

Regional Source Control Program

2021 Report

Capital Regional District | Parks & Environmental Services, Environmental Protection



Capital Regional District

625 Fisgard Street, Victoria, BC V8W 2S6

T: 250.360.3000 F: 250.360.3079

www.crd.bc.ca

December 2022

REGIONAL SOURCE CONTROL PROGRAM 2021 REPORT

EXECUTIVE SUMMARY

Source control is the first step in wastewater treatment. The Capital Regional District (CRD) Regional Source Control Program's (RSCP) goals are to protect sewage collection and treatment facilities, public health and safety, and the receiving marine environment by reducing the amount of contaminants that industries, businesses, institutions and households discharge into the CRD's sanitary sewer systems. Source control is widely accepted as a cost-effective and essential first step in sewage treatment in all major urban areas throughout North America.

The program regulates over 2,000 businesses through industrial wastewater discharge permits, authorizations and 11 sector-specific codes of practice. In 2021, the percentage of businesses with a rating of "overall compliance" was 93% and the percentage of mixed liquor and dewatered sludge samples that met Class A standards for metals was 100% for the 13th consecutive year.

The CRD undertakes monitoring and regulating as outlined in the Core Area and Saanich Peninsula liquid waste management plans (LWMP) and reports annually to the BC Ministry of Environment and Climate Change Strategy (ENV) about program activities and results.

From January to December 2021, the program continued to apply a "sector-by-sector" approach to code of practice inspections, focusing on the dry cleaning, automotive, vehicle wash and food services sectors, as well as wet-cutting and funeral homes sub-sectors. Overall compliance rates for codes of practice, permitted industrial facilities and facilities operating under authorizations, were 93%. The main activities and accomplishments of the program in 2021 include:

- industrial, commercial and institutional liquid waste regulation
- monitoring
- enforcement
- contaminants management and reductions
- significant incident response
- residential and business outreach
- program and planning development

Additional Initiatives in 2021

- Co-chaired Source Control Community of Practice meetings, with facilitation by the BC Water & Waste Association (BCWWA).
- Co-presented to BCWWA on adaptations under the LWMP in response to the new Core Area Wastewater Treatment Plant (WWTP).
- Continued use of modified inspection protocols to ensure service delivery and protection of the sewer system, while following COVID-19 safety and exposure control plans during the continuation of the pandemic.
- Adjusted source control inspection goals to support McLoughlin WWTP (e.g., increased food service inspections).
- Continued fats, oils, and grease (FOG) and obstructive waste mail-outs.
- Finalized details for an updated regulatory approach for microbreweries in advance of amending the fermentation sector Code of Practice (CoP) and informed the microbreweries of impending changes.
- Created a new excavation dewatering permit application form to help streamline the information gathering process for these complicated temporary permits.

- Initiated discussions with the Province of BC regarding options to allow limited types of non-infectious blood and fluids (biomedical waste) to be discharged to sewer from medical facilities.
- Reviewed and adjusted authorization sampling and inspection frequency for consistency and fairness based on discharge volumes, risk and contaminants of concern.
- Completed sector sweeps of authorizations for wet-cutting and funeral home facilities.
- Completed a sector sweep of kitchen equipment cleaning operations regulated under the general bylaw.
- Continued the printing sector Code of Practice (CoP) review.
- Conducted surveys of fabrication and manufacturing facilities to evaluate the need for potential regulation.
- Collaborated with municipal business licensing staff to share new business information for review against permitting requirements.
- Participated in the Cross Connection Control Program plumbing inspector roundtable to update municipal inspectors on common and new issues seen during inspections and to highlight significant investigations and targeted residential mail-outs.

**REGIONAL SOURCE CONTROL PROGRAM
2021 REPORT**

CONTENTS

| | |
|--|----|
| Executive Summary | i |
| 1.0 INTRODUCTION..... | 1 |
| 2.0 BACKGROUND | 2 |
| 2.1 Policies and Procedures..... | 2 |
| 2.1.1 Policies Approved by the CRD Board | 2 |
| 2.1.2 Operating Procedures | 2 |
| 2.2 Sewage Collection Areas and Sewage Facilities | 2 |
| 3.0 REGIONAL SOURCE CONTROL ACTIVITIES AND ACCOMPLISHMENTS – 2021 | 3 |
| 3.1 Industrial, Commercial and Institutional Liquid Waste Regulation | 4 |
| 3.1.1 Regulatory Background..... | 4 |
| 3.1.2 Waste Discharge Permits..... | 4 |
| 3.1.3 Authorizations..... | 5 |
| 3.1.4 Codes of Practice | 7 |
| 3.1.5 General Bylaw | 10 |
| 3.1.6 Coordinated Inspections..... | 10 |
| 3.1.7 Monitoring..... | 10 |
| 3.2 Enforcement | 14 |
| 3.2.1 Operations Regulated By Waste Discharge Permit | 14 |
| 3.2.2 Operations Regulated by Authorization | 15 |
| 3.2.3 Operations Regulated by Codes of Practice | 16 |
| 3.3 Contaminants Management | 17 |
| 3.3.1 Trucked Liquid Waste..... | 17 |
| 3.3.2 Contaminant Characterization of the Dental Sector..... | 20 |
| 3.3.3 Contaminant Characterization of the Automotive Repair Sector | 20 |
| 3.3.4 Contaminant Characterization of the Printing Sector | 21 |
| 3.4 Contaminant Reductions | 21 |
| 3.4.1 Marine Outfall Contaminant Reductions | 21 |
| 3.4.2 Sludge and Mixed Liquor Contaminant Reductions | 22 |
| 3.5 Significant Incident Reporting..... | 25 |
| 3.6 Outreach and Partnerships Initiatives | 25 |
| 3.6.1 Residential Outreach..... | 25 |
| 3.6.2 Business Outreach | 26 |
| 3.6.3 Partnerships Initiatives | 26 |
| 3.6.4 2021 Collaborations | 26 |
| 3.7 Performance Measures | 28 |
| 4.0 CONCLUSION | 29 |
| 5.0 REFERENCES..... | 31 |

LIST OF TABLES

| | | |
|----------|---|----|
| Table 1 | CRD Treatment Plants and Sewage Collection Areas | 3 |
| Table 2 | Annual Sewage Flows 2020-2021 | 3 |
| Table 3 | Summary of Waste Discharge Permit Activity in 2021 | 4 |
| Table 4 | Summary of Authorization Activity in 2021 | 5 |
| Table 5 | Summary of Codes of Practice (Bylaw No. 2922) | 8 |
| Table 6 | Summary of Code of Practice Activity in 2021 | 8 |
| Table 7 | Summary of RSCP Monitoring Activity in 2021 | 10 |
| Table 8 | Summary of Waste Discharge Permit Compliance – 2021 | 15 |
| Table 9 | Code of Practice Enforcement Summary | 16 |
| Table 10 | Summary of Reported Sewer System Incidents (2021) | 24 |
| Table 11 | Results of Program Performance Measures (2012-2021) | 28 |

LIST OF FIGURES

| | | |
|----------|---|----|
| Figure 1 | Trucked Liquid Waste Fat, Oil and Grease and Lift Station Waste Volumes | 18 |
| Figure 2 | Trucked Liquid Waste Disposal Volumes of All Waste Types | 19 |
| Figure 3 | Trucked Liquid Waste Annual Catch Basin Waste Disposal Volumes..... | 19 |

APPENDICES

| | |
|------------|---|
| Appendix 1 | Program Priority Contaminant List (2021) |
| Appendix 2 | Calculation Methods for Program Performance Measures |
| Appendix 3 | CRD Regulated Industrial Categories (Currently Operating under Program Permits or Authorizations) |

REGIONAL SOURCE CONTROL PROGRAM 2021 REPORT

1.0 INTRODUCTION

Source control is the first step in wastewater treatment. It is a waste management strategy that reduces the amount of contaminants that industries, businesses, institutions and households discharge to sewers. In 1993, the Capital Regional District (CRD) committed to the development and implementation of a region-wide source control program and adoption of a Sewer Use Bylaw (Bylaw No. 2922) under the *BC Environmental Management Act*. The bylaw is the main regulatory instrument for source control in sanitary sewer systems, creating a level playing field for businesses and institutions throughout the CRD. The program also develops fact sheets, provides technical guidance and promotes best management practices.

The goals and objectives of the CRD's Regional Source Control Program (the program) are documented in the Saanich Peninsula Liquid Waste Management Plan (1996) and the Core Area Liquid Waste Management Plan (2000). The most recent independent review of the program (SES 2022), covering the period of 2016-2020 was completed prior to completion of this annual report in 2022.

Source control is a key component of effective wastewater treatment and is an integral part of the core area wastewater treatment strategy moving forward. The current program meets or exceeds Canadian best practices for source control and the CRD is a nationally recognized leader in this field.

The program goals are as follows:

- protect the marine receiving environment adjacent to the CRD's sewage outfalls
- protect sewage infrastructure belonging to the CRD and its member municipalities
- protect the health and safety of sewage workers and the general public
- protect the quality of sewage sludge and biosolids
- protect treatment plants against upsets
- consistently apply the program for all users of CRD sewage facilities

During the second year of the COVID-19 pandemic, staff met their goal to maintain a normal level of service, while ensuring the health and safety of inspectors and acting as responsible community members by observing the recommendations of the BC Centre for Disease Control, Provincial Health Officer, Government of Canada, and the scientific and health care community by following strict sanitizing protocols and, when required, minimizing contact with other people as much as possible.

Procedures were modified such that inspections and other regulatory compliance interaction with businesses were done remotely when higher levels of pandemic response required it and in-person when the situation allowed. In this way, the program maintained contact with businesses and let them know that source control was still an important priority and regulatory requirement. Compliance was maintained with minor allowances in some cases where a business may have been closed for periods of time, for example.

This report meets the CRD's commitments in the Core Area and Saanich Peninsula liquid waste management plans to prepare an annual report on the program for submission to ENV, presents a summary of program activities and accomplishments for the period January to December 2021, and highlights some initiatives planned for 2022.

The information in this report is used by CRD staff to evaluate the performance and future direction of source control program activities and by municipal staff to understand trends in discharge of contaminants from residential and business sources.

2.0 BACKGROUND

2.1 Policies and Procedures

The following policies and procedures are used to provide guidance and ensure fair and consistent application of the CRD Sewer Use Bylaw and associated enforcement, cost recovery and monitoring activities.

2.1.1 Policies Approved by the CRD Board

- Regional Source Control Program Enforcement Policy
- Regional Source Control Program Fees and Charges Policy
- Sewer Use Bylaw Process of Review
- Regional Source Control Program Code of Practice Management Policy – Food Services

2.1.2 Operating Procedures

- Sampling and Analysis Procedure Manual
- Analytical Result Reporting Procedure
- Non-domestic Waste Discharge Reporting Procedure
- Significant Incident Reporting Procedure
- Procedure for Managing Contaminated Water Produced During Firefighting Operations in the CRD

The policies and procedures are periodically updated to reflect changes within the program.

Additional health and safety procedures were implemented to prevent the spread of COVID-19 and to protect the public and workers. Beginning in 2021, a CRD Safety and Exposure Control Plan was put in place (later renamed the Communicable Disease Safety Plan) and specific Regional Source Control Program COVID-19 inspection safety protocols were developed.

2.2 Sewage Collection Areas and Sewage Facilities

The CRD Sewer Use Bylaw applies to any discharge of non-domestic waste into a sewer that is connected to a sewage facility operated by the CRD. The program is designed to ensure that the bylaw and its associated policies and procedures are applied consistently within the separate collection areas for these sewage facilities.

With the addition of McLoughlin Point Wastewater Treatment Plant in December 2020, the CRD now owns and operates seven wastewater treatment plants, as shown in Table 1. Three of these plants—McLoughlin Point, Saanich Peninsula and Ganges—receive significant industrial, commercial or institutional wastewater flows, while the remaining four are small plants receiving mostly residential flows. McLoughlin Point now receives and processes the flows from the former Clover and Macaulay treatment plants which have been converted to pump stations.

The sewage flows into each treatment plant are reported in the annual compliance monitoring reports for CRD sewage outfalls. Estimated annual sewage flows contributed by each participating area, over the period October 1, 2020 to September 30, 2021, are listed in Table 2.

Table 1 CRD Treatment Plants and Sewage Collection Areas

| CRD Sewage Treatment Plant | Sewage Collection Areas |
|----------------------------|---|
| McLoughlin Point | Victoria, Esquimalt, Saanich, Oak Bay, View Royal, Colwood, Langford, Department of National Defence, Esquimalt First Nation, Songhees First Nation |
| Saanich Peninsula | Sidney, Central Saanich, North Saanich, Pauquachin First Nation, Tseycum First Nation, Institute of Ocean Sciences |
| Ganges | Ganges Village (Salt Spring Island Electoral Area) |
| Maliview | Maliview area (Salt Spring Island Electoral Area) |
| Schooner Way | Buck Lake area (Southern Gulf Islands Electoral Area) |
| Cannon Crescent | Magic Lake Estates (Southern Gulf Islands Electoral Area) |
| Port Renfrew | Port Renfrew (Juan de Fuca Electoral Area) |

Table 2 Annual Sewage Flows 2020-2021

| Participant | Estimated Annual Flow (m ³ /year)* | Percentage of Total Flows |
|-----------------------------|---|---------------------------|
| Saanich | 10,234,514 | 26.73 |
| Oak Bay | 3,054,787 | 7.98 |
| Victoria | 13,284,932 | 34.69 |
| Esquimalt | 2,451,312 | 6.40 |
| View Royal | 816,583 | 2.13 |
| Colwood | 1,169,227 | 3.05 |
| Langford | 3,327,295 | 8.69 |
| Esquimalt First Nation | 27,738 | 0.07 |
| Songhees First Nation | 243,322 | 0.64 |
| North Saanich | 528,049 | 1.36 |
| Central Saanich | 1,449,113 | 3.78 |
| Sidney | 1,339,620 | 3.50 |
| Pauquachin First Nation | 29,661 | 0.08 |
| Tseycum First Nation | 14,980 | 0.04 |
| Institute of Ocean Sciences | 3,889 | 0.01 |
| Ganges Sewer | 167,123 | 0.44 |
| Maliview Sewer | 19,815 | 0.05 |
| Magic Lakes Estates Sewer | 109,685 | 0.29 |
| Port Renfrew Sewer | 19,997 | 0.05 |
| Total Flow | 38,291,624 | 100% |

Note: *For the period October 1, 2020-September 30, 2021

3.0 REGIONAL SOURCE CONTROL ACTIVITIES AND ACCOMPLISHMENTS – 2021

Program activities and accomplishments in 2021 are discussed under the following broad groups of activities:

- industrial, commercial and institutional liquid waste regulation
- enforcement
- contaminants management
- contaminant reductions
- significant incident reporting
- outreach
- data management
- revenue and expenditures
- planning and development
- performance measures

3.1 Industrial, Commercial and Institutional Liquid Waste Regulation

3.1.1 Regulatory Background

The Sewer Use Bylaw (CRD Bylaw No. 2922) serves as the main regulatory instrument for CRD sanitary sewer system source control. The bylaw specifies the various regulatory conditions under which facilities must operate if they discharge non-domestic waste into a sanitary sewer. The regulatory conditions for businesses include operation under waste discharge permits, authorizations or sector-specific codes of practice. Under the program enforcement policy, staff make reasonable efforts to resolve issues through cooperative measures. Where education proves ineffective, punitive measures are available, including tickets under the bylaw.

Following adoption of the Sewer Use Bylaw in August 1994, the program focused primarily on identifying, inspecting, assessing and permitting larger industrial facilities, and preparing authorizations for smaller commercial and institutional dischargers operating within the CRD. This process was largely completed over the period 1995-1998. Waste discharge permits require ongoing management, inspection and periodic amendment to accommodate changes in site-specific processes, practices and discharge conditions. New businesses continue to be assessed for operation under permits or authorizations each year. For further information on permits and authorizations, see sections 3.1.2 and 3.1.3.

In 1998, the focus of the program shifted toward development, adoption and implementation of codes of practice each as a separate schedule in the Sewer Use Bylaw, which regulate discharges from larger numbers of smaller commercial and institutional facilities operating in the CRD. The first regulatory codes of practice, considered unique in North America, were adopted in 1999 and inspections and enforcement for these codes commenced the following year. By the end of 2003, 11 codes of practice had been adopted. All codes were developed using extensive stakeholder involvement to help ensure their practicality and acceptance within each sector. For further information on codes of practice, see Section 3.1.4.

The Sewer Use Bylaw and its associated policies and procedures were amended periodically during the first 12 years of the program, largely to accommodate adoption of codes of practice, but also to add new restricted waste limits and a structure for cost recovery. In 2021, staff continued the process of assessing and reviewing the Sewer Use Bylaw to ensure it continues to provide an adequate level of protection. Updates to the bylaw were completed in 2022 and will be consolidated into the bylaw once approved in early 2023.

3.1.2 Waste Discharge Permits

Waste discharge permits are site-specific regulatory documents, issued to businesses or institutions under the CRD Sewer Use Bylaw, that outline requirements for wastewater pre-treatment, effluent quality, monitoring and reporting. Waste discharge permits are issued to facilities or operations that discharge significant non-domestic wastewater flows (greater than 10 m³/day) or wastewater containing high loads of restricted wastes or specified chemical contaminants into the sanitary sewer. Table 3 provides a summary of waste discharge permit activity in 2021.

Table 3 Summary of Waste Discharge Permit Activity in 2021

| Waste Discharge Permit Activity | 2021 |
|---|-------------|
| Permits active (at year end) | 33 |
| New permits issued | 1 |
| Permits closed | 1 |
| Permits amended | 14 |
| Permit site inspections (including evaluations for new permits) | 60 |

At the end of 2021, there were 33 active waste discharge permits being managed by staff. The majority of these permits were ongoing, with no expiry date. One new temporary excavation dewatering permit was issued for a facility in December 2021. Unlike previous years, there were no new cruise ship discharge permits. One landfill permit was closed because the landfill had reached capacity and closed. A small amount of leachate from that landfill continues to be sent offsite for treatment and discharge at a permitted facility.

Permit management activity includes reviewing discharger self-monitoring reports on a monthly or quarterly basis, preparation of compliance letters, meetings and regular phone contact with permittees and site inspections. Permit managers are also responsible for comparing CRD audit sampling data to permittee self-monitoring data and submitting permit fee billing information to CRD Finance.

Most permit inspections scheduled at the beginning of 2021 were completed within the year. One temporary excavation dewatering permit was issued at the end of the year and was inspected in 2022, and one permit did not discharge. Throughout 2021, inspection staff continued their permit confirmation process, which is an ongoing activity. This includes conducting investigations into potential new non-domestic waste discharge permits or authorizations in known hot spots within the region (e.g., industrial parks), or those identified through municipal engineering department contacts or business licensing staff.

Additionally, a new permit application form was created for temporary excavation dewatering to help streamline a complicated application process. The revised form clearly outlines the many requirements for background and analytical information and reduces the time that was previously associated with issuing temporary excavation dewatering permits.

3.1.3 Authorizations

Letters of authorization are issued under the Sewer Use Bylaw in cases where overall contaminant loads to sanitary sewer are low or where discharges are predicted to have a minimal impact on collection and treatment systems and/or the receiving environment. Authorizations contain site-specific discharge requirements and best management practices designed to decrease the impact of the discharge or limit the potential for illegal discharges. They are normally issued without expiry dates. Some authorizations have self-monitoring and/or reporting requirements.

Authorizations are commonly issued to regulate unusual discharges or discharges from small groups of similar operations, such as ship and boat waste facilities, funeral homes, and sani-dumps. They can also be issued to businesses where a code of practice is either planned or under development, or where requirements differ from those specified in a code (e.g., an alternative treatment technology, such as an automatic grease recovery device in a food services business, rather than a grease interceptor).

Inspections are carried out on a periodic basis with an emphasis on those authorizations, which had previously been regulated under permits or those, which include operations discharging priority contaminants. Table 4 summarizes authorization activity in 2021.

In 2016, all recreation facilities that were previously regulated under the Code of Practice for Recreation Facility Operations were moved to authorization. This move was due to the high variety of discharge practices occurring and this code will, therefore, be repealed from Sewer Use Bylaw No. 2922 in the next amendment.

Table 4 Summary of Authorization Activity in 2021

| Authorization Activity | 2021 |
|---|------|
| Authorizations active (at year end) | 92 |
| New authorizations issued | 9 |
| Authorizations closed or transferred to codes or permits | 5 |
| Authorizations amended | 8 |
| Authorization site inspections (including evaluations for new authorizations) | 83 |

At the end of 2021, there were 92 active waste discharge authorizations being managed. The majority of these were ongoing, with no expiry date. Nine new authorizations were issued over the year: four for short-term discharges of wastewater created during the installation of cure-in-place lining for municipal water pipelines, one for sensor testing at a small manufacturing operation, one wet-cutting operation and one equipment rental operation that both formerly discharged to storm sewer, and two sani-dump facilities. The four short-term authorizations expired, and one auto body shop installed code-compliant treatment works.

A review of all authorizations that include monitoring and sampling requirements was initiated near the end of 2021. The goal of the review was to ensure consistent and fair requirements across similar facilities which resulted in several amendments. Some amendments were completed in 2021, while the remainder will be completed in 2022.

Additionally, a thorough review of all wet-cutting, funeral home and technology and manufacturing facilities was conducted using a sector-by-sector process similar to the approach for Codes of Practice, which includes inspecting businesses due for an inspection in each sector for baseline compliance, reviewing the existing authorizations for any necessary amendments or updates, ensuring consistent application of the bylaw for all facilities, and updating data for new and/or newly sewer facilities.

WET-CUTTING

The wet-cutting sector utilizes wet-jet cutting and water-cooled cutting technologies, resulting in a liquid waste stream that requires regulation for discharge. This sector was last reviewed in 2016, resulting in one facility being identified as a discharger which was issued an authorization in 2017. The primary contaminant of concern from these activities is Total Suspended Solids (TSS) and concentrations can be quite high. Other parameters that have been monitored but are typically within bylaw limits for this sector include chemical oxygen demand (COD), pH and metals.

A review of the source control database, Google, and within CRD Programs identified 24 businesses under the categories of stone cutting, countertops, monument cutting, water-jet and wet-jet cutting. Nine were retail or administrative offices and were categorized as no regulated waste. Three facilities did not discharge to sewer. Instead, operational water was all recirculated, and slurries or solids were sent offsite. Two facilities discharged to ground and nine facilities discharged to storm sewer. Notifications were sent to the appropriate municipality offering CRD services should they wish to require the facilities to discontinue discharging to storm drain and discharge to sanitary instead. A new authorization was created for one facility that was previously not discharging but had changed procedures and was classified as a discharging operation.

FUNERAL HOMES

The funeral home sector was reviewed in its entirety in 2003 and again in 2016 prior to the 2021 review. The discharge of human blood and body fluids during the embalming process requires treatment in the form of disinfection as a requirement of the bylaw, specifically Schedule "A", Prohibited Waste, Section 7, Biomedical Waste.

Approximately 25% of deaths result in burial requiring embalming, and most decedents are cremated. Previous reviews determined that the body disinfection wash at the beginning and at the end of the embalming process mixes with the blood and bodily fluids during discharge to sanitary sewer and is sufficient to disinfect the fluids. Any disposal of diluted embalming fluid or formaldehyde from this industry is minimal and below hazardous waste concentrations.

Most facilities are only offices to meet with families so have no operational wastewater discharge. Four facilities perform only cremation or act as a holding facility before a decedent is transferred elsewhere. These also have no operational wastewater discharge. One facility directs its wastewater to a holding tank which is trucked to a permitted septage processing facility.

Four facilities discharge to sanitary sewer under authorization. No changes to their procedures were identified during the review, however there is a potential for an operation to embalm a decedent carrying

an infectious disease, although this would be rare. There are no quarantine protocols at the hospital for the decedent and no provincial or other regulations stipulating any special procedures to the morticians.

Blood carrying an infectious disease listed as “Risk Group 4” as defined in the Transportation of Dangerous Goods (TDG) Act is prohibited from disposal to the sanitary sewer under Schedule “A” (7) Biomedical Waste.

Currently, the definition of biomedical waste in the bylaw is outdated. TDG has since been updated such that the list of infectious viruses is called “Category A”. Additionally, bodily fluids from funeral homes are not included in the definition of biomedical waste in the TDG. The review recommended amending the authorizations to specifically require blood containing infectious disease to be captured and disposed of off-site as biomedical waste in order to protect CRD staff working downstream of these facilities.

TECHNOLOGY AND MANUFACTURING

Victoria is in the top ten major markets for the technology industry, based on a scoring system from Coldwell Banker Richard Ellis (CBRE) Group investment firm. According to a local news article, the primary industries are software and application development, advanced manufacturing and ocean science. In order to ensure all discharging facilities in this area were captured, a review of the source control database, internet, Google maps and a visual survey by car of known technology and industrial parks was conducted.

The review identified ten companies not known to CRD staff which were contacted and investigated to determine if any discharges to sanitary or storm sewer were occurring. Seven facilities were confirmed as having no discharges or no regulated discharges to sewer. One facility was confirmed as a food manufacturer whose discharge fell under the food services code of practice and already had treatment works in place, one mechanical system facility was given best practice recommendations in the rare circumstance where they require discharges to sanitary, and one powder coating facility was discharging to storm drain on the Saanich Peninsula and was inspected under Bylaw 4168. A draft authorization is currently pending to allow the wastewater to be discharged to sanitary sewer instead of storm drain.

3.1.4 Codes of Practice

3.1.4.1 Background

The CRD has made commitments in the Core Area and Saanich Peninsula liquid waste management plans to the development and implementation of codes of practice to regulate non-domestic waste discharges from commercial and institutional sectors to the CRD’s sanitary sewers. The program defines codes of practice as “regulatory documents containing mandatory sanitary sewer discharge standards for specific industrial, institutional or commercial sectors”.

Table 5 lists the 11 codes of practice in effect. All the facilities under the recreation code have been issued authorizations and the code will be removed in the upcoming bylaw amendment.

Codes of practice include mandatory requirements for waste treatment, inspection, maintenance and record keeping for businesses and institutions discharging non-domestic wastes to sanitary sewer. They are believed to be among the first of their type to be adopted in North America. Staff have prepared plain language guidebooks for each code sector explaining the applicable regulations and providing best management practices to help businesses achieve compliance and improve environmental performance. These guidebooks are also accessible through the program’s webpage.

Table 5 Summary of Codes of Practice (Bylaw No. 2922)

| Code of Practice | Adoption Date |
|---------------------------------|--------------------------------|
| Food Services Operations | November 24, 1999 ¹ |
| Dry Cleaning Operations | November 24, 1999 ² |
| Photographic Imaging Operations | November 24, 1999 |
| Dental Operations | November 22, 2000 |
| Automotive Repair Operations | December 12, 2001 ² |
| Vehicle Wash Operations | December 12, 2001 ² |
| Carpet Cleaning Operations | December 11, 2002 |
| Fermentation Operations | December 11, 2002 |
| Printing Operations | December 11, 2002 |
| Laboratory Operations | December 10, 2003 |
| Recreation Facility Operations | December 10, 2003 |

Notes:¹Code amended December 2001 and March 2003²Code amended December 2003**3.1.4.2 Code of Practice Inspection Summary – 2021**

In 2021, the CRD continued to emphasize customer service and support as part of code of practice inspections, in addition to ensuring compliance with code requirements. This involves making every effort to educate regulated operations, provide guidance, and in some cases feedback through laboratory analysis of effluent quality and multiple visits to the same establishment.

In 2020, in response to the pandemic, the inspection work plan was rescheduled and reprioritized based on which facilities were operating, loadings concentration (level of flow and contaminants of concern) and associated risk to infrastructure and environment. Inspections were then prioritized based on the risk assessment findings. As the pandemic continued into 2021, follow-ups of businesses assessed as high-risk or that had been temporarily closed were prioritized.

Five full-time equivalent inspectors conduct the code of practice inspections, in addition to managing the permits and authorizations. During front-line interactions with businesses, the inspectors can also provide auditing and reporting services for other CRD programs, technical services for other Parks & Environmental Services projects or programs, as required, and participate in the development and implementation of outreach initiatives.

Table 6 provides a summary of code of practice inspection activity in 2021. The sector estimates shown in the table are the numbers of active operations estimated within each sector at the beginning of each year. The total number of site inspections (1,513 in 2021) includes first (or primary) inspections within an inspection cycle and repeat (or follow-up) inspections to confirm compliance status of 2,123 businesses.

Table 6 Summary of Code of Practice Activity in 2021

| Code of Practice (Est. Sector Size – 2021) | % of Sector Inspected in 2021 |
|---|----------------------------------|
| Automotive Repair (194) | 46% |
| Carpet Cleaning (30) | 7% |
| Dental (141) | 3% |
| Dry Cleaning (11) | 82% |
| Fermentation (20) | 10% |
| Food Services (1,565) | 85% |
| Laboratory (56) | 13% |
| Photographic Imaging (27) | 7% |
| Printing (27) | 59% |
| Vehicle Wash (52) | 89% |

The sector-by-sector review process includes inspecting businesses due for an inspection in each sector for baseline compliance, reviewing the code of practice for any necessary amendments or updates, and updating data for new and/or newly sewer facilities. Sectors of focus in 2021 were automotive (mechanical) repair, dry cleaning, food services (half of all facilities) and vehicle wash. In addition, revised protocols for the food service sector resulted in higher than usual repeat inspection numbers. Other sectors were visited only for follow-up inspections. Both discharging and non-discharging businesses (those sending business waste for off-site treatment or operating as a storefront) in the food services sector were inspected, while in the automotive, dry cleaning and vehicle wash sectors, only dischargers were inspected.

Each inspector in the inspection team is assigned a geographic area and inspects the majority of the codes in their area. Some codes are part of a sector sweep or more detailed investigation, which may be conducted by one 'code expert', for example carpet cleaning and fermentation. The businesses inspected were comprised of those within the existing cross connection and regional source control information management system database, and also facilities identified through an online search, drive-through of the area, cross-referencing the Cross Connection Control Program database, BC Assessment code query, and new municipal business licenses.

Starting in 2016, dischargers operating treatment works on site were inspected on a schedule based on risk associated with priority contaminants: automotive and vehicle wash (annually), dental (biennially), dry cleaning (annually starting in 2018), and laboratory (biennially). The non-discharging businesses in these sectors (i.e., sending business waste for off-site treatment or operating as a storefront) are inspected every three to five years. The carpet cleaning and fermentation sectors are inspected every five years and the printing and photographic imaging sectors are inspected every three years.

Rigorous food service inspections are performed every year due the sector's large size (1,565 regulated businesses) and potential to impact sewer infrastructure through grease blockages. In both 2020 and 2021, food services received an increase in attention in order combat issues with FOG in sewage infrastructure and a lack of maintenance as a side-effect of COVID-19. In 2021, 936 food service businesses were inspected (an 18% increase over 2020), with 400 repeat inspections required to address non-compliance issues and provide education and support through the pandemic. The majority of those repeat inspections focused on assisting the facility to comply with regulatory requirements, such as proper maintenance of existing grease interceptors.

Continuing on the work started in 2020, several samples were collected from printing facilities to determine effectiveness of various levels of treatment occurring in the sector. Due to the shift in the make-up of businesses in this sector from traditional paper printing to primarily screen-printing operations, code requirements may not be applicable in all situations.

A historical review of sampling data for the automotive repair sector collected between 2010 and 2020 was initiated to aid in designing a future sector sweep and decisions on acceptance of alternative treatment works.

A contaminant characterization of the microbrewery sector finalized in 2020 recommended that microbreweries be managed under authorizations to facilitate the collection of more substantial contaminant concentration and flow data. Wastewater from fermentation operations alters the pH in the sewer system and contains total suspended solids and COD that, in high concentrations can impact sanitary sewer infrastructure, aquatic life and the environment. Authorization requirements, including self-monitoring and reporting will be scaled based on the facility's annual production of saleable product.

In 2021, details for the new approach for microbreweries were finalized including installation of an approved monitoring point and minimum composite sampling requirements for facilities that produce over 250 hL per year, flow monitoring for facilities that produce over 1000 hL per year, and keeping records for pH, off-spec product disposal and production volumes for all facilities. A letter informing facilities of the new approach, asking for preliminary information and requesting to schedule site visits occurred in 2021. Site visits starting with the larger microbreweries to assist them with the transition and to collect data required to write the authorizations will continue throughout 2022 and it is expected all microbreweries will be under authorization by the end of 2023.

3.1.5 General Bylaw

In addition to permits, authorization and codes, the bylaw specifies various regulatory conditions under which recreational vehicle waste, ship and boat waste and kitchen equipment cleaning facilities must operate if they discharge non-domestic waste into a sanitary sewer. While recreational vehicle and ship and boat waste facilities have historically been managed under authorizations, kitchen equipment cleaning facilities have primarily used offsite waste management and so have not required further regulation.

A review of these facilities was conducted in 2021 and found that two facilities out of seven were discharging in contravention of Section 2.12 of the bylaw. One of the two facilities underwent further inspection and investigation in 2022 and an authorization is currently pending. The remaining facility will be inspected in 2022 to determine if an authorization is similarly appropriate.

3.1.6 Coordinated Inspections

3.1.6.1 Coordinated Significant Incident Responses

There were four significant incidents formally reported in 2021, and one incident reported in 2019 that received further investigation and follow-up. Two involved a build-up of fat, oil and grease reported by CRD or municipal staff, one was dark oily material reported by municipal staff, and one was a public complaint of unauthorized discharge of recreational vehicle waste. Further details of each incident can be found in Table 10.

3.1.7 Monitoring

Staff carried out the following types of monitoring in 2021: permit compliance, authorization compliance, code of practice, and key manhole monitoring. All wastewater samples collected in 2021 were analyzed by a contract laboratory using standard analytical procedures specified in the program Sampling and Analysis Procedure Manual.

Table 7 provides a summary of monitoring activity in 2021. Sampling instances (middle column) are the total number of samples taken and managed from collection to data entry. This number includes field replicate samples and multiple samples taken from the same site throughout the year. The number of sampling stations (right column) tallies the number of physical sampling locations visited throughout the year. Each station may be sampled multiple times.

Table 7 Summary of RSCP Monitoring Activity in 2021

| Monitoring Events | Total Sampling Instances in 2021 | Number of Sampling Stations in 2021 |
|--|----------------------------------|-------------------------------------|
| Permit compliance | 83 | 30 |
| Authorization compliance | 39 | 20 |
| Code of Practice | 15 | 10 |
| Key manhole | 20 | 6 |
| Assessment monitoring | 0 | 0 |
| Miscellaneous sampling project | 0 | 0 |
| Significant incidents | 1 | 0 |
| Source Control Storm Water Monitoring | 1 | 0 |
| Saanich Peninsula Plant influent | 12 | 1 |
| Saanich Peninsula Plant dewatered sludge | 12 | 1 |
| Ganges influent | 12 | 1 |
| Ganges mixed liquor | 11 | 1 |

3.1.7.1 Permit Compliance Monitoring

Businesses operating under waste discharge permits are required to carry out self-monitoring of their wastewater for a range of parameters on a specified regular basis. This data is normally submitted to staff on a monthly or quarterly basis for compliance assessment. An important component of the program is the collection and analysis of audit samples from each permitted site twice per year. This is done to verify compliance and confirm that the self-monitoring data being submitted are representative of discharges from each permitted site. Staff normally collect these samples throughout the year, following a pre-arranged schedule. Additional sampling events are carried out as necessary on suspected problem discharges from permitted sites.

The average number of scheduled audit events per permit in 2021 was two. The goal of collecting audit samples from each permitted site twice per year was achieved at all sites but one due to low effluent discharge during the second annual audit sampling.

Staff responsible for managing a specific permit review the data submitted by the permittee. If a significant difference is detected between permittee self-monitoring results and CRD audit results, the permittee is contacted and an investigation into the discrepancy is initiated. The majority of all audit results obtained in 2021 were not significantly different from self-monitoring results reported from the same site, except for two breweries. This indicated that the majority of self-monitoring results being submitted by permittees had been collected and analyzed in an appropriate manner, as required by each permit. Further investigation and confirmation of proper sampling techniques, location of monitoring points and proper sampling handling at the two breweries is underway.

Since CRD audit monitoring is carried out in accordance with strict quality assurance procedures, it provides reliable information when calculating characteristic contaminant levels or loads for a particular industry or business type. This information is useful for planning purposes in specified collection areas.

3.1.7.2 Authorization Compliance Monitoring

Twenty-nine businesses operating under authorizations were monitored in 2021, 14 of which have self-monitoring requirements. One business is audited each month as they are an entirely new industry integrated within the CRD sewage system.

The CRD monitoring provides, at minimum, an annual check on the quality of effluent being discharged by businesses known to have reported restricted waste generation or handling on site. The results of this monitoring indicated that the majority of discharges from authorizations in 2021 were in compliance with Sewer Use Bylaw restricted waste limits.

3.1.7.3 Code of Practice Monitoring

A sector-focused approach to code of practice monitoring was implemented in January 2012. The approach involves focusing on fewer sectors per year, but inspecting and sampling the entire sector, where possible. This focused monitoring is coordinated with inspections, in order to address any compliance issues, which may influence monitoring results.

The monitoring approach generates a comprehensive overview of the composition of the wastewater within each sector and provides information on the effectiveness of specified treatment works reducing contaminant loads. The data generated also assists businesses in meeting the restricted waste criteria defined in the CRD Sewer Use Bylaw (Bylaw No. 2922).

There are no wastewater self-monitoring and reporting requirements for businesses operating under code of practice. Code of practice compliance is achieved by installing the required, properly sized treatment works, regular maintenance of the treatment works and record keeping.

The printing sector was selected for monitoring in 2020, and follow-up monitoring was done in 2021. Additionally, follow-up inspection and monitoring was conducted at one dry cleaning facility and one

automotive repair facility. The final round of sampling for the dental sector was delayed due to another wave of COVID-19 in late 2021.

PRINTING

Due to changes in availability of service providers for the trade waste interceptors, required in the Code of Practice for Printing Operations, facilities have fallen behind in maintenance or started to design their own treatment works. In order to encourage more frequent maintenance and ensure compliance of modified treatment works, samples were collected from five discharging facilities in early 2021, with an additional two samples collected in the latter half of the year.

All samples were analyzed for conventional contaminants, volatile organic compounds, and inorganic contaminants (metals). The results are summarized below:

Conventional Contaminants

- Chemical oxygen demand: six samples were above the Bylaw limit of 1,000 mg/L, but facilities operating under this Code are exempt from that requirement
- Total suspended solids: three samples exceeded the Bylaw limit of 350 mg/L (430 mg/L, 590 mg/L and 1,800 mg/L)
- Mineral Oil and Grease: one sample slightly exceeded the Bylaw limit of 15 mg/L

Organic Contaminants

- Analysis of volatile organic compounds (benzene, toluene, ethylbenzene and xylene) showed all samples within the Bylaw limit, with most samples having non-detectable results

Inorganic Contaminants

- Copper: one sample exceeded the limit of 1 mg/L, at 2.98 mg/L
- Selenium: one sample exceeded the limit of 0.3 mg/L, at 5.3 mg/L

HISTORICAL REVIEW OF AUTOMOTIVE REPAIR

Automotive repair facilities have been routinely sampled since 1999. This routine sampling was placed on a two- to three-year cycle after the roll-out of the Automotive Repair Operations Code of Practice under the Bylaw in 2004. In recent years, it has been noted that sampling has been focused on non-compliant facilities and a thorough sweep of all discharging facilities has not been done. Additionally, some repair facilities have installed alternative treatment works such as coalescing plates in their oil-water separators. To aid in a future sector sweep and decisions on acceptance of alternative treatment works, a review of historical sampling data collected between 2010 and 2020 was conducted. See section 3.3.3 for further discussion.

All samples were analyzed for conventional contaminants and inorganic contaminants (metals). Most samples were also analyzed for volatile organic compounds. The results are summarized below:

Conventional Contaminants

- Chemical oxygen demand: 60% (30 of the 51 samples) were above the Bylaw limit of 1,000 mg/L, however facilities operating under this Code are exempt from that requirement
- Total suspended solids: 8% (4 of the 47 samples) exceeded the Bylaw limit of 350 mg/L (360 mg/L, 454, 430, and 730 mg/L)
- Mineral Oil and Grease: 23% (11 of the 47 samples) exceeded the Bylaw limit of 15 mg/L (ranging from 66 mg/L to 470 mg/L)
- pH: 34% (16 of the 47 samples) exceeded the Bylaw limit of 5.5 - 11 (ranging from 4.3 to 5.4)

Organic Contaminants

- Benzene: 1 of the 32 samples exceeded the Bylaw limit of 0.1 mg/L (0.23 mg/L)
- Toluene: 3 of the 32 samples exceeded the Bylaw limit of 0.2 mg/L (0.4 mg/L, 0.54 mg/L and 2.5 mg/L)
- Ethylbenzene: 1 of the 32 samples exceeded the Bylaw limit of 0.2 mg/L (0.62 mg/L)
- Xylene: 4 of the 32 samples exceeded the Bylaw limit of 0.2 mg/L (ranging from 0.25 mg/L to 4.3 mg/L)
- Polynuclear Aromatic Hydrocarbons (PAH): 13% (6 of the 48 samples) exceeded the Bylaw limit of 0.05 mg/L (ranging from 0.12 mg/L to 0.81 mg/L)

Inorganic Contaminants

- Cadmium: 2% (1 of the 50 samples) exceeded the Bylaw limit of 0.3 mg/L, at 3.11 mg/L
- Copper: 8% (4 of the 50 samples) exceeded the Bylaw limit of 1 mg/L (ranging from 1.15 mg/L to 1.51 mg/L). One additional sample was within the measurement variability for this parameter
- Iron: 4% (2 of the 50 samples) exceeded the limit of 50 mg/L, (64 mg/L and 148 mg/L). One additional sample was within the measurement variability for this parameter
- Selenium: 6% (3 of the 50 samples) exceeded the limit of 0.3 mg/L at (4.2 mg/L, 4.0 mg/L and 4.4 mg/L)
- Silver: 12% (6 of the 50 samples) exceeded the limit of 0.5 mg/L (ranging from 2.5 mg/L to 6.6 mg/L)
- Zinc: 8% (4 of the 50 samples) exceeded the limit of 3 mg/L (ranging from 3.84 mg/L to 26.7 mg/L)

3.1.7.4 Key Manhole Monitoring

Key manhole monitoring is carried out to monitor for contaminants originating from sources within wide sanitary sewer collection areas. This includes monitoring at two residential sites and two Department of National Defence sites within the Macaulay Point and Clover Point collection areas. It also includes one residential site and one Victoria International Airport site within the Saanich Peninsula Wastewater Treatment Plant collection area.

The program was enhanced to capture a wider range of parameters at more locations on a four-year cycle, in order to better understand trends in contaminants from various land use types and collect data to evaluate program efforts against the operational needs of the McLoughlin Point Wastewater Treatment Plant, which was commissioned in December 2020, as well as the other CRD treatment facilities across the region. Enhanced sampling, which was scheduled in 2021, was delayed due to the COVID-19 pandemic. Many businesses stopped operating, others operated with modified hours and/or services, tourism and post-secondary student populations were significantly reduced, and residential sewer use patterns changed significantly as a result of pandemic restrictions. It was deemed that any additional enhanced key manhole sampling results would not represent normal patterns. Therefore, enhanced key manhole sampling was postponed until the end of the pandemic.

RESIDENTIAL SITES

Residential (or domestic) key manhole monitoring has been carried out by CRD staff since 1996. This sampling has provided information on background levels of typical contaminants found in residential wastewater and the data has been used to predict contaminant loads from domestic sources for planning purposes.

The 2021 residential sampling program included sampling events at Dean Park (North Saanich), and Harling Point pump station (Oak Bay) in January, April, July and October. There were no exceedances of Sewer Use Bylaw restricted waste limits in 2021.

DEPARTMENT OF NATIONAL DEFENCE SITES

In 2021, staff sampled a key manhole at the Lang Cove pump station, serving the Department of National Defence Dockyard area in January, April, July and October. Two samples were collected at the Department of National Defence Colwood pump station in April and October, however, the April sample was

unsuccessful due to COVID-19 site access restrictions. All parameters were within Sewer Use Bylaw restricted waste limits.

SAANICH PENINSULA WASTEWATER TREATMENT PLANT COLLECTION AREA SITES

Samples were collected in April and October at Victoria International Airport site. All parameters were within Sewer Use Bylaw restricted waste limits.

3.1.7.5 Saanich Peninsula Wastewater Treatment Plant Influent and Dewatered Sludge Monitoring

Every year, four composite samples of Saanich Peninsula plant influent are collected each quarter by CRD staff for metals and priority pollutant analysis. In 2021, 24-hour composite sampling occurred in January, April, July and October.

Ten composite dewatered sludge samples were also collected by CRD staff for analysis in 2021. Daily samples were combined into weekly composites, which were submitted for moisture, metals and weak acid dissociable cyanide analysis on a monthly basis, with a field duplicate submitted in February and September. The results are discussed in Section 3.4.2.

3.1.7.6 Ganges Wastewater Treatment Plant Influent and Mixed Liquor Monitoring

As in past years, a single (grab or composite) sample of influent was collected at the Ganges Wastewater Treatment Plant. The 24-hour composite sample collected in July 2021 was submitted for priority pollutant analysis.

In 2021, 11 mixed liquor (treatment plant wastewater mixed with activated sludge) samples were collected for analysis. Grab samples were collected monthly (except for November) and were submitted for moisture and metals analysis. The results are discussed in Section 3.4.2.

The data are used to identify contaminants of concern, provide ongoing information on contaminant variability, loads and trends at the treatment plants, and provide input to planning initiatives.

3.2 Enforcement

The CRD has adopted a stepwise approach to enforcement of the Sewer Use Bylaw, as outlined in the program enforcement policy. This enforcement policy classifies offences, outlines enforcement steps and includes use of cooperative measures, such as increased communication, education and monitoring, to resolve issues of non-compliance. The policy was originally approved by the CRD Board in February 1997 and was last amended in November 2006.

The CRD Ticket Information Authorization Bylaw contains fines (tickets) that have been set for specific offences under the Sewer Use Bylaw and its associated code of practice. These fines were last amended in January 2018.

Enforcement activities are directed at ensuring or restoring discharger compliance with the terms and conditions of the Sewer Use Bylaw, waste discharge permits, authorizations and code of practice. Enforcement action is applied in an escalating manner that is reasonable, fair, consistent and impartial. Warnings, tickets, orders and fines are issued, as necessary, in cases of continuing non-compliance.

3.2.1 Operations Regulated By Waste Discharge Permit

Of the 33 active waste discharge permits in place at the end of 2021, 22 sites were in “full compliance” with their permits and the Sewer Use Bylaw. One permit was at “staff assessment”, one site remained at “discharger under review”, and 10 sites were considered to be “in progress” but still in compliance with their permits under the enforcement policy. The enforcement levels and numbers of permits at each level are summarized in Table 8.

Table 8 Summary of Waste Discharge Permit Compliance – 2021

| Enforcement Level | Number of Permits |
|---|-------------------|
| Full Compliance | 22 |
| Step 1 | 5 |
| Step 2 | 4 |
| Step 3 | 1 |
| Discharger Under Review (non-compliant) | 1 |

Above Step 3, a significant escalation of enforcement action occurs, including notification of compliance status by letter, increased inspection or monitoring frequency, staff assessment of treatment works or procedures and scheduling of meetings to discuss remedial actions. Commitments and requirements agreed to at these meetings are confirmed in a follow-up letter to the permittee. Failure to meet these commitments and requirements can result in elevation from staff assessment to “discharger under review” status. Dischargers at the “discharger under review” level or above are considered to be non-compliant with their permits.

Operations having “discharger under review” status must prepare and submit a detailed compliance plan for approval by the deputy sewage control manager. A 90-day period is typically allowed for the preparation of this plan. This period allows a discharger to hire a consultant to help determine appropriate actions to achieve compliance. Progress meetings are held with the discharger after 30 and 60 days to measure progress, fully communicate the intent of any requirements, and clarify any outstanding issues. A compliance plan, once approved by the deputy sewage control manager, becomes a compliance program that usually forms part of the discharger's waste discharge permit through an amendment.

If no acceptable compliance plan is received within the 90-day period, an order may be issued under the *Environmental Management Act* to set conditions for discharge, or a lawyer's letter is issued. Failure to comply with an order or a lawyer's letter will result in consideration of legal action.

One permit site classified above Step 3 remained under staff assessment by program staff and one permit site remained under “discharger under review” in 2021. These sites included:

- A septage disposal facility was escalated to “discharger under review” level for sulfide exceedances in 2015, and remained until October 2018. Staff worked with the facility until they regained compliance in October 2018. However, due to continued chemical oxygen demand exceedances, they were escalated to “discharger under review” level again in November 2018. The permittee submitted a compliance plan detailing improved maintenance and repairs in August 2020 and substantial improvements in effluent quality were observed. Effluent strength continued to be improved through 2021 but issues arose in 2022. CRD staff continue to work with the facility to ensure improvements identified in the compliance plan are completed.
- A permitted shipyard was escalated to Step 3 levels for tributyl-tin issues in 2019. A written report was submitted with plans to adjust maintenance and work procedures, as well as upgrade treatment works in July 2019. Maintenance and work procedures were effectively improved, however, upgrades to treatment works were postponed until plans for an expansion at the site are settled. Analytical results in 2020 and 2021 showed marked improvement. The permit was amended in early 2022 to incorporate multiple improvements to work procedures and the facility is now considered in compliance.

No charges were laid against waste discharge permit holders under the Sewer Use Bylaw during 2021.

3.2.2 Operations Regulated by Authorization

A small group of the total number of authorizations issued is scheduled for inspection each year, based on the types of contaminants regulated, the contaminant levels, discharge volumes and the overall impact of discharges from these operations. Discharges from authorizations are considered to have a relatively minor impact in comparison to discharges from permitted facilities.

There were 83 inspections carried out at sites operating under authorizations in 2021. At the end of 2021, 79 of 83 inspected businesses were in full compliance with their authorizations, 10 were at a Step 1, one was at Step 2, and two were at Step 3 and “under staff assessment”. One of which was a composting facility with continued high-strength organics in their wastewater, however, levels continue to improve over the previous years. The other was a ferry pump station under review for excess sulphides. Increased maintenance and aeration in the tank reduced effluent strength. However, COVID-19 restrictions on travel have not been typical of normal operations so staff continued to monitor through 2021 to ensure levels remained low.

The overall compliance level for the total 92 authorizations active at the end of 2021 was 90%.

3.2.3 Operations Regulated by Codes of Practice

The stepwise approach to achieve compliance is applied to all code of practice sectors in a similar way to dischargers operating under permits or authorizations, as outlined in the enforcement policy. Dischargers are classified as being in “full compliance” if they have been inspected and no unsatisfactory issues are identified. Dischargers having committed offences, up to and including Step 3, are classified as being “in progress” and those at the “discharger under review” level and above are classified as being in “non-compliance” with the code. A summary of the code of practice enforcement results for inspections carried out from the implementation date of each code to 2020 is presented in Table 9.

Table 9 Code of Practice Enforcement Summary

| Code of Practice | % Full Compliance ¹ (%) | % Not Assessed ² (%) | % In Progress ³ (%) | % Non-Compliance ⁴ (DUR) (%) |
|----------------------|------------------------------------|---------------------------------|--------------------------------|---|
| Automotive Repair | 96 | 5 | 5 | 0 |
| Carpet Cleaning | 87 | 3 | 10 | 0 |
| Dental | 97 | 1 | 3 | 0 |
| Dry Cleaning | 91 | 9 | 0 | 0 |
| Fermentation | 80 | 0 | 20 | 0 |
| Food Services | 90 | 5 | 5 | 0 |
| Laboratory | 98 | 0 | 2 | 0 |
| Photographic Imaging | 82 | 15 | 4 | 0 |
| Printing | 89 | 0 | 11 | 0 |
| Vehicle Wash | 83 | 15 | 2 | 0 |

Notes:

¹Percentage of active operations, regulated within the sector and in compliance with all requirements of the code at the last inspection, including sites with required treatment works and those using off-site waste management.

²Percentage of active operations, regulated within the sector classified as not assessed, typically those identified through business licence sharing agreements near the end of the year.

³Percentage of active operations, regulated within the sector classified as not yet assessed, Step 1, 2 or 3 of the enforcement policy at the last inspection date.

⁴Percentage of active operations, regulated within the sector classified as “discharger under review” at the last inspection date.

Most code of practice enforcement actions to date have been associated with implementation of the food services code, which regulates one of the largest business sectors in the CRD. This sector has been very cooperative during application of the escalating approach to enforcement, and approximately 5% of food services operations inspected were considered to be “in progress”, with no facilities classified as “discharger under review”. The main non-compliance issues continue to be failure to maintain a grease interceptor and failure to install a properly sized interceptor.

There were seven tickets issued by the CRD to food services operations in 2021, one was waived upon demonstration of increased maintenance, and six were paid. One of the six was initially disputed but the defendant failed to appear in court and the ticket was later paid.

One food production facility that had two outstanding tickets issued in 2020 due to failure to install treatment works went to hearing in 2021. One ticket was undisputed and the court waived the other. The facility has still not installed treatment works and staff are considering other enforcement options as well as corrections to the Bylaw to prevent similar rulings in the future.

The automotive (mechanical) sector had 96% of the facilities in overall compliance and 5% of the facilities “in progress” in 2021, which equates to nine of the 194 regulated facilities, mainly for lack of records. 5% of the facilities had not been assessed before year-end. A review of sampling conducted over the past several years was initiated in 2021, preliminary findings are discussed below with more detail in next year’s report.

In the dry-cleaning sector, overall compliance was 91% with 9% of the facilities “not assessed”, which equates to one of the 11 regulated facilities. Four facilities are discharging using treatment works, with the remaining opting for off-site waste management. As with the automotive sector, inspections of the small number of dischargers in this sector are now completed annually to ensure proper solvent management and/or disposal.

The dental sector had 99% of the facilities in overall compliance and 3% “in progress”, which equates to four of the 141 regulated facilities. Three of the four were at Step 1 for records management and one facility (1%) could not be assessed. A study of contaminant levels downstream of three major dental buildings was initiated in 2020 and final results are discussed below.

The food services sector is the largest sector, and 2021 saw an increase of 18% in the number of inspections compared to 2020. Total compliance for this sector was not as high as previous years, only 90%, however, overall compliance remained high at 92%. The increased focus on this sector is also a factor in the compliance levels. The majority of the 5% facilities “in progress” were due to excess grease. A relatively high portion of facilities (5%) were not accessible since many were temporarily closed or had reduced their hours.

The vehicle wash sector overall compliance dropped compared to the previous year, reaching only 85%. However, only 2% of the facilities were “in progress”, which equates to only one of the 52 regulated facilities. Eight facilities or 15% were not assessed due to still being under construction or otherwise not being fully investigated before year-end.

In 2021, 93% of facilities regulated under program codes of practice, permits and authorizations achieved overall compliance.

3.3 Contaminants Management

Contaminants management builds on the program’s successful regulatory approach to make reductions in specific priority contaminants that have proven difficult to control or treat. This involves a focus towards avoidance, elimination or substitution of polluting products, processes or materials. Contaminants management projects initiated or completed in 2021 are outlined below.

3.3.1 Trucked Liquid Waste

In 2020, the CRD’s Trucked Liquid Waste service was transferred to the Regional Source Control Program. This service complements the program’s efforts by coordinating the collection and disposal of trucked liquid waste. This type of waste represents the resulting source control diversion of non-domestic liquid waste that is prohibited from discharge to sanitary sewer or stormwater systems and must be transported by truck to a permitted disposal facility. Types and sources of wastes managed range from stormwater catch basins, car washes, and restaurant grease interceptors to pit toilets as well as septage from recreational boats and commercial ships.

The program goals are achieved primarily through outreach and education as well as waste diversion as a result of RSCP inspections and regulation. A web-based service provider directory is maintained by staff to allow waste generators to find hauling and disposal options for many different types of trucked liquid waste.

Advertisements

Staff continued to update web-based information and respond to trucked liquid waste inquiries during this time and monitored effectiveness of the program. The advertisement campaigns and media were re-launched after a pause during the first year of the COVID-19 pandemic.

Performance Measures

Performance of trucked liquid waste programs is assessed through annual waste disposal volumes. Trends in trucked liquid waste quantities deposited at regional facilities are used as a key performance indicator of the program's success. In general, increasing disposal volumes among waste type show a positive trend and indicate that waste is being properly disposed of at treatment facilities. However, decreasing volumes can also indicate positive performance measures as well. For example, decreasing volumes associated with municipal lift station pump-outs can be linked with priority objectives of source control initiatives such as reduction of residential obstructive waste as well as diversion and recycling of fats, oils, and grease from households and restaurants.

Data available from public and private trucked liquid waste disposal facilities are assessed annually. However, an unknown volume of waste is disposed of at out-of-region facilities and those volumes are not available for assessment. Waste received at local septage/trucked liquid waste disposal facilities were reviewed in 2021 and this data contributes to inform regional planning efforts and outreach activities.

Overall waste volumes disposed and treated in 2021 were the highest recorded in the last five years and continue on an upward trend. Disposal of fats, oils, and grease (FOG) primarily from restaurants started to rebound after lower recorded levels during the pandemic. Waste from sanitary sewer lift stations has shown a decreasing trend over the last five years indicating a reduced impact to infrastructure and associated maintenance costs due to a decrease in blockages. Catch basin wastes showed a significant trend upwards indicating improving municipal maintenance activities which protect stormwater and the nearshore marine environment.

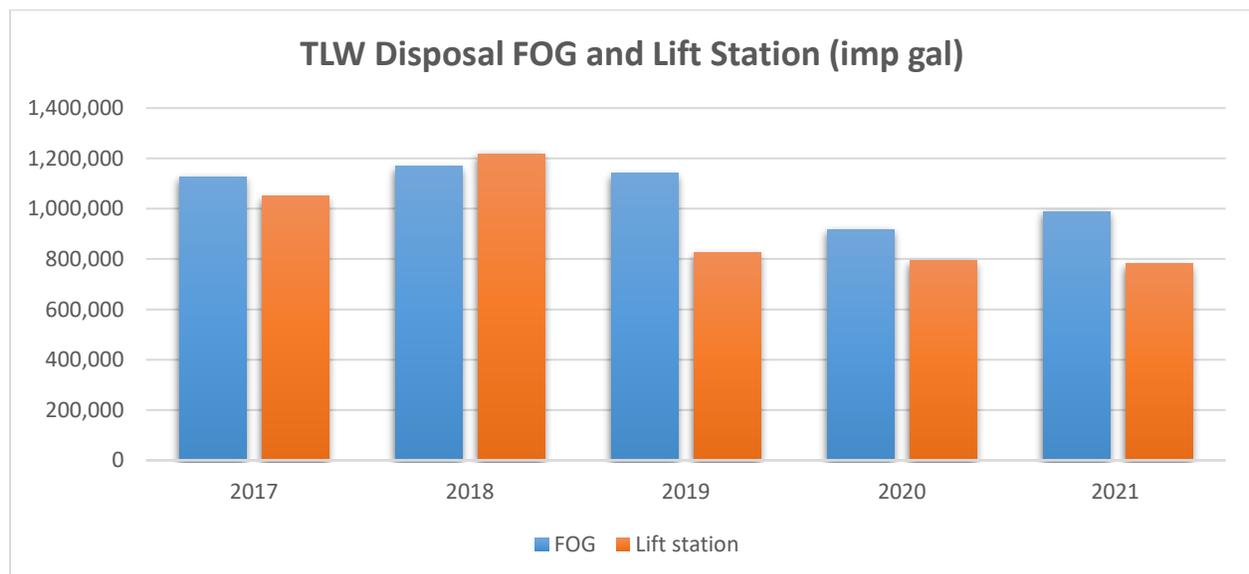


Figure 1 Trucked Liquid Waste Fat, Oil and Grease and Lift Station Waste Volumes

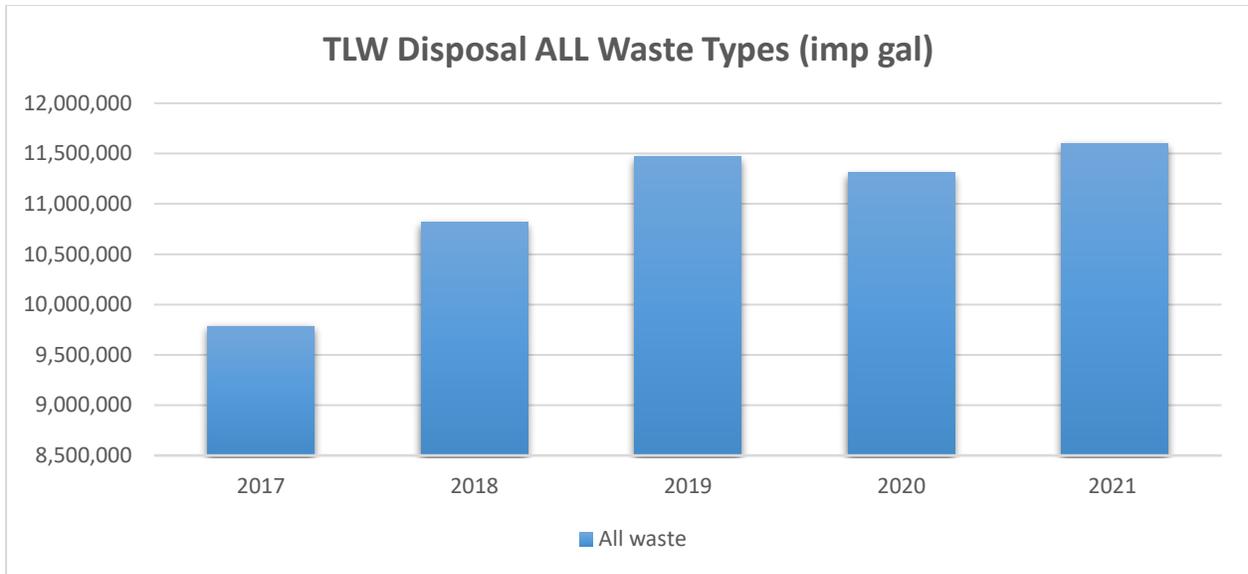


Figure 2 Trucked Liquid Waste Disposal Volumes of All Waste Types



Figure 3 Trucked Liquid Waste Annual Catch Basin Waste Disposal Volumes

3.3.2 Contaminant Characterization of the Dental Sector

A sector sweep incorporating sampling of dental facilities was last conducted in 2010. At that time, it was determined that difficulties surrounding collecting a sample at dental facilities were insurmountable due to installation and design of treatment units. Sampling of wastewater further downstream and the marine discharge showed low mercury levels and the sector has long had high overall compliance rate, which has historically supported a low priority for this sampling.

However, a modified sector sweep of select dental facilities was initiated to confirm those assumptions. Initially, a small group of dental offices were visited as a joint inspection with the sample technician and an inspector. Sampling was unsuccessful, since monitoring points in many cases had not been installed and accessing the wastewater would require plumbing modifications.

Sampling was initiated in June from three key collection points downstream of buildings that had been identified as containing a high concentration of dental facilities. Due to the pandemic lockdown, the majority of the facilities were closed, which enabled the program to collect samples that would provide background levels. A second round of sampling was conducted when businesses re-opened in October 2020 and a third round was planned in 2021 to represent normal operations. The third round of sampling was delayed until 2022 due to another COVID-19 wave.

The Code of Practice for Dental Operations requires pre-treatment of wastewater using an amalgam separator, regular maintenance and record keeping. If discharging greater than 2 mg/L of mercury, the facility must replace the amalgam separator's collecting container.

All samples were well below the 0.02 mg/L Bylaw 2922 Schedule "B" limit for mercury, with the results from the second round on average being lower than the first. Conclusions from the review will be discussed in more detail following the third and final round of sampling in 2022. Preliminary results show all samples continue to be well below Bylaw limits.

3.3.3 Contaminant Characterization of the Automotive Repair Sector

Automotive repair facilities have been routinely sampled since 1999. This routine sampling was placed on a two- to three-year cycle after the roll-out of Automotive Repair Operations Code of Practice under the Bylaw in 2004. To aid in future sector sweeps and decisions on acceptance of alternative treatment works, a review of historical sampling data collected between 2010 and 2020 was conducted.

Regulating businesses in this sector requires systemic compliance sampling as well as inspections. The review could not identify a documented method for selection of facilities for sampling, and it appears most of the samples collected focused on follow-ups at non-compliant facilities. Many compliant dischargers have not been sampled in several years and the data review is skewed towards facilities that have or continue to exceed Bylaw limits and therefore represents a worst-case scenario.

The review of sampling results indicates the most frequent exceedances were in chemical oxygen demand (COD), low pH and mineral oil and grease (MOG). The Code of Practice includes an exemption for COD, however.

Other patterns emerged less frequently including volatile organic compounds (VOCs), primarily xylenes, toluene and semi-volatile hydrocarbons (PAH), followed in frequency by silver, copper and zinc and occasional exceedances of iron and selenium. Analytical results are discussed in more detail in section 3.1.7.3.

Recommendations from the review include sampling every discharging facility over a 3- to 5-year cycle, in order to get a better picture of sector compliance and effectiveness of treatment works. This more fulsome approach will ensure fairer and more even regulation of all discharging facilities and help create a more representative picture to compare to discharges from alternative treatment works. However, it will also put additional demand on sampling technician and inspectors' time and has to compete with other program priorities.

3.3.4 Contaminant Characterization of the Printing Sector

The nature of the printing sector has changed considerably since the code was adopted in 2002. Local newspaper and other paper printing businesses have all converted to digital printing or contract printing to larger facilities out of the region. The printing facilities that remain are primarily screen-printing operations. Most of these facilities have existing treatment works, but three newer facilities opened and have been unable to install the trade waste interceptor mandated by the Bylaw due to changes in service providers.

Seventeen facilities were inspected during the sector sweep in 2020. One facility was closed, and five were digital or storefronts only. Those five facilities were excluded from sector counts in this report. Four facilities used offsite waste management and seven facilities discharged their wastewater to sanitary sewer. Of the seven dischargers, five facilities were sampled in 2020. Three additional discharging facilities were also inspected in 2021 for a total of 10 discharging facilities identified in this sector. Five dischargers had initial samples collected, and two dischargers had follow-up samples collected in 2021.

Chemicals used in the printing sector have changed over time; in the early 2000s solvents such as Varsol were much more widely used. Modern fixers and dyes are water-based and largely biodegradable. The majority of acrylic paints do not use metals in their colour formulas. Sampling results similarly show that volatile organic carbons are low to non-detect, but that chemical oxygen demand, total suspended solids, and occasionally metals, can still be an issue.

One facility, which had failed to install treatment works, decided to sell their screen-printing equipment and focus on digital printing instead. Five facilities had no exceedances and one facility had exceedances in 2020 but following cleaning and changing filters had compliant results. Staff continue to conduct follow-up inspections and sampling with the remaining three facilities to ensure proper maintenance of treatment works and that the discharges meet Bylaw limits.

3.4 Contaminant Reductions

3.4.1 Marine Outfall Contaminant Reductions

One of the main objectives of the program is protection of the marine receiving environment. A specific goal associated with this objective, included in both the Core Area and Saanich Peninsula liquid waste management plans, is “to maintain or reduce effluent contaminant loadings to the receiving environment”.

3.4.1.1 Core Area Outfall Effluent

In 2020, significant upgrades took place at the Macaulay and Clover pump stations to redirect flows to the new McLoughlin Point Wastewater Treatment Plant.

The CRD Environmental Monitoring Program relocated their sampling location from the pump stations upstream to the new treatment plant. Because of issues with the sample location and inconsistent sample collection, 2021 McLoughlin wastewater results are not directly comparable to previous years.

CRD staff formerly regularly monitored effluent quality at the Macaulay Point and Clover Point outfalls and now the McLaughlin Point outfall for a wide range of substances. The most recent effluent trend analysis was undertaken in 2017. That report provided a statistical assessment of wastewater trends at Clover Point and Macaulay Point outfalls over the period 1990-2015. The findings of this report for Clover and Macaulay points over the 25-year period of record were discussed in previous Regional Source Control Program annual reports and the next trend analysis will be discussed in this section when complete.

Total oil and grease is of particular interest to the program due to both the impacts to effluent quality and blockages in sewage infrastructure. The 2017 trend analysis showed a decreasing concentration over time. 2019 and 2020 data are unsuitable for trend analysis, but a preliminary assessment of the first 7 months of 2022 shows the decreasing trend is continuing. This will be reported in more detail in the next RSCP annual report using the full 2022 dataset. The program gives a high priority towards efforts to work with businesses and to educate the public about the source control of fats, oils and grease.

Pharmaceuticals and personal care product monitoring began mid-way through the trend analysis period in 2014, and a full trend analysis of pharmaceuticals and personal care product data will be part of the next study in approximately three years.

A simple comparison between sampling results in 2014 and 2019 for both Macaulay Point and Clover Point outfalls shows large decreases in two compounds associated with anti-bacterial soaps. At both outfalls, triclocarban decreased by >82% and triclosan decreased by >55%. This is expected with the phasing-out of these compounds in personal care products.

Of the indicator pharmaceuticals analyzed, there was no clear trend between 2014 and 2017.

These results are used to assess opportunities to reduce input of these contaminants to the sewage system. Further information about core area effluent quality in 2021 can be found in the *Core Area Wastewater Facilities Environmental Monitoring Program 2021 Report* available on the CRD website.

3.4.1.2 Saanich Peninsula Wastewater Treatment Plant Influent and Effluent

Influent and effluent data has been collected at the plant since the plant commenced operation in 2000. The first summary of trends in these data was reported in Hatfield Consultants Ltd, 2005. Golder Associates Ltd., 2009a included a statistical assessment of wastewater influent and effluent trends at the plant over the period 2000-2008. Golder Associates Ltd., 2017 provided an update of trends to 2015. The findings of this report over the 14-year period of record at the plant were discussed in previous Regional Source Control Program annual reports and the next trend analysis will be discussed in this section when complete.

Total oil and grease is of particular interest to the program due to both the impacts to effluent quality and blockages in sewage infrastructure. The 2017 trend analysis showed a decreasing concentration over time. The program gives a high priority towards efforts to work with businesses and to educate the public about the source control of fats, oils and grease.

Pharmaceuticals and personal care product monitoring began mid-way through the trend analysis period in 2014, and a full trend analysis of pharmaceuticals and personal care product data will be part of the next study in approximately five years.

In the 2019 RSCP annual report, a simple comparison between sampling results in 2014 and 2019 showed large decreases in two compounds associated with anti-bacterial soaps. This trend continued in 2020 with triclocarban decreased by 94% (was 89% in 2019) and triclosan decreased by 90% (was 66% in 2019). This is expected with the phasing-out of these compounds in personal care products.

Of the indicator pharmaceuticals compared between 2014 and 2020, there is a trend of decreasing concentration of seven of nine analyzed pharmaceuticals. Two of the nine pharmaceuticals are consistently low or not detected. This is encouraging, as pharmacies were not accepting medication returns for most of 2020 due to COVID-19 protocols. It appears that the Medication Return campaign messaging has had a lasting effect on resident behaviour regarding the flushing of unwanted medication.

Further information about plant influent and effluent quality in 2021 can be found in the *Saanich Peninsula Treatment Plant Wastewater and Marine Environment Program 2021 Report* available on the CRD website.

3.4.2 Sludge and Mixed Liquor Contaminant Reductions

Another important objective of the program is the protection of sewage treatment plant sludge quality.

Monitoring of dewatered sludge produced at the Saanich Peninsula Wastewater Treatment Plant commenced in March 2013 and continued in 2021. Monitoring of the mixed liquor produced at the smaller Ganges Wastewater Treatment Plant began in 1994 and continued in 2021.

Prior to the construction of the McLaughlin Wastewater Treatment Plant in 2021 these analyses were not performed in the Core Area due to primary screening not producing sludge. It is anticipated that solids from the plant will be analyzed similarly to Saanich Peninsula once the plant is fully commissioned.

3.4.2.1 Saanich Peninsula Wastewater Treatment Plant Sludge

A dewatered sludge monitoring plan was developed and implemented in March 2013. The dewatered sludge is not a biosolids product, as defined by the *Organic Matter Recycling Regulation*. The sludge is sampled and is assessed using the Class A biosolids quality criteria for comparison purposes to evaluate overall metal concentrations and end-product quality. This monitoring is not intended to characterize the material as a biosolids product.

Mercury levels have been consistently well below the maximum acceptable concentration for Class A biosolids in the last five years of production. Weak acid dissociable cyanide, first monitored in 2013 to confirm increasing trends in Saanich Peninsula Wastewater Treatment Plant influent has remained low, as have silver levels.

Cadmium and molybdenum levels in plant dewatered sludge generally continued at levels similar to biosolids in the last few years of production. Results were all below the respective biosolids criteria. The levels of two electroplating metals, chromium and nickel, appear to be closely correlated with one another, as would be expected, as they are both used in the electroplating process at two facilities in the catchment area.

Previous reports flagged occasional exceedances for mercury, silver and weak acid dissociable cyanide in the last few years. CRD's Environmental Monitoring and Regional Source Control programs investigated these and did not find clear trends or sources upstream in the sewage infrastructure. A review of data revealed that the peaks were the result of samples that had very different laboratory detection limits than past years and the data analysis technique of calculating averages with non-detected parameters assigned a value of 0.5 times the detection limit. For source control analysis, treating non-detected results as "zero" gives a more useful benchmark to assess program performance and not accidentally flag parameters of concern.

3.4.2.2 Ganges Wastewater Treatment Plant Mixed Liquor

The Ganges Wastewater Treatment Plant process produces a mixed liquor product, not a biosolids product, as defined by the *Organic Matter Recycling Regulation*. The mixed liquor is sampled and is assessed using the Class A biosolids quality criteria for comparison purposes to evaluate overall metal concentrations and end-product quality. This monitoring is not intended to characterize the material as a biosolids product. The plant mixed liquor has met Class A quality criteria for all parameters, except mercury (and occasionally molybdenum, once for cadmium), since monitoring began in 1994.

Mercury and silver levels in Ganges mixed liquor show an overall trend is toward lower levels for both metals. Implementation of the dental and photo imaging codes of practice is thought to be the main reason for the reductions in mercury and silver concentrations at the plant. Continued enforcement of the codes of practice, and a shift to digital imaging, is likely contributing to the continued lower levels of these metals.

There has been a decrease in the levels of cadmium and molybdenum in plant mixed liquor over time. Prior to 2008, molybdenum levels were high and variable, sometimes exceeding the Class A criterion. This may have been due to the use of molybdate corrosion inhibitors in heating and cooling systems within the collection area. More recent levels suggest that there may have been a change to molybdate-free products in at least some situations.

Table 10 Summary of Reported Sewer System Incidents (2021)

| Contaminant | Nature of Incident | Potential Impact | Incident Follow-up |
|--|--|---|--|
| Fats, Oils and Grease (FOG) | Continuation of investigation of fats, oils and grease buildup at Hallowell sanitary sewer pump station in View Royal – Initially reported September 2019 | Grease blockages can lead to overflows in municipal sewer pipes and mains –maintenance and health concerns | <ul style="list-style-type: none"> Investigation revealed high density of multi-unit residential housing in the area was contributing to the buildup Targeted residential mail-out letters were sent to residences in July 2021 View Royal staff visited the pump station in Dec 2021 and found an estimated 80-90% reduction in FOG |
| | CRD Operations staff reported FOG buildup in the Craigflower pump station located on the West Shore. Staff spoke with each member municipality who each identified several smaller catchments were FOG and obstructive wastes were an issue – January 2021 | | <ul style="list-style-type: none"> In catchments where inputs were entirely residential, targeted residential mail-out letters were sent In catchments where inputs included food services, those facilities were inspected At Wilfert pump station, seven food service facilities in the catchment were all in compliance with no obvious source of FOG found Municipal staff reported improvements in the majority of pump stations targeted |
| | Salt Spring Operations staff reported excess FOG in the Manson Road pump station – January 2021 | | <ul style="list-style-type: none"> Staff followed up with inspections of six food service facilities identified in the catchment Three facilities were identified as having non-compliance issues Staff conducted follow-up inspections with escalating enforcement Staff will continue to conduct follow-ups until satisfactory maintenance is achieved for each facility Operations staff reported a significant improvement was observed |
| Likely Mineral Oil and Grease (MOG) and other hydrocarbons | Corix (Langford) staff reported a dark oily, thick, floating mat that appears in the Westshore pump station every few months – April 2021 | Hydrocarbons are harmful to the marine receiving environment | <ul style="list-style-type: none"> Staff followed up with inspections of seven automotive (mechanical) repair and vehicle wash facilities identified in the catchment One facility was identified as lacking maintenance, staff will continue to conduct follow-ups until satisfactory maintenance is achieved |
| Discharge of recreational vehicle waste | A member of the public submitted a complaint about unauthorized discharges of RV waste – September 2021 | Anaerobic and high strength waste can lead to odour issues and potential safety concerns due to hydrogen sulphide | <ul style="list-style-type: none"> Staff issued a letter to the RV owner letting them know discharge of RV waste directly to sanitary is prohibited and that a sani-dump should be used No further complaints have been received to date |

3.5 Significant Incident Reporting

CRD and municipal engineering staff communicate periodically regarding sanitary sewer wastewater quality problems, suspicious discharges or significant incidents leading to contamination of the CRD's collection and treatment systems. A Significant Incident Report form was initially developed in 2000 to record operational problems within all trunk sewers and treatment plants operated by the CRD. The report form and response procedure was reviewed in 2013, following an incident involving a spill of Bunker "C" fuel oil into the CRD's Lang Cove pump station, and a new significant incident response procedure was developed by CRD staff for implementation in 2014. Staff develop detailed sewer catchment area maps, as needed, to support potential investigations.

Table 10 provides a summary of incidents reported in 2021 that impacted, or had the potential to impact, the environment, sewerage works, sewage treatment facilities or public health and safety. Notes on incident follow-up were summarized from CRD significant incident reports, municipal grease reports, complaint forms, memos, emails, conversation records and other notes on file. There were no incidents reported that affected the operation of CRD sewage treatment plants in 2021.

3.6 Outreach and Partnerships Initiatives

Staff continued to develop and maintain program-specific outreach and education messaging throughout 2021. Where appropriate, source control messaging was also integrated with other initiatives, campaigns and community outreach events held throughout the year, across the region. New campaigns are under development to promote source control actions, in order to protect wastewater quality and operation of existing sewage infrastructure and the new McLoughlin Point Wastewater Treatment Plant.

Key source control initiatives and campaigns for 2021 are summarized below under separate sections for residential and business outreach, education and the CRD website.

3.6.1 Residential Outreach

CRD staff produced a "What You Put Down the Drain Matters!" brochure in 2020 that is intended to address survey results that indicated that 92% of the public believe that source control practices will not be relevant, and that new tertiary treatment will deal with whatever is put down the toilet or sink. This messaging was continued in 2021 and addresses the fact that tertiary treatment does not remove all contaminants and that contaminants are often removed into the biosolids (leading to quality concerns of that resource) as well as the fact that the other sewage treatment plants in the CRD were previously protected by source control and continue to treat sewage.

An "unflushable waste" campaign and website update campaign highlighted how wastewater treatment works in the region, as well as what businesses and residents can do to protect wastewater infrastructure and how to reduce/dispose of medications, obstructive waste, microplastics and chemicals.

Fats, oils and grease and unflushable waste received attention in 2020 as infrastructure maintenance frequencies have been increasing in some parts of the region. In response to a written warning letter from Environment Canada and Climate Change issued for the Maliview Wastewater System, a new approach was tested in late 2020 where letters were mailed directly to residents in the Salt Spring Island Maliview catchment. The letters informed residents of issues at the pump station serving their neighbourhood, the potential financial implications to their sewer rates and best practices to reduce the strain on the treatment plant, including to only flush the "three Ps" (pee, poo and toilet paper). This messaging was not successful, but staff then used the approach for the Manson pump station and Harbour House pump station catchments in early 2021 which did resolve the issues at both pump stations.

A particularly strong partnership was developed with View Royal and Colwood at the end of 2020. CRD and municipal staff investigated catchments together and identified several residential pump stations requiring a focused approach involving direct mailing to residents encouraging proper disposal of waste (such as fats, oils and grease, wipes and dental floss), and to flush only the "three Ps". Initial improvements

in maintenance frequency reported by View Royal and Colwood was encouraging, and this work continued into 2021 with Langford also participating.

A total of 495 letters were mailed directly to residents residing in eight catchments on the West Shore that were identified as having blockage and increasing maintenance issues. Six of the eight catchments showed a marked improvement, one showed improvement but the issue returned in early 2022 and one catchment showed no improvement. Follow-up letters thanking the residents in the catchments that showed improvements were sent in 2022 and a second reminder letter was sent to the two that needed further improvement. In some cases, maintenance required by municipal staff changed from as frequent as weekly to no maintenance required as last reported in mid-2022.

The CRD has promoted medication return annually as a strategy to keep pharmaceuticals out of the wastewater stream. As pharmacies were not accepting medication returns in 2020 due to COVID-19 protocols, it was hoped that residents are storing their medications for drop-off when the program is started again. Continuing downward trends in indicator pharmaceuticals in wastewater suggests that previous years' Medication Return campaign messaging has had a lasting effect on resident behaviour regarding the flushing of unwanted medication. This program will be re-initiated in Spring 2023 when pharmacies accept medication drop-off again.

3.6.2 Business Outreach

Program inspectors continued to be the front-line staff delivering outreach messaging to local businesses. Outreach included distribution of sector-based posters and guidebooks. These tools are updated periodically based on feedback from businesses and results of inspections. In addition, inspectors worked with business owners to highlight the benefits associated with protection against cross connections (protection of public health), water conservation (potential cost savings), solid waste diversion best management practices and other CRD initiatives.

Staff updated business and sector-specific webpages for the CRD website in 2021. Brochures and posters were reviewed in 2021 and those needing new material will be updated in 2022.

3.6.3 Partnerships Initiatives

Since its inception, the CRD has worked with many agencies to expand program reach and effectiveness, improve services and resolve problems of mutual concern. These agencies have included ENV, federal agencies, such as the Department of National Defence and Public Services and Procurement Canada (formerly Public Works and Government Services Canada), regional districts, municipalities, Island Health and local academic institutions.

In 2021, there were continued collaborative efforts between staff and external partners to provide augmented inspection services and superior customer service, and to promote high environmental performance within businesses.

Some examples of both internal and external collaborative partnerships initiatives undertaken in 2021 are outlined below.

3.6.4 2021 Collaborations

In 2021, CRD staff undertook the following collaborative activities:

- Continued to leverage the CRD's standing as one of the oldest and most comprehensive source control programs in Canada to share information and promote the development of source control programs throughout BC and Alberta, while co-hosting the Source Control Community of Practice, in partnership with the BC Water and Waste Association.
- Shared techniques for identifying potential new discharging businesses for compliance with the City of Chilliwack to offer suggestions for best approaches to help improve their program.

- Participated in the Cross Connection Control's Municipal Plumbing Inspector Roundtable to discuss common and new issues seen during inspections and to highlight significant investigations and targeted residential mail-outs.
- Continued to work with Island Health staff and other CRD program staff, including Cross Connection Control and Onsite Wastewater Management, to share information, maintaining the strong partnership between the program and Island Health inspectors.
- Continued the Business Licensing Municipal Working Group to share new businesses licence information for CRD inspection and permitting purposes (seven municipalities established information sharing procedures, and negotiations continue with three remaining municipalities).

3.6.4.1 Island Health Collaboration

Staff continued to work with Island Health inspectors, sharing information on difficult food service establishments, planning co-inspections, where necessary, and dealing with mobile food facilities.

Island Health administrative staff continued their information sharing efforts in 2021, forwarding Application for Food Facility forms to the CRD. The forms provide contact and operating details for new food service businesses, enabling CRD staff to work with new applicants more proactively, and dramatically improving the accuracy of program business data.

3.6.4.2 Collaboration with Academic Institutions

The CRD also developed various partnerships with educational institutions in 2021.

A CRD inspector presented a workshop to Camosun College environmental technology students via videoconference, covering overviews of regional government, regional wastewater management and source control practices.

Source control and marine monitoring staff co-presented on changes and adaptations each program has undergone in response to the new core area wastewater treatment plant at the BC Water and Waste Association Virtual Conference.

The CRD did not commission a study by Royal Roads University environmental science students this year due to COVID-19 pandemic restrictions on off-campus projects.

3.6.4.3 Municipal Collaboration

Since 1999, municipal staff have been encouraged to issue Waste Discharge Assessment forms to persons applying for new building licences or new sewer connections for businesses that have the potential to discharge non-domestic waste to sewer. Completed forms are forwarded by the municipality to the CRD for evaluation. In addition, businesses or plumbers contracted to perform upgrades at code of practice operations directly contact CRD staff regarding code of practice requirements. Letters copied to municipal plumbing or licensing contacts are sent directly to code of practice operations outlining specific requirements and providing information.

In 2021, CRD staff worked with municipal staff to resolve various fats, oils and grease blockages in sewers. Municipal staff continued to provide plumbing and building information, flow data and other information to CRD staff to assist in the preparation of permits, authorizations and code of practice treatment works installations.

A particularly strong partnership was developed with View Royal and Colwood at the end of 2020. CRD and municipal staff investigated catchments together and identified several residential pump stations requiring a focused approach involving direct mailing to residents encouraging proper disposal of waste (such as fats, oils and grease, wipes and dental floss) and only to flush the "three Ps" (pee, poo and toilet paper). Initial improvements in maintenance frequency reported by View Royal and Colwood was encouraging and this work continued into 2021. Results are discussed above in section 3.6.1.

CRD staff met with City of Victoria staff to discuss how CRD inspectors could support the City’s efforts to regulate business stormwater discharges. A preliminary plan for this work was established pending the City of Victoria hiring a new stormwater enforcement officer.

3.7 Performance Measures

Three program performance measures are used to assess RSCP performance:

- Percentage of regulated businesses with proper waste treatment installed (this measure is associated with the program objective of consistent application of the program for all users of CRD sewage facilities).
- Percentage of priority contaminants showing no increase in loads to the core area environment (this measure is associated with the program objective of protecting the marine environment adjacent to the CRD’s sewage outfalls).
- Percentage of biosolids and sludge samples that meet Class A standards for metals (this measure is associated with the program objective of protecting the quality of sewage sludge and biosolids).

“Overall Compliance” was established in 2014 to replace “Percentage of regulated businesses with proper waste treatment installed”. The method of calculating each performance measure is described in Appendix 2.

Table 11 Results of Program Performance Measures (2012-2021)

| Performance Measure | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|-------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Proper waste treatment ¹ | 90 | 97 | -- | | | | | | | |
| Overall compliance ² | -- | | 95 | 97 | 98 | 96 | 93 | 95 | 93 | 93 |
| Priority contaminants ³ | -- | -- | -- | -- | 92 | -- | -- | -- | -- | -- |
| Biosolids and sludge ⁴ | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Notes:

¹Percentage of regulated businesses with proper waste treatment installed.

²Overall Compliance replaced “Proper waste treatment” as of 2014.

³Percentage of priority contaminants showing no increase in loads to the core area environment (preliminary result from draft report). Study performed every three-five years.

⁴Percentage of biosolids and sludge samples that meet Class A standards for metals.

“Proper waste treatment” was modified in 2014 to “Overall Compliance”, as a better indicator of effective contaminants diversion. An enforcement status of “Compliant” or “Step 1” indicates proper treatment works or that an acceptable performance-based treatment arrangement has been made, though not necessarily compliant with what is prescribed in the codes of practice. Further, a “Compliant” or “Step 1” enforcement status assumes that the treatment works are being properly maintained. All treatment systems are rendered ineffective if they are not maintained, thus as a compliance indicator, this is much more accurate in representing how well waste is being managed.

“Priority Contaminants” is based on the “yearly trend” in loads at both Macaulay Point and Clover Point outfalls for 36 priority contaminants, as documented in the most recent trend assessment report (Golder Associates Ltd, 2017). Long-term analysis of effluent trends for the core area outfalls is only undertaken every three-five years. The most recent analysis, including data from 1990-2015, was received in 2017.

“Biosolids and Sludge” has shown some variability in the early years, largely due to the mixed liquor metals results from the Ganges Wastewater Treatment Plant exceeding Class A criteria for biosolids. However, in 2021, for the 13th consecutive year, the plant mixed liquor results met the Class A criteria for all metals, including mercury. Saanich Peninsula plant dewatered sludge monitoring commenced in March 2013. All of these results also met the Class A criteria for metals. The combined results from the two plants provided an overall 100% rating for this performance measure in 2021.

4.0 CONCLUSION

This report meets the CRD's commitments in the Core Area and Saanich Peninsula liquid waste management plans to prepare an annual report on the program for submission to the provincial government. The information in this report is used by CRD staff to evaluate the performance and future direction of source control program activities and by municipal staff to understand trends in discharge of contaminants from residential and business sources.

The CRD continued to work towards its goals to protect sewage collection and treatment facilities, public health and safety, and the marine receiving environment, by reducing the amount of contaminants that industries, businesses, institutions and households discharge into the CRD's sanitary sewer systems. The program regulated approximately 2,200 businesses through industrial wastewater discharge permits, authorizations and sector-specific codes of practice.

Increasing trends in trucked liquid waste quantities deposited at regional facilities are used as a key performance indicator of the program's success. Catch basin quantities received at regional facilities increased significantly in 2021 over 2020 and 2019 levels. This trend will be evaluated in 2022 to ensure the continued protection of stormwater and the nearshore marine environment.

A total of 2,123 code of practice inspections were conducted over the year. Semi-annual inspections of the 33 active permits, and annual inspections of most of the 92 active industrial, commercial and institutional authorizations, were completed. One new permit and nine new authorizations for a variety of business types and terms were issued. Four significant incidents reported in 2021 and one reported in 2019 in regional and municipal sewers were investigated or continued to be investigated in 2021, and seven tickets were issued to non-compliant food services operations. The overall compliance rate, including facilities operating under code of practice, authorization and permit was 93% in 2021.

Ganges Wastewater Treatment Plant mixed liquor results met the Class A biosolids criteria for all metals, including mercury. Saanich Peninsula Wastewater Treatment Plant dewatered sludge results also met the Class A criteria for metals.

Most monitoring targets set for 2021 were achieved, despite the challenges of the COVID-19 pandemic. In addition, sampling continued at seven facilities in the printing sector to confirm compliance following a sector review.

The CRD also reduces inputs of contaminants into the sewer system with numerous non-regulatory tools, which leads to the reduction of contaminants to the environment. Significant activities throughout the year included:

- Continued promoting new engagement and behaviour change tools with the "What You Put Down the Drain Matters!" campaign and a new obstructive waste program.
- Creation of a standardized direct mail out to residents in service areas with high obstructive waste maintenance requirements.

In 2022, the program will be working on several initiatives, including:

- Continuing the enhanced key manhole study to capture a wide range of parameters in sewage at several locations in order to better understand trends in contaminants from various land use types and collect data to evaluate program efforts against the operational needs of the McLoughlin Point Wastewater Treatment Plant, as well as the other CRD treatment facilities across the region.
- Evaluating emerging business sectors in order to set appropriate regulations and discharge limits for their unique flow and waste strength characteristics.
- Continuing to update web and print resources for the education of businesses and residents.

- Delivering educational campaigns to promote source control actions in order to protect wastewater quality and operation of existing sewage infrastructure and the new McLoughlin Point Wastewater Treatment Plant.

5.0 REFERENCES

CFIA, 1997. Canadian Food Inspection Agency Trade Memorandum T-4-93, Standards for Metals in Fertilizers and Supplements. September 1997.

Ecofish Research Ltd., 2014. Source Control Strategies for Triclosan and Nonylphenols. Report prepared for the CRD by Ecofish Research Ltd., April 2014.

Golder Associates Ltd., 2006. Trend Assessment for Substances in Macaulay Point and Clover Point Wastewater (1990-2005). Prepared for the CRD by Golder Associates Ltd., September 2006. Report Number 05-1421-035.

Golder Associates Ltd., 2009a. Trend Assessment for Substances in Macaulay Point and Clover Point Wastewaters and the Saanich Peninsula Wastewaters and Biosolids. Report prepared for the CRD by Golder Associates Ltd., November 2009. Report Number 08-1421-0105.

Golder Associates Ltd., 2013. 2011 Trend Assessment for Substances in Macaulay Point and Clover Point Wastewater and the Saanich Peninsula Wastewater and Biosolids. Report prepared for the CRD by Golder Associates Ltd., April 2013. Report Number 11-1421-0050.

Golder Associates Ltd., 2017. 2017 Trend Assessment for Substances in Macaulay Point and Clover Point Wastewater, Saanich Peninsula Wastewater and Biosolids, and Ganges Wastewater and Mixed Liquor. Draft Report prepared for the Capital Regional District Scientific Programs Division, Victoria, BC.

Hatfield Consultants Ltd., 2005. Saanich Peninsula Wastewater Treatment Plant Data Analysis. Report prepared for the CRD by Hatfield Consultants Ltd., December 2005.

KWL, 2015. Five-Year Review of the CRD's Source Control Program (2009-2013). Report prepared for the CRD by Kerr Wood Leidal Associates, June 2015.

Morrison Hershfield, 2010. CRD Regional Source Control Program—Five-Year Review (2004-2008). Report prepared for the CRD by Morrison Hershfield, March 2010.

PLA, 2002. CRD Clover and Macaulay Point Wastewater Outfalls: 1988-2000 Effluent Quality and Quantity. Report prepared for the CRD by Paine, Ledge and Associates, August 2002.

PLA, 2004. Trend Analysis of Selected Substances in the Clover and Macaulay Point Effluents, 1996-2003. Report prepared for the CRD by Paine, Ledge and Associates, 2004.

Source EnviroSolutions (SES), 2022. Five-Year Review of the CRD Regional Source Control Program (2016-2020). Report prepared for the CRD by Source EnviroSolutions, July 2022.

WERF, 2008. Water Environment Research Foundation, 03-CTS-16TA. Assessment of Grease Interceptor Performance (Supplemental Report to 03-CTS-16T), 2008.

APPENDIX 1

Program Priority Contaminant List

| TOTAL METALS |
|---|
| arsenic (As) |
| cadmium (Cd) |
| chromium (Cr) |
| cobalt (Co) |
| copper (Cu) |
| lead (Pb) |
| manganese (Mn) |
| mercury (Hg) |
| molybdenum (Mo) |
| nickel (Ni) |
| selenium (Se) |
| silver (Ag) |
| zinc (Zn) |
| POLYCYCLIC AROMATIC HYDROCARBONS (PAH) |
| Total PAH |
| Low molecular weight PAH |
| naphthalene |
| acenaphthylene |
| acenaphthene |
| fluorene |
| phenanthrene |
| anthracene |
| fluoranthene |
| High molecular weight PAH |
| pyrene |
| benzo(a)anthracene |
| chrysene |
| benzo(b)fluoranthene |
| benzo(k)fluoranthene |
| benzo(a)pyrene |
| dibenzo(a,h)anthracene |
| indeno(1,2,3-cd)pyrene |
| benzo(g,h,i)perylene |
| Phthalates |
| bis(2 ethylhexyl)phthalate |
| di-n-butyl phthalate |
| MISCELLANEOUS |
| 1,4-dichlorobenzene |
| Cyanide - weak acid dissociable (WAD) |
| Cyanide - strong acid dissociable (SAD) |
| phenol |
| total oil and grease |

APPENDIX 2

Calculation Methods for Regional Source Control Program Performance Measures

The following methods are used to calculate the four CRD performance measures referred to in Section 3.7.

Performance Measure #1:

Percentage of regulated businesses with proper waste treatment installed

As of 2014, this performance measure has now been replaced with “overall compliance”. “Number of regulated business with proper waste treatment installed” was, in earlier program years, a significant marker of program influence. As new codes of practice were being introduced to the region, it was important to measure how many (and how quickly) businesses were adopting proper wastewater treatment systems. It is the belief of CRD staff that a shift to “overall compliance” is now a better indicator of effective contaminants diversion due to:

- **Consistent high compliance with proper treatment works installed:** Inspection history shows that, as a baseline, almost all regulated facilities are operating with proper waste treatment.
- **Performance-based compliance site-specific practices:** Alternative arrangements in practices or technologies, which might deviate from what is prescribed in a code, may be effectively treating the waste. For example, there are several automotive facilities with (technically) under-sized oil/water separators, who are supplementing their systems with oil coalescing plates, analyzing the wastewater effluent and being monitored through an authorization to ensure that the systems are not bypassing hydrocarbons or in excess of other restricted waste limits.
- **Treatment works maintenance:** The top enforcement issue amongst regulated facilities is proper maintenance of treatment works. All treatment work systems are rendered ineffective if they are not maintained, thus, as a compliance indicator, this is a much more accurate representation of proper contaminants diversion. A facility not maintaining a system will receive a major infraction (Step 2) compliance status.
- **Working with facilities with inadequate or no treatment works:** On the rare occasion where a facility is found to have no treatment works on site, staff work swiftly with the business towards adopting an effective system. When there is resistance to working proactively with staff, enforcement actions escalate quickly, typically resulting in positive action from the facility. When inspected treatment works are viewed as ineffective¹, the inspector will work with the business to improve treatment performance through either an upgraded system that meets CRD requirements; authorizing modifications to the existing system to meet or beat base performance requirements; or assisting the business in modifying their practices to eliminate the need for on-site treatment works².

Performance Measure #2

Percentage of priority contaminants showing no increase in loads to the core area environment

This measure is associated with the CRD objective of protecting the marine environment adjacent to the CRD's sewage outfalls.

¹ (e.g., under capacity, in poor repair, or not undergone base standard certification)

² (e.g., an automotive shop disconnecting their floor drains and using off-site treatment services exclusively)

The CRD has collected samples of wastewater from the Macaulay Point and Clover Point outfalls, since 1988. Wastewater samples have been analyzed for over 200 parameters, including priority substances and conventional parameters. Statistical analyses have been conducted periodically in the past to evaluate long-term trends in concentrations and loads of these substances in wastewater. The most recent trend assessment (Golder Associates Ltd., 2018), utilizing data from the period 1990-2015, updates the previous assessment (Golder Associates Ltd., 2013).

In 2008, the CRD prepared a list of core area priority contaminants, based on information provided by the CRD's Environmental Monitoring Program and other sources. The above table shows the current list of 36 program priority contaminants (Appendix 1 of this report). Most of these contaminants have been targeted for reduction by the program, either through regulation or outreach, or a combination of initiatives.

Performance measure #2 is based on the "yearly trend" in loads at both Macaulay Point and Clover Point outfalls for the 36 priority contaminants, as documented in the most recent trend analysis report. All program priority contaminants showing either a decrease or "no significant trend" in loads at either Macaulay Point or Clover Point outfalls are identified and reported as a percentage of the 36 listed priority contaminants. Note that trends for "total" metals, not "dissolved", are used in the calculation. For polycyclic aromatic hydrocarbon, trends for individual polycyclic aromatic hydrocarbon, low molecular weight polycyclic aromatic hydrocarbon, high molecular weight polycyclic aromatic hydrocarbon and total polycyclic aromatic hydrocarbon are used in the calculation.

Performance Measure Calculation

The following table shows how performance measure #2 was calculated for 2005, 2008, 2011 and 2016, based on information provided in Golder Associates Ltd, 2017. Note: Only the contaminants for which a significant increasing trend was reported are shown—all other contaminants showed either a "significant decrease", no "significant trend" (ns) or "could not be calculated" (nc).

| RSCP Priority Contaminant | Yearly Trend Core Area Loads | | | |
|---|------------------------------|----------------|----------------|----------------|
| | (1990-2005) | (1990-2008) | (1990-2011) | (1990-2016) |
| TOTAL METALS | | | | |
| arsenic (As) | | Increase | | |
| cadmium (Cd) | | | | |
| cobalt (Co) | | | Increase (MAC) | |
| chromium (Cr) | | | | |
| copper (Cu) | | | | |
| lead (Pb) | | | | |
| molybdenum (Mo) | Increase (CLO) | Increase (MAC) | | |
| manganese (Mn) | | | | |
| mercury (Hg) | | | | |
| nickel (Ni) | | | | |
| selenium (Se) | | Increase | | |
| silver (Ag) | | | | |
| zinc (Zn) | | | | |
| POLYCYCLIC AROMATIC HYDROCARBONS (PAH) | | | | |
| Low molecular weight PAH | | | | |
| naphthalene | | | | |
| acenaphthylene | | | | |
| acenaphthene | | Increase | | Increase (MAC) |
| fluorene | | | | Increase (MAC) |
| phenanthrene | | | | |
| anthracene | | | | |
| fluoranthene | | Increase | | |
| High molecular weight PAH | Increase | Increase | | |
| pyrene | | | | |
| benzo(a)anthracene | | | | |
| chrysene | | | | |
| benzo(b)fluoranthene | | | | |
| benzo(k)fluoranthene | | | | |
| benzo(a)pyrene | | | | |
| dibenzo(a,h)anthracene | | | | |
| indeno(1,2,3-cd)pyrene | | | | |
| benzo(g,h,i)perylene | | | | |

| RSCP Priority Contaminant | Yearly Trend Core Area Loads | | | |
|--------------------------------------|------------------------------|----------------|----------------|----------------------|
| | (1990-2005) | (1990-2008) | (1990-2011) | (1990-2016) |
| Total PAH | | Increase (MAC) | | |
| Phthalates | | | | |
| bis(2 ethylhexyl)phthalate | Increase | Increase (MAC) | | |
| di-n-butyl phthalate | | | | |
| Miscellaneous | | | | |
| 1,4-dichlorobenzene | | | | |
| phenol | | | | |
| total oil and grease | | | | |
| Cyanide - WAD | | | Increase (CLO) | Increase (CLO + MAC) |
| Cyanide - SAD | | | | |
| Total # Increase | 3 | 8 | 2 | 3 |
| Total # Decrease or "ns" | 33 | 28 | 34 | 33 |
| % of 36 Priority Contaminants | 92% | 78% | 94% | 92% |

Performance Measure #3

Percentage of biosolids and sludge samples that meet Class A standards for metals

Performance measure #3 is linked to the CRD objective of protecting the quality of sewage sludge and biosolids.

Composite samples of biosolids produced at the Saanich Peninsula Wastewater Treatment Plant were analyzed on a regular basis during periods of production from May 2000 to April 2011. Samples were analyzed for metals, moisture, pH, nutrients and microorganisms. Analytical results for metals were assessed using Class A biosolids standards, as specified in Canadian Food Inspection Agency Trade memorandum T-4-93 Table II (see below).

Following the CRD Board direction to cease land application of biosolids, the Saanich Peninsula plant has produced only dewatered sludge since April 2011. The dewatered sludge was landfilled as controlled waste throughout 2012, without routine sampling and analysis. Consequently, there was no 2012 plant dewatered sludge data available for input to this performance measure. Plant dewatered sludge monitoring commenced in March 2013.

Class A Biosolids Standards, Maximum Acceptable Metal Concentrations*

| Metal | Concentration (mg/Kg dry weight) |
|--------------|---|
| Arsenic | 75 |
| Cadmium | 20 |
| Cobalt | 150 |
| Mercury | 5 |
| Molybdenum | 20 |
| Nickel | 180 |
| Lead | 500 |
| Selenium | 14 |
| Zinc | 1,850 |

Note:

*From: Canadian Food Inspection Agency Trade Memorandum T-4-93 Table II

The Ganges Wastewater Treatment Plant produces a mixed liquor product, and the Saanich Peninsula Wastewater Treatment Plant produces dewatered sludge. Neither of these are biosolids products by definition. Grab samples of Ganges plant mixed liquor are analyzed for metals and moisture on a monthly basis. Composite samples of Saanich Peninsula plant dewatered sludge are submitted for metals cyanide and moisture analysis initially on a weekly and finally on a monthly basis. The results are assessed using the Class A biosolids standards referred to above.

The performance measure is calculated using the ratio of the annual number of samples of both dewatered sludge and mixed liquor that were compliant with Class A standards and the total annual number of samples collected and analyzed—expressed as a percentage.

Performance Measure Calculation – 2021

The following table illustrates how performance measure #3 is calculated for 2021.

| Treatment Plant | # Samples (2021)¹ | # Compliant (2021)² |
|--|-------------------------------------|---------------------------------------|
| Ganges Plant (Mixed Liquor) | 12 | 12 |
| Saanich Peninsula Plant (Dewatered Sludge) | 12 | 12 |
| Totals | 24 | 24 |
| Percentage Compliant | | 100% |

Notes:

¹the number of dates on which discrete samples were submitted for analysis.

²the number of samples with results that were fully compliant with Class A biosolids standards for nine metals. Results for any field duplicates taken on the same date are averaged. If the standards are exceeded for one or more of the nine metals, a "failure" is recorded for the entire sample.

The overall percentage of biosolids and sludge samples that met Class A standards for metals in 2021 was 100%.

RSCP Performance Measure #4

"Overall compliance"

This new performance measure, replacing "Number of facilities with proper waste treatment" would include facilities regulated through permits, authorizations or codes of practice receiving either a "compliance" or "Step 1" inspection status. A "Step 1" compliance status is indicative of a "first infraction" e.g., a late permit report, or failure to keep records, as required. A single infraction does not have a significant impact on the program. Any facility without proper treatment works or not maintaining treatment works would be given a "Step 2" ("first major infraction" or higher level of enforcement depending on the situation).

Performance Measure Calculation – 2021

The first step in estimating overall compliance is establishing the individual code of practice sector size. All of the facilities within each code of practice data set are assessed and screened on the following criteria:

- Repeat inspections removed
- Not Connected to Regional Sewers discharge types removed
- Storm Drain discharge types removed
- Facilities with no inspection dates removed
- Unknown Discharge Type discharge types removed
- Closed Facilities removed
- Unknown Discharger Types discharge types removed
- Operating Under Another Regulatory type discharge types removed
- Operation Under Construction discharge types removed
- Facilities operating under an authorization removed
- Groundwater Discharger discharge types removed

It should be noted that the screened facilities are not assumed to permanently exist in that state, and are revisited for updates through "newly sewered facility", mapping updates and/or site contact to determine if practices have changed. Sector sizes for permitted and authorized facilities are simply based on number of active permits/authorizations at that time.

Summary of Code of Practice/Permit/Authorization Sector Sizes in 2021

| Code of Practice | Est. Sector Size (2021) |
|-----------------------------------|--------------------------------|
| Automotive Repair | 194 |
| Carpet Cleaning | 30 |
| Dental | 141 |
| Dry Cleaning | 11 |
| Fermentation | 20 |
| Food Services | 1,565 |
| Laboratory | 56 |
| Photographic Imaging | 27 |
| Printing | 27 |
| Recreation Facility | na* |
| Vehicle Wash | 52 |
| Total CoP Operations | 2,123 |
| Total Active Permits | 33 |
| Total Active Authorizations | 92 |
| Total Regulated Facilities | 2,248 |

Notes:

*Recreation facilities previously regulated under the code of practice have all been transferred over to individual authorizations.

With the established code of practice sector sizes and number of permitted/authorized facilities, number of “overall compliant” facilities within each data set are established using the last compliance status of 2021. Facilities with “compliant” or “Step 1” status are considered “overall compliant”, i.e., minor infractions, but assumed treatment works and associated maintenance. Overall compliance since full implementation of code of practice are presented in the following table.

Progress on Overall Compliance for 2021 since Adapting New Success Measures

| Codes | Sector Size | # Insp 2021 | % Insp | Total Comp | Comp % | In Prog | In Prog % | Step 1 | # Overall Compliant (Compliant Or Step 1) | % Overall Compliant | DUR | DUR % |
|-------------------|-------------|-------------|--------|------------|--------|---------|-----------|--------|---|---------------------|-----|-------|
| Automotive | 194 | 89 | 45.9% | 186 | 95.9% | 9 | 4.6% | 6 | 192 | 99.0% | 0 | 0.00% |
| Carpet | 30 | 2 | 6.7% | 26 | 86.7% | 3 | 10.0% | 3 | 29 | 96.7% | 0 | 0.00% |
| Dental | 141 | 4 | 2.8% | 136 | 96.5% | 4 | 2.8% | 3 | 139 | 98.6% | 0 | 0.00% |
| Dry Cleaning | 11 | 9 | 81.8% | 10 | 90.9% | 0 | 0.0% | 0 | 10 | 90.9% | 0 | 0.00% |
| Fermentation | 20 | 2 | 10.0% | 16 | 80.0% | 4 | 20.0% | 0 | 16 | 80.0% | 0 | 0.00% |
| Food | 1565 | 1336 | 85.4% | 1403 | 89.6% | 80 | 5.1% | 40 | 1443 | 92.2% | 0 | 0.00% |
| Labs | 56 | 7 | 12.5% | 55 | 98.2% | 1 | 1.8% | 1 | 56 | 100.0% | 0 | 0.00% |
| Photo | 27 | 2 | 7.4% | 22 | 81.5% | 1 | 3.7% | 1 | 23 | 85.2% | 0 | 0.00% |
| Printing | 27 | 16 | 59.3% | 24 | 88.9% | 3 | 11.1% | 3 | 27 | 100.0% | 0 | 0.00% |
| Recreation* | - | - | - | - | - | - | - | - | - | - | - | - |
| Vehicle Wash | 52 | 46 | 88.5% | 43 | 82.7% | 1 | 1.9% | 1 | 44 | 84.6% | 0 | 0.00% |
| Total | 2123 | 1513 | 71.3% | 1921 | 90.5% | 106 | 5.0% | 58 | 1979 | 93.2% | 0 | 0.00% |
| Authorizations | 92 | 83 | 90.2% | 79 | 85.9% | 13 | 14.1% | 10 | 82 | 89.1% | 0 | 0.00% |
| Permits | 33 | 60 | 90.9% | 22 | 66.7% | 10 | 30.3% | 5 | 32 | 97.0% | 1 | 3.03% |
| All Totals | 2248 | 1656 | 73.7% | 2022 | 89.9% | 129 | 4.6% | 73 | 2093 | 93.1% | 1 | 0.04% |

Notes:

*Recreation facilities previously regulated under the CoP have all been transferred over to individual authorizations.

APPENDIX 3
CRD Regulated Industrial Categories
(Currently Operating under Program Permits or Authorizations)

| BUSINESS TYPE | TYPICAL CONTAMINANTS OF CONCERN | TYPICAL PRE-TREATMENT INSTALLED |
|---------------------------|---|---|
| Breweries | solids, organics, pH | solids diversion, filtration, pH adjustment |
| Chemical Manufacturing | pH, toxic metals, solvents | process control, waste neutralization, off-site waste management |
| Food Processing | fats, oils and grease, solids, organics | solids separation, grease interceptor, neutralization, dissolved air flotation |
| Groundwater Remediation | mineral oil and grease, toxic metals, toxic organics, solids, sulphides | settling, filtration, sulphide reduction, adsorption |
| Hazardous Waste Treatment | mineral oil and grease, toxic organics, sulphides, solids, solvents | filtration, oil/water separation, chemical oxidation, aeration, precipitation, flocculation, adsorption, sulphide reduction |
| Hospitals | fats, oils and grease, solids, organics, solvents, pH | solids separation, grease interceptor, off-site waste management, absorption |
| Industrial Laundries | fats (and mineral), oils and grease, solids, organics | grease interceptor, filtration, oil skimmers |
| Metal Platers | toxic metals, cyanide, solvents, pH | process control, metals adsorption, off-site waste management |
| Organic Waste Treatment | fats, oils and grease, metals, solids, pH, sulphides | dewatering, grease interceptor, bio-reactors, sulphide reduction, dissolved air flotation |
| Recreation Facilities | pH, chloride, high volume | pH and chloride adjustment, attenuation |
| Ship Repair | mineral oil and grease, solvents, toxic metals, toxic organics, solids | settling, flocculation, filtration, electrocoagulation |
| Street Waste Treatment | fuel, toxic metals, mineral oil and grease, organics, solids | filtration, settling, oil/water separation |
| Transportation | mineral oil and grease, fuel, solids, de-icing fluid | neutralization, oil/water separation, dissolved air flotation |
| Wet-Cutting | suspended solids | solids separation, settling |