



## STANDARDS FOR INSTALLATION OF GRAVITY BUILDING SEWERS / SIDE SEWERS

The information provided herein is intended to assist the contractor or homeowner in the installation of a gravity building and/or side sewer. Any work to be performed on gravity side sewers, as defined below, shall be performed by a Lakehaven-approved side sewer contractor, maintaining the required bonding and current insurance certificate. Work to be performed on private building sewers, as defined below and located within the applicant's private property or within adjacent private property, may be performed by the property owner or property owner's contractor, provided all materials and workmanship meet the requirements of these standards, and the property owner holds Lakehaven harmless from any damage that may be incurred as a result of the installation.

### DEFINITIONS:

**Gravity Building Sewer:** A privately owned and maintained pipeline system located within private property that is designed to carry sewage or wastewater leading from a building drain/plumbing outlet of a structure to the gravity side sewer, or emptying into a private grinder pump wet well, if applicable. The gravity building sewer shall begin at the terminus of the "building drain" as defined by the applicable plumbing code and shall terminate at the property line/right-of-way margin or Lakehaven easement boundary, or at a private grinder pump wet well, if applicable.

**Gravity Side Sewer:** A privately owned and maintained pipeline system located within a public right-of-way or Lakehaven easement that is designed to carry sewage or wastewater leading from a gravity building sewer terminus, a private force main/discharge pipeline from a private grinder pump, or other approved facilities to the public gravity sanitary sewer system main.

### INSTALLATION:

1. **Permitting.** A Sewer Service Connection Permit (SSCP, a.k.a. Side Sewer Permit) is required for installation and/or repair of all gravity building and/or side sewers. The permit application shall include a site plan prepared to scale, illustrating the proposed structure/facility to be served. Refer to the sample plan showing the minimum site plan requirements. Lakehaven will obtain from the right-of-way authority having jurisdiction any required right-of-way construction permit for a gravity side sewer located within public rights-of-way.
2. **Utility Locates.** To properly identify and locate existing utilities, and in accordance with State law, the contractor shall request utility locates not less than two (2) business days or more than ten (10) business days before excavation, except for emergencies, by calling **811**.
3. **Structure Served.** The contractor shall verify that all plumbing fixtures and facilities within a structure, and all plumbing building drain outlets as defined in the applicable plumbing code, are connected to the gravity building sewer, by dye testing or other approved means, if necessary.
4. **Pipe/Fittings Material for Gravity Building/Side Sewers.** Pipe and fitting material shall be one of the following:
  - Polyvinyl Chloride (PVC), ASTM D3034, SDR-35 wall thickness, push-on rubber gasket joints;
  - Polyvinyl Chloride (PVC), AWWA C-900, DR-18 wall thickness, push-on rubber gasket joints;
  - Ductile Iron, ANSI/AWWA C151/A21.51, thickness Class 52, push-on rubber gasket joints shall be epoxy-lined (interior) and asphalt-coated (exterior) for:
    - Gravity side sewers for non-single family residential structures



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- Gravity side sewers for single family residential structures, if connecting to epoxy-lined ductile iron gravity sewer main
  - Gravity building sewers for single family residential structures (at owner's discretion)
  - Gravity building sewers for non-single family residential structures;
  - Ductile Iron, ANSI/AWWA C151/A21.51, thickness Class 52, push-on rubber gasket joints may be cement mortar-lined (interior) and asphalt-coated (interior and exterior) for:
    - Gravity side sewers for single family residential structures, if connecting to cement mortar-lined and asphalt-coated ductile iron gravity sewer main
    - Gravity building sewers for single family residential structures; or
  - The material used for a gravity side sewer shall match that used for the gravity sewer main to which connection is being made.
  - The material for reducers and other fittings shall match that used for the pipe, except ductile iron fittings shall be used for PVC AWWA C-900 pipe.
  - Fernco® couplings with stainless steel band clamps, or equal, shall be used to join Acrylonitrile-butadiene-styrene (ABS) pipe (building drain) to PVC pipe. To discourage root intrusion at repair points for existing concrete pipe, minimum No. 14 solid, bare copper wire shall be wrapped twice around the concrete pipe at the end of the couplings, when joining the concrete pipe to the new PVC pipe replacement section.
  - ROMAC® couplings, or equal, shall be used to join cast iron, ductile iron, or concrete pipe to PVC pipe.
  - Reducers and other fittings of other materials intended to be used for joining non-PVC pipe to PVC pipe shall first be approved by Lakehaven prior to installation.
5. **Pipeline Size/Trench Width.** The inside diameter for gravity building sewers for a single family residence shall be four inches (4") or greater, and six inches (6") or greater for two single family dwellings, multi-family dwellings or non-residential structures. The inside diameter for gravity building sewers for a single family residence downstream of and beyond the property served shall be six inches (6") or greater. The inside diameter for gravity side sewers shall be six inches (6") or greater. The minimum width of the trench shall be the inside pipe diameter, plus six inches (6") on each side of the pipeline.
6. **Pipeline Alignment/Bends.** Gravity side sewers shall be laid at uniform slope and straight alignment from the sewer main to their terminus; changes in horizontal and/or vertical direction should be avoided and will only be allowed with prior written approval by Lakehaven. Gravity building sewers shall be laid at uniform grade and straight alignment; changes in horizontal and/or vertical direction will only be made with proper pipe fittings. Single bend fittings shall not exceed 45°; a change in direction exceeding 45° may be made with multiple bends, provided a minimum of two feet (2') of pipe is placed between bends and a clean-out is installed at locations as required below.
7. **Pipeline Cover.** The minimum cover over the pipeline, as measured from the final finished grade to the exterior top of the pipe, shall be one and one half feet (1½') in non-traffic areas, or two and one half feet (2½') in traffic areas. Any acceptable pipe material listed above may be used in non-traffic areas. Ductile iron pipe shall be used in traffic areas where the pipeline cover is between two and one half feet (2½') and four and one half feet (4½'). PVC SDR-35, PVC DR-18, or ductile iron pipe may be used in traffic areas where the pipeline cover is four and one half feet (4½') or



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greater. Pipeline in public right-of-way shall have a minimum three feet (3') of cover over the pipeline.

8. **Pipeline Slope.** Minimum slope for a gravity building and/or side sewer shall be two percent (2%). Maximum slope shall be two hundred percent (200%). Where ductile iron pipe is used and its slope exceeds twenty percent (20%), the joints shall be restrained.
9. **Clean-outs/Test Tee Assemblies.**
  - If no obstructions are present or planned, one clean-out shall be placed no less than two feet (2') and no more than three feet (3') from the building/structure wall. If an obstruction is present or planned, such as a porch or set of steps against the building/structure wall, no joints shall be allowed under said existing or planned obstruction, and one clean-out shall be placed no less than two feet (2') and no more than three feet (3') from the outside edge of the existing or planned obstruction.
  - A clean-out shall be placed at a minimum of every other bend group, where a change in direction exceeding 45° is being made with multiple bends.
  - For sewer service lines >100' in length, two-way clean-outs shall be installed at the approximate mid-point of such lines (maximum 100' spacing) or as otherwise directed by Lakehaven. Installation of two-way clean-outs shall be avoided within public rights-of-way.
  - If not already provided, a test tee appurtenance, together with necessary fittings, shall be installed at the connection of the gravity building sewer to the existing gravity side sewer stub. Upon completion of satisfactory testing, the vertical branch of the test tee shall be sufficiently capped or plugged to prevent the inflow/infiltration of groundwater.
  - Terminal screw-in plugs of all clean-outs shall be extended to final finished grade, within a driving area, and between six inches (6") and twelve inches (12") below final finish grade within a non-driving area. Clean-out pipe and fittings located within a driving area shall be protected by installation of a cast iron valve box and cover meeting an HS-20 loading design, having the word "SEWER" or letters "C O" cast into the cover.
10. **Monitoring Manholes.** A monitoring/sampling manhole (APWA Type 1, 48-inch diameter) is required for all new or modified multi-family residential and non-residential sewer service connections, and shall meet the requirements set forth in Section 5 "Manhole Construction" of the current version of Lakehaven's standard specifications for sanitary sewers. The invert of the monitoring manhole shall be placed at an elevation higher than the crown of the receiving gravity sewer main pipeline, or higher than the crown of any pipeline penetrating a receiving downstream connecting manhole. The location of the monitoring manhole should typically be at the confluence of domestic & non-domestic wastewater streams.
11. **Pipeline Bedding Material.** Crushed surfacing top course (a.k.a. 5/8-inch minus crushed rock) shall be placed and compacted four inches (4") below the bottom surface of the pipeline, and six inches (6") above the top surface of the pipeline. No other bedding material is acceptable.
12. **Trench Backfill Material.** Native material may be used for trench backfill for gravity building sewers on private property and for gravity side sewers within Lakehaven easements, provided it is free of organic material and contains no rocks larger than four inches (4") in diameter and can be adequately compacted by mechanical means. Material for, placement of, and compaction of trench backfill for gravity side sewers in public rights-of-way, and subsequent surface restoration, shall conform to the most current adopted standards of the right-of-way authority issuing the permit for the work.



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- 13. Tracer Tape.** Tracer tape shall be installed over non-metallic gravity building and/or side sewers. The tracer tape shall be the detectable type, minimum two inches (2") in width, and marked with the word "**SEWER**" (Lineguard Type II Detectable or approved equal). The tracer tape shall be placed in a continuous fashion approximately six inches (6") to twelve inches (12") above the top of the pipeline, extending along the full length of the pipeline.
- 14. Sewer and Water Pipeline Crossings.** A minimum of eighteen inches (18") vertical separation shall be provided between public water mains/ public water service lines AND gravity side sewers/ gravity building sewers at points of crossing, with the water pipeline crossing over the sewer pipeline. If these separation criteria cannot be met, special designs must be developed to meet Washington State Department of Ecology guidelines and/or requirements. A minimum of twelve inches (12") vertical separation shall be provided between private water lines/building supply lines AND gravity side sewers/ gravity building sewers at points of crossing, with the water pipeline crossing over the sewer pipeline. If these separation criteria cannot be met, special designs must be developed to meet the applicable guidelines and/or requirements of the plumbing code of the agency having jurisdiction.
- 15. Parallel Sewer and Water Pipelines.** A minimum of ten feet (10') horizontal separation shall be provided between public water mains/ public water service lines AND paralleling gravity side sewers/ gravity building sewers. If these separation criteria cannot be met, special designs must be developed to meet Washington State Department of Ecology guidelines and/or requirements. A minimum of twelve inches (12") horizontal separation shall be provided between private water lines/building supply lines AND paralleling gravity side sewers/ gravity building sewers. The private water lines/building supply lines AND paralleling gravity side sewers/ gravity building sewers shall be laid in separate trenches. If these separation criteria cannot be met, special designs must be developed to meet the applicable guidelines and/or requirements of the plumbing code of the agency having jurisdiction.
- 16. Crossing Under Existing A.C. Water Mains.** At the discretion of Lakehaven's inspector and where a gravity building and/or side sewer pipeline is constructed under an existing asbestos-cement (A.C.) water main, the contractor, at his/her own expense, shall replace that portion of the A.C. water main with new ductile iron pipe and transition couplings meeting current Lakehaven standards, a minimum of two feet (2') into both trench walls. Portland concrete or Controlled Density Fill (CDF) cradles will not be allowed to support the existing A.C. water main.
- 17. Sewer Tap.** If a gravity side sewer stub or tee is not provided, the sewer main shall be saddled and tapped. Only ROMAC® CB tapping saddles shall be used. The connection effected by this method shall have perfectly round holes cut by a hole-saw, with no sharp or jagged edges. The tap shall be oriented on the cross-section of the gravity sewer main at an angle no greater than forty-five degrees (45°) above the horizontal plane. The connection made shall be air-tight.
- 18. Stormwater Restrictions.** **NO** roof downspouts, building footing drains/ sump pump discharge pipes, groundwater/ spring drains, drains from uncovered outdoor impervious surfaces, etc., shall be connected to the gravity building and/or side sewer. In accordance with Lakehaven's approved Sewer Use Rules, storm water, surface water, ground water, artesian well water, roof runoff, subsurface drainage, swimming pool drainage, condensate, deionized water, non-contact cooling water, and unpolluted wastewater shall be prohibited from entering the gravity building and/or side sewer, unless specifically allowed otherwise by Lakehaven's General Manager.



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- 19. Shared-Use Use Side Sewer.** No gravity building sewer may be connected to another gravity building sewer on an adjacent property, or to a gravity side sewer serving an adjacent property, without prior written approval by Lakehaven and execution of a Shared-Use Use Agreement and private easement(s). If shared-use use is allowed, no more than three (3) single family residences may jointly use a single sewer service connection. The pipeline downstream of the point of connection of separate gravity building sewers shall be a minimum six inches (6") in size. Consideration for use of a Backwater Check Valve should be considered for these types of connections; CONTACT LOCAL BUILDING OFFICIAL FOR REQUIREMENTS &/OR OTHER INFORMATION.
- 20. Backwater Check Valves.** For shared-use use gravity side sewers, and for any structure with a finished floor elevation less than or equal to one foot (1') above the rim elevation of 1) the manhole on the public gravity sewer main to which gravity side sewer connection is directly made, or 2) the first manhole upstream of the gravity side sewer connection to the public gravity sewer main, use of a Backwater Check Valve may be indicated under UPC/IPC. CONTACT LOCAL BUILDING OFFICIAL FOR REQUIREMENTS &/OR OTHER INFORMATION.
- 21. Leakage Testing.** All gravity building and/or side sewers shall be tested by water exfiltration or low-pressure air methods under Lakehaven observation. Testing shall meet the requirements set forth in Section 6.2 "Testing of Gravity Pipelines" of the current version of Lakehaven's standard specifications for sanitary sewers.
- 22. Inspection of Installation and Leakage Testing.** A minimum of twenty-four (24) hours advance notice is required for site inspections of gravity building and/or side sewers on private property. A minimum of twenty-four (24) hours advance notice is required for site inspections of gravity side sewers within public rights-of-way. The contractor shall email [Inspections@Lakehaven.org](mailto:Inspections@Lakehaven.org) to request/schedule site inspection of the installed gravity building and/or side sewer. The trenches for the gravity building and/or side sewer shall be de-watered prior to the inspection. Approval of the installation and leakage testing results by Lakehaven's inspector is required prior to backfilling the trench and compaction of the backfill material.
- 23. Standard Plans.** Refer to the Standard Plan entitled "Building Sewer/Side Sewer Installation Details." If you have any questions, contact Lakehaven's Development Engineering Inspections staff for clarification at [Inspections@Lakehaven.org](mailto:Inspections@Lakehaven.org).
- 24. Existing On-Site Sewage Disposal System Abandonment.** If applicable, existing on-site sewage disposal systems, septic tanks, holding tanks, or cesspools shall be abandoned in accordance with the approved standards and regulations of the jurisdictional County Health Department.

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**Lakehaven Water & Sewer District**

**31623 – 1st Avenue South**

**P. O. Box 4249**

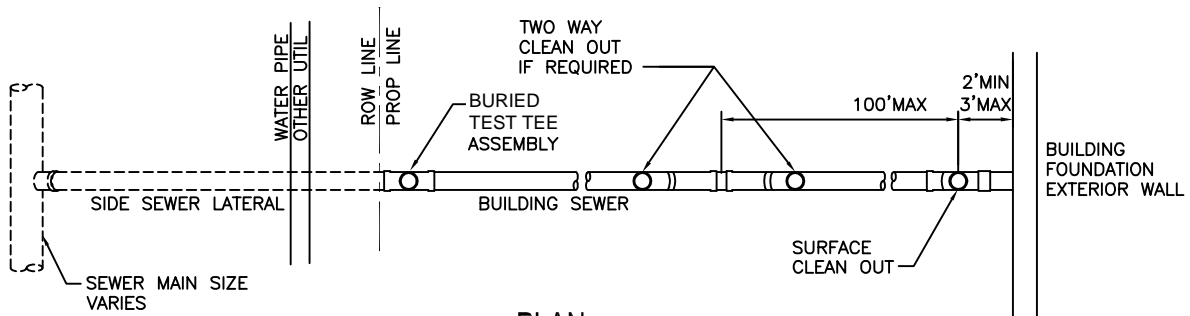
**Federal Way, WA 98063-4249**

**Development Engineering Email: [DE@Lakehaven.org](mailto:DE@Lakehaven.org)**

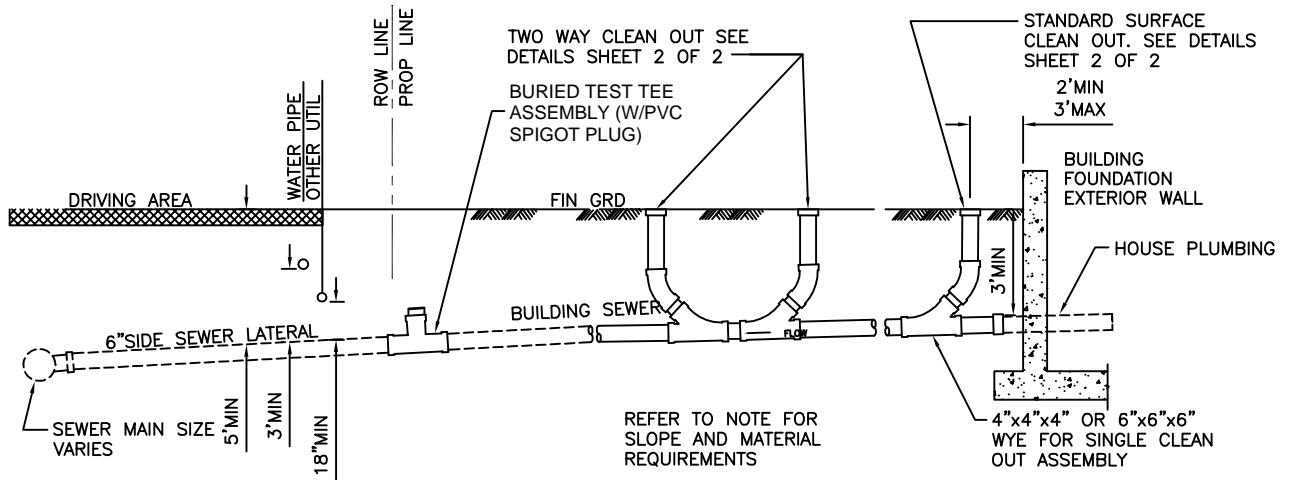
**Email for Inspection Staff:**

**[Inspections@Lakehaven.org](mailto:Inspections@Lakehaven.org) (available inspection time slots: 8AM-10AM, 10AM-Noon, Noon-2PM)**

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**PLAN**  
**TYPICAL SEWER SERVICE INSTALLATION**



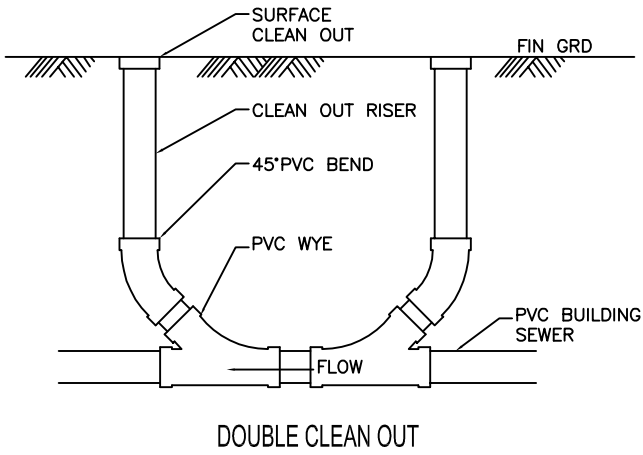
**PROFILE**  
**TYPICAL SEWER SERVICE INSTALLATION**

### SEWER SERVICE CONSTRUCTION NOTES

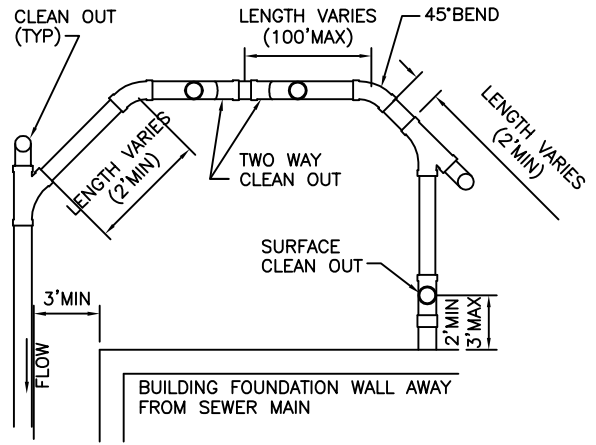
- 1.) When possible, design building sewage collection system to exit the building on the side nearest the sewer service connection point.
- 2.) Sewer service pipe at 2% minimum slope.
- 3.) Two Way clean out assemblies required on sewer service lines greater than 100' in length, maximum 100' spacing between Two Way clean out assemblies.
- 4.) For joining ABS to PVC pipe, use PVC Adaptor.
- 5.) For joining PVC to CI or Conc pipe use Romac coupling with stainless steel band clamps, or equal.
- 6.) Bedding material to be as specified in "Interim Standards for Gravity Building Sewer Installation".
- 7.) Backfill material to be as specified in "Interim Standards for Gravity Building Sewer Installation".
- 8.) Trench Width to be Pipe Diameter + 6" ea. side of pipe.



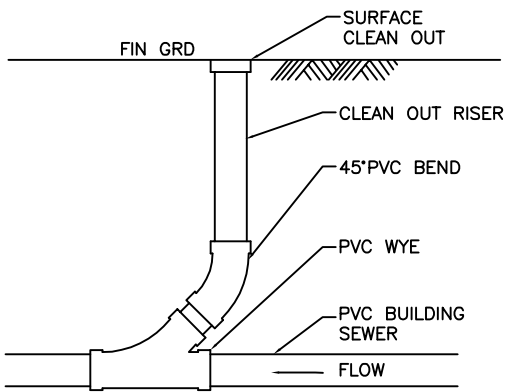
LAKEHAVEN WATER & SEWER DISTRICT	
KING COUNTY	WASHINGTON
<b>SEWER SERVICE INSTALLATION DETAILS</b>	
DATE: 1/21	SCALE: NONE
DRAWN: BIA	SHEET 1
CHECKED:	OF 2
APPR: BIA	



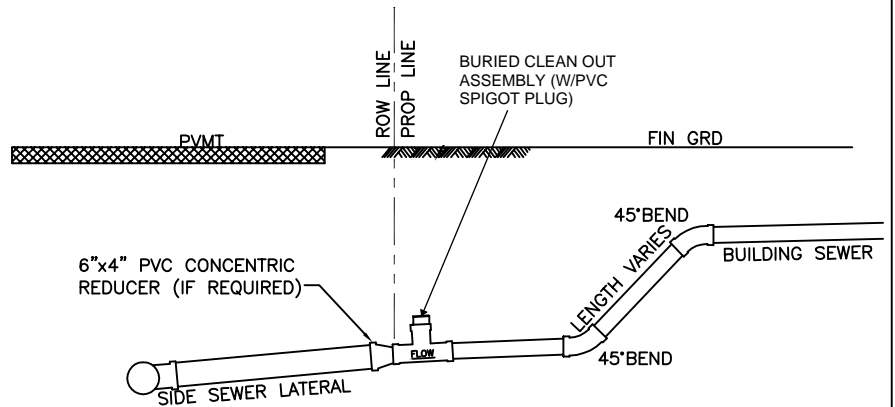
DOUBLE CLEAN OUT



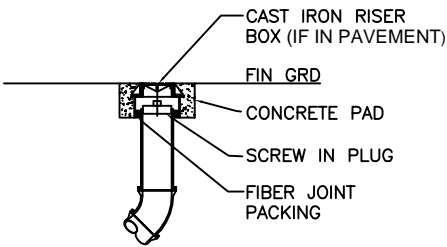
PLAN  
ALTERNATIVE SIDE SEWER INSTALLATION



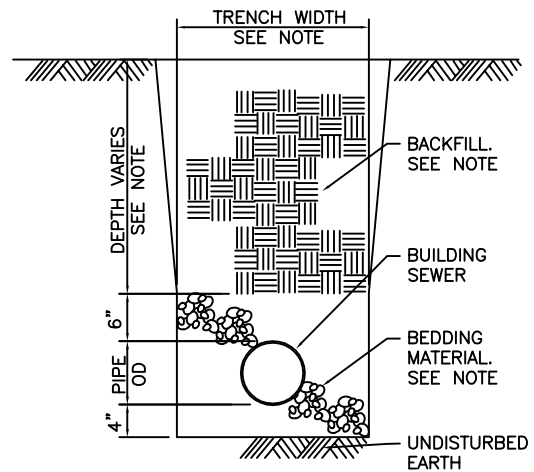
STANDARD SURFACE CLEAN OUT  
TYPICAL SECTIONS AT CLEAN OUT



PROFILE  
ALTERNATIVE SIDE SEWER INSTALLATION



CLEAN OUT DETAILS



SECTION  
TYPICAL TRENCH



LAKEHAVEN WATER & SEWER DISTRICT  
KING COUNTY WASHINGTON

SEWER SERVICE  
INSTALLATION DETAILS

DATE: 1/21  
DRAWN: BIA  
CHECKED:  
APPR: BIA

SCALE: NONE  
SHEET 2  
OF 2