume shall be not less than one thousand (1000) gallons.

   b. The size of the interceptor shall be based on the maximum number of meals serviced at the maximum periods of the day (either breakfast, lunch or dinner). Volume, in gallons, of the interceptor shall be 2½ gallons times the maximum meals served during the busiest period of the day.

c. An alternate method of determining the size of the grease interceptor is to multiply seating capacity times a turnover constant of 1.6 times 2½ gallons. Seating capacity can be approximated, using ten (10) square feet of dining area per person. (Interceptor Volume = Seating Capacity x 1.6 x 2.5 gallons)

d. The size of the grease interceptor shall be determined by the following formula:

Interceptor size (liquid capacity in gallons) = number of meals served per peak hour **X** waste flow rate **X** retention time **X** storage factor

1) Meals served per peak hour to be estimated as follows:

Seating capacity **X** occupancy factor (0.80) **X** meals per hour per seat

2) Waste flow rate:

With dishwashing machine	6 gallons
Without dishwashing machine	5 gallons
Food waste disposal	1 gallon

3) Retention time: 1.0 hours

4) Storage Factor:

Fully equipped commercial kitchen:

8 hour operation	1
16 hour operation	2
24 hour operation	3
Single service kitchen:	1.5

e. An appropriate volume may be determined by multiplying the total rate of flow in gallons per minute from each fixture required to be connected to the interceptor times a minimum retention time of not less than fifteen (15) minutes, the resulting volume expressed in gallons.

2. Grease Traps:

a. Grease Traps shall be sized based on one of the methods given in this Regulation. The District shall determine which sizing method is appropriate under the conditions and circumstances of wastewater service and loading.

b. Fixture Capacity Method: Under this method, the physical size of each fixture compartment to be connected to the Grease Trap shall be measured and the capacity determined. The drainage load in gallons shall then be computed assuming the drainage load to be equal to 0.75 times the total physical capacity. The sum of the drainage loads for each fixture compartment to be connected to a single Grease Trap will be the total Grease Trap drainage load. The total Grease Trap drainage load is then

divided by the drainage period for the fixture compartments connected to determine the flow rate to the Grease Trap in gallons per minute (gpm). Multiply the Grease Trap flow rate thus determined, or the rated capacity of the flow control device, by the minimum retention time (15 minutes) to determine the required liquid capacity of Grease Trap to be installed.

c. Fixture Unit Method: Under this method the fixture compartment outlet or trap arm size shall be utilized to determine the fixture compartment drainage load in gpm, assuming one (1) fixture unit equivalent produces a flow rate of 0.5 gpm. The sum of the drainage loads for each fixture compartment to be connected to a single Grease Trap or the rated capacity of the flow control device will be the total Grease Trap drainage load in gpm. Multiply this total drainage load in gpm by the minimum retention time (15 minutes) to determine the required liquid capacity of the Grease Trap to be installed.

The following fixture unit equivalent values shall be utilized when sizing Grease Traps under the Fixture Unit Method:

Fixture Outlet Trap or Trap Arm Size	Fixture Unit Equivalent Value
1-1/4"	1
1-1/2"	3
2"	4
2-1/2"	5
3"	6
4"	8

d. Selection of the appropriate size for a Grease Trap is dependent on the drainage period of the fixtures connected to the trap. By adjusting the fixture drainage period through use of a flow control device, (1) a smaller Grease Trap could be utilized for a given fixture size or capacity; (2) multiple fixtures could be connected to the same Grease Trap.

e. Where the required Grease Trap size would exceed that which is commercially available, either multiple Grease Traps shall be installed in parallel or a Grease Interceptor shall be utilized.

1.06 Installation.

A. The installation of Grease Interceptors and Grease Traps shall be in accordance with the plumbing code, as utilized by the local building permitting authority and this Regulation, and shall be accomplished in a workmanlike manner in accordance with industry standards and in compliance with the design and sizing requirements hereunder.

B. The installation of Grease Interceptors and Grease Traps shall be accomplished by a licensed plumber pursuant to C.R.S. §§ 12-58-101 through -117, with documented experience in the installation of such devices.

C. Each Grease Interceptor and Grease Trap shall be readily accessible for inspection, servicing, and maintaining in proper working condition. The use of ladders or the removal of bulky equipment in order to inspect or service interceptors and traps shall constitute a violation of accessibility criteria. Where feasible, all interceptors shall be located outside of the facility served. Interceptors may not be installed in any part of a building where food is handled. Location of all interceptors and traps shall be approved by the District, and shall be shown on the approved building plan.

1. No dishwasher shall be connected to or discharge into any Grease Interceptor or Grease Trap of less than 1,000 gallons capacity which is utilized by other fixtures. Automatic dishwashing units shall be plumbed through their own properly sized Grease Interceptor, properly sized Grease Trap or directly into the building sewer and waste system.

2. No food grinder or disposal unit shall be connected to or discharge into any Grease Trap. Such units shall be plumbed through a properly sized Grease Interceptor or directly into the building sewer and waste system.

3. All fixtures not equipped with a garbage disposal (garbage grinder) which are connected to a Grease Interceptor shall be equipped with a fixed or removable mesh or screen which shall catch garbage and food debris and prevent it from entering the Grease Interceptor.

4. Wastes with a temperature in excess of 140 degrees F. shall not be discharged into a Grease Interceptor or Grease Trap, and liquid discharge from a Grease Interceptor or grease trap shall not exceed 70 degrees F.

1.07 Maintenance.

A. Grease Interceptors and Grease Traps shall be maintained by regularly scheduled cleaning so that they will properly operate as intended to intercept the fats, oil and grease from the Affected Property's waste water and prevent the discharge of said materials into the District's waste water treatment system.

B. Maintenance of Grease Interceptors and Grease Traps shall be done in a workmanlike manner in accordance with industry standards only by a business/professional normally engaged in the servicing of such plumbing fixtures. An individual property owner will not be permitted to accomplish maintenance specified by this Regulation.

C. The District shall provide a customer and/or Affected Property with a form for recording Grease Interceptor/Grease Trap maintenance. The customer and/or Affected Property shall provide one copy of the completed form to the District immediately following completion of periodic maintenance of any Grease Interceptor or Grease Trap within the District.

D. As a minimum, any Grease Interceptor in service in the District shall be serviced at a maximum interval of 120 days.

1. A variance from this requirement may be obtained from the District Manager or Wastewater Superintendent when the owner can show or confirm that there is no

normal use during any given 120 calendar day period.

2. The District may inspect the interceptor and outlet and if it is deemed necessary by the District, more frequent servicing and maintenance will be required.

E. As a minimum, any Grease Trap in service in the District shall be serviced at a maximum interval of 30 days.

1. A variance from this requirement may be obtained from the District Manager or Wastewater Superintendent when the owner can confirm that there is no normal use during any given 30 calendar day period.

2. The District may inspect the trap and outlet and if it is deemed necessary by the District, more frequent servicing and maintenance will be required.

F. Biological treatment shall not be a substitute for the servicing of Grease Interceptors and Grease Traps at the frequency determined by the District. Emulsification of oil and grease with enzyme treatments only delays physical separation. Oil and grease may then separate downstream and cause clogging problems in the collection system. A Grease Interceptor and Grease Trap using biological treatment requires continuous monitoring, maintenance, and inoculation of the bacterial cultures.

G. The District may inspect Grease Interceptors and Grease Traps monthly to determine the load on the fixture and the effectiveness of maintenance activities. The District will inventory all Grease Interceptors and Grease Traps in its service area and document the inspections of these interceptors and traps.

1. These inspections may determine that more frequent maintenance than previously specified in these Regulations is required.

H. Existing sources not connected to a Grease Interceptor or Grease Trap and contribute oil and grease to the District's waste stream and collection system will be identified through the District's inspection program. Once these sources are identified, the Affected Property owners and lessees shall be required to install a Grease Interceptor or Grease Trap and maintain it according to these Regulations. In the time before a Grease Interceptor or Grease Trap can be installed the District will require these businesses to implement Best Management Practices (BMPs) to keep oil and grease out of the sanitary sewer system as described below.

1. Scrape food from plates into garbage cans.

2. Pre-wash plates by spraying them off with cold water over a small mesh catch basin positioned over a drain. This catch basin should be cleaned into a garbage can or other solid waste disposal device as needed.

3. Pour all liquid oil and grease from pots into waste grease bucket stored at the pot washing sink. Heavy solid build-up of oil and grease on pots and pans should be scraped off into a waste grease bucket.

4. Other kitchen practices identified by the District and/or facility which will decrease

the point source discharge of oil and grease.

1.08 Responsibility, Fines and Third-Party Compensation.

A. Affected Property owners and lessees shall be jointly and severally responsible for installing Grease Interceptors and Grease Traps, cleaning Grease Interceptors and Grease Traps, for maintaining the Grease Interceptors and Grease Traps in efficient operating condition at all times, and for otherwise complying with the provisions of this Regulation. Grease Interceptors and Grease Traps shall be maintained by regularly scheduled removal of the accumulated grease and solids so that they will properly operate as intended to intercept the grease and solids from the customer's wastewater and prevent the discharge of grease and solids to the District's wastewater treatment system. This maintenance shall be performed in a workmanlike manner in accordance with industry standards before the retention capacity of the interceptor or trap is exceeded. Detailed and accurate records of maintenance shall be maintained on- site and shall be provided to and available to the District upon request. Such maintenance records shall be in the form of Exhibit A attached hereto, or such other form as reasonably required from time to time by the manager of the District.

B. The District reserves the right to levy fines and/or penalties to such facilities that do not conform to the District's fats, oil and grease (FOG) control regulations, including the failure to install the required type and size of Grease Interceptor or Grease Trap required under this Regulations. Such fines and/or penalties may also be levied at the sole discretion of the District's manager in the event the Affected Property fails to provide access as required by this Regulations, fails to conform to the recordkeeping provisions of this Regulations, or other failure to adhere to the requirements or conditions of the FOG control permit. The amount of the fine shall be determined by the Manager based upon a schedule of fines and penalties enacted by resolution of the Board of Directors of the District which bears a reasonable relationship to the costs and expenses incurred by the District due to the noncompliance, risk of injury to the District, and the necessity to discourage violations and repeated violations, in accordance with Colorado Revised Statutes §§ 32-1-1001, 1006.

C. Compensation shall be paid to any surrounding property, business and/or homeowners by the owners and/or lessees of the Affected Property for any damage resulting from non-compliance with the District's regulations.

D. Any extraordinary costs incurred by the District due to interference, damage or special processing necessary in the treatment and/or collection system shall be paid by the Affected Property owners or lessees to the District. The direct costs of all labor, equipment and materials incurred in rectifying the interference or damage, including reasonable attorney's fees, shall be billed directly to the owner of the Affected Property by the District, and such costs shall become part of the total utility charges and fees due and owing to the District and shall constitute a lien on the Affected Property until paid in full, in accordance with Colorado Revised Statutes §§ 32-1-1001, 1006.

1.09 Sewer Use Regulations.

A. This regulation forms a part of the Sewer Use Regulations of the District. Enforcement of this regulation is governed by the express terms hereof and the enforcement provisions of Article XII of the Sewer Use Regulations, which is incorporated by

reference, including, without limitation, those provisions for administrative violations, violation of discharge limitations, enforcement procedures, penalties, field observations, and extra monitoring charges. Any violation of this regulation for Grease Interceptors and Grease Traps shall be considered a discharge violation under the enforcement provisions of Article XII of the Sewer Use Regulations. Compliance with this regulation, as well as the other provisions of the Sewer Use Regulations, shall be the joint and several obligation of the owner of the Affected Property served and any party in possession of the Affected Property using the wastewater services of the District. Any monies due or penalties owed to the District under the provisions of this regulation, or other provisions of the Sewer Use Regulations, shall constitute a utility charge and fee owed to the District and shall constitute a lien upon the property served until paid in full, in accordance with Colorado Revised Statutes §§ 32-1-1001, 1006.

B. If monies due and penalties are not paid, water service may be shut off in addition to a lien being placed on the property.

C. The District has the right to reject any waste which may be harmful to or cause obstruction of the publicly-owned wastewater collection system, or which may interfere with the operation of the publicly-owned treatment works.

1.10 Application.

A. This regulation applies to all existing and future uses within the scope of Part III, Chapter 1, 1.01, A. For those businesses currently conducting operations subject to these regulations, they shall be provided a grace period of one year in which to come into full compliance with these regulations. The District has determined that the enactment of this regulation is in the best interest of the District and its customers and is necessary for this efficient and proper operation and protection of the District's operations and facilities, and that this regulation is necessary and in furtherance of the health, benefit, and welfare of the District's customers.

B. Unenforceability of any provision contained in this Section shall not affect or impair the validity of any other provision of this Section.

C. If monies due and penalties are not paid, water service may be shut off in addition to a lien being placed on the property in accordance with Colorado Revised Statutes §§ 32-1-1001, 1006.

Fats, Oils and Grease Control

Acknowledgement of Receipt of Requirements

The signature below certifies that _____(Company Name) has received Security Sanitation District's Fats, Oils and Grease Control Requirements.

_____ _____

Signature of Authorized Representative Date

_____

Print Name and Title

Grease Interceptor/Trap & Used Fryer Oil Maintenance Log

(For Business to keep up to date and available upon request)

Business Name_____

Business Address_____

Grease Interceptor/Trap Location_____

_____

Date of Interceptor/ Trap Cleaning or Inspection		Name Of Individual That Inspected Or Cleaned Interceptor/ Trap	APPX. Gallons/Lbs Of Grease/Debris Removed (2 cups=1Lb)	How Was The Waste Disposed Of (Ex:Trash Bin,Hauler)
Date	Initials			

Does your business use fryer oil?_____

Does your business recycle used fryer oil?_____

If yes, name and phone # of recycler_____

Are used fryer oil containers properly secured to avoid the possibility of spillage or vandalism?_____

If used fryer oil is not recycled how is it disposed_____

_____

Date of Used Fryer Oil Pick-Up		Approximate Gallons Picked-Up	Where Is Used Oil Taken and How is It Used **(Manifest must be completed each pick-up)**
Date	Initials		

Certification: I certify under penalty of law that the above information is true, accurate, and complete to the best of my knowledge. I am aware that there are significant penalties for submitting false information including the possibility of fines and/or imprisonment for known violations.

_____ _____/_____

Signature of Authorized Representative Title Date

Security Sanitation District
231 Security Blvd
Colorado Springs CO. 80911

ATTN: Wastewater Department
Phone# 392-7844 Fax# 390-7252

Security Sanitation District
Grease Interceptor/Trap Inspection Form

Date of Inspection: _____

Business: _____

Address:

_____

Contact Person
and Title: _____ Phone: _____

Grease Interceptor Location:

_____

Interceptor Capacity (gallons) _____ Number of Pits _____

Is the capacity sufficient: ☐ **YES** ☐ **NO**

Use of enzymes? ☐ **YES** ☐ **NO**

Number of Customers/Day: _____

General Condition of Interceptor/Trap: ☐ **Excellent** ☐ **Good** ☐ **Poor** ☐ **Replace**

Pumping Company: _____

Address:

_____

Contact Person
and Title: _____ Phone: _____

Interceptor Pump Schedule: _____

Date of Last Pumping: _____

Comments:

_____

Minimum Cleaning &
Inspection Schedule: ☐ **4-month** ☐

LIQUID WASTE HAULER LOAD MANIFEST

(copy to be provided to Wastewater Dept. each pumping)
Phone# 392-7844 Fax#390-7252

Hauler Company Name_____
Truck License#_____
Date Pumped_____ Time Pumped_____am/pm
Dumping Destination_____
Customer Name_____
Customer Address_____
Customer Phone #_____Business or Residence ?

TYPE OF VESSEL PUMPED:

SEPTIC TANK GREASE INTERCEPTOR GREASE TRAP
OTHER _____

Approximate gallons pumped:_____

CUSTOMER CERTIFICATION:	**Liquid Waste Hauler Certification**:
As an authorized representative of the above named customer, I certify under penalty of law that the above information is true and correct to the best of my knowledge. I further certify that the material being pumped is not hazardous as defined by RCRA,and is generated from domestic discharges or from food service operations.	I certify under penalty of law that the above inform-tion is true and correct to the best of my knowledge. Furthermore, I certify that the truck listed above contains the materials listed above in the Customers Certification, and does not contain hazardous waste as defined by the Resource Conservation and Recovery Act.
_____	_____
Customer Signature Date	Hauler Signature Date
_____	_____
Print Name/Title	Print Name/Title

Security Sanitation District
231 Security Blvd
Colorado Springs CO. 80911

ATTN: Wastewater Department
Phone# 392-7844 Fax# 390-7252

IMPORTANT NOTICE

Dear Security Sanitation District Customer:

The Security Sanitation District is required by the U.S. Environmental Protection Agency (EPA) to implement an oil and grease control and inspection program. With the growth in the Security service area and the number of new food establishments and new restaurant owners, grease removal has become a big concern for the Sanitation District. We need your assistance and cooperation.

The Security Sanitation District works hard to maintain the collection system and keep the sanitary sewers clean and free of oil and grease obstructions. As part of the Sanitation District's normal operations, cleaning of all sewer mains is performed at least annually. However, despite these efforts, blockages still occur, often as a result of improper maintenance of customer service lines or a lack of adequate grease interceptors. These blockages can then interfere with the normal flow of the Sanitation District's collection system.

Obstructions in the sanitary sewers can be a nuisance to your daily operations because of foul odors and backed up drains at your facility, as well as a nuisance and problem for surrounding homes and businesses. These obstructions can also generate hazardous gases in the Sanitation District's collection system, which in turn could affect our employee's health and safety.

Proper grease interceptor practices and maintenance are the business owner's responsibility. An overflowing, non-maintained or defective grease interceptor is a health hazard and can cause significant damage and impairment to the Sanitation District's collection system. The program implemented by the Security Sanitation District will hold the business responsible for the proper management of all oil and grease generated. If any of the guidelines set forth by the Sanitation District's program are not met, the District will have the authority to levy penalties for non-compliance, and may result in the termination of water service until such time facilities are brought into compliance.

The generator of oil and grease may also be held responsible for damages and clean-up to surrounding homes and businesses caused by such blockages. In addition, any extraordinary cost incurred by the Security Sanitation District due to interference, damage or special processing necessary in the treatment and/or collection system shall be paid by the business. In such a circumstance, the direct cost of all labor, equipment and materials used to rectify the interference or damage will be billed directly to the generator by the Security Sanitation District.

With your help, we hope to achieve the goal of this oil and grease control and inspection program by not having any blockages in the collection system caused by oil and grease. For any questions, please call the Security Sanitation District treatment plant at 392-7844 or the main office at 392-3475.

The Security Sanitation District

Roy E. Heald, General Manager

PART IV - SAND AND OIL CONTROL REQUIREMENTS

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PART IV - SOIL AND OIL CONTROL REQUIREMENTS

PART IV

SAND AND OIL CONTROL REQUIREMENTS

CHAPTER 1

GENERAL INFORMATION

1.01 General.

A. The FOG requirements established in Part III shall apply to facilities subject to the Sand and Oil control requirements of the District's Sewer Use Regulation.

B. Sand/Oil Interceptors shall be provided when, in the judgment of the District, they are necessary for the proper handling of sand, grit and/or petroleum-based liquid waste which may be harmful to, or cause obstruction of the publicly owned wastewater collection system, interfere with the operation of the publicly owned treatment works, or as otherwise required by the FOG regulations. The District will substantiate whether a Sand/Oil Interceptor is suitable for installation. As a general presumption, Sand/Oil Interceptors will be required for all Affected Property as described in this Article.

C. An adequate Sand/Oil Interceptor shall be installed, as specified herein, on the wastewater drainage system from any Affected Property. The adequacy of the Sand/Oil Interceptor shall be determined by compliance with the design, sizing, and other requirements of this regulation and/or the FOG Permit.

1. All drains from shop areas, washing areas and/or potential spill areas shall be connected to a Sand/Oil Interceptor. Fixtures to be connected include, but are not limited to, floor drains, engine/parts cleaning sinks and wash areas located in areas where sand and petroleum-based liquid waste containing materials may exist.

2. Toilets, urinals and similar fixtures shall not waste through a Sand/Oil Interceptor. Such fixtures shall be plumbed directly into the building sewer and waste system.

D. A variance from compliance with the FOG regulations or Sand/Oil Interceptor on any non-residential structure may be granted by the District Manager or the Board of Directors after due consideration by the District for good cause shown including, without limitation, the particular hardship and unique circumstances of the customer which are not brought about as a result of the customer's acts or omissions. The variance applicant has the burden of proof on the above issues and to establish that the requested variance will not harm or otherwise interfere with the operation of the District's wastewater collection system. The granting of any variance shall be at the sole discretion of the District based upon the facts and circumstances of each request. Any variance granted shall not establish a precedent for any future variance request.

1.02 Definitions.

A. Affected Property. Affected Property has the meaning set forth in Part III.

B. Sand/Oil Interceptor. This is defined as a unit of at least 300 gallons capacity designed to retain sand/oil from one or more fixtures and which shall be located remote from the fixtures being served, typically outside the building being served. This is the preferred unit of choice by the District. The use of larger capacity Sand/Oil Interceptors is encouraged whenever possible in that larger interceptors work more efficiently. In resolving any question of capacity of Sand/Oil Interceptors, any uncertainties shall be resolved in favor of the larger capacity interceptor.

1.03 Design and Sizing.

A. The design and sizing of a required Sand/Oil Interceptor shall be in accordance with the current edition of the International Plumbing Code (IPC) as utilized by the local building permitting authority and these Regulations and shall be designed, sized, installed, maintained and operated so as to accomplish its intended purpose of intercepting the sand/oil from the customer's wastewater and preventing the discharge of such sand and oil to the District's wastewater treatment system.

B. The size, type and location of each Sand/Oil Interceptor shall be approved in the District's discretion, in accordance with the standards set forth in these Regulations. Except where otherwise specifically permitted, no wastes other than those requiring separation shall be discharged into any Sand/Oil Interceptor. One set of plans, including complete mechanical and plumbing sections shall be submitted to the District for approval prior to construction. Such plans shall include the size, type and location of each interceptor. The applicant has the burden of proof to establish that the proposed Sand/Oil Interceptor is capable of processing the wastewater in accordance with the standards set forth in these Regulations and that the applicant's use of the Affected Property will not harm or otherwise interfere with the operation of the District's wastewater collection system. Such approval shall not exempt the user from compliance with any applicable code, ordinance, rule, regulation or order of any governmental authority. Such approval shall not be construed as or act as a guarantee or assurance that any discharge is or will be in compliance with any applicable code, ordinance, rule, regulation, or order or any governmental authority. Any subsequent alterations or additions to such facilities shall not be made without due notice to and prior approval of the District.

C. Design

1. All waste shall enter the Sand/Oil Interceptor through the inlet pipe only.

2. Wastes in excess of 140 degrees Fahrenheit (°F) shall not be discharged into a Sand/Oil Interceptor and liquid discharged from a Sand/Oil Interceptor shall not exceed 70°F.

3. Sand/Oil Interceptors shall be so designed and located as to be readily accessible for cleaning and shall have a water seal of not less than six (6) inches.

4. Sand/Oil Interceptors shall be constructed in accordance with the design specifications contained herein, shall require prior approval by the District and shall have a minimum of two (2) compartments with fittings designed for sand/oil retention. There shall be a minimum of two (2) manholes to provide access for cleaning and inspection of all fixtures and compartments of the interceptor, a minimum of one (1) per ten (10) feet of interceptor length. In the case of smaller, or circular interceptors, where it is not practical to install two manholes, a single manhole shall be located so as to permit entrance to the first compartment, and inspection of the second. All areas of the second compartment shall be accessible for cleaning. Manhole covers shall be gastight in construction having a minimum opening dimension of twenty (20) inches. In areas where traffic may exist, the interceptor shall be designed to have adequate reinforcement and cover, meeting HS-20 load specifications.

5. If an existing Sand/Oil Interceptor does not meet the design and sizing criteria as set forth, the interceptor shall be replaced with a properly designed and sized interceptor.

6. Upon change of ownership of any existing Affected Property which would be required to have a Sand/Oil Interceptor under this Regulation, the applicant for sanitary sewer service shall demonstrate that a properly sized and functioning Sand/Oil Interceptor is installed.

7. Sand/Oil Interceptors shall be so designed that they will not become air bound if closed covers are used. The tank and the discharge line shall each be vented, and the vents shall not tie together less than 42 inches above the tank lid elevation.

8. An effluent sampling box shall be provided on the discharge of each Sand/Oil Interceptor where so required by the District.

1.04 Sizing Criteria.

A. Sand/Oil Interceptors: When determining the minimum size of Sand/Oil Interceptor required, the following criteria shall be considered:

1. The minimum acceptable volume shall be not less than three hundred (300) gallons.

2. The minimum acceptable liquid operating depth shall be not less than four (4) feet.

3. For facilities or portions thereof in which vehicle washing will not occur: Provide ten (10) gallons of interceptor capacity for each one hundred (100) square feet of building drainage area connected to the interceptor.

4. For facilities or portions thereof in which vehicle washing will occur:

a. For facilities without wash water recovery systems: Provide six hundred (600) gallons of interceptor capacity for each wash bay.

b. For facilities with wash water recovery systems: Provide an interceptor capacity (liquid capacity in gallons) = wastewater flow rate (gallons per vehicle) X 48. The wastewater flow rate shall be as specified by the manufacturer of the wash water recovery system which will be installed.

B. An approximate volume may be determined by multiplying the total rate of flow in gallons per minute from each fixture required to be connected to the interceptor times a minimum retention time of not less than one hundred twenty (120) minutes, the resulting volume expressed in gallons.

1.05 Installation.

A. The installation of Sand/Oil Interceptors shall be in accordance with the current edition of the International Plumbing Code (IPC), or other generally applicable building code as utilized by the local building permitting authority and these Regulations, and shall be accomplished in a workmanlike manner in accordance with industry standards and in compliance with the design and sizing requirements hereunder.

B. The installation of a Sand/Oil Interceptor shall be accomplished by a licensed plumber with documented experience in the installation of such devices.

C. Each Sand/Oil Interceptor shall be readily accessible for inspection, servicing, and maintaining in proper working condition. The use of ladders or the removal of bulky equipment in order to inspect or service interceptors shall constitute a violation of accessibility. Where feasible, all interceptors shall be located outside of the facility served. Location of all interceptors shall be approved by the District, and shall be shown on the approved building plan.

1.06 Maintenance.

A. Sand/Oil Interceptors shall be maintained in a workmanlike manner in accordance with industry standards by regularly scheduled removal of the accumulated sand and oil so that they will properly operate as intended to intercept the sand and oil from the Affected Property's waste water and prevent the discharge of sand and oil to the District's waste water treatment system

B. Maintenance of Sand/Oil Interceptors shall be done only by a business/professional normally engaged in the servicing of such plumbing fixtures. An individual property owner will not be permitted to accomplish maintenance specified by this Regulation.

C. In the event the Sand/Oil Interceptor is not properly maintained by the applicant, owner, lessee, or other authorized representative of the Affected Property, the District may authorize such maintenance work be performed on behalf of the Affected Property. The costs of such maintenance shall be billed directly to the District customer and shall become part of the utility charges and fees due and owing to the District and shall constitute a lien against the property served until paid in full, in accordance with Colorado Revised Statutes §§ 32-1-1001, 1006.

D. Maintenance shall be performed in a workmanlike manner before the retention capacity of the interceptor is exceeded. Detailed and accurate records of maintenance shall be maintained on-site and shall be provided to and available to the District upon request. Such maintenance records shall be in the form as approved by the District. The records shall include detailed information relating to the amount of sand and oil removed compared to the size of the Sand/Oil Interceptor and one copy of the completed form shall be provided by the customer and the maintenance business to the District immediately following completion of maintenance of any Sand/Oil Interceptor within the District.

E. A copy of the invoice from the business/professional reporting the date the interceptor was cleaned, the amount of oil and/or sand removed and a recommendation of how frequently the interceptor should be cleaned shall be sent to the District office after each cleaning. A copy of all Sand/Oil Interceptor cleaning invoices are to be on file at the business being served and available to the District upon request. Failure to comply with the above may result in fines, penalties, revocation of the FOG Permit, disconnection of service, or termination of water service.

F. As a minimum, any Sand/Oil Interceptor in service in the District shall be serviced at a maximum interval of 120 days.

    1. A variance from this requirement may be obtained from the District Manager or Wastewater Superintendent when the Affected Property owner can confirm that there is no normal use during any given 120 calendar day period. With written authorization from the Board, the maximum time variance between services is 365 calendar days.

    2. The District may inspect the interceptor and outlet and if it is deemed necessary by the District, more frequent servicing and maintenance will be required.

G. Biological treatment shall not be a substitute for the servicing of Sand/Oil Interceptors at the frequency determined by the District. Emulsification of oil and/or grease with enzyme treatments only delays physical separation. Oil and/or grease may then separate downstream and cause clogging problems in the collection system. A Sand/Oil Interceptor using biological treatment requires continuous monitoring, maintenance, and inoculation of the bacterial cultures.

H. The District may inspect the Sand/Oil Interceptor monthly to determine the load on the fixture and the effectiveness of maintenance activities. The District will inventory all Sand/Oil Interceptors in their service area and document the inspections of these interceptors.

I. These inspections may determine that more frequent maintenance than previously specified is required.

J. Existing sources not connected to a Sand/Oil Interceptor which contribute sand, grit and/or petroleum-based liquid waste to the District's waste stream and collection system will be identified through the District's inspection program. Once these sources are identified, the Affected Property owners and lessees shall be required to install a Sand/Oil Interceptor within a reasonable period of time to be specified by the District and to maintain it according to these Regulations. In the interim time period

before a Sand/Oil Interceptor can be installed the District will require these businesses to implement Best Management Practices (BMPs) to keep sand and oil out of the sanitary sewer system by:

1. Not dumping petroleum-based waste products into the waste collection system;

2. Discontinuing use of wash facilities until such time a suitable system is in place to intercept sand, grit, and petroleum-based products;

3. Sweeping floors and other service areas with hand brooms and dispose of all sweepings as solid waste to minimize the use of wash down water to the greatest extent practicable;

4. Utilizing appropriate absorbent materials to contain and cleanup any spillage of petroleum-based products and disposing of all used absorbent materials as solid waste; and

5. Other practices identified by the District and/or facility which will decrease the point source discharge of sand and oil.

1.07 Responsibility, Fines and Third-Party Compensation.

A. Affected Property owners and lessees shall be jointly and severally responsible for installing Sand/Oil Interceptors, cleaning Sand/Oil Interceptors, for maintaining the Sand/Oil Interceptors in an efficient operating condition at all times, and for otherwise complying with the provisions of the FOG control requirements and these regulations. Sand/Oil Interceptors shall be maintained by regularly scheduled removal of the accumulated oil and solids so that they will properly operate as intended to intercept the oil and solids from the customer's wastewater and prevent the discharge of oil and solids to the Districts' wastewater treatment system. This maintenance shall be performed in a workmanlike manner in accordance with industry standards before the retention capacity of the interceptor is exceeded. Detailed and accurate records of maintenance shall be maintained on-site and shall be provided to and available to the District upon request. Such maintenance record shall be in the form of Exhibit A attached hereto, or such other form as reasonably required from time to time by the manager of the District.

B. The District reserves the right to revoke the FOG permit. The District also reserves the right to levy fines and/or penalties to such facilities that do not conform to the District's regulations, including the failure to install the required type and size of sand/Oil Interceptor required under this Regulation. Such fines and/or penalties may also be levied at the sole discretion of the District's manager in the event the Affected Property fails to provide access as required by this Regulation, fails to conform to the recordkeeping provision of this Regulation, or other failure to adhere to the requirements or conditions of the FOG control permit or FOG regulations. The amount of the fine shall be determined by the District Manager based upon a schedule of fines and penalties enacted by resolution of the Board of Directors of the District which bears a reasonable relationship to the costs and expenses incurred by the District due to the noncompliance, risk of injury to the District, and the necessity to discourage violations and repeated violations.

C. Compensation shall be paid to any surrounding property, business and/or homeowners by the owners and/or lessees of the Affected Property for any damage resulting from

noncompliance with the District's regulations.

D. Any extraordinary costs incurred by the District due to interference, damage or special processing necessary in the treatment and/or collection system shall be paid by the Affected Property owner and/or lessees of the Affected Property to the District. The direct cost of all labor, equipment and materials incurred in rectifying the interference or damage, including reasonable attorney's fees, shall be billed directly to the owner of the Affected Property by the District, and such costs shall become part of the total utility charges and fees due and owing to the District and shall constitute a lien on the Affected Property until paid in full, in accordance with Colorado Revised Statutes §§ 32-1-1001, 1006.

1.08 Sewer Use Regulations.

A. This regulation forms a part of the Sewer Use Regulations of the District. Enforcement of this regulation is governed by the express terms hereof and the enforcement provisions of Part A, Article XII of the Sewer Use Regulations, which is incorporated by reference, including, without limitation, those provisions for administrative violations, violation of discharge limitations, enforcement procedures, penalties, field observations, and extra monitoring charges. Any violation of this regulation for Sand/Oil Interceptors shall be considered a discharge violation, major violation, under the enforcement provisions of Part A, Article XII of the Sewer Use Regulations. Compliance with this regulation, as well as the other provisions of the Sewer Use Regulations, shall be the joint and several obligation of the owner of the Affected Property served and any party in possession of the Affected Property using the wastewater services of the District. Any monies due or penalties owed to the District under the provisions of the Sewer Use Regulations shall become a utility charge and fee owed to the District and shall constitute a lien upon the property served until paid in full, in accordance with Colorado Revised Statutes §§ 32-1-1001, 1006.

B. If monies due and penalties are not paid, water service may be shut off in addition to a lien being placed on the property.

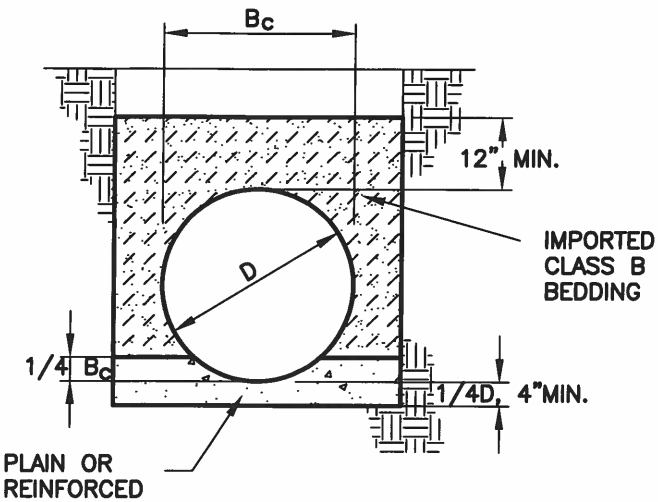
C. The District has the right to reject any waste which may be harmful to or cause obstruction of the publicly owned wastewater collection system or which may interfere with the operation of the publicly owned treatment works.

1.09 Application.

A. This regulation applies to all existing and future uses within the scope of this Article. Those Affected Properties currently conducting operations subject to these regulations shall be provided a grace period of one year from the effective date of these regulations in which to come into full compliance with these regulations. The District has determined that the enactment of this regulation is in the best interest of the District and its customers and is necessary for the efficient and proper operation and protection of the District's operations and facilities and this regulation is necessary and in furtherance of the health, benefit, and welfare of the District's customers.

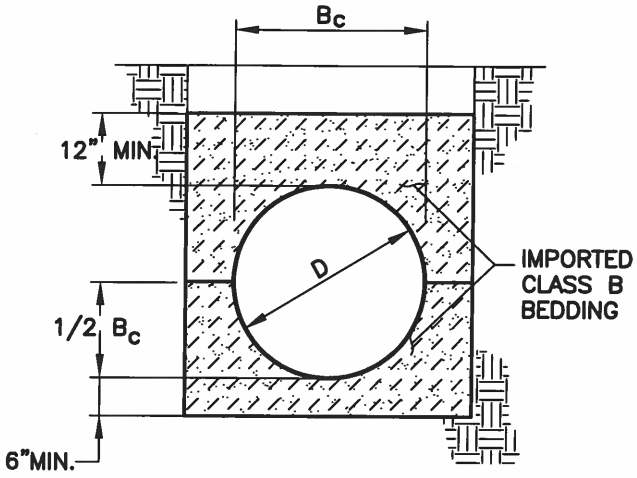
B. Unenforceability of any provision contained in this Section shall not affect or impair the validity of any other provision of this Section.

PART V - CONSTRUCTION STANDARDS



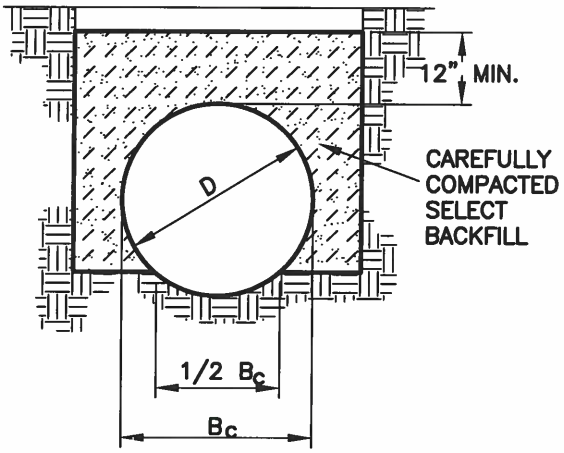
CLASS "A" (CONCRETE CRADLE)

L.F.=2.8



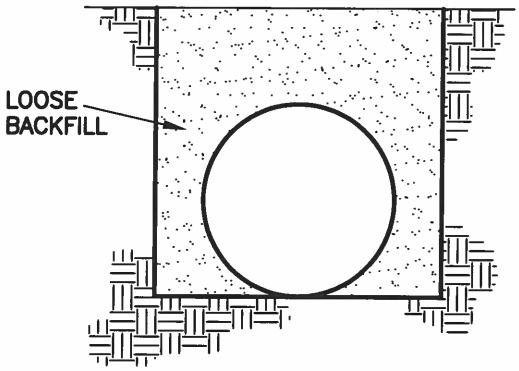
CLASS "B" (GRANULAR BASE)

L.F.=1.9



CLASS "C" (SHAPED BOTTOM)

L.F.=1.5



CLASS "D" (FLAT BOTTOM)

L.F.=1.1

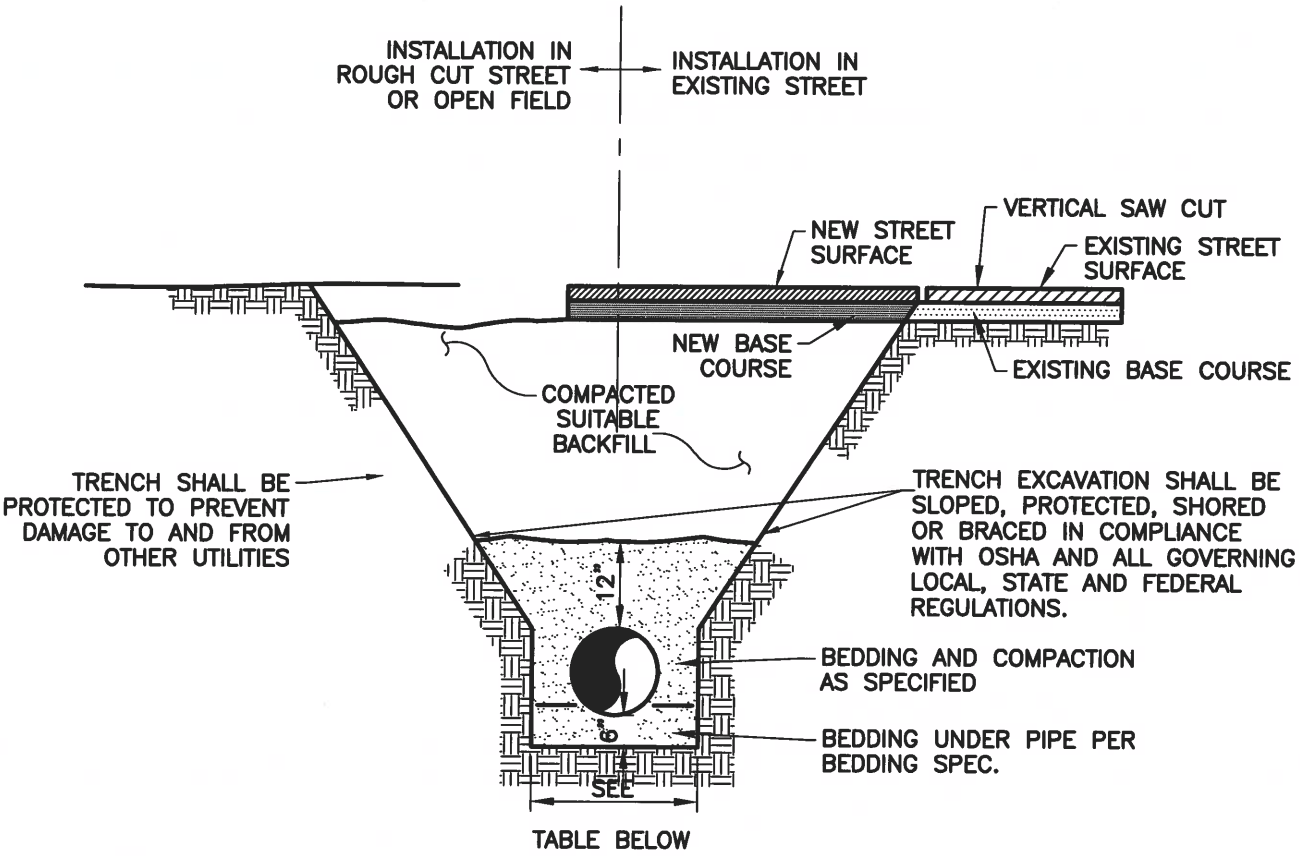
NOTES:

1. FOR ROCK OR OTHER INCOMPRESSIBLE MATERIALS, THE TRENCH SHALL BE OVEREXCAVATED A MINUMUM OF 6" AND REFILLED WITH GRANNULAR BEDDING MATERIAL AS DEFINED BY CLASS "B" BEDDING.
2. L.F. = LOADFACTOR
3. CLASS "D" BEDDING WILL NOT BE ACCEPTABLE UNDER ANY CONDITION.
4. MINIMUM DENSITY FOR CAREFULLY COMPACTED SELECT BACKFILL SHALL BE 95% OF STD. PROCTOR DENSITY OR AS SPECIFIED FOR THE TRENCH BACKFILL, WHICHEVER IS GREATER.

SECURITY SANITATION DISTRICT

PIPE BEDDING

DRAWN: EMC	REVISED:	WW-1
DATE: FEB 2020	REVISED:	
SCALE: NONE	REVISED:	



BOTTOM OF TRENCH WIDTH		
PIPE DIAMETER	MINIMUM WIDTH	MAXIMUM WIDTH
4"	1'–5"	3'–9"
6"	1'–7"	3'–11"
8"	1'–9"	4'–1"
12"	2'–1"	4'–5"
15"	2'–6"	4'–9"
18"	2'–10"	5'–2"
24"	3'–2"	5'–6"

ALL PIPE EMBEDMENT SHALL BE IMPORTED CLASS B BEDDING UNLESS OTHERWISE DIRECTED.

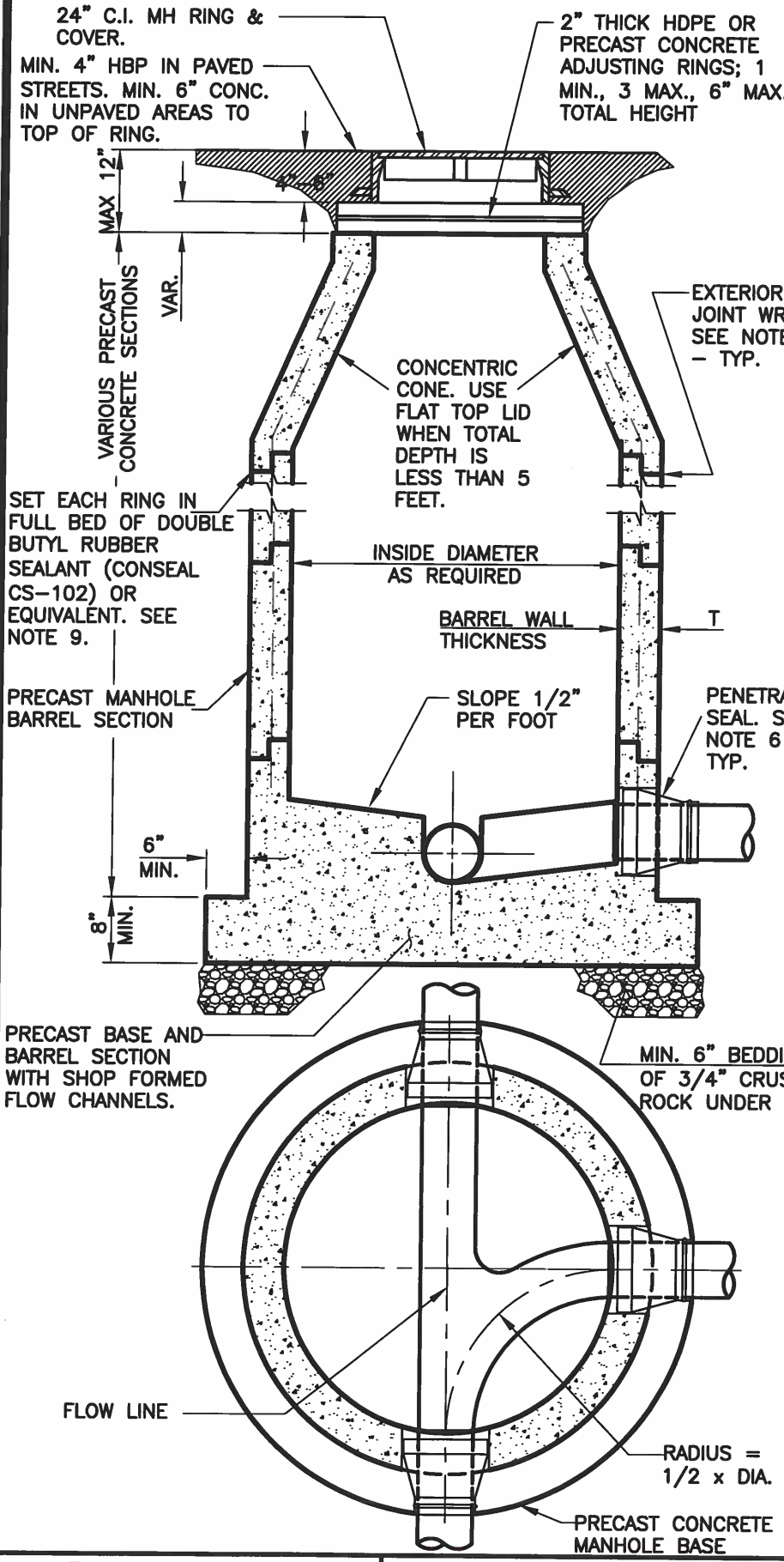
AN OVER EXCAVATED TRENCH SHALL BE REFILLED AND THOROUGHLY COMPACTED UNDER THE DIRECTION OF THE DISTRICT.

UNDER NO CIRCUMSTANCES WILL PIPE BE LAID IN A PROPOSED FILL AREA PRIOR TO IT BEING COMPLETELY FILLED. THE FILL WILL BE PLACED FIRST TO PROPOSED GRADE AND COMPACTED AS REQUIRED. A TRENCH THEN WILL BE EXCAVATED AND THE PIPE INSTALLED IN THE USUAL MANNER.

SECURITY SANITATION DISTRICT

TYPICAL TRENCH CROSS SECTION

DRAWN: EMC	REVISED:	WW–2
DATE: FEB 2020	REVISED:	
SCALE: NONE	REVISED:	



1. MANHOLE BARREL MINIMUM DIMENSIONS SHALL CONFORM TO TABLE.

OUTLET PIPE I.D.	MANHOLE I.D.	T
8" TO 30"	5'-0"	6"
36" TO 54"	6'-0"	7"
GREATER THAN 25' IN DEPTH	SPECIAL DESIGN	SPECIAL DESIGN

REFER TO STANDARD SPECIFICATIONS REGARDING MANHOLE DIAMETER CRITERIA. MANHOLE DIAMETER WILL VARY DUE TO PENETRATION LOCATIONS.

2. MANHOLE FLOW CHANNELS SHALL BE CONSTRUCTED BY FORMING OR SHAPING CAST-IN-PLACE CONCRETE. PIPE SHALL NOT BE LAID THROUGH MANHOLE BASE. CHANNEL DEPTH SHALL BE NO LESS THAN DIAMETER OF THE LARGEST PIPE AT MANHOLE.

3. PRECAST CONCRETE AND REINFORCEMENT TO CONFORM TO ASTM C-478.

4. REFER TO APPROVED PROJECT SPECIFIC CONSTRUCTION DOCUMENTS FOR REQUIRED HIGH BUILD EPOXY WATERPROOFING COATING AT ALL EXTERIOR CONCRETE SURFACES WHICH MAY BE REQUIRED FOR SITE SPECIFIC CONDITIONS.

5. EXTERIOR JOINT DOUBLE WRAP, MIN. 12" WIDE, SHALL BE INSTALLED AT ALL JOINTS ON MANHOLE BARREL; CONSEAL CS-212, OR ACCEPTED EQUAL.

6. PROVIDE PIPE TO MANHOLE CONNECTION, KOR-N-SEAL® OR EQUIVALENT.

7. REFER TO STANDARD SPECIFICATIONS FOR RING & COVER REQUIREMENTS. CLEAR RING OPENING SHALL BE NO LESS THAN 24".

8. MANHOLES SHALL NOT HAVE STEPS PERMANENTLY INSTALLED. BARREL PENETRATIONS WHERE STEPS HAVE BEEN REMOVED SHALL BE FILLED WITH EPOXY BASED GROUT, SIKAGROUT 212 OR EQUIVALENT. STEPS SHALL BE COMPLETELY REMOVED, NOT CUT OFF AT THE BARREL SURFACE.

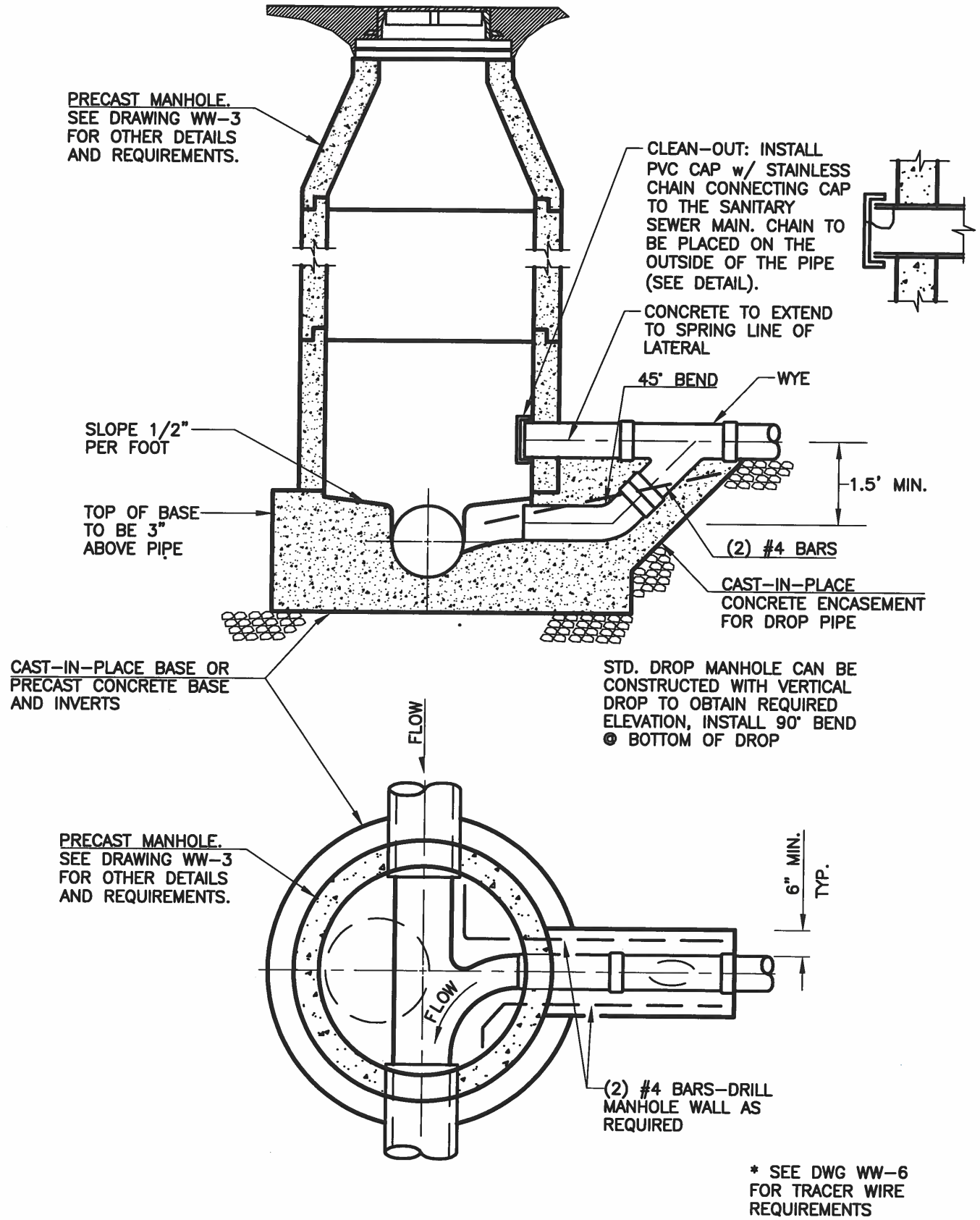
9. PLACE EACH RING, BARREL AND CONE SECTION IN DOUBLE BED OF BUTYL RUBBER SEALANT, CONSEAL CS-102 OR EQUIVALENT, NO LESS THAN TWO CONTINUOUS PIECES OF SEALANT, 1"x1" WITH JOINT ON EACH PIECE OFFSET FROM THE OTHER.

10. SEE DWG WW-6 FOR TRACER WIRE REQUIREMENTS.

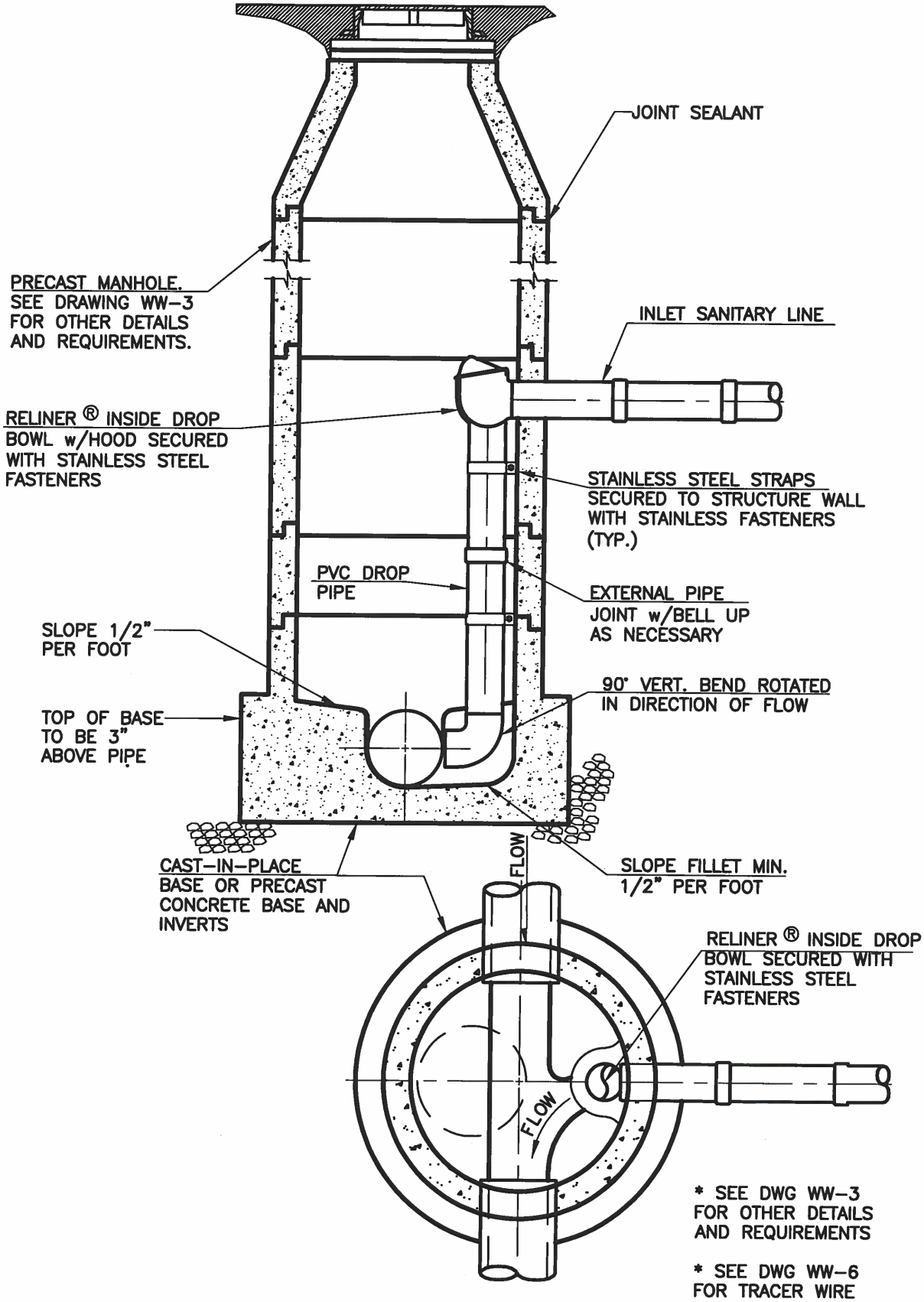
SECURITY SANITATION DISTRICT

PRECAST MANHOLE

DRAWN: EMC	REVISED:		WW-3
DATE: FEB 2020	REVISED:		
SCALE: NONE	REVISED:		



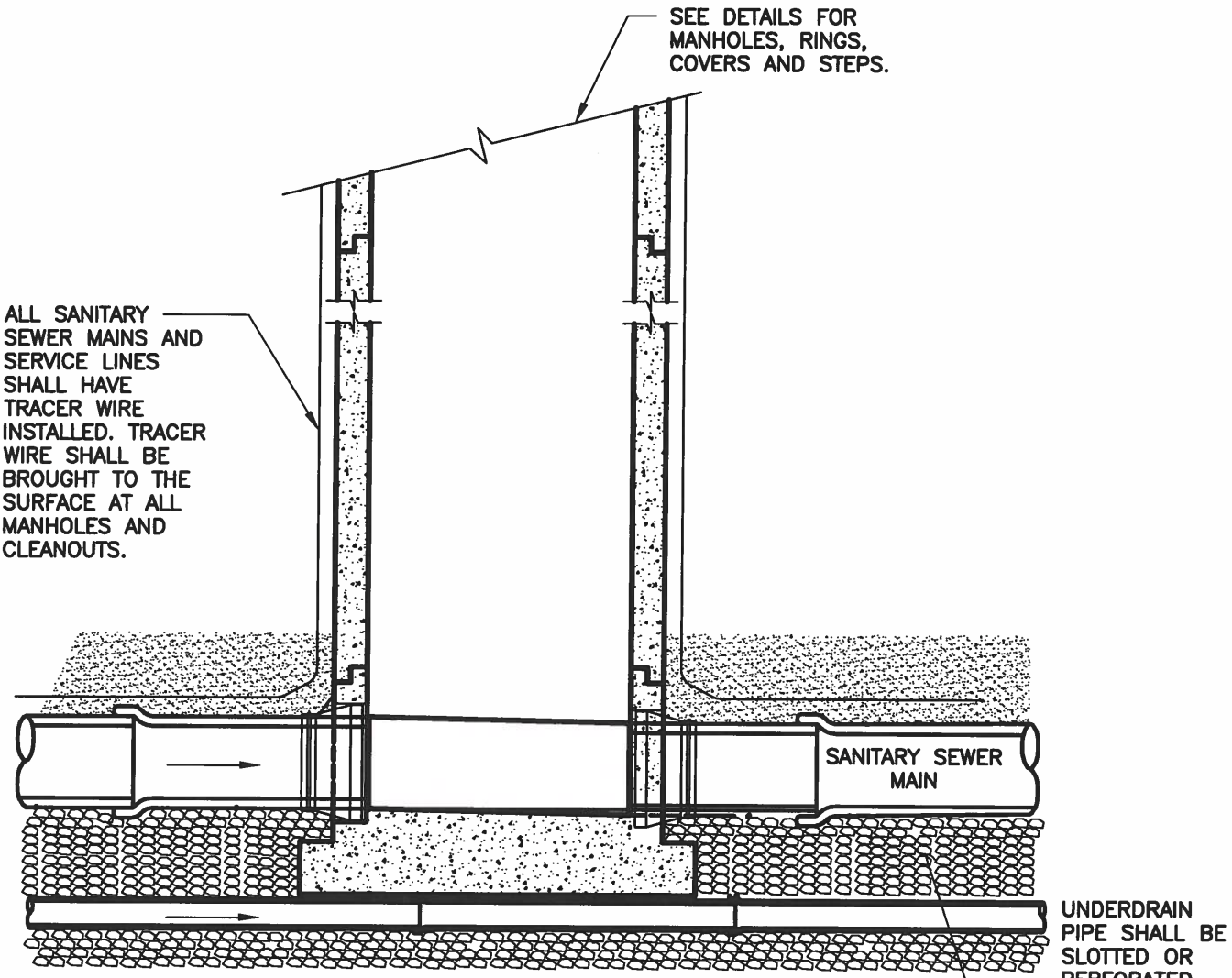
SECURITY SANITATION DISTRICT	SANITARY SEWER EXTERNAL DROP MANHOLE	
	DRAWN: EMC	REVISED:
	DATE: FEB 2020	REVISED:
	SCALE: NONE	REVISED:
		WW-4

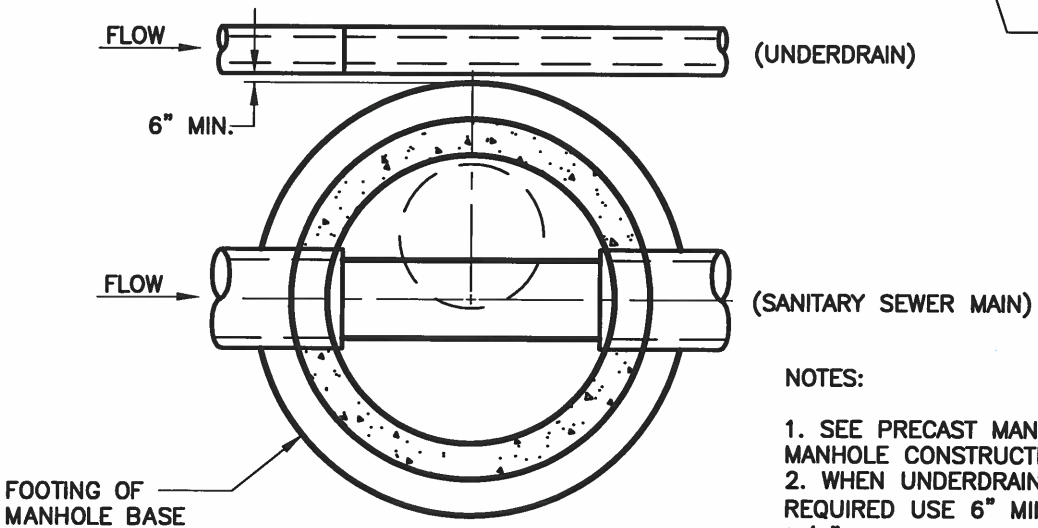


SECURITY SANITATION DISTRICT

SANITARY SEWER INTERNAL DROP MANHOLE

DRAWN: EMC	REVISED:	WW-5
DATE: FEB 2020	REVISED:	
SCALE: NONE	REVISED:	





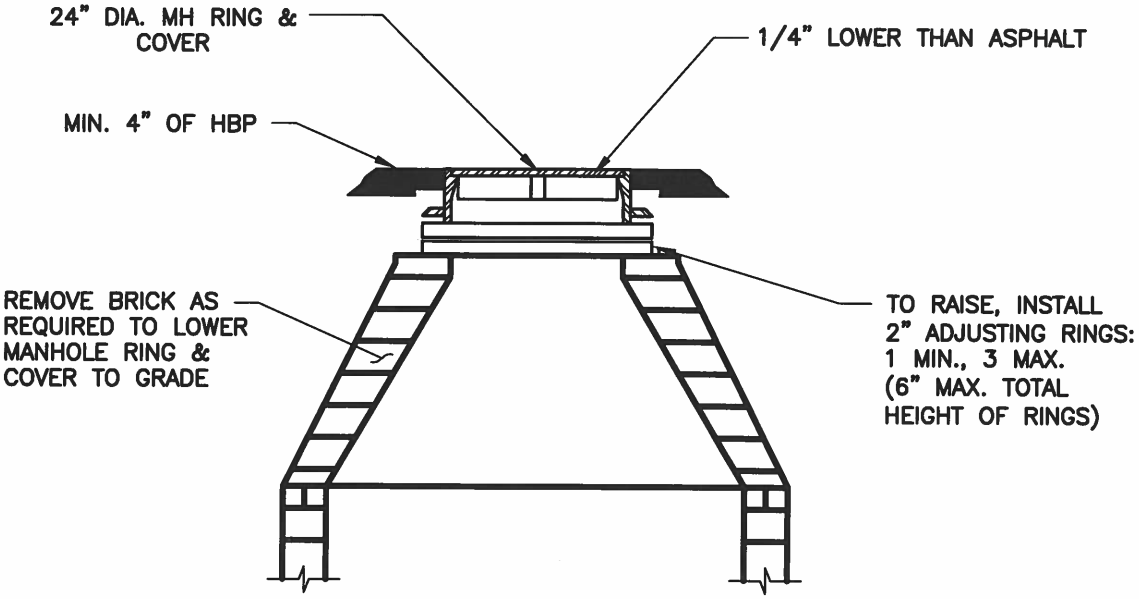
NOTES:

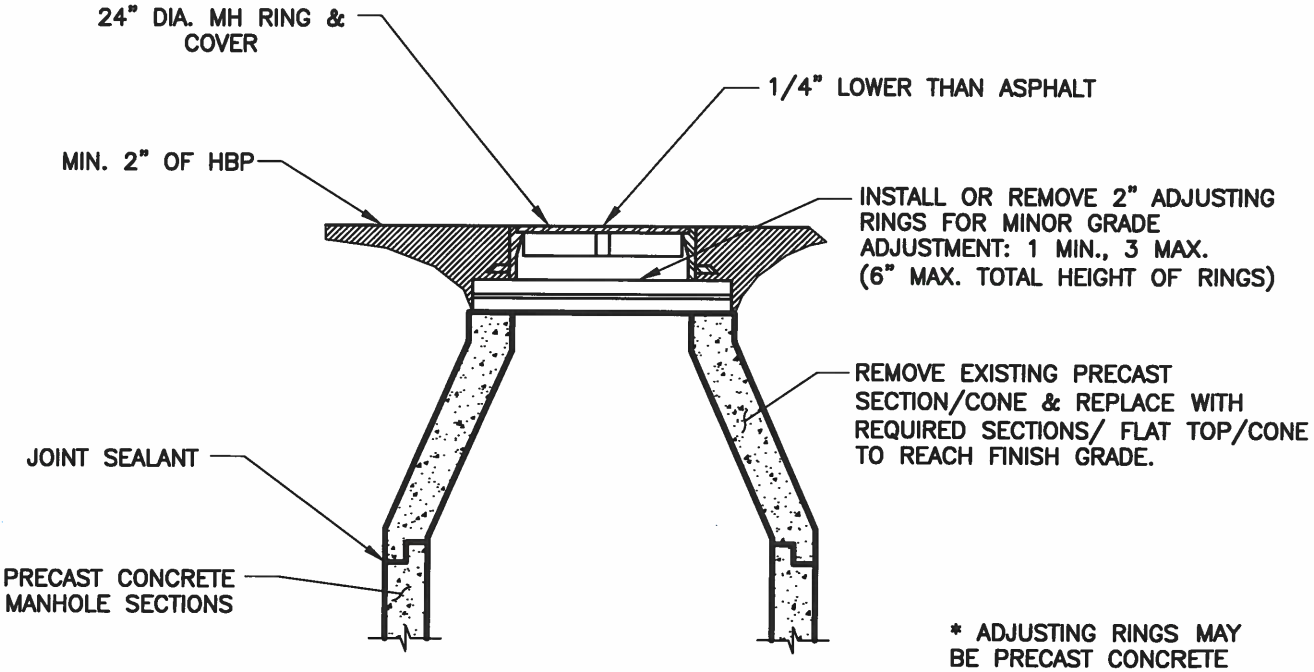
1. SEE PRECAST MANHOLE DETAILS FOR MANHOLE CONSTRUCTION.
2. WHEN UNDERDRAIN PIPE NOT REQUIRED USE 6" MIN. THICKNESS OF 3/4" ROCK.

SECURITY SANITATION DISTRICT

MANHOLE WITH UNDERDRAIN

DRAWN: EMC	REVISED:	WW-6
DATE: FEB 2020	REVISED:	
SCALE: NONE	REVISED:	



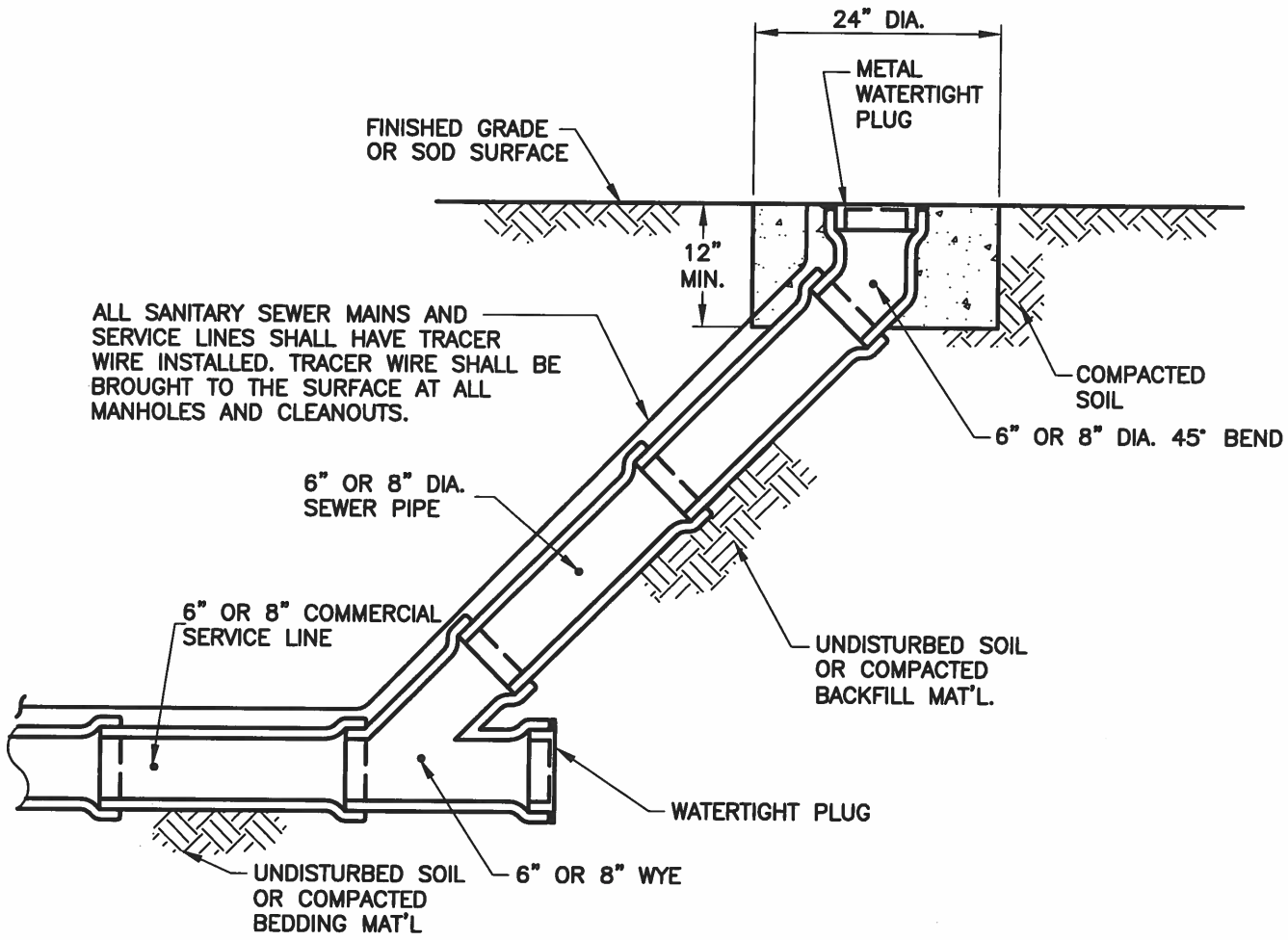


* ADJUSTING RINGS MAY BE PRECAST CONCRETE OR HDPE MATERIAL IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

SECURITY SANITATION DISTRICT

MANHOLE RING AND COVER ADJUSTMENT

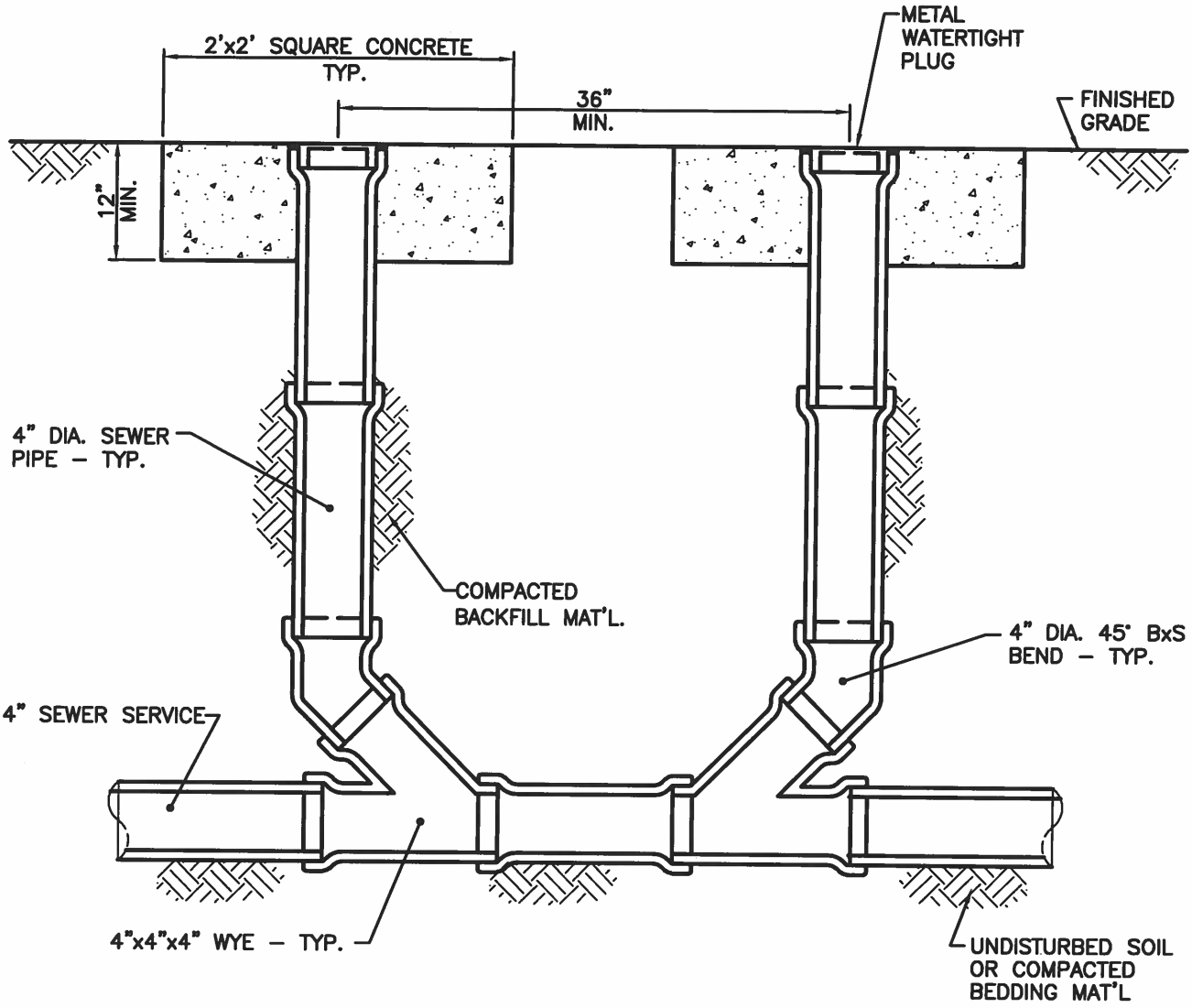
DRAWN: EMC	REVISED:		WW–7
DATE: FEB 2020	REVISED:		
SCALE: NONE	REVISED:		



NOTE:

1. END OF LINE CLEANOUTS NOT ALLOWED ON SSD MAINS.
2. PROVIDED FOR USE ON PRIVATE, COMMERCIAL SERVICE LINE EXTENSIONS ONLY IF APPROVED BY THE SSD.

SECURITY SANITATION DISTRICT	COMMERCIAL SERVICE LINE CLEAN-OUT		
	DRAWN: EMC	REVISED:	WW–8
	DATE: FEB 2020	REVISED:	
	SCALE: NONE	REVISED:	



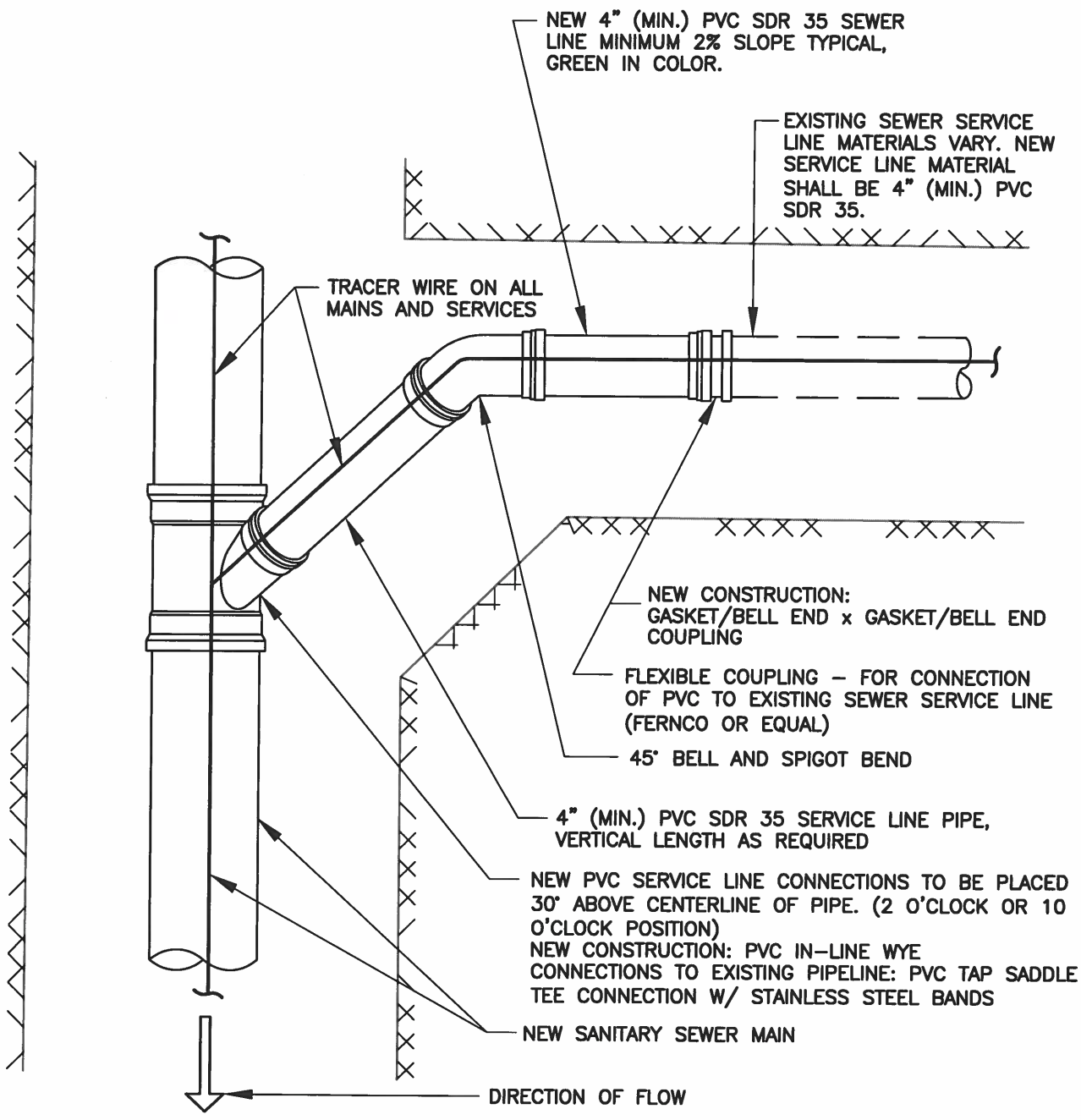
NOTE:

1. REQUIRED ON SERVICE LINES WITH ONE OR TWO STACKS.
2. SERVICE LINE CLEANOUTS SHALL BE PLACED 2" BELOW GRADE WITH A 10" LONG RISER BOX PLACED AT GRADE WITH "SEWER" CAST IN THE LID.

SECURITY SANITATION DISTRICT

DUAL CLEANOUT

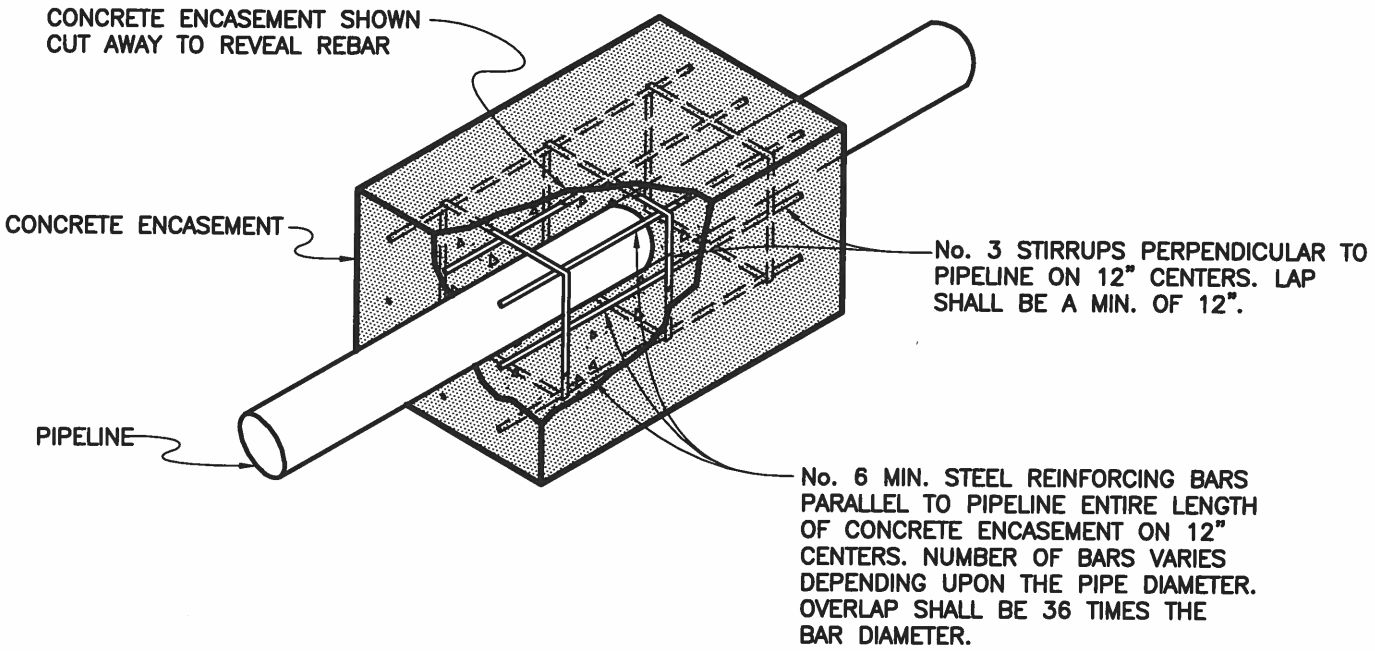
DRAWN: EMC	REVISED:	WW-8A
DATE: FEB 2020	REVISED:	
SCALE: NONE	REVISED:	

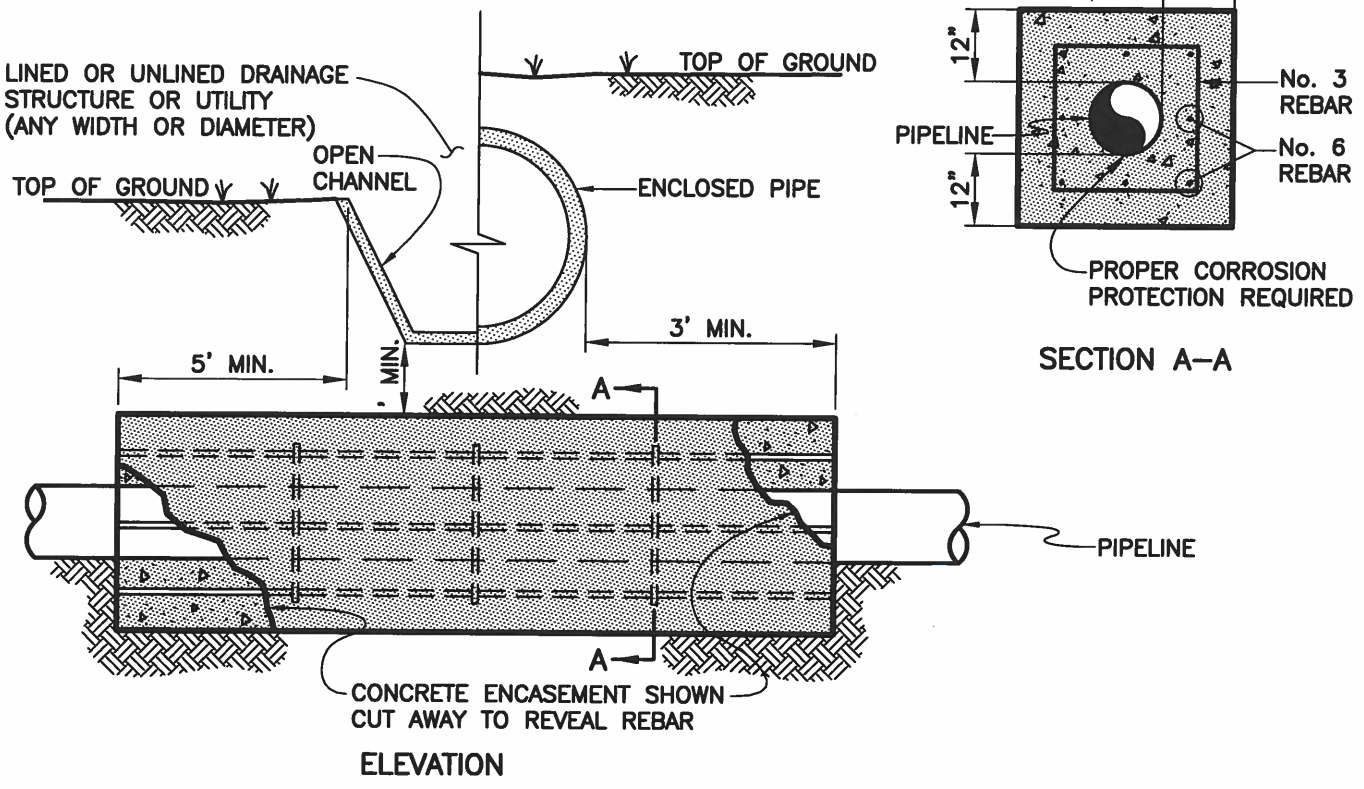


NOTE:

1. ALL NEW SERVICE LINE CONSTRUCTION SHALL BE 4"(MIN.) SDR 35 PVC, GREEN IN COLOR, GASKET/BELL END x SPIGOT PIPE.

SECURITY SANITATION DISTRICT	SANITARY SEWER SERVICE CONNECTION		
	DRAWN: EMC	REVISED:	WW–9
	DATE: FEB 2020	REVISED:	
	SCALE: NONE	REVISED:	

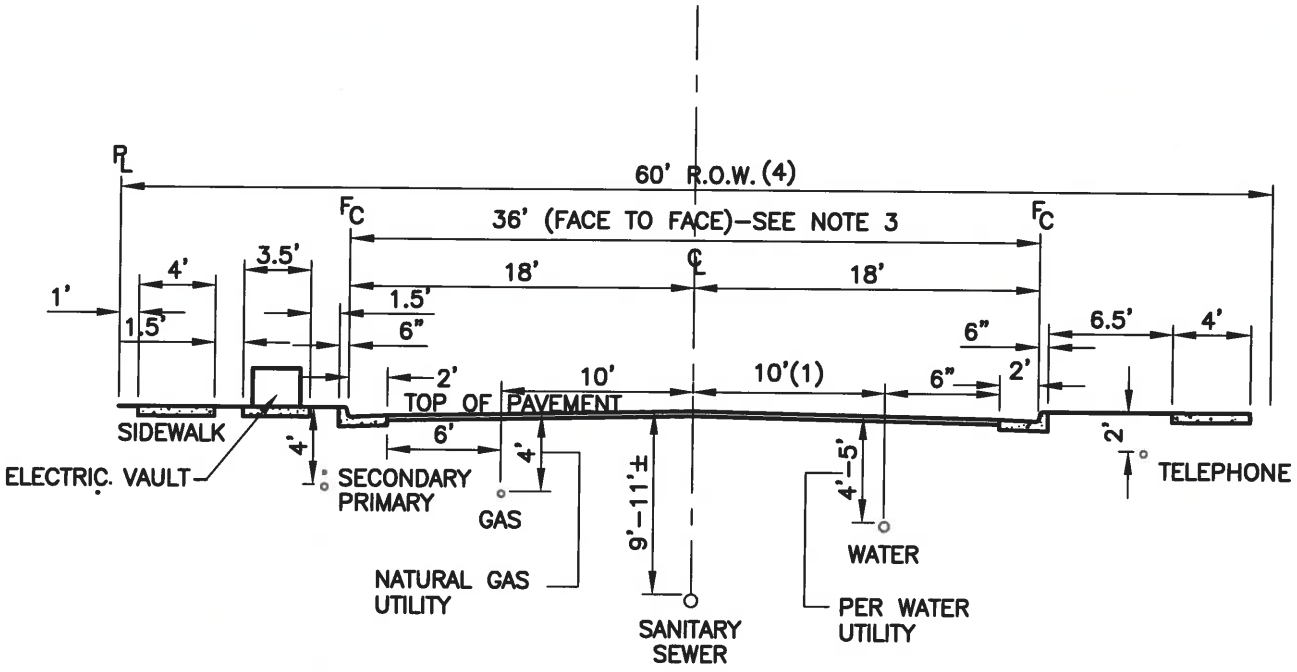




ELEVATION

SECTION A–A

SECURITY SANITATION DISTRICT	PIPE ENCASEMENT		
	DRAWN: EMC	REVISED:	WW-10
	DATE: FEB 2020	REVISED:	
	SCALE: NONE	REVISED:	



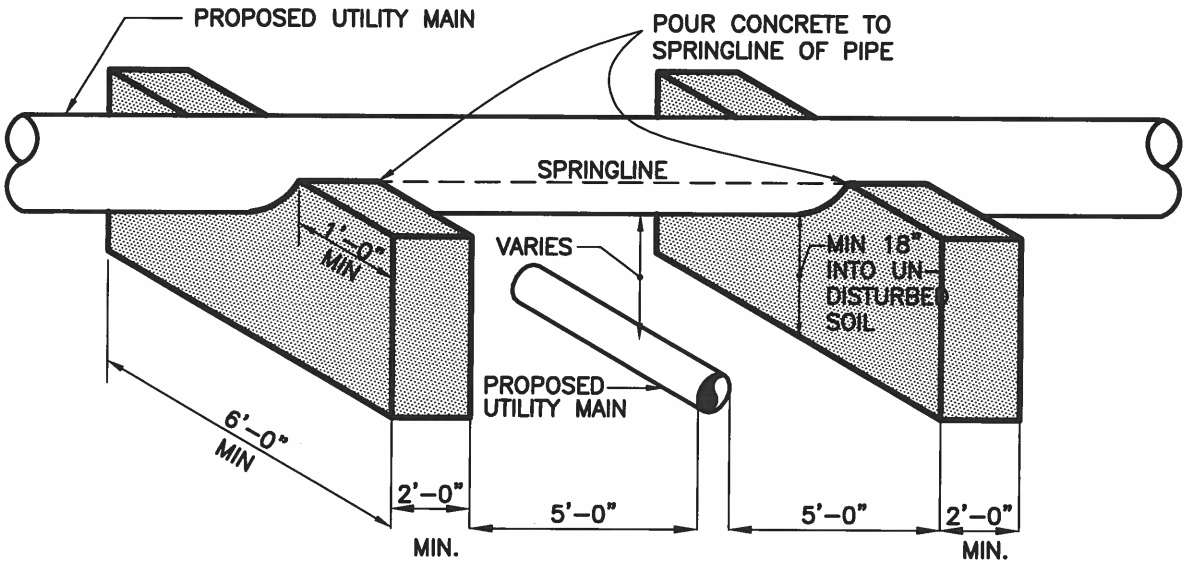
TYPICAL CROSS SECTION
UTILITIES LOCATION

GENERAL NOTES

1. ALL SEWERS SHALL MAINTAIN A 10' CLEAR SEPARATION FROM WATER, OUTSIDE OF PIPE TO OUTSIDE OF PIPE.
2. ELECTRIC CONDUITS SHALL BE ON THE OPPOSITE SIDE OF THE STREET FROM WATER.
3. FOR 40' WIDE STREET SECTIONS, MAINTAIN WATER 10 FEET FROM SANITARY SEWER OUTSIDE OF PIPE TO OUTSIDE OF PIPE AT STREET CENTERLINE.
4. FOR 50' WIDE RIGHT–OF–WAY (ROW), A 5–FOOT WIDE SIDEWALK AND UTILITY EASEMENTS ARE REQUIRED ADJACENT TO THE STREET ROW. FIVE (5) FOOT WIDE ATTACHED SIDEWALK IS USED WITH ELECTRIC UTILITIES BEHIND WALK IN EASEMENT.

SECURITY SANITATION DISTRICT

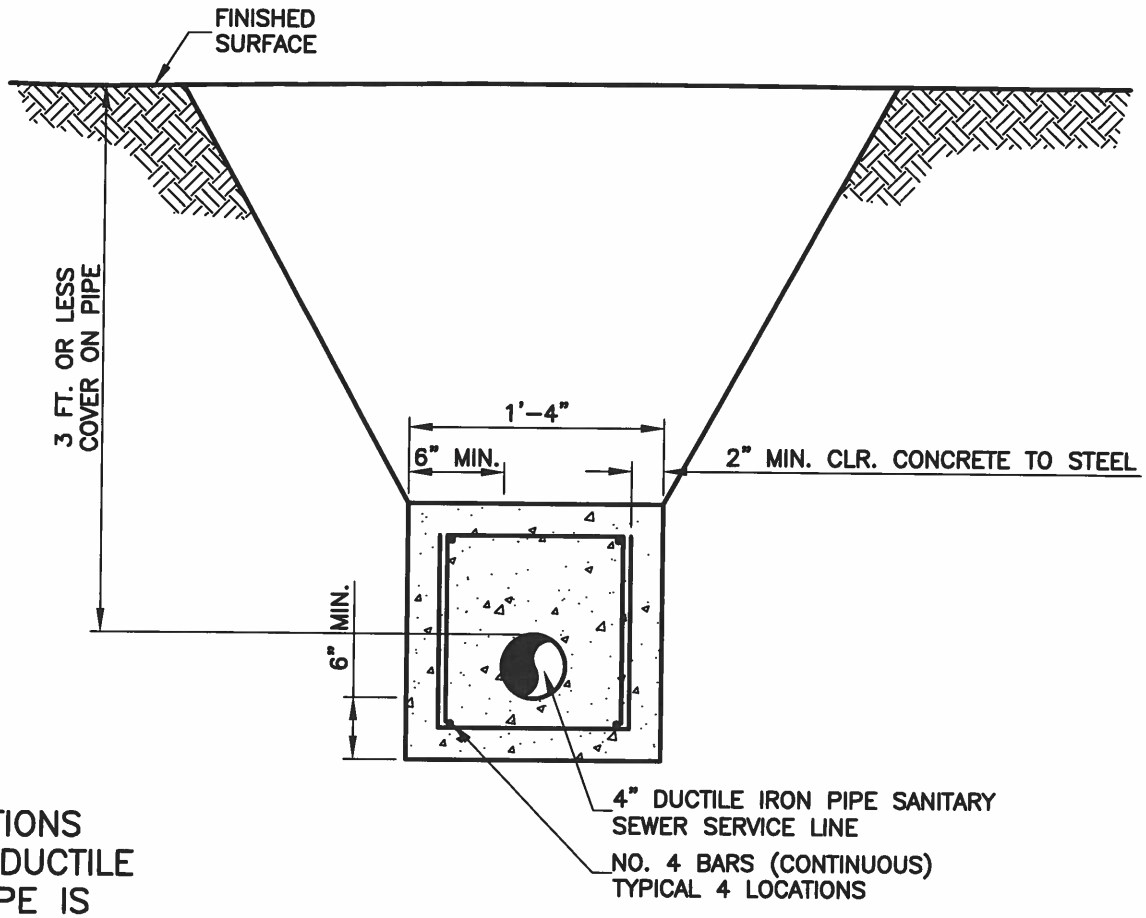
TYPICAL UTILITIES LOCATION			
DRAWN: EMC	REVISED:		WW–11
DATE: FEB 2020	REVISED:		
SCALE: NONE	REVISED:		



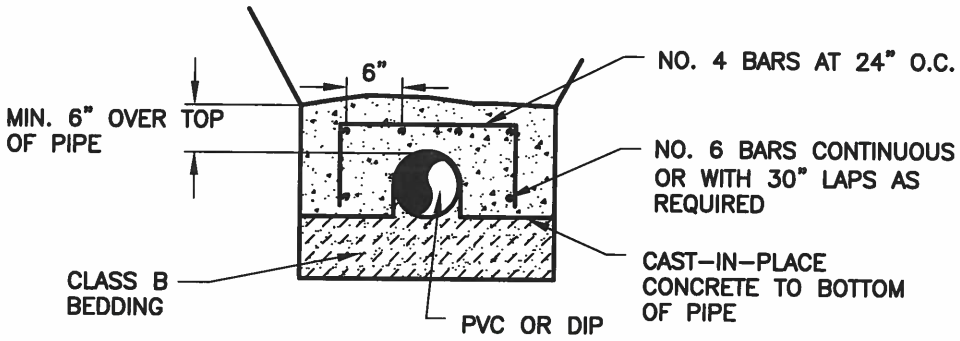
NOTES :

1. CONCRETE BRIDGING BLOCKS TO BE REINFORCED WITH No. 6 REBAR SET ON 12" CENTERS.
2. NO JOINTS OF UTILITY MAIN SHALL BE ALLOWED BETWEEN CONCRETE BRIDGING BLOCKS.

SECURITY SANITATION DISTRICT	PIPE BRIDGING	
	DRAWN: EMC	REVISED:
	DATE: FEB 2020	REVISED:
	SCALE: NONE	REVISED:
		WW-12



* LOCATIONS WHERE DUCTILE IRON PIPE IS REQUIRED



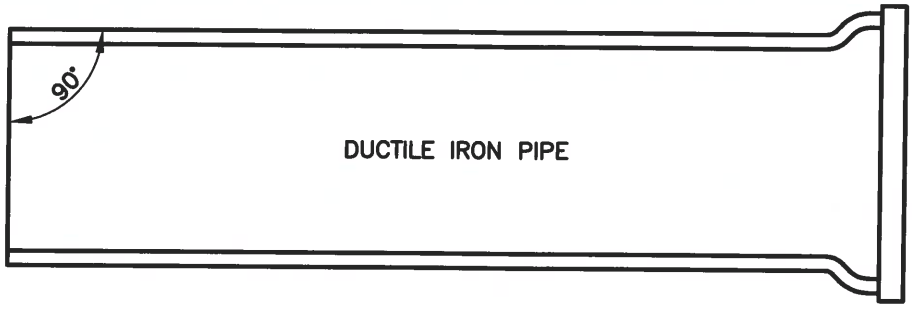
REINFORCED CONCRETE PIPE CAP

NOTES:

1. DUCTILE IRON PIPE WITHOUT CONCRETE ENCASEMENT MAY BE PERMITTED BY THE DISTRICT IF FINAL PIPE COVER IS MORE THAN 3 FEET.
2. CONCRETE ENCASEMENT PER THIS DRAWING IS REQUIRED WITH DUCTILE IRON PIPE WHERE FINAL PIPE COVER IS 3 FEET OR LESS.
3. IF THE CONCRETE ENCASEMENT IS REQUIRED ON A SANITARY SEWER SERVICE LINE, THE PROPERTY OWNER/CUSTOMER IS COMPLETELY RESPONSIBLE FOR OPERATION, MANITENANCE AND REPLACEMENT OF ANY SEWER SERVICE LINE FROM THE DISTRICT'S SEWER MAIN TO THE STRUCTURE SERVED.
4. THE DISTRICT MAY ACCEPT CONCRETE CAP FOR PIPE PROTECTION IN SPECIAL CONDITIONS

SECURITY SANITATION DISTRICT	SHALLOW SANITARY SEWER LINE PROTECTION/ENCASEMENT	
	DRAWN: EMC	REVISED:
	DATE: FEB 2020	REVISED:
	SCALE: NONE	REVISED:
		WW-13

* LOCATIONS WHERE DUCTILE IRON PIPE IS REQUIRED



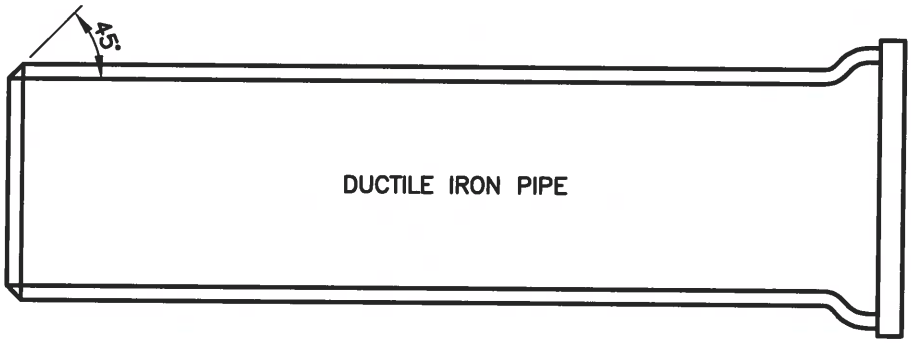
MECHANICAL JOINT CONNECTION

PIPE MUST BE CUT AT RIGHT ANGLES TO LONGITUDINAL CENTERLINE IN ALL CASES.

PIPE ENDS SHALL BE FREE OF BURRS.

MORTAR LINING SHALL BE FLUSH WITH PIPE END.

GOUGES CUT IN PIPE ENDS SHALL NOT BE ALLOWED.



SLIP JOINT CONNECTION

PIPE CUT IN STRAIGHT LINE AND BEVELED AT 45° ANGLE ON END.

GENERAL NOTES:

1. ALL PIPE CUTTING EQUIPMENT AND PIPE CUTS MUST BE APPROVED BY THE DISTRICT.
2. ALL PIPE ENDS TO BE USED IN INSTALLATION SHALL BE DRESSED SMOOTH TO THE SATISFACTION OF THE INSPECTOR PRIOR TO INSTALLATION.
3. PREPARE SURFACE AND APPLY COATINGS ON ALL BARE METAL SURFACE TO MATCH INTERNAL PIPE LINING OR APPLY EPOXY POLYAMIDE, 10 MILS. MIN., UNLESS OTHERWISE SPECIFIED.

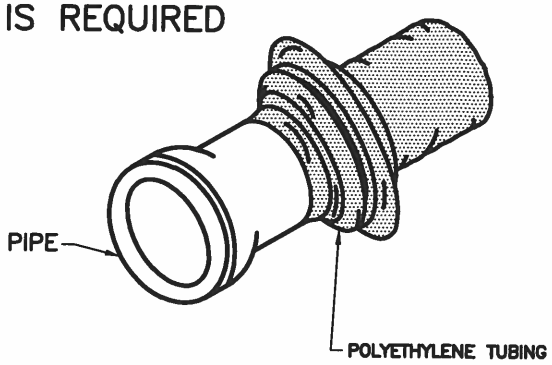
SECURITY SANITATION DISTRICT	PIPE CUTTING		
	DRAWN: EMC	REVISED:	WW-14
	DATE: FEB 2020	REVISED:	
	SCALE: NONE	REVISED:	

FIELD INSTALLATION OF POLYETHYLENE WRAP

* LOCATIONS WHERE DUCTILE IRON PIPE IS REQUIRED

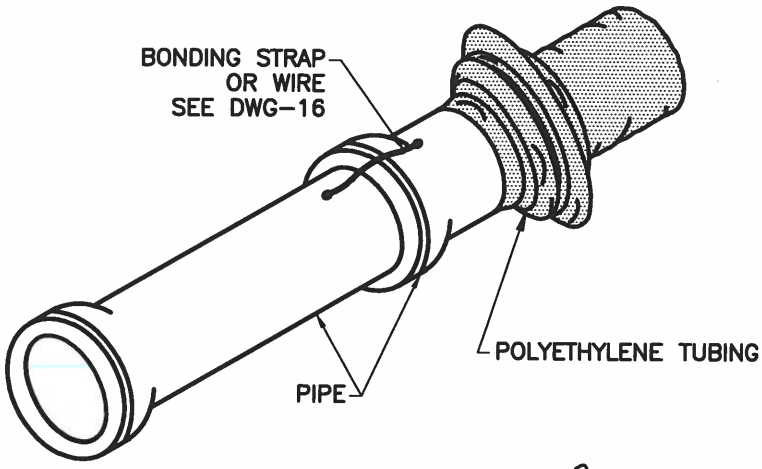
STEP 1:

PLACE TUBE OF POLYETHYLENE MATERIAL ON PIPE PRIOR TO LOWERING IT INTO TRENCH.



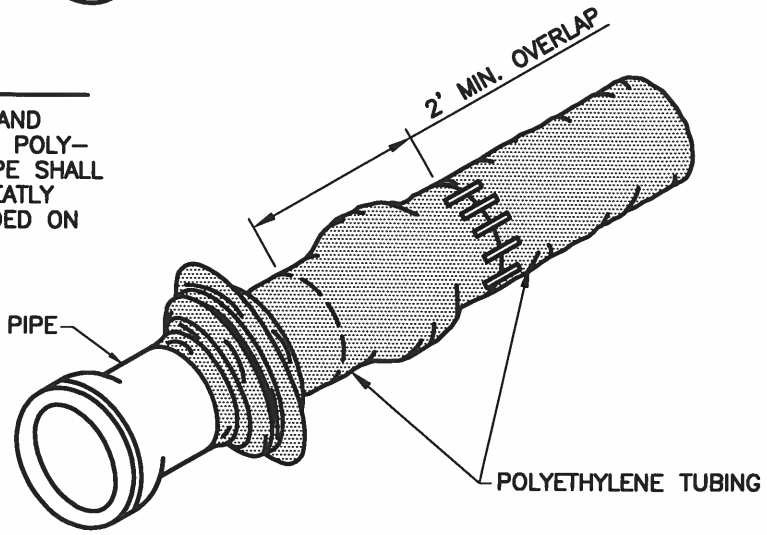
STEP 2:

PULL TUBE OVER THE LENGTH OF THE PIPE. TAPE TUBE TO END AT JOINT. FOLD MATERIAL AROUND THE ADJACENT SPIGOT END AND WRAP WITH TAPE TO HOLD THE PLASTIC TUBE IN PLACE. INSTALL BONDING STRAP OR WIRE AT EVERY JOINT OF PIPE PRIOR TO WRAPPING IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.



STEP 3:

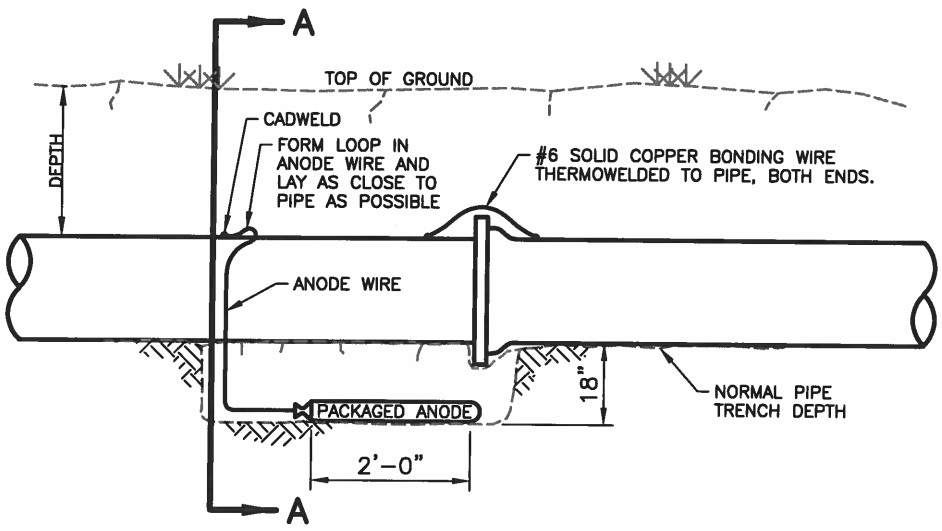
OVERLAP FIRST TUBE WITH ADJACENT TUBE AND SECURE WITH PLASTIC ADHESIVE TAPE. THE POLY-ETHYLENE TUBE MATERIAL COVERING THE PIPE SHALL BE LOOSE. EXCESS MATERIAL SHALL BE NEATLY DRAWN UP AROUND THE PIPE BARREL, FOLDED ON TOP OF PIPE AND TAPED IN PLACE.



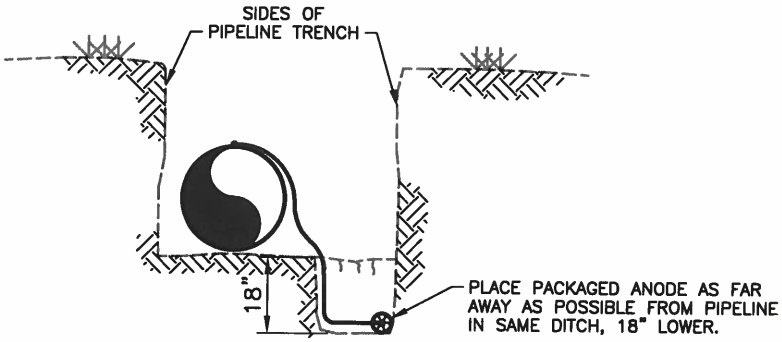
SECURITY SANITATION DISTRICT	POLYETHYLENE PIPE WRAP		
	DRAWN: EMC	REVISED:	WW-15
	DATE: FEB 2020	REVISED:	
	SCALE: NONE	REVISED:	

* LOCATIONS WHERE DUCTILE IRON PIPE IS REQUIRED

- 0'–0" TO 3'–0": NOT ACCEPTABLE
- 3'–0" TO 5'–0": USE DIP
- >5'–0" TO 14'–0": USE SDR 35
- >14'–0": USE SDR 26 OR AS DIRECTED



ELEVATION



SECTION A–A

NOTE:

1. CADWELD CONNECTION TO BE PRIMED AND COATED CAREFULLY. PACKAGED ANODE SHOULD BE COVERED WITH FINE SOIL CONTAINING NO ROCKS OR DIRT CLUMPS, TAMPED.

2. WHEN ANODES ARE REQUIRED WITH METAL FITTINGS AND APPURTENANCES TOGETHER WITH PVC PIPE INSTALLATION, THE ANODES SHALL BE PLACED AND ATTACHED TO THE METAL IN SAME MANNER AS SHOWN ON

SECURITY SANITATION DISTRICT	CADWELD/ANODE CONNECTION		
	DRAWN: EMC	REVISED:	WW–16
	DATE: FEB 2020	REVISED:	
	SCALE: NONE	REVISED:	

* LOCATIONS WHERE DUCTILE IRON PIPE IS REQUIRED

MAXIMUM DEFLECTION

PER SLIP JOINT OF D.I.P.

PIPE DIAMETER			MFRS. DEFL.	DESIGN DEFLECTION (80% MAX.)			APPROX. RADIUS FOR DEFLECTING CURVES WITHOUT BENDS	
I.D.	O.D.(IN.)	O.D.(FT.)			MAX. DEFL. DIST.			
					(1)	(2)	20'L	18'L
4"	4.80"	.400'	5°00'00"	4°00'00"	16"	15"	286'	258'
6"	6.90"	.575'	5°00'00"	4°00'00"	16"	15"	286'	258'
8"	9.05"	.754'	5°00'00"	4°00'00"	16"	15"	286'	258'
10"	11.10"	.925'	5°00'00"	4°00'00"	16"	15"	286'	258'
12"	13.20"	1.100'	5°00'00"	4°00'00"	16"	15"	286'	258'
14"	15.30"	1.275'	3°00'00"	2°24'00"	10"	9"	477'	430'
16"	17.40"	1.450'	3°00'00"	2°24'00"	10"	9"	477'	430'
18"	19.50"	1.625'	3°00'00"	2°24'00"	10"	9"	477'	430'
20"	21.60"	1.800'	3°00'00"	2°24'00"	10"	9"	477'	430'
24"	25.80"	2.150'	3°00'00"	2°24'00"	10"	9"	477'	430'
30"	32.00"	2.666'	3°00'00"	2°24'00"	10"	9"	477'	430'
36"	38.30"	3.192'	3°00'00"	2°24'00"	10"	9"	477'	430'
42"	44.50"	3.708'	2°00'00"	1°36'00"	6"	6"	716'	645'

(1) 20'L = NORMAL 20-FOOT JOINT LAYING LENGTH
(2) 18'L = NORMAL 18-FOOT JOINT LAYING LENGTH

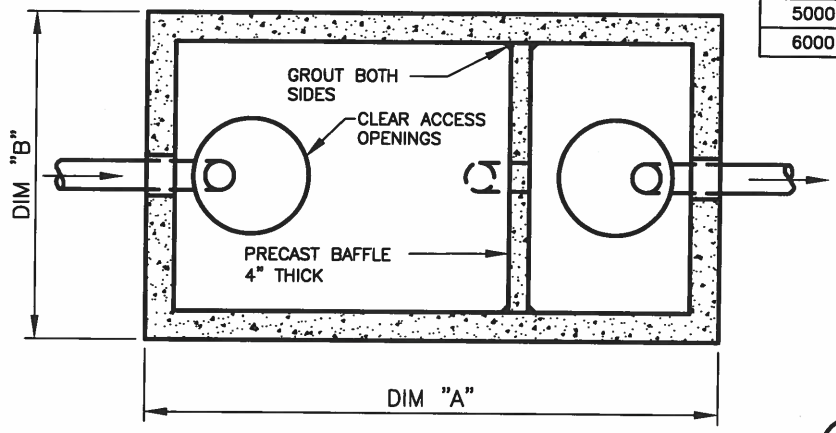
SECURITY SANITATION DISTRICT

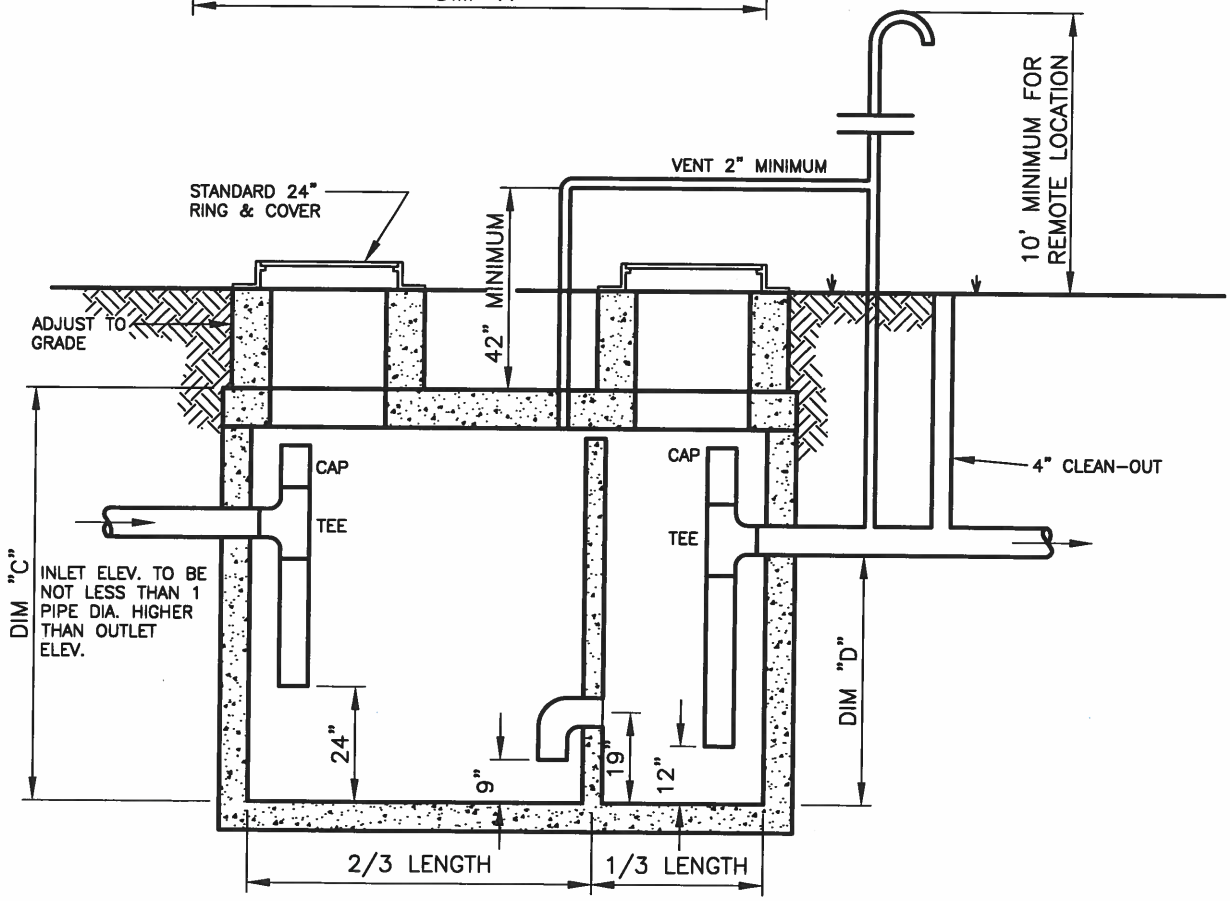
MAXIMUM PIPELINE DEFLECTION DATA			
DRAWN: EMC	REVISED:		WW-17
DATE: FEB 2020	REVISED:		
SCALE: NONE	REVISED:		

NOTES :

1. MINIMUM SIZE = 1000 GALLONS
2. CONCRETE = 28 DAY COMPRESSIVE STRENGTH = 4500 psi
3. DESIGN: ASTM C857-87 & C858-83 MINIMUM
4. LOADING: AASHTO HS-20
5. FILL w/ CLEAN WATER PRIOR TO START-UP OF SYSTEM

SIZING CHART				
GALLON CAPACITY	DIM "A"	DIM "B"	DIM "C"	DIM "D"
1000	7'-0"	5'-0"	7'-2"	4'-2"
1250	9'-0"	5'-0"	7'-2"	5'-2"
1500	9'-0"	5'-8"	7'-2"	4'-4"
1750	11'-2"	5'-8"	7'-2"	4'-11"
2000	11'-2"	6'-8"	8'-0"	4'-7"
2500	12'-8"	6'-8"	8'-0"	5'-6"
2750	12'-8"	6'-8"	8'-0"	6'-0"
3000	15'-7"	9'-7"	8'-6.5"	6'-3"
4000	15'-7"	9'-7"	8'-6.5"	6'-3"
5000	19'-11"	9'-11"	8'-11"	6'-2"
6000	19'-11"	9'-11"	10'-5"	7'-2"





SECURITY SANITATION DISTRICT

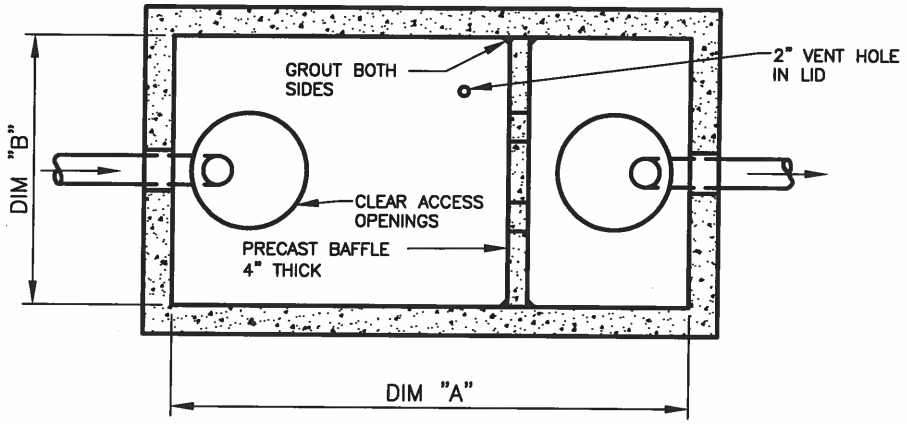
GREASE INTERCEPTOR

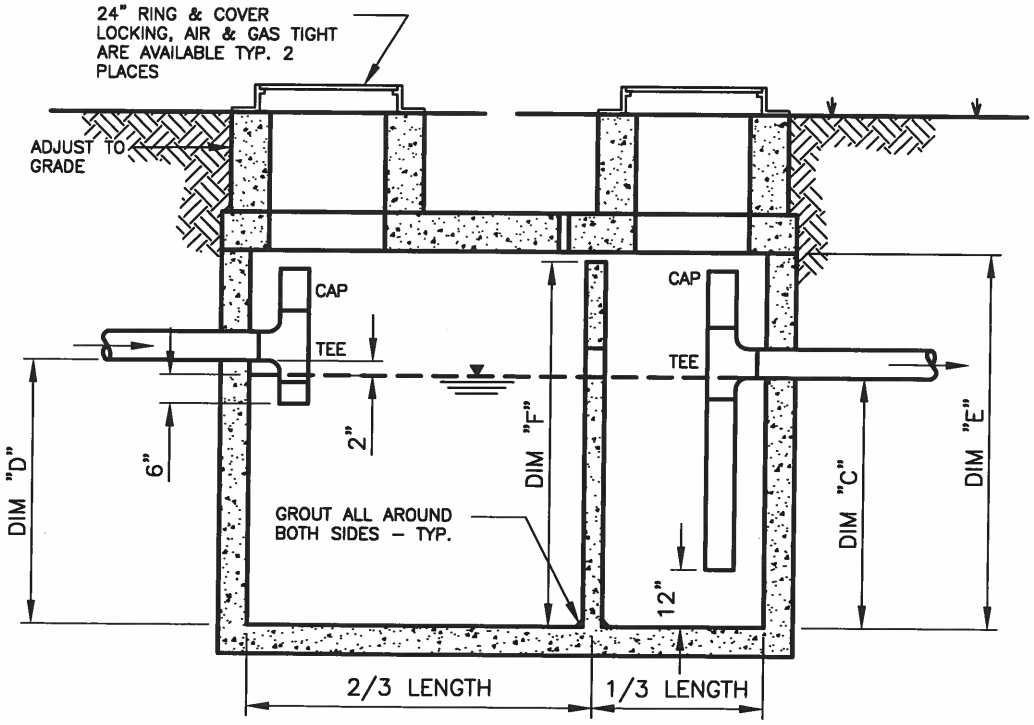
DRAWN: EMC	REVISED:	WW-18
DATE: FEB 2020	REVISED:	
SCALE: NONE	REVISED:	

NOTES :

1. MINIMUM SIZE = 300 GALLON
2. CONCRETE = 28 DAY COMPRESSIVE STRENGTH = 4500 psi
3. DESIGN: ASTM C857-87 & C858-83 MINIMUM
4. LOADING: AASHTO HS-20
5. FILL w/ CLEAN WATER PRIOR TO START-UP OF SYSTEM

SIZING CHART						
GALLON CAPACITY	DIM "A"	DIM "B"	DIM "C"	DIM "D"	DIM "E"	DIM "F"
320	6'-0"	4'-0"	2'-0"	2'-2"	3'-0"	2'-10"
500	11'-0"	4'-0"	2'-0"	2'-2"	3'-0"	2'-10"
1000	11'-0"	4'-0"	3'-3"	3'-5"	4'-6"	4'-4"
1500	11'-0"	4'-0"	5'-0"	5'-2"	6'-0"	5'-10"
1800	11'-0"	4'-0"	5'-6"	5'-8"	6'-6"	6'-4"
2000	11'-0"	4'-0"	6'-0"	6'-2"	7'-0"	6'-10"
2500	12'-6"	6'-0"	4'-6"	4'-8"	6'-0"	5'-10"
3000	12'-6"	6'-0"	5'-6"	5'-8"	7'-0"	6'-10"
3500	12'-0"	11'-0"	3'-8"	3'-10"	5'-0"	4'-10"
5000	17'-0"	11'-0"	3'-8"	3'-10"	5'-0"	4'-10"
5500	17'-0"	11'-0"	4'-0"	4'-2"	5'-9"	5'-7"



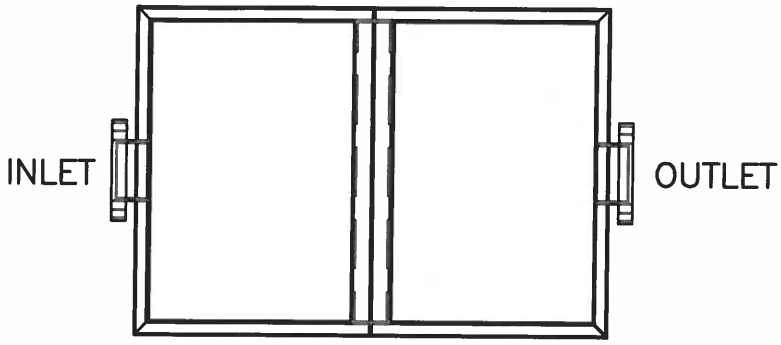


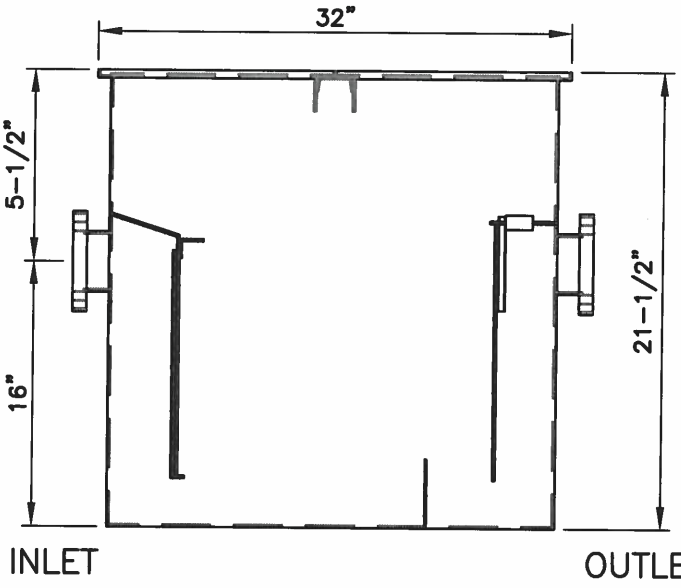
SECURITY UTILITY DISTRICT SANITATION

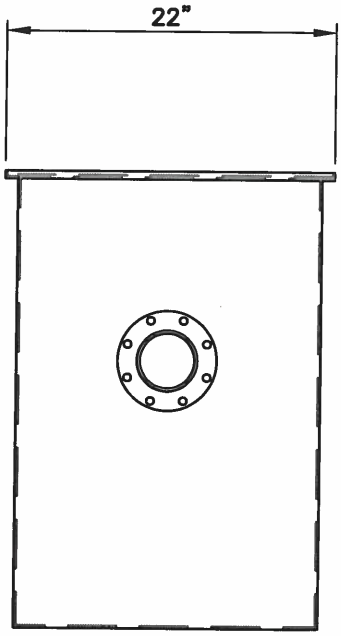
SECURITY SANITATION DISTRICT

SAND/OIL SEPARATOR

DRAWN: EMC	REVISED:	WW-19
DATE: FEB 2020	REVISED:	
SCALE: NONE	REVISED:	







SPECIFICATIONS

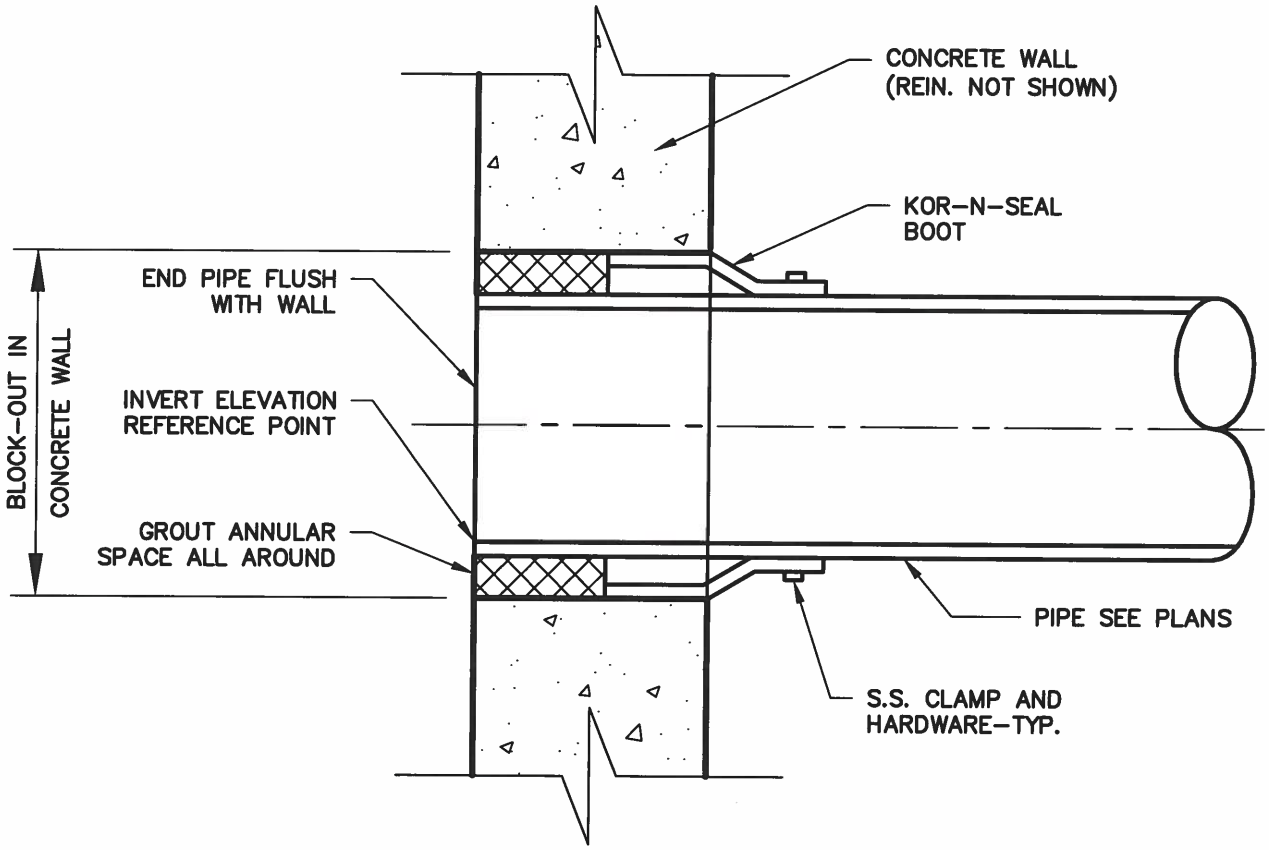
ALL WELDED STEEL SEPARATOR, 100 lb. GREASE CAPACITY

DESIGN BASIS: WATTS MODEL WD-50

MINIMUM RETENTION TIME OF NO LESS THAN 15 MIN.

UNIT MUST BE IN CONFORMANCE WITH ALL REQUIREMENTS OF THE CURRENT PLUMBING CODE AND APPLICABLE LOCAL AUTHORITIES.

SECURITY SANITATION DISTRICT	GREASE TRAP: 100 lb. GREASE CAPACITY		
	DRAWN: EMC	REVISED:	WW-20
	DATE: FEB 2020	REVISED:	
	SCALE: NONE	REVISED:	



SECURITY SANITATION DISTRICT

KOR-N-SEAL® BOOT DETAIL OR EQUIVALENT

DRAWN: EMC	REVISED:	WW-21
DATE: FEB 2020	REVISED:	
SCALE: NONE	REVISED:	