TECHNICAL AND COMMUNITY ADVISORY COMMITTEE
CORE AREA WASTEWATER TREATMENT

Notice of Meeting on **Friday November 24, 2023 at 1:00 pm**
CRD Boardroom, 6th Floor, 625 Fisgard Street, Victoria, BC

Brenda Donald	Don Monsour	Ivan Leung	Josh Andrews	Peter Kickham (CRD)
Caterina Valeo	Doug Kobayashi (Vice-Chair)	Jas Paul	Katie Wilson	Richard Ding
Christopher Coleman (Chair)	Edward Brown	Jim McAloon (CRD)	Lesley Hatch	Winona Pugh
Claire Remington	Glenn Harris (CRD)	Joel Clary	Lori Nickerson (CRD)	
Dale Green (CRD)	Greg Gillespie	John Roe	Michael Engelsjord	

AGENDA

1.	Territorial Acknowledgement	
2.	Introduction of New Members	
3.	Committee Confidentiality	
4.	Approval of Agenda	
5.	Adoption of Minutes of October 27, 2023	
6.	Chair's Remarks	
7.	I&I LWMP Commitments – Peter Kickham	20 minutes
8.	Environmental Protection Goals for Overflows – Dale Green	20 minutes
9.	I&I Review by Kerr Wood Leidal – Chris Johnston	60 minutes
10.	Update of Biosolids Public Outreach – Katie Hamilton	10 minutes
11.	Other Business	
12.	Next meeting: December 11, 2023	
13.	Closing Comments	
14.	Adjournment	

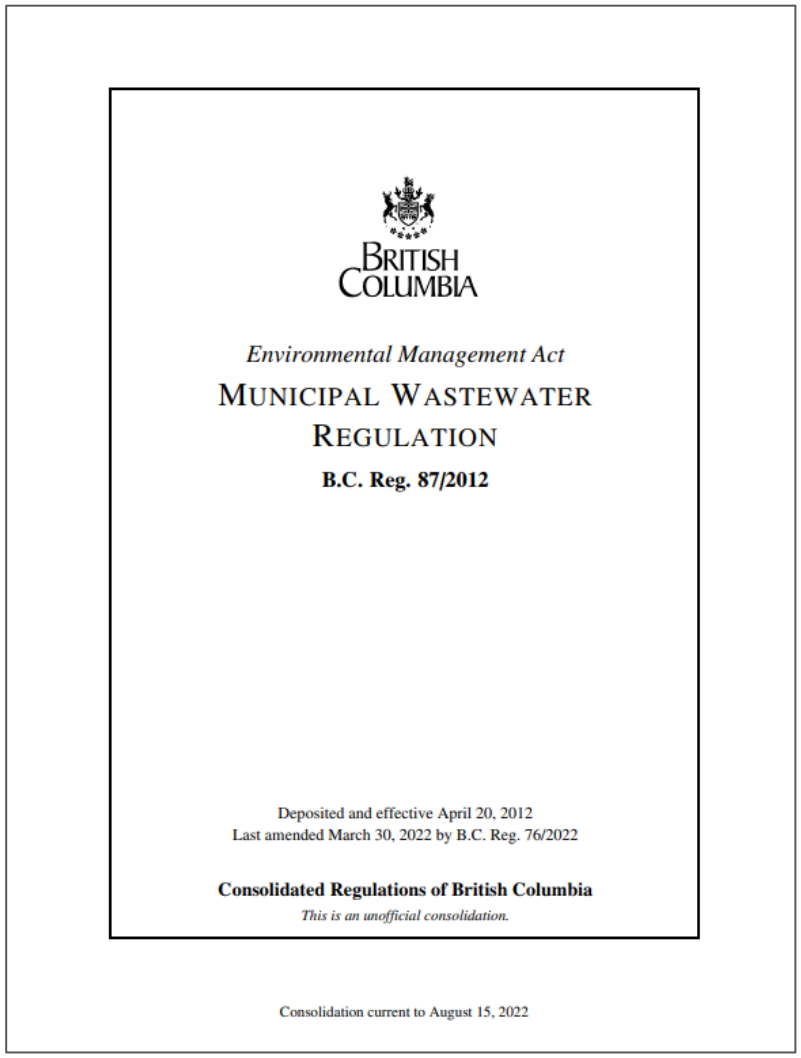
Inflow and Infiltration Regulatory Context

Peter Kickham, Manager, Regulatory Services, Environmental Protection

Technical and Community Advisory Committee

November 24, 2023

Regulatory Context



BRITISH COLUMBIA

Environmental Management Act

MUNICIPAL WASTEWATER REGULATION

B.C. Reg. 87/2012

Deposited and effective April 20, 2012
Last amended March 30, 2022 by B.C. Reg. 76/2022

Consolidated Regulations of British Columbia
This is an unofficial consolidation.

Consolidation current to August 15, 2022

1. Ensure an overflow does not occur during storm events with a less than 5-year return period

2. Ensure that inflow and infiltration does not occur such that sewer flow exceeds 2 times the ADWF during storm events with a less than 5-year return period.

Less than 5-year Storm

Greater than 5-year storm

Regulatory Context

- Prohibitions for overflows and I&I driven flows are managed under approved Liquid Waste Management Plans with:
  - Planning commitments and timelines for eliminating overflows in sub-5-year events, and
  - Planning, commitments and timelines for reducing I&I in sanitary sewer systems.

- The CALWMP contains commitments to reduce I&I and the resulting overflows which have resulted in significant improvement.

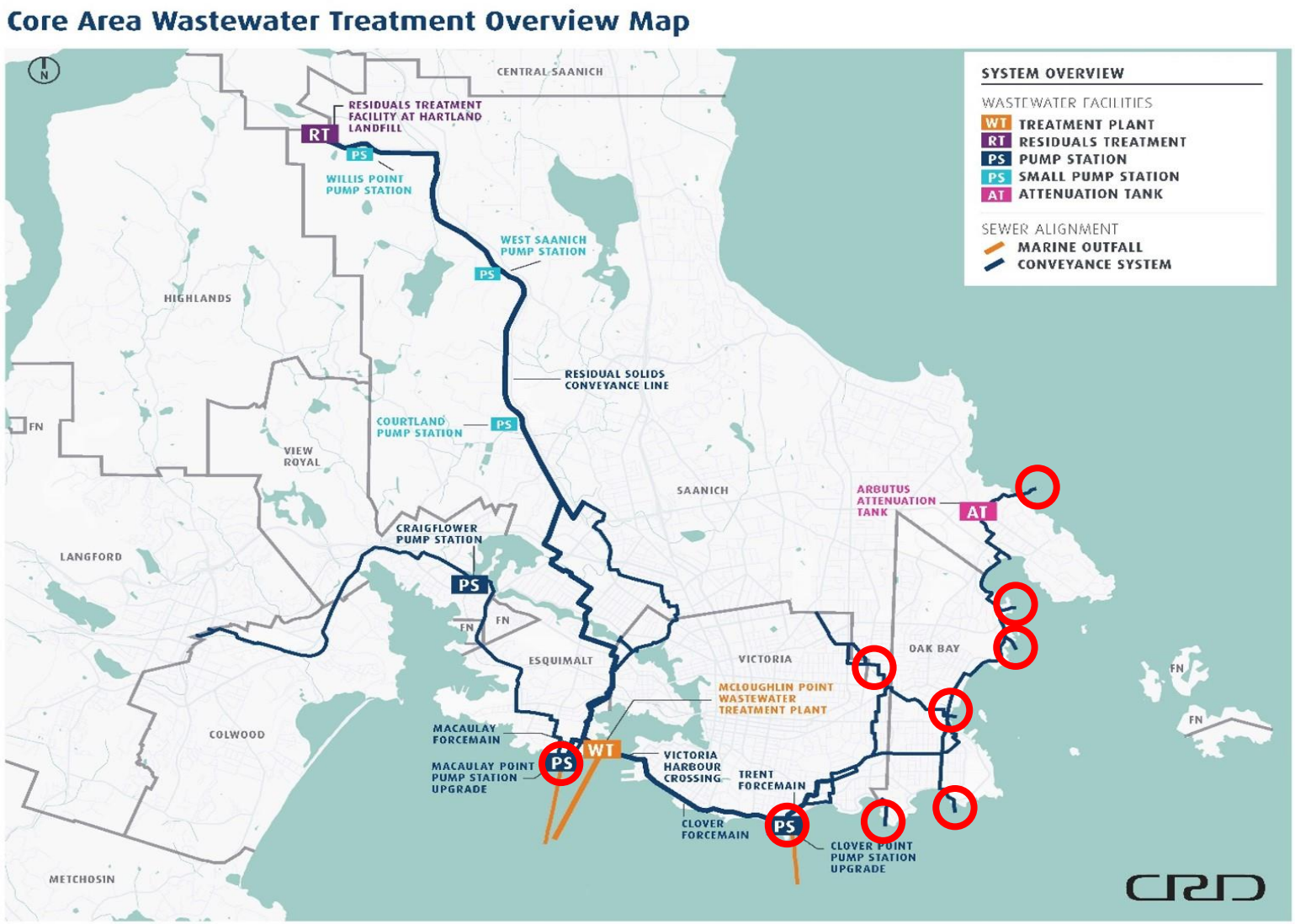
Current Commitment

- Reduce I&I such that maximum wet weather flow is less than four times average dry weather flow by 2030.

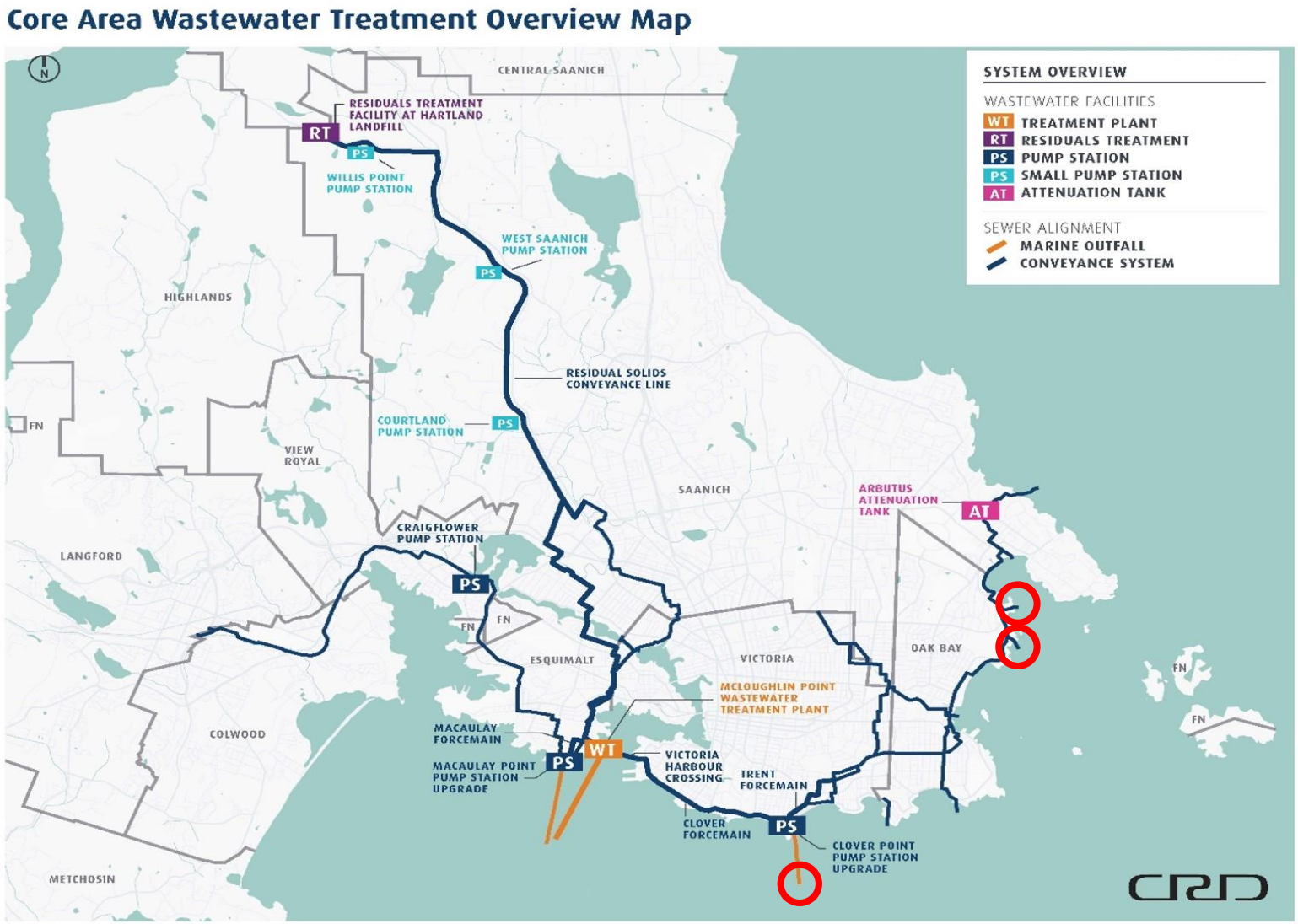
Actions include:

- Monitoring flows in the system to identify priority areas.
- Develop I&I management plans (completed in 2011).
- Update sewer bylaws to prohibit connection of rain or groundwater connections to sanitary sewer.
- Implement overflow reduction plan from 2008.

Historic Overflow Points
(Less than 5-year storms)



Current Overflow Points
(Less than 5-year storms)



Conclusions

- I&I and overflow reduction efforts from current LWMP have resulted in significant improvement.

- Updated commitments for I&I are necessary to show progress on an appropriate timeline to receive approval from BC ENV.

Inflow and Infiltration Environmental Context

Dale Green, Supervisor, Source Control Programs

Technical and Community Advisory Committee

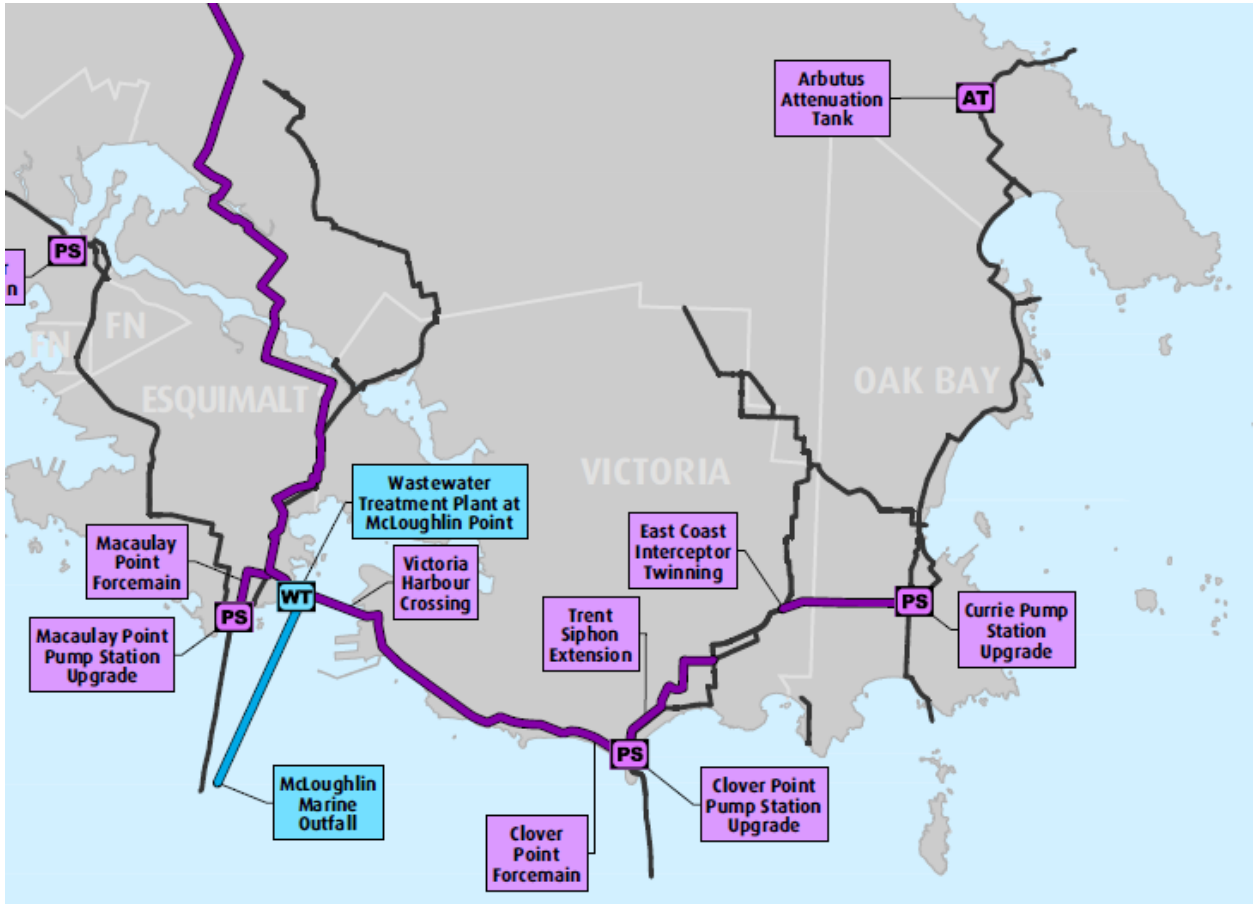
November 24, 2023

Overview

- Background
- Marine monitoring
- Environmental Goals
- Case Study

Background

Wastewater Overflow Modeling – post WWTP project and I&I improvements

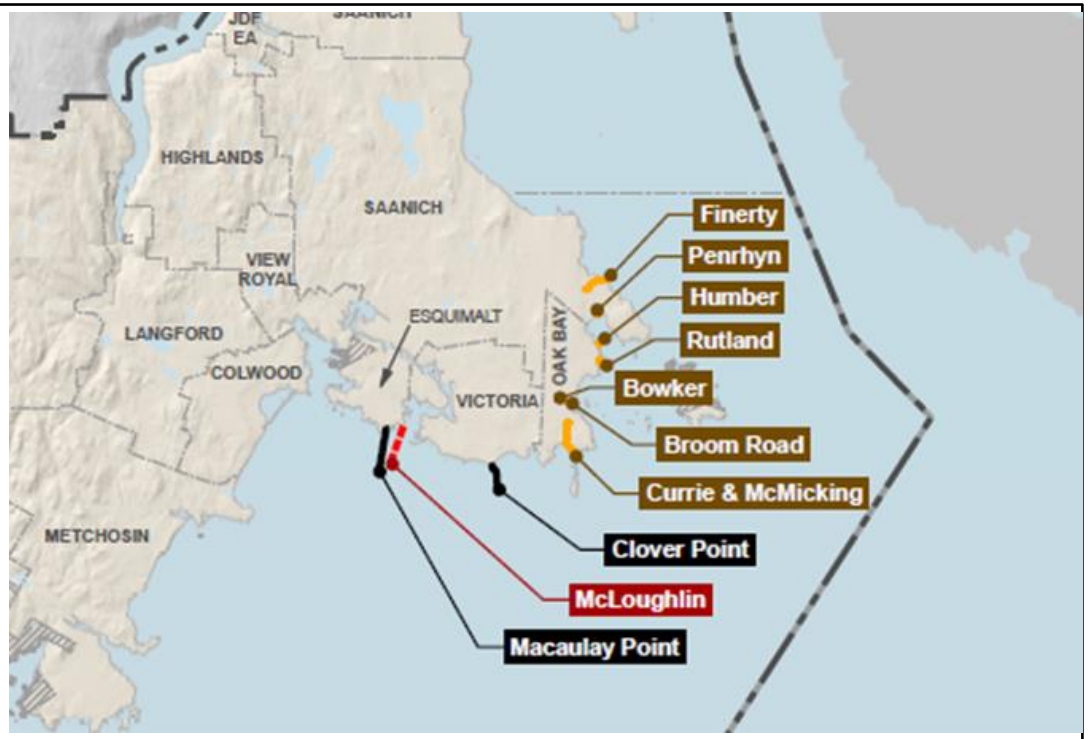


- Finnerty - 25-year event
- Humber - 7-10x/year
- Rutland - 7-10x/year
- McMicking - 25-year event
- Clover:
  - Long – 61 hour/year
  - Short – 100-year event
- Macaulay
  - Long – 10-year event

Monitoring

Locations of overflow points requires a monitoring program

- Core Area has about 550 stormwater discharge points but less than 10 wastewater overflow locations
- Sanitary Sewer Overflows can be nearshore (e.g., McMicking, Broom, Finnerty) or offshore (Clover and Macaulay)
- Combined Sewer Overflows are nearshore (Humber and Rutland)



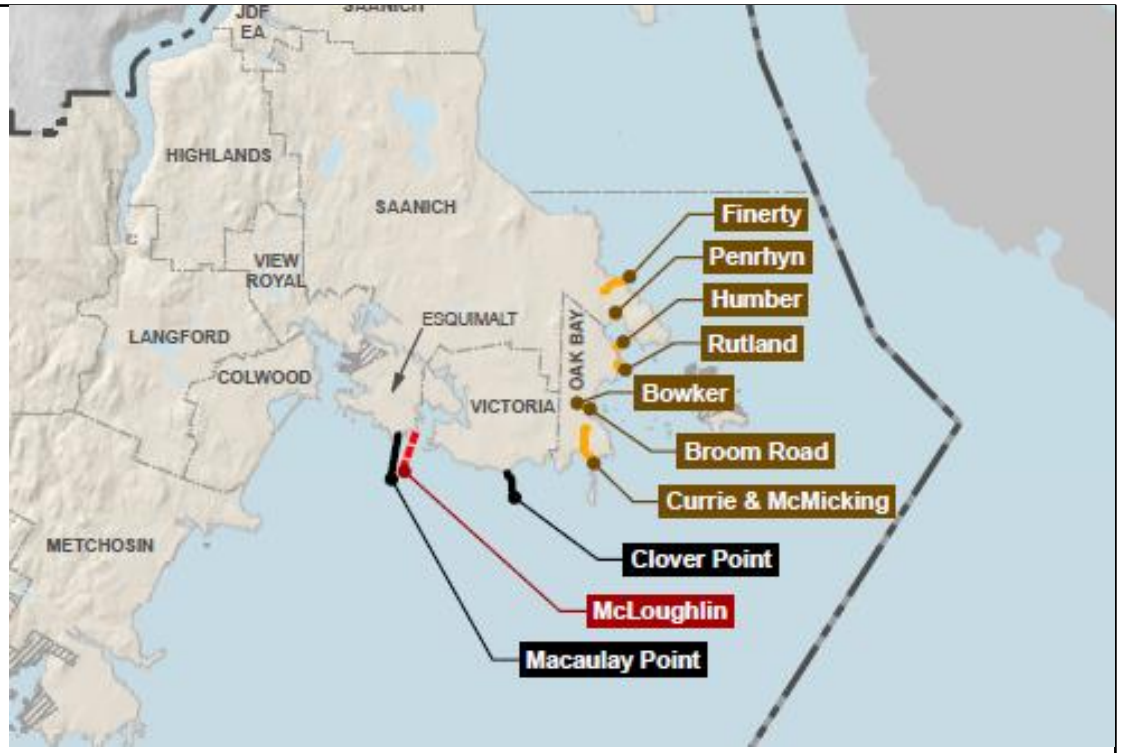
As we discussed at the last meeting, overflows are high-flow relief points.

Staff monitor overflows to meet environmental protection guidelines and to inform and protect public

Monitoring

Locations of overflow points requires a monitoring program

- CRD used to sample immediately after each overflow event (when possible).
- Signs and press releases advised people of the risk and we monitored until levels dropped.
- Over time the data showed that after about 24-48 hours that contamination will disperse (October to April).

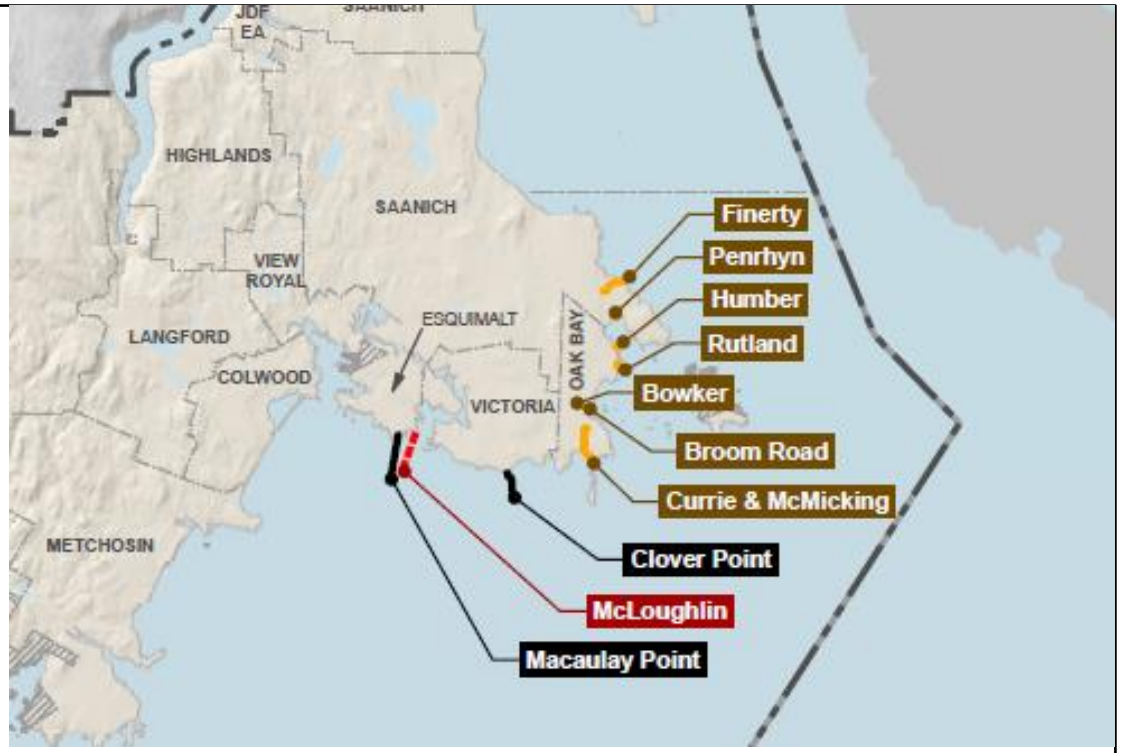


- We still issue alerts but now sample after 48 hours to confirm dispersal.

Monitoring

Locations of overflow points requires a monitoring program

- Overflows between May and September are monitored more closely for public health concern.
- This is peak water recreation time
  - Risk of public contact is much higher
  - Less flushing

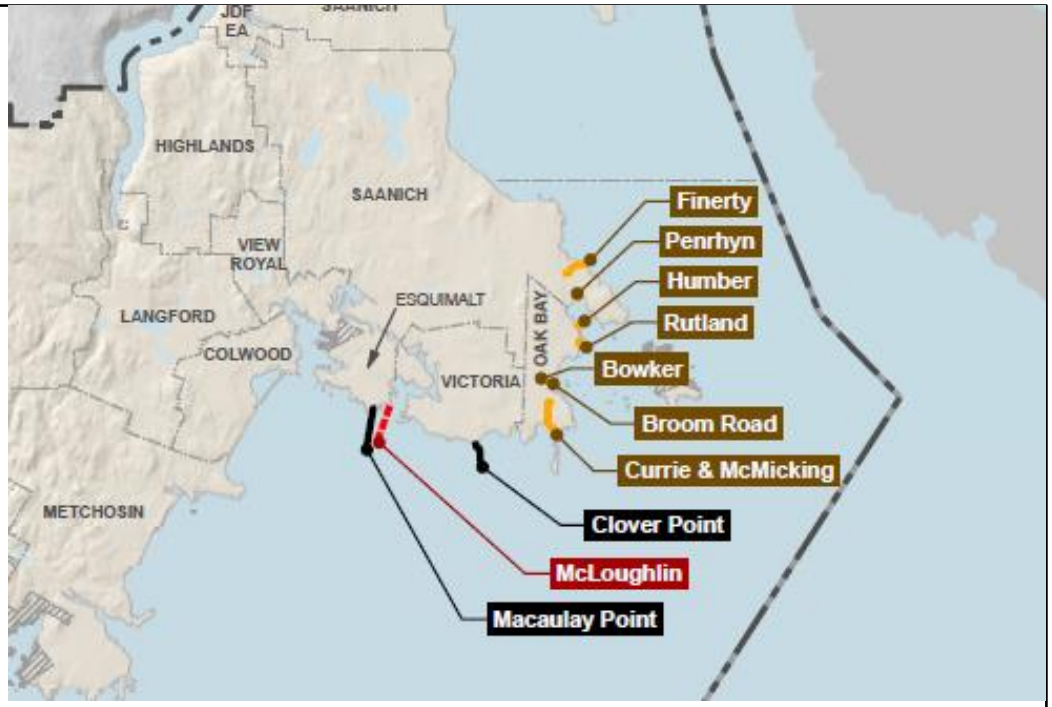


- Storms are rare but dry season overflows can also result from infrastructure issues.
  - Power outages, pump failures, electrical faults, blockages

Monitoring

Challenges

- Climatic variation drives frequency
  - 2009 to 2017 - approximate 10x variation in total numbers of overflows
  - Microclimates
  - 5 mm/hour rule of thumb
- Overflows mix with stormwater
  - Separating contributions to marine sampling is difficult. In some areas animal sources are interference.



- Difficult to sample at end of storm
  - Wet rocks, nighttime, wind
  - Unsafe for boats
- Every overflow is different: location, quantity and duration. Tide and currents matter.

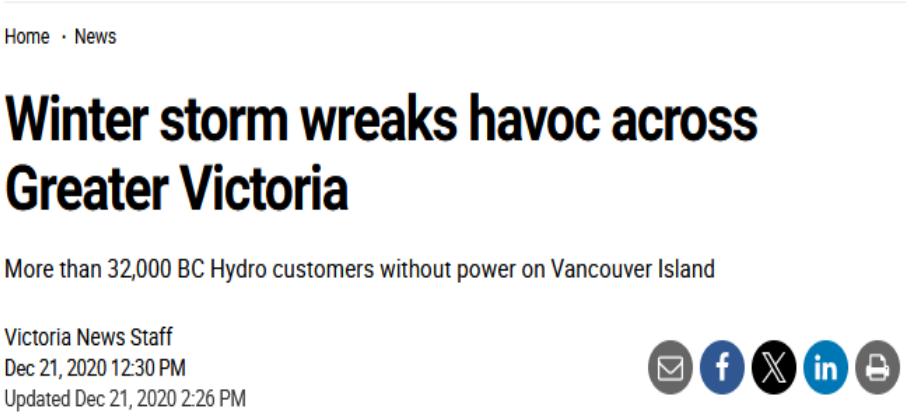
Monitoring

Protect Human Health

- Health Canada recreational water guidelines.
- Risk-management approach to safe human contact.
- **70 enterococci per 100 mL** single sample, **35 per 100 mL** geometric mean over 5 samples.
- Enterococci is an indicator species of fecal bacteria.

Example of Overflow Monitoring

- December 21, 2020 - heavy rain event.
- 68.8 mm @ Gonzales weather station over 18 hours (average 3.8 mm/hour).
- Approx. 8 of the 18 hours were > 5 mm/hour.



Home · News

Winter storm wreaks havoc across Greater Victoria

More than 32,000 BC Hydro customers without power on Vancouver Island

Victoria News Staff
Dec 21, 2020 12:30 PM
Updated Dec 21, 2020 2:26 PM

Overflow point	Volume of flow (m³)	Time of flow	24-hour bacteria level
Finnerty SSO	13,670	~16 hours	12 – 530
Humber CSO	22,756		5 – 128
Rutland CSO	27,588		
Currie SSO	48,649		Not sampled
Harling SSO	1,927		6 - 99

Note: we can't normally measure at the peak of the event

I&I Environmental Context

Questions?

Capital Regional District
TCAC November 24 Meeting

Update of 2024 LWMP Section 5: Management of I&I and Control of Wastewater Overflows

Chris Johnston, P.Eng.
Kerr Wood Leidal Associates Ltd.
November 24, 2023

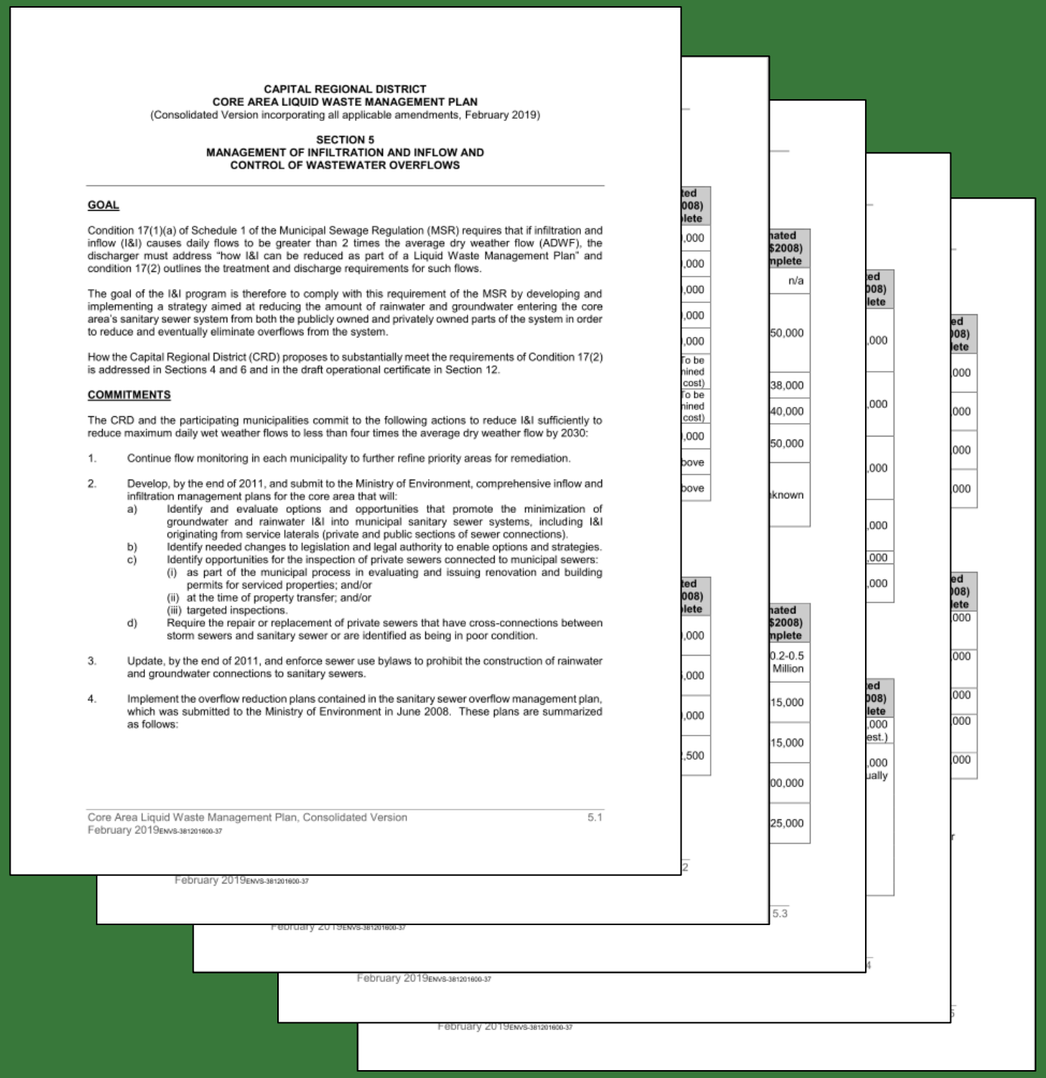
Outline

1. Previous Commitments, Draft Commitments, Proposed New Commitments
2. Current State of I&I Reduction Trends in the CRD, Partially Separated Laterals
3. Key Items in Asset Management Programs
4. Proposed I&I Reduction Accounting System
5. 3-Methods for Dealing with Sewer Lateral Replacements
6. Summary Actions for both Younger and Older Sewer Systems

2024 LWMP Section 5 Objectives

- Provincial MWR limits SSOs to a 5-year occurrence.
- CRD and member municipalities have now achieved this goal for all outfalls except the Clover Point Long Outfall.
- Previous LWMP Commitment was to eliminate overflows less than a 5-year occurrence at Clover Long Outfall by 2030. (This will be difficult for Victoria and Oak Bay).
- Potential New Commitment: extend deadline to 2045 on the basis that its not just the rehabilitation of sewers that is required, investigation programs have shown that a significant upgrade to the drainage system is also required (i.e., partially separated sewer laterals).
- Keep the commitments straight-forward and avoid the "How" details.

2019 Consolidated LWMP Section 5 Existing Commitments



CAPITAL REGIONAL DISTRICT
CORE AREA LIQUID WASTE MANAGEMENT PLAN
(Consolidated Version incorporating all applicable amendments, February 2019)

SECTION 5
MANAGEMENT OF INFILTRATION AND INFLOW AND CONTROL OF WASTEWATER OVERFLOWS

GOAL

Condition 17(1)(a) of Schedule 1 of the Municipal Sewage Regulation (MSR) requires that if infiltration and inflow (I&I) causes daily flows to be greater than 2 times the average dry weather flow (ADWF), the discharger must address "how I&I can be reduced as part of a Liquid Waste Management Plan" and condition 17(2) outlines the treatment and discharge requirements for such flows.

The goal of the I&I program is therefore to comply with this requirement of the MSR by developing and implementing a strategy aimed at reducing the amount of rainwater and groundwater entering the core area's sanitary sewer system from both the publicly owned and privately owned parts of the system in order to reduce and eventually eliminate overflows from the system.

How the Capital Regional District (CRD) proposes to substantially meet the requirements of Condition 17(2) is addressed in Sections 4 and 6 and in the draft operational certificate in Section 12.

COMMITMENTS

The CRD and the participating municipalities commit to the following actions to reduce I&I sufficiently to reduce maximum daily wet weather flows to less than four times the average dry weather flow by 2030:

1. Continue flow monitoring in each municipality to further refine priority areas for remediation.

2. Develop, by the end of 2011, and submit to the Ministry of Environment, comprehensive inflow and infiltration management plans for the core area that will:
   a) Identify and evaluate options and opportunities that promote the minimization of groundwater and rainwater I&I into municipal sanitary sewer systems, including I&I originating from service laterals (private and public sections of sewer connections).
   b) Identify needed changes to legislation and legal authority to enable options and strategies.
   c) Identify opportunities for the inspection of private sewers connected to municipal sewers:
      (i) as part of the municipal process in evaluating and issuing renovation and building permits for serviced properties; and/or
      (ii) at the time of property transfer; and/or
      (iii) targeted inspections.
   d) Require the repair or replacement of private sewers that have cross-connections between storm sewers and sanitary sewer or are identified as being in poor condition.

3. Update, by the end of 2011, and enforce sewer use bylaws to prohibit the construction of rainwater and groundwater connections to sanitary sewers.

4. Implement the overflow reduction plans contained in the sanitary sewer overflow management plan, which was submitted to the Ministry of Environment in June 2008. These plans are summarized as follows:

Core Area Liquid Waste Management Plan, Consolidated Version 5.1
February 2019 ENVS-381201600-37

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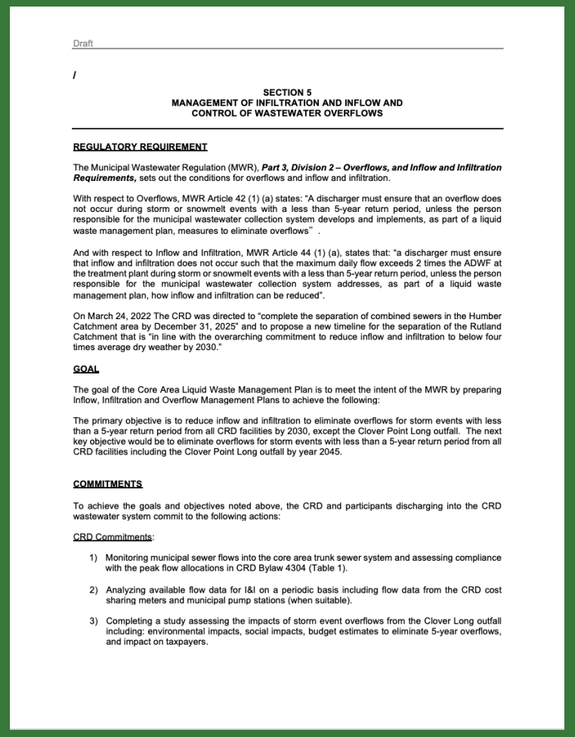
KERR WOOD LEIDAL
consulting engineers

2024 LWMP Section 5 Updates (April 2022 Draft)



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SECTION 5
MANAGEMENT OF INFILTRATION AND INFLOW AND CONTROL OF WASTEWATER OVERFLOWS

REGULATORY REQUIREMENT

The Municipal Wastewater Regulation (MWR), ***Part 3, Division 2 – Overflows, and Inflow and Infiltration Requirements,*** sets out the conditions for overflows and inflow and infiltration.

With respect to Overflows, MWR Article 42 (1) (a) states: "A discharger must ensure that an overflow does not occur during storm or snowmelt events with a less than 5-year return period, unless the person responsible for the municipal wastewater collection system develops and implements, as part of a liquid waste management plan, measures to eliminate overflows" .

And with respect to Inflow and Infiltration, MWR Article 44 (1) (a), states that: "a discharger must ensure that inflow and infiltration does not occur such that the maximum daily flow exceeds 2 times the ADWF at the treatment plant during storm or snowmelt events with a less than 5-year return period, unless the person responsible for the municipal wastewater collection system addresses, as part of a liquid waste management plan, how inflow and infiltration can be reduced".

On March 24, 2022 The CRD was directed to "complete the separation of combined sewers in the Humber Catchment area by December 31, 2025" and to propose a new timeline for the separation of the Rutland Catchment that is "in line with the overarching commitment to reduce inflow and infiltration to below four times average dry weather by 2030."

GOAL

The goal of the Core Area Liquid Waste Management Plan is to meet the intent of the MWR by preparing Inflow, Infiltration and Overflow Management Plans to achieve the following:

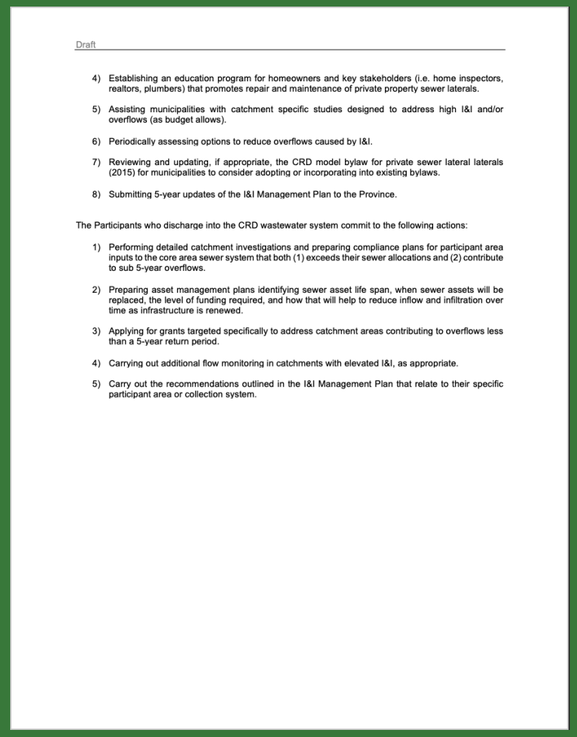
The primary objective is to reduce inflow and infiltration to eliminate overflows for storm events with less than a 5-year return period from all CRD facilities by 2030, except the Clover Point Long outfall. The next key objective would be to eliminate overflows for storm events with less than a 5-year return period from all CRD facilities including the Clover Point Long outfall by year 2045.

COMMITMENTS

To achieve the goals and objectives noted above, the CRD and participants discharging into the CRD wastewater system commit to the following actions:

CRD Commitments:

1) Monitoring municipal sewer flows into the core area trunk sewer system and assessing compliance with the peak flow allocations in CRD Bylaw 4304 (Table 1).
2) Analyzing available flow data for I&I on a periodic basis including flow data from the CRD cost sharing meters and municipal pump stations (when suitable).
3) Completing a study assessing the impacts of storm event overflows from the Clover Long outfall including: environmental impacts, social impacts, budget estimates to eliminate 5-year overflows, and impact on taxpayers.



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4) Establishing an education program for homeowners and key stakeholders (i.e. home inspectors, realtors, plumbers) that promotes repair and maintenance of private property sewer laterals.
5) Assisting municipalities with catchment specific studies designed to address high I&I and/or overflows (as budget allows).
6) Periodically assessing options to reduce overflows caused by I&I.
7) Reviewing and updating, if appropriate, the CRD model bylaw for private sewer lateral laterals (2015) for municipalities to consider adopting or incorporating into existing bylaws.
8) Submitting 5-year updates of the I&I Management Plan to the Province.

The Participants who discharge into the CRD wastewater system commit to the following actions:

1) Performing detailed catchment investigations and preparing compliance plans for participant area inputs to the core area sewer system that both (1) exceeds their sewer allocations and (2) contribute to sub 5-year overflows.
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3) Applying for grants targeted specifically to address catchment areas contributing to overflows less than a 5-year return period.
4) Carrying out additional flow monitoring in catchments with elevated I&I, as appropriate.
5) Carry out the recommendations outlined in the I&I Management Plan that relate to their specific participant area or collection system.

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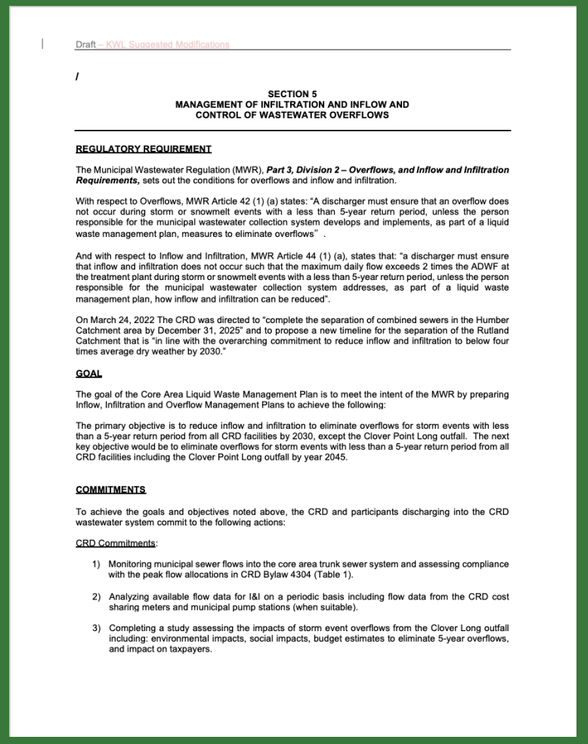
KERR WOOD LEIDAL
consulting engineers

2024 LWMP Section 5 Updates (Proposed KWL Additional Changes)



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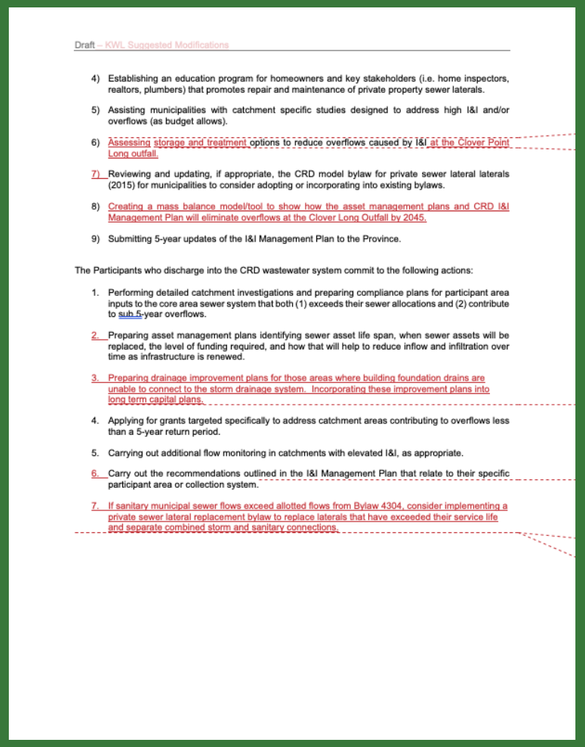

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7) Reviewing and updating, if appropriate, the CRD model bylaw for private sewer lateral laterals (2015) for municipalities to consider adopting or incorporating into existing bylaws.
8) Creating a mass balance model/tool to show how the asset management plans and CRD I&I Management Plan will eliminate overflows at the Clover Long Outfall by 2045.
9) Submitting 5-year updates of the I&I Management Plan to the Province.

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3. Preparing drainage improvement plans for those areas where building foundation drains are unable to connect to the storm drainage system. Incorporating these improvement plans into long term capital plans.
4. Applying for grants targeted specifically to address catchment areas contributing to overflows less than a 5-year return period.
5. Carrying out additional flow monitoring in catchments with elevated I&I, as appropriate.
6. Carry out the recommendations outlined in the I&I Management Plan that relate to their specific participant area or collection system.
7. If sanitary municipal sewer flows exceed allotted flows from Bylaw 4304, consider implementing a private sewer lateral replacement bylaw to replace laterals that have exceeded their service life and separate combined storm and sanitary connections.

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5. Carrying out additional flow monitoring in catchments with elevated I&I, as appropriate.
6. Carry out the recommendations outlined in the I&I Management Plan that relate to their specific participant area or collection system.
7. If sanitary municipal sewer flows exceed allotted flows from Bylaw 4304, consider implementing a private sewer lateral replacement bylaw to replace laterals that have exceeded their service life and separate combined storm and sanitary connections.

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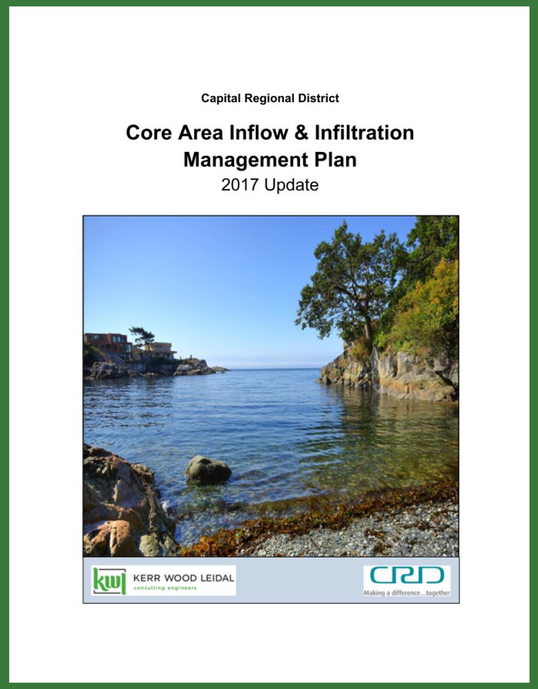
I&I Progress to Date



- Total Sanitary Sewer Overflows (SSOs) have steadily declined due to capital upgrading projects and I&I reduction projects.
- Municipalities continue to make progress on reducing I&I
- “Partially separated sewer laterals” in Victoria and Oak Bay present additional challenges due to inadequate drain systems

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Storm Related Overflows Through 2023 (Sub 5-Year Return Period)

	Location	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
SSOs	Western Trunk (sensitive)	13	4	3	3	7	1	0	0	5	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSOs	Eastern Trunk (sensitive)	8	10	13	11	15	5	7	4	12	8	11	12	11	4	0	2	0	0	1	0	0	0	0	0	0	2	0	0	0
SSOs	West/East Trunks (other)	21	28	32	30	50	7	9	19	45	9	18	30	38	13	52	36	25	14	10	6	21	2	10	21	8	10	11	9	1
CSOs	Uplands Combined Sewer	11	20	26	22	25	8	14	7	24	14	21	21	19	6	26	17	14	19	17	20	23	7	6	19	10	19	24	13	7
	Total (all waters including Macaulay, McMicking, Clover, Finnerty)	53	62	74	66	97	21	30	30	86	31	50	63	70	23	78	53	39	33	28	26	44	9	16	40	18	31	35	22	8

SSOs up to a 5-year return period only occur at the Clover Point Long Outfall

Completion of the Marigold Storm Tank and Macaulay o/f Improvements (2004)

Completion of the Trent Street Pump Station (2009)

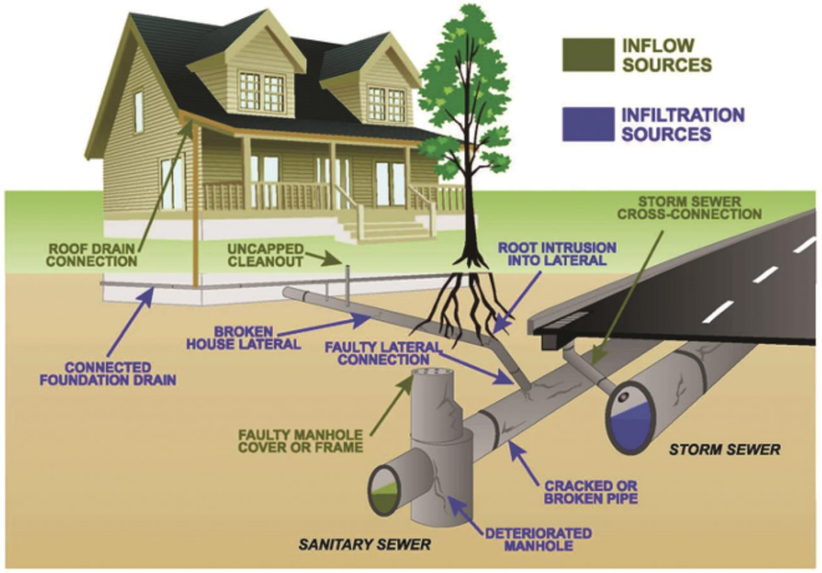
Completion of the Arbutus Storm Tank, Macaulay P.S., Clover P.S., Trent Forcemain Extension, and McLoughlin WWTP (2022)

I&I Reduction Trends

	2010	2012	2014	2016	2019	Trend
Colwood	10,309	8,540	7,965	8,777	8,777	↓
Esquimalt	52,412	52,599	48,727	51,471	48,786	↓
Langford	11,023	9,364	9,222	10,606	8,587	↓
Oak Bay	51,873	48,133	46,600	55,686	56,123	→
Saanich	15,514	13,613	15,427	15,223	14,369	→
Victoria	96,734	94,281	84,650	76,026	73,490	↓
View Royal	12,322	12,294	13,216	14,525	11,541	→

Based on 5-year, 24-hour, volume L/ha/day I&I response

Partially Separated Sewer Laterals



Storm sewer constructed as part of ditch enclosure project. Foundation drains unable to connect due to higher elevation.

Many catchments in the older areas of Esquimalt, Victoria, and Oak Bay either have storm sewers that are too shallow or non-existent.

This makes separation of storm and sanitary sewer laterals difficult

I&I Rehabilitation and Replacement Programs will need to include significant drainage system improvements

Asset Management Program Enhancements

- Likely every municipality has an asset management program
- The key aspects required for this LWMP update are confirmation of sewer life expectancy and cashflows showing the expected replacement/rehabilitation program levels over time

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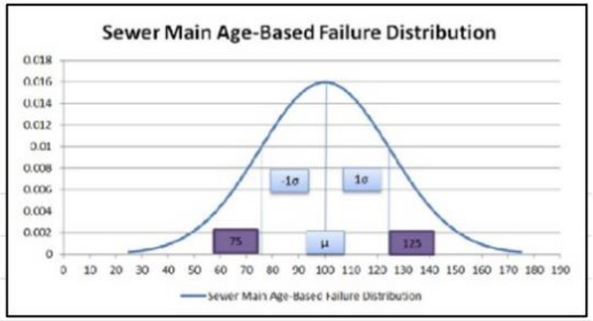
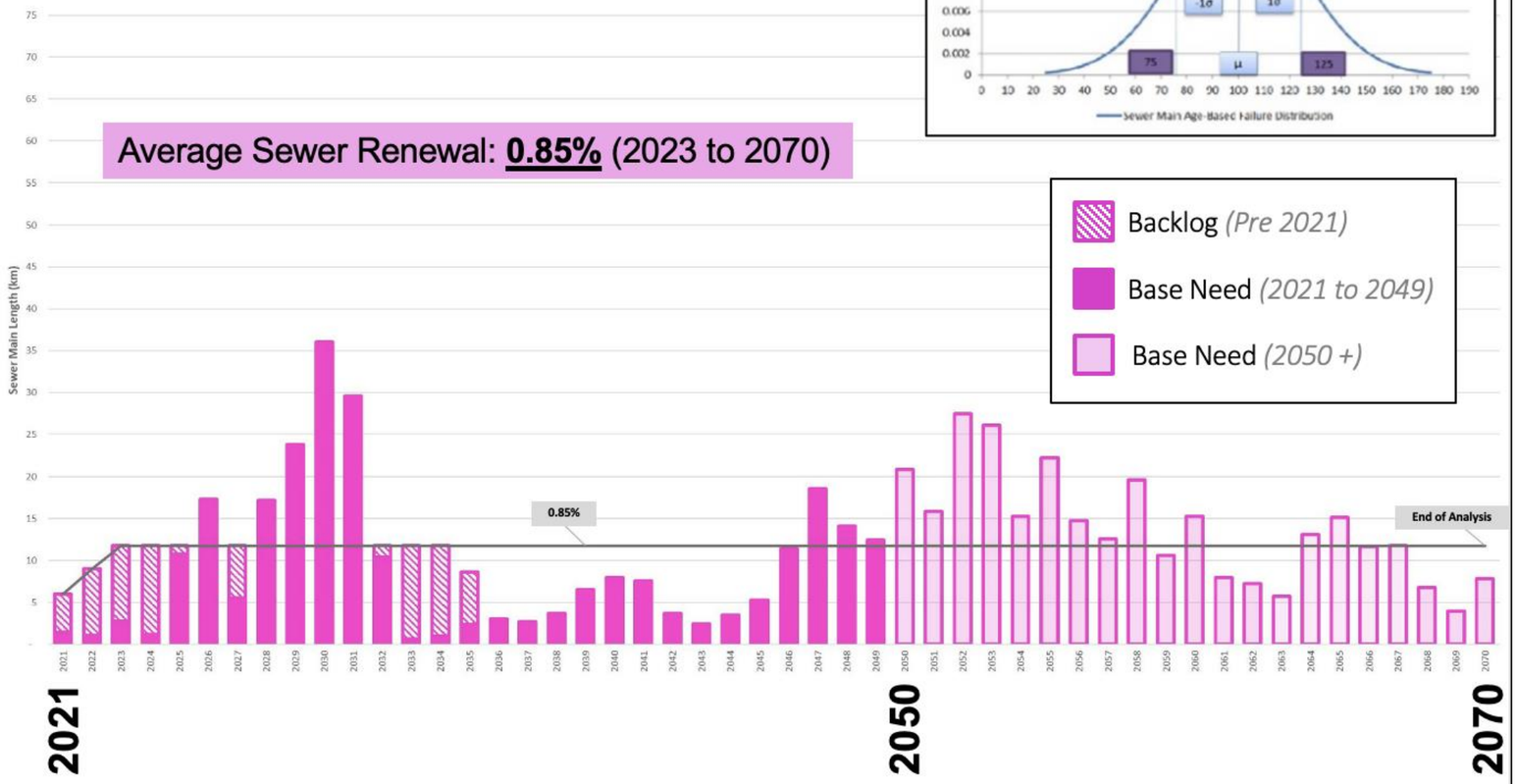
Sewer Asset Management Plan Example

Future Replacement Projects Based on Risk with a mean Service Life of 100-years



Average Sewer Renewal: **0.85%** (2023 to 2070)



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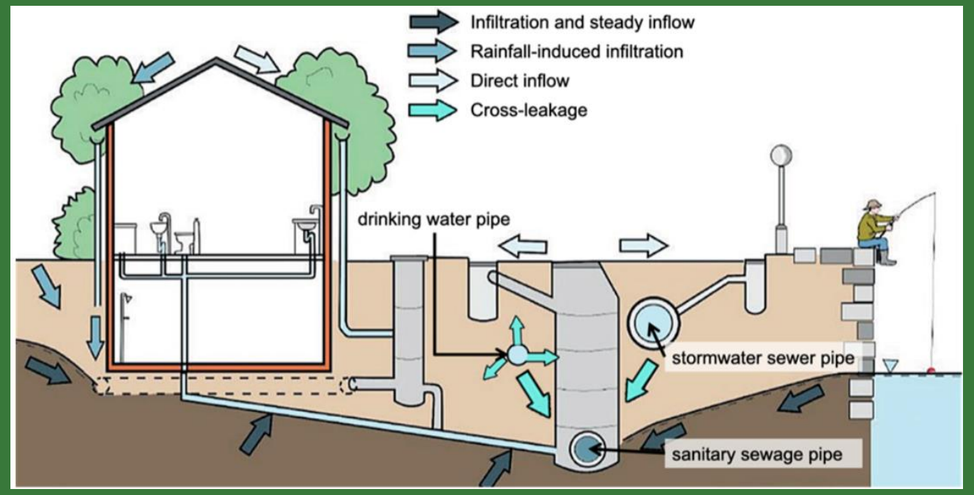
Proposed I&I Accounting System



- The current CRD I&I Management Plan shows basic trending of I&I by sewer catchment.
- Future I&I reduction can be predicted knowing the proposed future programs for rehabilitation and replacement.
- Reporting to the Province the anticipated reductions to meet the new 2045 target will provide proof to the proposal.

Private Sewer Laterals

Municipality/ Participant	Allocated Peak Daily Flow (ML/d)	Peak 24-hr Flow		Status
		5-yr Rainfall Event (ML/d)	% of Allocated Capacity	
Colwood	18.80	7.70	41%	✓
Esquimalt	28.36	30.16	106%	✗
Langford	56.48	17.01	30%	✓
Oak Bay	26.48	37.96	143%	✗
Saanich	131.56	83.52	63%	✓
Victoria	153.19	150.64	98%	–
View Royal	14.17	7.10	50%	✓

Recommended Commitment 7 (KWL):

"If sanitary municipal sewer flows exceed allocated flows from Bylaw 4304, consider implementing a private sewer lateral replacement bylaw to replace laterals that have exceeded their service life and separate combined storm and sanitary connections."

Benefits:

- I&I on private sewer laterals represent 50 to 80% of all I&I. The pipe material will eventually fail. Municipal replacement bylaws are considered to be the best practice available.

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Typical Private Lateral Replacement Bylaws

Building Permit Enforcement Triggers

Incentives for Lateral Replacement

Real Estate Triggers

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Private Laterals – Historical Options

Incentive-Based

Subsidies (Rebates and Loans)

Property Tax Exemption

Provincial Tax Exemption

Regulatory-Based

Municipal Bylaw

Change of Ownership Trigger (Rare)

Building Permit trigger (more common)

Provincial Regulation

Expropriate Laterals

Insurance Program

Lateral Replacement – New Construction and Building Permit Trigger

Excerpts from the City of Surrey Program

39. When there is an application to redevelop a parcel, the following shall apply to the service connection and the building sanitary sewer:

(a) If the service connection or the building sanitary sewer is **less than 30 years old**, the owner must provide **a video inspection** from a pipe **assessment certification program (PACP)** certified contractor and recommendation for the City to review. The owner shall repair or replace the service connection or the building sanitary sewer, or both, if the City determines that: it contains defects or deficiencies, including excessive damage; is not in adequate condition for service; does not meet the City's Design and Construction Standards; or is made of materials other than PVC;

(b) If the service connection or the building sanitary sewer **is 30 years old or older and is made of materials other than PVC, a replacement or new service connection or building sanitary sewer, or both, is required**;

(c) If the service connection or the building sanitary sewer is **30 years old or older and is made of PVC**, the owner must provide **a video inspection from a PACP** certified contractor and recommendation for the City to review. The owner shall repair or replace the service connection or the building sanitary sewer or both, if the City determines that it: contains defects or deficiencies, including excessive damage; is not in adequate condition for service; or does not meet the City's Design and Construction Standards;

(d) Despite Sections 39(a), (b) and (c), all no-corrode, asbestos, cement, clay or otherwise non-standard material pipes of any age or condition shall be replaced with PVC or an alternate pipe material approved by the City;

(k) Despite Sections 39(g) and (h), renovations to an existing building on a parcel **where the combined building value is less than or equal to $120,000 are exempt from the requirements of this Section 39;**

Lateral Replacement – Certification Method

Excerpts from the Proposed Metro Vancouver I&I Template

- Incentive based method with certifications required
- Base utility rate for non-certified sewer laterals or expired certifications
- Utility rate discount for certified sewer laterals. Provide automatic certification for PVC services less than 30-years old.
- Premiums added to utility rate if City determines private lateral to be in bad condition due to side shot CCTV inspection or observation port inspection (if available).
- Premiums added at age thresholds (for old sewers) or by material type. Consider rebates for replacement.
- Enhanced premiums added to utility bill for combined connections provided a functional storm sewer is available. Rebates offered for separation.
- Significant premiums added to utility bill if the service violates existing bylaws and/or remedial orders.
- Consider working with home insurance companies to provide additional incentives for certified laterals.

Lateral Replacement – Real Estate Sale Trigger

Certification and Replacement
(Difficult to implement, Rare)

- Requiring sewer laterals to be inspected/rehabilitated either by the date of transfer of ownership of a property or within a period of time after the transfer, e.g. 6 months.
- This kind of trigger is difficult for municipalities to enforce, as no current legal mechanism exists by which municipalities may insert such requirements as a condition precedent to the successful conclusion of the title transfer process.

Lateral Replacement – Key Actions Needed

- Municipalities near or exceeding their sewer capacity allotment should consider adopting a private lateral replacement bylaw
- Determine what methods and resources will be used to inspect the new service.
- Municipalities with partially separated services should develop public-side stormwater servicing.

KWL Recommendations Summary

Likely Actions for Newer Sewer Systems

- Continue the investigations as outlined in the CRD Core Area I&I Management Plan.
- Update Asset Management Plans to show that cashflows support sewer pipe service life selection. (May mean modifying future cashflows)

Likely Actions for Older Sewer Systems

- Identify partially separated service areas and develop long term plans for drainage upgrades to these.
- Update Asset Management Plans to incorporate predicted sewer lives (will result in funding levels to match sewer service lives).
- Consider implementing/updating a private sewer lateral bylaw if 5-year storm exceeds allocated flows.