

**CITY OF PRICEVILLE**

**SEWER FACILITIES  
CONSTRUCTION MANUAL**

**Revised 10/19/2023**



This manual is prepared as a guide for the design and construction of Sanitary Sewer Collection Systems to be connected to the Public Sewer System of the City of Priceville.

## **DESIGN STANDARDS**

# DESIGN STANDARDS

This is a guide for the design of sanitary sewers to be connected to the Sanitary Sewer System of the City of Priceville. Any questions not answered in this guide may be referred to the Sewer Superintendent of the City.

The minimum design assumptions for sewer design are:

Each residence shall provide a daily flow of 250 gallons of wastewater.

Each employee in a commercial establishment shall provide a flow of fifty gallons per day.

Schools shall provide a daily flow of fifty gallons per person.

Provide for a flow of three gallons per minute for each fixture in restaurants and public facilities.

Maximum flow will be at least three times the average daily flow.

## 1. GRAVITY SEWER SIZES

- 1.1 Pipe should be sized so that design flow can be carried with the pipe running approximately half full. No gravity sewer main shall be less than eight (8) inches in diameter. No service line shall be less than four (4) inches in diameter.

## 2. GRADIENT

- 2.1 All gravity sewers shall be designed to provide a minimum wastewater velocity of two feet per second.

- 2.2 The minimum pipe gradients allowed are:

Eight inch.....0.004 feet/foot or 0.4%  
Ten inch.....0.0028 feet/foot or 0.28%  
Twelve inch.....0.0022 feet/foot or 0.22%  
Fifteen inch or larger.....0.0015 feet/foot or 0.15%

## 3. PIPE – Gravity

- 3.1 The following are minimum pipe strength requirements:

|                                     |   |                          |
|-------------------------------------|---|--------------------------|
| Three to twelve feet of cover       | - | PVC-ASTM D3034-SDR 26    |
| Twelve to twenty-five feet of cover | - | PVC-ASTM D3034-SDR 26    |
| Over twenty-five feet of cover      | - | PVC – AWWA C 900         |
|                                     |   | or Class 50 Ductile Iron |

- 3.2 All pipe with less than three feet of cover or crossing a drainageway that may be excavated to the point that the pipe would have less than three feet of cover shall be ductile iron.
- 3.3 SDR 35 pipe is not allowed on any sewer.
- 3.4 DIP will be used on all ditch or waterway crossings.
- 3.5 Laterals will be upright at connection points for structures with a two-way clean out tee.
- 3.6 Copper solid core tracer wire will be used on mains and laterals, with connection points at each lateral and manhole. The wire must be 10 gauge.
- 3.7 Under no circumstances shall a gravity sewer line of any kind be allowed to traverse the course of a waterway, ditch or stream within its banks.
- 3.8 The designer should check with the Sewer Superintendent if there is any question.
- 3.9 Under no circumstances shall a gravity line traverse under the course of a sidewalk or curb.

#### 4. PIPE – Force Main

- 4.1 Force mains shall be a minimum of six-inch diameter. Unless cover or pressures dictate otherwise, the pipe may be: PVC–ASTM D 2241 class 200, HDPE rated for a minimum of 200 psi, SDR-21, or ductile iron pipe.
- 4.2 There may be conditions that require pipe to be heavier or stronger than noted above.
- 4.3 Force mains may require air release or vent stations, with an acceptable brass gate valve.
- 4.4 Thrust blocks (kickers) will be used on all turns in pipe.
- 4.5 Copper solid core tracer wire will be used with a connection point at 1,000 feet intervals. The wire must be 10 gauge.
- 4.6 Isolation valves will be used at 500 feet intervals.
- 4.7 DIP will be used on all street crossings and spans, ditch or waterway crossings.
- 4.8 The designer should check with the Sewer Superintendent if there is any question.

- 4.9 Under no circumstances shall a force main of any kind be allowed to traverse the course of a waterway, ditch or stream within its banks.
- 4.10 Under no circumstances shall a force main traverse under the course of a sidewalk or curb.

## 5. MANHOLES

### 5.1 Precast Concrete Manholes

- A. The precast reinforced concrete manholes shall be constructed in accordance with ASTM Standard Requirements for Precast Reinforced Concrete Manholes, ASTM Designation C-478, latest revision.
- B. Precast concrete manholes shall be of the following types and sizes:
1. Standard Manholes: Manhole barrel diameter 4'-0" for use on sewers less than 24 inches in diameter.
  2. Type I Manhole: Manhole barrel diameter 5'-0" for use on sewers 24 inches through 36 inches in diameter.
  3. Type IA Manhole: Manhole barrel diameter 6'-0" for use on sewers 42 inches through 48 inches in diameter.
- C. Top section shall be eccentric cone type.
- D. The interior surfaces of the manhole shall be coated with a high-build glass-flake Cementitious epoxy coating to dry film thickness of not less than 20 mils. Cementitious epoxy coating shall be PCS-9043 Type II Coating as manufactured by Permite Coatings, or equivalent.

### 5.2 Manhole Castings

- A. Manhole frames and covers shall be cast from gray iron meeting the requirements of ANSI/ASTM A 48-83, not less than Class 30.
- B. Manholes shall not be subject to flooding. Where indicated, or subject to inundation, waterproof (watertight) manhole frames and covers shall be furnished and installed and shall conform to the following requirements:
- C. The minimum opening in the top shall be 21 inches. All covers shall be rated for traffic bearing with machined bearing surfaces to prevent movement of the lid.
- D. Manholes shall be designed with a gradient drop of 0.1 foot from inlet to outlet. A 0.2 foot drop is preferred. If the inlet pipe is smaller than the outlet pipe, the minimum drop will be to match crowns of the pipes.

- E. Drop manholes will be similar, with the drop provided by a “Memphis” tee on the outside of the manhole encased in Class “B” concrete. Drops will be required any time the inlet is 2’-0” or more above the outlet.

### 5.3 Manhole Locations

- A. Manholes shall be installed at distances not greater than 400 feet apart. Manholes shall be installed at the upstream end of each line, at all changes in grade, size or alignment, and at all intersections.
- B. Manholes shall not be placed within areas subject to flooding. Under no circumstances shall manholes be placed in the course of a waterway, ditch or stream within its banks.

## 6. SERVICE CONNECTIONS

- 6.1 Residential connections shall be a minimum of four-inch SCH 40 PVC sewer pipe. The connections will join the sewer main at a tap properly designed for the connection. All service connections will have a two-way clean-out installed at the edge of the easement of the property line. The service line to the clean-out will belong to the City, and upstream from the clean-out will belong to the customer. Service lines shall have a minimum gradient of 0.01 feet/foot (1.0%). Residential service lateral connection points must be between 3’-5’ in depth. (see appendix profile for details)
- 6.2 Multi-family and Non-Residential connections shall be as determined on a case-by-case basis.
- 6.3 Service laterals located in vehicle traffic areas shall be traffic rated and/or within traffic rated boxes.
- 6.4 Service laterals shall not be placed within drainageways or areas subject to flooding or periodic inundation.

## 7. LIFT STATIONS

- 7.1 A report shall be prepared and sent to the sewer department for review. The report will show all pertinent calculations for flow estimates, pump selection, pumping cycles at design and maximum flow, and any other data considered in the design. Lift stations shall be designed to pump often enough to prevent septicity and a sufficient pumping rate to provide a 2 feet per second wastewater velocity in the force main. Pumps shall be Flygt submersible pumps. Pumps must operate on

480v, 3 phase electrical service. At least 2 pumps shall be provided. The pump controller shall be an SC100. All piping in the lift station shall be ductile iron flanged fittings.

- 7.2 Elapsed time meters will be provided for each pump.
- 7.3 A double-throw safety switch shall be installed in the main electrical feed between the meter and controller with the second power supply to be from a generator connection. The connection shall be a Hubbell 460R7W female or equal for 480v, 3 phase, 60a service.  
A permanent natural gas generator may be required for lift stations when deemed necessary by the City. Such requirement will be determined on a case-by-case basis.
- 7.4 All lift station MCC (motor control center) cabinets shall have a 120v GFI plug on the exterior of the cabinet.
- 7.5 Wet wells will have a minimum 6 ft diameter, with an access hatch at a minimum of 3 x 5-ft opening.
- 7.6 All wet wells will be lined with NUKOTE lining product.
- 7.7 All lift stations will have a water service with a freeze proof faucet.
- 7.8 All lift stations will have a security light.
- 7.9 A concrete slab around the valve pit and wet well will be a minimum of 20 x 25 ft. All other areas inside the station fence shall be gravel.
- 7.10 The Motor Control Center will be a minimum of 5 ft. from valve pit or wet well.
- 7.11 Perimeter fencing must be commercial-grade chain link, hardware, and materials (at minimum) with a minimum locking gate size of 12-ft. When chain link fencing is used, a landscape barrier may be required as deemed necessary by the City.
- 7.12 All lift stations will have a bypass pump connection (6 inch minimum).
- 7.13 All lift stations shall not be subject to flooding. Where indicated, or subject to occasional inundation, such design elevation shall be as approved by the City.
- 7.14 All lift stations shall be equipped with fall protection/grating.
- 7.15 All lift station lift chains and guide rails shall be stainless steel.
- 7.16 All lift stations shall have cellular emergency and failure notification equipment.

## 8. PROPERTY

- 8.1 All sewer lift stations shall be on property owned by the City. Sewer lines may be on easements dedicated for that purpose. It is the responsibility of the developer to provide the property and easements. Sewers should be placed near streets or otherwise provide all-weather vehicle access to all manholes.
- 8.2 All sewer plans must be reviewed and approved by the sewer department prior to any construction work. This may be in conjunction with Planning Commission approval, if that is required for the project.

## 9. Grease Traps

- 9.1 Grease traps shall be required for all commercial or industrial uses which may generate grease, oil, or other substances of like kind. (food production, schools, automotive service centers/stations, car washes, etc.)
- 9.2 Grease traps shall be the sole responsibility of the owner.
- 9.3 Grease traps shall be pumped on an established schedule, and shall be inspected by the City as necessary.

## 10. CERTIFICATION

- 10.1 At the completion of construction, the design engineer must furnish the Sewer Superintendent with a letter certifying that all components of the project have been constructed in substantial accord with the approved plans and a copy of the plans with changes shown as record drawings.

# **CONSTRUCTION STANDARDS**

# CONSTRUCTION STANDARDS

This is a guide for construction of sanitary sewers to be connected to the Sanitary Sewer System of the City of Priceville. Any questions not covered here should be referred to the Sewer Superintendent of the City.

## 1. GRAVITY PIPING

### 1.1 Installation

- A. The pipe is to be straight between manholes in both alignment and gradient. At any change in either alignment or gradient, a manhole is required.
- B. Pipe is to be bedded in a crushed stone (ALDOT No. 57). Bedding shall extend below the pipe a sufficient depth to provide a firm base. The minimum amount of bedding is twelve inches depth. Bedding is to be placed the full width of the trench to a height of one foot above the top of the pipe.
- C. Trench backfills above the bedding will depend on the surface requirements. If the sewer is under pavement or other travel way, the backfill above the bedding will be crushed stone. If the sewer is in the open, the trench can normally be backfilled with material excavated from the trench. In either case the contractor will be responsible for maintenance of the surface until the end of the warranty period.
- D. No damaged pipe or fittings may be allowed to remain in the finished work.
- E. Installations will be performed by a State Licensed Contractor with a sewer certification.

### 1.2 Testing and Inspections

- A. All construction work will be open for inspection at any time for the designated representatives of the City. When all work is completed, the gravity sewer will be subject to a low-pressure air test and television inspection in the presence of a representative of the City. All piping must be clean of any dirt, mud or debris prior to testing. Each segment of the sewer will be required to hold a stabilized air pressure of five pounds per square inch for a period of five minutes with no drop in pressure. Television inspection will provide a thorough visual inspection of the sewer in place and provide a record of the inspection on paper and either DVD, or other acceptable video file. It will provide a record of all pipe lengths and service locations.

- B. Testing and video inspection will not be conducted until after the final backfill has been in place a minimum of 30-days to permit stabilization of the soil-pipe system.
- C. No pipe shall exceed a deflection of 5 percent of the inside diameter. If deflection exceeds 5 percent, the pipe shall be excavated. Replacement or correction shall be accomplished in accordance with the requirements in the approved specifications.

## 2. MANHOLES

- 2.1 Manholes are required at every change in grade or alignment, at junctions with other mains, at the end of lines, and at a maximum of four hundred linear feet between manholes in straight runs. In straight runs, manholes will be evenly spaced unless required otherwise by line intersections present or future. Manhole inverts will be smooth and even, providing for smooth flow thru the structure. All surfaces will be smooth in the invert and benches to prevent catching paper or other fibrous material.
- 2.2 Manhole Testing shall be as provided by the sheet attached in the *Appendix*.

## 3. LIFT STATIONS

- 3.1 Lift stations will be constructed in accord with approved plans and specifications. All fittings shall be tightly fitted together and be a neat orderly package. Manufacturers' representatives for all equipment shall inspect the installation and give the engineer a written report approving the installation of their equipment prior to start-up. A representative of the City will witness the start-up of the station.

## 4. FORCE MAINS

### 4.1 Installation

- A. Force mains are the wastewater carrier pipes from the lift station to the plant or gravity sewer. The pipe shall be placed with the proper cover and as smooth as possible in gradient and alignment. Backfill for the pipe will be similar to the backfill for gravity pipes. Bends can only be used with the permission of the engineer. Air release and vent stations must be placed at the high spots along the line.

### 4.2 Testing and Inspection

- A. Force mains shall be tested with a water pressure test. The main shall hold water at the proposed system pressure plus 50 pounds per square inch or a minimum of 100 pounds per square inch measured at the lift station or origin.

The minimum time for the pressure test is four hours. The test must be witnessed by a representative of the City.

## 5. CONNECTION TO EXISTING SEWER

- 5.1 The connection to the existing sewer may only be made with the permission of the Superintendent and in the presence of his designated representative. This may be done prior to final inspection. In this case a plug will be placed in the new line until final inspection is complete. ~ see section 7 PENALTIES

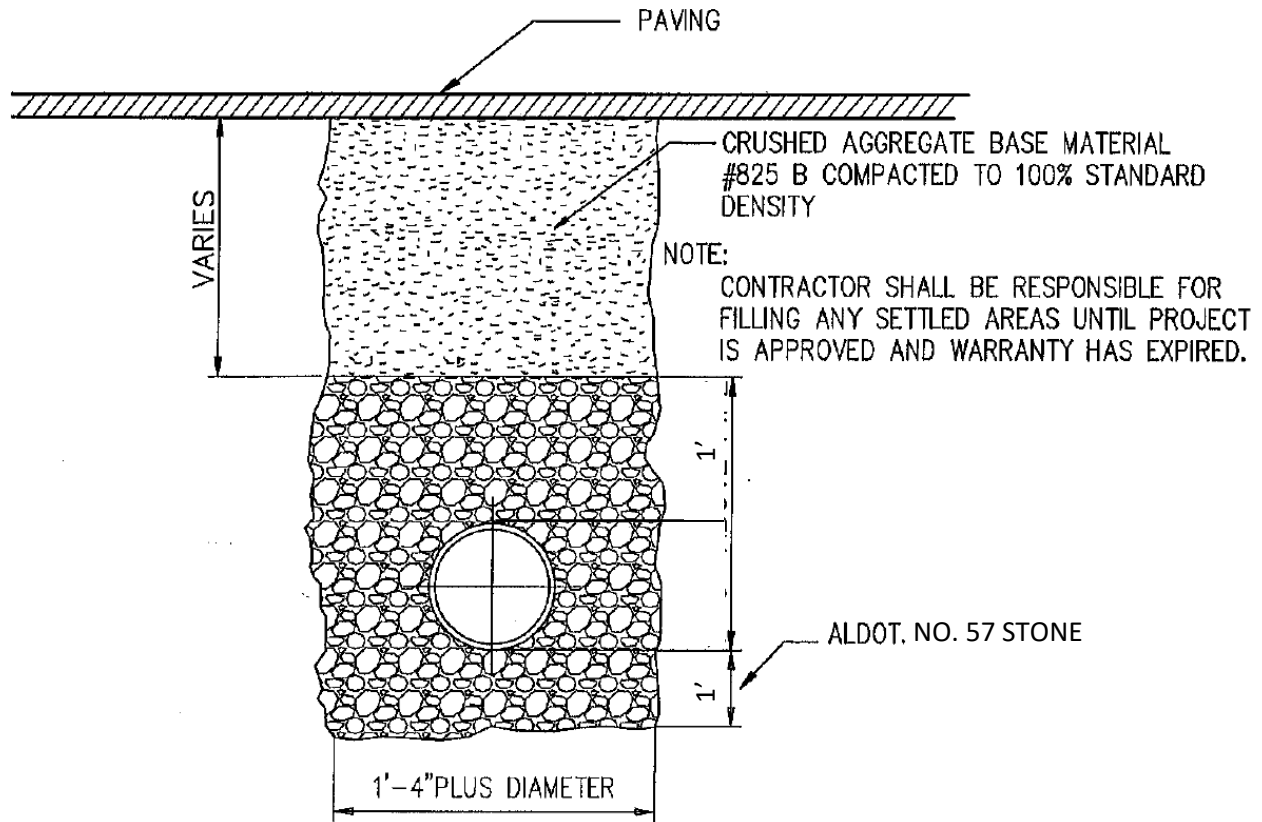
## 6. WARRANTY

- 6.1 When all construction and testing is complete and final inspection has been cleared and record drawings provided, the City will accept the facility for connection to the sewer system. The contractor's warranty of the facility will start at that time. The warranty will be for one year and cover all items of material and workmanship. The contractor will make all repairs in a timely manner to keep the facility operating and protect the interest of all parties unless a longer time is required.
- 6.2 A bond in the amount of 10% of the total construction cost will be provided to the City for a period of thirteen months to provide for repairs not made in a timely manner by the Contractor.

## 7. PROHIBITED ITEMS AND PENALTIES

- 7.1 Under no circumstances shall any material, debris, or waste of any kind be allowed to enter the City's existing sewer system prior to final inspection and approval.
- 7.2 Under no circumstances shall rainwater or groundwater be allowed access to the sewer system.
- 7.3 The City has the right to refuse any waste of any kind deemed detrimental to the safety and/or operation of the sewer system.
- 7.5 The City may require "pre-treatment", at the cost of the producer, of any waste of any kind deemed detrimental to the safety and/or operation of the sewer system.
- 7.4 In the event any violation of any item listed above, the developer shall be subject to costs incurred for removal of such items and/or repair of any system facilities, whether on or off-site, which are deemed as a result of such violations. The developer may be subject to further fines or penalties, as may be determined by law.

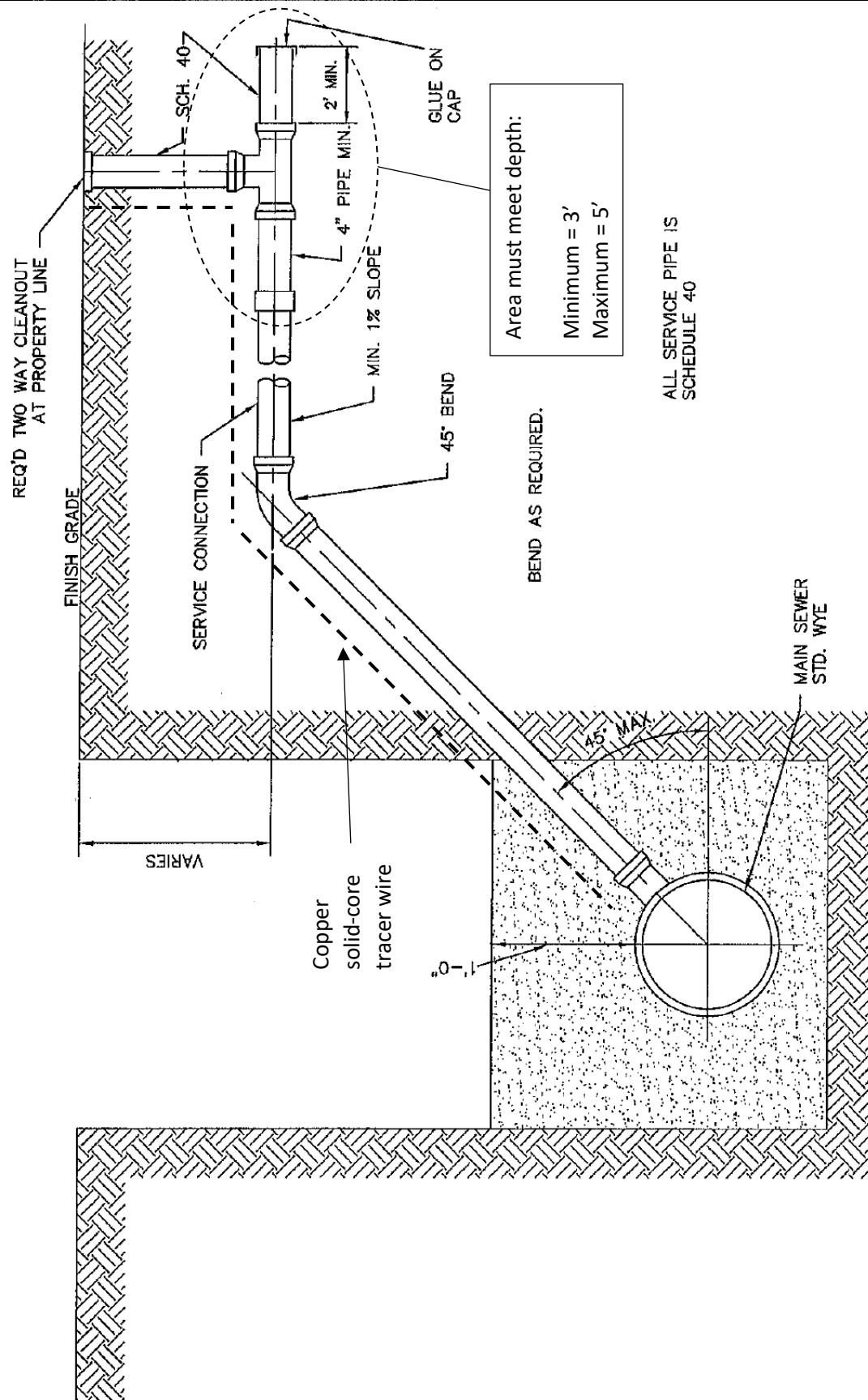
## **APPENDIX**



CLASS "B" BEDDING  
(UNDER PAVED AREA)

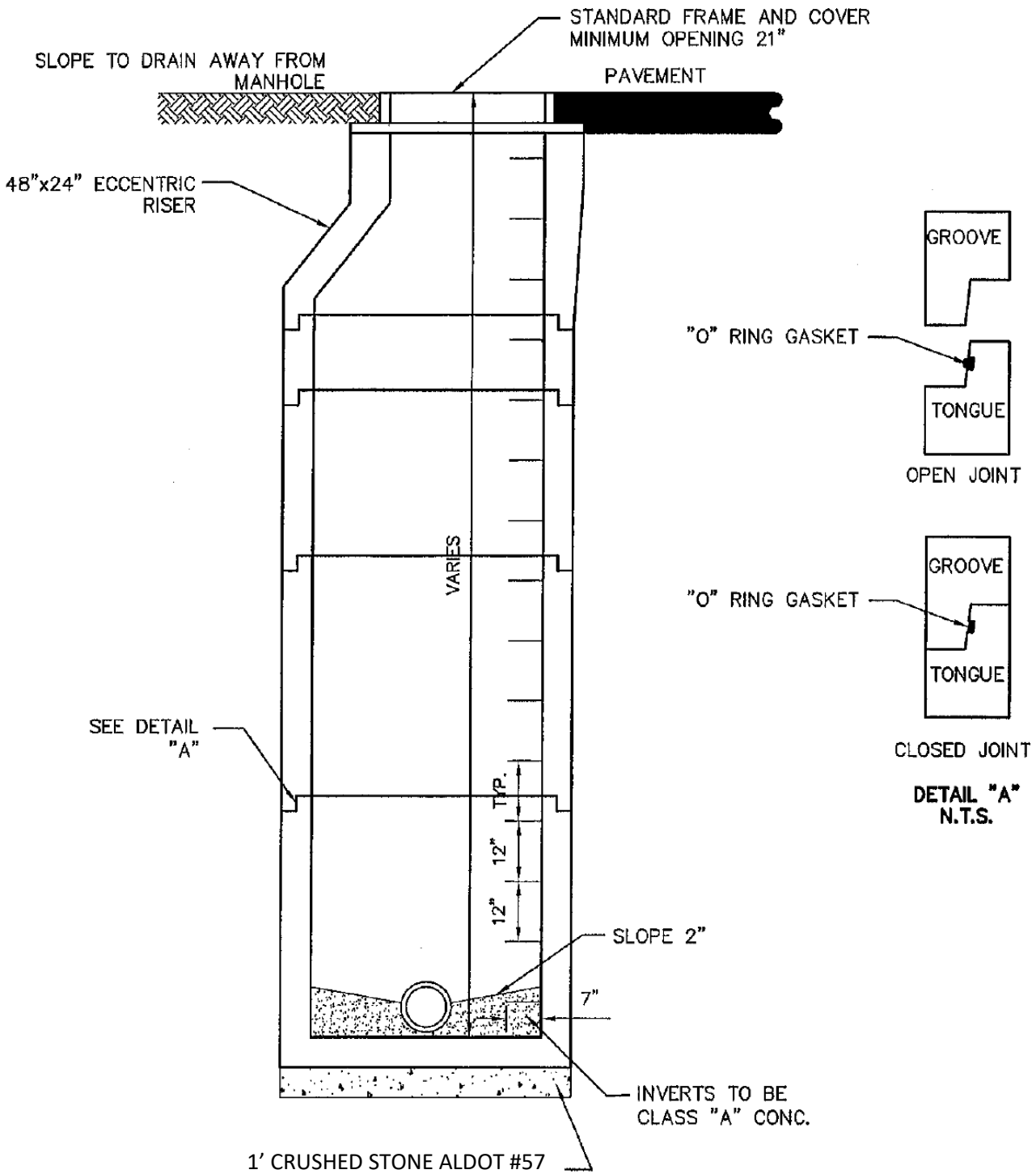
# BEDDING AND BACKFILL FOR GRAVITY SEWER PIPE

NOT TO SCALE



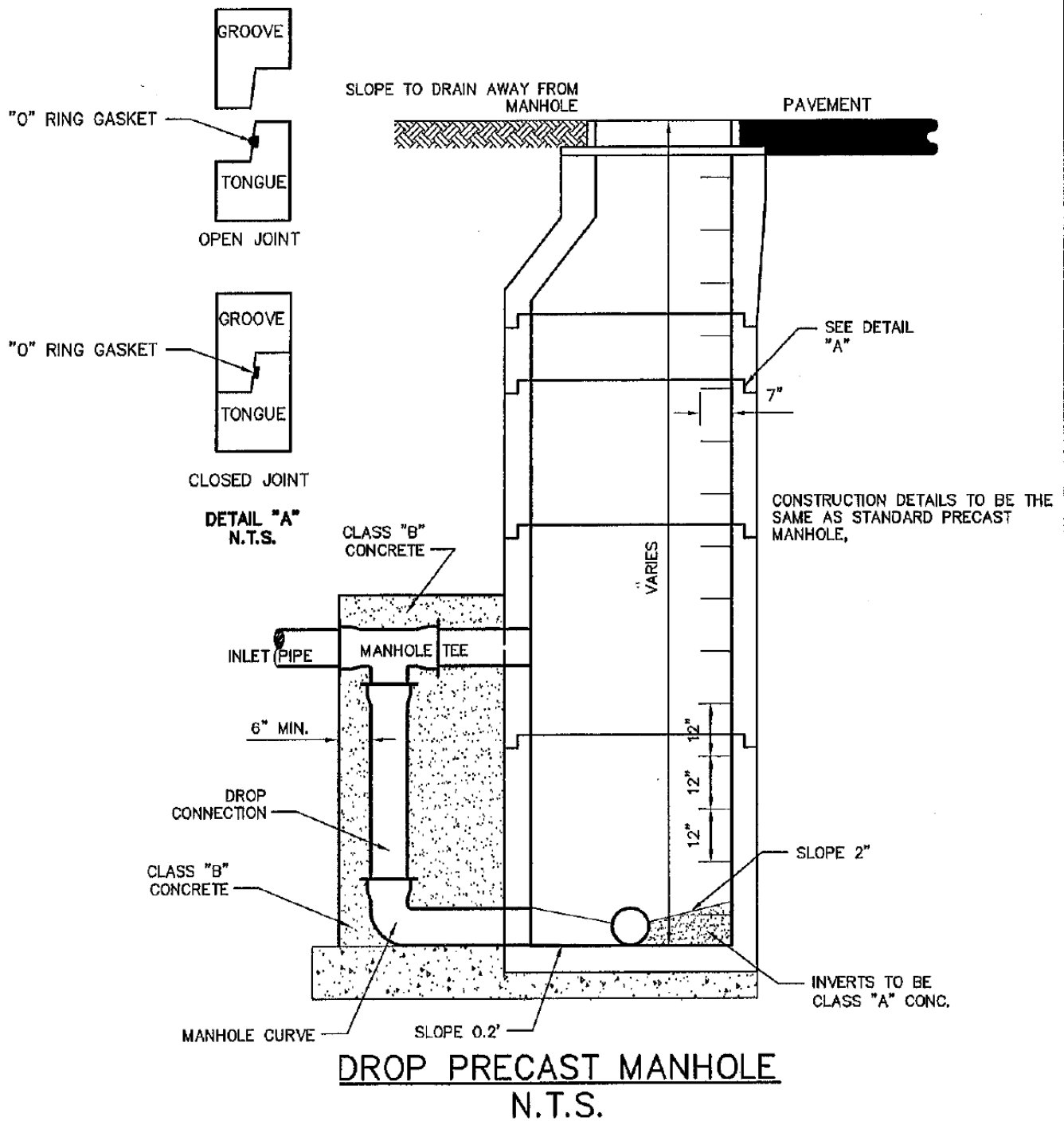
# HOUSE CONNECTION IN DEEP CUT N.T.S.

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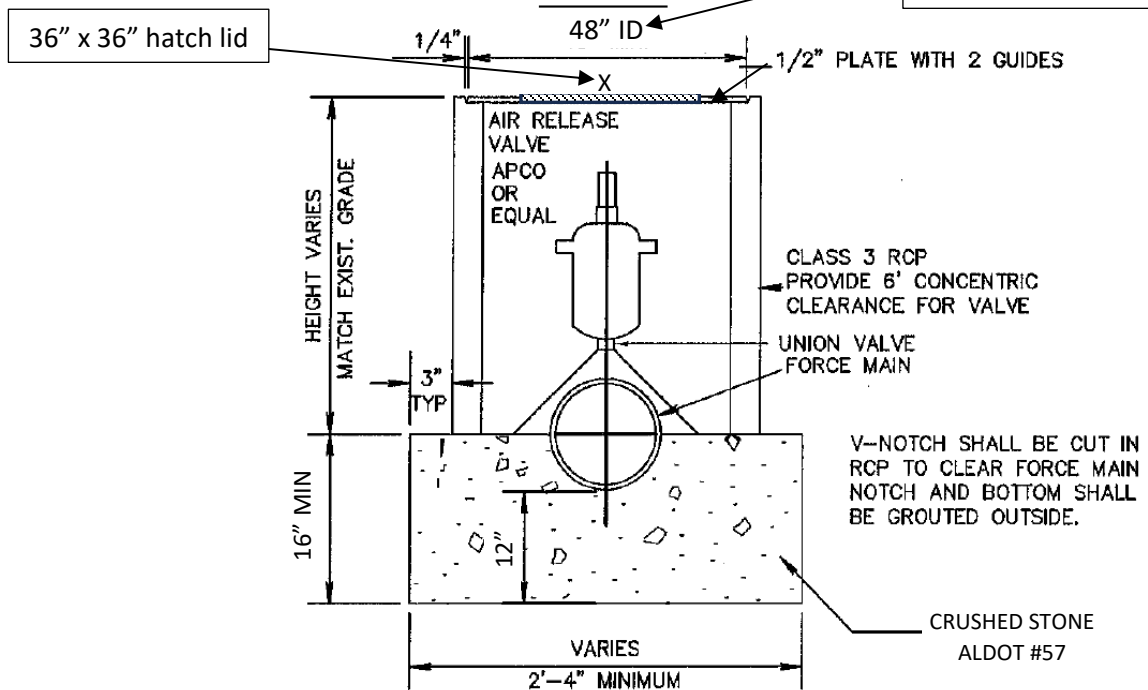
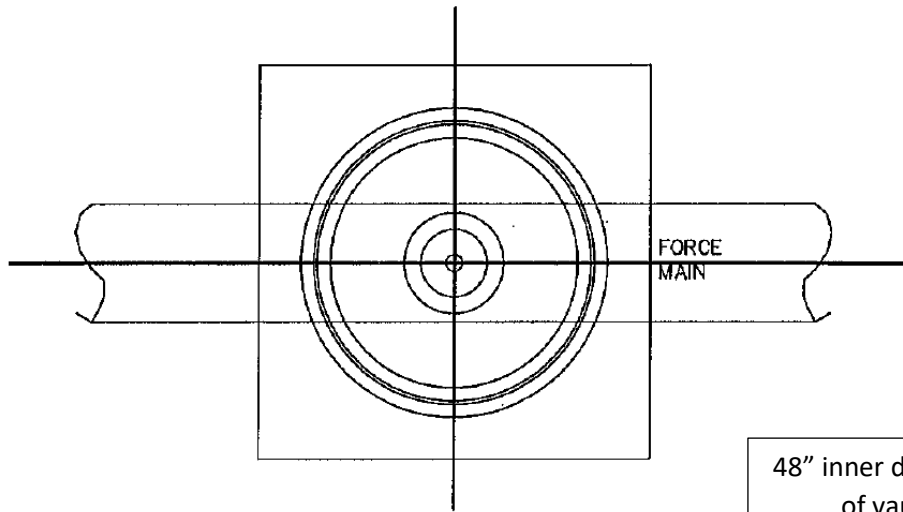


## STANDARD PRECAST MANHOLE N.T.S.

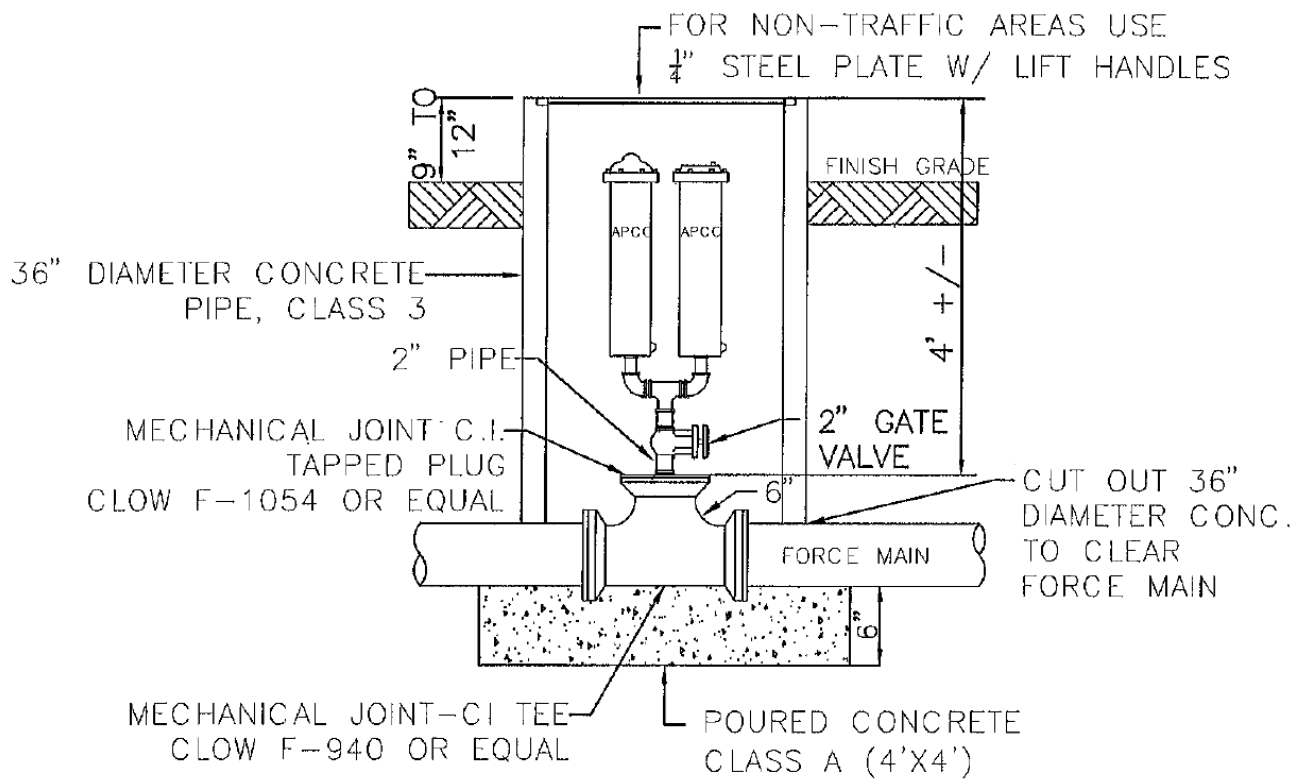
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**INSTALLATION DETAILS**  
**AIR RELEASE VALVE**  
**NOT TO SCALE**



## VENT STATION

NOT TO SCALE