



**King County**

**Department of Natural Resources and Parks**

**Wastewater Treatment Division**

**Contract P00208P16**

**Professional Services for Evaluation of Inflow and Infiltration (I/I)  
Reduction Concepts**

**Phase 2:**

**Definition of Three I/I Program Concepts**

**DRAFT**

**Task 6000**

**Regional Best Management Practice (BMP) Development**

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Project 150258

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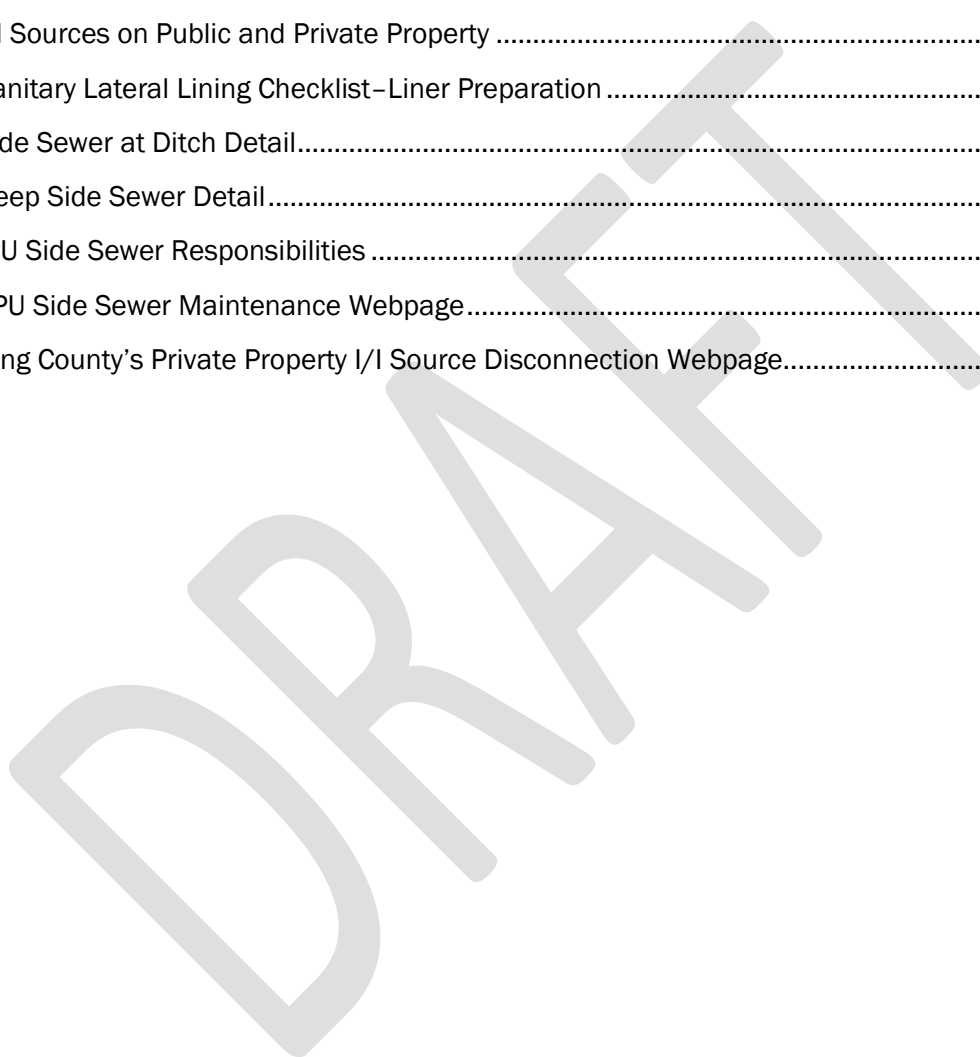
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# 1.0 Introduction

This technical memorandum (TM) presents options for regional inflow and infiltration (I/I) best management practices (BMPs) for King County's separated sewer system to be developed by the King County Wastewater Treatment Division (WTD) under its I/I Control Program. This TM describes and then evaluates each option for benefits and applicability to local agencies. The TM also presents additional considerations that may influence whether an option is ultimately chosen for implementation, as well as any work that may need to be completed prior to implementing the selected option.

This TM–Task 6000, Regional BMP Development–is part of a broader effort to reduce I/I entering the County's sewer system through the *Evaluation of Inflow and Infiltration Reduction Concepts* project. The task builds on work documented in the following TMs:

- Task 410 *Verify 2004 King County Final Draft Regional I/I Control Standards, Procedures, and Policies*, October 2017
- Task 420 *Assessment of Existing Local Agency Sewer and Side Sewer Standards*, October 2017
- Task 430 *Approach to Achieve Common Sewer and Side Sewer/Lateral Standards*, February 2019
- Task 510 *Evaluation of Current Inspection Programs at Cities and Sewer Districts*, October 2017
- Task 520 *Outline for a Standardized Regional Inspection Training Program*, February 2019
- Task 600 *Private Side Sewer Program Identification and Relevance to the King County Wastewater Service Area*, April 2019
- Task 600 *Evaluation Process, Findings, and Outcomes*, April 2019
- Task 4100 *Program Development Plan*, April 2020

## 1.1 Infiltration and Inflow Control Program Overview

Reducing I/I is an ongoing activity required by all wastewater utilities to effectively manage the collection system and control rate payer costs. I/I is defined as rainwater, surface water, and groundwater that flows directly and indirectly into sanitary sewers. I/I may also originate via illicit stormwater connections. This additional flow takes up capacity that would otherwise be used to convey wastewater. The additional operating costs that result from the need for larger pipes, maintenance structures, and pump stations to accommodate higher flows are spread across all local agencies and their customers through WTD's utility rates, fines, and cleanup costs associated with an increase in sanitary sewer overflow (SSO) events and annual wastewater treatment costs.

In 1999, as part of the Regional Wastewater Services Plan, WTD established the I/I Control Program. This program was designed to reduce the amount of peak wet weather flow entering the County's sewer system whenever such actions were determined to be cost-effective. Currently, the I/I Control Program focuses on portions of the conveyance system that have capacity deficiencies. Specifically, the I/I Program has developed methods to collect data to assess where localized I/I reduction might be a more cost-effective solution than increasing pipe and/or pump station capacity. To date, the I/I Control Program has been effective in select areas of the regional system by addressing localized I/I with this method.

Working in tandem with the I/I Program, WTD's Conveyance System Improvement (CSI) Program functions to develop separated conveyance system projects to accommodate the projected flows from WTD-supported service populations. King County provides wholesale wastewater conveyance and treatment services for 17 cities, 16 local sewer utilities, and one Indian tribe in King, Snohomish, and Pierce counties (local

agencies).<sup>1</sup> These local agencies own and operate independent collection systems that include pipelines and pump stations to collect and convey wastewater from their respective service areas to King County's regional conveyance system for treatment and disposal.

CSI Program planning has identified conveyance system needs in the separated system where the existing capacity does not meet the current or projected flows. These flows include assumptions for future population growth and future I/I deterioration rates. CSI Program projects are proposed to address each conveyance system capacity need. A timeline and estimated project cost have been established based on a set of nine prioritization criteria<sup>2</sup> that include such factors as available capacity (as defined by level of service), operations and maintenance issues, and local agency input.

Per King County's conveyance system policies (King County Code 28.86.060), WTD uses the 20-year peak wastewater flow as the design standard for the separated portion of the regional wastewater system to accommodate increased flows and protect against SSOs. To meet this standard, facilities are designed to convey the peak flow that can be expected on an average of once every 20 years (i.e., a 20-year return interval). Under peak flow conditions, as much as 75 percent of the peak flow in the separated sewer system is estimated to be the result of I/I flows in the conveyance system.<sup>3</sup>

Based on national I/I surveys and historic King County I/I reports, a significant source of that I/I originates on private property, particularly from side sewers. As service areas are built out, and as the local collection system ages and deteriorates, the WTD conveyance system can expect to see increased flow from I/I. Consequently, conveyance system rehabilitation may be required sooner than expected after combining the increased I/I flows with additional sanitary flows from population growth.

## 1.2 Project Background

In 2015, the Metropolitan Water Pollution Abatement Advisory Committee (MWPAAC) I/I Task Force (I/I Task Force) was created to formulate ideas for I/I programs that could benefit the regional wastewater system by looking at long-term solutions to significantly reduce and remove I/I from the sewer system as a whole. The I/I Task Force developed a list of recommended options for future regional I/I Control Program actions. That list provided the framework for the current work being performed as part of the Evaluation of Inflow and Infiltration Reduction Concepts project.

The goal of the project is to identify implementable, long-term solutions to decrease future I/I throughout King County's regional wastewater collection system. The work, to date, has been divided into the following phases:

- Phase 1, conducted from 2017 to 2019, reviewed a wide variety of program concepts and identified three I/I reduction concepts for further consideration:
  - Regional sewer and side sewer BMPs
  - Regional inspector training and certification program
  - Private side sewer inspection program with financial assistance

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<sup>1</sup> The Muckleshoot Indian Tribe owns all sewer mains and side sewers within its service area. See Phase 1 Task 420 TM for more information.

<sup>2</sup> King County Department of Natural Resources and Parks Wastewater Treatment Division. Conveyance System Improvement Program, Program Update. 2017.

<sup>3</sup> King County Metro. Wastewater 2020 Plus Infiltration/Inflow Existing Conditions. February 1994, pg. 13; and King County. Pilot Project Report. October 2004, pg. 1-3.



- Phase 2, initiated in 2019 and continuing through 2020, builds on the Phase 1 work and provides descriptions and considerations for those three identified programs to support discussions on scope and implementation. Results are not yet known, but may include:
  - Recommendations on side sewer BMPs for a web-based regional toolkit
  - Recommendations on regional inspector training and certification program content and expectations
  - Options defined for private side sewer inspection programs

### 1.3 Purpose

This TM documents the approach taken during Phase 2 to define implementable BMPs for regional I/I prevention and mitigation that may limit the increase and/or reduce the overall I/I levels in King County's regional wastewater service area. All BMPs recommended for consideration for regional adoption are side sewer and private property-based. The BMPs recommended in this TM may be more feasible and relevant to most local agencies than other non-private property-related options, especially for local agencies who are not experiencing high rates of I/I in their collection systems. Implementation of the recommended BMPs is very likely to result in I/I prevention and long-term reduction efforts on the local level throughout the WTD service area. Throughout this TM, these BMPs will be referred to as "side sewer BMPs."

Opportunities for adopting BMPs were first presented in the Phase 1 Task 410 *Verify 2004 King County Final Draft Regional I/I Control Standards, Procedures, and Policies* TM. They were also discussed in the Task 420 *Assessment of Existing Local Agency Sewer and Side Sewer Standards* TM (Task 420 TM). In this TM, BMPs used by each local agency were reviewed and compared to current local and national BMPs. The Task 420 TM also describes I/I prevention, source identification, and mitigation best practices implemented by local agencies and sewer utilities with successful I/I reduction programs, which were not included in the 2004 King County standards, but might be considered for regional adoption.

The Phase 2 Task 4000 *Program Development Plan* TM provided an overview of the approach that would be taken under Task 6000 to develop this Regional BMP I/I Program (Task 4000 TM). Concepts presented in the Task 4000 TM that helped define the Regional BMP I/I Program include:

- Goals, Objectives, and Success Factors
- Implementation Risks and Barriers
- Outreach Plans
- Next Steps

As part of the Task 6000 Regional BMP Development planning process, the Consultant team worked closely with MWPAAC, primarily via the I/I Task Force, to develop the following program elements presented later in this TM:

- Program Definition
- Review of Key Considerations
- Benefits of BMP Adoption and Implementation

## 2.0 Regional Side Sewer BMP Toolkit

Regional side sewer BMPs that address preventive and mitigative measures on a voluntary basis can be considered components in a “Side Sewer BMP Toolkit.” The efforts undertaken by WTD as part of this project helped to identify the initial set of BMPs in this toolkit. Over time, other BMPs may be identified, evaluated, and standardized for regional use. MWPAAC agencies can implement current and future preventive and/or mitigative measures that are most appropriate and impactful to their local service areas.

### 2.1 Goal

By adopting and implementing regional BMPs that have a high potential for preventing and/or reducing I/I related to side sewers, WTD, and its component agencies within the WTD service area, are likely to realize various benefits over time. These include:

- Measurable reduction in flow to treatment plants that is attributed to I/I, or lack of increased flow even with community growth and development
- Reduced occurrences of sanitary sewer overflows, including basement backups
- Reduced resource expenditures in responses to service requests related to side sewers
- Increased awareness of side sewer maintenance responsibilities
- Gradual increase in overall collection system structural integrity

As detailed in the Task 4100 TM, WTD’s overall goal for this initiative is to achieve consistent regional use of three to five BMPs with a high potential to reduce I/I in sewer basins by all WTD’s component agencies.

### 2.2 Objectives

The following are program objectives as agreed upon by the I/I Task Force:

- Identify BMPs that can be implemented by all (or most) agencies, as applicable (see Section 3).
- Select three to five BMPs that appear to have the greatest I/I reduction potential.
- Develop selected BMP standards and materials for use.
- Coordinate with MWPAAC agencies to support BMP application and/or BMP adoption (see Section 5).
- Integrate equity and social justice (ESJ) measures into program development and implementation, as applicable (addressed throughout).

### 2.3 Success Factors

The preliminary success factors for the Regional I/I BMP program are defined as:

- Able to demonstrate a measurable reduction or lack of increase in flow to treatment plants.
- Achieve 100 percent compliance in the application of selected BMPs in all agencies.

The use of common standards throughout the King County service area will increase transparency and provide confidence that all participants are doing their part to reduce I/I.

### 3.0 Side Sewer BMP Listing

This section discusses the various types of side sewer BMPs that can be adopted and provides specific local and national examples of each type. **Figure 3-1** illustrates methods by which I/I can enter sanitary sewer mains. I/I sources within the public right-of-way include cracked or broken pipes, deteriorated manholes, faulty manhole covers or frames, and direct connections to stormwater conveyance facilities. Private property sources include yard, roof, and footing drains, broken side sewers, and faulty lateral connections to the sewer main.

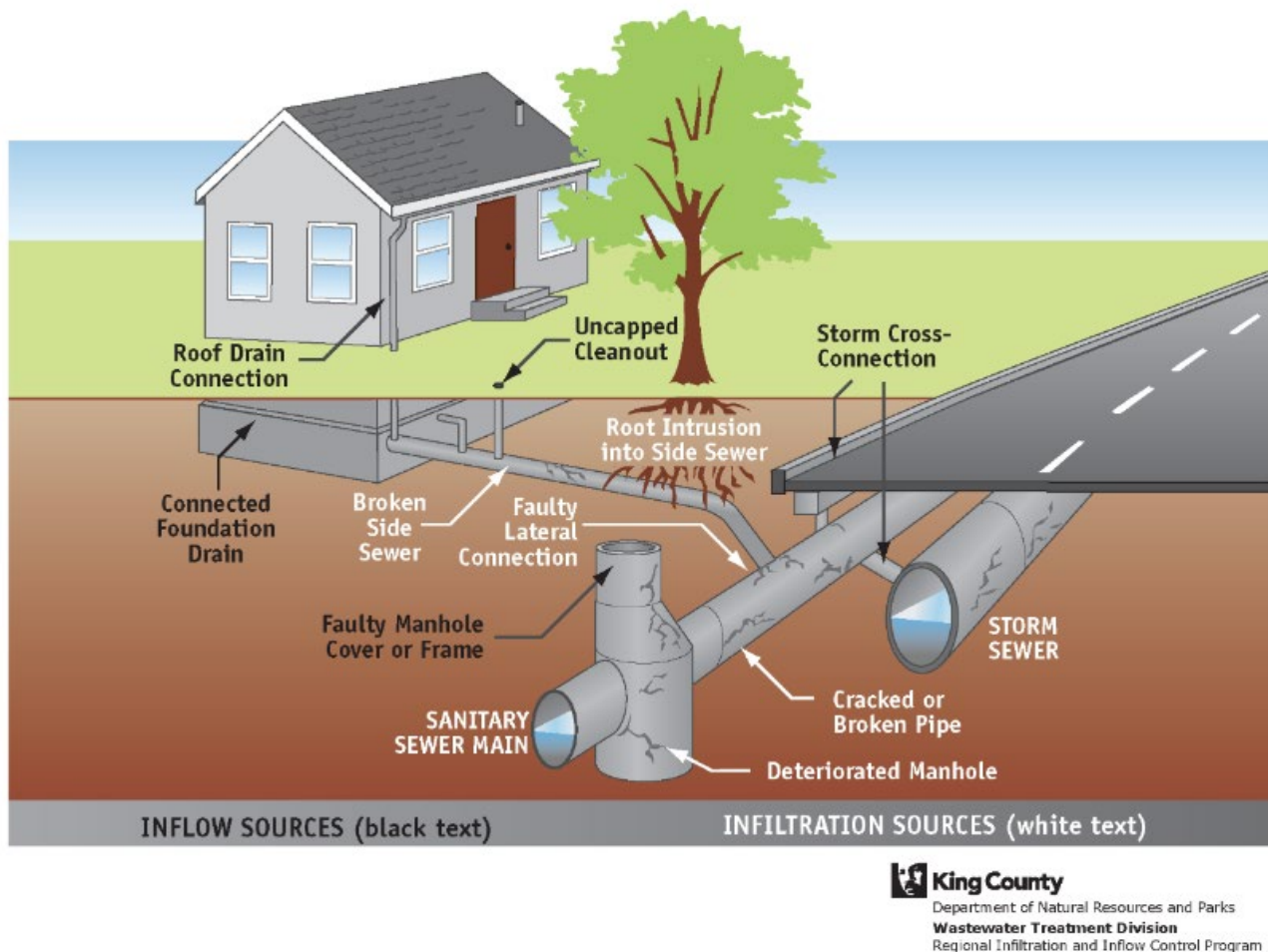


Figure 3-1. I/I Sources on Public and Private Property

Levels of I/I vary within the WTD service area. Some local agencies do not experience high levels of I/I as evidenced by low wet weather-related SSO and surcharge occurrences. Other agencies that do experience high I/I rates typically develop capital improvement projects to address I/I sources as they are identified, for example, by rehabilitating defective sewer mains and manholes.

When considering I/I BMPs that would most benefit all agencies over the long-term, BMPs that address I/I sources related to side sewers, versus public rights-of-way, are expected to have a higher potential for more local agencies to achieve reduction goals.

Side sewer BMPs can be classified into the following three categories:

- **Side sewer I/I prevention BMPs:** prevent I/I from entering side sewers and connections at sewer mains due to construction, repair, and rehabilitation-related issues.
- **Proactive side sewer maintenance BMPs:** encourage residential property owners to maintain their side sewers to prevent defects that could lead to I/I entering the collection system and/or cause backups into homes.
- **Identifying and/or mitigating I/I sources on private property BMPs:** identify and/or mitigate non-structural side sewer-related private property I/I sources.

This section describes BMPs related to I/I prevention and mitigation, as well as approaches for local agencies to reduce side sewer-related expenditures that are actually incurred by private property owners and occupants. From most local agencies' experience, when property owners/occupants are unaware of the responsibility to maintain their portion of the side sewer, misunderstandings arise regarding who will resolve backups and how soon. For example, backups caused by root intrusion in the privately-owned portion of side sewers can draw significant time and staffing resources from local agencies, which are ultimately not responsible for the root problem but are responding to the backups.

Developing and implementing applicable components of the Side Sewer BMP Toolkit may help to reduce the expenditure of local agencies' time and resources on problems that are the responsibility of private property owner or occupant. The Side Sewer BMP Toolkit may include guides and models, forms, public education materials, and other resources.

Due to the limitations that some local agencies (special purpose districts) have with modifying legal authorities, some of the BMPs presented in this TM may not be implementable on a regional basis. However, those BMPs are included because of the important role they may play in long-term I/I reduction in specific instances (e.g., side sewers installed in steep slopes).

### 3.1 Side Sewer I/I Prevention BMPs

Opportunities to prevent I/I from entering the sewer system from side sewers involve identifying and implementing the following:

- Strict sewer connection policies and applicable/appropriate local design guidelines
- Construction standards and specifications that incorporate best available technologies and materials
- State-of-the art inspection technologies and methods
- Property owner/occupant outreach and education

**Table 3-1**, on the following pages, summarizes those BMPs that have been identified based on their ability to meet the above requirements. These side sewer-related BMPs were identified as part of the Phase 1 *Task 430 Approach to Achieve Common Sewer and Side Sewer/Lateral Standards* effort.<sup>4</sup> The purpose/benefits, examples, and potential stakeholders involved are listed for each BMP. Whenever possible, local agency examples are provided. If a local agency example is not available, a suitable national alternative is shown.

### 3.1.1 National Model BMPs

Since the inception of its Backup Prevention Program (BUPP), Johnson County Wastewater (JCW, Olathe, Kansas) has served as a national model for a comprehensive private property program focused on reducing the impact of sewer system-related surcharges. JCW's *Private I/I Removal Program Procedures Manual*, originally developed in 1998 and refined through the years while the program was in place, provides utilities across the country with various examples on which to model resolutions, enforcement programs, letters, minimum standards for I/I source disconnection, testing procedures, and product approval processes.<sup>5</sup>

### 3.1.2 Local Model BMPs

During the Phase 1 *Task 420 Assessment of Existing Local Agency Standards Sewer and Side Sewer Standards* efforts, many local agencies were found to have I/I prevention BMPs already in place. One agency, the Skyway Water & Sewer District in the West Hill area of unincorporated King County, could serve as a local model for the organization and implementation of various recommended BMPs. Skyway has developed a comprehensive Side Sewer Program that is outlined in their *2011 Side Sewer Regulations*, which provides a variety of information on side sewer installation including:

- Obtaining a side sewer permit
- Contractor licensing and insurance
- Contracting with property owners
- Minimum installation requirements (includes general and gravity- and pressure-specific information)
- Inspection and testing requirements
- Maintenance and repair
- Penalties

The document is available for download as a PDF at <https://www.skywayws.org/forms.php>.

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<sup>4</sup> See the Phase 1 Task 430 TM for a complete listing of potential I/I BMPs (related to sewer mains in rights-of-way and side sewers).

<sup>5</sup> A copy of the JCW I/I Procedures Manual (2012) and other related resources can be downloaded from the Water Environment Federation's Private Property Virtual Library at <http://www.wefppvl.org/WEF-PPVL-library/?p=53>

**Table 3-1. Side Sewer I/I Prevention BMPs**

BMP	Purpose/Benefit	Local or National Example	Potential Stakeholders
<b>A.1</b> Watertight side sewer specifications, standard drawings, and proper construction methods for new and repaired side sewers	<ul style="list-style-type: none"> <li>Addresses key issues that could lead to I/I due to construction and installation practices.</li> </ul>	<ul style="list-style-type: none"> <li>Alderwood Water and Wastewater District, Standards and Specifications 3-2.050 and S-10: require watertight provisions for side sewer construction, including the use of ductile iron pipe in easements and right-of-way.</li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Contractor</li> <li>Local agency</li> <li>King County WTD</li> </ul>
	<ul style="list-style-type: none"> <li>Ensures cap is not removed by third parties for other reason (such as yard drainage).</li> </ul>	<ul style="list-style-type: none"> <li>City of Mercer Island, Standard Details: requires a locking cleanout cap (Standard Detail S-19).</li> </ul>	
	<ul style="list-style-type: none"> <li>Nationally recognized high performing guidance document.</li> </ul>	<ul style="list-style-type: none"> <li>National Association of Sewer Service Companies (NASSCO) specification guidelines for lateral/renewal repairs.<sup>6</sup></li> </ul>	
<b>A.2</b> New side sewer construction inspection and product-specific inspection requirements	<ul style="list-style-type: none"> <li>Ensure Contractor meets material and construction requirements for side sewer installation, including gravity side sewers and grinder pump side sewers.</li> </ul>	<ul style="list-style-type: none"> <li>Skyway Water and Sewer District, <i>Side Sewer Regulations</i>, Article X-10.03 and 10.04: includes comprehensive provisions for side sewer inspection and testing for new construction.</li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Contractor</li> <li>Local agency</li> <li>King County WTD</li> </ul>
		<ul style="list-style-type: none"> <li>City of Algona, Public Works Standards 7.4.D.4: "Side sewer shall be inspected by the City's Representative/Inspector prior to backfilling. Side sewer shall be plugged and tested in the presence of the City Inspector by filling with water to obtain 4.5 psi or 10 feet of head. Leakage rate shall not exceed 0.31 gal/hr. for 4-inch pipe and 0.47 gal/hr. for 6-inch pipe, per 100 feet of pipe."</li> </ul>	
<b>A.3</b> Repair/rehabilitation, and replacement inspection requirements	<ul style="list-style-type: none"> <li>Ensures work performed on existing side sewers meet material and construction requirements.</li> </ul>	<ul style="list-style-type: none"> <li>NASSCO's suggested standard specification for Pressure Testing and Grouting of Sewer Laterals, Laterals, and Lateral Connections Using the Packer Method with Solution Grouts.</li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Contractor</li> <li>Local agency</li> <li>King County WTD</li> </ul>
		<ul style="list-style-type: none"> <li>City of Columbus, Ohio, Sanitary Lateral Lining Inspector Checklist (see <b>Figure 3-2</b>)</li> </ul>	
<b>A.4</b> Side sewer contractor prequalification	<ul style="list-style-type: none"> <li>Ensures contractors who work on side sewers are registered, licensed, insured, and bonded.</li> <li>Reduces risk of non-qualified contractors performing work on side sewers.</li> </ul>	<ul style="list-style-type: none"> <li>City of Redmond Side Sewer Roster: provides a list of side sewer contractors who have met the eligibility requirements and are authorized to perform side sewer work within the City of Redmond.<sup>7</sup></li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Contractor</li> <li>Local agency</li> <li>King County WTD</li> </ul>
		<ul style="list-style-type: none"> <li>Seattle Public Utilities (SPU) also maintains a Side Sewer Roster and requires contractors to pass a written exam prior to authorization.<sup>8</sup></li> </ul>	

<sup>6</sup> [https://www.nassco.org/resources/manufacture-specifications?field\\_specification\\_topics\\_tid=251](https://www.nassco.org/resources/manufacture-specifications?field_specification_topics_tid=251)

<sup>7</sup> <https://www.codepublishing.com/WA/Redmond/municode/Redmond13/Redmond1305.html>

<sup>8</sup> <http://www.seattle.gov/sdci/codes/licensing-and-registration/side-sewer-contractor-registration>

**Table 3-1. Side Sewer I/I Prevention BMPs**

BMP	Purpose/Benefit	Local or National Example	Potential Stakeholders
<p><b>A.5</b> Unauthorized connection prohibition</p>	<ul style="list-style-type: none"> <li>Clearly states unauthorized connections must be removed and provides appropriate enforcement mechanism to ensure disconnection.</li> <li>Ensures only one side sewer connection from each structure is made to the main sewer, and that side sewer is directly connected to the appropriate draining fixtures within the structure.</li> </ul>	<ul style="list-style-type: none"> <li>Soos Creek Water and Sewer District, Side Sewer Specification 10: outlines unauthorized connections and the monetary and other penalties associated with an illicit connection. It also states that the driver for these enforcement actions is inflow and infiltration prevention.</li> <li>City of Auburn, Engineering Design Standards Section 7.08.3(4): requires that during construction in areas with more than one side sewer per structure, Contractors must test each connected structure to verify which side sewer is used by that structure. The test involves flushing every toilet or running every sink or tub on each floor of each structure and directly observing from which side sewer the effluent discharges. Only those size sewers can be connected. All others are to be abandoned in place.</li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Contractor</li> <li>Local agency</li> <li>King County WTD</li> </ul>
<p><b>A.6</b> Side sewer design guidelines that address flood-prone areas</p>	<ul style="list-style-type: none"> <li>Ensures water tightness, and maintains structural integrity of the side sewer that runs under the ditch.</li> <li>Failure of a cleanout at this location has a high potential to result in a sewer overflow that reaches a surface water body.</li> </ul>	<ul style="list-style-type: none"> <li>City of Pacific, SS-Side-Ditch Sanitary Sewer Side Sewer at Ditch Detail Drawing: requires a cleanout to be installed at a minimum of 18 inches from the outside ditch slope. Additionally, if the cleanout is located within a driving surface, a load bearing casting and cover is required in lieu of a round valve box (see <b>Figure 3-3</b>).</li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Contractor</li> <li>Local agency</li> <li>King County WTD</li> <li>King County Department of Natural Resources and Parks (DNRP)</li> <li>Washington Departments of Fish and Wildlife (DFW) and Ecology (DOE)</li> <li>Floodplain managers</li> <li>Transportation departments or others responsible for ditch maintenance</li> </ul>
<p><b>A.7</b> Lake line guidelines and lakefront property provisions</p>	<ul style="list-style-type: none"> <li>Ensures water tightness in areas where shallow side sewers are installed.</li> <li>Protects structures from mainline surcharges.</li> </ul>	<ul style="list-style-type: none"> <li>Cross Valley Water District, Side Sewer Specifications Article VI, 6.29 and 7.04: describe provisions developed for side sewers within lakefront property.</li> <li>City of Bellevue, Sewer Engineering Standards S5-20 Lake Line Clean-Out: describes provisions for lake line side sewer clean-outs above and below the hydraulic gradient.</li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Contractor</li> <li>Local agency</li> <li>King County WTD</li> <li>DNRP</li> <li>DFW and DOE</li> </ul>

**Table 3-1. Side Sewer I/I Prevention BMPs**

BMP	Purpose/Benefit	Local or National Example	Potential Stakeholders
<p><b>A.8</b> Over-water structure connection provisions and recommendations (floating homes, floating on-water residences, house barges and buildings on piers)</p>	<ul style="list-style-type: none"> <li>Reduces the possibility of high inflow levels related to failures in vessel to shore connections.</li> </ul>	<ul style="list-style-type: none"> <li>SPU correspondence: SPU shared an instance where a developer used U.S. Coast Guard regulations and recommendations for vessel to shore sewer connections when designing a sewer system for a new group of floating homes. A unique feature that should be considered is a flexible coupler that can accommodate a rising and lowering tide.</li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Contractor</li> <li>Local agency</li> <li>King County WTD</li> <li>DNRP</li> <li>DFW and DOE</li> <li>U.S. Coast Guard</li> <li>Port Authorities</li> </ul>
<p><b>A.9</b> Side sewer design guidelines in steep areas</p>	<ul style="list-style-type: none"> <li>Ensures that side sewers are sufficiently anchored in place, which reduces the potential for damage from ground movement.</li> </ul>	<ul style="list-style-type: none"> <li>SPU, <i>Design Requirements for Side Sewers DR2011-4 H.8.</i>: “Surface mounting of side sewers using ductile iron pipe with restrained joints, PE pipe, or solvent welded PVC Schedule 40 or 80 pipe and anchoring may be allowed for those situations in which trenching and backfilling are inappropriate such as in steep slope areas. Anchoring systems must be designed and stamped by a licensed professional engineer.”</li> <li>City of Pacific, SS-SS Deep Side Sewer Detail Drawing: a 6-inch diameter ductile iron Class 52 sewer pipe (see <b>Figure 3-4</b>) is required for deep side sewer installations.</li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Contractor</li> <li>Local agency</li> <li>King County WTD</li> <li>Washington State Department of Natural Resources (Landslide Hazard Program)</li> </ul>
<p><b>A.10</b> Side sewer disconnection, reconnection, and demolition requirements</p>	<ul style="list-style-type: none"> <li>Side sewer disconnection, if performed improperly, may result in mainline damage and potential entry of I/I flows, similar to an area drain.</li> <li>Disconnection, reconnection, and demolition all impact the structural integrity of the sewer main or side sewer, so lateral connections must be carefully performed to prevent inflow into the system.</li> </ul>	<ul style="list-style-type: none"> <li>City of Bellevue, 2017 Sewer Engineering Standards S2-04.3 Sanitary Sewer General Plan Notes and S6-15, demolition requirements: “<i>Side sewer demolitions must be performed prior to the removal of a building foundation. The side sewer for each building must be excavated and removed from the house connection to the edge of the public right-of-way, or property line. Contractors are required to cap the end of the side sewer to remain in place. Side sewer demolition must be performed in the presence of the City of Bellevue Sewer Maintenance Engineering Technician.</i>”</li> <li>SPU correspondence: SPU Engineering has contacted service providers to install mechanical plugs at sewer connection using robotic technology inside sewer mains. This reduces the risk of structurally damaged lateral piping causing voids/ roadway failures.</li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Contractor</li> <li>Realtors</li> <li>Local agency</li> <li>King County WTD</li> <li>Local departments of planning and development</li> </ul>



<input type="checkbox"/>	Verify resin/catalyst and felt liner materials are consistent with the approved materials.
<input type="checkbox"/>	Verify appropriate seasonal resin mix is being used (i.e., summer vs. winter mixes).
<input type="checkbox"/>	Check production date of resin/catalyst to ensure that it is within the recommended shelf life.
<input type="checkbox"/>	Verify that the resin/catalyst has been stored in the proper containers and at the appropriate temperatures.
<input type="checkbox"/>	Verify liner material cut to length, including 1' for CIPP sample and 1' for test liner used to note resin activation.  Note time resin preparation (mixing) is initiated.
<input type="checkbox"/>	Verify resin application during wet-out process, i.e., full saturation of liner material with no spotting or dry patches noted.  Note time wet-out process completed.

**Figure 3-2. Sanitary Lateral Lining Checklist–Liner Preparation**

*Source: City of Columbus, Ohio, Sanitary Lateral Lining Inspector Checklist*

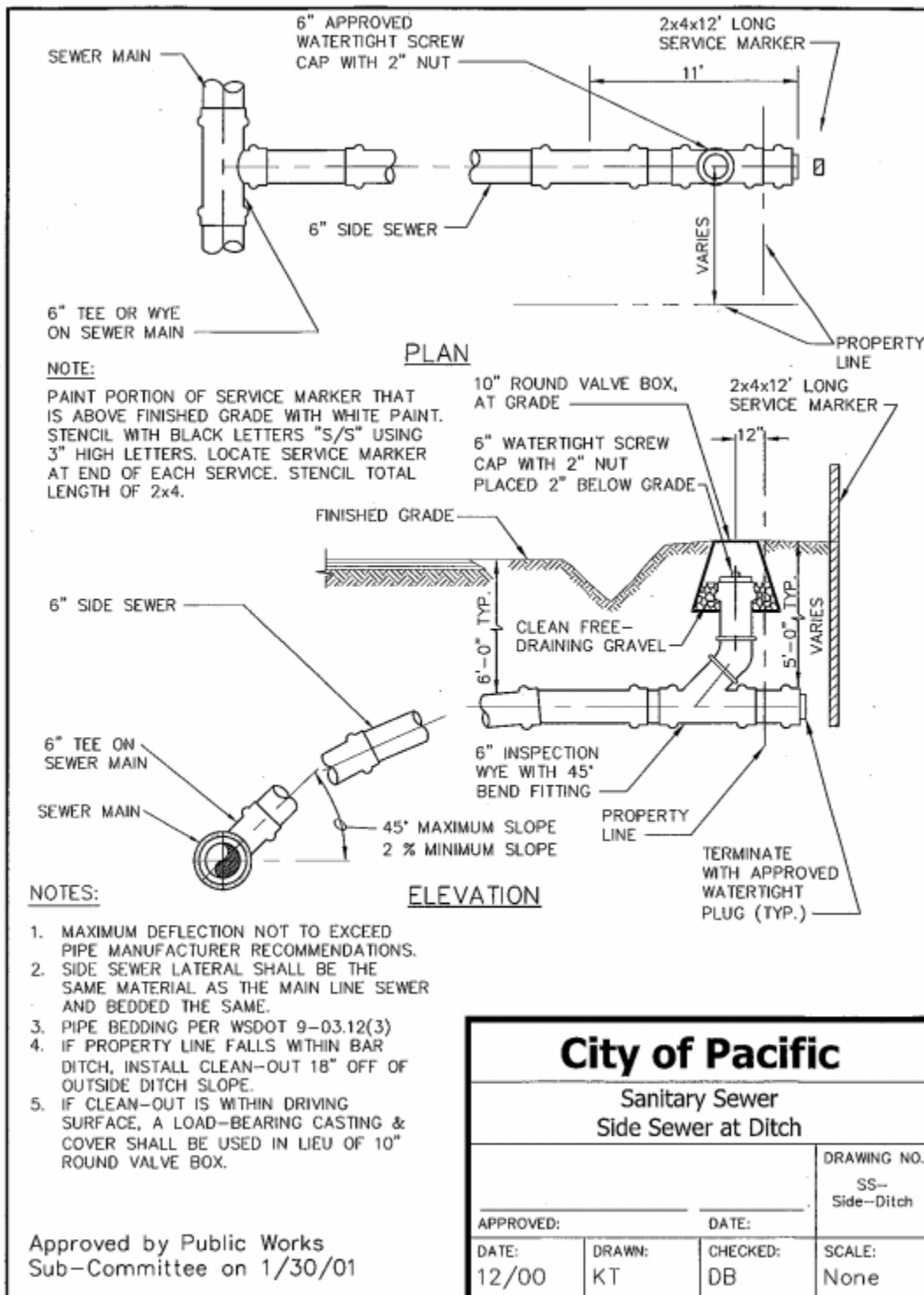


Figure 3-3. Side Sewer at Ditch Detail

Source: City of Pacific, Washington Sanitary Sewer Detail Drawings

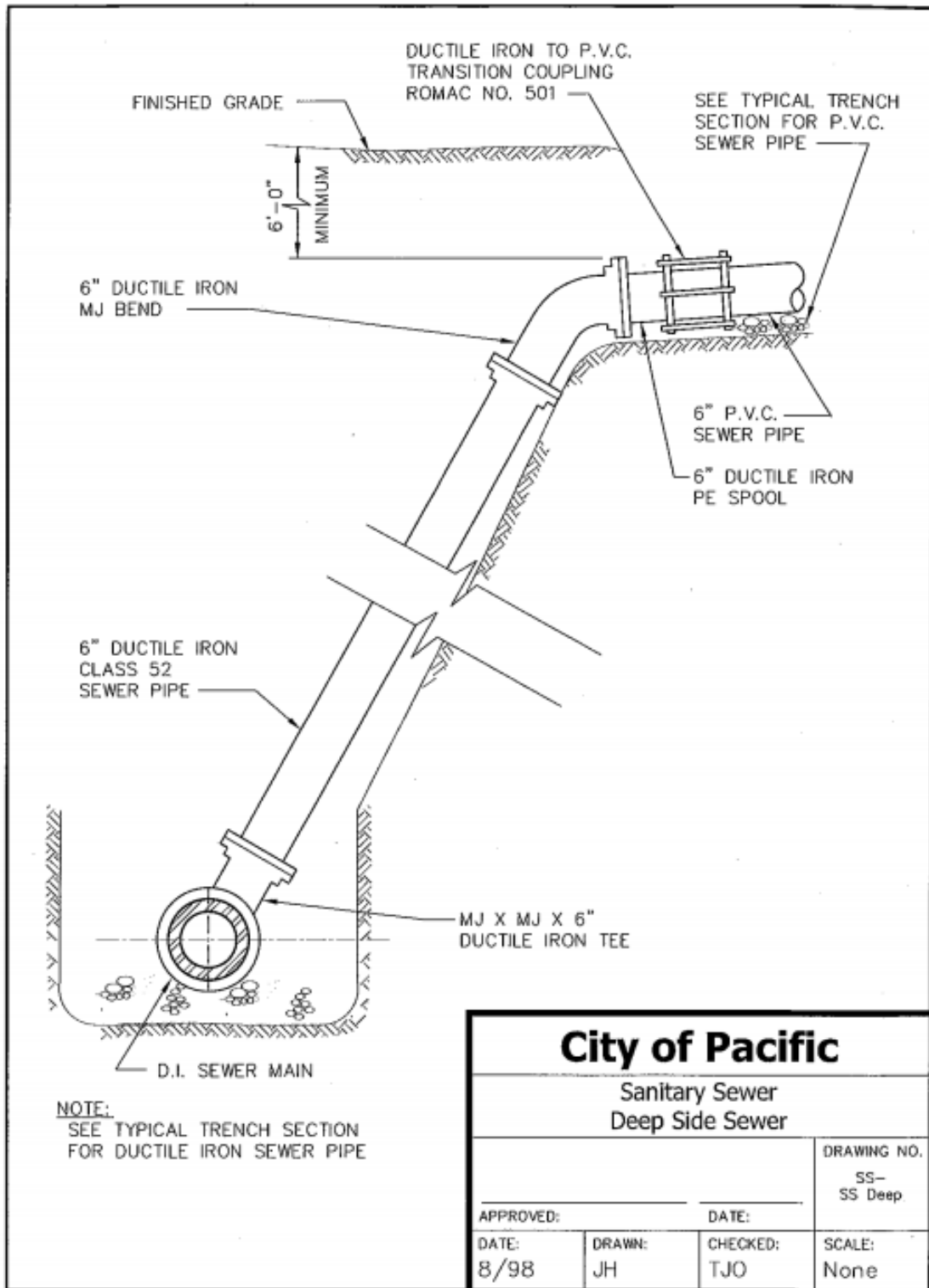


Figure 3-4. Deep Side Sewer Detail

Source: City of Pacific, Washington Sanitary Sewer Detail Drawings

### 3.2 Proactive Side Sewer Maintenance BMPs

As indicated previously, except for those served by the Muckleshoot Public Works Division, property owners in King County WTD's service area are responsible for maintaining at least a portion of, or the entire length of, their side sewers. In this discussion, side sewer maintenance is defined as inspection, proper use, and repair, including replacement, of faulty side sewers.

Most local agencies do not have a regular maintenance program for side sewers. During the Phase 1 local agency interviews, only the Highlands Sewer District was found to require that private side sewers be inspected every 5 years.<sup>9</sup> Without regular inspections included in a maintenance program, it is difficult to identify defective side sewers until a major event occurs (e.g., sanitary sewer overflow, sewage backup into a property owner's home, or a void forming under a street or sidewalk). Faulty side sewers are often discovered when these major events are investigated. When sewer main lines are internally inspected as part of a capital improvement project, defects are noted at side sewer connections and/or during side sewer inspections conducted through closed-circuit television (CCTV) camera lateral launches.

In addition to initial construction-related problems, side sewer defects can be caused by a range of other unrelated factors such as tree root intrusions, seismic activity, and other damage-causing incidents.

Property owners have little incentive to maintain their side sewers for several reasons including limited financial assistance to cover the costs of side sewer maintenance, a lack of education regarding owner responsibilities, and, in the absence of experiencing a sewer backup, difficulty identifying direct benefits of investing in maintenance.<sup>10</sup> Conversely, property owners who do maintain their side sewers reduce the risk of failures that may result in a backup and expensive side sewer repair or replacement.

There are many examples of local agencies that have taken measures to encourage residential property owners to maintain their side sewers. **Table 3-2**, on the following pages, summarizes these types of proactive BMPs, including their respective purpose/benefits, examples, and potential stakeholders. Whenever possible, local agency examples are provided.

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<sup>9</sup> For more information on side sewer ownership and maintenance responsibilities, see the Phase 1 Task 420 TM, page 2.

<sup>10</sup> Gonwa, W., Simmons, T. F., and Schultz, N. U. (2004). *Development of Milwaukee MSD's Private Property Infiltration and Inflow Control Program*. Milwaukee, WI: Collection Systems 2004 - Innovative Approaches to Collection System Management.

**Table 3-2. Proactive Side Sewer Maintenance BMPs**

BMP	Purpose/Benefit	Local or National Example	Potential Stakeholders
<b>B.1</b> Side sewer maintenance responsibility declaration and enforcement mechanism	<ul style="list-style-type: none"> <li>Reduces the risk of loss of service and property damage.</li> <li>Reduces the risk of sewer overflow from cleanout or structure that reaches a surface water body.</li> </ul>	<ul style="list-style-type: none"> <li>Cross Valley Water District: clearly delineates sewer maintenance responsibilities in its Specifications for Side Sewer Construction (SSSC) Article XIV.14.01, as stated below:  <i>“All costs and expense incidental to the installation, connection, maintenance and repair or replacement of the inside and outside sewers shall be borne by the owner or occupant of the premises served by the side sewer.”</i></li> <li>Progressive enforcement actions and penalties for violations of the District’s side sewer requirements are defined in SSSC Article XVII – Penalties.</li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Local agency</li> <li>King County WTD</li> </ul>
<b>B.2</b> Tree/sewer main separation requirement	<ul style="list-style-type: none"> <li>Reduces the risk of root intrusion by requiring a minimum separation distance between trees and sewer mains; the practice also helps reduce the risk of root intrusion at the service connection.</li> </ul>	<ul style="list-style-type: none"> <li>City of Redmond, Water and Wastewater Design Requirements, state:  <i>“Trees shall not be located within eight (8) feet horizontally of the pipe [sewer main]”</i> (Section V.7.g).</li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Local agency</li> <li>King County WTD</li> <li>Local foresters</li> </ul>
<b>B.3</b> Model courtesy notice to property owner/occupant regarding roots observed in lateral connection	<ul style="list-style-type: none"> <li>Provides property owners with advance notice of a side sewer problem before a major event such as a blockage or backup occurs.</li> <li>Provides good customer relations and opportunity to share educational material</li> <li>Reduces crew time expended to respond to service requests in future.</li> </ul>	<ul style="list-style-type: none"> <li>County of Los Angeles Department of Public Works: provides property owners with a courtesy Notice of Sewer Lateral Root Intrusion when roots are observed during mainline CCTV inspections (see <b>Appendix A</b>).</li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Local agency</li> <li>King County WTD</li> </ul>
<b>B.4</b> Model web content for local agencies	<ul style="list-style-type: none"> <li>Effectively educates the public about local agencies operations and programs, including identifying who is responsible for maintaining side sewers.</li> </ul>	<ul style="list-style-type: none"> <li>Florida Rural Water Association: model content was developed for sewer agencies to use on their websites; this material is part of an overall Sewer Toolkit geared for smaller sewer utilities (see <b>Appendix B</b>).<sup>11</sup></li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Local agency</li> <li>King County WTD</li> </ul>

<sup>11</sup> Florida Rural Water Association, Sewer Toolkit: A guide for sanitary sewer maintenance policies and procedures

**Table 3-2. Proactive Side Sewer Maintenance BMPs**

BMP	Purpose/Benefit	Local or National Example	Potential Stakeholders
<p><b>B.5</b> Side sewer maintenance guidance documents</p>	<ul style="list-style-type: none"> <li>Provides good customer relations and opportunity to share educational material.</li> <li>Ensures property owners are aware of side sewer maintenance responsibility.</li> </ul>	<ul style="list-style-type: none"> <li>King County WTD “Know Your Sewer Card” (see <b>Appendix C</b>): provides important information on how to prevent sewer overflows by properly using and maintaining side sewers.</li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Local agency</li> <li>King County WTD</li> </ul>
		<ul style="list-style-type: none"> <li>City of Tacoma, Private Contractor Inspection Information: requires real estate professionals to provide the “Before you buy or sell a property” educational flyer to buyers and sellers they are representing prior to the closing of a property transaction (see <b>Appendix D</b>).</li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Local agency</li> <li>King County WTD</li> <li>Realtors</li> </ul>
		<ul style="list-style-type: none"> <li>City of Tacoma, Private Contractor Inspection Information: tip sheet provides useful information on how to find an inspection contractor, expected costs, and how to know if repairs should be made (see <b>Appendix E</b>).</li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Local agency</li> <li>King County WTD</li> <li>Plumbers</li> <li>Side sewer contractors</li> </ul>
		<ul style="list-style-type: none"> <li>City of Tacoma, <i>Side Sewer Condition Assessment and Repair Recommendations Manual</i>: manual was developed to educate property owners about common problems found in side sewers, to explain when it is recommended to perform repairs, and to describe repair/replacement processes.<sup>12</sup></li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Local agency</li> <li>King County WTD</li> <li>Plumbers</li> <li>Side sewer contractors</li> </ul>

<sup>12</sup> A copy of Tacoma’s manual can be downloaded from this webpage:

[https://www.cityoftacoma.org/government/city\\_departments/environmentalservices/wastewater/wastewater\\_system/private\\_side\\_sewers](https://www.cityoftacoma.org/government/city_departments/environmentalservices/wastewater/wastewater_system/private_side_sewers)

### 3.3 Other Private Property I/I Source Identification and Mitigation BMPs

As shown in **Figure 3-1**, there are additional sources of I/I that may be located on private property but that are not related to the structural condition of the side sewer, including connected downspouts, foundation drains/sump pumps, and missing cleanout caps. The BMPs described in this section involve identifying and mitigating these sources by disconnecting improper connections and redirecting stormwater away from the sewer system.

In many cases, if I/I sources are not properly disconnected and redirected, stormwater and groundwater will find its way into the sewer system through another entry point. For example, disconnected downspouts that discharge directly to the ground can cause stormwater to flood a foundation drain; if the foundation drain is connected directly (or via a sump pump) to the side sewer, stormwater will still enter the sewer system.

It is important to note that before these types of I/I sources are disconnected/redirected on private property, an adequate stormwater system must be in place to prevent redirecting drainage inappropriately to another property or causing ponding/flooding that may result in structural damage.

**Table 3-3**, on the following page, summarizes BMPs that involve identifying and/or mitigating non-structural side sewer-related private property I/I sources, including their respective purpose/benefits, examples, and potential stakeholders. Whenever possible, local agency examples are provided.

**Table 3-3. Other Private Property I/I Source Identification and Mitigation BMPs**

BMP	Purpose/Benefit	Local or National Example	Potential Stakeholders
<b>C.1</b> Side Sewer CCTV Inspection Specification	<ul style="list-style-type: none"> <li>Nationally recognized guidance document that has been refined over time to reflect advances in technology and lessons learned.</li> <li>Successfully used by utilities across the country to standardize CCTV inspection services.</li> <li>These inspection and testing methods are useful in identifying, locating, and quantifying sources of I/I on private property.</li> </ul>	<ul style="list-style-type: none"> <li>NASSCO specification guidelines for lateral inspection and dye testing/tracing.<sup>13</sup></li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Local agency</li> <li>King County WTD</li> <li>Plumbers</li> <li>Side sewer contractors</li> </ul>
<b>C.2</b> Rainfall Simulation/Dye Testing Specification			
<b>C.3</b> Unauthorized private property I/I source disconnection public education materials	<ul style="list-style-type: none"> <li>Provides good customer service and educational opportunity regarding unauthorized connections and proper sewer maintenance responsibilities.</li> <li>Disconnecting/redirecting downspouts and sump pumps reduce I/I entering sanitary sewers.</li> <li>Reduces peak flows in localized area.</li> </ul>	<ul style="list-style-type: none"> <li>City of Kirkland Downspout Disconnection Program: a downspout disconnection fact sheet and do-it-yourself instruction guide are available on the City's program webpage.<sup>14</sup></li> <li>Delaware County, Penn., Regional Water Quality Control Authority, <i>Disconnecting &amp; Redirecting Your Sump Pump &amp; Downspouts</i> brochure: Provides information on the County's rules and regulations, impact of inflow on the sewer system, and follow up actions that can be taken by property owners and residents (see <b>Appendix F</b>).</li> </ul>	
<b>C.4</b> Cleanout cap replacement program	<ul style="list-style-type: none"> <li>Address a commonly occurring source of inflow by replacing missing cleanout caps.</li> </ul>	<ul style="list-style-type: none"> <li>Montgomery, Ala., Water Works &amp; Sanitary Sewer Board, Cleanout Cap Replacement Program: clean out caps (PVC and brass) are kept on all sewer maintenance vehicles and whenever a missing cleanout cap is observed, it is replaced.</li> </ul>	<ul style="list-style-type: none"> <li>Property owner</li> <li>Local agency</li> <li>King County WTD</li> </ul>

<sup>13</sup> [https://www.nassco.org/resources/manufacture-specifications?field\\_specification\\_topics\\_tid=251](https://www.nassco.org/resources/manufacture-specifications?field_specification_topics_tid=251)

<sup>14</sup> [http://www.kirklandwa.gov/depart/Public\\_Works/Utilities/Storm\\_Surface\\_Water/YardSmart/Types\\_of\\_Projects/Downspout\\_Disconnection.htm](http://www.kirklandwa.gov/depart/Public_Works/Utilities/Storm_Surface_Water/YardSmart/Types_of_Projects/Downspout_Disconnection.htm)



## 4.0 BMP Consideration and Refinement

This section describes the process undertaken to refine the recommended list of BMPs, including consideration of potential issues that could impact BMP applicability and effectiveness.

### 4.1 Issues for Consideration and Initial Recommendations

The overall objectives of Task 6000 (listed in Section 2.2 of this TM) were strongly considered during the evaluation of the BMPs presented in Section 3. While it is understood that each local agency has its own definition of side sewer responsibilities and legal authorities, it is also important to note that not all local agencies currently experience high rates of I/I in their collection systems. Therefore, given that no broad regulatory requirements are in place to motivate change, the effort level required for some local agencies to adopt and implement certain BMPs may not be time- or cost-efficient at this time. Each BMP was evaluated by the project team with the following considerations in mind:

- Applicability to local agencies/districts
- Assumed ability to be implemented by all (or majority of) local agencies
- Highest potential for I/I reduction (or prevention)
- Assumed ease/difficulty of implementation

Some BMPs related to I/I prevention, such as common side sewer specifications and inspection/testing requirements, may be better defined as part of the implementation of a Regional Side Sewer I/I Program (BMPs A.1, A.2, A.3, A.4, and A.10). As the options for a Regional Side Sewer I/I Program are still under consideration as part of Task 8000 of this project, it may be premature to invest the significant amount of time and resources required for consensus of the local agencies regarding the specifics of these preventive measures.

Several I/I prevention BMPs are applicable to only certain local agencies and districts (e.g., A.6, A.7, A.8, A.9, and B.2). While these BMPs may not apply to the environmental and other conditions in all local agencies and districts, they could be valuable components of long-term I/I mitigation for the relevant agencies.

Some of the BMPs are effective measures to take to prevent, reduce, or mitigate the impacts of I/I that apply to local agencies and districts that are experiencing high rates of I/I (either now or in the future). These BMPs may be more appropriate to include in later efforts to expand King County's I/I Toolkit. These include BMPs B.1, B.4, C.1, C.2, and C.4.

Table 4-1 on the following page presents a summary of all BMPs evaluated based on relevant issues discussed above.

**Table 4-1. Matrix of BMPs by Relevant Issues**

BMP Number, Category, and Summary Description		Applicable to only certain local agencies	Able to be implemented by majority of local agencies	Highest potential for I/I reduction (or prevention)	Able to be implemented by majority of local agencies without extreme challenges	Applicable to Regional Side Sewer Implementation Prog.	Effective for local agencies experiencing high rates of I/I
<b>Side Sewer I/I Prevention BMPs</b>							
A.1	Watertight side sewer specifications, standard drawings, and proper construction methods for new and repaired side sewers		◆	◆	◆	◆	◆
A.2	New side sewer construction inspection and product-specific inspection requirements		◆	◆	◆	◆	◆
A.3	Repair/rehabilitation, and replacement inspection requirements		◆	◆	◆	◆	◆
A.4	Side sewer contractor prequalification	◆				◆	◆
A.5	Unauthorized connection prohibition **		◆	◆			◆
A.6	Side sewer design guidelines that address flood-prone areas	◆		◆			◆
A.7	Lake line guidelines and lakefront property provisions	◆		◆			◆
A.8	Over-water structure connection provisions and recommendations (floating homes, floating on-water residences, house barges and buildings on piers)	◆		◆			◆
A.9	Side sewer design guidelines in steep areas	◆					◆
A.10	Side sewer disconnection, reconnection, and demolition requirements		◆	◆	◆	◆	◆
<b>Proactive Side Sewer Maintenance BMPs</b>							
B.1	Side sewer maintenance responsibility declaration and enforcement mechanism		◆	◆			◆
B.2	Tree/sewer main separation requirement	◆					
B.3	Model courtesy notice to property owner/occupant regarding roots observed in lateral connection **		◆	◆	◆		◆
B.4	Model web content for local agencies		◆		◆		◆
B.5	Side sewer maintenance guidance documents **		◆		◆		◆
<b>Other Private Property I/I Source Identification and Mitigation BMPs</b>							
C.1	Side Sewer CCTV Inspection Specification				◆		◆
C.2	Rainfall Simulation/Dye Testing Specification				◆		◆
C.3	Unauthorized private property I/I source disconnection public education materials**		◆	◆	◆		◆
C.4	Cleanout cap replacement program		◆	◆	◆		◆

\*\*Indicates this BMP was initially recommended to the I/I Task Force for consideration.

As a result of this evaluation, the following BMPs were included in the initial recommendations forwarded to the I/I Task Force for consideration.

#### **A.5 Unauthorized Connection Prohibition**

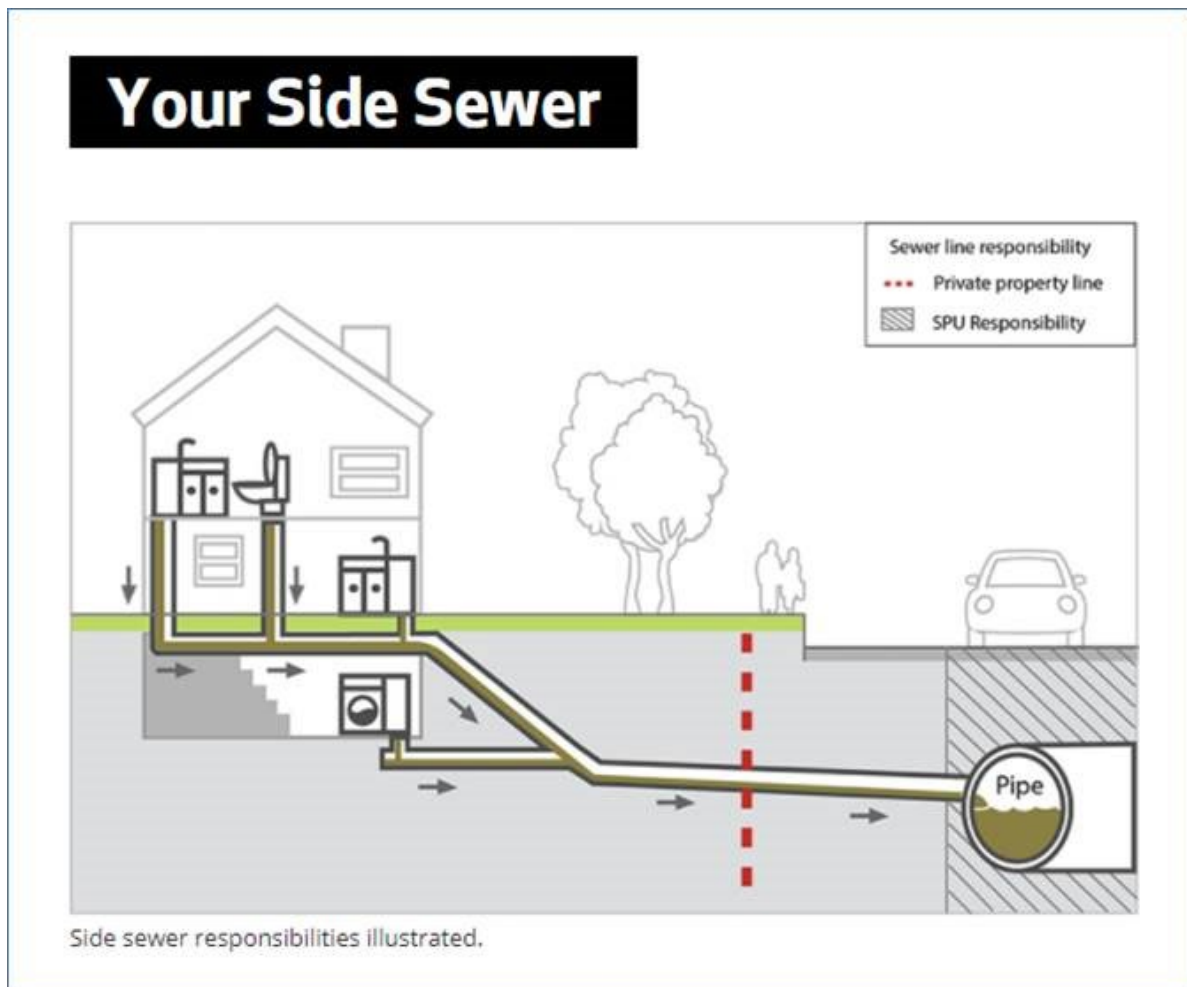
This BMP provides model language for adoption of legal authority, which clearly states that unauthorized connections must be removed and provides appropriate enforcement mechanism to ensure disconnection. Additionally, the model language includes provisions to ensure only one side sewer connection from each structure is made to the main sewer, and that side sewer is directly connected to the appropriate draining fixtures within the structure.

While most local agencies and districts have language in their legal authorities regarding unauthorized connections, this language could be strengthened in many instances to state the details more clearly. The legal authorities should clearly state that the local agency or district has the authority to perform tests on private property to identify unauthorized connections and to establish the following: what happens when unauthorized connections are found (who is responsible for disconnecting and redirecting clear water flow), allowable timeframes to complete the work, and what penalties can be incurred if compliance is not met.

As indicated in **Table 3-1** above, there are several local examples of strong and enforceable prohibitions on unauthorized connection from which model language may be developed.

### B.3 Courtesy Notice to Property Owner/Occupant Regarding Roots Observed in Lateral Connections (Model Notice)

Roots in laterals and service connections (side sewer connections) are commonly observed during routine CCTV inspections performed by many sewer utilities and their CCTV inspection contractors. By notifying property owner/residents of this finding, the property owner can also be made aware of their responsibility for maintaining the side sewer (including hiring a plumber to clear roots). In many local agency/district service areas, including SPU, property owners are responsible for maintenance of their side sewer, even the portion that lies within the right-of-way (see **Figure 4-1**).



**Figure 4-1 SPU Side Sewer Responsibilities**

Source: SPU, <http://www.seattle.gov/utilities/your-services/sewer-and-drainage/side-sewers>

By proactively clearing the side sewer, a plumber will notify the property owner/occupant of a defect and address it to prevent the likelihood of a backup (or SSO from cleanout) and to reduce infiltration into the sewer system. Additionally, if the side sewer defect is located within the right-of-way, the appropriate party (utility or property owner) can address the defect before a backup or SSO occurs, or void develops. This reduces the number of backup-related service requests for the utility and possible emergency repair work. The Consultant team has worked with sewer utilities' maintenance crews across the country who experience significant impacts to productivity due to side sewer/lateral issues that could have been avoided by this type of proactive measure.

## B.5 Side Sewer Maintenance Guidance Documents (Model Documents)

Comprehensive and easily accessible side sewer maintenance guidelines are extremely important in educating property owners on their responsibilities for maintaining, inspecting, and repairing their side sewers. As side sewers age and deteriorate, the responsibility for maintaining structural integrity and preventing I/I entry into this sanitary sewer component is increasingly important for the appropriate party. Information presented on SPU's side sewer maintenance webpage, shown in **Figure 4-2**, could be used as a model for other local agencies:

Seattle.gov  
Mayor Jenny A. Durkan

Side sewer with damage from cracked or degraded pipes.

### Side Sewer Maintenance

A "side sewer" carries wastewater from a building's sinks, toilets and drains to the public sewer. Side sewers are sometimes called "sewer laterals" or just "sewer pipe."

#### Ownership

If you own your home or building, you own your side sewer until it connects to the public sewer pipe. Some properties share a side sewer.

#### Maintenance Steps

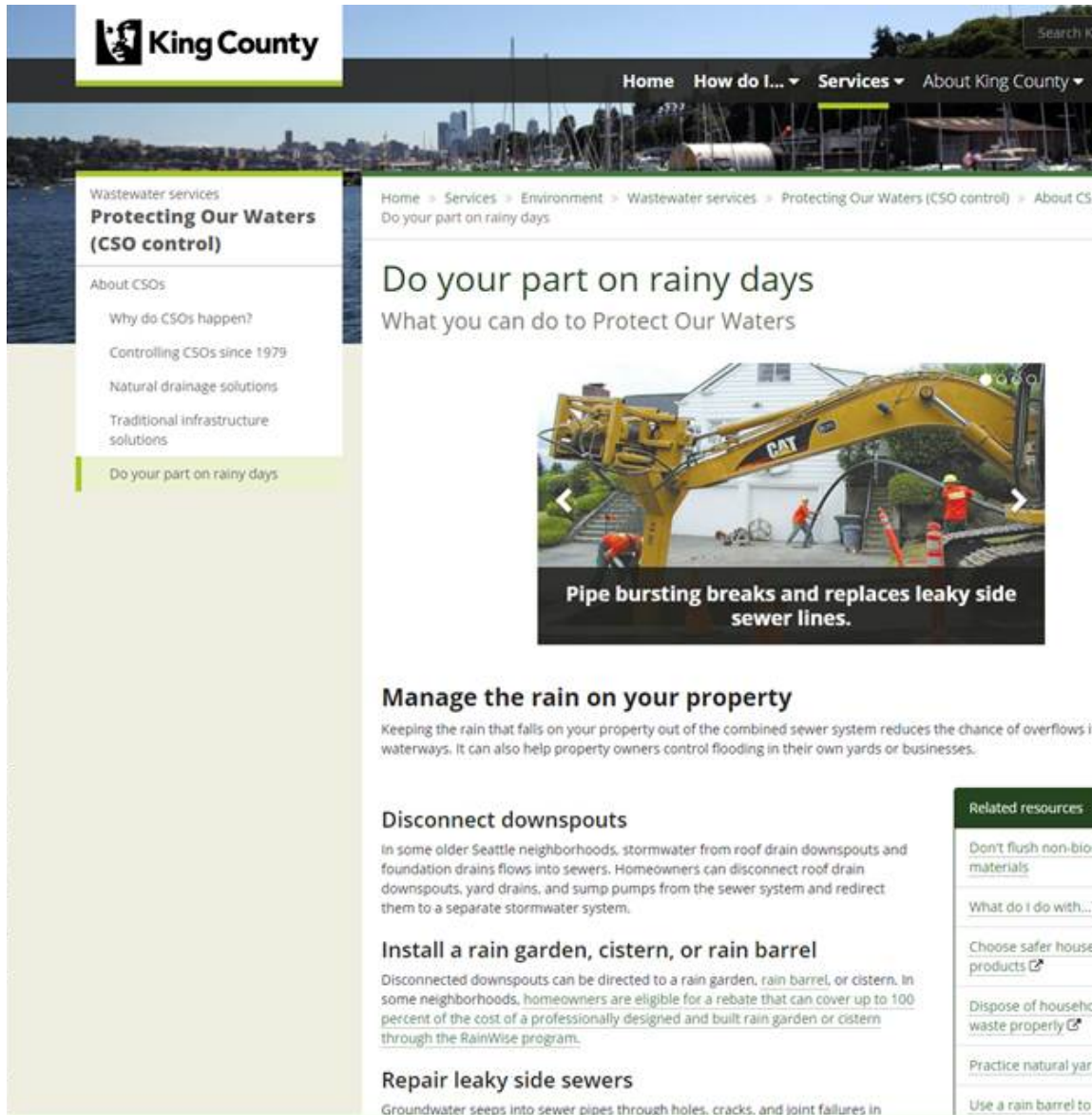
- 1. Know where it is:** download your property's [side sewer information](#) from the Seattle Department of Construction and Inspections (DCI) website.
- 2. Take care of it:** flush only toilet paper and properly dispose of grease. Learn more about [what happens to sewer pipes](#) when we flush items other than toilet paper.
- 3. Get it inspected**
  - Hire a plumber or sewer inspector who can run a video camera through your side sewer to find problems.
  - Learn about [typical side sewer problems](#) (common issues and defects).
  - Choose a sewer inspection company, plumber, or side sewer contractor to inspect your side sewer.
  - Remember! Have the side sewer inspected before you purchase a property.
- 4. If needed, clean or repair it**
  - Regular cleaning can prevent costly repairs, and broken side sewers must be fixed.
  - Hire a contractor to clean or repair your side sewer. If the public right-of-way needs to be disturbed to perform the repair then you need to hire a [registered side sewer contractor](#) to do the repairs.
  - Learn more about [side sewer repair methods](#).

**Figure 4-2. SPU Side Sewer Maintenance Webpage**

Source: Seattle Public Utilities, <https://www.seattle.gov/utilities/your-services/sewer-and-drainage/side-sewers/maintenance>

### C.3 Prohibited I/I Source Disconnection/Redirection Public Education Materials (Model Materials)

While this BMP may not apply to all local agencies at this time, those that experience excessive peak I/I flows will most likely opt to address private property sources of I/I (roof leaders, area drains, window well drains, foundation drains, etc.). Having this information available for their customers is extremely valuable. Even utilities that do not have I/I mitigation efforts underway may have this information available for their customers as a best practice. King County has an example of this type of information on its “Do your part on rainy days” web page, shown in **Figure 4-3**.



**Figure 4-3. King County's Private Property I/I Source Disconnection Webpage**

Source: King County WTD, <https://kingcounty.gov/services/environment/wastewater/cso/about/help.aspx>

## 4.2 I/I Task Force Feedback

King County and the Consultant team presented the initial recommendations for side sewer BMPs to the I/I Task Force during a meeting held July 20, 2020. Members of the I/I Task Force were asked to complete a web-based survey regarding the applicability and feasibility of the BMPs, as well as the preferences of their respective sewer districts. The survey results were shared and discussed. A copy of the survey results is included in **Appendix G**.

The following side sewer BMPs were selected by all survey respondents when asked which BMPs they would propose to include in a BMP Toolkit:

- A.1 Watertight side sewer specifications, standard drawings, and proper methods for new and repaired side sewers
- A.2 New side sewer construction inspection and product-specific inspection requirements
- A.3 Repair, rehabilitation, and replacement inspection requirements
- A.5 Unauthorized connection prohibition

“Which BMPs would you propose to include in a BMP toolkit as best meeting the goals and objectives of the Regional BMP development?”

A majority of survey respondents (75%) identified the following BMPs as those to include in a toolbox to best meet goals and objectives:

- A.6 Side sewer design guidelines that address flood-prone areas
- A.10 Side sewer disconnection, reconnection, and demolition requirements
- B.2 Tree and sewer main separation requirement

Only one BMP was not identified as not best meeting goals and objectives<sup>15</sup> and two BMPs were identified as being difficult or extremely challenging to implement. These BMPs were removed from further consideration:

- A.4 Side sewer contractor prequalification (implementation challenges)
- C.2 Rainfall simulation and dye testing specifications (not meet goals and objectives)
- C.4 Cleanout cap replacement program (implementation challenges)

Results of the survey were presented and discussed during the next I/I Task Force meeting held on October 19, 2020. Some I/I Task Force members indicated that more details are needed regarding the Consultant’s recommended BMPs before they would be willing to support the recommendations. Some requested information, such as the projected I/I reduction (e.g., percentage, volume, etc.) associated with a specific BMP.

The cost/benefit of implementation is not available, and it is outside the scope of the Consultant’s contract to gather/provide this type of information. Other issues raised, such as the specific wording used in model legal authority language, website content, or guidance documents, could not be addressed without further developing details of the proposed BMPs. Additionally, it is anticipated that local agencies and districts will modify the model language or guidance documents as needed to reflect local conditions prior to adoption and implementation.

<sup>15</sup> Note: BMP C.4, Cleanout cap replacement program, was inadvertently omitted from this survey.

Based on the outcome of continued discussions with I/I Task Force members, Engineering & Planning Committee leadership, and others, King County accepted the Consultant team’s recommendation for the initial BMPs to be included in the Regional I/I Toolkit. It is important to note that as the Regional I/I Side Sewer Inspection Program is developed, other BMPs could be added to the toolkit. Additionally, an I/I Task Force member indicated that another group is working to develop lake line guidelines (BMP A.7), and when available, these guidelines could also be added to the Regional I/I Toolkit.

## 5.0 Side Sewer BMP Recommendations

This section describes recommendations for the proposed BMPs based on the outcome of continued discussions with I/I Task Force members, Engineering & Planning Committee leadership, and others. King County accepted the Consultant’s recommendation for the initial BMPs to be included in the Regional I/I Toolkit. It is important to note that as the Regional I/I Side Sewer Inspection Program is developed, other BMPs could be added to the toolkit. For example, an I/I Task Force member indicated that another group is working to develop lake line guidelines (BMP A.7), and when available, these guidelines could also be added to the Regional I/I Toolkit. **Table 5-1** presents a summary of recommendations for the side sewer BMPs.

**Table 5-1. Summary of BMP Recommendations**

BMP	Recommendation
A.1 Watertight side sewer specifications, standard drawings, and proper methods for new and repaired side sewers	Revisit BMP after Side Sewer Inspection Program Scope Defined
A.2. New side sewer construction inspection and product-specific inspection requirements	
A.3. Repair, rehabilitation, and replacement inspection requirements	
A.4 Side sewer contractor prequalification	Not an I/I Task Force preferred BMP; do not pursue
A.5 Unauthorized connection prohibition	Adopt and implement as appropriate to the local agency/district
A.6. Side sewer design guidelines that address flood-prone areas	Local agency/district specific – consider for future development by others
A.7 Lake line guidelines and lakefront property provisions	
A.8 Over-water structure connection provision and recommendation	
A.9 Side sewer design guidelines in steep area	Revisit BMP after Side Sewer Inspection Program Scope Defined
A.10 Side sewer disconnection, reconnection, and demolition requirements	
B.1 Side sewer maintenance responsibility declaration and enforcement mechanism	Consider for future BMP development/tool kit addition
B.2 Tree and sewer main separation requirement	Remove from consideration per I/I Task Force
B.3 Model courtesy notice to property owner/occupant regarding roots in lateral connection	Adopt and implement as appropriate to the local agency/district
B.4 Model web content for local agencies	Consider for future BMP development/tool kit addition
B.5 Side sewer maintenance guideline documents	Adopt and implement as appropriate to the local agency/district
C.1 Side sewer CCTV inspection specifications	Consider for future BMP development/tool kit addition
C.2 Rainfall simulation and dye testing specifications	Not an I/I Task Force preferred BMP; do not pursue
C3. Unauthorized private property I/I source disconnection public education materials	Adopt and implement as appropriate to the local agency/district
C.4 Cleanout cap replacement program	Not an I/I Task Force preferred BMP; do not pursue



## 6.0 Next Steps

This section outlines the next steps to be taken to promote the development, adoption, and implementation of the recommended BMPs.

After the selected side sewer BMPs are accepted by King County and the local agencies/districts, the Consultant will develop model language and guidelines based on local and national BMPs. Local agencies and districts will then be able to tailor the BMP as needed for adoption and implementation.

Moving forward, other I/I-related BMPs may be identified and developed as part of the Evaluation of Inflow and Infiltration Reduction Concepts initiative. As mentioned previously, another group is developing lake line guidelines, and if/when available, they could be added to the County's Regional I/I Toolkit. Other similar opportunities, including King County or local agency/district I/I Projects, may yield valuable information to add to the Regional I/I Toolkit as well.

DRAFT

## **Appendix A: Sample Sewer Lateral Root Intrusion Courtesy Notice**



GAIL FARBER, Director

# COUNTY OF LOS ANGELES

## DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

900 SOUTH FREMONT AVENUE  
ALHAMBRA, CALIFORNIA 91803-1331  
Telephone: (626) 458-5100  
<http://dpw.lacounty.gov>

ADDRESS ALL CORRESPONDENCE TO:  
P.O. BOX 1460  
ALHAMBRA, CALIFORNIA 91802-1460

April 19, 2012

IN REPLY PLEASE

REFER TO FILE: **SM-1**

Current Property Owner  
1234 Spring Creek Road  
Rancho Palos Verdes, CA 90275

Dear Property Owner:

### **SEWER LATERAL ROOT INTRUSION 1234 SPRING CREEK ROAD, RANCHO PALOS VERDES, CALIFORNIA 90275**

As the agency responsible for the maintenance of the sanitary sewer system in your area, the County of Los Angeles Consolidated Sewer Maintenance District (District) is providing you with this courtesy notice informing you that the sewer lateral serving the property located at 1234 Spring Creek Road, Rancho Palos Verdes, California 90275, requires maintenance per **County Code 20.24.080 Maintenance of Sewer Laterals.**

***"All house laterals, industrial connection sewers, septic tank outlet connections to STEP system, and appurtenances thereto existing as of January 23, 1953, or thereafter constructed, shall be maintained by the owner of the property served in a safe and sanitary condition, and all devices or safeguards which are required by this Division 2 for the operation thereof shall be maintained in good working order."***

Using closed-circuit television (CCTV) camera technology, the District recently televised the sanitary sewer mainline and discovered the presence of roots in your sewer lateral connection. The intrusion of the roots from your lateral may block the flow of sewage in the mainline sewer causing a sanitary sewer overflow upstream of your property.

Since the CCTV inspection, the sewer mainline has been cleaned and blockages from root growth have been removed; however, the root blockage in your sewer lateral is still present. As the property owner, you are responsible for the entire length of the sewer lateral, which includes the portion that extends beyond the property line into the public right of way. We request that you contact a qualified plumbing contractor to service your sewer lateral within 90 days to remove roots and any other obstructions that may cause a sewage backup.

Current Property Owner  
April 19, 2012  
Page 2

Prior to your plumbing contractor servicing your lateral, please notify the District's sewer maintenance yard in your area at (323) 233-3330 to arrange for authorization to access the downstream manhole.

During your lateral service, your plumbing contractor must protect the District's sewer mainlines from dislodged roots and other debris by utilizing catcher baskets at the manhole downstream from your lateral connection.

After your lateral has been serviced, please notify Mr. Fernando Villaluna, Sewer Maintenance Division, at (626) 300-3380 or [fvillaluna@dpw.lacounty.gov](mailto:fvillaluna@dpw.lacounty.gov).

For your reference, we have enclosed photos of your lateral connection showing the presence of the root blockage. Also enclosed are some literature on ways of minimizing sewer overflows and damage to your home.

Thank you for helping the Department of Public Works keep the public's sewers clean and in good working order.

Very truly yours,

GAIL FARBER  
Director of Public Works

KEITH E. LEHTO  
Assistant Deputy Director  
Sewer Maintenance Division

HK:gy

Enc.

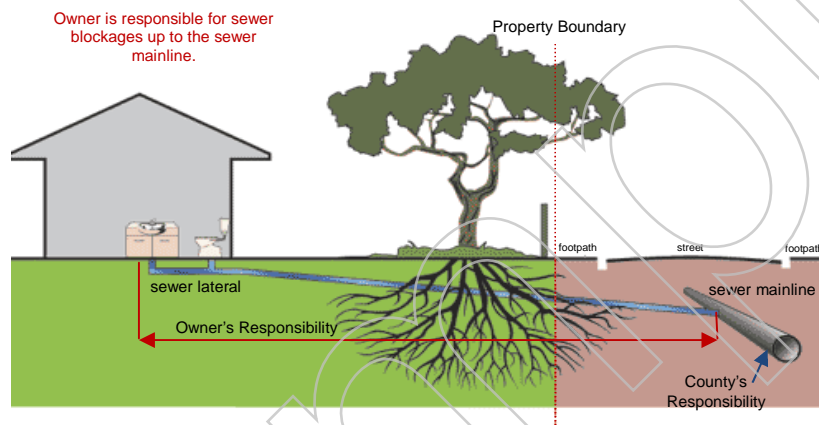
1234 SPRING CREEK ROAD  
RANCHO PALOS VERDES, CA 90275  
Roots at Lateral Connection



## Minimizing Sewer Overflows and Damage to Your Home

The sewer system within the County of Los Angeles Consolidated Sewer Maintenance District (District) is comprised of a series of underground pipes. Many are publicly owned; however, the sewer laterals are entirely owned by the private property owner they serve. The laterals extend from the building to the mainline within the street (or within an easement at the rear of your home). The laterals are typically four inches in diameter while the District's mainline is typically at least eight inches in diameter. The private property owner is responsible for the entire length of the lateral, which includes the portion that may be located within the public right of way (under the asphalt and street landscaping).

### SEWER LATERALS – AREAS OF RESPONSIBILITY



Sewer backups can cause tremendous damage to the interior of a home. In order to minimize these, the District provides continual maintenance services for the public sewer mainlines.

Unfortunately, sewer laterals are often not maintained by private property owners until a disaster strikes. "Out of sight, out of mind" is a typical approach to sewer lateral maintenance and operation by many. It is our hope that we can provide you various means of addressing these issues and thus minimize your risk of an overflow entering your home.

The three methods we suggest are:

1. Maintain your lateral through proper cleaning, repair, and replacement
2. Do not place improper items into the sewer or make improper connections to the sewer
  - a. Keep rainwater out of the sewer lines as it overwhelms the capacity of the sewer lines and may cause sewer spills.
  - b. Do not pour fats, oils, and grease in your drains as these products harden and stick to the inside of the sewer pipes, which build up and may eventually cause a blockage in the sewer pipe.
3. Install a backflow preventer and cleanout in your sewer lateral.

## **Appendix B: Example Model Web Content**

## **MODEL WEB CONTENT FOR CITY SANITARY SEWER DEPARTMENTS**

*The following information is designed to be used in conjunction with the Sewer Toolkit, located in the Wastewater section of the Florida Rural Water Association website at [www.frwa.net](http://www.frwa.net).*

Your city website can be an effective method of educating the public about city operations and programs. The sample website content below is designed to help you develop (or expand) web content about your city's sanitary sewer system. Keep in mind that these are only examples – the information should be customized in the way that most effectively shares your city's message and best meets your city's needs.

If you don't find what you are looking for below, remember there are many cities in Florida that do a great job of sharing information on their web sites. Just enter [www.google.com](http://www.google.com) on your website browser, enter the name of a city and explore the information others have to offer about their sanitary sewer systems.

### **SAMPLE ONE**

#### **Contact Info**

City of Palm Falls

Public Works Department Address Palm Falls, FL 00000

Telephone: (555) 555-5555 Fax (555) 555-5555 [pubworks@ci.palm-falls.fl.us](mailto:pubworks@ci.palm-falls.fl.us)

#### **Sanitary Sewer**

Public works is responsible for inspecting and maintaining the collection system infrastructure and the sanitary lift stations and ensuring uninterrupted collection of wastewater.

The City has \_\_\_\_\_ miles of sanitary sewer lines. Most of the lines are in the street. Some run through utility easements in grassy areas. Each year, the Public Works department cleans approximately one-third of the City's sanitary sewer lines. Lines requiring a higher level of maintenance are cleaned annually or semi-annually. This routine maintenance helps to prevent blockages and backups.

The sanitary sewer lines are cleaned using high performance sewer cleaning equipment. A cleaning nozzle is propelled from one manhole to the next using water under high pressure. The nozzle is then pulled back to the starting manhole. As the nozzle is pulled back, water scours the inside of the sanitary sewer pipe. Any debris in the pipe is pulled back with the water. The debris is removed from the manhole with a vacuum unit. If roots are found, they are cut with a root cutter. This process is repeated on every sewer line cleaned.

#### **Keep Your Toilet Bowl Lid Down!**

Summer is the season for sewer cleaning. The City has \_\_\_\_\_ miles of sanitary sewer lines. Each year, the Public Works department cleans approximately one-third of the



City's sanitary sewer lines. The sanitary sewer lines are cleaned using high performance sewer cleaning equipment. A cleaning nozzle is propelled from one manhole to the next using water under high pressure. The nozzle is then pulled back to the starting manhole. As the nozzle is pulled back, water scours the inside of the sanitary sewer pipe. Any debris in the pipe is pulled back with the water. The debris is removed from the manhole with a vacuum unit. If roots are found, they are cut with a root cutter. This process is repeated on every sewer line cleaned.

During cleaning of sanitary sewer lines, air occasionally vents into a home through the sanitary sewer service line and ventilation system. When this happens water in the toilet bowl can bubble or surge or, in rare cases, splash out of the bowl. The common causes of air venting into homes during sanitary sewer cleaning are: air movement from normal cleaning operations, the use of higher pressure necessary when cleaning sanitary sewer lines that have a steep slope, sewer lines running close to the building, a plugged roof vent, and the size and complexity of the home's waste and ventilation system. So, to minimize water splashing out of your toilet bowl, make it a habit to keep the lid down.

### **Sewer Backups**

If you have a sewer backup and do not know where the blockage is, you should contact the City before contacting a drain cleaning company. You may be able to avoid an unnecessary charge if the problem is in the City's sewer line rather than in your property's service line. A Public Works employee will determine if the problem is in the City's line or in your property's service line.

**555-555-5555 (Public Works)**

**Monday – Friday 8:00 a.m. to 4:30 p.m.**

**555-555-5550**

**After hours, weekends and holidays.**

The property owner is responsible for clearing any blockage in the service line between the home and the City sanitary sewer main. This includes debris and tree roots. The property owner is also responsible for cleaning and repairing any damage done to the property by the backup.

The City is not automatically liable for blockages in the City's sanitary sewer system. The City is only liable for those damages if the backup was caused by the City's negligence.

Most homeowner insurance policies exclude damage resulting from sewer backups. Many insurance providers do have insurance riders that can be purchased to insure loss due to sewer backups.

Sanitary sewer line blockages are typically caused by roots, grease, and improper disposal of items. Tree roots can enter the sanitary sewer system at joints and cracks in the sewer service lines and mains. Grease can solidify in the sewer lines and restrict other waste from flowing through. The lines can be blocked by items like disposable diapers,

paper towels, feminine hygiene products, washing machine lint, or other items improperly flushed down the drain or toilet.

### **Sewer Repairs**

The property owner is responsible for any repairs on the service line from the home to, and including, the connection at the property line. In most locations, the City is responsible for repairs within the public road right of way.

### **Sewer Odors**

Floor and sink drains usually have water filling the bottom of the drain trap which acts as a barrier between the air in the sewer line and the air in your home. When a drain trap becomes dry, sewer odors can enter into the residence. If you experience sewer odors in your home, run water down your drain.

### **Sump Pumps**

If you use a sump pump in your basement, it is illegal to drain the water into the basement sanitary sewer drain or laundry tub. Sump pumps must be discharged outside of the house to the yard or drainway that will prevent the water from draining directly to the street. Call the Public Works department if you need more information.

## SAMPLE TWO

### **Sewer Backups and Blockages**

#### **What to do in the event of a sewer backup**

Property owners experiencing a sewer backup may call 555-555-4555 between the hours of 7 a.m. and 3:30 p.m., Monday thru Friday. After 3:30 p.m. and on weekends, residents may call Police at 911. City crews will be dispatched to assess the situation.

If it is determined that no blockage or restrictions exist in the City's sanitary sewer system, the property owner is advised to contact a professional plumber or drain cleaning service to have the private sewer service inspected. The City cannot make a recommendation for drain cleaning services. A property owner may wish to obtain several estimates.

Property owners should be aware, if the problem is in the private sewer line, the property owner is responsible for correcting the problem. The owner of the property is responsible for maintaining and cleaning the sewer line from the building to the City's sewer main, including the connection on the sewer main.

Many homeowners' insurance policies exclude damage resulting from sewer backups. However, some insurance companies do provide sewer backup coverage. If you are concerned about the possibility of a sewer backup and want to insure that you are covered, the City urges you to check with your home insurer regarding the availability of sewer backup insurance.

**How to prevent backups in your service line & in the City sewer main** Property owners can do many things to prevent their service from backing up. Remember, the very same things can help prevent backups in the City main as well.

**Grease:** Cooking oil should be poured into a heat-resistant container and disposed of in the garbage after it cools, not down the drain. Some people assume that washing grease down the drain with hot water is satisfactory. This grease goes down the drain, cools off, and solidifies either in the drain, the property owner's service, or in the sewer main. When this happens, the line eventually clogs.

**Paper Products:** Paper towels, disposable diapers, and feminine products cause many problems in the property owner's service as well as in the City main. These products do not deteriorate quickly. They become lodged in portions of the service and main, causing sewer backups. These products should be disposed of in the garbage.

**Sewer Root Control:** The continual flow of nutrient-filled water found in sewer pipes attracts tree roots. Roots growing along pipes exert significant pressure on pipes. These roots may push into and around gasket connection points which may expand and break seals. Root infiltration can cause a blockage to the service resulting in sewage backup in your home and damage to your property.

**Tips for Controlling Roots:** The conventional method of removing roots by a professional drain cleaning service involves cutting or tearing of roots to solve an immediate problem or stoppage, but this method does not retard the growth or destroy the roots outside the pipe. This is similar to pruning the bushes and shrubs surrounding your residence. An annual chemical root control program is an effective preventive maintenance measure. A product that foams with the addition of water is the most effective means of coating the roots and pipe surfaces. These products may be purchased from your local hardware store or home center.

**Illegal Plumbing Connections:** Do not connect French drains, sump pumps, roof gutter drains, or foundation drains to your sanitary sewer service. It is illegal and will cause debris and silt to clog your service line. Consult a plumber to correct any illegal connections.

## Utility Billing Information

### Reading Your Utility Bill

The City is committed to providing quality water and sewer services. A review of rates is conducted annually to determine the City's costs to provide these services. The City's intention is to recover costs from the users of the services.

### Basic Charge

The City has established a basic charge because there are fixed costs involved with providing service to each customer regardless of water usage.

**Water Charges**

Water usage is determined by a meter reading received electronically from each property on a monthly basis.

**City Sewer Charges**

City Sewer charges cover the costs associated with the collection of sewage and maintenance of the pipes and facilities. They also cover the expenses of transporting sewage to the regional treatment plant and treatment of the sewage to meet federal water quality standards. This charge is based on water consumption and is subject to a maximum that is set according to your winter water usage.

**Late Payments**

Past due amounts are subject to a monthly and annual penalty.

**Delinquent Accounts**

Delinquent amounts are certified to the property taxes of the home.

**Payment Drop Box**

Would you like to save postage? For your convenience the City has a drop box for water and sewer bill payments. The drive-up drop box is located in the City Hall parking lot. Payments deposited in the drop box are credited within three business days. Place your check and remittance stub in an envelope and drop it in the box - no postage required.

**Moving In or Out? Final Meter Reading Required**

Customers moving from residences or businesses need to contact Public Works at 555-555-5555 with a forwarding address for the final billing and meter reading. Customers will be asked to provide a meter reading when moving in or out of a property.

**OTHER INFORMATION TO CONSIDER FOR YOUR CITY'S WEB SITE****Sewer use ordinance**

The City's Sewer Use Ordinance prohibits certain discharges into their sanitary sewer lines. The City's Sewer Use Ordinance can be viewed at \_\_\_\_\_ (*insert link or .pdf document to the City's sewer use ordinance*).

**Brochure**

For more information about sewer backups and what you should know and how you should protect yourself, please see the following brochure: (*insert link or .pdf document to brochure; if your City does not have a brochure, see model brochure developed as part of the Sewer Toolkit [www.frwa.net](http://www.frwa.net)*).

**Equipment used in sewer maintenance process**

The Public Works department may use the following types of equipment when performing inspection and maintenance of its sanitary sewer system:

**Jetter/Vactor** - The jetter uses a high pressure water system to clean the sewer main of debris, such as sand, grease, and other materials that settle in the sewer main. Using a high pressure water system, the jetter propels a hose, with a specially designed nozzle, into the sewer main. The hose is then pulled back slowly while the high pressure water system flushes the materials to a downstream manhole for removal by the vactor. The vactor uses a positive displacement to create a vacuum that can lift debris from manholes.

**Rodding Machine** - A rodding machine is designed to push or pull a specially designed steel rod while rotating in the sewer main. With the use of specially designed tools attached to the end of the rod, this machine is one of the most efficient and dependable methods for removing heavy root growths, sand, grease, and debris from storm, sanitary, and combined sewer pipes.

**Bucket Machine** - A bucket machine is primarily used to remove debris in larger sewer lines from manhole to manhole. When pulled in one direction, and with both ends open, the bucket is pulled through the debris to be removed. When the direction is reversed, the tailing end of the bucket closes and traps debris inside. The bucket is then pulled to the downstream manhole for removal.

**TV Inspection** - Closed circuit television video (CCTV) inspection equipment and pipeline inspection/asset management software is used to inspect sanitary and storm sewers. The system uses a self-propelled transporter to carry the camera down the sewer main. While the camera is in operation, visual data is recorded for maintenance assessment needs.

**Manhole Inspection** - Manhole inspections are performed to quickly verify how the large diameter sewers are operating, and to visually inspect signs of infiltration from the cover, walls, joints, and pipe connections. Manhole inspections should be conducted on a routine basis.

## **Appendix C: King County “Know Your System” Card**

**Storm Season increases risk of floods and sewer overflows**

# Know Your Sewer System.

## Know Who To Call.

### 1 Home With Septic

Clean-up service\* ( ) \_\_\_\_\_  
 Insurance ( ) \_\_\_\_\_  
 Septic service or plumber ( ) \_\_\_\_\_

### 2 Home On Local Sewer System

Clean-up service\* ( ) \_\_\_\_\_  
 Insurance ( ) \_\_\_\_\_  
 Plumber ( ) \_\_\_\_\_  
 Local sewer agency\*\* ( ) \_\_\_\_\_

### 3 Manhole Overflows

Local sewer agency\*\* ( ) \_\_\_\_\_

### 4 Storm Drain/Street Flooding

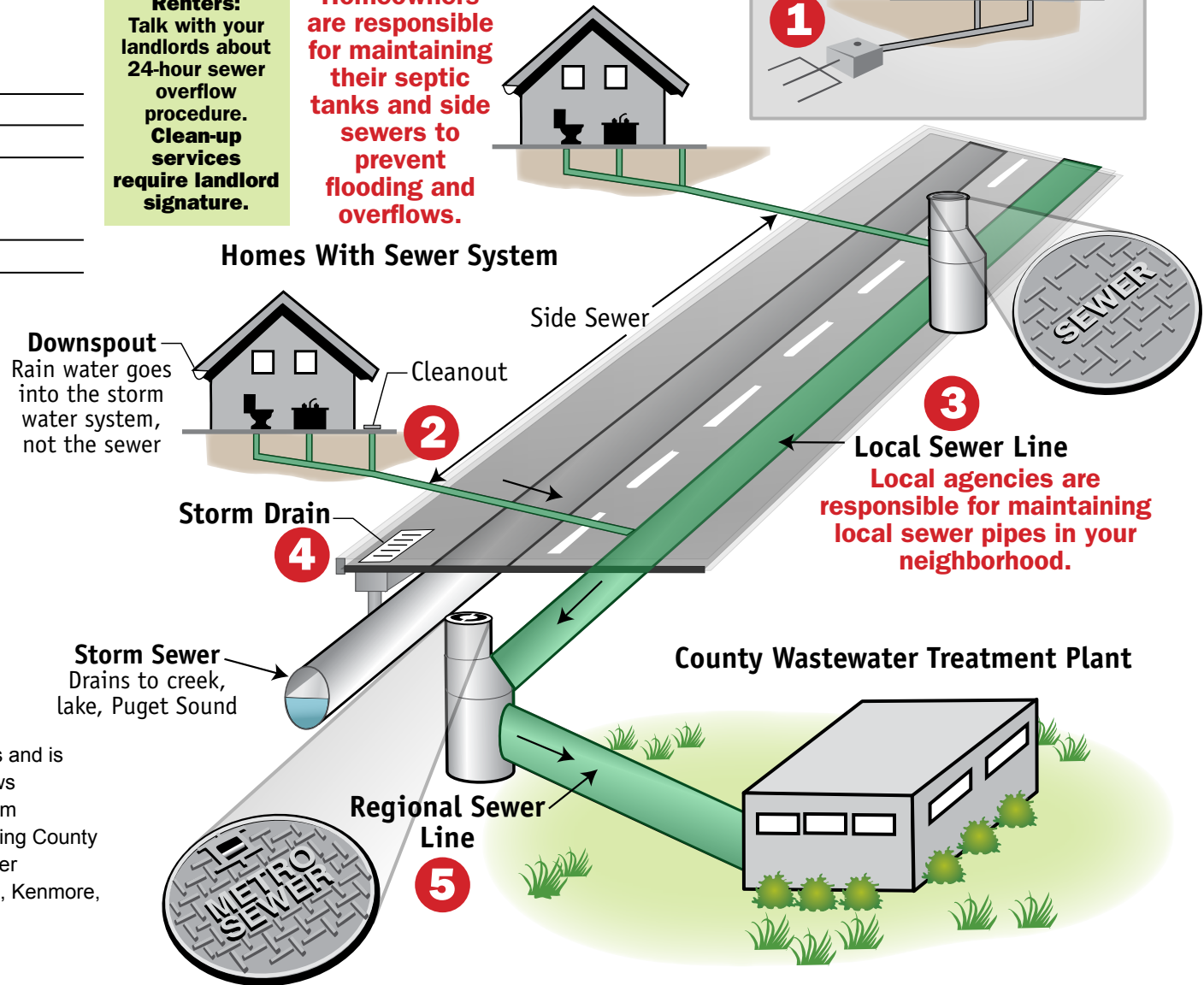
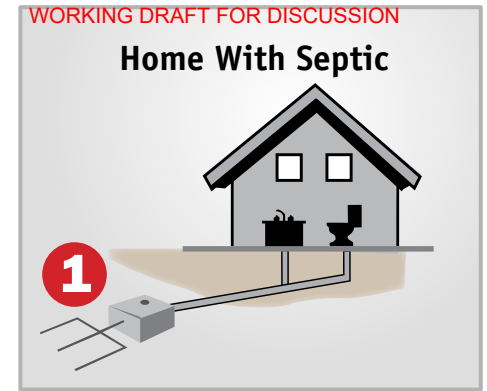
City Public Works/Surface Water Utility\*\* ( ) \_\_\_\_\_

### 5 Regional System Overflows

King County collects sewage for local agencies and is responsible for regional treatment. For overflows occurring in the regional system, (overflows from manholes that say "Metro" on the lid, or near King County pump stations), call the King County Wastewater Treatment Division at 206-263-3801 (in Seattle, Kenmore, Shoreline), or 206-684-2404 (all other areas).

**Renters:**  
 Talk with your landlords about 24-hour sewer overflow procedure. Clean-up services require landlord signature.

**Homeowners**  
 are responsible for maintaining their septic tanks and side sewers to prevent flooding and overflows.



# Keep yourself safe during a flooding event or sewage overflow

1. Evacuate if necessary – call 911 in emergencies
2. Stay out of flooded areas and avoid contact with any type of flood water
3. Safely turn off electricity to affected area
4. Stop using plumbing that drains to the sewer system
5. Prevent the spread of contaminants and odors: turn off furnaces, air conditioners, and close vents
6. If you have been exposed to floodwater or wastewater, change clothing and shoes and wash affected skin surfaces.
7. Contact your doctor at the first sign of illness or infection
8. Hire a professional service to clean up damaged areas of your home. You can find services listed in phone directories under “Water Damage Restoration”. Use caution if you choose to clean up the spill; wear boots, rubber gloves and properly dispose of contaminated material.

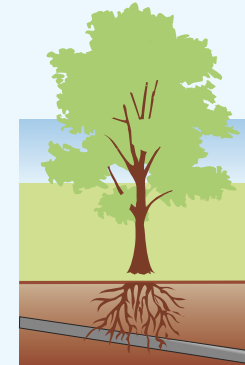


# Help prevent overflows

Protect sewer pipes, the treatment system and the Puget Sound



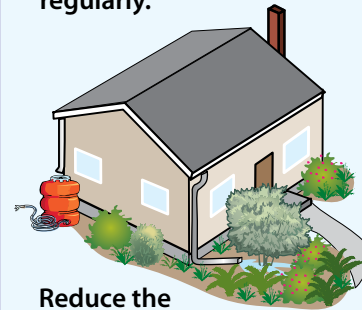
Inspect your side sewers and septic systems regularly.



Prevent tree roots from breaking sewer pipes.



Dispose of garbage and hair in the trash can, not the toilets.



Reduce the amount of rainwater entering the sewer system. Choose rain gardens, rain barrels, pervious pavement and green roofs.



Dispose of grease in the trash can or recycle it.



Prevent harmful chemicals from entering the wastewater system. Use simple, biodegradable household and personal products.



Prevent medicines from entering the wastewater system.

Return medicines to a pharmacy or dispose in the trash can.



Keep storm drains clear



Store hazardous materials in spill proof containers, dispose at hazardous waste facilities.

Learn more about responding to sewer spills at [kingcounty.gov](http://kingcounty.gov). Search “sewer spills.” Floods are a common emergency in our area. Learn how to prepare and respond at [www.govlink.org/storm/](http://www.govlink.org/storm/)

Alternative formats available

Call 206-263-6028 or 711 (TTY)

Printed on recycled stock. Please recycle.

1104\_2068\_SewerOverflowCard\_rev1.indd sk, md 12/2024  
Produced by: King County DNRP, WLRD, GIS, Visual Comm. & Web Unit



**King County**

Department of Natural Resources and Parks  
**Wastewater Treatment Division**



## **Appendix D: Tacoma “Before You Buy or Sell a Property” Brochure**



# Before you buy or sell a property ...

## Get to know what's underground

Side sewer repairs or replacement can be expensive – averaging \$5,000 to \$15,000 – and can often come as a surprise to property owners when sewage starts coming out of sinks, toilets, bathtubs and other building drains. Property owners should plan for side sewer maintenance and repair just as they do for replacement of roofs, furnaces and other major working systems of the building or residence.

Side sewers are the pipe that connects a building's plumbing to the City-maintained sanitary sewer main. The sewer main carries wastewater from your side sewer to the City's treatment facilities.

**To protect the value of your investment and avoid the surprise of costly repairs, the City of Tacoma recommends inspecting a building's side sewer if it is more than 25 years old and/or does not have plastic PVC pipe running from the building to the City sewer main.**

### Why does this matter to me?

- In Tacoma, property owners are responsible for repair and maintenance of their private side sewer.
- Buildings constructed prior to 1980 are likely to have side sewers made of clay or concrete pipes. These can crack, shift out of place, and/or be subject to intrusion by roots, causing leakage or blockage in the pipe.
- When your side sewer is blocked, sewage from your home can back-up in your pipes and surface through your sinks, toilets, bathtubs and other building drains, causing a health issue as well as a potentially expensive mess. Side sewer blockages are typically caused by failures in the pipe. Potential failures can be easily detected by a simple inspection before they cause a serious problem.
- Rainwater and groundwater that gets into the sanitary sewer system from leaky side sewers, and roof and foundation drains can cause overflows of untreated or partially treated wastewater (sewage) into streets, homes, businesses and local waterways. This rainwater and groundwater should be directed to the local surface water system.
- Just as groundwater can leak into a side sewer, sewage can leak out of a side sewer and become a public health hazard.
- If you know the condition of your property's side sewer, you can better prepare for repair or replacement instead of finding out about a problem when the sewer backs up.

### How do I find out the condition and age of a side sewer? How do I know what it's made of? How do I know if there are sources of rainwater or groundwater getting into the side sewer?

1. Ask the current property owner if they have had any issues with slow-draining plumbing fixtures, sewage backups, or have performed any inspections or repairs on the side sewer.
2. The City has permit records for some, but not all, of the properties in Tacoma. To research City of Tacoma permit records, visit [www.govme.org](http://www.govme.org) and click on Permit / Site History or call Environmental Services at (253) 591-5588.
3. Hire a side sewer inspection contractor or a drain cleaner to perform a video inspection of the side sewer and to inspect the building for sump pumps, drains, or other sources that may be allowing rainwater or groundwater to enter the side sewer.



## **Appendix E: Tacoma Private Contractor Inspection Information Brochure**

# Private Contractor Inspection Information

## HOW DO I FIND SOMEONE TO INSPECT MY SIDE SEWER?

To find an inspection company, search the Internet or local yellow pages for “drain cleaners” or “sewer contractors” and call to inquire about video inspection services. Homeowners should ask for a Television Inspection that meets the City of Tacoma’s 2016 Side Sewer and Sanitary Sewer Availability Manual **section 3.3** available on [Tacomapermits.org](http://Tacomapermits.org) under **Resource Library - SANITARY SEWER & STORMWATER LIBRARY**.

## HOW MUCH CAN I EXPECT AN INSPECTION TO COST?

The cost of an inspection can vary depending on the length of the side sewer and how easy or difficult it is to access the side sewer. An average side sewer inspection costs \$200 to \$400. Costs may vary greatly from one company to the next. The Better Business Bureau is also a good resource for finding reputable companies: 253-830-2924. Since companies offer a wide range of prices, it’s a good idea to get at least three written bids before choosing a company.

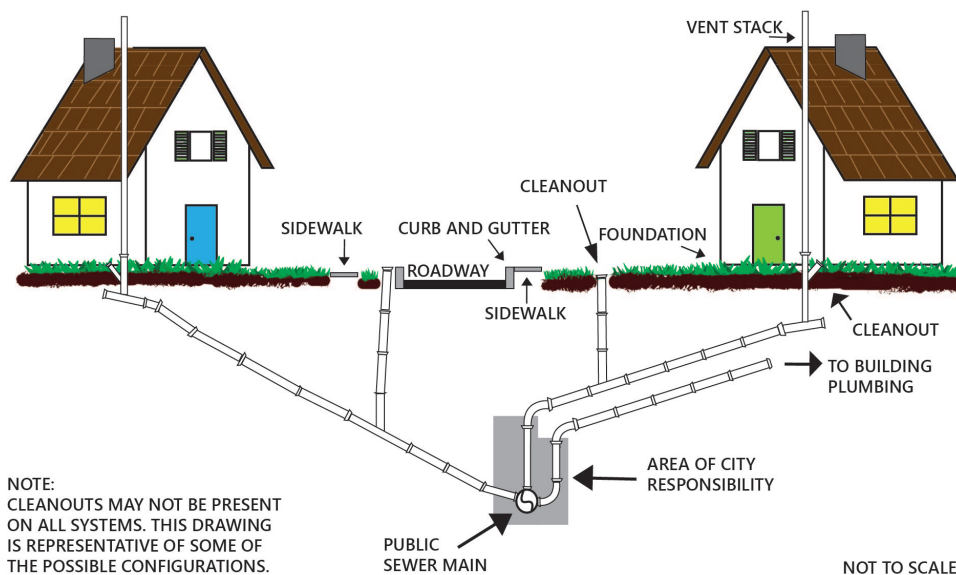
## WHAT SHOULD I EXPECT FROM AN INSPECTION?

An inspector will insert a video camera into the side sewer through a cleanout either outside or inside the building. If no cleanout is available, the inspector may need to install a cleanout or remove and replace a toilet to access wastewater plumbing. In some cases, plumbing vents on a roof can be used for video camera access. If you would like to receive a video recording of the inspection, ask about the inspector’s equipment capability prior to selecting a company.

## HOW WILL I KNOW IF REPAIRS SHOULD BE MADE?

The inspector should be able to point out defects to you on the video as they are performing the inspection and provide you with recommendations on whether repairs or replacements may be needed. Although many side sewer inspection companies may also offer repair services and may provide you a quote, it is also a good idea to get a few more written bids before choosing a repair company. If you’re unsure about whether the repairs being recommended are necessary, you may also want to share the video inspection with another inspection company to receive a second opinion before agreeing to costly repairs. To read about the City of Tacoma’s recommendations regarding specific side sewer problems and repairs please refer to the **Side Sewer Condition Assessment & Repair Manual**. For a copy, go to <http://www.cityoftacoma.org/sidesewer> or call Site Development at 253-591-5760.

## CITY OF TACOMA SIDE SEWER AREA OF RESPONSIBILITY



**Note: This Tip Sheet does not substitute for codes and regulations.**

**The applicant is responsible for compliance with all codes and regulations, whether or not described in this document.**

**More information: City of Tacoma, Planning and Development Services | [www.tacomapermits.org](http://www.tacomapermits.org) (253) 591-5030**

To request this information in an alternative format or a reasonable accommodation, please call 253-591-5030 (voice).

TTY or STS users please dial 711 to connect to Washington Relay Services.

## **Appendix F: DELCORA Sump Pump and Downspout Brochure**

**Function of Sump Pumps & Downspouts**

Rainwater can enter the basement through many sources. The job of a sump pump is to divert the water from inside your basement to a location outside of the house. A sump pump is usually installed in a sump pit which stores the water. When this water reaches a certain level, it triggers the sump pump which pumps the water back outside, away from the house. A downspout's purpose is to direct water from the roof gutters away from the house.

**The Problem of Inflow**

Inflow is caused by improperly connected foundation (footing) drains, sump pumps, and downspouts. Instead of directing the clear rain water outside and away from the house, it directs the water into the sanitary sewer system. Inflow is a problem because it creates an extra water burden for the sanitary sewer system, and when this system is overloaded, sewage can back up into our streets, buildings, and your home. It also means that our utility bills are higher because we are collectively paying for the unnecessary treatment of clean water!

**Rules and Regulations**

Inflow is a problem for all of Delaware County's communities and sanitary sewer systems. All municipalities have adopted ordinances which make it illegal to have improper connections to the sanitary sewer. Fees and other enforcement measures can be used to achieve compliance. To avoid fines make sure your sump pumps and downspouts discharge properly.

**Homeowners have an impact on preventing or causing the problem of inflow. Your community and neighbors are relying on you to take responsibility for making sure that your connections are not contributing to the problem.**

*For more information regarding what is being done about inflow in your community, contact your local municipality or sewer author-*



**DELAWARE COUNTY REGIONAL WATER QUALITY CONTROL AUTHORITY**  
 100 EAST FIFTH STREET  
 CHESTER, PA 19013  
 WWW.DELCORA.ORG  
 610-876-5523

PRINTED WITH THANKS TO THE:  
 FARIBAULT COUNTY SOIL AND WATER CONSERVATION DISTRICT  
 BLUE EARTH, MN 56013  
 www.faribaultcountyswcd.com

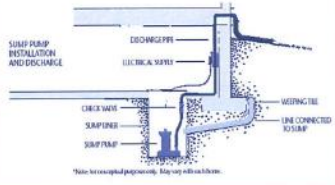
**Disconnecting & Redirecting Your Sump Pump & Downspouts**



**In wet weather it only takes a few improperly connected sump pumps to cause a sanitary sewer backup into basements, streets and waterways.**

**How Do I Know If My Sump Pump Is Improperly Connected?**

Your sump pump is improperly connected to the sanitary sewer if it is connected to the drain or sink in your basement. Unless you are sure your basement drain is not connected to the sanitary sewer, your sump pump is probably improperly connected.



*Proper sump pump discharge connections are to the outside of the house only!*

**Disconnecting Your Sump Pump**


If your sump pump discharges to the sanitary system in any way, the discharge must be re-directed out of the sanitary sewer system. The change could be as simple as directing the discharge outside the house through a hose. If you aren't familiar with the work, contact a plumbing professional, your local municipality, or your sewer authority for more information.

*Each household or business that redirects their stormwater out of the sanitary sewer helps solve the problem of sewage backing up into basements, streets, and waterways.*

**Disconnecting Your Downspout**





Disconnecting your downspout from the sanitary sewer is easy to do yourself.

1. Cut the downspout, leaving enough space to insert the elbow.
2. Tightly cap the end of the pipe sticking out of the ground that leads to the sanitary sewer.
3. Attach an elbow to the end of the downspout and use an appropriate extension to direct the water away from your home.



**Where Should I Direct the Flow of My Disconnected Sump Pump and Downspout?**

Water should be discharged away from your house or it may seep back into your basement. It should flow to an area where it can seep into the ground or be stored for later use. Direct flow to:

*Never direct stormwater into a sanitary sewer or onto a neighboring property!*

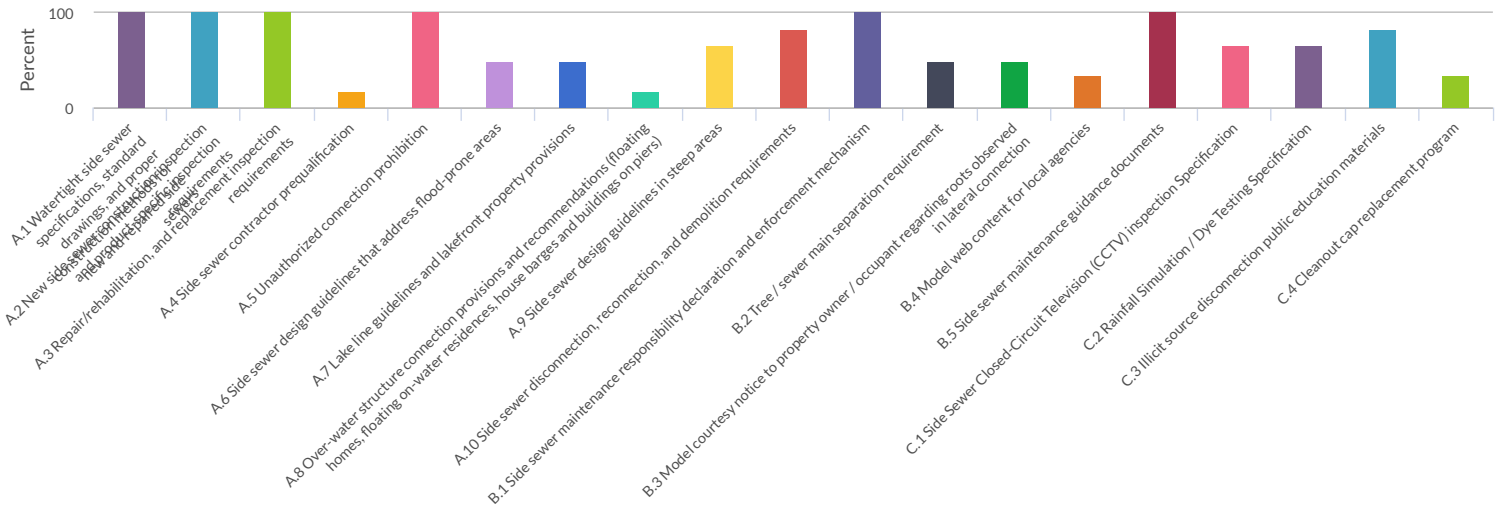
## **Appendix G: I/I Task Force BMP Survey Results**

Response Counts

<b>Completion Rate:</b>	<b>36.4%</b>	
	Complete	4
	Partial	7

**Totals: 11**

1. Which of these BMPs can your agency/utility implement? (Select all that apply)



Value	Percent	Responses
A.1 Watertight side sewer specifications, standard drawings, and proper construction methods for new and repaired side sewers	100.0%	6
A.2 New side sewer construction inspection and product-specific inspection requirements	100.0%	6
A.3 Repair/rehabilitation, and replacement inspection requirements	100.0%	6
A.4 Side sewer contractor prequalification	16.7%	1
A.5 Unauthorized connection prohibition	100.0%	6
A.6 Side sewer design guidelines that address flood-prone areas	50.0%	3
A.7 Lake line guidelines and lakefront property provisions	50.0%	3
A.8 Over-water structure connection provisions and recommendations (floating homes, floating on-water residences, house barges and buildings on piers)	16.7%	1
A.9 Side sewer design guidelines in steep areas	66.7%	4
A.10 Side sewer disconnection, reconnection, and demolition requirements	83.3%	5
B.1 Side sewer maintenance responsibility declaration and enforcement mechanism	100.0%	6
B.2 Tree / sewer main separation requirement	50.0%	3
B.3 Model courtesy notice to property owner / occupant regarding roots observed in lateral connection	50.0%	3
B.4 Model web content for local agencies	33.3%	2
B.5 Side sewer maintenance guidance documents	100.0%	6
C.1 Side Sewer Closed-Circuit Television (CCTV) inspection Specification	66.7%	4



Value	Percent	Responses
C.2 Rainfall Simulation / Dye Testing Specification	66.7%	4
C.3 Illicit source disconnection public education materials	83.3%	5
C.4 Cleanout cap replacement program	33.3%	2

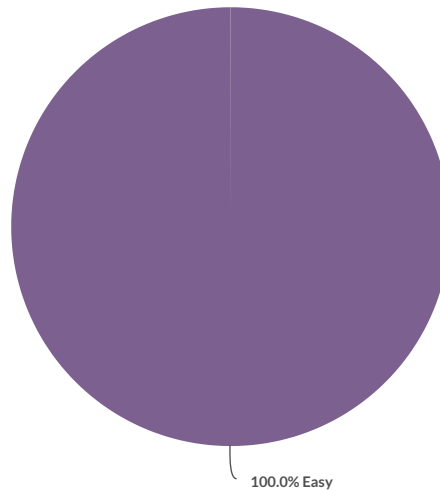
WORKING DRAFT FOR DISCUSSION

2. Any comments on the BMPs your agency can implement?

triggers  
 implemented inspection owner  
 differences enforced room  
 observed activity bmp's repair  
 application 0 e.g home  
 replace agencies adopting  
 facilities explicit existing  
 transfer standards ownership

[Show Responses ▾](#)

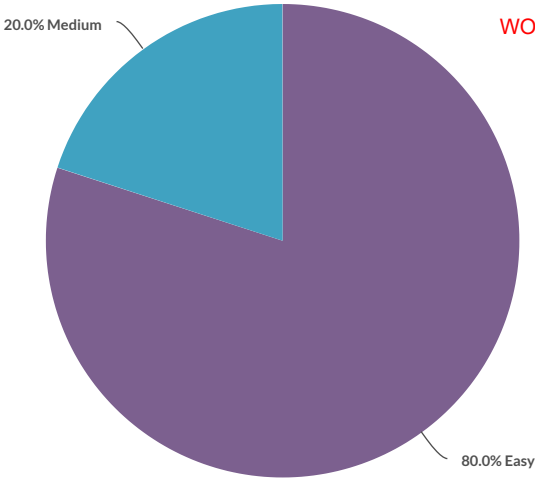
3. A.1 Watertight side sewer specifications, standard drawings, and proper construction methods for new and repaired side sewers?



Value	Percent	Responses
Easy	100.0%	5

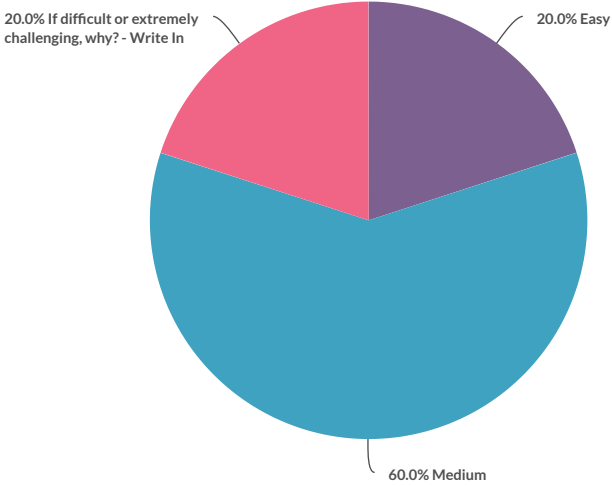
Totals: 5

4. A.2 New side sewer construction inspection and product-specific inspection requirements?



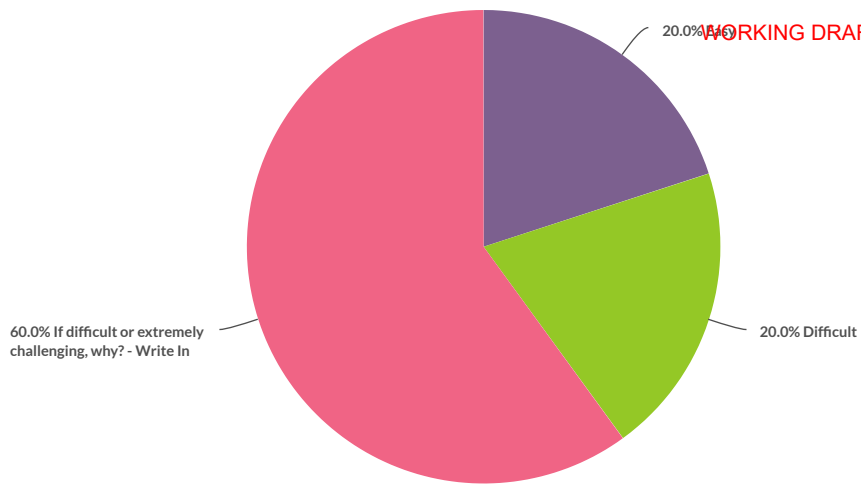
Value	Percent	Responses
Easy	80.0%	4
Medium	20.0%	1
		<b>Totals: 5</b>

5. A.3 Repair/rehabilitation, and replacement inspection requirements?



Value	Percent	Responses
Easy	20.0%	1
Medium	60.0%	3
<a href="#">If difficult or extremely challenging, why? - Write In (click to view)</a>	20.0%	1
		<b>Totals: 5</b>

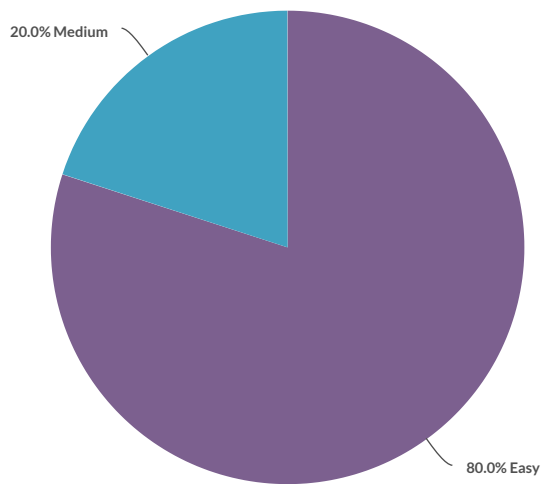
6. A.4 Side sewer contractor prequalification?



Value	Percent	Responses
Easy	20.0%	1
Difficult	20.0%	1
<a href="#">If difficult or extremely challenging, why? - Write In (click to view)</a>	60.0%	3
		<b>Totals: 5</b>

If difficult or extremely challenging, why? - Write In	Count
Difficult because we have nothing in place at this time.	1
Management of the system could be labor intensive, and may be considered to be non-customer friendly	1
We do not want to approve who a private home owner might want to hire for their property. We make sure contractor has a license.	1
<b>Totals</b>	<b>3</b>

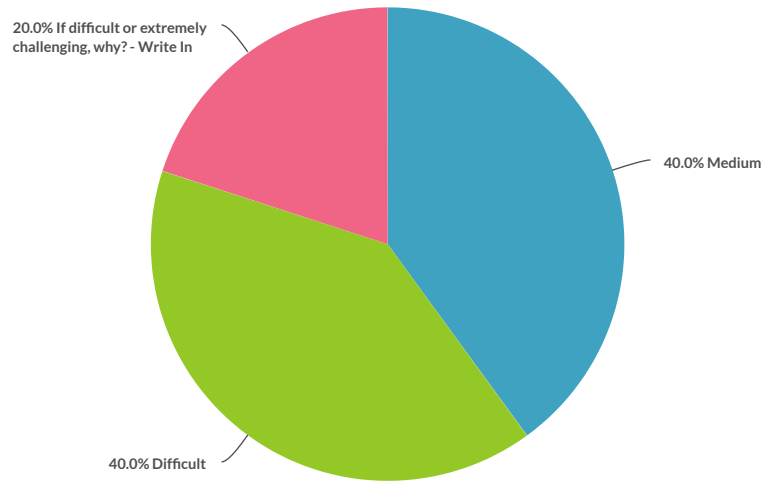
7. A.5 Unauthorized connection prohibition?



Value	Percent	Responses
Easy	80.0%	4
Medium	20.0%	1
		<b>Totals: 5</b>

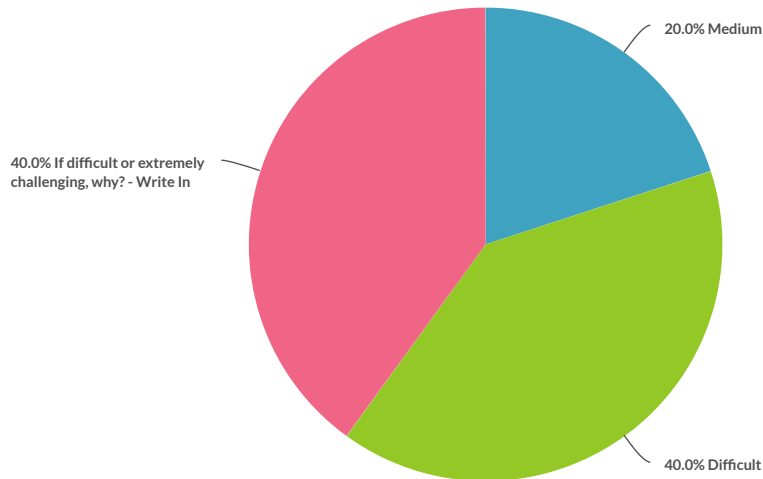
8. A.6 Side sewer design guidelines that address flood-prone areas?

WORKING DRAFT FOR DISCUSSION



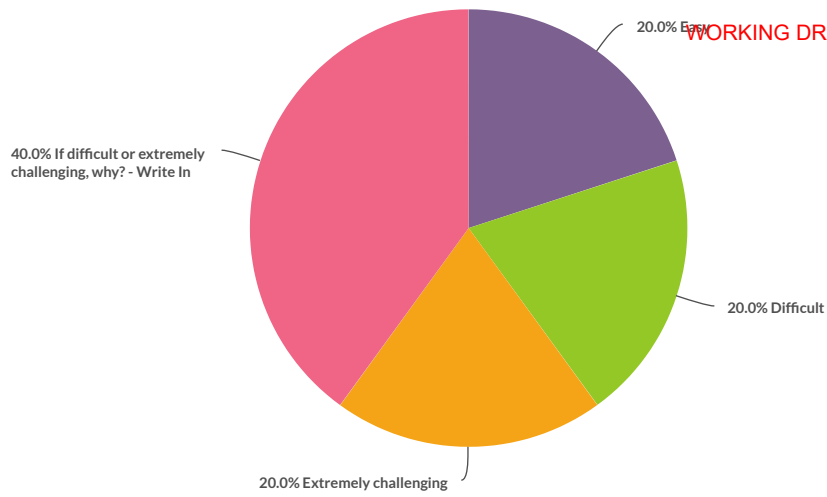
Value	Percent	Responses
Medium	40.0%	2
Difficult	40.0%	2
<a href="#">If difficult or extremely challenging, why? - Write In (click to view)</a>	20.0%	1
		<b>Totals: 5</b>

9. A.7 Lake line guidelines and lakefront property provisions?



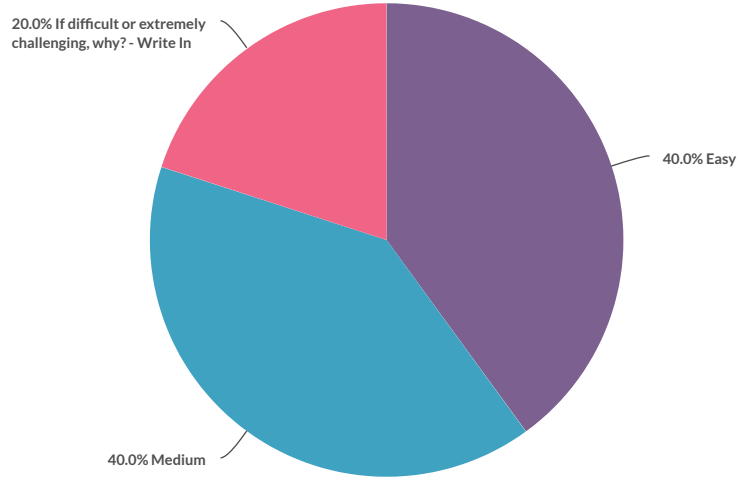
Value	Percent	Responses
Medium	20.0%	1
Difficult	40.0%	2
<a href="#">If difficult or extremely challenging, why? - Write In (click to view)</a>	40.0%	2
		<b>Totals: 5</b>

10. A.8 Over-water structure connection provisions and recommendations (floating homes, floating on-water residences, house barges and buildings on piers)?



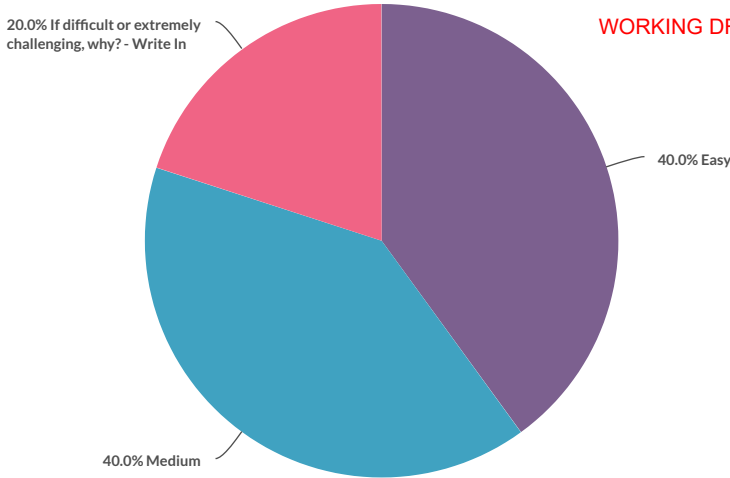
Value	Percent	Responses
Easy	20.0%	1
Difficult	20.0%	1
Extremely challenging	20.0%	1
<a href="#">If difficult or extremely challenging, why? - Write In (click to view)</a>	40.0%	2
		<b>Totals: 5</b>

11. A.9 Side sewer design guidelines in steep areas?



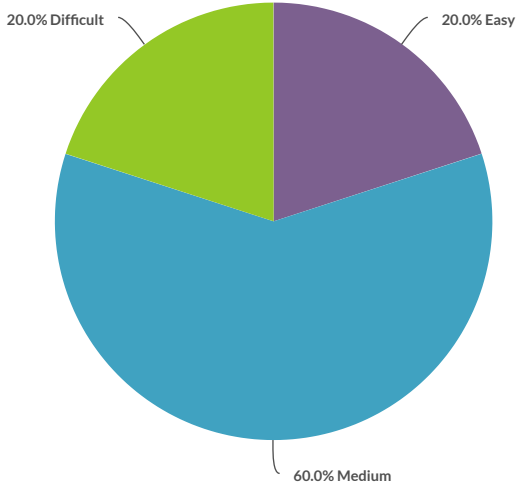
Value	Percent	Responses
Easy	40.0%	2
Medium	40.0%	2
<a href="#">If difficult or extremely challenging, why? - Write In (click to view)</a>	20.0%	1
		<b>Totals: 5</b>

12. A.10 Side sewer disconnection, reconnection, and demolition requirements?



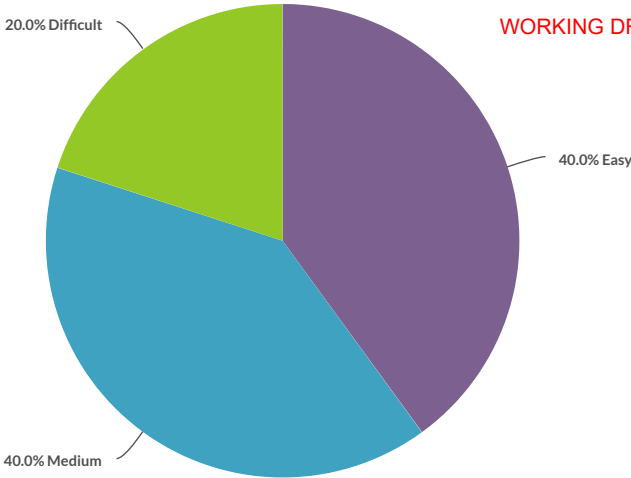
Value	Percent	Responses
Easy	40.0%	2
Medium	40.0%	2
<a href="#">If difficult or extremely challenging, why? - Write In (click to view)</a>	20.0%	1
		<b>Totals: 5</b>

13. B.1 Side sewer maintenance responsibility declaration and enforcement mechanism?



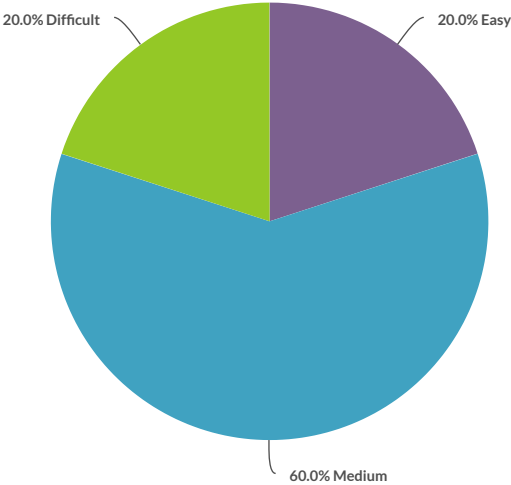
Value	Percent	Responses
Easy	20.0%	1
Medium	60.0%	3
Difficult	20.0%	1
		<b>Totals: 5</b>

14. B.2 Tree / sewer main separation requirement?



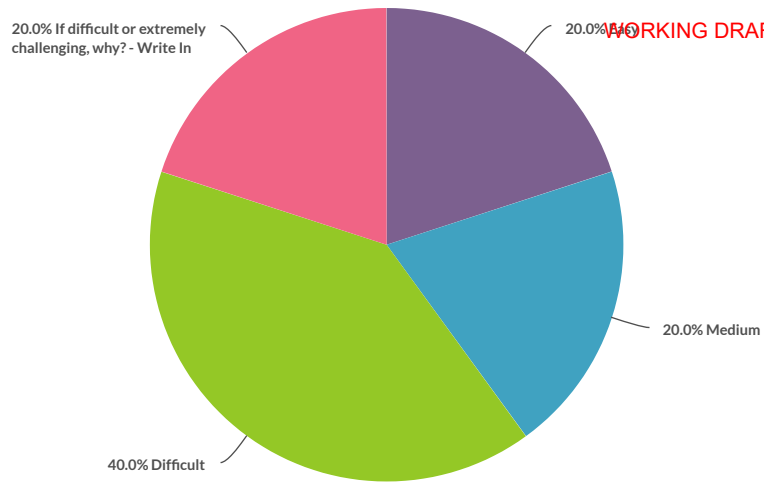
Value	Percent	Responses
Easy	40.0%	2
Medium	40.0%	2
Difficult	20.0%	1
		<b>Totals: 5</b>

15. B.3 Model courtesy notice to property owner / occupant regarding roots observed in lateral connection?



Value	Percent	Responses
Easy	20.0%	1
Medium	60.0%	3
Difficult	20.0%	1
		<b>Totals: 5</b>

16. B.4 Model web content for local agencies?

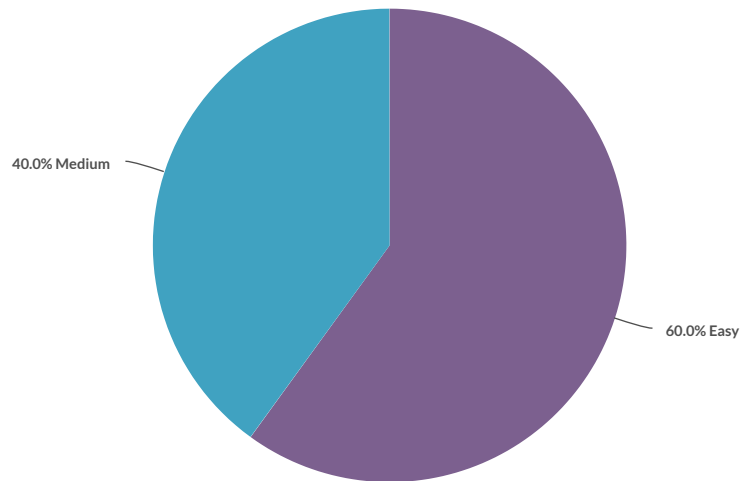


Value	Percent	Responses
Easy	20.0%	1
Medium	20.0%	1
Difficult	40.0%	2
<a href="#">If difficult or extremely challenging, why? - Write In (click to view)</a>	20.0%	1

Totals: 5

If difficult or extremely challenging, why? - Write In	Count
Not sure of the question	1
Totals	1

17. B.5 Side sewer maintenance guidance documents?



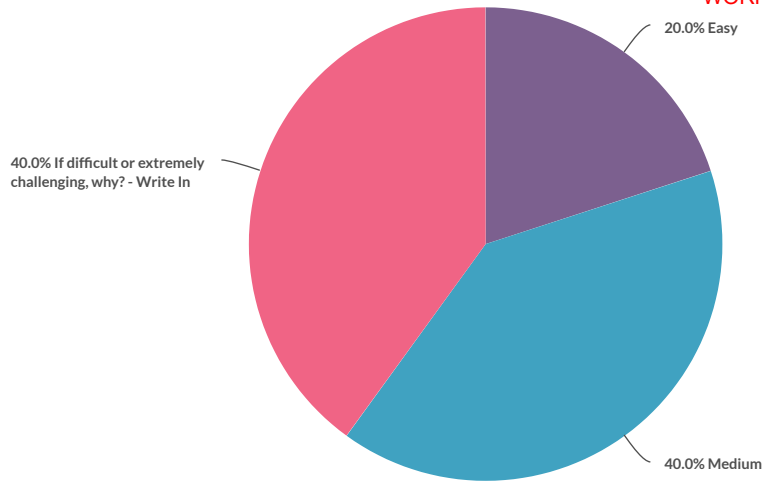
Value	Percent	Responses
Easy	60.0%	3
Medium	40.0%	2

Totals: 5



18. C.1 Side Sewer Closed-Circuit Television (CCTV) inspection Specification?

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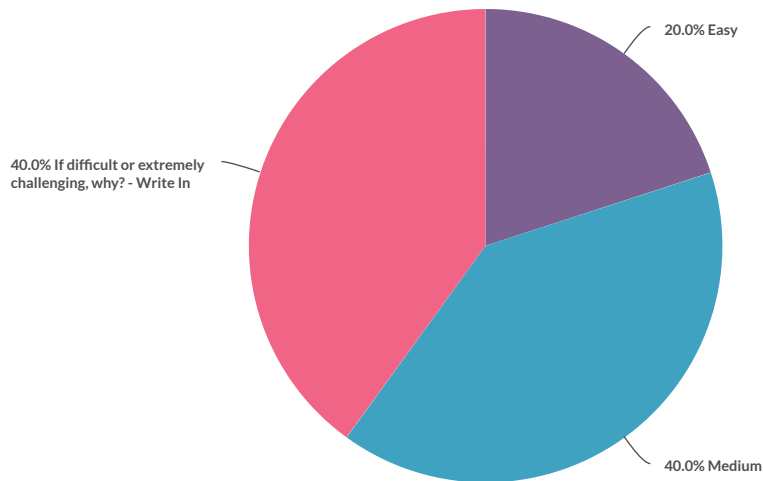


Value	Percent	Responses
Easy	20.0%	1
Medium	40.0%	2
<a href="#">If difficult or extremely challenging, why? - Write In (click to view)</a>	40.0%	2

Totals: 5

If difficult or extremely challenging, why? - Write In	Count
Difficult because we have nothing in place at this time.	1
We only go to property line. Some hard to reach	1
<b>Totals</b>	<b>2</b>

19. C.2 Rainfall Simulation / Dye Testing Specification?



Value	Percent	Responses
Easy	20.0%	1
Medium	40.0%	2
<a href="#">If difficult or extremely challenging, why? - Write In (click to view)</a>	40.0%	2

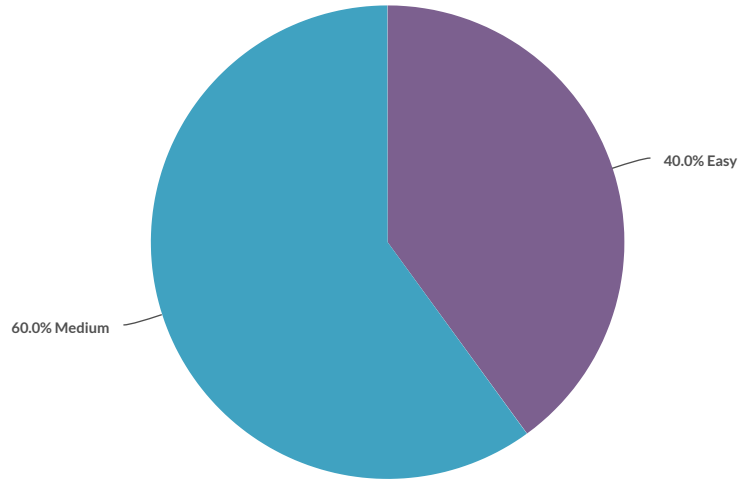
Totals: 5

If difficult or extremely challenging, why? - Write In

Count  
**WORKING DRAFT FOR DISCUSSION**

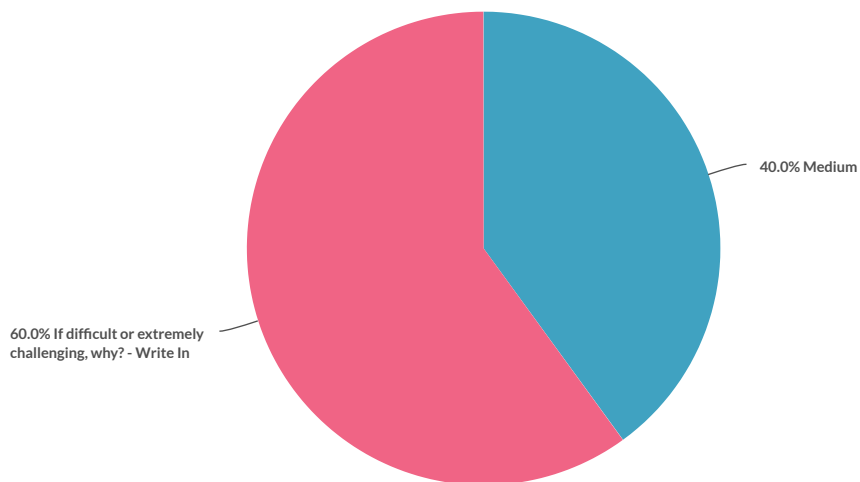
Although adoption of the specs would fairly simple, specifying when we'd use or require one may be an issue.	1
Difficult because we have nothing in place at this time.	1
<b>Totals</b>	<b>2</b>

20. C.3 Illicit source disconnection public education materials?



Value	Percent	Responses
Easy	40.0%	2
Medium	60.0%	3
		<b>Totals: 5</b>

21. C.4 Cleanout cap replacement program?



Value	Percent	Responses
Medium	40.0%	2
<a href="#">If difficult or extremely challenging, why? - Write In (click to view)</a>	60.0%	3
		<b>Totals: 5</b>

**If difficult or extremely challenging, why? - Write In**

**Count**  
**WORKING DRAFT FOR DISCUSSION**

Depends if our agency would be required to replace v. inform	1
Difficult because we have nothing in place at this time.	1
We have not had much of a problem with drainage from yards into the sewer system.	1
<b>Totals</b>	<b>3</b>

22. Please add any additional thoughts on the BMPs your agency would find difficult or extremely challenging to implement.

relevant standard standards  
difficult lake lines  
analysis feel  
change adopt free  
applicable answers  
questions problem marked

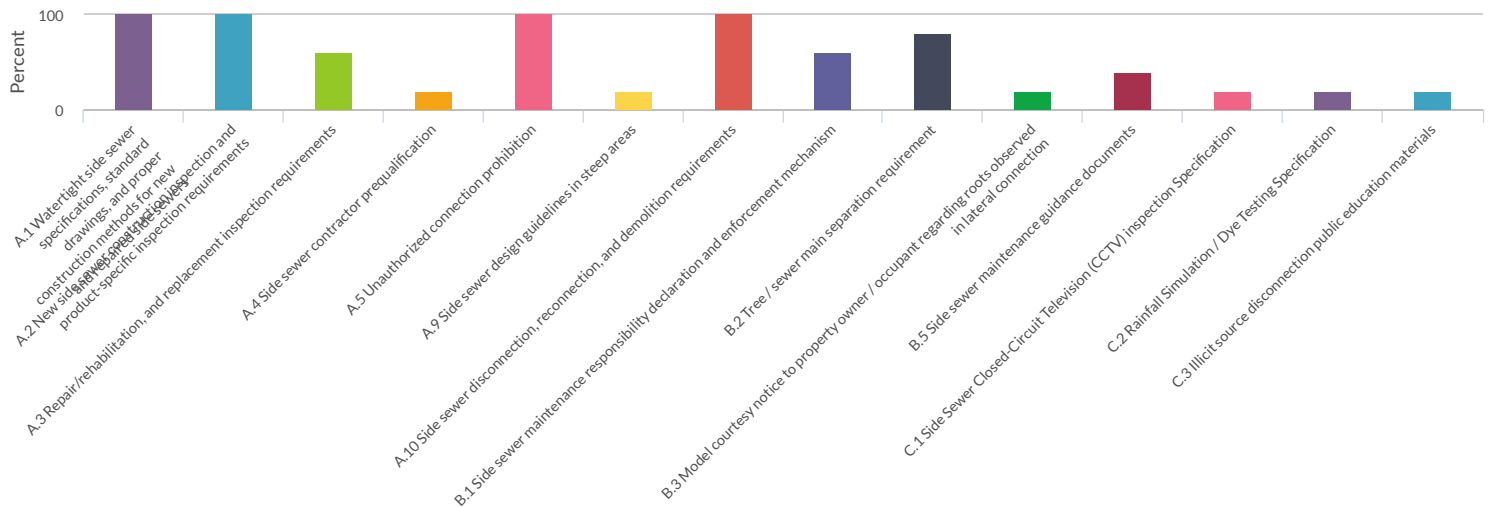
Hide Responses ▾

**ResponseID Response**

14 The non-applicable standards (i.e. lake lines) would not really be a problem for us, but we wouldn't adopt the standard, so I marked them as difficult. Feel free to change those answers to make any analysis of those questions more relevant.

◀ Previous Page Next Page ▶

23. Which of these BMPs (if any) are you currently implementing? (select all that apply)



Value	Percent	Responses
A.1 Watertight side sewer specifications, standard drawings, and proper construction methods for new and repaired side sewers	100.0%	5
A.2 New side sewer construction inspection and product-specific inspection requirements	100.0%	5
A.3 Repair/rehabilitation, and replacement inspection requirements	60.0%	3

Value	Percent	Responses
A.4 Side sewer contractor prequalification	20.0%	1
A.5 Unauthorized connection prohibition	100.0%	5
A.9 Side sewer design guidelines in steep areas	20.0%	1
A.10 Side sewer disconnection, reconnection, and demolition requirements	100.0%	5
B.1 Side sewer maintenance responsibility declaration and enforcement mechanism	60.0%	3
B.2 Tree / sewer main separation requirement	80.0%	4
B.3 Model courtesy notice to property owner / occupant regarding roots observed in lateral connection	20.0%	1
B.5 Side sewer maintenance guidance documents	40.0%	2
C.1 Side Sewer Closed-Circuit Television (CCTV) inspection Specification	20.0%	1
C.2 Rainfall Simulation / Dye Testing Specification	20.0%	1
C.3 Illicit source disconnection public education materials	20.0%	1

WORKING DRAFT FOR DISCUSSION

24. Any comments on BMPs your agency is currently implementing?

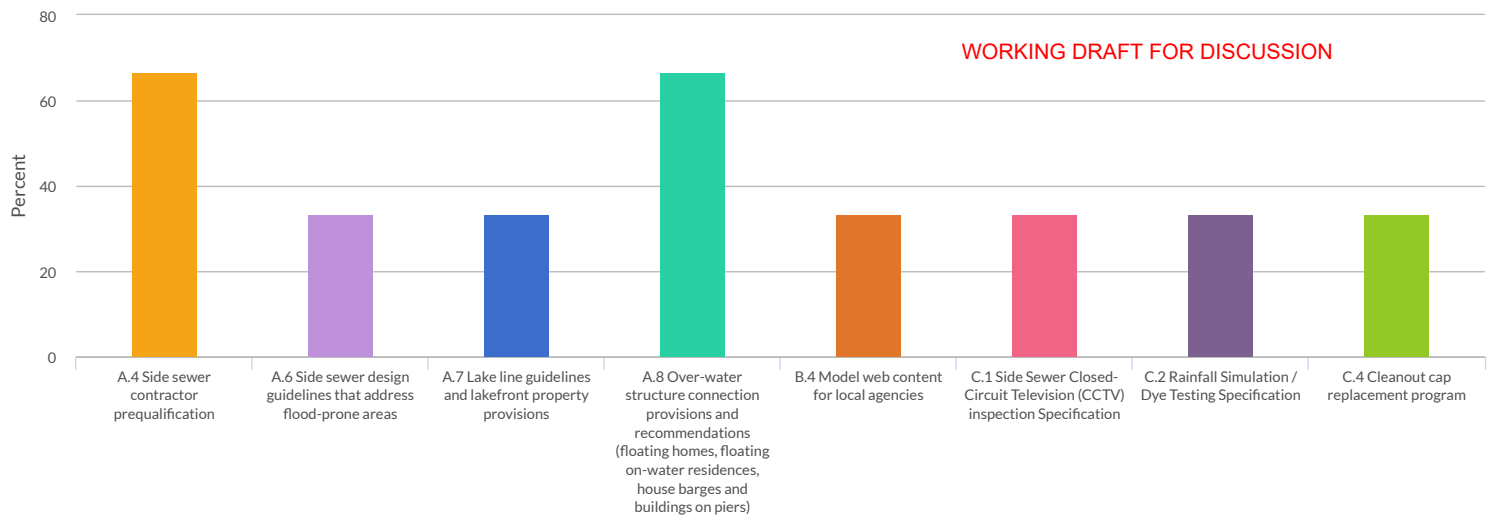
extensive intended  
 barrier  
 elements 0 list or  
 easements conform  
 root

Hide Responses ▾

ResponseID	Response
13	B.2 We do some elements of this. Root barrier within easements.
14	The ones we currently use may not be as extensive or thorough as intended by this list, so some changes may need to be made to conform if appropriate.

◀ Previous Page Next Page ▶

25. Which, if any, of these BMPs are not applicable to your agency? (select all that apply)



Value	Percent	Responses
A.4 Side sewer contractor prequalification	66.7%	2
A.6 Side sewer design guidelines that address flood-prone areas	33.3%	1
A.7 Lake line guidelines and lakefront property provisions	33.3%	1
A.8 Over-water structure connection provisions and recommendations (floating homes, floating on-water residences, house barges and buildings on piers)	66.7%	2
B.4 Model web content for local agencies	33.3%	1
C.1 Side Sewer Closed-Circuit Television (CCTV) inspection Specification	33.3%	1
C.2 Rainfall Simulation / Dye Testing Specification	33.3%	1
C.4 Cleanout cap replacement program	33.3%	1

26. Please explain why each (if any) BMP you selected in Question 22 above is not applicable to your agency.

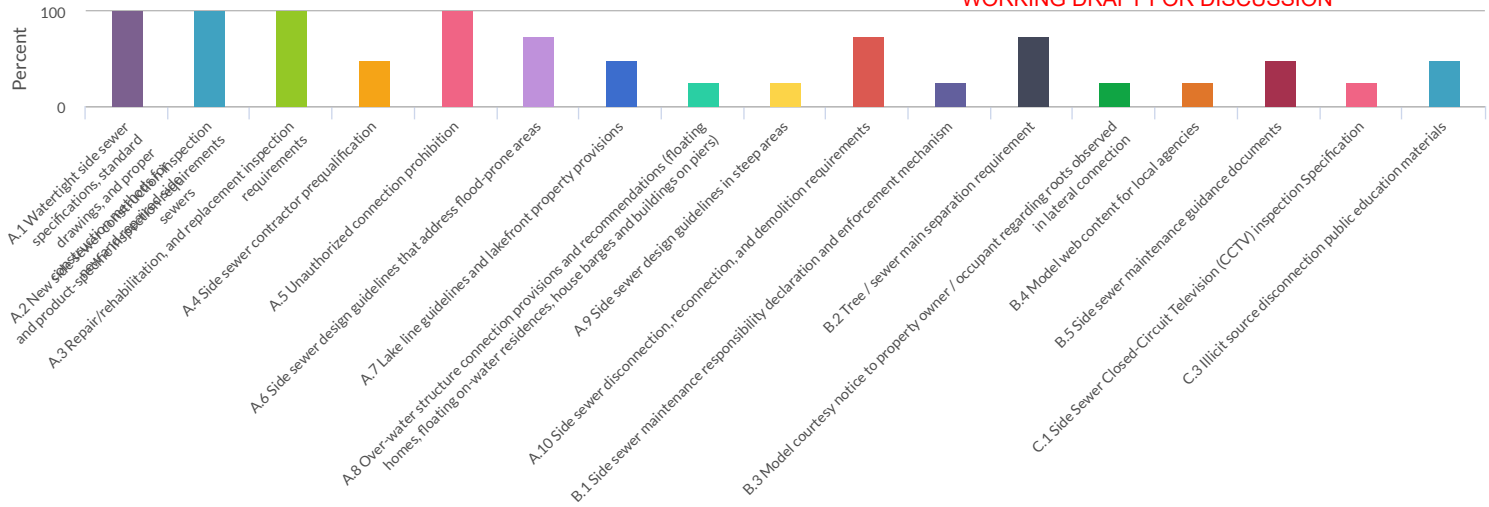
recommend structures  
inspect lake lines owner  
consent considered  
require houses 2 or home property  
water 10  
private prequalification jurisdiction

[Hide Responses](#) ▼

ResponseID	Response
13	A.4 Not going to recommend who to use on private property A.8 No houses over water C.1 and C.4 - No jurisdiction on private property, do not want to inspect without home owner consent
14	We currently don't require prequalification, although that could be considered. We do not currently have lake lines or structures above water.

27. Which BMPs would you propose to include in a toolbox as best meeting the goals and objectives? (select all that apply)

WORKING DRAFT FOR DISCUSSION



Value	Percent	Responses
A.1 Watertight side sewer specifications, standard drawings, and proper construction methods for new and repaired side sewers	100.0%	4
A.2 New side sewer construction inspection and product-specific inspection requirements	100.0%	4
A.3 Repair/rehabilitation, and replacement inspection requirements	100.0%	4
A.4 Side sewer contractor prequalification	50.0%	2
A.5 Unauthorized connection prohibition	100.0%	4
A.6 Side sewer design guidelines that address flood-prone areas	75.0%	3
A.7 Lake line guidelines and lakefront property provisions	50.0%	2
A.8 Over-water structure connection provisions and recommendations (floating homes, floating on-water residences, house barges and buildings on piers)	25.0%	1
A.9 Side sewer design guidelines in steep areas	25.0%	1
A.10 Side sewer disconnection, reconnection, and demolition requirements	75.0%	3
B.1 Side sewer maintenance responsibility declaration and enforcement mechanism	25.0%	1
B.2 Tree / sewer main separation requirement	75.0%	3
B.3 Model courtesy notice to property owner / occupant regarding roots observed in lateral connection	25.0%	1
B.4 Model web content for local agencies	25.0%	1
B.5 Side sewer maintenance guidance documents	50.0%	2
C.1 Side Sewer Closed-Circuit Television (CCTV) inspection Specification	25.0%	1
C.3 Illicit source disconnection public education materials	50.0%	2

28. Any comments on the BMPs you selected to include in a tool box?

difficult prove  
 b2 a10  
 standards enforcement

[Hide Responses](#) ▾

ResponseID	Response
13	With A10 and B2, enforcement of these standards could prove difficult

[◀ Previous Page](#) [Next Page ▶](#)

29. Based on your agency's input, do you see any opportunities/needs to revise the draft goals, objectives, and success factors? If yes, what do you suggest?

**No data:** No responses found for this question.

[Hide Responses](#) ▾

ResponseID	Response
13	N/a

[◀ Previous Page](#) [Next Page ▶](#)

30. If you consulted / coordinated / communicated with any other MWPAAC agencies before completing this survey, please indicate which one(s).

consult other  
 agencies

[Show Responses](#) ▶