Private Sewer Laterals: A Summary of Governance Issues and Strategies to Address Infiltration and Inflow

August 2007

GVRD

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1.0 Purpose

This report explores governance issues and strategies used by communities across North America to tackle infiltration and inflow (I/I) problems associated with private sewer laterals. The purpose is to highlight relevant financial and legal mechanisms to repair and replace these laterals so that Greater Vancouver Regional District municipalities consider developing appropriate measures and strategies to address I/I in their communities.

2.0 Issue

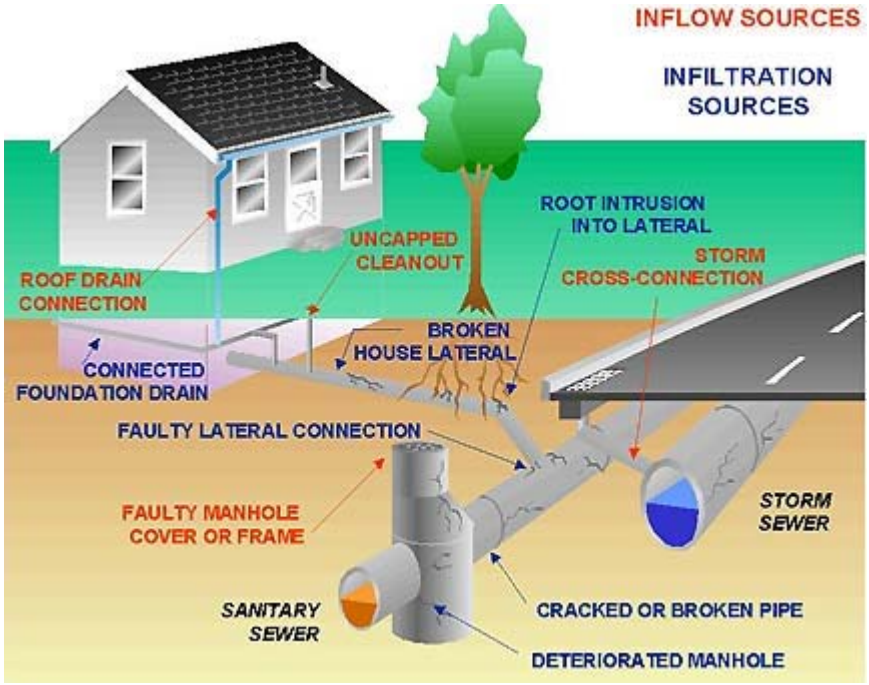
A private sewer lateral refers to the sewer pipe connecting the privately-owned building to the public sewer system. Unfortunately, these laterals are susceptible to I/I if improperly installed, maintained, repaired, or replaced. Excessive I/I can lead to the construction of oversized conveyance and treatment facilities or sewage overflows.

Within the Greater Vancouver Regional District (District), private sewer laterals constitute 8,500 kilometres or over 50% of the overall sewer system. However, unlike the municipal and regional sewer systems, these private laterals remain largely unmanaged. The contribution of I/I to the volume of wastewater treated varies according to system characteristics (e.g., system age, pipe material, groundwater conditions, maintenance, etc.), but estimates indicate a range of 30-80% (Water Environment Research Foundation, 2006). Although each individual sewer lateral is unlikely to impact the overall performance of the system significantly, the cumulative effects from all residential dwellings can have a major impact. Since an estimated 285,000 homes and apartments were built before 1990 (150,000 of these are pre-1970) within the District, the concern is that I/I from these older private sewer laterals is likely to be a significant problem for many years to come unless mitigated.

3.0 Definition of Private Sewer Lateral Infiltration and Inflow

Infiltration refers to subsurface flow, or groundwater, that seeps into the private lateral through holes, breaks, joint failures, defective connections, and other openings. The volume of infiltration is usually greatest during prolonged wet periods or after storms.

Inflow is stormwater that rapidly flows into the private sewer lateral via roof and foundation drains, downspouts, catch basins, manhole covers, and other sources (Figure 1).



(From King County website, 2005)

Figure 1: Infiltration and Inflow Sources

4.0 Mandate

The District together with its member municipalities began implementation of their Liquid Waste Management Plan (LWMP) in 2002 to address stormwater, wastewater treatment, sewage collection and non-point source liquid waste issues. A key strategy of this plan is to maintain sewage infrastructure and stretch capacity so that it provides reliable service, minimize the risk of spills to the environment, and avoid expensive future expenditures due to deferred maintenance and repairs.

Based on this strategy, the District developed a policy for Infrastructure Management (P8) for *Separate Sanitary Sewer Systems*. The Infrastructure Management policy states that "The District and its member municipalities will establish sewer infrastructure management programs that will maintain the regional trunks and interceptors, the municipal collection system, **and the private service laterals** in a state of good repair." The commitment developed from this policy (Infrastructure Management - C19) states that, "The District and its member municipalities will establish ongoing sanitary sewer system evaluation programs to determine the condition of the regional trunk sewerage system, the

municipal sewer system, **and private property service laterals**. As required, legislative and legal authority will be sought to address infiltration and inflow originating **from private property service laterals**."

5.0 Private Sewer Laterals - Current Knowledge and Techniques

It is only in the last decade that issues related to private sewer laterals have come to the forefront, under the scrutiny of wastewater utilities, public health and environmental agencies, NGOs, and the public. The recent interest in I/I reduction has generated numerous studies on the techniques for safe inflow removal and lateral rehabilitation and replacement (Water Environment Research Foundation, 2006). Although the effectiveness of the various techniques vary to the particular conditions, successful I/I programs occur with a combination of proper training and skills, quality control, and quality assurance.

The 2006 Water Environment Research Foundation (WERF) report, "*Methods for Cost-Effective Rehabilitation of Private Lateral Sewers*"(discussed below), examines the state of the knowledge of cost-effective inspections, rehabilitation techniques, and financial and legal issues surrounding lateral rehabilitation. This state-of-the art report illustrates how communities in North America and abroad are wrestling with this issue and how they can go about implementing a program. Other institutions and wastewater agencies undertook similar or more focused examinations to address I/I concerns specific to their needs.

Below is a synopsis of three of the most current and relevant reports that deal with infiltration and inflow issues. Other relevant and more specific data pertaining to how municipalities address I/I from private sewer laterals is discussed later in the report including Table 1 and Appendix A.

Synopsis of:
a) Methods for Cost Effective Rehabilitation of Private Sewer Laterals, WERF 2006

This report explores a wide variety of issues and topics associated with the rehabilitation of private sewer laterals. Specific details of individual initiatives are provided where available. This publication is of interest to policy makers, program managers, operation and maintenance personnel, and decision-makers.

This report provides a clear understanding of problems associated with private sewer laterals and ways to address it. The WERF document explains available options for inspection, methods for evaluation and techniques for rehabilitation. In addition, the report examines the financing and legal issues that affect private sewer rehabilitation. The purpose it to guide those who formulate policy recommendations (directors of public works utilities, city engineers, general managers, planners, financial managers, etc.) so that they are able to present,

with appropriate justification, a sound course of how to manage problems with sewer laterals in their community to politicians and the general public.

The potential range of parameters affecting the cost-effectiveness of lateral rehabilitation and the relatively small number of municipalities that have reported to date on this issue makes it difficult to answer in a general way the question "Do the benefits of private sewer lateral rehabilitation outweigh the costs?" Some systems achieved significant results reducing peak flow and annual flow by including lateral rehabilitation in their I/I reduction approaches. Other systems concluded that dealing with laterals and particularly private laterals is not worthwhile—at least at the present time. It is hoped, however, that this report provides guidance on the assessment, analysis, program development, method selection and legal and financial implementation that will make it an easier task to decide how to implement lateral rehabilitation within an overall wastewater system rehabilitation strategy.

Synopsis of:
b) Emerging Technologies for Conveyance Systems, USEPA 2006

The focus in this guide is on the availability, specifications and performance of various technologies, techniques and best management practices in a very detailed way. This publication is of particular interest to operations and technical personnel.

The purpose of this document is to provide a source of information on the newer, reliable and cost-effective conveyance systems technologies. This document:

- identifies nearly 100 conveyance system rehabilitation, replacement, and evaluation technologies that may extend the life of a conveyance system.
- classifies their development as established (utilized in many locations), innovative (tested at a demonstration scale and are available in at least some locations) or embryonic (in development stage and/or have been laboratory tested).
- provides a Technology Summary Sheet for each innovative or embryonic process with information about the description, state of development, associated contract names, and data sources.
- compares innovative processes/methods with respect to various criteria.
- identifies research needs to guide the development of innovative conveyance system management.

The document also provides information on each technology—its objective, its description, its state of development, available cost information, associated contact names and related data sources. For each innovative technology, this document further evaluates the technology with respect to other criteria, although it does not rank or recommend any one technology over another.

Synopsis of:
c) Review of the State of Knowledge of Municipal Effluent Science and Research, CCME/Hydromantis 2006

This report considers a variety of issues from large, urban utilities to small, rural ones within a Canadian context. Private sewer laterals are discussed only in a minor way. The publication is of particular interest to policy makers and decision-makers at a general level.

The objectives of the entire study are to:

1. Prepare a comprehensive consolidated inventory of harmful substances and emerging problematic substances found or likely to be found in Canadian Municipal Wastewater Effluent (MWWE). It identifies substance sources, typical effluent concentrations, and an annotated assessment of effects on the natural aquatic environment and on human health associated with the various substances or groups of substances.
2. Prepare an annotated summary of existing and emerging treatment technologies for treatment of conventional pollutants, harmful substances and emerging pollutants. The technologies will be assessed for their applicability to variations in Canadian Climates, environments, regions and receiving waters.
3. Provide a review of best management practices for specific issues related to municipal wastewater treatment, including but not limited to:
    - infiltration and inflow to municipal sewer systems
    - reduction and treatment of sanitary and combined sewer overflows (SSOs and CSOs)
    - management of hauled wastes such as septage, landfill leachate or industrial/commercial wastewaters
    - small or remote community wastewater issues, including treatment cost and pollutant management
    - discharges of treated effluents to marine environments
    - lagoon issues, including ice cover and ammonia removal in winter, and algae removal in summer
    - flow reductions to wastewater treatment plants using alternative technologies and source control plans, including water reuse and reclamation technologies
    - aging collection systems needs and upgrading practices
    - wastewater treatment facility performance monitoring and quality control practices

6.0 Summary of Governance Issues and Strategies

A number of recent studies and reports were examined with regard to governance issues and strategies. A summary of key findings is presented in this section.

To address sanitary sewage overflows and stretch infrastructure capacity, an infiltration and inflow program must tackle both the public and private components of the system to be successful. Policy makers and program managers should think creatively to find governance tools which allow a more equal sharing of the costs and benefits of the initiative, yet achieve the utility's goal of reducing I/I contributions to the wastewater system.

For a private lateral program to thrive, it typically takes a coordinated approach based on an education program, strong bylaws and inspection programs for their enforcement, and a solid financing mechanism. Fortunately, municipalities throughout the USA and abroad have begun to address theses issues and have developed some innovative governance models and financing arrangements to move beyond these barriers. To keep pace with the leaders, Canadian municipalities need to address private laterals in a proactive rather than reactive manner. Table 1 and Appendix A provide Canadian and American examples on how municipalities are addressing I/I from private sewer laterals.

A strong education program is required to engage citizens regarding private sewer lateral I/I issues and to make them part of the solution (Simpson, 2005). Most residents are presently unaware of the troubles associated with I/I and often not interested in learning more as they perceive their property to cause an insignificant amount towards the problem. Even if the need for repair or replacement of private sewer laterals is understood, a complication of this type of retrofit is that the costs for lateral repair or rehabilitation are normally assessed to the household. The high cost of repair, often between $2,000 and $10,000 depending on the circumstance, can make property owners reluctant to undertake the work especially if it has little or no perceived benefit to their property values. Consequently, it is important for an agency to demonstrate that an I/I program is justified and that the benefits outweigh the costs (e.g. private lateral rehabilitation costs are less than adding system capacity and/or a bigger treatment facility).

Legal issues commonly associated with dealing with laterals on private property include access to private property, liability, and using public money on private property. In the U.S., obtaining access to private property was difficult until municipalities demonstrated that the rights of the owner were overridden by the interest of the public in the safe and efficient operation of the sewer system. As a result, a well-written and comprehensive bylaw that addresses I/I from private

sewer laterals is important to be able to withstand challenges to municipal authority.

In British Columbia, the *Community Charter (SBC 2003) Chapter 26* provides the basis and the powers for municipalities to develop bylaws to address I/I on private property. Most of the backbone for this is found in the *Charter* under the following:

Part 2 - Municipal Purposes and Powers
Division 1 – Purposes and Fundamental Powers
7 Municipal Purposes
8 Fundamental Powers

Division 3 – Ancillary Powers
16 Authority to enter on or into property
17 Municipal action at defaulter's expense
18 Authority to discontinue providing a service

Although the homeowner is usually responsible for maintaining the private sewer laterals on private property, municipalities have historically avoided replacing and repairing these laterals because of liability concerns (WERF, 2006). Recently, municipalities have structured their private lateral program to minimize their liability by allowing qualified private contractors to undertake the work and assume responsibility.

Using public money to finance private lateral rehabilitation has been legally challenged in the U.S. in the past. However, it is documented that if the public expenditure is for the greater good of the public then it is justifiable. King County has argued that a precedent was set in Washington when electrical utilities provided conservation incentives to private homeowners, thereby justifying the use of public money from utilities to address I/I from dwellings. In Canada, using public money for private benefits for the overall greater good of society is more firmly entrenched. In Ontario, Windsor and Hamilton are examples of two cities that provide public money as incentives to rehabilitate private laterals (see Table 1 and Appendix A) albeit in a reactive manner.

The final important component to ensuring a sound private lateral I/I program is financing. Before private lateral programs can be initiated it may be necessary to prove that a lateral is defective, determine who is responsible for the problem, determine how it is to be financed, and assess whether the owner is able to pay (WERF, 2006). In the GVRD, approximately 150,000 dwellings were built before 1970. If 25% of the private laterals were defective and it cost $5,000 per dwelling to fix, the total cost would be approximately $190 million. Where will the money come from to pay for this I/I program? Is it going to be an owner-pays strategy, utility funded, or some combination of the two? Results from King County's 5-

Year Pilot Program indicate that the utility pay approach is the most effective and efficient. Other municipalities have used incentive programs to cost-share the expense of fixing private laterals (e.g. Vallejo, Ca., Windsor, Ont.). By contrast, Berkeley, California has put the onus on the homeowner to address the private lateral and has passed a bylaw stipulating that before homeowners sell their homes, a sewer lateral certificate must be obtained. If the home does not pass the inspection, then the owner must repair the sewer pipe before it can be sold.

7.0 Summary

This report explores governance issues and strategies used by communities across North America to tackle infiltration and inflow problems associated with private sewer laterals. Over the past decade, numerous public works agencies, particularly in the United States, have tried to determine the most effective and efficient course of action to tackle this issue within their community. In general, the key components to addressing I/I from private sewer laterals include public education, a strong legal basis (bylaws and enforcement), clear communication between the governing agency and the homeowner, and sound financing.

Table 1: Infiltration and Inflow - Governance Examples for Private Sewer Laterals

Location	Legislated/ Enforced	Primary Focus	Responsibility	Incentives	Disincentives	Education Programme	General Information
Oak Bay, B.C.	Province and City bylaw	I/I (inflow)	Homeowner	New downspout disconnection bylaw. If tree roots from City trees affect lateral then may be compensation depending on the type of problem. If the pipe is aging or deteriorating then the owner may be held accountable and pay according to a formula they've developed. If problem due to an issue on the sewer main or the connection then the City may pay depending on the age of pipe.			See Bylaw No. 3891, 4171 Owner responsible for maintaining, repairing, and replacing private lateral including the public portion.
District of Saanich, B.C.	City bylaw	I/I	Homeowner		Owner responsible for repairing or replacing a sanitary sewer connection due to a blockage or damage due to a condition that has developed on private property, an improper connection, or a prohibited waste being discharged by the owner.		Owner is responsible for repairing or replacing private lateral. Disincentive could be costly to the owner. See Bylaw No. 8133
Esquimalt, B.C.	City bylaw	I/I	Homeowner	If there is a blockage in the public portion of the lateral, the City will pay up to $200 in compensation.			Owners should contact their insurance company as the Municipality Is not liable for damages.
Hamilton, Ontario	Province and City bylaw	I/I (infiltration)	Homeowner (City to a lesser extent)	City on a one-time basis will repair or replace the private lateral if caused by City tree roots up to a maximum $1,500. City will maintain, repair, replace the public portion of the sewer lateral except when the blockage is due to the negligence of the owner or a special arrangement with the City.		Yes	Reactive approach. Bylaw states that owner is responsible for properly maintaining, repairing, and replacing the lateral on the private and public portion. See bylaw No. 06-026 City has inspection and powers of entry ,at reasonable times, subject to proper notice under the Municipal Act (Parts XIII, XIV
Toronto, Ontario	Province and City bylaw	I/I (inflow)	Homeowner and City	City will provide downspout disconnections as required.		Yes	Since 2004, downspouts disconnected on 3400 homes. Basement flooding a concern. Wet Weather Master Plan developed in 2003. No known private lateral program at this point in time other than addressing illegal connections when doing trunk sewer upgrades.
Windsor, Ontario	Provincial City bylaw	I/I (infiltration)	Homeowner and City.	City provides eel service up to 3 times in a 24-month period and assumes the cost of clearing blockages caused by tree roots.			Reactive approach

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Location	Legislated/ Enforced	Primary Focus	Responsibility	Incentives	Disincentives	Education Programme	General Information
Windsor, Ontario (cont'd)				If the private lateral needs replacing, the City will enter into an agreement with the owner to correct the defects. If an agreement is reached, the City will pay up to $1,400 or 50% whichever is less. The owner will pay the City for doing the work within 30 days of the date of the invoice or paying in full by way of 5 equal installments plus calculated interest at the rate of prime plus 1%. If the owner takes the latter route to pay, a lien is held against the house.	If no agreement with City then the owner pays the full amount.	Yes	May be the oldest private sewer replacement program in the country. see Bylaw 4921: Servicing of Private Sewer Connections
Waterloo, Ontario	Province and City bylaw	I (infiltration)	Homeowner and City	City provides a free 24-hour sewer lateral blockage, clearing service. If lateral (bituminous black pipe) needs replacing due to structural failure, the entire cost of the replacement is borne by the City.			Approximately 4000 black sewer laterals were installed during the 1950's and 60's. Note: Aurora, Ontario had a similar issue with Black pipe and the homeowner was responsible for payment. All other sewer pipe types are the responsibility of the owner. See Bylaw 81-118 sec 7
Ottawa, Ontario	Province and City bylaw	I/I (inflow)	Homeowner		Every person who contravenes the relevant provisions of the sewer use bylaw is liable for a fine $10,000 on 1st offence and < $25,00 for subsequent offences.	Yes	Right-of-entry shall not be prevented, hindered, obstructed, or interfered with as long as not entering the dwelling of the home. Most concerned about basement flooding.
McMinnville, Oregon	Federal, State Local Bylaws	I/I	Homeowner	Owner has 90 days to fix problem after being informed. If done to satisfaction, a 10% rebate is offered up to $250. City only provides financial assistance if the owner is unable to pay. It must be paid within 24 months plus a 25% surcharge is is added. Interest is 3.5% per annum. A lien is put against the house until paid.	If do not fix the problems within 90 days, owner will be fined $50/month until work is done.	Yes	Private lateral, downspout, and foundation drain program expected to take 10-20 years to complete. Believe 60% of I/I from these sources.
City of Sweet Home, Oregon	Federal, State, Local Bylaws	I/I	Homeowner and in special conditions the municipality	If within Sewer Lateral Rehabilitation Area, the City may undertake the work at no cost to the owner, but only once. Afterwards, the responsibility falls to the owner. City does investigation of pipe and informs owner of the corrective work required.	If the owner does not take corrective action within a specified time (at least 45 days from when informed by the City), then the owner is subject to penalties.	Yes	Believed significant savings possible if rehabilitated private and public SS system. Established process for identifying and eliminating I/I on private property; procedures for notifying property owners of the need to correct defective laterals; procedures for inspection and repair of laterals by the City; procedures for owners to correct laterals.
King County, Washington	Not federally or state mandated. Local bylaws.	I/I	King County and the local agencies	Public-funded. Believe will cost-effectively remove enough I/I from the collection system to delay, reduce, or eliminate, otherwise need conveyance system improvement projects.		Yes	6-year pilot study complete. About to embark on I/I program on private property based on B/C work, flow data, and pilot studies. 4 pilot projects indicated that I/I on private property achieved the highest level of I/I reduction.

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Location	Legislated/ Enforced	Primary Focus	Responsibility	Incentives	Disincentives	Education Programme	General Information
King County, Washington (cont'd)							Legal analysis indicated that I/I cost-effective and the expenditure of public funds is defensible and not in violation of state laws. Intend to proceed with initial projects to demonstrate feasibility of working on larger scale pilot projects.
Metropolitan Council Environmental Services Minneapolis-St Paul Region, Minnesota (MCES)	Local bylaws, Some issue s specific to State laws related to Inflows (sump pumps)	I/I (majority on inflow)	Homeowner MCES and local authorities	Cash rebates with the amount varying depending on the community. Mostly for foundation drain disconnections. For some communities, may be eligible to place the cost of sewer lateral repair or replacement on property taxes spread spread over a 10-year period.	Surcharge from excessive I/I to fund I/I reduction efforts. Communities have the right to appeal the surcharge (>25%). If communities do not meet I/I reduction goals by 2013, a demand charge is imposed by MCES to use to address the problem. If foundation drains remain connected, some communities charged an extra $100/month or more.	Yes	May limit increased wastewater service to communities with ongoing excessive I/I after 2013. Private sewer lateral program is in its infancy.
Berkeley, California	Federal, State City bylaws	I/I	Homeowner	To uphold a City law, all property owners who plan to sell their homes or remodel must prove that their private laterals are in good working order and not polluting waters. Owners are required to inspect, repair, and/or replace their private laterals prior to sale of property or obtain a permit if major remodeling exceeds $100,000 or $50,000 and involves more than two plumbing fixtures.	Violation is a misdemeanor but may be cited and prosecuted. (see bylaw on Sewer Laterals on Private Property Chap 17.24)	Yes	Program will help protect creeks, watersheds, and the Bay Area. It will also reduce the need for additional infrastructure.
Vallejo, California	Federal, State City bylaws	I/I	City and Homeowner	City funding for testing, repairing, or replacing private sewer laterals. District responsible for initial repairs if laterals fail test. Those that pass get an "A" certificate. Those that don't get repaired and are given a "B" certificate. Any future repair or maintenance is the responsibility of the owner.		Yes	Costs are evenly distributed among all users. District notifies all owners and tenants 90 days before tests. Ordinance No.92-69
Knoxville, Tennessee	Federal, City bylaws	I/I	City and Homeowner	City inspects private laterals and identifies defects to be corrected. Grants or loans are available to those who can't afford to pay.	After informing owner of defects or prohibited connections, the owner has 120 days to comply. If owner does not, then water service terminated	Yes	Lawsuit by Tennessee Clean Water Network forced City to take action.

8.0 References

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APPENDIX A - NOTES ON GOVERNANCE EXAMPLES

Appendix A – Notes on Governance Examples of I/I and Private Sewer Laterals

McMinnville, Oregon

- driven by EPA (Clean Water Act) and Oregon Dept of Enviro. Quality
- through monitoring, systematically evaluating town based on where they believe are problems (age & type of pipe, issues that have arisen, etc)
- estimated that 60% of city's I/I come from private sewer laterals
- policy is that private property owners are responsible for their private laterals
- if deemed defective and contributing to the sewage overflow problem then property owner pays
- after a householder is informed to fix the lateral, the owner has 90 days to get the work done
- the city recommends that the work be done by a qualified contractor
- roof downspouts and foundation drain connections also are addressed – a 2nd pipeline may be required
- if work done satisfactorily within 90 days then a 10% rebate is offered up to a maximum $250
- City only provides financial assistance if the owner is unable to pay for the work, but it must be paid off in 24 months and a 25% surcharge is added. Interest on the balance accrues at 3.5% annually
- a lien is placed upon the house until the work is paid off
- if the work is not done after 90 days of being informed, then property owners will be fined $50/month until the work is done (except under special circumstances)
- private lateral replacement program expected to take 10-20 years to complete
- *key words* – owner pays, small rebate, fines if don't undertake work, downspout pipes & basement drainage pipes need doing too

http://www.ci.mcminnville.or.us/city/departments/public-works-and-park-maintenance-sewer-faq/

City of Sweet Home, Oregon

Background

- driven by National Pollutant Discharge Elimination System (NPDES) and Mutual Agreement and Order (MAO) to eliminate all excessive I/I from the SS system
- completed Sanitary Sewage Master Plan in 2002 with one conclusion that they wanted to systematically replace older pipes including private sewer laterals

- believed would achieve significant cost savings if rehabilitated public and private components of SS system to reduce I/I
- established process for identifying and eliminating I/I on private property; procedures for notifying property owners of the need to correct defective laterals; procedures for inspection and repair of sewer laterals by the City; and a procedure for requiring owners to correct defective systems in a timely manner

Lateral Maintenance Responsibility

- state that property owners are responsible for all *sewer lateral preventative and corrective maintenance* activities **including** that portion of a sewer lateral connected to the property and located within the public right of way
- lateral structural maintenance on private property (whether or not a public easement has been granted) is the responsibility of the owners of the property served by the sewer lateral while if on public property, it is the responsibility of the City
- if the City performs lateral structural maintenance on private or public property, the City is responsible for the quality of work for 1 year, afterwards, the property owner assumes responsibility
- the City is not responsible for injury to persons or damage to property occurring due to a defect in a sewer lateral that existed prior to the initiation of the preventative, corrective, or structural maintenance or of a Sewer lateral Rehabilitation Project Area by the City under these rules
- City retains the right at all times for the property owners to maintain sewer laterals whether or not such owners are located in a Sewer Lateral Rehab. Project Area.

Inspection of SS Systems

- the City has the right to inspect and investigate the entire sewer system (public and private) using methods deemed appropriate (e.g. smoke testing)
- the City 1sts request permission to enter the property to conduct investigation, but if the owner does not comply, the City may enter the property in accordance with the procedures set forth in *Ordinance 13.08*. Notice of inspection is also given to the occupants of the premises (e.g. renters)
- following inspection, if the City determines that work is required, it notifies the owner that work is necessary on the private lateral and that is should be done within a specified time
- the City may notify the owner of the City's willingness to complete the necessary maintenance at no charge to the owner or occupant except as set forth in the following section
- City may require owner of property to conduct preventative and corrective maintenance or structural maintenance on a sewer lateral if

the owner rejected the City offer to do the work or did not respond within 30 days of the City's offer; the degree of owner or user involvement in creating the maintenance or structural problem requiring correction, or the expense of the correction and amounts budgeted by the City for making repairs or conducting maintenance system-wide or in a basin

- the City shall provide a description of the defects in writing, in person, or by certified mail
- notice will describe the type of maintenance or repair required and where it is suspected to occur, the date by which corrective action is required (at least 45 days from the date of the notice unless it is deemed that work needs to be done asap due to health or safety issues, a description of penalties if the owner fails to comply and the appeal process, and the permits required the city needs to inspect the corrective action undertaken to ensure that it was done properly
- the City may provide maintenance services , in its sole discretion, and contingent on available funding, at no, or limited expense to the property owner or occupant
- the City will do the above once and thereafter the responsibility falls to the property owner

http://www.ci.sweet-home.or.us/shpublicworks/index.htm

Portland, Oregon

- recently embarked on pilot study to determine I/I reduction
- taking a step-by-step approach for one particular area
- have first fixed the public main sewer and public lateral portions
- will undertake flow monitoring to determine if effective
- expect to do the private lateral portion
- how it will be done and who pays has not been determined

http://www.portlandonline.com/bes/index.cfm?a=71590&c31025

King County (Seattle area), Washington

- developed regional I/I control program in 1999 as part of their Regional Wastewater Services Plan
- in 2000, began a I/I control study to identify sources of I/I, test the effectiveness of various I/I control technologies, examine the B/C of I/I control, and prepare a regional plan

- comprehensive documents all through the 5-year process including an audit process
- program is voluntary with local agency cooperation, rather than wait for federal or state consent orders or regulatory mandates
- pilot studies corroborated that high I/I originates on private property
- 2006 report recommends that public money be spent on fixing private laterals
- essentially it buys capacity for the conveyance system so that additional works are not required
- from a legal perspective, determined that could spend money on private system using as an example the energy conservation approach taken by energy companies in the past
- did not recommend that a surcharge on local agencies for flows that exceeded targets be implemented because it would be difficult to implement and not be effective in their opinion.

http://dnr.metrokc.gov/WTD/i-i/index.htm

Berkeley, California

- effective October 1/06, a new City of Berkeley law will require all property owners who plan to sell or remodel their homes to prove that their private sewer lines are in good shape and not adding to polluted waters
- under Federal order, the City has to reduce the amount of water that flows into the sanitary sewer system
- half the water that enters the sewers during wet weather comes form deficient private sewer laterals (property owner responsibility) and from downspouts and yard area drains
- program will help protect water quality of creeks, watersheds, and the Bay
- property owners are required to inspect and, if necessary, repair or replace any private sewer lateral prior to sale of a property, or obtain a permit for a major remodelling project that costs more than $100,000 or costs $50,000 and involves more than two plumbing fixtures
- if you can prove that your sewer lateral is less than 20 years old, or that repair has been done in the last 10 years, the City will issue a Sewer Lateral Certificate of compliance at no charge.
- if you can't prove this than you need to have your sewer lateral inspected by CCTV conductor by a licensed plumbing contractor or sanitary sewer contractor

http://www.ci.berkeley.ca.us/pw/sewers/sewer.html

Vallejo, California

- funding to test, repair or replace private sewer laterals is through user fees
- the cost is distributed evenly among all users of the system
- District notifies all property owners and tenants 90 days before lateral testing
- District responsible for initial repair that fail test in a manner determined by District to be most cost-effective
- all private laterals that pass test will be given an "A" certificate
- when don't pass test, the laterals is repaired and a "B" certificate is issued
- any repair or maintenance of the lateral, after the initial repair by the District, will then be the responsibility of the property owner
- *see Ordinance No. 92-69*

http://www.vsfcd.com/

Minneapolis-St. Paul, Minnesota
(Metropolitan Council Environmental Services –MCES)

- I/I Surcharge Procedure Manual (January 2007) based on policy that it would not provide additional interceptor capacity to handle I/I

Foundation Drain Disconnection

- surcharge program for communities with excessive I/I problems
- includes a rebate to communities as they implement I/I programs – better than spreading it around to all communities (no free riders)
- estimated that 70% of I/I from private property
- surcharge program provides MCES with contingency funding to build additional capacity if necessary
- alternatively, it provides an incentive and mechanism for communities to fund the cost of mitigating their excess peak I/I
- want communities to end their peak flow by 2011 because by 2013, want to institute a wastewater demand charge program for those communities that have not met their I/I goals
- by 2013, no rebates or credits will be allowed
- surcharge amount exceeds 25% of the municipal wastewater charge
- can potentially limit increased wastewater service to communities with ongoing excessive I/I improvements
- 7 regional communities handle the "who pays and how" question in different ways
- because foundation drains were built when this technique was not illegal, feel there is little way to force or make property owner disconnect the drain

- the disconnection must be based on enacting a legal basis to proceed and providing an incentive to the property owner to comply
- most common incentive is the cash rebate with the amount varying depending on the community
- Duluth provides $1,800 to each property owner who disconnects the foundation drain from the house lateral (note that West Lafayette, Indiana provides a 100% rebate for disconnection, new sump pump installation, and lawn restoration)
- other communities have elected to impose a strong financial disincentive to remain connected by charging an extra $100 per month or more
- some metro areas won't add new development until old foundation drains are disconnected – the # of foundation drains to be disconnected for each new building permit depends on the severity of the I/I problem
- point-of-sale compliance requirements is another option (e.g. Rockford, Illinois)
- once the means to implement the disconnection program is determined, there should be a good public process to inform owners of the consequences

House Lateral Repair

- haven't proceeded to repair private sewer laterals on private property, but Duluth is undertaking a pilot project
- who pays still to be determined?
- see city funding program (www.fergusoncity.com/publicworks/sewer lateral program.asp

http://www.metrocouncil.org/environment/ProjectTeams/I-I-Home.htm

Monroe County (Rochester) New York

- from the Operations and Use Rules and Regulations Regarding I/I to the Pure Water System
- the Division of Pure Waters will identify neighbourhoods and locations that have suffered public or private I/I issues in the past or are likely to in the future
- if property owner has requested lateral be replaced, a fee will be charged if done by DPW
- undertake follow-up investigations and facility evaluations in neighbourhoods that have experienced severe or chronic problems
- DPW will implement public awareness programs that inform ratepayers of the problems associated with I/I
- if problems related to private property, the DPW will notify the owner by mail of conditions and the time schedule to comply

- DPW will re-inspect property within 6 months to 1 year to ensure that owner has complied
- if problem persists, the owner is subject to a surcharge (see Monroe County Code, Section 343-14, 343-44 to 343-49)

http://www.monroecounty.gov/des-purewaters.php

Knoxville, Tennessee

- lost court case and must repair its sewer lines (Clean Water Act)
- Knoxville Utilities Board (KUB) inspects private laterals and identifies defects to be corrected
- property owner informed of defect and given specific amount of time to correct the problem
- if don't address problems then KUB can shut off water service
- KUB offers aid through a grant or loan program to conduct the work

http://www1.kub.org/newsite/plp.shtml

Esquimalt, B.C.

- have policy regarding sewers and drainage blockage on private property
- owners are responsible for sewer and drain laterals on their property private easements
- if there is a blockage, owners shall first ensure that it is not in their system by having a plumbing or drain cleaning firm rod and clean the piping from their building to the property line
- if blockage is in municipal system the municipality will pay the costs and the owner can invoice the municipality for investigation costs up to $200.
- Municipality is not liable for damages arising from the malfunction of the sewer drain (see section 288 of Municipality Act – check)
- owners should contact their insurance company for reimbursement
- no mention of a proactive approach to assess private laterals to initiate repairs

http://www.esquimalt.ca/Engineering/sewers.htm

District of Saanich, B.C.

- see bylaw No. 8133 for the Administration and Regulation of Public Sewers
- owner is responsible for repairing or replacing a sanitary sewer connection as a result of a blockage or damage due to a condition that has developed on private property, an improper connection, or a prohibited waste being discharged by the owner

http://www.gov.saanich.bc.ca/resident/utilities/wastewater.html

Windsor, Ontario

- perhaps the oldest private sewer replacement program in Canada dating back to 1974
- bylaw 4921:Servicing of Private Sewer Connections
- the city provides eel service up to three times in a 24 month period and assumes the cost of clearing blockage caused by tree roots providing the connection is not over 100 feet in length
- in the event that servicing personnel find that the private sewer lateral is unserviceable owing to a lack of proper clean-out, inaccessibility of clean-out, main trap, damaged pipe, or immoveable obstruction, or if the equipment of the servicing staff becomes broken and lodged within the connection, staff will inform the owner of the deficiency
- the lateral is then declared ineligible for service by the city
- the city and the owner will enter into an agreement to replace the entire connection to city specifications, if not, any assistance by the city is terminated
- the owner will correct the deficiency through the use of city staff or with a qualified person – if an agreement is reached, the city will assume a cost not exceeding $1,400, 50% of the total cost of replacement, or the unit cost multiplied by the length of replacement on the public highway
- the owner shall pay the owner's cost of replacement by either paying in full within 30 days of the date of the invoice by the city or paying in full by way of 5 equal annual instalments plus calculated interest at he rate of prime plus 1%, plus registration costs (amortization cost of replacement)
- if the owner takes the amortization route, the owner agrees that it is held as a lien against the real property value until the fee is paid in full
- this agreement is registered against the owner's property.

http://www.citywindsor.ca/000344.asp

Hamilton, Ontario

- see bylaw No. 06-026 (Feb 15, 2006)
- has a Sewer Lateral Management Program
- in the Sewer and Drain by-law, the owner is responsible for properly maintaining, repairing, and replacing (if necessary) the sewer lateral on private property **and** on the public portion.
- in addition, the owner is responsible for any repair to any roadway, shoulder, sidewalk, curb, sodding, and other existing work that is due to the faulty sewer lateral whether on private or public property
- the City will maintain, repair, and replace the public portion of the sewer lateral except when any blockage is due to the negligence of the homeowner or unless a special arrangement has already been entered into with the City

- the City will maintain, repair, and replace the sewer lateral public portion upon request by the homeowner, but the owner shall pay a fee should the results indicate that no defect is responsible
- if tree roots from a City tree have entered a private sewer lateral, the City on a one time basis will repair or replace the private lateral up to a maximum $1,500 from the time that this bylaw was enacted.
- to be eligible for reimbursement, the work must use materials and installation approved by the City Manager
- have inspection and powers of entry on behalf of the City, at reasonable times, subject to the required notices and applicable entry rights under the relevant sections of the Municipal Act (Parts XIII, and XIV)
- are other provisions dealing with removal or demolition of building to disconnect and plug private laterals, if necessary.
- also to reinstate the roads, shoulders, curbs, sidewalks, sodding, and other works disturbed to the same condition.
- have a public pamphlet outlining the program and the roles and responsibilities and the tree roots from City trees reimbursement program
- no mention of a proactive approach to assess private laterals to initiate repairs

http://www.myhamilton.ca/myhamilton/CityandGovernment/CityDepartments/PublicWorks/Water/WaterandWasterwaterPrograms/

Waterloo, Ontario

- property owner responsible for the maintenance and repair of the entire sewer lateral (by-law 81-118 sect 7)
- bituminous fibre pipe (black pipe), used during the 1950's and 1960's , is being replaced
- approximately 4,000 black sewer laterals were installed
- City provides a **free** 24-hour sewer lateral blockage, clearing service
- if the black sewer lateral needs replacing due to structural failure, the **entire cost of the replacement will be borne by the City**
- approximately 25% or 1,000 laterals have been replaced with the majority occurring in conjunction with other utility or road construction and/or rehabilitation.

http://www.city.waterloo.on.ca/DesktopDefault.aspx?tabid=319

Cambridge, Ontario

- when residents have sewer lateral blockages then can call the public works dept. for 24-hour service to clear the sewer connections
- applicant is responsible for all costs if the blockage is on private property
- no reimbursement is provided

http://www.city.cambridge.on.ca/article.php?ssid=35

Ottawa, Ontario

- homeowner is responsible for all drainage from their property (private sewers, plumbing, grading etc.), so that water from roof drainage drains away from the building
- city provides a checklist for owners to prevent/reduce basement flooding
- City has a brochure on sewer backups
- recognize that sewer lateral blockages on private property can cause flooding in basements due to the pipe being blocked with debris (e.g. tree roots, grease, paper, etc)
- sewer use by-law states that no person shall directly or indirectly permit the discharge or deposit of matter into a private lateral that can interfere or cause damage to the storm sewer or its operation
- right-of-entry shall not be prevented, hindered, obstructed, or interfered with as long as not entering the dwelling of a house
- homeowners are liable for cost of investigation, repairing, replacing
- every person who contravenes the relevant provisions of the section is liable to a fine of $10,000 for the 1st offence and not more than $25,000 for subsequent offences

http://www.ottawa.ca/city_services/waterwaste/backups_en.shtml

Toronto, Ontario

- developed Wet Weather Master Plan in 2003 to reduce and ultimately eliminate adverse impacts of wet weather flow on the environment and public health
- began implementation in 2004
- I/I program began in 2002 to identify sources of stormwater entering the sanitary sewer system that could lead to basement flooding
- source control deals with downspout disconnection program, green roof application, rainwater harvesting
- 3,400 homes had downspout disconnection undertaken in 2004-5
- otherwise, don't appear to have a formal private sewer lateral upgrade program at this point other than when undertaking sewage flow monitoring in which they may address illegal connections

http://www.toronto.ca/water/sewers/basement_flooding.htm

Aurora, Ontario

- in 2000-02, recognized that bituminous fibre sanitary sewer laterals were causing I/I problems (7% of type of sewer but 69% of all repairs)
- town dealt with problem on public property
- for private property, the town proposed a pre-determined fixed price for homeowners while fixing the public portion

- using CCTV, let homeowners review the condition of their pipe
- sewer by-laws state that pipe failures experienced on the private portion was the responsibility of the owner

http://www.town.aurora.on.ca/aurora/index_e.aspx?ArticleID=275

North Shore City, New Zealand

- in 1998, launch Project Care to address I/I issues on a catchment by catchment basis
- recognized that private laterals were a problem
- inspected and rated 7000 private laterals by 2004
- 2 out of 3 private laterals were found defective
- NS City Council sent letters to owners informing them that repairs were necessary under the powers of the Local Government Act
- owners given 90 days to undertake repairs (60% owners did the work within the time frame and 40% did not)
- if didn't do work after final notice, the City would do it but charge an extra 10% administrative fee
- special agreements were arranged if financing was a problem for some home owners
- Devonport catchment reduced their stormwater egress from 16.7% to 8.2%

http://www.northshorecity.govt.nz/Water/WaterProjects/WaterProjectsWastewaterProjects.htm