

STANDARDS FOR
DESIGN AND CONSTRUCTION
BIGFORK WATER & SEWER DISTRICT



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Typical Trench Detail

Typical Sanitary Sewer Manhole Detail

SECTION 1 - GENERAL PROVISIONS

GP-01 Definition of Terms

1. Words and phrases in these Standards have the same meaning as those in the Montana Public Works Standard Specifications.

GP-02 Applicability

1. These standards shall govern all construction and upgrading of facilities both in the public right-of-way (off-site) and for private development (on-site) for water system and sanitary sewer facilities and improvements.

GP-03 Standard Specifications

1. Design detail, workmanship and materials shall be in accordance with the current edition of the Montana Public Works Standard Specifications, except where these standards provide otherwise.
2. The most current edition of the rules and regulations of the Montana Department of Environmental Quality shall also be applicable.

GP-04 District Fees

1. Water and Sewer Connection Fee
 - A. A fee shall be paid, in accordance with the Bigfork Water and Sewer District (District) Rates, for the connection of each new water and sewer service to the system. This fee must be paid even though a service line has previously been stubbed to the property line or other point.
2. Water and Sewer Review Fee
 - A. A fee as defined in the Bigfork County Water and Sewer District Rules and Regulations Article IV, Section 21 shall be paid to the District for the review of design reports, construction drawings, and specifications as required in these Design Standards.

3. Constructing Water Service

- A. When it is necessary to tap an existing water main for a service connection, the Customer or his Contractor shall provide all equipment, material and labor to excavate, expose and tap the main. The Customer or his Contractor shall install the tap and stop, as directed and approved by the District. The District shall provide the meter and pit and the Customer or his Contractor shall install it, as directed by the District. The Customer or his Contractor shall provide all equipment, labor and materials to install the service line from the corporation stop to the point of service and restore the pavement or other surface in the public right-of-way to its pre-construction condition.

4. Constructing Sanitary Sewer Service

- A. When it is necessary to tap an existing sewer main for a service connection, the Customer or his Contractor shall provide the equipment, labor and materials required to excavate, expose and tap the main, install the service line from the main to the point of use and restore the pavement or other surface in the public right-of-way to its pre-construction condition.

GP-05 Excavation Permit (Right of Way Encroachment Permit).

1. All work within the public right-of-way shall require a Permit issued by the Flathead County Road Department Supervisor or the County's Representative.
 - A. All provisions of the Standards for Design and Construction for the Bigfork Water and Sewer District shall be complied with regardless of the circumstances.

GP-06 Applicable Laws and Indemnification of District.

1. The Contractor shall give all notices and comply with all federal, state and local laws, ordinances and regulations affecting the conduct of the work, and shall indemnify and hold harmless the District against any claim or liability arising from, or based on, the violation of any such law, ordinance, regulation, etc., whether by himself or his employees.

GP-07 Interruption of Service.

1. Any construction that will interrupt normal operation of Bigfork water or sewer will require a District-approved method of notifying affected individuals. The Contractor should present the news release to the news media at least two (2) days prior to the beginning of any construction activity. The Contractor shall notify individuals affected by the project of the type and duration of the interruption.

2. Under emergency conditions, the Contractor shall notify the District Office as soon as possible. To the extent possible, the Contractor shall also dispatch members of his staff to notify affected individuals in person.

GP-08 Liability Insurance and Bonding.

1. Liability Insurance

- A The Contractor shall procure and maintain, at his own expense, during the construction period, General Public Liability and Property Damage Insurance including vehicle coverage issued to the Contractor and protecting him from all claims for personal injury, including death, and all claims for destruction or damage to property, arising out of or in connection with any operations covered by the contract documents, whether such operations be by himself or by any Subcontractor under him.
- B Insurance shall be written with a limit of liability not less than \$750,000 for each claim and \$1,500,000 for each occurrence. The Contractor shall hold harmless, indemnify and defend the District and each of its agents arising, or alleged to arise from the performance of the work described herein, but not including the sole negligence of the District or its representatives. Each policy or certificate shall bear an endorsement or statement waiving the right of cancellation or reduction in coverage without ten (10) days written notice being delivered by certified mail to the District.

GP-09 Dust and Pollution Control.

1. The Contractor shall be responsible to maintain the construction site and all haul routes in accordance with the current requirements of the Montana Department of Environmental Quality. On District initiated projects, if the Contractor fails to meet this requirement, the District will complete the cleanup and all labor, equipment, material and administrative costs will be billed to the Contractor.

GP-10 Storm Water Discharge Permit.

1. The Montana Pollutant Discharge Elimination System regulations require a storm water discharge permit for construction activity in which clearing, grading and excavating will result in the disturbance of five (5) or more acres, or the disturbance of one (1) or more acre if located within one hundred (100) feet of a surface water body (stream, river, lake or wetland). A Storm Water Erosion Control Plan must be approved by the Montana Department of Environmental Quality prior to construction.

GP-11 Construction Inspection.

1. All work designed by an Engineer shall be inspected and certified by the same Engineer to insure conformance to plans and specifications. It is the Contractor's responsibility to notify the Engineer of the work requiring inspection at least twenty-four (24) hours in advance so the Engineer may schedule and perform such inspections.

GP-12 Guarantee for Equipment, Materials and Workmanship.

1. The Contractor shall guarantee all materials and equipment furnished and construction work performed on public improvements for a period of one (1) year from the date of written acceptance of the work by the District.

GP-13 Stop Work Order.

1. A written Stop Work Order may be issued by the District or its representative if the work in progress does not meet the Standards for Design and Construction for the Bigfork Water and Sewer District. Work may resume only after the Stop Work Order has been rescinded by the District or its representative.

GP-14 Cleanup.

1. The Contractor shall clean the construction site of all debris, construction materials, etc., immediately upon completion of the project. On District initiated projects, if the Contractor fails to meet this requirement, the District will complete the cleanup and all labor, equipment, material and administrative costs will be billed to the Contractor.

GP-15 Call Before You Dig.

1. All Developers/Contractors are responsible for notification of all utilities in advance of any construction in right-of-way or utility easements. The utilities one-call Underground Location Center phone number is 1-800-424-5555.

GP-16 General Notes.

The following general notes shall appear on the plan sheets:

1. GENERAL NOTES

- A The Contractor shall notify all utility companies in writing and shall be responsible for securing the exact location of all existing underground utilities prior to beginning excavation.

- B The Contractor shall excavate all utility lines prior to beginning trench excavation to insure adequate crossing clearance.
- C All water line fittings and valves to have mechanical joint restraints and be thrust blocked as per MPWSS Standard Drawing #02660-1 and #02660-3.
- D The Contractor shall excavate connection to existing utilities prior to commencing construction to determine exact fitting needed.
- E The Contractor shall maintain a minimum of 6.0 feet cover on all water lines and sewer force mains installed.
- F All trenches shall have type 'A' backfill. Tracer wire shall be provided on all water lines. See MPWSS construction specifications section 02221 and MPWSS Standard Drawing #02221-1.
- G Maintain 18" minimum vertical separation, outside of pipe to outside of pipe, between water and sewer lines at crossings.
- H Insulation is required over any gravity sewer main with less than 4.0 feet of cover over the pipe. Insulation shall be placed to a thickness of 2 inches and a width of 3.5 feet, centered 6 inches over the pipe. The insulation shall be closed cell high-density urethane foam board. Pipe bedding shall be compacted and leveled prior to placement of insulation board.
- I Contractor shall make provision for testing, disinfecting and flushing new water mains prior to operating valves to connect to existing distribution.
- J Water main pipe deflection shall be a maximum of 9" per 20 feet length of PVC pipe. No mechanical equipment shall be used to bend or deflect pipe.
- K Detector tape (6" wide, 5 mil. W/50 gauge foil core) shall be required over all water and sewer mains and all water and sewer services. Detector tape shall be connected to existing tape at water main or sewer mains and shall be brought to the surface at water main valve boxes, water service curb boxes and sewer manholes. Tape shall be appropriately marked "WATER LINE BURIED BELOW" or "SEWER LINE BURIED BELOW" at frequent intervals. Tape shall be placed 12" to 18" below finished ground/road surface.
- L A 14-gauge insulated toning wire shall be installed along all water mains and water services. The wire shall be taped to the top of the pipe and shall be brought to the surface behind all fire hydrants, not through the valve box, and back down in one continuous loop, and tied off outside the curb stops. All connections/splices shall be wrapped with heat shrink tape.

- M Curb stops shall be marked with steel fence posts painted blue. Sewer services shall be marked with a 2" x 4" wood marker that extends vertically from the invert of the service line to the ground surface and with a steel fence post painted green. A second steel fence post or #4 rebar shall be buried just below the ground surface with the 2" x 4" wood marker for all sewer services.

GP-17 Pre-Development Meeting.

1. Prior to beginning final design of water or wastewater facility improvements within the Bigfork Water and Sewer District, the Developer and Developer's Engineer are strongly encouraged to meet with District staff to discuss the proposed project and to get input from District staff regarding the improvements that will be required.

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SECTION II - WATER SYSTEMS

WS-01 General.

1. Water systems shall be designed, constructed and tested in accordance with the current editions of circular WQB 1 – Montana Department of Environmental Quality – Standards for Water Works, Montana Public Work Standard Specifications and this document.
2. The minimum cover for all water mains from top of pipe to finish grade shall be six (6) feet unless otherwise approved by the District Manager. Unless specifically authorized by utility personnel, the minimum depth of bury for service lines from the main to the premise shall be six (6) feet.
3. The meter and meter pit will be provided to the Owner upon payment of hook-up fees.
4. The Contractor or person performing the work shall provide the District proof of insurance prior to tapping or connecting to District water lines.
5. Pressure test and Bacteriological Results will be furnished to the District prior to final acceptance.

WS-02 Design of Water Systems.

1. All water systems necessary to provide service to and within a development shall be constructed at the Developer's expense and shall be designed by a Professional Engineer. Plans Specifications and design reports shall bear the seal of the Engineer in responsible charge of the design.
2. Water system designs shall be reviewed by the Bigfork Water and Sewer District and Montana Department of Environmental Quality, with approval from both. All required approvals shall be obtained prior to beginning construction.
3. Design Calculations and testing results shall be submitted to the Bigfork Water and Sewer District as required.

4. In addition, the following shall apply to the design of all water mains:
 - A. All water main extensions will require the Design Engineer to submit a written report to the Bigfork Water and Sewer District (District) that will address the fire and domestic flow requirements. The report shall include data on test results at the nearest hydrant that shows the static pressure at zero flow from the hydrant. For residential developments having more than one-hundred (100) single family dwelling units or that require utilization of a pressure booster pump(s), the report may be required by the District to show the adequacy to meet fire flow and domestic flow requirements. The normal operating range of pressure allowed for water systems is 40-100 psi.
 - B. In an effort to minimize dead-end water mains, all water main extensions shall be looped where deemed reasonable by District Staff. Where District staff deems not reasonable to loop, all mains must be extended to the end of the property where they will be valved and capped to allow for future extension.

WS-03 Fire Flow.

1. The amount of fire flow required for structures shall be based on the Uniform Fire Code Appendix III-A. Non-Structural utilization of an area shall have the fire flow requirements as determined by the Fire Chief. The minimum fire flow for any structure shall be one thousand (1,000) gallons per minute (gpm), with a minimum of twenty (20) pounds per square inch (psi) residual pressure at the hydrant during flow.
2. All fire suppression systems for structures shall have backflow preventers installed.

WS-04 Water Service Lines.

1. Structures containing two or more residences under separate ownership, such as townhouses, shall have separate service lines, service valves and meters for each residence. Structures containing two or more residences, offices or businesses that are rental units under common ownership may have one service line, valve and meter for all occupants within a single structure subject to District approval. Each structure on a property with plumbing for water must have an independent service line, curb stop and meter with pit.
2. Curb stops and meter pits shall be located outside of the roadway pavement between the edge of pavement and road right-of-way or road easement. In the event that this cannot be met, a utility easement must be established across the front of the property to allow installation of District equipment. The District shall approve the location of all curb stops, meter pits and utility easements prior to installation.
3. All service lines shall be installed prior to the blow off/drain appurtenance on dead-end water mains.

4. Construction drawings shall show the location of all water service lines and include the stationing where the service leaves the main.
5. Tracer wire shall be provided for all water service lines.

WS-05 Valve Installation.

1. Valves shall be installed in the distribution system at sufficient intervals to facilitate system repair and maintenance, but in no case shall there be less than one valve every 1000 feet. Generally, there shall be two valves on each tee and three valves on each cross.

WS-06 Water System Material Specifications .

1. Minimum Pipe Sizes.

- A. The minimum diameter of all mains shall be eight (8) inches unless a smaller diameter is approved by the Bigfork Water and Sewer District, except fire hydrant runs less than fifty feet in length may be six (6) inches.

2. Main Line Pipe Material.

- A. Water main piping from six (6) to twelve (12) inches in diameter shall be DR 14, Class 200 PVC Pipe conforming to AWWA C-900 Standards.

3. Gate Valves.

- A. Gate Valves shall be Mueller Resilient Seat Wedge Gate Valves, or an approved equal, conforming to AWWA C-509 Standards.

4. Fire Hydrants.

- A. Fire hydrants shall be Red Mueller Super Centurion 250 Fire Hydrants (5 – 1/4 “, 3-way) conforming to AWWA C-502 Standards. The placement of all fire hydrants shall be subject to the approval of the Fire Chief.

5. Service Fittings.
Curb Stops.

Curb stops shall be Ford Ball Curb, Minneapolis Pattern w/ Grip Joints Both Ends for IPS PE Pipe (Ford B66-444M-G), or an approved equal.

Corporation Valves.

Corporation Valves shall be 1" Ford Ball Corp. W/ "CC" Thread Inlet and Grip Joint Outlet for IPS PE Pipe (Ford FB1001-4-G) or approved equal.

Stainless Steel Inserts.

Stainless steel inserts must be used with all compression type fittings when used with polyethylene pipe, as recommended by manufacturer.

6. Valve Boxes.

A. Valve boxes shall be Tyler 6860 Series "DD" – Screw Type, #6 Base to be marked WATER.

7. Curb Boxes.

A. Curb boxes shall be Ford, or an approved equal, cast iron extension type with Minneapolis Style Thread, 1 ¼" I.D. upper section, minimum length 6 ½ feet, with a shut off and/or lid having a pentagon nut in the plug.

8. Service Saddles.

A. Service saddles shall be Romac model 306, stainless steel, with CC Threads, (1"– 12"), or an approved equal. No single or double strap type is allowed on PVC pipe.

9. Service Pipe.

A. Service pipe up to three (3) inches in diameter shall be polyethylene (PE), 3408, IPS, Class 200, SDR-7 pipe conforming to AWWA C-901 Standards. Service pipe four (4) inches or larger in diameter shall be DR 14, Class 200 PVC pipe, conforming to AWWA C-900 Standards.

10. Ductile Iron Fittings.

A. Ductile iron fittings shall be Class 350 SSB fittings conforming to AWWA C-153 Standards.

11. Tapping Sleeves.

A. Tapping sleeves shall be Power Seal Model 3490 AS (Stainless Steel), or an approved equal. Tapping Sleeve shall be installed a minimum of 24" from the nearest joint on the existing pipe to be tapped. No size-on-size tapping sleeves will be allowed.

12. Thrustblocks/ Restraint.

- A. Thrustblocks for pipe, valves, fire hydrants and dead ends shall be installed per Montana Public Works Standard Drawing No. 02660-1 and No. 02660-3.
- B. In addition to thrustblocks, all water line fittings and valves to have mechanical joint restraint (EBAA Iron Series 2000 PV).

13. WS-07 Tracer Tape.

- A. All non-metallic pipe and services shall be installed with continuous tracer tape installed twelve (12) to eighteen (18) inches under the final ground surface. No breaks or splices will be allowed. A continuous loop shall be placed from the main line to the meter box. The marker shall be plastic, non-biodegradable, metal core or backing that can be detected by a standard metal detector. In addition to tracer tape, install 14 gauge coated copper wire, taped to the top of pipe, brought to the surface behind all fire hydrants, not through the valve boxes, in one continuous loop.

14. WS-08 Disinfecting and Flushing Water Main.

- A. Continuous Feed Method.
 - 1) The Continuous Feed Method, per the Montana Public Works Standard Specifications, is the preferred method for disinfecting all water mains.
- B. Clearing the Main of Heavily Chlorinated Water.
 - 1) After the applicable retention period, heavily chlorinated water should not remain in prolonged contact with the pipe. In order to prevent damage to the pipe lining or corrosion damage to the pipe itself, the heavily chlorinated water shall be flushed from the main until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the system or is acceptable for domestic use.
 - 2) Heavily chlorinated water shall not be disposed of in sanitary sewers or storm drains. The Contractor shall dispose of all heavily chlorinated water in an environmentally safe manner. If there is any question that the heavily chlorinated water will cause damage to the environment, a reducing agent may be applied to neutralize the chlorine.

15. Bacteriological Testing.

- A. Samples for bacteriological testing shall be taken after final flushing and before the water main is placed in service.

- B. Samples shall be taken by the Contractor or Design Engineer's representative from a minimum of two (2) separate locations to be determined by the District.
- C. Whenever possible, service lines shall be stubbed to the surface for the purpose of flushing and obtaining samples.
- D. If the original set of water samples cannot be certified by an approved laboratory as suitable for drinking, the Contractor may submit a second set. If a sample from the second set proves to be contaminated, the water main must be re-chlorinated. Whenever the main is flushed prior to sampling, a waiting period of not less than five (5) days will be observed before samples are taken. The Contractor shall be responsible for all costs associated with testing.

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SECTION III - SANITARY SEWER SYSTEMS

SS-01 General.

1. Sanitary Sewer systems shall be designed, constructed and tested in accordance with the current editions of WQB 2 Montana Department of Environmental Quality – Design Standards for Wastewater Facilities, Montana Public Work Standard Specifications and this document.

SS-02 Sanitary Sewer Design.

1. Gravity Sewers.

- A. Unless waived by the District Manager, the Engineer shall submit a written report for all improvements or additions to the sanitary sewer system. The report shall assess the ability of the existing collection system to handle the peak design flow from the project and the impact on the Wastewater Treatment Plant.

2. Manhole Spacing.

- A. The maximum spacing between sanitary sewer manholes shall be as follows:

Pipe Diameter	Max. Distance Between Manholes
< 15"	400
18"-30"	500

3. Velocity.

- A. The minimum velocity, in either gravity or force mains, shall be two (2) feet per second based upon flowing full conditions for gravity mains. The maximum velocity shall be ten (10) feet per second, unless otherwise approved by the District.

4. Force Main Cleanouts

- A. Pressure type cleanouts, of the same size as the force main, may be required by the Bigfork Water and Sewer District on force mains 4-inches in diameter and larger and are required on all force mains smaller than 4-inches. If required, cleanouts shall be provided at approximate six hundred (600) foot intervals along a force main unless approved by the District Manager. The cap of the force main cleanout shall be tapped for and fitted with a one (1)

inch threaded plug. The force main shall be equipped with a plug valve and valve box immediately upstream of each force main cleanout.

5. Gravity Main Cleanouts.

- A. Gravity main cleanouts shall not be allowed unless otherwise approved by the District Manager.

6. Quality of Sewage.

- A. No development shall introduce any sewage into the District sewer facility that is not consistent with normal domestic sewage or ordinance of the District.

7. Minimum Depth

- A. The minimum depth of gravity sewer mains shall be four (4) feet to flow line. The minimum depth of force mains shall be six (6) feet to top of pipe.

8. Gravity Sewer Mains Required

- A. The District requires all main extensions to be conventional gravity flow systems.
- B. Service delivery systems other than gravity sanitary sewer service will require review and approval of the District prior to connection to the sewer system. In the event that the District grants an exception, the system must be designed with the following standard materials.
 - 1) Pipe materials must be polyethylene or HDPE.
 - 2) Saddles must be fused or stainless steel.
 - 3) Shut off valves must be installed on each service line at the property line. Valves must be brass construction.
 - 4) Valve box risers must be marked "SEWER".

SS-03 Tracer Tape.

- 1. All non-metallic pipe and services shall be installed with continuous tracer tape installed twelve (12) to eighteen (18) inches under the final ground surface. No breaks or splices will be allowed. The marker shall be plastic, non-biodegradable, metal core or backing that can be detected by a standard metal detector.

SS-04 Sanitary Sewer Service Lines.

- 1. Structures containing two or more residences under separate ownership, such as townhouses, shall have separate sanitary sewer service lines for each residence. Structures containing two or more residences, offices or businesses that are rental

units under common ownership may have one sanitary sewer service line for all occupants within a single structure subject to District approval.

2. Construction drawings shall show the location of all sewer service lines and include the stationing where the service leaves the main.

SS-05 General Specifications for Food Grade Oil & Grease Interceptors.

1. Pre-cast concrete interceptors:

Pre-cast interceptors shall conform to the size, shape, form, and details shown on the plans. Concrete for pre-cast units shall be Class A concrete defined in the following specifications. All units shall be adequate to withstand AASHTO H-20 (44.30% impact, soil weight = 130 pcf, equivalent fluid pressure = 55 pcf) loading and shall be designed in accordance with ACI 301 and ASTM C-858. All structures not specified in the standard detail shall be submitted to the District for approval as a shop drawing at least 3 weeks prior to installation

A flexible plastic joint sealing compound shall be used for any tongue and the groove joints to provide a watertight joint. The performing flexible plastic joint sealing compound shall meet Federal Specifications SS-S-210 and AASHTO M198 75 1, Type B. The sealing compound shall show no visible deterioration when immersed separately in a solution of acid, alkalize and saturated hydrogen sulfide for a period of 30 days. The plastic gasket shall be "Ram-Nek" as manufactured by Henry Co. or an approved equal.

All piping within these interceptors shall be solvent weld PVC – SCH 40 DWV. Vertical influent and effluent piping shall be secured to the interceptor walls with non-corroding support brackets.

Interceptors installed in a parking lot or a roadway shall have manhole rings and covers raised to grade by using pre-cast concrete riser rings that are a minimum of 6" wide.

2. Cast-In-Place Concrete Interceptors:

All cast-in-place grease interceptors shall be designed using the same loading criteria as for pre-cast interceptors. Each interceptor shall be designed by a Montana registered Professional Engineer. For each cast-in-place interceptor, there shall be three sets of wet stamped structural plans submitted to the District for approval.

3. Manhole rings and covers:

Manhole rings and covers shall be cast iron in accordance with ASTM A-48, Class 35 B. Twenty-four inch diameter assemblies shall be Neenah-1706, or approved equal, style with a combined weight of not less than 400 pounds (approx. distribution: Frame 235 lbs., Lid 165 lbs.) Covers shall be checkered with letters designating "sewer". All

bearing surfaces shall be machined. Manhole lids shall be manufactured with a 1" wide elongated oval lifting hole. Manhole lids with more than one lifting hole shall not be accepted. Rim elevation shall be 2" to 4" above grade in open space and shall be 0" to 1/2" below grade of any finished surface. May require blind pick holes.

4. Concrete:

Class A concrete shall be used for all cast-in-place and pre-cast concrete interceptors. The concrete shall have a minimum 28-day compressive strength of 3,000 p.s.i. for cast-in-place structure and a minimum 28 day compressive strength of 4,000 p.s.i. for pre-cast structures.

Class B concrete shall be used for all thrust blocks, protective pads, and encasements. Class B concrete shall have a minimum 28-day compressive strength of 2000 p.s.i.

SS-06 Sizing Criteria for Food Grade Oil & Grease Interceptors

Table 1. Sizing of Grease Interceptors

Number of meals X Waste flow X Retention X Storage = Interceptor size
 Per. peak hour ¹ Rate ² Time ³ Factor ⁴ (liquid capacity)

- 1 Meals served at peak hour.
- 2 Waste flow rate
 - a. With dishwasher.....6 gallon flow
 - b. Without dishwasher.....5 gallon flow
 - c. Single service kitchen.....2 gallon flow
 - d. Food waste disposer.....1gallon flow
- 3 Retention times
 - Commercial kitchen waste
 - Dishwasher.....2.5 Hours
 - Single service Kitchen
 - Single serving.....1.5 Hours
- 4 Storage factors
 - Fully equipped commercial kitchen.....8 Hour operation: 1
 -16 Hour operation: 2
 -24 Hour operation: 3
 - Single service kitchen.....1.5

Minimum Acceptable Interceptor Size is 750 Gallons

Diagram 1

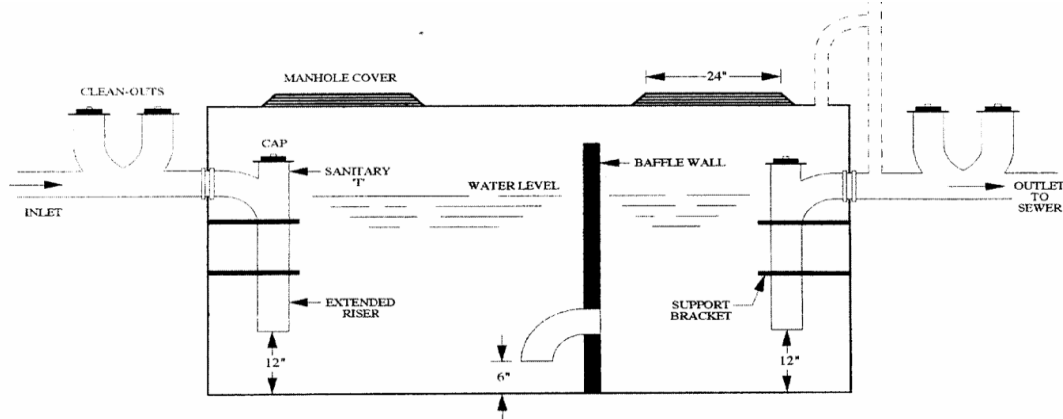


Diagram of an Approved Food Grade Oil & Grease Interceptor

Concrete lid and base of interceptor shall be a minimum of 8" thick. Sidewalls shall be a minimum of 5" thick. Baffle wall shall be a minimum of 3" thick. Submit variances to District for approval.

Baffle wall shall extend a minimum of 10" above water level.

PVC screw plug clean outs shall be taken to grade and protected by a cast iron lamp hole cover with a locking lid marked "sewer". Lamp hole covers shall be secured in a square concrete pad. The concrete pad shall extend 12" beyond the center of each cleanout and have a depth equal to the lamp hole cover. Concrete pad to be poured at time of final grade.

Inlet invert shall be a minimum of 2" higher than outlet invert.

Vent may be cast iron or pvc, schedule 40, taken to 6" above roof line or grade depending on location.

Interceptor shall be bedded in a minimum of 6" of $\frac{3}{4}$ " crushed rock.

Grease capacity rated for large compartment only. Secondary compartment has volume equal to 1/3 of total capacity.

No bolt down covers allowed without permission from The District

Within trap, all pipe and fittings shall be solvent welded schedule 40 P.V.C min. 3" diameter.

Fill with clean water prior to start up of system.

Gray water use only; black water shall be carried by separate sewer.

SS-07 General Specifications For Sand/Oil/Water Separators

1. Pre-cast concrete separators:

Pre-cast separators shall conform to the size, shape, form, and details shown on the plans. Concrete for pre-cast units shall be Class A concrete defined in the following specifications. All units shall be adequate to withstand AASHTO H-20 (44.30% impact, soil weight = 130 pcf, equivalent fluid pressure = 55 pcf) loading and shall be designed in accordance with ACI 301 and ASTM C-858. All structures not specified in the standard detail shall be submitted to the District for approval as a shop drawing at least 3 weeks prior to installation

A flexible plastic joint sealing compound shall be used for any tongue and the groove joints to provide a watertight joint. The performing flexible plastic joint sealing compound shall meet Federal Specifications SS-S-210 and AASHTO M198 75 1, Type B. The sealing compound shall show no visible deterioration when immersed separately in a solution of acid, alkalize and saturated hydrogen sulfide for a period of 30 days. The plastic gasket shall be "Ram-Nek" as manufactured by Henry Co. or an approved equal.

All piping within these separators shall be solvent weld PVC – SCH 40 DWV. Interior vertical influent and effluent piping shall be secured to the separator walls with non-corroding support brackets.

Separators installed in a parking lot or a roadway shall have manhole rings and covers raised to grade by using pre-cast concrete riser rings that are a minimum of 6" wide.

2. Cast-In-Place Concrete separators:

All cast-in-place separators shall be designed using the same loading criteria as for pre-cast separators. Each separator shall be designed by a Montana registered Professional Engineer. For each cast-in-place interceptor, there shall be three sets of wet stamped structural plans submitted to the District for approval.

3. Manhole rings and covers:

Manhole rings and covers shall be cast iron in accordance with ASTM A-48, Class 35 B. Twenty-four inch diameter assemblies shall be Neenah-1706, or approved equal, style with a combined weight of not less than 400 pounds (approx. distribution: Frame 235 lbs., Lid 165 lbs.) Covers shall be checkered with letters designating "sewer". All bearing surfaces shall be machined. Manhole lids shall be manufactured with a 1" wide elongated oval lifting hole. Manhole lids with more than one lifting hole shall not be accepted. Rim elevation shall be 2" to 4" above grade in open space and shall be 0" to ½" below grade of any finished surface.

4. Concrete:

Class A concrete shall be used for all cast-in-place and pre-cast concrete separators. The concrete shall have a minimum 28-day compressive strength of 3,000 p.s.i. for cast-in-place structure and a minimum 28 day compressive strength of 4,000 p.s.i. for pre-cast structures.

Class B concrete shall be used for all thrust blocks, protective pads, and encasements. Class B concrete shall have a minimum 28-day compressive strength of 2000 p.s.i.

SS-08 Sizing Criteria for Sand/Oil/Water Separators

Utilize this sizing formula to determine the sand/oil/water separator size necessary for your proposed business. If the size is less than the 750-gallon minimum than you must increase the size to meet the minimum standard.

There shall be 45 gallons of capacity for every ___ square foot of floor space depending on the business category as seen below:

15 square feet of floor space at: Steam cleaning, truck washes, heavy equipment wash, automatic car wash (car moved by chain).

50 square feet of floor space at: Automatic drive through car wash.

75 square feet of floor space at: Self service car wash, automotive service garages.

100 square feet of floor space at: Machine shops.

250 square feet of floor space at: Paint spray booths.

2000 square feet of floor space at: Parking garages (where floors are to be washed).

3000 square feet of floor space at: Parking garages (where tenants' cars are to be washed).

4000 square feet of floor space at: Parking garages (no water outlets except fire sprinklers).

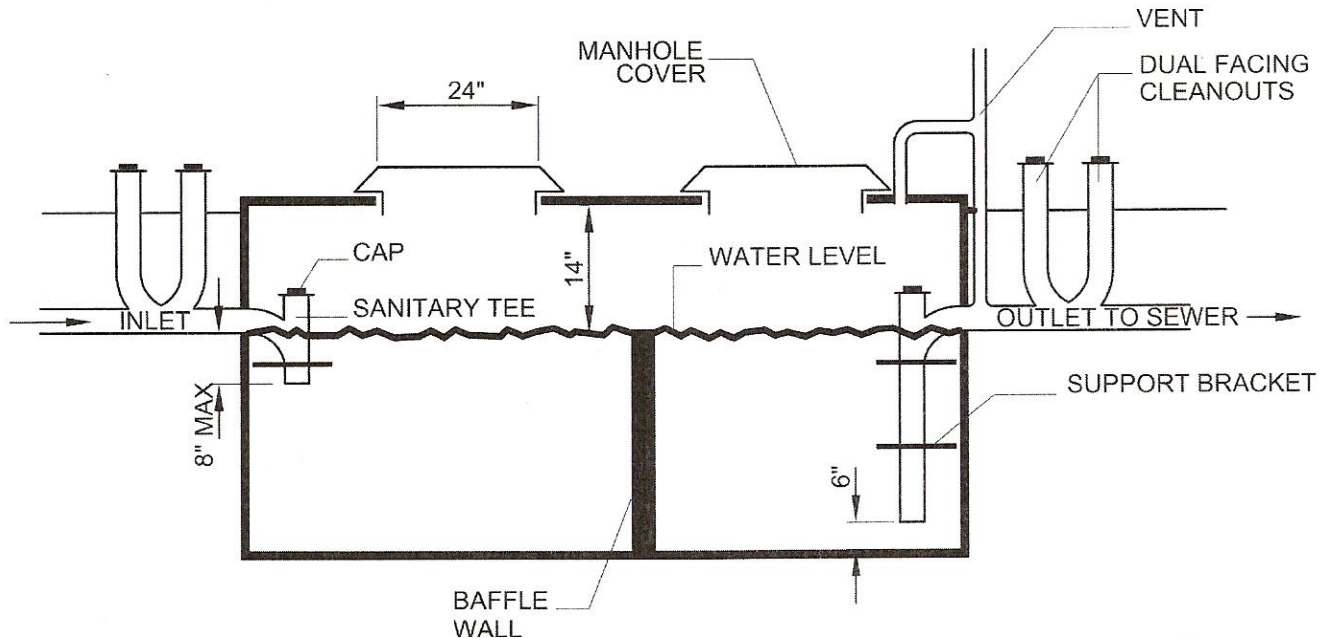
For example, a self serve car wash with floor space dimensions of 60'X30' would have an area of 1800 sq. ft. To determine the size of the sand/oil/water separator, divide the area by 75 square feet and multiply the product by 45 gallons.

1800 sq. ft. X 45 gallons = 1080 gallons
75 sq. ft.

Minimum acceptable size is 750 gallon capacity

Diagram 1

Diagram of an Approved Sand/Oil/Water Separator



1. Concrete lid and base of interceptor shall be a min. of 8" thick. Side walls shall be a min. of 5" thick. Baffle wall shall be a min. of 3" thick. Submit variances to Authority for approval.
2. Top of baffle wall shall match water level.
3. PVC screw plug clean outs shall be taken to grade and protected by a cast iron lamp hole cover with a locking lid marked "sewer", Lamp hole covers shall be secured in a square concrete pad. The concrete pad shall extend 12" beyond the center of each cleanout and have a depth equal to the lamp hole cover. Concrete pad to be poured at the time of final grade.
4. Inlet invert shall be a min. of 2" higher than the outlet invert.
5. Vent may be cast iron or PVC, Schedule 40, taken to 6" above roof line or grade depending on location,
6. Interceptor shall be bedded in a min. of 6" of 3/4" crushed rock.
7. Secondary compartment has volume equal to 1/3 of total capacity.
8. No bolt down covers allowed without permission of the Authority.

9. Within separator, all pipe and fittings shall be solvent welded Schedule 40 PVC min. 3" diameter.
10. Walls and bottom reinforced throughout with 2x16 6/10 remesh.
11. Fill and clean water prior to start up of system.
12. Gray water use only; black water shall be carried by a separate sewer.

SS-09 Sewage Lift Station

1. A written report shall be submitted by the Design Engineer for any project that will create a new sewage lift station or will contribute to an existing sewage lift station. The report for a new sewage lift station shall contain, but not be limited to, the following.
 - A description of the proposed wet well, pumping system and force main.
 - The capacity of the recommended pumps and potential for upgrading.
 - A map showing the potential lift station service area.
 - The average and peak design flows for the proposed project and for the potential service area.
 - The hydraulic capacity of the force main.
 - The reserve capacity of the lift station when the proposed project is on line and at full capacity.

 - The pump run and cycle times for the average and peak design flows.

 - Strategies for improvements that may be necessary to accommodate future sewer extensions (i.e. increased storage, pumping or auxiliary power capacity).

 - A statement of the pump selection process, including the engineer's calculations for the total dynamic head, total discharge head, net positive head and other pertinent pump selection criteria.

 - The designed pump operating curve plotted on a manufacturer's pump performance chart with the designed operating point clearly identified.

2. The report for a project that will contribute to an existing sewage lift station shall contain, but not be limited to, the following:
 - A description of the existing wet well, pumping system and force main.
 - The capacity of the existing pumps and potential for upgrading.
 - A map showing the potential lift station service area.
 - A list of existing users and their average design flows.
 - The existing peak design flows and reserve capacity.
 - The pump run and cycle times for the existing average and peak design flows.
 - The hydraulic capacity of the force main.
 - A list of proposed users and their average design flows
 - The proposed average and peak design flows to the lift station.
 - The reserve capacity of the lift station when the proposed project is on line and at full capacity.
 - The pump run and cycle times for the proposed average and peak design flows.
 - Recommendations for improvements, if necessary, to enable the lift station to serve the proposed project.

3. Unless otherwise approved by the District Manager, new pumping systems shall be of the above ground, self-priming, suction lift type and the pumps shall be equal to that manufactured by the Gorman Rupp Company. Unless otherwise approved by the District Manager, an emergency power supply and/or provisions for emergency bypass pumping will be required for all lift stations. Upon request from the District Manager, the Design Engineer shall submit a list of three lift station of the type proposed which have been in operation at least five (5) years. The District reserves the right to accept or reject the proposed lift station.
4. An alarm system shall be provided that is capable of detecting power interruption, high water and high motor temperature conditions. The alarm signals and notification procedures shall be installed as directed by the District.
5. All sewage lift stations shall be connected to SCADA and shall meet the following SCADA System Specifications:
 - A. *Programmable Controller: Allen Bradley Micro Logix Series 1200, P/N 1762-L24AWA.*
 - B. *Analog Input Module: Allen Bradley, P/N1762-IF4.*
 - C. *24 Volt DC Power Supply: Sola, P/N SCP30S24-DN.*
 - D. *Radio Modem (450-470 MHZ): Teledesign, P/N TS400B05B45SB.*
 - E. *Directional Antenna (450-470 MHZ): Teledesign/Antenex, P/N ANTTTS044BB10B-450N*

SS-10 Sanitary Sewer System Material Specifications.

1. Minimum Pipe Sizes.
 - A. The minimum diameter of any gravity sewer main shall be eight (8) inches.
2. Sanitary Sewer Manhole Ring and Cover.
 - A. The sanitary sewer manhole ring and cover shall be Inland Foundary 722-A, Olympic Model 37 or an approved equal. The cover shall be marked SEWER.
3. Sewer Service Pipe.
 - A. Sanitary Sewer Service Pipe shall be a minimum of SDR 35 PVC pipe.
4. Sewer Saddle.
 - A. Sewer saddles shall be Romac Saddle: CB-4.63 U.N. (for any main type) or PVC Saddle: O-ring/gasket seal with stainless steel clamps (PVC main only).

5. Sewer Force Main Pipe.

- A. Sewer force mains 2-inches in diameter and smaller shall be high density polyethylene (HDPE) with a pressure rating not less than 120 psi. Force mains larger than 2-inches shall be PVC with a minimum pressure rating of 200 psi.

SS-11 Television Inspection.

1. Prior to final acceptance by the District, the Contractor at his expense shall provide television inspection of all new sewer mains in accordance with MPWSS Section 02730. The television inspection must be reviewed by District staff prior to final acceptance. The television inspection must be in DVD or Electronic form, and clear picture Quality.

SS-12 Testing.

1. Testing of the sewer line or force main shall be done in accordance with the Montana Public Works Standard Specifications.
2. Test results will be furnished to the District prior to final acceptance.

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SECTION IV - CONSTRUCTION STANDARDS

CS-01 Contractor Requirements (District Initiated Projects Only).

1. Contractors installing water or sanitary sewer improvements shall be subject to the following requirements:

A. Montana Contractor's License.

1) The Contractor shall have a current Montana Contractor's License.

B. Statement of Ability and Experience.

1) The Contractor may be required to submit a statement of work completed of a similar nature within the past twenty-four (24) months.

2) The statement shall include the name, address and phone number of each reference.

3) The Contractor may include any other information deemed appropriate by the Bigfork Water and Sewer District (District) Manager.

C. Insurance and Bonding.

1) Insurance and bonding shall be in accordance with current District requirements. The Bigfork Water and Sewer District shall be named as additional insured. Additional insurance and bonding may be required for special circumstances as directed by the District Manager.

2. Contract Award.

A. The Contractor shall provide the Montana Contractor's License Number, Statement of Ability and Experience and evidence of insurance and bonding of the successful bidder to the District Manager. Prior to the contract being awarded, the District Manager must approve the Contractor in writing.

B. Pre-Construction Meeting.

1) The Engineer shall conduct a pre-construction meeting. The successful Contractor, representatives of affected Utility Companies and the District Manager or his/her designate shall be present.

C. Construction Schedule.

- 1) Prior to construction, the Contractor shall provide a proposed construction progress schedule. The schedule shall show the proposed dates of commencement and completion of each of the various divisions of the project.
- 2) The Engineer shall forward a copy of the construction schedule to the District Manager.

D. Shop Drawing Submittal.

- 1) The District shall be provided with a copy of the approved shop drawings for all projects prior to beginning construction.
3. All water, sewer or any other construction within the public right-of-way, easement or lands shall be constructed, inspected and tested in accordance with the current edition of the Montana Public Works Standard Specifications. In addition, the following shall apply to construction, inspection and testing of all public infrastructure construction projects:

A. Construction Inspection.

- 1) The Inspecting Engineer shall provide construction inspection as required. Inspection shall be in accordance with the current edition of the Montana Public Works Standard Specifications. The following inspection procedures shall apply to all utility construction projects:
 - a) All water main valves and fittings, fire hydrants, sewer manholes, wet wells and sewer/water main crossings shall be inspected and approved by the Bigfork Water and Sewer District prior to backfilling.
 - b) A District Representative will be present for all disinfection and testing procedures.
 - c) The Design Engineer shall provide the District with photocopies of daily inspection reports, including Proctors and compaction test results for all projects. These reports shall be submitted on a weekly basis.
 - d) Inspection shall be provided not less than ½ -time for all projects.

CS-02 Contractor Requirements (Other Projects).

1. Contractors installing water or sanitary sewer improvements shall be subject to the following requirements:
 - A. Montana Contractor's License.
 - 1) The Contractor shall have a current Montana Contractor's License.
 - B. Pre-Construction Meeting.
 - 1) The Engineer shall conduct a pre-construction meeting. The successful Contractor, representatives of affected Utility Companies and the District Manager or his/her designate shall be present.
2. All water, sewer or any other construction within the public right-of-way, easement or lands shall be constructed, inspected and tested in accordance with the current edition of the Montana Public Works Standard Specifications. In addition, the following shall apply to construction, inspection and testing of all public infrastructure construction projects:
 - A. Construction Inspection.
 - 1) The Inspecting Engineer shall provide construction inspection as required. Inspection shall be in accordance with the current edition of the Montana Public Works Standard Specifications. The following inspection procedures shall apply to all utility construction projects:
 - a) All water main valves and fittings, fire hydrants, sewer manholes, wet wells and sewer/water main crossings shall be inspected and approved by the Bigfork Water and Sewer District prior to backfilling.
 - b) A District Representative will be present for all disinfection and testing procedures.
 - c) The Design Engineer shall provide the District with photocopies of daily inspection reports, including Proctors and compaction test results for all projects. These reports shall be submitted for final acceptance.

CS-03 Record Drawings, Project Acceptance and Operation and Maintenance.

1. Upon project completion and before written acceptance will be issued by the District, the Inspecting Engineer shall certify and submit one set of record drawings to the District. Until record drawings have been submitted to, and approved by the District Manager, the District will not accept the project as complete. After drawings have

been submitted to the District, the District will issue written acceptance to the Owner. The Contractor shall be responsible for operation and maintenance until the District provides written acceptance. The one-year guarantee period begins from the date of written acceptance by the District.

CS-04 One-Year Guarantee Inspection.

1. The Inspecting Engineer shall conduct a one-year guarantee inspection. The maintenance bond will be released when systems are certified and accepted by the District as meeting construction standards. A District Representative shall accompany the Engineer on the inspection. The Engineer shall notify the Contractor of any work found to be defective. The necessity of renewing the bond and extending the guarantee period will be determined by the District Manager.

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