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EEP 25-07

**REPORT TO ELECTORAL AREAS COMMITTEE**
**MEETING OF WEDNESDAY, MARCH 12, 2025**

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**SUBJECT** **Bylaw No. 4671: CRD Electoral Areas Water Conservation Bylaw No. 1, 2023, Amendment Bylaw No. 1, 2025 and Bylaw No. 4673: CRD Ticket Information Authorization Bylaw, 1990, Amendment Bylaw No. 84, 2025**

## ISSUE SUMMARY

Amendments to Bylaw No. 4492, "Capital Regional District Electoral Areas Water Conservation Bylaw No. 1, 2023" and Bylaw No. 1857, "Capital Regional District Ticket Information Authorization Bylaw, 1990" are required to support the introduction of an additional water use restriction stage in Local Service Areas (LSA).

## BACKGROUND

Over the past several years, seasonal droughts have increasingly stressed source water supplies, making water conservation measures for local services on Salt Spring Island, the Southern Gulf Islands, and the Juan de Fuca Electoral Areas more critical. Bylaw No. 4492, "Capital Regional District Electoral Areas Water Conservation Bylaw No. 1, 2023" (Appendix A for the unofficial redlined consolidation version) was adopted in 2023 and regulates the use of drinking water in LSA for the protection of local water system supplies to mitigate the risk of low water storage levels.

Currently Stage 3 is the most restrictive stage in Bylaw No. 4492. In 2023, Stage 3 was activated for three systems (Cedars of Tuam, Skana and Surfside Park). In 2024, Stage 3 was activated for two systems (Cedars of Tuam and Skana). Given the frequency of activations and the goal to avoid operational implications including the trucking of emergency water supplies, there is a need for a more restrictive stage in times of severe water shortages where water supplies may be at risk of not having enough water available.

Bylaw No. 4671, "Capital Regional District Electoral Areas Water Conservation Bylaw No. 1, 2023, Amendment Bylaw No. 1, 2025" (Appendix B) amends the Electoral Areas Water Conservation Bylaw to add a fourth water conservation stage, broaden the scope of vegetable watering to allow "food production" throughout the bylaw and adds or amends definitions as needed. The goal of Stage 4 is to restrict outdoor and residential indoor water use as much as possible at times of severe water shortage. Commercial indoor water use is not regulated in this amendment.

To support the new Stage 4 restrictions, the Ticket Information Authorization Bylaw requires amendment via Bylaw No. 4673, "Capital Regional District Ticket Information Authorization Bylaw, 1990, Amendment Bylaw No. 84, 2025" (Appendix C) to insert two new Stage 4 offenses and fines.

## ALTERNATIVES

*Alternative 1*
The Electoral Areas Committee recommends to the Capital Regional District Board:

1. That Bylaw No. 4671, "Capital Regional District Electoral Areas Water Conservation Bylaw No. 1, 2023, Amendment Bylaw No. 1, 2025", be introduced and read a first, second and third time; and
2. That Bylaw No. 4671 be adopted.
3. That Bylaw No. 4673, "Capital Regional District Ticket Information Authorization Bylaw, 1990, Amendment Bylaw No. 84, 2025", be introduced and read a first, second and third time; and
4. That Bylaw No. 4673 be adopted.

*Alternative 2*
That Bylaw No. 4671 and Bylaw No. 4673 be referred to staff for revision.

## IMPLICATIONS

*Regulatory Implications*

Water use restrictions in any stage do not apply to nurseries, farms, turf farms or tree farms. A summary of Stage 4 restrictions is as follows:

- all outdoor water use is restricted except limited amounts for food production purposes
- residential indoor water use is restricted to drinking, food preparation purposes and for sanitation purposes; and
- other uses may be granted with written approval from the General Manager of the Capital Regional District Infrastructure & Water Services Department.

*Financial Implications*

The costs of promoting and enforcing Stage 4 water use restrictions will be borne by the specific service in which the action is taken as an operational expenditure.

*Service Delivery Implications*

Due to the severity of water levels that will activate Stage 4, staff will notify water users in the affected LSA by media and hand-delivery of a letter (sample attached as Appendix D) describing the situation, applicable regulations and additional best practices for water users to follow.

Additionally, outreach material and the Capital Regional District website will be updated as needed and there are plans to have signage installed this year prior to the activation of water use restrictions at key locations in the LSA to inform residents of the current water stage, including Stage 4 if this bylaw amendment is adopted by the Capital Regional District Board. The CRD will also issue a public alert notification system (PANS) to the community.

## CONCLUSION

There is a need for a more restrictive stage to promote water conservation in times of severe water shortages where water supplies may be at risk of not having enough water available. Currently, Stage 3 of the Capital Regional District Electoral Areas Water Conservation Bylaw No. 4492 is the most restrictive stage in the bylaw and has been activated five times over the last two years. Staff have prepared an amendment to this bylaw to add Stage 4 with increased water

use restrictions to protect water supplies in Local Service Areas. Activation of Stage 4 will be supported by communications, including local signage, website pages, social media and hand-delivery of letters to impacted properties.

## RECOMMENDATION

The Electoral Areas Committee recommends to the Capital Regional District Board:

1. That Bylaw No. 4671, "Capital Regional District Electoral Areas Water Conservation Bylaw No. 1, 2023, Amendment Bylaw No. 1, 2025", be introduced and read a first, second and third time; and
2. That Bylaw No. 4671 be adopted.
3. That Bylaw No. 4673, "Capital Regional District Ticket Information Authorization Bylaw, 1990, Amendment Bylaw No. 84, 2025", be introduced and read a first, second and third time; and
4. That Bylaw No. 4673 be adopted.

| | |
|---|---|
| Submitted by: | Glenn Harris, Ph.D., R.P.Bio., Acting General Manager, Parks, Recreation & Environmental Services |
| Concurrence: | Alicia Fraser, P. Eng., General Manager, Infrastructure & Water Services |
| Concurrence: | Kristen Morley, J.D., General Manager, Corporate Services & Corporate Officer |
| Concurrence: | Ted Robbins, B. Sc., C. Tech., Chief Administrative Officer |

## ATTACHMENTS

Appendix A: Bylaw No. 4492, "Capital Regional District Electoral Areas Water Conservation Bylaw No. 1, 2023", unofficial redlined consolidation
Appendix B: Bylaw No. 4671, "Capital Regional District Electoral Areas Water Conservation Bylaw No. 1, 2023, Amendment Bylaw No. 1, 2025"
Appendix C: Bylaw No. 4673, "Capital Regional District Ticket Information Authorization Bylaw, 1990, Amendment Bylaw No. 84, 2025"
Appendix D: Stage 4 Water Conservation Notice

**APPENDIX A**

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# BYLAW NO. 4492

# CAPITAL REGIONAL DISTRICT ELECTORAL AREAS WATER CONSERVATION BYLAW NO. 1, 2023

## Consolidated for Public Convenience

**(This bylaw is for reference purposes only)**

ORIGINALLY ADOPTED MAY 10, 2023
(Consolidated with Amending Bylaws 4671)

For reference to original bylaws or further details, please contact the Capital Regional District,
Legislative Services Department, 625 Fisgard St., PO Box 1000, Victoria BC V8W 2S6
T: (250) 360-3127, F: (250) 360-3130, Email: legserv@crd.bc.ca, Web: www.crd.bc.ca

**CAPITAL REGIONAL DISTRICT**
**Bylaw No. 4492**

**********

**ELECTORAL AREAS WATER CONSERVATION BYLAW**

**********

**WHEREAS** under Section 335 of the *Local Government Act*, a regional district may regulate in relation to a service;

**AND WHEREAS** the Capital Regional District ("CRD") has established or continued Water Supply local services providing drinking water in the Southern Gulf Islands, Salt Spring Island, and Juan de Fuca Electoral Areas;

**AND WHEREAS** the CRD desires to enact regulations to protect local Water System supplies to mitigate the risk of low water storage levels within these Water Systems;

**AND WHEREAS** this bylaw does not apply to water not provided under a Water System operated by the CRD on behalf of service participants, such as water from private water systems, irrigation wells, or water provided by other public authorities;

**NOW, THEREFORE**, the Board of the Capital Regional District in open meeting assembled enacts as follows:

## 1. Definitions

In this bylaw, the following terms, whether capitalized or not, have the following meanings:

"Automatic shut-off nozzle" means a nozzle, attached to a water hose, that shuts off the supply of water automatically unless the application of hand pressure allows the supply of water.

"Board" means the Board of the Capital Regional District.

"Boat" means a vessel propelled on water by an engine, oars or sails.

"Boulevard" means that portion of any highway other than the paved, improved or main travelled roadway, driveway or sidewalk and includes any landscaped median.

"Bylaw Enforcement Officer" means a person appointed or contracted by the Board or the Council of a Municipality to enforce this bylaw.

"CRD" means the Capital Regional District.

"Excess Water Use" means to apply or use more Water than is required to provide a service, produce a product or complete a task, and without limitation includes the application of Water to a hardscape, such as a sidewalk, driveway or parking lot, or to exterior windows or exterior building surfaces, through a hose or power-washer to the point that Water runs-off or spreads

to surrounding areas.

"Exempted Person" means an Owner or Occupier of property identified in Schedule "A" as exempt or excused from one or more of the regulations under this bylaw.

"Farm" refers to a parcel of land classified as farmland for assessment and taxation purposes.

"Fill" means to completely fill or partially fill with Water an empty or substantially empty hot tub, swimming pool, fountain, wading pool, or similar structure, but for certainty does not include topping up with or adding Water in the normal course of operation, where the hot tub, swimming pool, fountain, wading pool, or similar structure is filled with Water and is in operation at the time Water Use Restrictions come into effect.

*(Bylaw 4671)*

"General Manager" means the General Manager of the Capital Regional District Infrastructure & ~~Integrated~~ Water Services Department.

"Irrigation System" means an irrigation system that consists of controllers, wiring, and accessories such as climate and soil sensors, piping, and emission devices such as sprinklers, rotors or micro-irrigation components that artificially supplies water to a landscaped area, lawn or garden.

"Lawn" or "Turf" means a cultivated area that surrounds or is adjacent to an institutional, commercial or residential building, and that is covered by grass, turf or other plants used as ground cover, such as but not limited to clover, and that is used for decorative, ornamental or recreational purposes.

"Micro-irrigation or Drip-irrigation System" means a system using irrigation components which consume less than 20 gallons per hour and operate at less than 25 Pounds per square inch to deliver Water to the root zone of the plant material being irrigated, and includes spray emitter systems (Micro-Sprays), point source emitters and linear tape systems as defined in the BC Trickle Irrigation Manual prepared and published by the Irrigation Industry Association of British Columbia (1999), but does not include weeper hoses or soaker hoses.

"Motion-Activated Sprinkler Device" means a water sprinkling device that automatically operates through detection of motion or similar event and is used to deter wildlife and other animals.

"New Lawn" or "New Turf" means a lawn that is newly established either by seeding or the laying of new sod or turf on a property.

"Newspaper" has the same meaning as in the *Community Charter.*

"Notice" means a Notice given under Section 5 of this bylaw.

"Nursery" means a commercial business in which flowers, plants, trees or shrubs are grown or displayed for sale.

"Occupier" has the same meaning as in the *Community Charter*.

"Once-Through Cooling" means to use Water to provide a cooling effect through the transfer

of heat to Water that circulates only once through equipment, and is then discharged, whether to a sewer, stream, other water body, to the ground, or otherwise.

"Over-Water" means to apply Water in a manner that saturates the lawn, Boulevard or landscaped area being watered to the point of saturation and results in Water spreading or running-off to other areas including, but not limited to, municipal storm drains.

"Owner" has the same meaning as in the *Community Charter*.

"Public Authority" has the same meaning as in the *Community Charter*.

"Public, Institutional or Community Playing Field" means grass, sod or turf covered grounds that are owned, maintained or operated by a public authority, or by a private institution such as a private school, and are designed to be played upon, or that are used for sporting or other community events and activities, but for certainty does not include a lawn or turf on private residential property.

"Public Spray Park" means a facility that is open to the public and that that is equipped with water sprays, water jets, sprinklers and similar devices that spray water for recreation and enjoyment of the users.

"Residential Property" means a property which is used primarily for the purpose of residence by persons on a permanent, temporary or seasonal basis.

"Sanitation Purposes" means the use of Water for washing, cleaning and maintaining sanitary conditions including, but not limited to, disposal of liquid waste.

*(Bylaw 4671)*

"Soaker Hose" or "Weeper Hose" means a garden hose or a pipe with small holes that allow water to seep into the ground, to the roots of plants, discharging water through the entire length of its porous surface.

"Sprinkler" means an Irrigation System, a sprinkler system, or a hose connected, water emitting device such as sprinklers, rotors, or sprayer components, that artificially supply water to a landscaped area, lawn or garden, but excludes a Micro-irrigation or Drip-irrigation System.

"Stage" refers to the Stages 1, 2, 3 and 4 of Water Use Restrictions prescribed in Schedule "A" of this bylaw.

*(Bylaw 4671)*

~~"Stage" refers to the Stages 1, 2 and 3 of Water Use Restrictions prescribed in Schedule "A" of this bylaw.~~

"Surface Coating" means one or more coatings such as paint, preservative, or stucco applied to exterior building surfaces.

"Tree Farm" means a commercial operation or business such as a tree plantation, tree nursery, or Christmas tree farm that grows trees for sale, and includes a privately owned forest that is managed for timber production.

"Turf Farm" means a commercial operation or business that grows and sells sod or turf.

"Vehicle" means a device in, on or by which a person or thing is or may be transported or drawn on a highway or other roadway.

"Water", when used as a noun, means drinking water supplied by the CRD from a Water System Supply directly or indirectly to an Owner or Occupier, and when used as a verb means the act of using or applying such Water.

"Water System" or "Water Systems" means the following local services, individually or collectively as applicable, as set out in the below table:

| **Water System Name** | **Establishing Bylaw** |
|---|---|
| Beddis Water System | Bylaw No. 3188, "Beddis Water Service Establishment Bylaw No. 1, 2004" |
| Cedar Lane Water System | Bylaw No. 3424, "Cedar Lane Water Service Establishment Bylaw No. 1, 2007" |
| Cedars of Tuam Water System | Bylaw No. 3021, "Salt Spring Island Cedars of Tuam Water System Service Establishment Bylaw No. 1, 2002" |
| Fulford Water System | Bylaw No. 3202, "Fulford Water Service Establishment Bylaw No. 1, 2004" |
| Highland/Fernwood Water System | Bylaw No. 3753, "Highland and Fernwood Water Service Establishment Bylaw No. 1, 2010" |
| Lyall Harbour/Boot Cove Water System | Bylaw No. 2920, "Lyall Harbour/Boot Cove Water Service Establishment Bylaw No. 1, 2001" |
| Magic Lake Estates Water System | Bylaw No. 1874, "Outer Gulf Islands Magic Lake Estates Water System Local Service Establishment Bylaw, 1990" |
| Skana Water System | Bylaw No. 3089, "Skana Water Service Establishment Bylaw No. 1, 2003" |
| Sticks Allison Water System | Bylaw No. 2556, "Sticks Allison Water Local Service Establishment Bylaw No. 1, 1997" |
| Surfside Park Water System | Bylaw No. 3087, "Surfside Park Estates Water Service Establishment Bylaw No. 1, 2003" |
| Port Renfrew Water System | Bylaw No. 1747, "Port Renfrew Water Supply Local Service Establishment Bylaw No. 1, 1989" |
| Wilderness Mountain Water System | Bylaw No. 3503, "Wilderness Mountain Water Service Establishment Bylaw No. 1, 2008" |

"Water System Area" means the area serviced by a Water System, as may be amended by the CRD from time to time.

"Water System Supply" means the CRD drinking water supplies for the Water Systems operated and administered by the CRD under the authority referred to in the Recitals to this bylaw.

"Water Use Restrictions" means the restrictions prescribed in Schedule "A" of this bylaw.

"Wading Pool" means a shallow, artificial pool 600 mm or less in depth, of portable or permanent construction for children to play or wade in.

## 2. Application

The restrictions and regulations in this bylaw are applicable in each Water System's service area.

## 3. Inspection

A Bylaw Enforcement Officer has the authority to enter at all reasonable times on any property which is subject to this bylaw to ascertain whether the requirements of this bylaw are being met or the regulations in this bylaw are being observed.

## 4. Water Use Restriction Stages

(1) The Stage 1 Water Use Restrictions prescribed in Schedule "A" are in effect each year from May 1 to September 30 inclusive, except as provided under subsection (2).

(2) When necessary for the conservation of Water or the preservation of the Water Supply the General Manager may:

(a) amend the effective period of time for Stage 1 for any or all Water Systems, or

(b) terminate or bring into effect a Stage more restrictive than Stage 1 at any time of the year for any period of time for any or all Water Systems.

(3) The Stage determined under subsection (2) and the Water Use Restrictions prescribed under Schedule "A" for that Stage take effect 48 hours after the Notice for that Stage under section 5(1) and remain in effect until that Stage is terminated.

(4) A Stage will remain in effect until it is terminated under this bylaw, or until the commencement of another Stage.

## 5. Notice

The General Manager must make a public announcement of the activation or termination of any water use restriction stage, other than the automatic activation and termination of the Stage 1 water use restriction on May 1 and September 30 of each calendar year, and may do so by one or more of the following means:

(a) radio or television broadcast;

(b) posting on the CRD website and social media;

(c) posting or delivery of notices; or

(d) publication in a local newspaper.

## 6. Determining Water Use Restriction Stages

In making a determination under Section 4(2), the General Manager may consider the following factors:

(1) time of year and typical seasonal water demand trends;

(2) precipitation and temperature conditions and forecasts;

(3) current and forecasted storage levels and storage volumes of CRD Reservoirs

or Water Systems and draw down rates;

(4) stream flows and inflows into CRD Reservoirs and Water Systems;

(5) water usage, recent consumption and trends, and customer compliance with restrictions on Water use under this bylaw;

(6) Water System performance;

(7) the effects of climate change; and

(8) any other factor the General Manager considers to be relevant for making a determination under Section 4(2).

## 7. Water Use Restrictions

(1) The Water Use Restrictions for each Stage are prescribed for each Water System in Schedule "A" to this bylaw and must be followed during the period that the applicable Stage is in effect under this bylaw.

(2) For greater clarity, when a Stage is in effect under this bylaw, no person shall perform any of the outdoor watering activities described in Schedule "A" to this bylaw except at the days and times, and in the manner permitted, during that Stage as set out in Schedule "A".

(3) No person shall waste Water by using more Water from a Water System than is required to provide a service, produce a product or complete a task, including but not limited to:

(a) allowing a tap or hose to run Water unnecessarily,

(b) the Over-Watering of plants or lawns,

(c) power-washing, using water from a hose, or otherwise applying or using Water in a manner that constitutes Excess Water Use, or

(d) using a Motion-Activated Sprinkler Device or Sprinkler in such a manner that water spray patterns are not confined to the property on which the device is located, and are allowed to spray onto adjoining public or private property.

(4) No person, being an Owner or Occupier of property in a Water System Area, shall use Water or cause Water from a Water System to be used contrary to the provisions of this bylaw in effect at the time of use.

## 8. Exemptions to Water Use Restrictions

(1) Nurseries, Farms, Turf Farms and Tree Farms are exempted from all Stage restrictions.

(2) Exempted Persons are exempted from Section 7 to the extent permitted by Schedule "A".

## 9. Schedules

(1) Schedule "A" of this bylaw forms part of and is enforceable in the same manner as the bylaw.

## 10. Offences and Penalties

(1) A person who contravenes this bylaw commits an offence and is liable to a fine not less than $100 and not exceeding $10,000.

(2) Where an offence is committed or continues for more than one day, a person shall be deemed to have committed separate offences for each day on or during which an offence occurs or continues, and separate fines, each not less than $100 and not exceeding $10,000, may be imposed for each day on or during which an offence occurs or continues.

(3) Nothing in this bylaw shall limit the District from pursuing any other remedy that would otherwise be available to the District at law.

(4) A Bylaw Enforcement Officer may, if they have reason to believe an offence has been committed against this bylaw, complete and leave with the alleged offender, or at the address of the alleged offender with someone who appears to be 16 years of age or older, a ticket information pursuant to Bylaw No. 1857, "Capital Regional District Ticket Information Authorization Bylaw, 1990", as may be amended or repealed and replaced from time to time, indicating a penalty equal to the amount stipulated for such an offence.

## 11. Bylaw Citation

This Bylaw may be cited as "Capital Regional District Electoral Areas Water Conservation Bylaw No. 1, 2023".

| | | | |
|---|---|---|---|
| READ A FIRST TIME THIS | 10th | day of | May, 2023 |
| READ A SECOND TIME THIS | 10th | day of | May, 2023 |
| READ A THIRD TIME THIS | 10th | day of | May, 2023 |
| ADOPTED THIS | 10th | day of | May, 2023 |

CHAIR

CORPORATE OFFICER

**SCHEDULE "A"**
to Bylaw No. 4492

**OUTDOOR WATER USE RESTRICTION STAGES**

APPLICATION
This schedule does not apply to Nurseries, Farms, Turf Farms and Tree Farms.

**1. STAGE 1 Water Restrictions**

(1) During Stage 1,

(a) no person shall, by any method, water a lawn growing on a property, including but not limited to a property that is used for residential, commercial, or institutional purposes, on more than one day per week between the hours of 4:00 a.m. to 10:00 a.m. or 7:00 p.m. to 10:00 p.m.

(b) no person shall

(i) water trees, shrubs, flowers and ~~vegetables~~ for food production on any day with a Sprinkler other than during the prescribed hours for Stage 1 lawn watering or on any day at any time if watering is done other than by hand-held container, hand held hose equipped with an automatic shut-off nozzle, or by Micro-irrigation or Drip-irrigation systems;

(ii) water newly planted trees, shrubs, flowers and for food production~~vegetables~~ by any method referred to in Section 1(1)(b)(i) of this Schedule other than during installation and the following 24 hours;

(iii) outside the prescribed Stage 1 lawn Watering hours, water new sod or newly seeded lawns, other than on new sod installation and during the first 21 days after installation, or for newly seeded lawns, water until growth is established or for 49 days after installation, whichever is less;

(iv) water public, institutional or community playing fields other than between the hours of 1:00 a.m. to 10:00 a.m. or 7:00 p.m. to 10:00 p.m. on any day, unless failure to water will result in a permanent loss of plant material;

(v) wash a Vehicle with Water other than by using a hand held container or a hand held hose equipped with an automatic shut-off nozzle or at car dealerships or commercial car washes; and

(vi) use Water to wash sidewalks, driveways, parking lots, exterior windows or exterior building surfaces, by means of other than a power washer or hand-held hose equipped with a shut-off valve or in a manner that results in Excess Water Use.

(c) a person must not allow a Public Spray Park

(i) to emit Water continuously;

(ii) to be operated other than by either:

1) a motion sensor timer, or

2) manually by the user provided the device that is activated manually by the user is equipped with a timer or automatic shut-off that prevents continuous emission of Water.

(2) As exceptions to the Stage 1 restrictions,

(a) Owners or Occupiers of property who, by reason of physical or mental incapacity, are unable to water their property within the restricted days and times, and whose property is not equipped with an automatic in-ground Irrigation System, with the written approval of the General Manager given under this bylaw, shall not water their lawn or turf on more than two days of the week for a maximum of 9 hours per day;

(b) no Public Authority shall:

(i) water public, institutional or community playing fields, lawns and Boulevards other than during the hours of 1:00 a.m. to 10:00 a.m. or 7:00 p.m. to 10:00 p.m. on more than one day per week; and

(ii) water trees, shrubs, flowers and ~~vegetable gardens~~for food production other than at the times and in the manner prescribed under Section 1(1)(b)(i) of this Schedule.

(c) owners or operators of golf courses shall not water

(i) fairways on any day, other than during the Stage 1 lawn prescribed times;

(ii) trees, shrubs, flowers and for food production~~vegetables grown~~ on golf courses other than in accordance with Section 1(1)(b)(i), of this Schedule; and

(iii) golf greens and tees on any day unless failure to water will result in permanent loss of plant material.

## 2. STAGE 2 Water Restrictions

(1) During Stage 2,

(a) no person shall, by any method, water a lawn growing on a property including but not limited to property that is used for residential, commercial or institutional purposes, on more than one day per two-week period between the hours of 4:00 a.m. to 10:00 a.m. or 7:00 p.m. to 10:00 p.m.

(b) no person shall

(i) use Water to wash sidewalks, driveways or parking lots, exterior windows or exterior building surfaces, except as necessary for applying surface coating, preparing a surface prior to paving or repointing bricks, or if required by law to comply with health or safety regulations;

(ii) utilize a Motion-Activated Sprinkler Device to deter animals or wildlife;

(iii) water a lawn on property used as a cemetery;

(c) a person must not allow a Public Spray Park

(i) to emit Water continuously;

(ii) to be operated other than by either:

1) a motion sensor timer, or

2) manually by the user provided the device activated manually by the user is equipped with a timer or automatic shut off that prevents continuous emission of Water;

(d) a person must not

(i) fill an ornamental fountain with Water, or

(ii) operate an ornamental fountain that uses Water, other than an ornamental fountain that re-circulates continuously and is not replenished or re-Filled with Water from the a Water System Supply; and

(e) no person shall

(i) water trees, shrubs, flowers and for food production~~vegetables~~ on more than one day per week with a Sprinkler other than during the prescribed morning hours (4:00 a.m. to 10:00 a.m.) for Stage 2 lawn watering or on any day at any time if watering is done other than by hand-held container, hand-held hose equipped with an automatic shut-off nozzle, or by Micro-irrigation or Drip-irrigation system;

(ii) water newly planted trees, shrubs, flowers and for food production~~vegetables~~ during installation and for the following 24 hours other than by any method referred to in Section 2(1)(e)(i) of this Schedule;

(iii) water public, institutional or community playing fields other than between the hours of 1:00 a.m. to 10:00 a.m. or 7:00 p.m. to 10:00 p.m., on more than one day per week unless failure to water will result in a permanent loss of plant material;

(iv) wash a Vehicle or Boat with Water other than commercial car washes using less than 57 litres of Water per Vehicle wash or using 50% recirculated Water as long as the total amount of Water, excluding recirculated Water, does not exceed 57 litres per Vehicle wash; or

(v) leave water service turned on, at the residential point of connection to the residence, home, or dwelling, when property is uninhabited for more than 30 consecutive days.

(2) As exceptions to Stage 2 restrictions,

(a) Owners or Occupiers of property who, by reason of physical or mental incapacity, are unable to water their property within the restricted days and times, and whose property is not equipped with an automatic in-ground Irrigation System, with the written approval of the General Manager given under this bylaw, shall not water their lawn or turf on more than one day per week for a maximum of 9 hours per day;

(b) no Public Authority shall:

(i) water public, institutional or community playing fields, lawns and Boulevards other than during the hours of 1:00 a.m. to 10:00 a.m. or 7:00 p.m. to 10:00 p.m., on no more than one day per week if failure to water will result in a permanent loss of plant material;

(ii) water trees, shrubs, flowers and ~~vegetable gardens~~ for food production other than at the times and in the manner prescribed under Section 2(1)(e)(i), and (ii) of this Schedule;

(c) owners or operators of golf courses shall not water

(i) fairways more than one day per week during prescribed lawn watering times;

(ii) trees, shrubs, flowers and for food production~~vegetables grown~~ on golf courses other than in accordance with Section 2(1)(e)(i) and (ii) of this Schedule; and

(iii) golf greens and tees on any day unless failure to water so will result in permanent loss of plant material.

**3. STAGE 3 Water Restrictions**

(1) During Stage 3,

(a) no person shall

(i) water a lawn, turf or Boulevard;

(ii) fill a wading pool, swimming pool, hot tub or garden pond;

(iii) operate a Public Spray Park;

(iv) operate or fill an ornamental fountain with Water;

(v) wash a Vehicle or a Boat with Water;

(vi) use Water to wash sidewalks, driveways or parking lots, exterior windows or exterior building surfaces, except as necessary for applying a surface coating, preparing a surface prior to paving or repointing bricks, or if required by law to comply with health or safety regulations;

(vii) utilize a Motion-Activated Sprinkler Device to deter animals or wildlife; or

(viii) leave water service turned on when property is uninhabited for more than 30 consecutive days.

(b) no person or Public Authority shall

(i) water trees, shrubs, flowers and for food production~~vegetables~~ on any day, except where watering only one day per week between the hours of 4:00 a.m. to 10:00 a.m. and when watering is done by hand-held container, a hand held hose equipped with an automatic shut-off nozzle, or by Micro-irrigation or Drip-irrigation systems;

(ii) water newly planted trees, shrubs, flowers and for food production~~vegetables~~ other than between the hours of 4:00 a.m. to 10:00 a.m. or 7:00 p.m. to 10:00 p.m. if watering is done by hand-held container or a hand held hose equipped with an automatic shut-off nozzle, during installation and during the following 24 hours after installation is completed;

(iii) water public, institutional or community playing fields other than between the hours of 4:00 a.m. to 10:00 a.m., on no more than one day per week, if failure to water will result in a permanent loss of plant material.

(2) As exceptions to the Stage 3 restrictions,

(a) owners or operators of golf courses shall not water

(i) fairways more than one day per week during the hours of 4:00 a.m. to 10:00 a.m. or 7:00 p.m. to 10:00 p.m.;

(ii) trees, shrubs, flowers and for food production~~vegetables grown~~ on golf courses other than in accordance with Section 3(1)(b)(i) and (ii) of this Schedule; and

(iii) golf greens and tees on any day unless failure to water will result in permanent loss of plant material;

(b) Vehicles and Boats must not be washed with Water other than at commercial car washes using less than 57 litres of Water per Vehicle wash or using 50% recirculated Water as long as the total amount of Water, excluding recirculated Water, does not exceed 57 litres per Vehicle wash.

## 4. STAGE 4 Water Restrictions

(1) During Stage 4,

(a) all outdoor use of Water is prohibited other than for food production on one day per week between the hours of 4:00 a.m. to 10:00 a.m. by hand-held container, a hand-held hose equipped with an automatic shut-off nozzle or by Micro-irrigation or Drip-irrigation systems; and

(b) Residential Property indoor use of Water is restricted to drinking, food preparation purposes and for sanitation purposes.

(2) Exemptions to the restrictions in Section 4.(1) may be granted with the written approval of the General Manager given under this bylaw.

*(Bylaw 4671)*

**CAPITAL REGIONAL DISTRICT**
**BYLAW NO. 4671**

**********

**A BYLAW TO AMEND THE ELECTORAL AREAS WATER CONSERVATION BYLAW (BYLAW NO. 4492)**

**********

**WHEREAS:**

A. Under Bylaw No. 4492, "Capital Regional District Electoral Areas Water Conservation Bylaw No. 1, 2023", the Regional Board has established a bylaw to regulate water use for local services providing drinking water in the Southern Gulf Islands, Salt Spring Island, and Juan de Fuca Electoral Areas; and

B. The Regional Board wishes to amend Bylaw No. 4492 to add an additional stage of Water Use Restrictions.

**NOW THEREFORE**, the Board of the Capital Regional District in open meeting assembled hereby enacts as follows:

1. Bylaw No. 4492, "Capital Regional District Electoral Areas Water Conservation Bylaw No. 1, 2023", is hereby amended as follows:

   (a) by inserting the following definition, in alphabetical order, in Section 1:

   "Sanitation Purposes" means the use of Water for washing, cleaning and maintaining sanitary conditions including, but not limited to, disposal of liquid waste.

   (b) by replacing the definition of "General Manager" with

   "General Manager" means the General Manager of the Capital Regional District Infrastructure & Water Services Department

   (c) by replacing the definition of "Stage" with:

   "Stage" refers to the Stages 1, 2, 3 and 4 of Water Use Restrictions prescribed in Schedule "A" of this bylaw.

   (d) by replacing all occurrences of the words "vegetables", "vegetables grown" and "vegetable gardens" in Section 1 of Schedule "A" with "for food production".

   (e) by replacing all occurrences of the words "vegetables", "vegetables grown" and "vegetable gardens" in Section 2 of Schedule "A" with "for food production".

   (f) by replacing all occurrences of the words "vegetables", "vegetables grown" and "vegetable gardens" in Section 3 of Schedule "A" with "for food production".

   (g) by inserting the following within Schedule "A" as section 4:

   4. STAGE 4 Water Restrictions

   (1) During Stage 4,

   (a) all outdoor use of Water is prohibited other than for food production on one day per week between the hours of 4:00 a.m. to 10:00 a.m. by hand-held container, a

hand-held hose equipped with an automatic shut-off nozzle or by Micro-irrigation or Drip-irrigation systems; and

(b) Residential Property indoor use of Water is restricted to drinking, food preparation purposes and for sanitation purposes.

(2) Exemptions to the restrictions in Section 4.(1) may be granted with the written approval of the General Manager given under this bylaw.

2. This bylaw may be cited for all purposes as “Capital Regional District Electoral Areas Water Conservation Bylaw No. 1, 2023, Amendment Bylaw No. 1, 2025".

| | | | |
|---|---|---|---|
| READ A FIRST TIME THIS | day of | _____, | 2025 |
| READ A SECOND TIME THIS | day of | _____, | 2025 |
| READ A THIRD TIME THIS | day of | _____, | 2025 |
| ADOPTED THIS | day of | _____, | 2025 |

CHAIR

CORPORATE OFFICER

**CAPITAL REGIONAL DISTRICT**
**BYLAW NO. 4673**

**********

**A BYLAW TO AMEND BYLAW NO. 1857, CAPITAL REGIONAL DISTRICT TICKET INFORMATION AUTHORIZATION BYLAW, 1990**

**********

**WHEREAS** the Regional Board amended Bylaw No. 4492, "Capital Regional District Electoral Areas Water Conservation Bylaw No. 1, 2023" to add an additional stage of Water Use Restrictions for local water services in the Electoral Areas;

**NOW THEREFORE** the Board of the Capital Regional District in open meeting assembled enacts as follows:

1. Bylaw No. 1857, "Capital Regional District Ticket Information Authorization Bylaw, 1990", is amended by replacing the existing Schedule 20 with the Schedule 20 attached to this bylaw.

2. This Bylaw may be cited for all purposes as "Capital Regional District Ticket Information Authorization Bylaw 1990, Amendment Bylaw No. 84, 2025".

| | | | | |
|---|---|---|---|---|
| READ A FIRST TIME THIS | th | DAY OF | MONTH, | 2025 |
| READ A SECOND TIME THIS | th | DAY OF | MONTH, | 2025 |
| READ A THIRD TIME THIS | th | DAY OF | MONTH, | 2025 |
| ADOPTED THIS | th | DAY OF | MONTH, | 2025 |

_____
CHAIR

_____
CORPORATE OFFICER

# SCHEDULE 20 TO BYLAW NO. 1857

CAPITAL REGIONAL DISTRICT ELECTORAL AREAS WATER CONSERVATION BYLAW NO. 1, 2023

| | WORDS OR EXPRESSIONS DESIGNATING OFFENCE | SECTION | FINE |
|---|---|---|---|
| 1. | Hinder/Prevent Inspection | 3 | $500.00 |
| 2. | Wasting water | 7.(3) | $200.00 |
| 3. | Wasting water during Stage 2 | 7.(3) | $300.00 |
| 4. | Wasting water during Stage 3 | 7.(3) | $400.00 |
| 5. | Use water contrary to bylaw | 7.(4) | $200.00 |
| 6. | Stage 1 – water lawn contrary to days/times | Sch. A 1.(1)(a) | $200.00 |
| 7. | Stage 1 – water contrary to restrictions | Sch. A 1.(1)(b) | $100.00 |
| 8. | Stage 1 – operate Public Spray Park contrary to restrictions | Sch. A 1.(1)(c) | $100.00 |
| 9. | Stage 1 – Public Authority watering contrary to days/time | Sch. A 1.(2)(b) | $100.00 |
| 10. | Stage 1 – watering golf courses contrary to restrictions | Sch. A 1.(2)(c) | $200.00 |
| 11. | Stage 2 – water lawn contrary to days/times | Sch. A 2.(1)(a) | $250.00 |
| 12. | Stage 2 – wash sidewalks, driveways, parking lots, or exterior surfaces | Sch. A 2.(1)(b)(i) | $250.00 |
| 13. | Stage 2 – use motion-activated sprinkler device | Sch. A 2.(1)(b)(ii) | $250.00 |
| 14. | Stage 2 – water cemetery lawn | Sch. A 2.(1)(b)(iii) | $250.00 |
| 15. | Stage 2 - operate Public Spray Park contrary to restrictions | Sch. A 2.(1)(c) | $250.00 |
| 16. | Stage 2 – fill ornamental fountain | Sch. A 2.(1)(d)(i) | $250.00 |
| 17. | Stage 2 – operate ornamental fountain | Sch. A 2.(1)(d)(ii) | $250.00 |

| | | | |
|---|---|---|---|
| 18. | Stage 2 - water contrary to restrictions | Sch. A 2.(1)(e) | $250.00 |
| 19. | Stage 2 – Public Authority watering contrary to days/times | Sch. A 2.(2)(b) | $200.00 |
| 20. | Stage 2 – watering golf courses contrary to restrictions | Sch. A 2.(2)(c) | $250.00 |
| 21. | Stage 3 – water lawn, turf, or boulevard | Sch. A 3.(1)(a)(i) | $400.00 |
| 22. | Stage 3 – fill pool, hot tub, or garden pond | Sch. A 3.(1)(a)(ii) | $400.00 |
| 23. | Stage 3 – operate a Public Spray Park | Sch. A 3.(1)(a)(iii) | $400.00 |
| 24. | Stage 3 – operate or fill ornamental fountain | Sch. A 3.(1)(a)(iv) | $400.00 |
| 25. | Stage 3 – wash vehicle or boat with Water | Sch. A 3.(1)(a)(v) | $400.00 |
| 26. | Stage 3 – wash sidewalks, driveways, parking lots, or exterior surfaces | Sch. A 3.(1)(a)(vi) | $400.00 |
| 27. | Stage 3 – use motion-activated sprinkler device | Sch. A 3.(1)(a)(vii) | $400.00 |
| 28. | Stage 3 – leave water service turned on | Sch. A 3.(1)(a)(viii) | $400.00 |
| 29. | Stage 3 –water contrary to restrictions | Sch. A 3.(1)(b) | $400.00 |
| 30. | Stage 3 – watering golf courses contrary to days/times | Sch. A 3.(2)(a) | $400.00 |
| 31. | Stage 3 – washing vehicle or boat contrary to restrictions | Sch. A 3.(2)(b) | $400.00 |
| 32 | Stage 4 – outdoor use of Water | Sch. A 4.(1)(a) | $500.00 |
| 33 | Stage 4 – Residential Property indoor use contrary to restrictions | Sch. A 4.(1)(b) | $500.00 |

Making a difference...together

Parks, Recreation & Environmental Services
625 Fisgard Street, PO Box 1000 T: 250.360.3078
Victoria, BC Canada V8W 2S6 www.crd.bc.ca

Date

File: xx

Owner Name
Address
City, BC Postal code

Dear Resident:

**RE: STAGE 4 WATER CONSERVATION NOTICE**

Source water resources for the <insert LSA Water System field> are reaching a critical stage due to low water levels in <insert LSA Water Source field>. With the region currently facing sustained drought conditions, and the sensitivity of your water source, we are seeking your cooperation to reduce water usage for everyone's benefit.

The Capital Regional District Electoral Areas Water Conservation Bylaw No. 4492 regulates water use for local services providing drinking water in the Southern Gulf Islands, Salt Spring Island, and Juan de Fuca Electoral Areas. **Please follow Stage 4 water conservation measures in the <insert LSA Water System field>.**

**Residents are required to eliminate all outdoor water use, other than for food production, including but not limited to:**

- No watering of lawns, turf or boulevards
- No watering of trees or shrubs
- No washing of outdoor surfaces (driveways, sidewalks, decks, etc.)
- No washing of vehicles and boats
- No use of motion-activated sprinklers to deter wildlife

**Residents are required to limit indoor water use as follows:**

- Water use is restricted to drinking and food preparation purposes and for sanitation purposes (washing, cleaning and maintaining sanitary conditions)

**What else can you do?**

- Recycle water wherever you can: install water catchment systems and keep pails and buckets handy to catch extra water.
- Remind tenants, visitors and guests of the need to conserve water with shorter showers.
- Avoid potential water loss catastrophes by shutting off the water at the main when leaving home for more than one day.

Please visit https://www.crd.ca/service/drinking-water/systems for details specific to your drinking water system.

For water conservation tips and for more information, please visit www.crd.ca/water.

Sincerely,

Author

Making a difference...together

EIS 25-05

**REPORT TO ENVIRONMENTAL SERVICES COMMITTEE**
**MEETING OF WEDNESDAY, FEBRUARY 19, 2025**

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**SUBJECT** **Biosolids Literature Review Outcomes**

## ISSUE SUMMARY

To present the Environmental Services Committee with the results of the independent academic literature review on the risks and benefits of biosolids land application.

## BACKGROUND

At the August 9, 2023 Capital Regional District (CRD) Board meeting, staff were directed to *report back with a proposal that CRD Environment Service fund University of Victoria or other suitable independent academic institution to prepare a review: a) of available literature, to determine whether there are validated examples and/or peer reviewed papers assessing the risks and benefits of the application of biosolids on environmental and human health, and b) based on this and on The Precautionary Principle, whether CRD may have a legal liability for such application.*

At the October 18, 2023, Environmental Services Committee meeting, staff presented a proposal for an academic institution to conduct a literature review. At that time, the provincial government's Technical Working Group (TWG) was expected to issue a report on its review of the Organic Matter Recycling Regulation in late 2023. Given the upcoming report, the committee passed the following motion: *That the committee postpone discussion on this item until the January 2024 committee meeting.*

After delays to the release of the TWG report, the CRD Board directed staff to reinitiate the process of authorizing the literature review by the following motion at the March 13, 2024 Board meeting: *Given delays to provincial reporting on Organic Matter Recycling Regulation, and the Board's previous direction to initiate an academic analysis, that the Board direct staff to move forward with a third-party academic review of the scientific literature on the uses and impacts of biosolids*.

At the June 19, 2024 Environmental Services Committee meeting, staff presented qualification criteria for a suitable academic researcher. The Committee directed staff to 1. *Secure a tenured professor that fulfills the qualification criteria outlined in this report, to undertake the independent literature review, as per the terms of reference previously approved for this work, with a budget not to exceed $40,000*; and 2. *That staff be directed to procure a legal review in alignment with the selection criteria and scope of work presented in this report, with a budget not to exceed $25,000.*

Dr. Chris Kennedy, a Professor of Aquatic Toxicology at Simon Fraser University was selected to author the literature review. The report (Appendix A), focused on relevant literature published in 2023 and 2024; the work was completed in late 2024.

The law firm Borden Ladner and Gervais is completing the review of legal liability associated with land application of biosolids. The review is in the late stage of drafting, and staff anticipate providing the report to the ESC in March.

The objectives of the literature review were to provide up to date information on the following:

1. The human health and environmental risks of both legacy contaminants and Contaminants of Emerging Concern (COECs), with consideration of environmental conditions typical of the BC south coast.
2. Contaminant concentrations in biosolids relative to levels of exposure in general society.
3. The limitations of extrapolating lab-based toxicity testing to observations in the environment.
4. A summary of the areas of uncertainty in biosolids land application risk, including a summary of relevant techniques for evaluating and addressing uncertainty.
5. A summary of biosolids land application techniques that can reduce risk and/or address uncertainty.
6. A summary of the risks and concerns that have resulted in land application bans elsewhere.
7. An assessment of the overall risks of biosolids land application considering the intent of the Precautionary Principle (Rio Declaration, 1992 and subsequent derivations).

The literature review considered a broad suite of COECs including per and polyfluoroalkyl substances (PFAS), pharmaceuticals and personal care products and microplastics.

## IMPLICATIONS

*Environmental Implications*

The author concluded that the low concentration of COECs in CRD biosolids coupled with existing toxicity data suggests that the COECs in CRD biosolids represent a negligible to low risk to human health and the environment. However, the report also highlighted significant sources of uncertainty in this conclusion, which should be reviewed regularly as the science evolves.

An adaptive management framework is recommended to mitigate uncertainty by regularly reviewing available updates to the scientific literature. Under such a framework, decision makers keep pace with evolving science and regularly weigh the risks and benefits in biosolids management. In the context of biosolids land application, this means enhanced monitoring of COECs in biosolids, careful site selection, and the adoption of advanced treatment technologies as they become available.

*Alignment with Existing Plans & Strategies*

The conclusions of the literature review align with the CRD's proposed Long-term Biosolids Management Strategy (long-term strategy), as Tier 1 of the long-term strategy includes investigation and development of emerging technology (advanced thermal demonstration facility) for biosolids management. The long-term strategy also exercises a precautionary approach by excluding agricultural land application options. Staff have also begun testing biosolids biannually for a greater range of contaminants, including PFAS and pharmaceuticals, which can inform an adaptive management framework where staff will continue to monitor the evolving science to inform decision-making.

## CONCLUSION

A literature review commissioned by the CRD examined the human health and environmental risks and benefits of biosolids land application. Based on recent research, the review concluded

that contaminants of emerging concern (COECs) present in CRD biosolids pose a negligible to low risk to human health and the environment. However, it also identified significant sources of uncertainty in this risk assessment. To address this uncertainty, the review recommended an adaptive management framework that includes exercising caution and exploring emerging technologies. The CRD's proposed long-term strategy aligns with these conclusions by prioritizing the development of an advanced thermal demonstration facility and excluding agricultural land application from consideration. Staff will continue to monitor evolving science and have initiated enhanced monitoring of COECs in biosolids to inform future decision-making.

## RECOMMENDATION

There is no recommendation. This report is for information only.

| | |
|---|---|
| Submitted by: | Peter Kickham, M.E.T., R.P.Bio., Acting Senior Manager, Environmental Innovation & Strategy |
| Concurrence: | Luisa Jones, MBA, General Manager, Parks, Recreation & Environmental Services |
| Concurrence: | Ted Robbins, B. Sc., C. Tech., Chief Administrative Officer |

## ATTACHMENT

Appendix A: Biosolids Land Application – An Updated Review of Human Health and Environmental Risks

**APPENDIX A**

# FINAL REPORT

# Biosolids Land Application – An Updated Review of Human Health and Environmental Risks

Version 2.0

December 12, 2024

Prepared for:

Capital Regional District

Prepared by:

Biowest Environmental Research Consultants

Dr. Christopher J. Kennedy

# Table of Contents

# 1 Introduction

Municipal wastewater treatment yields two primary byproducts: treated wastewater and solid residue, or biosolids. Soil application of biosolids as an organic fertilizer is economic way to beneficially use the carbon and nutrient contents in biosolids to promote soil fertility. A substantial body of research has explored the risks and benefits associated with the land application of biosolids, including numerous studies focused on contaminants, including heavy metals, pathogens, and contaminants of emerging concern (COECs) (Hydromantis Inc., 2010; McCarthy et al., 2015; LRCS Land Resource Consulting Services, 2016; Pozzebon and Seifert, 2023; BC ENV 2024).

There are many benefits associated with the land application of biosolids. Benefits include the addition or organic matter to soil and the associated increase in soil water retention and reduction in soil erosion, as well as the addition of essential nutrients for plant growth. Biosolids can provide a natural alternative to synthetic fertilizers and can store carbon in soil and reduce greenhouse gas emissions (LRCS Land Resource Consulting Services, 2016' BC ENV, 2024). These benefits have been well documented by others and are not the focus of this review. The objective of this report is to build on previous literature reviews assessing potential human health and environmental risks through a comprehensive scan of the recent primary scientific literature and other relevant studies.

As background, the British Columbia Organic Matter Recycling Regulation (OMRR) (available at https://www.bclaws.gov.bc.ca/OMRR) provides a regulatory framework for the production, quality, and application of organic matter products, including biosolids. Its purpose is to ensure that biosolids and other organic materials are used in a way that protects human health and the environment while promoting sustainable resource use. The OMRR was developed based on a review of the available scientific literature in the late 1990s and implemented in 2002. The OMRR has undergone several regulatory reviews, with additional amendments proposed which are noted to include provisions to enable the BC Ministry of Environment and Climate Change Strategy to require sampling and analysis for COECs (BC ENV, 2024). Currently, while the OMRR includes requirements for vector (i.e., rodents, birds and insects) attraction reduction processes, and limits for pathogens and heavy metals, the regulation does not include limits for several key COECs including per- and polyfluroalkyl substances (PFAS), pharmaceuticals and personal care products (PPCPs), and microplastics. While it is acknowledged that the derivation of limits for some of the COECs is complicated by the limited available toxicological data, the importance of recommending limits based on the best available science is essential for the protection of human health and the environment.

In response to concerns over the land application of biosolids, the BC government has convened two technical working groups (TWGs), one in 2015 and a second in 2022, to review scientific information on biosolids production and waste management practices. A summary of the findings of the reports produced by the two TWGs follows.

The findings of the 2015 Technical Working Group were presented in the report titled *A literature review of risks relevant to the use of biosolids and compost from biosolids with relevance to the Nicola Valley, BC* (LRCS Land Resource Consulting Services, 2016). The review focused on risks not addressed by the existing regulatory framework for biosolids management in Canada, including the issue of COECs. Primary environmental and human health risks identified included the potential contamination of ground and surface water by COECs, seasonal risks due to groundwater recharge and runoff following biosolids application, and the potential for livestock and wildlife to be directly exposed to contaminants in biosolids via ingestion of biosolids during foraging, as well as the ingestion of plants that have accumulated the contaminants. Several knowledge gaps were identified, including:

- Insufficient empirical data to conduct detailed human health and ecological risk

assessments.

- Lack of data on the ever-expanding list of emerging contaminants of concern present in biosolids.
- Lack of research on the potential synergistic effects of contaminants present in biosolids.
- Limited field studies on biosolid impacts on ground and surface water and subsequent effects in aquatic receiving environments.
- Limited studies assessing the effects of the land application of biosolids on wildlife at all trophic levels.
- Gaps in the understanding of the ability of treatment processes to reduce toxic loading to environmental media and biota.

The report presented several recommendations, including implementing routine public reporting on biosolid composition, focusing on contaminants, including COECs, conducting quantitative risk assessments to address area-specific exposures and associated risks, revising regulations to increase setback distances from watercourses for Class B biosolids and enhanced monitoring programs, to further evaluate the effectiveness of composting and thermal treatment to reduce COECs and to develop public education and source reduction programs to reduce the introduction of contaminants into wastewater systems.

The 2022 TWG provided recommendations in a report titled Organic Matter Recycling Regulation, Technical Working Group Report 2024. The scope of the 2022 TWG was limited and focused on identifying new scientific information on biosolids and compost constituents and management, and on new information on COECS in biosolids and compost since the 2015 TWG. BC ENV (2024) provides the following key messages derived from the TWG findings:

- Each compost and biosolids product is unique to their origin. For example, wastewater treatment plants vary in their input sources (e.g., industrial vs. residential) and may use different treatment processes. Further, the land to which the biosolids (and compost) are applied have unique characteristics. As such, an OMRR application plan specific to the source and the application site should be prepared.
- The importance of source control as the quality of the biosolids (and compost) is directly related to their inputs. The 2022 TWG therefore advocated for regulations that focus on preventing contamination at the source.
- Our understanding is constantly evolving as science advances, and it is challenging to keep pace with evolving science. The 2022 TWG therefore recommended that the ministry devote resources to monitoring the scientific literature and be transparent regarding the research that is used to inform policy.
- To identify and manage COECs it was recommended that the BC ENV develop a comprehensive and transparent strategy that should include not only the presence of COECs, but associated risk. The TWG recommended that the ENV focus on the results of field-based, vs. laboratory-based, studies.
- Provision of context for clear, factual and easily understood information, including providing plain language information on the BC ENV website for why we compost and use biosolids.

Given the large body of scientific literature on the benefits and risks of biosolids that exists, as well as the work conducted by the TWGs convened by the BC ENV, this review is focused on the scientific literature and other relevant reports that have been produced over the last two years (2023 and 2024), with the objective to provide up to date information on the following:

- The human health and environmental risks of both legacy contaminants and COECs, with consideration of environmental conditions typical of the BC south coast.
- Contaminant concentrations in biosolids relative to levels of exposure in general society.
- The limitations of extrapolating lab-based toxicity testing to observations in the environment.
- A summary of the areas of uncertainty in biosolids land application risk, including a summary of relevant techniques for evaluating and addressing uncertainty.
- A summary of biosolids land application techniques that can reduce risk and/or address uncertainty.
- A summary of the risks and concerns that have resulted in land application bans elsewhere.
- An assessment of the overall risks of biosolids land application considering the intent of the Precautionary Principle (Rio Declaration, 1992 and subsequent derivations).

# 2 Contaminants Present in Biosolids and Associated Risks

Previous studies have identified the presence of numerous contaminants in biosolids. These include legacy contaminants such as heavy metals (Sloan et al., 1997; Evanylo et al., 2006; LRCS Land Resource Consulting Services, 2016; Marchuk et al., 2023) and persistent organic pollutants like polychlorinated biphenyls (PCBs), dioxins and furans (PCDD/Fs) and polycyclic aromatic hydrocarbons (PAHs) (Furr et al., 1976; Bergh and Peoples, 1977). In addition, several COECs have been identified in biosolids, including PFAS (LRCS Land Resource Consulting Services, 2016; Wang et al., 2020; Moodie et al., 2021), microplastics (Crossman et al., 2020; Mohajerani and Karabatak, 2020), PPCPs (LRCS Land Resource Consulting Services, 2016; Mohajerani and Karabatak, 2020; Kinney and Heuvel, 2020) and industrial contaminants such as plasticizers, surfactants and brominated flame retardants. The USEPA (https://www.epa.gov/biosolids/basic-information-about-biosolids) reports that more than 700 contaminants have been identified in biosolids (in at least one instance) since 1993, with the contaminants present in biosolids varying between wastewater treatment plants (WWTPs) depending on inputs to the facilities.

Regulatory agencies, including the BC ENV, have established limits for metals in biosolids, as well as for pathogens. These contaminants are routinely monitored in biosolids prior to land application. Further, as the toxicity of the legacy organic pollutants (e.g., PCBs, PCDD/F, PAHs) is well understood, many of them have existing standards or criteria in Canada and internationally. A sampling program conducted by the BC ENV (2019) indicated that the concentrations of metals, pathogens and legacy organic pollutants were less than the applicable standards/guidelines for biosolids in samples collected from two WWTPs in the province. Further, previous assessments (Smith, 2009; Eriksen et al., 2009; Jensen et al., 2012; WEAO 2001 and 2010; Higgin et al., 2010) have evaluated risks associated with these contaminants in biosolids. These previous studies have indicated a negligible to low potential for risk to human health and the environment. As the use of some of these chemicals have been phased out overtime, concentrations of these contaminants in wastewater (and biosolids) have also decreased overtime. Despite having a good understanding of the potential risks associated with legacy contaminants in biosolids on an individual level, many of the uncertainties discussed throughout this report, including the lack of understanding of the potential for additive and synergistic effects of contaminants in biosolids, also apply to legacy contaminants.

Contaminants of emerging concern are those that have been identified in recent years, primarily due to advancements in laboratory methodologies and the associated reduction in laboratory detection limits. As they are relatively new contaminants, with limited toxicological data, regulatory agencies typically have not derived environmental quality standards for COECs. Further, due to the same limitation as well as a lack of understanding of the fate of these contaminants following land application of biosolids, a limited number of risk assessments have been conducted to assess the potential for COECs in biosolids to adversely impact human health and the environment. Those available (Eriksen, 2009; Smith, 2009; Jensen et al., 2012; Higgens et al., 2010; Kennedy/Jenks, 2017) have concluded that the contaminants generally represent a low risk to human and environmental health based on the low concentrations of most of the COECs identified in biosolids. Further studies (Higgins et al., 2010; Clarke and Smith, 2011; TCEQ , 2021; Warke and McAvoy, 2024) have attempted to prioritize or rank COECs in biosolids, but have encountered similar challenges due to the paucity of toxicity data for many of the COECs.

A review of the recent (2023-2024) literature pertaining to COECs in biosolids indicates that the scientific understanding of select COECs in biosolids is evolving at a rapid rate, with many recent studies focused on PFAS, microplastics and PPCPs. Research focused on the prevalence of these and other COECs in biosolids, their fate following land application, and their toxicities is being undertaken across the globe, including in Canada. This research has highlighted the existing data gaps and uncertainties in our understanding of COECs in biosolids owing to the complex mixture of contaminants present in biosolids,

the variability in the contaminant profile observed between sources depending on inputs, and the potential for these contaminants to act additively or synergistically.

With the objective of this report to update previous studies regarding human health and ecological risks from the land application of biosolids, a summary of the recent literature and other information (e.g., regulatory decisions) pertaining to PFAS, microplastics and PPCPs follows. Recent data on the concentrations of PFAS in Canadian biosolids was identified, including from the Capital Regional District (CRD), and has been used to conduct a screening level human health and ecological risk assessment of select PFAS with available toxicological data (Section 2.1.1), as well as a comparison of exposures of PFOA and PFOS in CRD biosolids relative to typical daily exposures intakes of PFOA and PFOS (Section 2.1.2). Additionally, a summary of a 2024 study conducted to rank unregulated organic compounds (UOCs) identified in biosolids is also provided (Warke and McAvoy, 2024) (Section 2.4).

## 2.1 PFAS

Per- and polyfluorinated alkyl substances (PFAS) are a group of over 4700 aliphatic compounds containing at least one carbon-fluorine (C-F) bond. Due to environmental concerns, North America, Europe, and Australia voluntarily phased out long-chain PFAS (≥8 carbons) in the early 2000s, replacing them with shorter-chain versions. These shorter-chain PFAS are less prone to soil absorption and bioaccumulation, yet they are more environmentally mobile. Despite their reduced bioaccumulation, short-chain PFAS still persist in the environment and can pose risks to human health and the environment (Pozzebon and Siefert, 2023).

Although toxicity and effects data only exist for a small number of PFAS, the health effects of this class of chemicals are well documented. Exposure to PFAS, even at low concentrations, can have significant adverse health effects and effect multiple organs and systems, including liver, kidney and thyroid function, as well as the immune, nervous and reproductive systems (https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/water-talk-per-polyfluoroalkyl-substances-drinking-water.html). Additionally, in the environment, PFAS exposures have been linked to negative impacts on the immune and nervous systems of wildlife, as well as effects on growth, reproduction, and development (ECCC, 2023 and 2024).

In May 2023, Environment and Climate Change Canada and Health Canada published the Draft State of PFAS Report (Government of Canada, 2023), providing a qualitative assessment of the fate, sources, occurrence, and potential impacts of PFAS on the environment and human health. The report highlights the extreme stability of PFAS in the environment, often referred to as "forever chemicals". The report also emphasizes the potential for cumulative effects from co-exposure to multiple PFAS, which may lead to adverse environmental and health outcomes. In July 2024, an updated draft report (Government of Canada, 2024) was issued which incorporated new information and public comments. The updated report continues to underscore the environmental persistence and potential human health and environmental risks associated with PFAS, and reinforces the need for comprehensive management strategies to mitigate their impact. Additionally, in alignment with the Government of Canada's 2021 notice of intent to address PFAS as a class of chemicals (https://www.canada.ca/en/health-canada/services/chemical-substances/other-chemical-substances-interest/per-polyfluoroalkyl-substances.html), in August 2024, Health Canada published an objective for Canadian Drinking Water Quality for PFAS of 30 nanograms/L (ng/L) for the sum of 25 PFAS (Health Canada, 2024a).

PFAS have been identified in biosolids globally, and while concentrations of PFAS in biosolids are influenced by inputs to WWTPs, treatment methods, and sludge stabilization techniques, studies have confirmed their presence in biosolids in Canada nationwide (McCarthy, 2015; Letcher et al., 2020; Lakshminarasimman et al., 2021 and Gewurtz et al., 2024).

In response to growing concerns over PFAS in biosolids, in June 2024 the Canadian Food Inspection Agency (CFIA) recommended an interim standard for PFAS in commercial biosolids of 50 part per billion

(ppb) of perfluorooctane sulfonate (PFOS) on a dry weight basis (Canada Food Inspection Agency trade memoranda T-4-132 available at https://inspection.canada.ca/en/plant-health/fertilizers/trade-memoranda/t-4-132-commercial-biosolids), with enforcement of the standard to begin as of October 18, 2024. CFIA (2024) indicates that the available data suggest that approximately 92% of Canadian biosolids contain PFOS at concentrations below 50 ppb (ng/g). Data provided by the Capital Regional District (CRD) indicates that the average concentration of PFOS in biosolids from the region is 5.4 ppb (ng/g) and is nearly an order of magnitude below the CFIA limit (see data in Table 1).

The US EPA has prioritized research, restriction, and remediation of PFAS in the environment, including in biosolids, and has defined a PFAS Strategic Roadmap which includes a risk assessment for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) in biosolids. The assessment is currently underway and is anticipated to be completed by the end of 2024 (https://www.epa.gov/biosolids/and-polyfluoroalkyl-substances-pfas-biosolids). During the completion of the assessment, the US EPA has advised states to monitor biosolids for PFAS contamination, identify suspected industrial discharges and implement pre-treatment requirements where appropriate to reduce concentrations of PFAS in biosolids. The US EPA has indicated that if the risk assessment determines that PFOA or PFOS in biosolids may adversely affect public health or the environment, that risk managers will consider options for numerical limitations and best management practices for these compounds.

Additionally in the USA, several states have responded to concerns regarding PFAS in biosolids by enacting rules that limit the concentration of PFAS in biosolids, with Maine (in 2022) and Connecticut (in 2024) implementing bans on the use or sale of PFAS-containing biosolids.

Key findings of recent scientific studies that have evaluated PFAS in biosolids include the following:

1. As the quality of biosolids is dependent on the contaminants present in raw wastewater, it is important to consider upstream controls and monitoring to minimize the input of PFAS-containing wastes into wastewater treatment systems (BC ENV, 2024; Tansel et al., 2024; Gewurtz et al., 2024). In their review of PFAS concentrations in influent, effluent and biosolids samples collected from 27 wastewater treatment plants (WWTPs) across Canada, Gewurtz et al. (2024) identified that PFAS concentrations are the highest in samples from plants that receive landfill leachate.

2. PFAS concentrations in biosolids in the US have not decreased despite the phasing out of the longer chain PFAS in the early 2000s (Pozzebon and Siefert, 2023; Borthakur et al., 2022; Gewurtz et al., 2024). In a study of biosolids sourced from Canadian WWTPs, Gewurtz et al. (2024) reported that except PFOS, the concentrations of long-chain PFAS have generally decreased overtime; however, they remain at measurable concentrations. Further, Gewurtz et al. (2024) found that the replacement of long-chained PFAS with short-chain PFAS has resulted in concentrations of short-chain PFCAs in wastewater influent and effluent increasing over the period of 2009 and 2021, with the short-chain PFAS less frequently detected in biosolids.

3. Recent evidence suggests that PFAS are transformed during the wastewater treatment process. Studies (Helmer et al., 2022; Tansel et al., 2024; Behnami et al., 2024) indicate that some PFAS precursors transform during treatments like anaerobic digestion, potentially altering contaminant profiles and increasing certain PFAS concentrations post-treatment. PFAS not degraded during aerobic and anaerobic digestion will instead become concentrated during treatment (Lakshminarasimman et al., 2021; Gewurtz et al., 2024; Tansel et al., 2024). Carbon chain length significantly affects PFAS partitioning, with longer chain PFAS adsorbed to sludge, and shorter chain PFAS partitioning to the wastewater (Behnami et al., 2024; Gewurtz et al., 2024).

### 2.1.1 Screening Level Human Health and Ecological Risk Assessment for PFAS in Biosolids

Data collected from 29 Canadian wastewater treatment plants, as summarized in Zhou et al. (2024) from

Letcher et al. (2020) and Lakshminarasimman et al. (2021) indicate that PFOS was the most prevalent PFAS (<0.49–50.4 ng/g dw) in collected biosolids, followed by PFDA (0.11–53 ng/g dw) and PFOA (<0.07–23 ng/g dw) (Zhou et al., 2024; Letcher et al., 2020; Lakshminarasimman et al., 2021).

Gewurtz et al. (2024) summarized data for 42 PFAS in samples collected in 2021 from 27 WWTP across Canada, and reviewed trends in concentrations overtime. The 2021 results were consistent with the previous studies, indicating PFOS is the most prevalent, with concentrations ranging from <0.32 to 96 ng/g dw.

Gerwurtz et al. (2024) reported that the PFAS with the highest concentrations in Canadian biosolids (2018 to 2021) were PFOS, PFBA and the short-chain precursor 5:3 FTCA. Long-chain PFCAs, PFOS, FOSA, the long-chain intermediate transformation products *N*-methylperfluorooctanesulfonamidoacetic acid (MeFOSAA) and N-ethylperfluorooctanesulfonamidoacetic acid (EtFOSAA), PFHxA, and 5:3 FTCA were frequently (in >60 % of the samples) over this period, with the long-chain PFAS likely detected more frequently due to their greater tendency to sorb to solids (Gewurtz et al., 2024; Helmer et al., 2022).

The below table summarizes the concentrations of select PFAS identified in Canadian biosolids (from Letcher et al., 2020; Lakshminarasimman et al., 2021 and Gewurtz et al., 2024). In addition, average PFAS concentrations measured in CRD biosolids (n=3) have been provided for comparative purposes.

| **PFBA (C4)** | **PFPeA (C5)** | **PFHxA (C6)** | **PFHpA (C7)** | **PFOA (C8)** | **PFNA (C9)** | **PFDA (C10)** | **PFUnA (C11)** | **PFDoA (C12)** | **PFBS (C4)** | **PFHxS (C6)** | **PFOS (C8)** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Letcher et al., 2020 | | | | | | | | | | | |
| <0.48-3.0 | <0.28-6.0 | 0.17-4.65 | <0.08-1.53 | <0.07-11.5 | 0.09-4.72 | 0.11-23.4 | 0.19-7.49 | 0.19-6.09 | <0.14-3.48 | <0.06-2.43 | 0.49-**50.4** |
| Lakshminarasimman et al., 2021 | | | | | | | | | | | |
| <2.06 | <2.06-14 | <2.06-8.3 | <2.06-5.2 | <2.06-23 | <2.06-20 | <2.06-53 | <2.06-7 | <2.06-10 | <4.11-11 | <**4.11** | <4.11-**27** |
| Gewurtz et al., 2024 (2021 data) | | | | | | | | | | | |
| <1.3-200 | <0.64-12 | <0.32-7.9 | <0.32-2.6 | <0.32-42 | <0.31-8.8 | <0.31-27 | <0.31-3.5 | <0.31-7.6 | <0.32-7.5 | <0.32-**5.4** | <0.32-**96** |
| Capital Regional District Biosolids | | | | | | | | | | | |
| <1.50 | 1.28 | 2.02 | 0.96 | 1.11 | 0.37 | 1.80 | 0.738 | 1.34 | 0.474 | 2.2 | 5.35 |
| **Health Canada SSVs (HC, 2019), BC CSR Standards and CCME Soil Quality Guidelines, Residential/Agricultural Land Use, Human Health Protection** | | | | | | | | | | | |
| 114,000[a] | 800[a] | 800[a] | 800[a] | 700[a] | 800[a] | NA | NA | NA | 61,000[a]<br>300,000[b] | 2,300[a] | 2,100[a]<br>1000[b]<br>2,000[c] |
| **Grippo et al., (2021), BC CSR Standards and CCME Soil Quality Guidelines, Residential/Agricultural Land Use, Ecological Protection** | | | | | | | | | | | |
| 2,980[d] | NA | 6,200[d] | NA | 3,840[d] | 24.2[d] | 67.7[d] | NA | NA | 817[d] | 2.8[d] | 70,000[b]<br>10[c]<br>8.7[d] |

**Table 1:** Concentrations of PFAS reported in biosolids from WWTPs in Canada (in ng/g) (from Letcher et al., 2020; Lakshminarasimman et al., 2021 and Gewurtz et al., 2024) compared to Health Canada SSVs (2019) and BC CSR soil standards for residential and agricultural land use. NA: Not Applicable, [a] Health Canada SSV, [b] BC CSR soil standard, [c] CCME soil quality guideline, [d] Grippo et al. (2021) ESV, **Bold** – concentration exceeds ecological protection guidelines/standards.

Following the land application of biosolids, there is the potential for human and ecological receptors to be exposed to the biosolids, and thus the contaminants, including PFAS, present in the biosolids. Depending on the land application technique used (e.g., injection, incorporation into surface soils, amendments), the biosolids and COECs may be 'diluted'. For this screening exercise, it has been conservatively assumed that there is the potential for human and ecological receptors to be exposed directly to the PFAS concentrations measured in Canadian biosolids. In practice, biosolids are mixed with other materials prior to land application; for example the CRD uses a mixing ratio of 18:1 (5 parts sand, 13 parts wood and 1 part biosolids, or approximately 6% biosolids by volume).

Per standard risk assessment methodologies, including those recommended in guidance from the BC ENV

(2023a), Health Canada (2024b) and the CCME (2020), the concentrations of PFAS presented in Table 1 have been compared to guidelines/standards derived to be protective of human health and ecological direct contact exposures, including for human health, incidental ingestion of soil, and for ecological receptors, direct contact, and for wildlife, soil and food ingestion.

Soil guidelines/standards derived to be protective of human health are available for select PFAS from Health Canada (2019), the BC Contaminated Sites Regulation (CSR) (BC, 2023b) and the CCME (2021). Health Canada recommends human health protective soil screening values (SSVs) for 11 select PFAS including PFOS, PFOA, PFBA, PFBS, PFHxS, PFPeA, PFHxA, PFHpA, PFNA and two fluorotelomer sulfonates (6:2 FTS and 8:2 FTS). The SSVs also consider the potential for PFOS and PFOA to act additively, with an SSV of < 1 for the sum of the ratio of the [PFOS]/$SSV_{PFOS}$ and the [PFOA]/$SSV_{PFOA}$. Using the maximum concentration of PFOS and PFOA reported in Table 1 (PFOS = 96 ng/g and PFOA = 42 ng/g), the ratio is < 1 and thus meets the SSV. In addition, the BC CSR provides human health protective soil standards for PFOS and PFBS, and the CCME provides a human health soil quality guideline for PFOS. A comparison of the maximum concentrations of the PFAS measured in Canadian biosolids to the Health Canada SSVs, as well as the BC CSR and CCME human health protective soil standards (See Table 1) indicates that the measured concentrations are well below the SSVs, standards and guidelines, with the average concentrations of PFAS measured in CRD biosolids (n=3) well below the Canadian maximum concentrations and all available SSVs, standards and guidelines. As noted, the direct comparison of measured concentrations in biosolids to the standards and guidelines is highly conservative given the mixing that occurs prior to land application. For example, applying the 18:1 mixing ratio used by the CRD, the concentrations of PFAS in Table 1 would be divided by a factor of 18 to provide a resulting exposure concentration. Applying this ratio, the maximum exposure concentration of PFOS (the PFAS measured at the highest concentration) in CRD biosolids would be 0.3 ng/g compared to the lowest standard for human health protection of 1000 ng/g and the lowest standard for ecological health protection of 8.7 ng/g (protective of food chain exposures).

Soil guidelines and standards in BC and available from the CCME for the protection of the environment, are limited to PFOS only. On behalf of the US Department of Energy, Grippo et al. (2021) developed ecological screening values (ESVs) to support screening-level ecological risk assessments at U.S. Air Force (Air Force), Navy, Army, and other U.S. Department of Defense (DOD) sites PFAS have been detected in soils and surface waters. A comparison of the maximum concentrations of PFAS measured in Canadian biosolids to the ESVs and CSR/CCME guidelines/standards for PFOS is provided in Table 1. As presented, concentrations of select PFAS, including PFOS and PFHxS exceed the guidelines for environmental protection, and specifically the CCME soil quality guideline and the Grippo et al. (2021) EVS for soil and food ingestion. Concerning the Grippo et al. (2021) ESV that is exceeded, it is specific to soil and food ingestion of mammalian ground insectivores. Further, concentrations of PFOS exceed the CCME guidelines protective of soil leaching to groundwater for the protection of potable groundwater (10 ng/g) and aquatic life (10 ng/g).

The below discussion considers screening quotients (SQs) for select PFAS; SQs were calculated as the [PFAS] / guideline (or standard or screening value).

The above screening exercise indicates that the concentrations of individual PFAS in both Canadian biosolids, including those from the CRD, for which there is available toxicity data to derive soil guidelines are less than the guidelines derived to be protective of human health (maximum SQ of 0.06 for PFOA), and thus, exposure to these individual PFAS in biosolids, as well as combined exposures to PFOS and PFOA, are not anticipated be associated with risks to human health. As noted the comparison of measured concentrations is highly conservative as amendment would occur prior to application.

The comparison of the PFAS concentrations measured in Canadian biosolids, as reported by Letcher et al., 2020; Lakshminarasimman et al., 2021 and Gewurtz et al., 2024 exceed ecological health guidelines for select individual PFAS including PFOS (maximum SQ =11) and PFHxS (maximum SQ = 1.9). On this basis, there is the potential for the highest concentrations of these PFAS measured in Canadian biosolids

to pose a risk to ecological receptors and specifically wildlife exposed via soil and food ingestion. Further, as the maximum PFOS concentrations exceed of soil guidelines protective of drinking water and aquatic life (maximum screening quotient of 9.6), there are potential for risks to both human health and the environment associated with soil leaching to groundwater. The average concentrations of PFAS in the CRD biosolids were all below the available SSVs, ESVs, as well as the CCME guideline and CSR standard for PFOS (i.e., all SQs are well below 1).

The findings of the above screening exercise must be interpreted in the context that guidelines are only available for a small number of the 4700 PFAS known to exist, and that the individual guidelines may not consider the combined toxicity of the PFAS mixture present in biosolids. Further, as PFAS are persistent and accumulate in soils, following the repeated application of biosolids to land, the concentrations of PFAS have the potential to increase overtime.

### 2.1.2 Estimated Daily Intakes of PFOS and PFOA

As PFAS are ubiquitous in the environment, humans are exposed daily to PFAS from a variety of sources (i.e., consumer products, diet, air, water and soil). Limited data exists on Canadian's exposure to PFAS; however, biomonitoring data indicates that PFAS are present at measurable concentrations in the blood of most Canadians (Government of Canada, 2024).

Using summary statistics from secondary sources for concentrations of PFOA and PFOS in indoor and outdoor air, water and dust in the US, as well as European dietary intake estimates to estimate exposures from food, East et al. (2023) estimated exposure to adults and children over the period of 2011 to 2017. Daily intake estimates for adults were estimated to be 40 ng/day PFOA and 40 ng/day PFOS, and rates for young children (toddlers) were estimated to be 14 ng/day PFOA and 17 ng/day PFOS. A comparison of these estimates using a first-order pharmacokinetic model indicated that the results were aligned with serum concentration measurements from the National Health and Nutrition Examination Survey over the same time period (East et al., 2023), providing evidence that the modeled daily intakes are reasonable. It is noted that although not discussed by East et al. (2023), it is assumed that exposures to PFAS in biosolids would be accounted for in the measured serum contributions in areas where biosolids are applied and represent a potential source.

As measured levels of PFAS in blood in Canada and the US are reportedly similar (Public Health Ontario, 2023), the results of East et al. (2023) have been considered here in an assessment of potential PFAS exposures for Canadians, and a comparison to potential exposures to PFOS and PFOA measured in Canadian biosolids.

Using Health Canada (2024b) exposure equations for the direct soil exposure pathways (i.e., incidental ingestion, dermal contact and inhalation of soil particulate) and receptor characteristics for an adult and a toddler, with the average PFOS and PFOA concentrations in CRD biosolids from Table 1 used as exposure point concentrations, exposure intakes associated with exposures to PFOA and PFOS in CRD biosolids were estimated. A summary of the results summed with the estimates from East et al. (2023) and compared to the Health Canada tolerable daily intakes (TDIs) for PFOA and PFOS are presented in Table 2.

| PFAS | Background EDI (East et al., 2023) (ng/day) | | EDI from CRD biosolids (ng/day) | | Total Exposure Estimate (ng/day) | | Total Exposure Estimate (ng/kg-bw/day) | | Health Canada Tolerable Daily Intakes (ng/kg-bw-day) |
|---|---|---|---|---|---|---|---|---|---|
| | Toddler | Adult | Toddler | Adult | Toddler | Adult | Toddler | Adult | |
| PFOA | 14 | 40 | 0.09 | 0.03 | 14.09 | 40.03 | 0.85 | 0.57 | 60 |
| PFOS | 17 | 40 | 0.44 | 0.14 | 17.44 | 40.14 | 1.06 | 0.57 | 21 |

Table 2. Estimated daily intakes for PFOA and PFOS (from East et al., 2023) and from exposures to PFOA and PFOS in biosolids using the maximum PFOA and PFOS concentrations in Table 1. Total exposure estimates are the sum of the EDIs from East et al., 2023 and the EDIs from biosolids.

The total exposure estimates (the sum of the estimated daily intakes from East et al., 2023 and those from CRD biosolids) in ng/kg-bw-day are well below the Health Canada (2021) tolerable daily intakes (TDIs),

suggesting that exposures for PFOA and PFOS in biosolids in the CRD, combined with background exposures, are unlikely to represent a health risk. The estimated exposures from the CRD biosolids are conservative as they are based on concentrations measured in the CRD biosolids, which as noted, would be reduced by a factor of 18 following the amendment of the biosolids prior to application.

As with the results of the screening assessment presented in Section 2.1.1, the above evaluation does not consider exposures to the mixture of PFAS in biosolids, which has the potential to act additively with one another as well as with other contaminants in biosolids, and thus is likely an underestimate of total risks associated with PFAS exposures. Despite this, the potential contribution of exposures to PFOS and PFOA from biosolids from the CRD to overall exposures of these PFAS is low, and when amendment of the biosolids is considered, is likely to be negligible.

## 2.2 Microplastics

Microplastics are pieces of plastic less than five millimeters in diameter and while some microplastics are intentionally manufactured (e.g., microbeads in beauty products), they generally result from the degradation of plastic debris. Microplastics have been identified to be present in biosolids around the globe, including in Canada (Crossman et al., 2020; Gies et al., 2018; Lavoy and Crossman, 2021; Savarajah et al.; 2023). Further, biosolids have been identified as an important pathway for microplastics to enter the environment (Crossman et al., 2020) and agricultural lands where biosolids have been applied are one of the largest reservoirs of microplastics (Pozzebon and Siefert, 2023). Due to their emerging nature, there are no regulations pertaining to microplastics in biosolids (or from other sources) in Canada.

While the studies assessing the prevalence of microplastic in biosolids in Canada were previously limited, Sivarajah et al., (2023) quantified microplastics in biosolids from 22 WWTPs located in nine Canadian provinces. Microplastics were identified in all samples, at concentrations ranging from 228 to 1353 particles per gram dry weight (dw) (median = 636 particles per gram dw). These concentrations are orders of magnitude greater than those reported from previous investigations of microplastics in biosolids in 4 other WWTP in Canada, as well as in other countries (Sivarajah et al., 2023). Importantly, despite the large variation in the concentrations of microplastics observed across the samples from the 22 WWTPs, the investigators did not find a significant difference in the concentrations based on region, the type of WWTP or the sludge treatment type. The results for the Pacific region (n=4) were the highest, with a median concentration of 914 particles per gram dw.

The effects of microplastics on humans and the environment remain largely uninvestigated. In recognition of this, in January 2024 the Government of Canada announced funding of $2.1 million over four years to three academic institutions for the research of microplastics and their potential to impact human health (https://www.canada.ca/en/health-canada/news/2024/01/government-of-canada-funding-research-on-the-health-risks-of-microplastics.html). While there is limited data on health effects, the inhalation of microplastics has been identified as a concern, with the inhalation of microplastics associated with oxidative stress in lung tissues and general inflammation responses in airways (Pozzebon and Siefert, 2023).

Microplastics are highly persistent, resistant to degradation and can accumulate in soils (Xu et al., 2019; Pozzebon and Siefert, 2023). This is of specific concern in areas where there is repeated land application of biosolids. Contrary to the benefits of the land application of biosolids, microplastics from biosolids and their accumulation in soil compromises soil structure and affects nutrient availability, water retention and aeration (Xu et al., 2019). They can also be toxic to soil organisms and thus reduce the beneficial effects these organisms have on soil fertility and structure (Xu et al., 2019). Evidence also suggests the potential for the chemical constituents in mircroplastics to leach into soil and groundwater, and for plants to absorb microplastic particles, serving as a pathway for microplastics to enter the food chain (Xu et al., 2019; Pozzebon and Siefert, 2023).

A recent study (Wang and Good, 2024) identified that microplastics in biosolids can act as vectors for the long-range transport of PFAS, including atmospheric deposition in aquatic systems. The authors indicate

that microplastics enriched with PFAS are an important concern due to the ubiquitous nature of both microplastics and PFAS globally, but also their co-occurrence in biosolids and the potential for combined toxicity (Wang and Good, 2024).

The presence of microplastics in biosolids, and the early evidence of effects to both human health and the environment, highlights the need for further research and the implementation of measures to prevent the further introduction of microplastics to the environment. Recent policies limiting single use plastics, along with existing regulations banning use of polymeric microbeads in cosmetics and personal care products, are likely to have resulted in a reduction in microplastics entering WWTPs. Despite this, the laundry of synthetic clothing will continue to contribute to the load of microplastics in biosolids (Crossman et al., 2020); however, the use of microfibre filters in washing machines would reduce microplastics sourced from laundering clothing.

## 2.3 Pharmaceuticals and personal care products

Pharmaceutical and personal care products (PPCPs) include prescription and over the counter medications and supplements, as well as pharmaceuticals used in agriculture to promote growth and health of livestock (Pozzebon and Siefert, 2023; Hydromantis Inc., 2010; McCarthy, 2015). PPCPs also include other products used for health and cosmetic purposes (e.g,, fragrances). Sub-categories of PPCPs include antibiotics, antimicrobials, steroidal chemicals, fragrances, alkylphenolics, and other PPCPs such as analgesics, antidepressants, antifugals, anti-inflammatories and diuretics, to name a few.

Traditional WWTPs are generally ineffective at removing PPCPs, which often persist through the treatment process. The land application of biosolids has been identified as the primary way that PPCPs enter the environment (Brown et al., 2019; Kinney and Vanden Heuvel, 2020; Pozzebon and Siefert, 2023).

Data indicate that most PPCPs degrade within months after being introduced to the environment; however, some studies indicate that select PPCPs can persist (Garcia-Santiago et al., 2016; McCarthy, 2015; Kinney and Vanden Heuvel, 2020). Further, many PPCPs are considered "pseudo-persistent" as they are continuously introduced to the environment (Pozzebon and Siefert, 2023). The potential for PPCPs to accumulate in soil and transfer to soil invertebrates and plants, as well as to leach to groundwater has been demonstrated (Garcia-Santiago, 2016), although limited data exists on the ecotoxicity of PPCPs, especially in terrestrial systems (Pozzebon and Siefert, 2023). Given the low doses of many PPCPs required to elicit a response in humans, PPCPs are likely to cause a variety of effects on biota if they accumulate in the environment. PPCPs contain endocrine disruptors which have the potential to interfere with human and animal hormonal systems even at low concentrations. Reproductive failure associated with exposure to endocrine disrupting contaminants has been well documented in aquatic systems (Pozzebon and Siefert, 2023).

Further, some antibiotics persist in the environment after land application, affecting soil microbial communities and potentially altering ecosystem functions. They can promote the growth of antibiotic-resistant bacteria, and may disrupt the balance of beneficial soil microorganisms, affecting nutrient cycling and soil health (Black et al., 2019; Pozzebon and Siefert, 2023). Antibiotic resistance has been defined by the World Health Organization as a global threat to health and food security. The promotion of antibiotic-resistant bacteria by PPCPs will contribute to this threat and is specifically concerning given the co-occurrence of antibiotic-resistant bacteria and pathogens in biosolids (Pozzebon and Siefert, 2023). Hung et al. (2022) found that biosolid samples contained significantly higher concentrations of antibiotic-resistant genes when compared to raw agricultural soils, as well as the potential for the airborne spread of the genes. The authors emphasized the importance of their findings to the global concerns regarding antibiotic resistance.

Previous studies (Garcia-Santiago et al., 2016; Kennedy/Jenks, 2017) have conducted preliminary evaluations of the potential effects and risks associated with PPCPs. Additionally, McCarthy (2015) summarized the results of previous risk assessments including those for PPCPs. Overall, the assessments

suggest that the potential for human health risks from exposure to individual PPCPs in biosolids is likely low, however, there are limitations and uncertainties in the previous assessments, including the consideration of a small number of PPCPs and the lack of accounting for potential additive and synergistic effects.

Garcia-Santiago et al. (2016) conducted a screening level risk assessment to assess the potential for human exposure to PPCPs measured in biosolids to exceed one therapeutic dose. The study focused on PPCPs shown to persist in WWTPs including carbamazepine, fluoxetine, triclosan, miconazole and ciprofloxacin, and Naproxen. Total exposures via the direct soil exposure pathways, as well dietary exposures, were evaluated. The results of the assessment indicated total hazard quotients (HQs) were less than an HQ of 1.0 (i.e., total exposures were less than one therapeutic dose), with most PCPPs having HQ values of less than 0.1, except for triclosan which has been shown to bioaccumulate, which had an average HQ of 0.28 and a 95% UCLM HQ of 0.95, indicating a potential risk to human health. The mean triclosan concentration reported by Garcia-Santiago et al. (2016) was 5,890 (SD = 3,870) ng/g, while the concentration of triclosan measured in CRD biosolids (n=1) is 1,870 ng/g.

Kennedy/Jenks Consultants (Kennedy/Jenks, 2017) completed a biosolids risk assessment on behalf of Metro Vancouver. A quantitative human health risk assessment was conducted for a small group of COECs detected in biosolids including over the counter pain medications (analgesics) and non-steroidal anti-inflammatory drugs, antidepressants, antibiotics, antimicrobials, plasticizers, and flame retardants. The results of the risk assessment suggested that the concentrations of the COECs in biosolids from the Metro Vancouver region were unlikely to result in adverse health effects to exposed individuals, including children. The assessment further demonstrated that it would take a minimum of a decade and up to one billion years of exposures to the COECs in biosolids to equal a single therapeutic dose of the PPCPs.

The number of PPCPs identified in biosolids continues to grow and there is a general lack of data on the effects of these chemicals in the environment. Given that many of them act via the same mode of action (e.g., endocrine disruptors) and/or belong to the same classes (e.g., antibiotics, SSRIs) it is essential that future assessments consider the combined effect of the mixture of these PPCPs on human health and the environment.

## 2.4 Prioritization of Unregulated Organic Chemicals in Biosolids (Warke and McAvoy, 2024)

While acknowledging the benefits of the land application of biosolids, Warke and McAvoy (2024) conducted a literature review to compile a database of all reported unregulated organic chemicals (UOCs) present in biosolids. Where data gaps were identified, predictive modelling and an extensive literature search were conducted to determine values for persistence, mobility, bioaccumulation, and toxicity. The prioritization process used these characteristics to rank the UOCs according to their potential impact on human health.

Of 906 chemicals identified in biosolids, 124 were categorized as either high or low priority. Among these, 13 chemicals were classified as carcinogenic, and 22 as endocrine disruptors. Notable examples of endocrine-disrupting chemicals included N-nitrosodimethylamine, cashmeran, nonylphenol, bisphenol A, and several PBDEs. Potential carcinogens identified included 1,2-dichloropropane, 1,4-dioxane, di(2-ethylhexyl)-phthalate, and trichloroethylene.

The priority UOCs were further ranked using scoring based on combinations of mobility, persistence, bioaccumulation, and toxicity. This analysis added eight additional compounds to the high-priority list, resulting in a total of 46 high-priority compounds, with the remaining 78 classified as low priority. The high priority UOCs included several carcinogens (e.g., N-nitrosodiethylamine), endocrine disruptors (e.g., BDE 99, estrone), PPCPs (e.g., fluoxetine, bisphenol-A, carbamazepine, triclosan) and industrial solvents (e.g., trichloroethylene)

Comparison of the Warke and McAvoy (2024) results to those from other studies ranking UOCs in biosolids identified similarities. Of the 46 high-priority UOCs identified by Warke and McAvoy (2024), 38 were also present in other priority lists, including 20 in from Higgins et al. (2010), 14 in a study conducted on behalf of Scottish EPA (WCA, 2019), and 12 in a study conducted by the Texas Commission on Environmental Quality (TCEQ, 2021).

Of the high-priority UOCs identified, several including: bisphenol-A, triclosan, nonylphenol, N-nitrosodimethylamine, 4-chloraniline, triphenyltin (TPhT), and several polybrominated diphenyl ethers (PBDEs) such as BDE 209, BDE 47, and BDE 99, have been associated with effects ranging from endocrine disruption to carcinogenic effects (Warke and McAvoy, 2024). Additionally, triclosan, is known to disrupt thyroid function, may cause reproductive and developmental toxicity and N- nitrosodimethylamine has been linked to neurological, gastrointestinal, and developmental disorders (Warke and McAvoy, 2024).

As noted, previous risk assessments for biosolids-amended soil indicate that most UOCs are below threshold levels for human exposure pathways (HQ < 1). However, Warke and McAvoy (2024) emphasized that preliminary data for pathways involving soil organisms and aquatic systems suggest the potential for HQ values exceeding 1 for certain UOCs including triclocarban, ciprofloxacin, and azithromycin, and that further study is needed for these pathways. Further, while some compounds like caffeine pose minimal risks to humans, they can significantly impact aquatic and soil organisms and antibiotics like ciprofloxacin and azithromycin, as well as fluoroquinolones, have been identified as photosynthetic inhibitors in plants and present potential risks to soil and aquatic ecosystems (Warke and McAvoy, 2024).

While the available data generally support that the measured concentrations of PCPPs in biosolids are low and for the most part do not represent a risk to human health and the environment, the results of Warke and McAvoy (2024) further highlight the number of contaminants in biosolids, and gaps where further research is required to understand potential risks to human health and the environment.

# 3 Fate and Transport of Contaminants in Biosolids and Considerations of Conditions Typical of the BC South Coast

In sensitive coastal environments, like those present in southern BC, the fate and transport of contaminants, is complex. As discussed throughout this report, land application of biosolids can result in the introduction of a range of contaminants, which may disperse in the environment through soil leaching, erosion, and runoff. This issue is exacerbated by heavy precipitation which can enhance the mobilization of contaminants. Precipitation infiltrates the soil and can leach soluble contaminants into groundwater. In agricultural and rural areas, where biosolids are most likely to be applied, the use of groundwater as a source of drinking water, irrigation water or livestock water, is more likely. Thus, the contamination of groundwater has the potential to result in human health exposures via potable water, as well as livestock and crop exposure. Further, groundwater impacted with contaminants from biosolids can migrate to nearby aquatic systems and result in effects to aquatic ecosystems, as well as entry into the human food chain via seafood consumption.

Heavy rainfall or snowmelt can also create surface runoff, which has the potential to mobilize contaminants from application areas, resulting in impacts to adjacent lands, or migration to nearby water bodies. For example, Crossman et al. (2020) suggested that heavy rainfall may result in the mobilization of microplastics from agricultural soils. The risk of contaminant mobilization via surface runoff is especially high prior to the incorporation of applied biosolids into the soil matrix (LRCS Land Resource Consulting Services, 2016).

Further, prolonged or intense precipitation can saturate soils, resulting in decreased soil adsorption of contaminants and subsequent leaching, as well as soil erosion. Eroded soils carrying adsorbed contaminants may be redistributed across the landscape onto adjacent lands or to nearby waterbodies. Additionally, natural processes such as freeze-thaw and drying cycles can release fine particles from biosolids, facilitating the movement of contaminants into subsurface soils and groundwater.

Tansel et al. (2024) discussed that PFAS persistence and mobility are dependent on soil interactions and precipitation events. Leaching, which is influenced by soil type and water infiltration rates, with higher infiltration rates in areas with high precipitation levels, facilitates PFAS migration to groundwater and surface water. PFAS compounds with long fluoroalkyl chains tend to bind more strongly to solid phases, while shorter-chain PFAS are soluble and prone to leaching and transport. Consistent with other studies (Blake and Fenton, 2020; Drew et al., 2021), Tansel et al. (2024) identified the potential for plant uptake of PFAS from biosolid-amended soils, raising concerns about bioaccumulation in food chains and ecosystems.

PCPPs in biosolids can similarly migrate, with pharmaceuticals showing potential to leach into groundwater (Santiago et al., 2016; Kinney et al., 2006). Gottschall et al., (2012) detected pharmaceuticals and personal care products (PPCPs) in groundwater following biosolids land application. While many PPCPs dissipate within a few months, others, particularly those embedded in biosolid aggregates, can persist for over a year (Kinney and Heuvel, 2020).

Some COECs, due to their persistence and bioaccumulation potential, can be transported long distances. For example, microplastics in biosolids exhibit hydrophobic characteristics, allowing them to adsorb other contaminants. These particles may then be subject to long-range transport (Carbery et al., 2018). Studies (Wang et al., 2024, Strynar et al., 2011) indicate that long-chain PFAS can attach to microplastics or dust and become airborne. These findings raise concerns regarding the multiple contaminant types present in

biosolids and their influence not only on the fate and transport of such contaminants, but also on their combined toxicities.

While the science on the fate and transport of COECs in biosolids in advancing, further research is required to fully understand the behaviour of these contaminants in the environment. Field studies in BC that evaluate seasonal influences, such a precipitation levels, on the environmental fate and transport of COECs in biosolids would provide valuable insight, including how the co-occurrence of numerous contaminants impact migration patterns and ultimately exposure pathways for human and ecological receptors.

# 4 Techniques to Reduce Risks in Biosolids Land Application

Numerous studies have emphasized the importance of government oversight and regulation to limit the risks associated with the land application of biosolids; however, as discussed, available regulations are limited due to the paucity of toxicity data for COECs. This gap, and the uncertainties discussed in Section 6, highlight the critical need for further research, source control to limit the entry of COECs into WWTPs, the development of treatment technologies that degrade COECs in biosolids, and standardized requirements for monitoring COECs in biosolids.

## 4.1 Recent Research on Treatment Technologies

Recognizing the critical problem that contaminants, and specifically COECs, in biosolids present, recent research has focused on treatment technologies that remove COECs. As noted, conventional WWTPs were not designed to remove COECs and thus, these contaminants will continue to persist in inputs to WWTPs.

Much recent research has been focused on technologies that destroy PFAS. An PFAS Innovative Treatment Team was formed by the USEPA is 2020 to investigate and develop innovative tools and methods to break the carbon fluorine (C-F) bonds in PFAS-containing waste. Four emerging technologies were identified by the team with a technology's suitability dependent on waste characteristics, processing requirements, and potential byproducts, as well as considerations for energy consumption, costs, and system mobility (Berg et al., 2022). Berg et al. (2022) also indicated that additional pretreatment and post-treatment steps may be necessary to enhance effectiveness and manage byproducts, such as volatile PFAS emissions.

The four emerging technologies were summarized by Berg et al. (2022) and include:

- Mechanochemical destruction (MCD), which has been shown to result in over 99% PFAS destruction in laboratory settings. The authors note that this technology requires further study for commercial-scale application.
- Electrochemical oxidation (EO), which uses electrical currents to break C-F bonds in PFAS, has shown successful bench and pilot-scale results, but faces challenges in scaling up.
- Supercritical water oxidation (SCWO) treats waste at high temperatures and pressures, producing heat that can sustain the process, but requires managing acidic byproducts and salt precipitation.
- Pyrolysis and gasification decompose materials at high temperatures, potentially destroying PFAS, and produce useful byproducts like char and syngas. Further research on this technology was noted to be required.

Research briefs on these technologies are available on the PITT's website, providing detailed information on benefits and areas needing further research available at https://www.epa.gov/chemical-research/pfas-innovative-treatment-team-pitt. Each of these technologies were noted by US EPA to be under evaluation, with further pilot-testing and reporting of the results planned for 2021; however, no further updates on these technologies were identified on the above webpage. While showing promise, the technologies are not yet commercially available.

Keller et al. (2024) pyrolyzed biosolid samples from a WWTP in Southern California at temperatures ranging from 400 to 700 °C for two hours. The study evaluated contaminant removal, with most contaminants being eliminated entirely and only minimal residuals detected. Notably, no PFAS were detectable at the lowest temperature tested (400 °C), and overall removal of PPCPs exceeded 99.9%. Microplastic removal ranged from 91 to 97% depending on conditions. Additionally, the resulting biochar was rich in iron and phosphorus,

making it a valuable fertilizer additive. The authors of the study indicated that a techno-economic analysis showed that pyrolysis could lead to significant cost savings, with revenue from biochar sales having the potential to offset the capital and operational costs of the drying and pyrolysis systems.

Vo et al. (2024) assessed treatment technologies for microplastics and organic contaminants in biosolids. Their multi-criteria analysis identified anaerobic digestion as the most established and practical approach, indicating that while thermal treatment shows potential, the application requires further advancements in infrastructure, regulatory frameworks, and public acceptance to become widely viable.

Recent studies have explored advanced oxidation treatment methods which are reportedly effective at degrading COECs including PPCPs and PFAS. Booton et al. (2024) indicate that chemical oxidation offers a promising alternative and eliminates persistent contaminants. Compared to biological systems, it is potentially simpler to operate and maintain, while requiring less space for efficient treatment. Key advantages of chemical oxidation are reported by the authors to include its ability to address COECs, its rapid start-up and shutdown capabilities, and its ability to avoid common challenges in biological treatment, such as toxic load management, biomass washout, sludge settling issues, and the complexities of sludge handling and disposal.

The recent research illustrates the potential for available technologies to destroy COECs, demonstrating that with further testing and implementation, that the risks association with the land application of biosolids could be greatly reduced.

## 4.2 Application Techniques and Site-Specific Application Considerations

Specific application techniques, such as injection, surface incorporation and amendment/mixing of biosolids to produce a biosolids growing media, have been demonstrated to reduce risks associated with biosolids land application. Injecting biosolids below the soil surface reduces bioaerosol dispersion, wind and water erosion, and prevents exposure to contaminants by reducing dust generation and the potential for surface contact. Injection also reduces adherence to plant tissues, and therefore exposures to livestock and wildlife. Similar results may be achieved by mixing biosolids into soil immediately after application (LRCS Land Resource Consulting Services, 2016).

BC ENV (2008), LRCS Land Resource Consulting Services (2016) and others have provided recommendations for reducing risks associated with the land application of biosolids. The recommendations include risk-based planning to reduce exposures, including avoiding sensitive ecosystems and proximity to water bodies, as well as areas with shallow groundwater where leaching of contaminants is more likely. Further, the use of personal protective equipment for workers, adhering to buffer zones required in the OMRR and avoiding application during heavy rainfall and snowmelt will further reduce exposures and the potential for contamination of groundwater and surface water. Implementing waiting periods between application and livestock (and wildlife) exposures is also recommended.

The amendment of biosolids with biochar or wood chips, as done in the CRD, has also been demonstrated to enhance the degradation and/or retention of leachable PPCPs (Pozzebon and Siefert, 2023).

# 5 Limitations of Extrapolating Lab-Based Testing to the Environment

The limitations in extrapolating lab-based toxicity testing results to real-world environmental scenarios are generally recognized and have been well documented by others (Cairns, 1983; Smith and Cairns, 1993; Hill et al., 1994). These limitations are exacerbated when considering the land application of biosolids owing to the large number of contaminants, including COECs, present in biosolids, and as the fate and toxicity of these contaminants which will vary depending on the mixture present and the application site characteristics. Controlled laboratory conditions cannot replicate the complex, variable nature of these environments.

The key limitations that arise during this extrapolation process include:

1. Laboratory tests are conducted under highly controlled conditions, which typically include simplified systems that do not reflect the complexity of the natural environment. Factors such as contaminant mixtures, environmental conditions (e.g., soil type, pH), and contaminant exposure pathways cannot be replicated in a lab setting.
2. Lab tests typical assess the effects of a single chemical or a small group of related chemicals. In the environment, specifically in the case of biosolids, organisms are exposed to complex mixtures with potential additive, synergistic, or antagonistic effects.
3. Lab studies typically expose test organisms to high concentrations of a single contaminant over short durations in confined spaces, with even chronic tests typically limited in duration. This does not reflect environmental exposures which often involve chronic exposures to low levels of contaminants over large areas. The effects of chronic, low dose exposures are typically underestimated in lab settings, leading to potential inaccuracies when predicting chronic toxicity in the natural environment.
4. In toxicity testing, exposures are usually simplified and typically limited to immersion in a contaminated medium or direct ingestion or inhalation. In natural environments contaminants exposure pathways are more complex and may include cross-media exposures, including food chain exposures. This oversimplification has the potential to underestimate exposures and associated effects.
5. Lab toxicity test methods have been developed for a limited number of species, focusing on model organisms that may not be representative species that are most sensitive to a specific contaminant. Further, lab tests may not include life stages (e.g., juveniles, larvae) most sensitive to the contaminants tested.
6. Laboratory organisms are often maintained in stable environments and lack the physiological adaptations that organisms may develop in response to natural stressors. Additionally, organisms may behave differently in the lab setting compared to in their natural environment, potentially influencing their exposure and response to contaminants.
7. In natural environments, interactions with abiotic factors (e.g., soil composition) and biotic factors (e.g., predation) may influence toxicity. These factors cannot be accounted for in a laboratory.

The above limitations of laboratory-based toxicity studies highlight the need for caution when extrapolating laboratory testing results to the environment. As noted, given the complex contaminant mixtures known to be present in biosolids, the likely potential for synergistic or additive effects, as well as the influence of the characteristics of the application area on fate and toxicity, the importance of field studies in the assessment

of potential risks from the land application of biosolids cannot be understated. Field observations, together with laboratory toxicity testing, are essential to understanding risks. The collective results of both, once available, should be considered in the establishment of a risk-based, adaptive management strategy for the land application of biosolids.

# 6 Uncertainties in the Risks Associated with the Land Application of Biosolids

Numerous uncertainties exist in the assessment of risks associated with the land application of biosolids. Many of these uncertainties have been documented by others (McCarthy, 2015; Pozzebon and Siefert, 2023; Garcia-Santiago et al., 2020; Schoof and Houkal, 2005; LRCS, 2016), including those summarized below and discussed in previous sections of this report. The rapidly evolving science on COECs in biosolids and their fate and effects following land application, as well as the very recent government policies and regulations pertaining to COECs in biosolids in Canada and elsewhere (e.g., CFIA October 2024 limit for PFAS in biosolids; Government of Canada July 2024 draft report of PFAS; Government of Canada 2023 funding for research on microplastics), underscore that the science on COECs is “emerging”.

Some of the key scientific gaps and uncertainties related to the land application of biosolids are summarized below:

1. Regulatory agencies have not derived limits for most COECs in biosolids, and further, given the paucity of toxicity (including ecotoxicity and specifically for wildlife at all trophic levels) and fate data for COECs, have not derived environmental quality standards. For the same reason, risk assessments evaluating the potential human health and environmental risks associated with exposures to COECs in biosolids, are limited and have generally focused on only a few of the more common COECs.
2. Due to advances in analytical chemistry methodologies, new COECs present in biosolids continue to be identified. The fate and effects of these contaminants are not well understood and thus, it is not possible to assess the potential for risks to human health and the environment.
3. Existing risk assessments and other evaluations of COECs in biosolids are focused on individual contaminants and are based on toxicity data from laboratory toxicity tests. These risk assessments do not consider that exposures to biosolids would result in the simultaneous exposure to numerous contaminants, and the potential for the contaminants to act additively or synergistically and thus are likely to have underestimated the potential for risks.
4. Similarly, the coexistence of numerous contaminants in biosolids may affect their fate, transport and distribution and therefore potential exposure pathways for human and ecological receptors. As an example, Wang and Good, (2024) identified that microplastics in biosolids can act as vectors for the long-range transport of PFAS. Field studies evaluated the influence of the contaminant mixtures present in biosolids on their environmental fate and transport are required to address this uncertainty.
5. The limited available toxicity data for most COECs is based on laboratory toxicity testing. The limitations and uncertainties associated with lab studies, and the need for field studies to be considered in the interpretation of risks, is highlighted in Section 5.
6. The long-term impacts of COECs in biosolids after land application, including their potential to accumulate overtime, leach into groundwater, enter the food chain, or impact human health or wildlife, are not fully understood. Further research in these areas is essential for the assessment and management of risks.
7. Efficient technologies for detecting and measuring COECs in biosolids and the environment are underdeveloped. Without reliable monitoring, it is challenging to assess or mitigate potential risks associated with contaminants in biosolids.

The rate at which our understanding of COECs in biosolids is advancing, with new data on the fate and effects of COECs being published continuously, underscores the importance an adaptive management framework for the land application of biosolids. . With time, it is anticipated that the uncertainties and data gaps identified here and elsewhere will be addressed, and thus regulators must keep pace with the evolving science and regularly weigh the risks and benefits of the practice in an informed and transparent manner.

# 7 Biosolid Land Application Bans

Several countries have restricted or banned the land application of biosolids due to concerns about environmental contamination, health risks, and public opposition primarily related to the presence of PFAS in biosolids, and their associated entry into the environment, specifically the human food chain.

In Canada, the land application of biosolids has been banned in specific regions due to environmental and public health concerns. In British Columbia, the Capital Regional District implemented a ban on the land application of biosolids in 2011. The ban was implemented due to concerns regarding COECs in biosolids, and to protect local drinking water sources, the environment, and public health. In March 2023, Quebec announced a temporary ban on the import and land application of biosolids originating from the United States due to concerns over PFAS contamination in imported biosolids. The province is working towards establishing standards for PFAS in biosolids to ensure environmental safety.

The following is a summary of the various countries that have banned or implemented strict regulations on the land application of biosolids.

## 7.1 United States of America

In the U.S.A., some states and municipalities have imposed restrictions or moratoriums on the land application of biosolids. In 2022, Maine became the first state to ban the land application of biosolids after it found PFAS had contaminated crops or water on over 50 farms throughout the state where sludge had been spread (Carey, 2023). Other states are starting to implement limits and bans. As of October 1, 2024, Connecticut prohibited the sale of PFAS-containing biosolids or wastewater sludge. Further, Michigan, New York, and Wisconsin have implemented interim strategies that limit the PFAS concentrations allowed in land-applied biosolids, and Colorado's interim strategy requires Source Control Programs to evaluate potential PFAS sources if concentrations in biosolids exceed a determined level.

Several more states have pending legislation that would enforce similar restrictions. As an example, Massachusetts is developing legislation that would set maximum levels for the amount of PFAS allowed in any fertilizer sold in the retail market, and proposed legislation in Oklahoma would require a warning label on any product derived from biosolids or sewage sludge.

## 7.2 Europe

In Europe, several countries have adopted a precautionary approach in banning the land application of biosolids, emphasizing soil and food safety. Switzerland has had a ban on agricultural use in place since 2006 with their current regulation requiring sewage sludge to be combusted, while the Netherlands has imposed stringent limits on several contaminants commonly identified in biosolids, resulting in very limited use. Due to concerns over COECs, including PFAS, pharmaceuticals and microplastics, Sweden, Germany and Austria (Vienna region) have banned the application of biosolids on agricultural land. The ban in Germany was implemented with the amendment of the German Sewage Sludge Ordinance in 2017, and by 2029 biosolids land application will be phased out. Germany is reportedly shifting towards incineration of sewage sludge and phosphorus recovery.

# 8 Discussion and Conclusion

In British Columbia, approximately 38,000 tonnes of biosolids are produced annually, with approximately 72% of biosolids and biosolids-derived products applied to land (BC ENV, 2019). As discussed throughout, while there are many benefits associated with the land application of biosolids, biosolids contain a complex mixture of contaminants, including COECs. Data on the fate and effects of these COECs is limited, and our understanding of the risks that these contaminants present to human health and the environment is rapidly evolving.

When weighed collectively, the available information on the land application of biosolids, including the information presented by others (e.g., Pozzebon and Siefert, 2023; LRCS Land Resource Consulting Service, 2016; McCarthy, 2015; BC ENV, 2024) and herein, supports the assessment of the practice in the context of the Precautionary Principle. The Precautionary Principle guides decision-makers to take action to protect the environment and public health in the face of environmental or health uncertainties (Goldstein, 2001).

Given the significant data gaps and uncertainties in the land application of biosolids, as well as the rapidly advancing science, previous studies that have concluded a low risk to human health and the environment must be interpreted in the context of the uncertainties. Risk assessments are conducted using the best scientific evidence available at the time of the assessment but must consider the unknowns in the overall interpretation of risks and in management decisions (Yoe, 2019, CSAP, 2016). Based on the data gaps and uncertainties summarized in Section 6, the uncertainty in the risk conclusions made to date, and specifically the potential for the assessments to have underestimated risks to human health and the environment, is categorized as moderate to high, and thus, is not supportive of a conclusion of low risk (CSAP, 2016). Rather, based on the uncertainties and the potential for the assessments to have underestimated risk, the risk conclusions are also uncertain, and cannot be further understood until the data gaps are resolved and the uncertainties are decreased.

In the context of biosolids from the CRD, with the data for PFAS and triclosan discussed herein, a review of the data indicates that the concentrations of the COECs are lower than measured in other Canadian biosolids. As noted, the comparison of the low concentrations of COECs with existing toxicity data suggests that the COECs in CRD biosolids represent a negligible to low risk to human health and the environment. Despite this, given the uncertainties discussed in Section 6, the uncertainty in this conclusion is moderate to high and should be reviewed regularly as the science on biosolids evolves.

Oberg and Mason-Renton (2018) examined how uncertainties and gaps in scientific knowledge were addressed and communicated in British Columbia, compared to Sweden, during their jurisdictional review of regulations on the land application of biosolids. The study highlighted how the jurisdictions had approached the uncertainty in the land application of biosolids differently; with BC taking the position that the absence of evidence of risk implies the practice is safe. Sweden, however, prioritized a precautionary approach, operating under the assumption that the absence of evidence or risk is not equivalent to evidence of absence (Oberg and Mason-Renton, 2018).Given the benefits of the land application of biosolids, the Canada-wide approach (CCME, 2012) encouraging the beneficial use of biosolids versus disposal, and as the scientific evidence available to date suggests that the land application of biosolids represents a negligible to low risk, Sweden's approach is likely overly restrictive.

Applying the Precautionary Principle aligns with using an adaptive management framework for the land application of biosolids. As noted, with time, it is anticipated that the uncertainties and data gaps identified in this report and elsewhere will be addressed, and thus regulators must keep pace with the evolving science and regularly weigh the risks and benefits of the practice in an informed and transparent manner. In the interim actions such as source control to limit the introduction of COECs to WWTPs, adopting advanced treatment technologies as they become available, careful site selection through the application of risk-based principles, and ongoing monitoring to minimize risks, are essential for the protection of human health and

the environment. Such strategies are increasingly emphasized in regulatory guidelines around the globe to ensure biosolids use does not compromise human health and the environment. This approach addresses both the potential risks and the benefits of nutrient recycling while minimizing ecological and human health hazards (Schoof & Houkal, 2005; Gianico et al., 2021).

# 9 Limitations

This report has been prepared and the work referred to in this report has been undertaken by Dr. Chris Kennedy for the Capital Regional District (CRD). Dr. Chris Kennedy makes no representation or warranty to any other person with regard to this report and the work referred to in this report and he accepts no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

This report has been prepared based on the CRD Terms of Reference and the literature identified during the review. Dr. Chris Kennedy expresses no warranty with respect to the accuracy of the data reported in the literature.

The evaluation and conclusions reported herein do not preclude the identification of additional literature pertinent to the contaminants discussed in this report. If new literature/studies become available, modifications to the findings, conclusions and recommendations in this report may be necessary.

Where information obtained from reference sources is included in the report, no attempt to verify the reference material was made. Dr. Chris Kennedy expresses no warranty with respect to the toxicity data presented in various references or the validity of the toxicity studies on which it was based. Scientific models employed in the evaluations were selected based on accepted scientific methodologies and practices in common use at the time and are subject to the uncertainties on which they are based.

Nothing in this report is intended to constitute or provide a legal opinion. Dr. Chris Kennedy makes no representation as to the requirements of or compliance with environmental laws, rules, regulations or policies established by federal, provincial or local government bodies. Revisions to the regulatory guidelines and standards referred to in this report may be expected over time, especially considering the evolving nature of the science for many of the contaminants evaluated. As a result, modifications to the findings, conclusions and recommendations in this report may be necessary.

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**REPORT TO FINANCE COMMITTEE**
**MEETING OF WEDNESDAY, MARCH 5, 2025**

---

**SUBJECT** **Implications of a "Buy Canadian" Purchasing Preference at CRD**

## ISSUE SUMMARY

To report on the potential implications to CRD of prioritizing the purchase of Canadian-made products and services during the trade dispute with the United States.

## BACKGROUND

On February 12th, the CRD Board endorsed the following motion:

> *Buy Canadian*
> The Board requests that staff report back to the next Finance Committee meeting on the CRD's procurement processes and the impact of prioritizing Canadian-made products and services during the international trade dispute.

This report focuses on the options available within the CRD's Procurement Policy and the applicable trade agreements to implement a "Buy Canadian" policy to prioritize the purchase of Canadian-made products and services.

The information contained in this report is current to the date of publishing, however, the trade dispute is a rapidly evolving matter that will likely change by the date of Committee and Board consideration. Staff anticipate more information will become available, as the Board's concerns are held in common with other Canadian public sector organizations. While staff have endeavored to present a summary of options and impacts, other agencies such as the Federation of Canadian Municipalities, are actively working to investigate the same issues to provide additional information and resources. Staff will continue to monitor additional information as it becomes available and will update the Board accordingly.

## IMPLICATIONS

### *CRD's Procurement Policy (BRD15)*

CRD's Procurement Policy requires procurement processes to be conducted in a competitive, fair, open, and transparent manner and on the basis of "best value", that is, the optimal combination of total cost, performance, economic, environmental, and social sustainability, reduced carbon dependency, and reduced waste. CRD complies with trade agreements binding on it as a local government, as well as those agreements which are not directly binding but which the Provincial and Federal Government expect public authorities to comply with.

A summary of trade agreement requirements for local government competitive procurement is summarized in the table below. Further information is available from the Federal Government.[1]

---

[1] https://www.international.gc.ca/trade-agreements-accords-commerciaux/ressources/fcm/complete-guide-complet.aspx?lang=eng

| Trade Agreement[2] | Application | Goods | Services | Construction |
|---|---|---|---|---|
| *New West Partnership Trade Agreement* | BC, Alta., Sask., Man. | $75,000 | $75,000 | $200,000 |
| *Canadian Free Trade Agreement* | Canada | $133,800 | $133,800 | $334,400 |
| *Canada-Europe Free Trade Agreement* | EU | $353,300 | $353,300 | $8.8-million |
| *Canada-United States-Mexico Free Trade Agreement* | US, Mexico | $237,700 | $237,700 | $8.8-million |

As a result, CRD purchases the majority of its goods, services, and construction competitively as they are over the *New West Partnership Trade Agreement* competitive thresholds. For procurements below competitive thresholds, staff are encouraged to work with trusted and known suppliers; award to Indigenous-controlled businesses; or consider "social" procurement thresholds, such as awarding to enterprising non-profits or those businesses who also provide benefit to historically equity-seeking groups or have ties to such groups.

***Can CRD prioritize Canadian-made Goods and Services?***

In relation to non-selection of US goods or services, the Canada-United States Mexico Agreement (CUSMA, the "new NAFTA") permits a "Buy Canadian" preference to be applied:

- For goods or services valued at less than $237,000; and
- For construction valued at less than $8.8-million.

Such preferences are already applied in the US to reserve contracts to US-based businesses and suppliers. Above these CUSMA thresholds, it is expected but not legally required that local governments conduct procurements treating US businesses and products of those member states as if they were Canadian businesses and products (for simplicity called "Most Favoured Nation" treatment). However, as CUSMA is not binding on local governments, should CRD choose to exclude US vendors entirely there is no bid dispute mechanism in CUSMA that would impact local governments and result in claims.

Certain funding and grant agreements require CRD to conduct competitive procurement and be non-discriminatory relating to those procurements. These terms are contractual and would need to be respected while those agreements are in place. They would take priority over CRD's temporary procurement policy or program language, and likely apply in Provincially-funded residential housing projects or large infrastructure projects funded by Canada.

2 https://www.canada.ca/en/treasury-board-secretariat/services/policy-notice/contracting-policy-notice-2023-6-trade-agreements.html

From an administrative perspective, CRD could express its preference for Canadian products and services, within prescribed limits, through a change to the CRD Procurement Policy or a Board direction, valid for the duration of the trade dispute, that includes the following provisions:

> ***Domestic Preference***
> For purchases of goods and services less than $237,000 and construction less than $8.8-million, CRD staff may, at their discretion with a view to "best value":
> - prefer Canadian or non-US origin, supplied, manufactured, or produced goods or services;
> - consider the risk of US tariffs and threatened US tariffs as a factor undermining the price certainty of US suppliers;
> - consider whether domestic products, services, or construction could be specified for some or all of the contemplated procurement;
> - discount any shipping or logistics cost from Canadian suppliers or manufacturers in the calculation of "best value";
> - consider whether after-sales service may only be provided from the US, and if so, consider this a risk undermining the "best value";
> - scope Canadian products into construction, goods, or services specifications for reasons of deliverability; constructability; price; quality of manufacture; security or confidentiality, including domestic economic security; business continuity; or confidence in continued pricing;
> - *determine whether products from countries other than the US, of like quality to Canadian products, could be used in place of US products given the increased cost of US products, services, and construction as a result of tariffs.*
>
> *Where a procurement is funded by a grant or sponsorship agreement, staff must consult agreement terms to determine if it is appropriate for this "Buy Canadian" exception to apply. Staff should obtain legal advice if considering applying domestic preference or non-US-preference above the thresholds listed in this section or in contemplating a change order or amendment which would increase the contract value above the thresholds listed above.*
>
> ***Buy Local Program***
> *Where a procurement is less than $75,000 for goods or services, or less than $200,000 for construction, the staff are encouraged to select BC-based or local suppliers for such work, always with a view to "best value" purchasing for CRD. Staff should not exceed these threshold amounts by way of amendment or change order without seeking legal advice.*

### *Operational Implications of a Buy Canadian Policy*

Understanding the effectiveness of a Buy Canadian preference could be challenging. CRD uses a decentralized procurement model, rather than having dedicated staff in a centralized purchasing function. Staff engaged in purchasing are expected to do so with minimal supervision. CRD's Procurement Policy sets out step-by-step procedures for initiation, approval and evaluation of bids and tenders, which staff must comply with. Given the number of purchases undertaken and individuals involved in purchasing, the level of administrative effort to implement will depend on whether this is a mandatory requirement with a compliance function, or an instruction to staff

without an additional compliance function. Any compliance function would require additional administrative time to implement.

As part of CRD Evolves, a Manager of Purchasing position was created within the Finance department to begin the establishment of a more centralized purchasing service. While this role will create more capacity, it is not intended to review and provide advice on each procurement and could not do so without causing delays to goods and service supply timelines.

Effect of Implementation

CRD does not track purchasing though a centralized database, nor does it track source of origin or category of goods, and has limited ability to report on the ratio of purchases that are from US-based suppliers compared to domestic products. That said, high-level review shows that most purchases under the proposed threshold amounts are already from Canadian services and distributors. CRD does not often see bids from US-based bidders for construction projects except where projects are major capital (such as the Residuals Treatment Facility). Even absent a "Buy Canadian" preference, given the instability of the US-supply market as a result of the tariffs, it would be unlikely for CRD to use US-suppliers without practical reason (e.g. they are the only after-sales service provider; they provided the goods in the initial procurement; they are the only supplier due to technical or other reasons).

While it is unknown what the impact of a Buy Canadian preference may be, it is in CRD's interests to build capacity in domestic or international suppliers, in the event tariffs effect the supply chain and to build relationships for critical services and supplies in other markets.

CRD relies on some US-sourced products including chemicals for water and sewer treatment and pre-fabricated structures. Those products are typically unique in the marketplace or the subject of long-standing supply arrangements with Canadian-based distributors or vendors that in turn source the materials from the United States. Chemicals for water and sewer treatment are currently not targeted by the Canadian retaliatory tariffs and therefore may not be affected in the short term. While staff are aware of the origin of some products, such as treatment chemicals, CRD does not keep records on the source of origin of all goods, services, or construction and therefore may not be able to fully identify or eliminate reliance on US-soured products that are being procured by third party suppliers and distributors. As an initial step, if required, identifying and recording the source of products and services in upcoming procurements may assist staff in understanding the source of commodities used by the CRD.

## CONCLUSION

In the mobilization to respond to the Canada-US tariff dispute, the CRD Board has asked staff to report on the implications of instituting a Buy Canadian policy at CRD. While it is possible to amend the CRD Procurement Policy to allow for a Buy Canadian preference within specific purchasing thresholds, imposing new policy requirements in our decentralized purchasing environment would require dedicated effort to train staff on the new requirements. Staff anticipate that additional guidance and resources will be forthcoming from the Federation of Canadian Municipalities (FCM) which will help inform CRD's responsive efforts to the imposition of future potential tariffs.

## RECOMMENDATION

There is no recommendation. This report is for information only.

| | |
|---|---|
| Submitted by: | Steven N. Carey, B.Sc, J.D., Senior Manager, Legal Services & Risk Management |
| Concurrence: | Kristen Morley, J.D., General Manager, Corporate Services & Corporate Officer |
| Concurrence: | Nelson Chan, MBA, FCPA, FCMA, Chief Financial Officer, GM Finance & IT |
| Concurrence: | Ted Robbins, B. Sc., C. Tech., Chief Administrative Officer |

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**REPORT TO THE CAPITAL REGIONAL DISTRICT BOARD**
**MEETING OF WEDNESDAY, MARCH 12, 2025**

---

**SUBJECT** **Public Hearing Report on Bylaw No. 4550, "Juan de Fuca Land Use Bylaw, 1992, Amendment Bylaw No. 160, 2023"**

## ISSUE SUMMARY

To receive the Report of the Public Hearing held January 28, 2025, for proposed Bylaw No. 4550, and to consider Bylaw No. 4550 for third reading.

## BACKGROUND

At its meeting of December 11, 2024, the Capital Regional District (CRD) Board gave first and second reading to Bylaw No. 4550, "Juan de Fuca Land Use Bylaw, 1992, Amendment Bylaw No. 160, 2023", and passed a resolution to delegate authority to the Regional Director to hold a public hearing with respect to Bylaw No. 4550.

Bylaw No. 4550 (Appendix A) will amend the Juan de Fuca Land Use Bylaw, Bylaw No. 2040, by deleting Parcel A (DD 1047521I) of District Lot 745, Renfrew District, and Parcel B (DD 52657I) of District Lot 745, Renfrew District, from the Forestry (AF) Zone and by deleting District Lot 175, Renfrew District, from the Resource Land (RL) Zone; and adding the said properties to a new Silviculture Campground (CR5) Zone to permit a commercial campground.

A public hearing was held for Bylaw No. 4550 on January 28, 2025. Eleven members of the public attended the hearing. Four written public hearing submissions were received prior to the close of the public hearing. Written public hearing submissions were provided to the Board through the CRD Board correspondence portal. The Report of Public Hearing is attached as Appendix B.

## ALTERNATIVES

*Alternative 1*

1) That the minutes that form the Report of Public Hearing for Bylaw No. 4550, "Juan de Fuca Land Use Bylaw, 1992, Amendment Bylaw No. 160, 2023", which are certified as a fair and accurate summary of the representations that were made at the public hearing held on January 28, 2025, be received;
2) That Bylaw No. 4550 be read a third time; and
3) That prior to adoption of proposed Bylaw No. 4550, the landowner registers a covenant in favour of the Capital Regional District prohibiting subdivision on District Lot 175, Renfrew District (PID: 023-414-308); and that staff be directed to ensure that all conditions are satisfied towards completion and registration.

*Alternative 2*

That the minutes that form the Report of Public Hearing for Bylaw No. 4550, "Juan de Fuca Land Use Bylaw, 1992, Amendment Bylaw No. 160, 2023", which are certified as a fair and accurate summary of the representations that were made at the public hearing held on January 28, 2025, be received.

## IMPLICATIONS

*Regional Growth Strategy Implications*

Section 445 of the *Local Government Act (LGA)* requires that all bylaws adopted by a regional district board after the board has adopted a Regional Growth Strategy (RGS) be consistent with the RGS. In accordance with CRD policy, where a zoning bylaw amendment that applies to land within the Shirley–Jordan River Official Community Plan (OCP) area is consistent with the OCP, it does not proceed to the full CRD Board for a determination of consistency with the RGS. The proposed rezoning is consistent with the policies of the Shirley–Jordan River OCP.

*Referral Process Implications*

Bylaw No. 4550 was referred to external agencies, the Shirley–Jordan River Advisory Planning Commission (APC) and to CRD departments in March 2024. Referral comments indicated that, while the scale of the initial proposal was consistent with low impact tourism, there were concerns that the use of Strata Lot 13, which is subject to a "no subdivision" and "no build" covenant, would impact neighboring landowners. Potential subdivision of the 66.0 ha RL zoned lot, campsite capacity, large recreational vehicles, wildfire risks, impacts of development near watercourses were also noted as items of concern. The Juan de Fuca Community Parks and Recreation Advisory Commission recommended that public trails connecting community and backcountry trails should be considered.

Referral comments and a revised proposal were returned to the Land Use Committee, and the CRD Board gave first and second reading to Bylaw No. 4550 at its meeting on December 11, 2024.

*Land Use Implications*

The Shirley-Jordan River OCP designates the subject properties as Coastal Upland (CU), which consists primarily of parcels enrolled in the Private Managed Forest Lands (PMFL) program and supports the continued use of those lands for forestry activities. If lands have been removed from the PMFL program, then uses such as low-impact recreation and low-impact tourism are supported. Community parks, single-family residential, and agriculture are also supported in this land use designation.

The proposal included an Environmental Review and Visitor Access and Servicing Route Plans, which were considered by the CRD Board at its meeting of December 11, 2024.

The proposal includes regulations for a *campground*, maintains *silviculture* and *one-family dwelling* as principal uses, and clarifies that *secondary suite, detached accessory suite,* and *home-based business* are accessory uses. The proposed CR5 zone includes regulations to limit the size of vehicles and the number of persons per camping space, and to prescribe *fire buffer* and watercourse setback requirements.

The applicant addressed the Land Use Committee at its meeting of December 10, 2024, stating opposition to providing a community amenity in the form of a trail connection in consideration of the numerous revisions made to the zoning proposal to address comments received through the application review process.

The Land Use Committee recommended that proposed Bylaw No. 4550 be advanced without the provision of a community amenity, and the CRD Board gave first and second reading to Bylaw No. 4550 at its meeting on December 11, 2024.

Staff are of the opinion that the revised proposal is aligned with the Coastal Uplands land use designation and broader OCP policies, and recommend that the proposed bylaw be given third reading. Staff further recommend that adoption of the Bylaw be withheld pending registration of a restrictive covenant prohibiting further subdivision of District Lot 175.

## CONCLUSION

The purpose of Bylaw No. 4550 is to amend Bylaw No. 2040 by removing the subject properties from the Forestry (AF) and Resource Land (RL) zones and adding them to a new Silviculture Campground (CR5) zone. Proposed Bylaw No. 4550 has been read a second time and a public hearing for Bylaw No. 4550 was held on January 28, 2025. Staff recommend that the minutes of the public hearing be received, and that the proposed bylaw be given third reading. Staff further recommend that adoption of the Bylaw be withheld pending registration of a restrictive covenant prohibiting further subdivision of District Lot 175.

## RECOMMENDATIONS

1) That the minutes that form the Report of Public Hearing for Bylaw No. 4550, "Juan de Fuca Land Use Bylaw, 1992, Amendment Bylaw No. 160, 2023", which are certified as a fair and accurate summary of the representations that were made at the public hearing held on January 28, 2025, be received;
2) That Bylaw No. 4550 be read a third time; and
3) That prior to adoption of proposed Bylaw No. 4550, the landowner registers a covenant in favour of the Capital Regional District prohibiting subdivision on District Lot 175, Renfrew District (PID: 023-414-308); and that staff be directed to ensure that all conditions are satisfied towards completion and registration.

| | |
|---|---|
| Submitted by: | Iain Lawrence, MCIP, RPP, Senior Manager, JdF Local Area Services |
| Concurrence: | Patrick Klassen, MCIP, RPP, Acting General Manager - Housing, Planning & Protective Services |
| Concurrence: | Ted Robbins, B. Sc., C. Tech., Chief Administrative Officer |

## ATTACHMENTS

Appendix A: Proposed Bylaw No. 4550
Appendix B: Report of Public Hearing

Appendix A: Proposed Bylaw No. 4550

**CAPITAL REGIONAL DISTRICT**
**BYLAW NO. 4550**

**********

**A BYLAW TO AMEND BYLAW NO. 2040, THE "JUAN DE FUCA LAND USE BYLAW, 1992"**

**********

The Capital Regional District Board, in open meeting assembled, enacts as follows:

1. Bylaw No. 2040 being the "Juan de Fuca Land Use Bylaw, 1992" is hereby amended as follows:

**A. SCHEDULE A, PART 1, SECTION 2 – DEFINITIONS**

(a) By deleting the definition of COMMERCIAL ZONE and replacing it with a new definition as follows:

"COMMERCIAL ZONE means C-1, C-1A, C-1B, C-2, C-3, C-4, C-5, CM-1, CR-1, CR-1A, CR-2, CR-3, CR-4, CR-4OW, CR5, DRMV, WT-TC;"

**B. SCHEDULE A, PART 1, SECTION 3.07**

(a) By adding the words "Silviculture Campground" after the words "Country Inn Ocean Wilderness"

**C. SCHEDULE A, PART 2 - ZONING DISTRICTS**

(a) By adding the new 35.0 Silviculture Campground Zone – CR5 as follows:

***35.0 SILVICULTURE CAMPGROUND ZONE – CR5***

**35.1 Principal Uses**

In addition to the uses permitted by Section 4.15 of Part 1 of this Bylaw, the following uses and no others shall be permitted in the CR5 zone:

Principle uses:

(a) One-family dwelling;
(b) Campground;
(c) Silviculture.

**35.2 Permitted Accessory Uses**

In addition to the uses permitted by Section 35.01 of Part 2 of this Bylaw, the following Accessory Uses in conjunction with a permitted Principal Use and no others shall be permitted in the CR5 zone:

(a) Home Based Business Categories One, Two and Three;
(b) Secondary Suite pursuant to Part 1, Subsection 4.19;
(c) Detached Accessory Suite pursuant to Part 1, Subsection 4.20.

**35.3 Minimum Parcel Size for Subdivision Purposes**

The minimum parcel size for subdivision purposes is no less than 4.0ha.

**35.4 Lot Coverage**

The maximum lot coverage is 10.0%.

**35.5 Density**

(a) 1 one-family dwelling per parcel;

(b) 20 camping spaces per parcel or 1 camping space per 5.0ha; whichever is less;

(c) The maximum number of persons per camping space is 10 and the maximum number of persons over the age of 19 per camping space is 4;

(d) Notwithstanding Section 35.5 (c) of Part 2 of this Bylaw, no more than two camping spaces may have a maximum of 15 people at any given time with no more than 6 of those persons who are over the age of 19.

**35.6 Height**

The maximum height for principal buildings is 11.0m

**35.7 Setback Requirements**

(a) All buildings and structures, both principal and accessory, and all camping spaces are required to be a minimum of 15.0m from every parcel line;

(b) All buildings and structures, both principal and accessory, and all camping spaces are required to be a minimum of 100.0m from the natural boundary of a stream.

**35.8 Separation Distance**

(a) All camping spaces and principal buildings must be separated from each other by a minimum of 20.0m;

(b) All outdoor fire sources including but not limited to open flames such as campfires, firepits or the similar are required to be surrounded by a 30.0m fire buffer.

**35.9 Special regulation**

Vehicles that are owned or are under the care of visitors and patrons of the campground must not exceed a length of 10.0m and trailers used for camping purposes are permitted provided that no dimension exceeds a length of 6.5m.

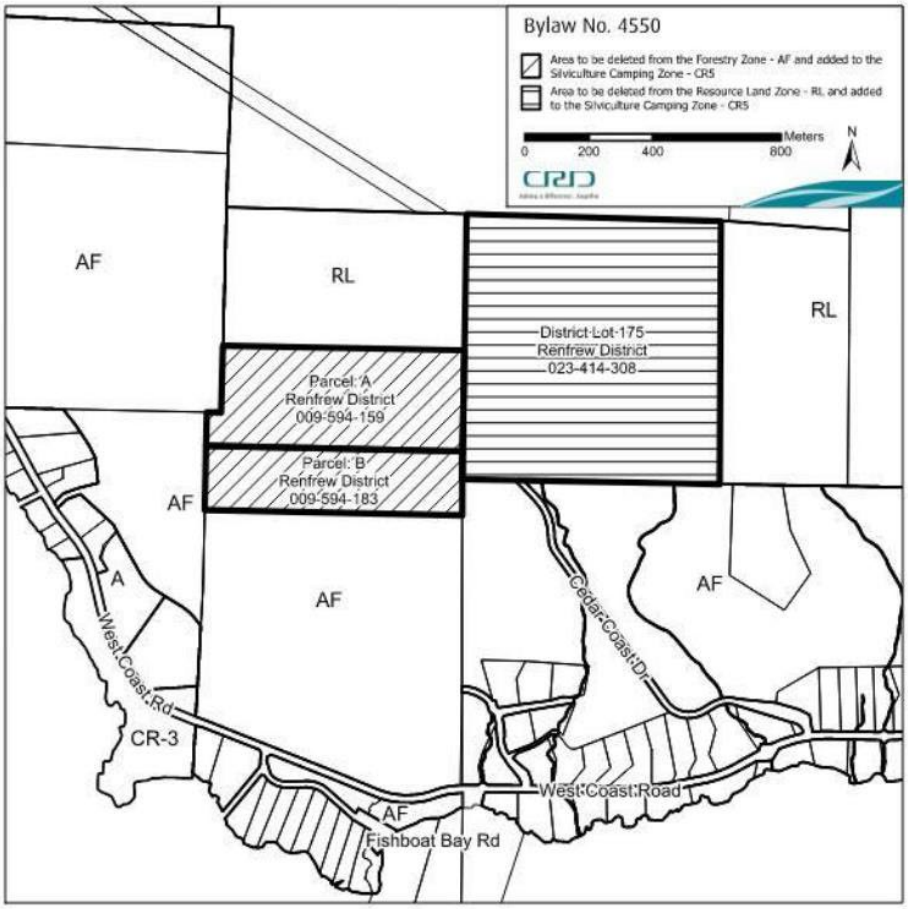
**35.10 Definitions**

For the purpose of the *SILVICULTURE CAMPGROUND ZONE – CR5*, the following definitions apply:

(a) ***Stream*** means a stream as defined by the *Water Sustainability Act*.

(b) ***Fire buffer***, means an area intended to enhance fire resistance around outdoor areas, buildings, structures, open flames, fire pits, campfires, or the similar and maintained to:
  (i) Be composed of non-combustible landscaping materials and non-invasive vegetation. This buffer may include lands designated as a development permit area as defined by the *Local Government Act,* provided that those lands remain undisturbed or a development permit authorizing a fire buffer has been issued;
  (ii) Ensure a minimum area no less than 3.0m wide composed solely of non-combustible materials is established around any entire outdoor fire source, including but not limited to open flames such as campfires, firepits, or the similar;
  (iii) Ensure a minimum separation distance of no less than 3.0m between the branches of all trees, shrubs, and woody plant species and from buildings, structures, and camping equipment or materials;
  (iv) Ensure that the ground remains cleared of large woody debris, branches, and dry grass and leaves;
  (v) Ensure that branches within 2.0 meters of the ground are removed from trees taller than 4.0m.

**Plan No. 1 of Bylaw No. 4550, an amendment to Bylaw No. 2040**




2. This Bylaw may be cited as "Juan de Fuca Land Use Bylaw, 1992, Amendment Bylaw No. 160, 2023".

| | | |
|---|---|---|
| READ A FIRST TIME THIS | day of | 2024 |
| READ A SECOND TIME THIS | day of | 2024 |
| READ A THIRD TIME THIS | day of | 2024 |
| ADOPTED THIS | day of | 2024 |

CHAIR CORPORATE OFFICER

Appendix B: Report of Public Hearing

**REPORT OF PUBLIC HEARING**
held at the Shirley Community Hall
2795 Sheringham Point Road, Shirley, BC
January 28, 2025, at 7:00 pm

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**SUBJECT:** **BYLAW NO. 4550**, cited as "Juan de Fuca Land Use Bylaw, 1992, Amendment Bylaw No. 160, 2023"

**PRESENT:** **Director A. Wickheim**, Chair by Resolution of the Capital Regional District Board on Wednesday, December 11, 2024
**CRD Staff:** D. Lucas, Planner, Juan de Fuca Local Area Services;
W. Miller, Recorder

**PURPOSE OF THE HEARING:**

Bylaw No. 4550 will amend will amend the Juan de Fuca Land Use Bylaw, Bylaw No. 2040, by deleting Parcel A (DD 1047521I) of District Lot 745, Renfrew District, and Parcel B (DD 52657I) of District Lot 745, Renfrew District, from the Forestry (AF) Zone and by deleting District Lot 175, Renfrew District, from the Resource Land (RL) Zone; and adding the said properties to a new Silviculture Campground (CR5) Zone to permit a commercial campground.

**NOTICE:** Notice was published on the CRD website, and in the Sooke News Mirror on January 23, 2025.

**ATTENDANCE:** 11

A Territorial Acknowledgement was provided at the preceding public hearing.

The Chair declared the public hearing open at 7:17 pm.

The guidelines and procedures of the public hearing and the Notice of Public Hearing were read to those present.

At the request of the Director, the location of the subject property and minimum parcel size proposed by Bylaw No. 4550 were clarified in response to questions raised by the public.

Two members of the public spoke to the application. Four written public hearing submissions were received prior to the close of the public hearing.

**Summary of Verbal and Written Representations**

Comment on emergency servicing:
- concern regarding fire risk
- concern that not all parcels being considered under the zoning amendment application are within the Shirley Fire Protection Local Fire Service Area
- the parcel zoned Rural Land has been added to the Shirley Fire Protection Local Fire Service Area

Comment on enforcement:
- concern regarding resources to monitor/patrol campground patrons, including managing noise levels, garbage disposal and water use
- applicant will be living on site

Comment on natural environment:
- concern that the CRD did not require the applicant to have the full extent of Aleda Creek and Swallow Creek professionally surveyed
- concern that Aleda Creek and Swallow Creek drinking water licence holders will be negatively affected by commercial campground use
- concern regarding setbacks between camping spaces and streams
- proposed bylaw requires camp spaces to be a minimum of 100 m from the natural boundary of a stream
- concern that a wildlife corridor was not required to protect wildlife including an established bear denning area on District Lot 175
- concern that the proposed commercial and silviculture use will have an overall negative environmental impact

Comment on amenity contribution:
- concern that the applicant was not required to provide community amenity in the form of a CRD statutory-right-of-way suitable for a public trail, as recommended by staff and by the Juan de Fuca Electoral Area Parks and Recreation Advisory Commission

The Chair called three times for further discussion on the bylaw and hearing none closed the public hearing on Bylaw No. 4550 at 7:28 pm.

CHAIR, Director A. Wickheim

Making a difference...together

**REPORT TO THE CAPITAL REGIONAL DISTRICT BOARD**
**MEETING OF WEDNESDAY, MARCH 12, 2025**

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**SUBJECT** **Public Hearing Report on Bylaw No. 4598, "Shirley-Jordan River Official Community Plan Bylaw No. 5., 2018, Amendment Bylaw No. 2, 2024" and Bylaw No. 4599, "Juan de Fuca Land Use Bylaw, 1992, Amendment Bylaw No. 162, 2024"**

## ISSUE SUMMARY

To receive the Report of the Public Hearing held January 28, 2025, for proposed Bylaw No. 4598, and Bylaw No. 4599 and to consider the bylaws for third reading.

## BACKGROUND

At its meeting of November 13, 2024, the Capital Regional District (CRD) Board gave first and second reading to Bylaw No. 4598, "Shirley-Jordan River Official Community Plan Bylaw No. 5., 2018, Amendment Bylaw No. 2, 2024" and Bylaw No. 4599, "Juan de Fuca Land Use Bylaw, 1992, Amendment Bylaw No. 162, 2024" and passed a resolution to delegate authority to the Regional Director to hold a public hearing with respect to Bylaw Nos. 4598 and 4599.

Bylaw No. 4598 (Appendix A) will amend the Shirley-Jordan River Official Community Plan (OCP), Bylaw No. 4001, by redesignating Lot A, Section 4, Renfrew District, Plan EPP131465 from Pacific Acreage (PA) to Commercial (CO) with amendments.

Bylaw No. 4599 (Appendix B) will amend the Juan de Fuca Land Use Bylaw, Bylaw No. 2040, Wildwood Terrace Neighbourhood Commercial (C-1A) Zone by including additional commercial uses and a smaller average and minimum parcel size to facilitate subdivision of Lot A, Section 4, Renfrew District, Plan EPP131465.

A public hearing was held for Bylaw Nos. 4598 and 4599 on January 28, 2025. Thirteen members of the public attended the hearing. No written submissions were received in response to the notice of public hearing. The Report of Public Hearing is attached as Appendix C.

## ALTERNATIVES

*Alternative 1*

1) That the minutes that form the Report of Public Hearing for Bylaw No. 4598, "Shirley-Jordan River Official Community Plan Bylaw No. 5., 2018, Amendment Bylaw No. 2, 2024", and Bylaw No. 4599, "Juan de Fuca Land Use Bylaw, 1992, Amendment Bylaw No. 162, 2024", which are certified as a fair and accurate summary of the representations that were made at the public hearing held on January 28, 2025, be received;
2) That Bylaw No. 4598, as amended, be read a third time;
3) That Bylaw No. 4598 be adopted;
4) That Bylaw No. 4599 be read a third time; and
5) That prior to the adoption of proposed Bylaw No. 4599, the landowner provides an amenity contribution by registering a statutory right-of-way adjacent to West Coast Road in favour of the Capital Regional District for the purpose of establishing a public trail; and that staff be directed to ensure that all conditions are satisfied towards completion and registration.

*Alternative 2*
That the minutes that form the Report of Public Hearing for Bylaw No. 4598, "Shirley-Jordan River Official Community Plan Bylaw No. 5., 2018, Amendment Bylaw No. 2, 2024", and Bylaw No. 4599, "Juan de Fuca Land Use Bylaw, 1992, Amendment Bylaw No. 162, 2024", which are certified as a fair and accurate summary of the representations that were made at the public hearing held on January 28, 2025, be received.

## IMPLICATIONS

*Regional Growth Strategy Implications*

Section 445 of the *Local Government Act (LGA)* requires that all bylaws adopted by a regional district board after the board has adopted a Regional Growth Strategy (RGS) be consistent with the RGS.

Since the proposal includes an amendment to the Shirley-Jordan River OCP, the bylaws were considered and accepted by the Planning and Protective Services Committee and by the CRD Board on November 13, 2024, in accordance with section 445 of the *LGA*.

*Referral Process Implications*

Bylaw Nos. 4598 and 4599 were referred to external agencies, the Shirley–Jordan River Advisory Planning Commission (APC) and to CRD departments in March 2024.

Public comment made at the April 23, 2024, meeting of the APC indicated support for improved pedestrian and biking access to the proposed commercial development fronting Highway 14.

In related comments, the JdF EA Parks and Recreation Advisory Commission addressed public safety, recreation opportunities and connectivity along West Coast Road by recommending the establishment of a roadside trail.

In response to those comments, the applicant has committed to providing a statutory right-of-way in favour of the CRD as a community amenity contribution for a roadside trail should Bylaw No. 4599 be adopted.

Referral comments and an updated concept plan with the proposed trail location were returned to the Land Use Committee, and the CRD Board gave first and second reading to Bylaw Nos. 4598 and 4599 at its meeting on November 13, 2024.

*Land Use Implications*

The proposal considered by the Land Use Committee at its meeting of March 19, 2024, identified that the land subject to the application was a portion of Section 4, Renfrew District, Except Those Parts in Plans 427R, 23879, VIP68644, VIP79213, VIP80549, VIP82411, EPP69011 and EPP117093. Since that meeting, the area subject to the bylaw amendments has been registered as Lot A, Section 4, Renfrew District, Plan EPP131465 (CRD File: SU000770). Staff have amended Bylaw No. 4598 to reflect the new legal description. No other changes to the bylaws have been made since second reading.

The Shirley-Jordan River OCP designates the subject property as *Pacific Acreage*, which supports 2.0 ha residential parcels, agriculture uses, and small-scale neighborhood commercial activities. The *Commercial* designation supports small-scale commercial; civic, institutional, tourism, recreation, silviculture; community parks; and light industrial uses, but prescribes parcel sizes of 120 ha or greater.

The subject property is zoned C-1A under the Juan de Fuca Land Use Bylaw, 1992, Bylaw No. 2040. The C-1A zone only applies to the subject property and specifies a minimum parcel size of 3.3 ha; maximum height of 9 m; parcel coverage of 25%; maximum floor area of 2,000 $m^2$; and setbacks of 7.5 m (front); 6.0 m (side); and 10.0 m (rear).

The C-1A zone currently permits convenience stores; civic uses; food and beverage processing; country market; and retail stores. The zone specifically excludes gas bars, gas stations, bulk fuel sales, auto repair, carwashes, or any use for which a permit is required under the *Environmental Management Act* or *Regulation*. Accessory uses include residential; screened outdoor storage; onsite store; picnic area; lounge; special event area in conjunction with *Liquor Control and Licensing Act;* as well as buildings or structures that support a permitted principal use.

The proposed amendments to the C-1A zone include reducing the minimum parcel area to an average of 0.4 ha and a minimum of 0.2 ha; increasing the maximum height of buildings and structures to 12 m; replacing the maximum total floor area with a floor space ratio (FSR) of 0.4; reducing the side yard setback to 3.0 m and the rear yard setback to 5.0 m, except that a 9.0 m minimum setback is required from residential and rural zones; and specifying minimum front and flanking yard setbacks of 7.5 m from a public road. Additional permitted uses would include restaurant, personal service, office, and health services.

Since the proposed uses are better suited to the *Commercial* designation, the application proposes an OCP amendment under Bylaw No. 4598 to redesignate the subject property from *Pacific Acreage* to *Commercial*. In order to support the proposed lot sizes, the amendment includes a change to policy 484 N to support an average parcel size of 0.4 ha and a minimum of 0.2 ha. An amendment to policy 484 R to add a 120 ha minimum parcel size to the *Restricted Development* designation is included to address concerns related to flooding hazards in the inundation area around Jordan River.

In order to make land available for a public trail, pedestrian access, natural vegetation, and landscaping, parking spaces are proposed to be setback a minimum of 7.5 m from lot lines abutting West Coast Road and 3.0 m from other lot lines. Parking would also be permitted on strata common property, rather than only on the property for which it is required.

Staff are of the opinion that the proposed zoning amendments are in keeping with the direction provided by the OCP, and that the proposed OCP amendments are consistent with the other policies of the Plan. Staff recommend that proposed Bylaw No. 4598, as amended to reflect the registration of Lot A, Section 4, Renfrew District, Plan EPP131465, be given third reading and adopted, and that proposed Bylaw No. 4599 be given third reading. Staff also recommend that prior to adoption of Bylaw No. 4599, the landowner register a statutory right-of-way in favour of the CRD for a public trail along the property boundary shared by West Coast Road.

## CONCLUSION

The purpose of Bylaw No. 4598 is to amend the Shirley-Jordan River Official Community Plan, Bylaw No. 4001, by redesignating the subject property from *Pacific Acreage* to *Commercial* with amendments. The purpose of Bylaw No. 4599 is to amend the Wildwood Terrace Neighbourhood Commercial (C-1A) zone of the Juan de Fuca Land Use Bylaw, 1992, Bylaw No. 2040, by permitting additional commercial uses and a smaller average and minimum parcel size. Proposed Bylaw Nos. 4598 and 4599 have been read a second time and a public hearing for the Bylaws was held on January 28, 2025. Staff recommend that the minutes of the public hearing be received, and that the proposed bylaws be given third reading. Staff further recommend that prior to adoption of Bylaw No. 4599, the landowner provide an amenity contribution by registering a statutory right-of-way adjacent to West Coast Road in favour of the Capital Regional District for the purpose of establishing a public trail; and that staff be directed to ensure that all conditions are satisfied towards completion and registration.

## RECOMMENDATIONS

1) That the minutes that form the Report of Public Hearing for Bylaw No. 4598, "Shirley-Jordan River Official Community Plan Bylaw No. 5, 2018, Amendment Bylaw No. 2, 2024", and Bylaw No. 4599, "Juan de Fuca Land Use Bylaw, 1992, Amendment Bylaw No. 162, 2024", which are certified as a fair and accurate summary of the representations that were made at the public hearing held on January 28, 2025, be received;
2) That Bylaw No. 4598, as amended, be read a third time;
3) That Bylaw No. 4598 be adopted;
4) That Bylaw No. 4599 be read a third time; and
5) That prior to the adoption of proposed Bylaw No. 4599, the landowner provides an amenity contribution by registering a statutory right-of-way adjacent to West Coast Road in favour of the Capital Regional District for the purpose of establishing a public trail; and that staff be directed to ensure that all conditions are satisfied towards completion and registration.

| | |
|---|---|
| Submitted by: | Iain Lawrence, MCIP, RPP, Senior Manager, JdF Local Area Services |
| Concurrence: | Patrick Klassen, MCIP, RPP, Acting General Manager – Housing, Planning & Protective Services |
| Concurrence: | Ted Robbins, B. Sc., C. Tech., Chief Administrative Officer |

## ATTACHMENTS

Appendix A: Proposed Bylaw No. 4598
Appendix B: Proposed Bylaw No. 4599
Appendix C: Report of Public Hearing

Appendix A: Proposed Bylaw No. 4598

**CAPITAL REGIONAL DISTRICT**
**BYLAW NO. 4598**

**********

**A BYLAW TO AMEND BYLAW NO. 4001, THE "SHIRLEY-JORDAN RIVER OFFICIAL COMMUNITY PLAN, BYLAW NO. 5, 2018"**

**********

The Capital Regional District Board, in open meeting assembled, enacts as follows:

1. Bylaw No. 4598 being the "Shirley- Jordan River Official Community Plan, Bylaw No. 5, 2018" is hereby amended:

**A. SCHEDULE A – SECTION 208 REGIONAL GROWTH STRATEGY CONSISTENCY**

(a) By deleting the following text in Schedule A, Section 208 B:

"A Commercial Land Use Designation has been applied to lands in Jordan River that are deemed not safe for residential habitation."

(b) By deleting the following text in Schedule A, Section 385:

"The hamlet of Jordan River currently has one small restaurant business serving local and tourist needs. The Commercial Land Use Designation applies to lands adjacent to the Jordan River."

(c) By deleting the following text in Schedule A, Section 386:

"The Commercial Land Use Designation applies to lands in Jordan River where residential and overnight habitation uses are not permitted due to the risk of flooding. The prescribed minimum lot size (120 ha) would prevent further subdivision of these lands."

And replacing with the following:

"The Commercial Land Use Designation applies to lands that provide potential for local services in support of development of the local economy. Except where lands may be restricted with respect to residential and overnight habitation uses due to the risk of flooding, an average density of one *parcel* per 0.4 ha within a plan of subdivision is supported.

(d) By deleting the following text in Schedule A, Section 404:

"The intent of the Commercial Land Use Designation is to support small-scale neighbourhood commercial and light industrial uses in the Jordan River inundation area. Civic, institutional, tourism, recreation, silviculture and community park uses are also supported."

And replacing with the following:

**"**The intent of the Commercial Land Use Designation is to support small-scale neighbourhood commercial and light industrial uses. Civic, institutional, tourism, recreation, silviculture and community park uses are also supported

(e) By deleting the text in Schedule A, Section 484 N, and replacing with the following:

**"**For lands designated as Commercial on Schedule B, an average density of one *parcel* per 0.4 hectares with one caretaker dwelling is supported"

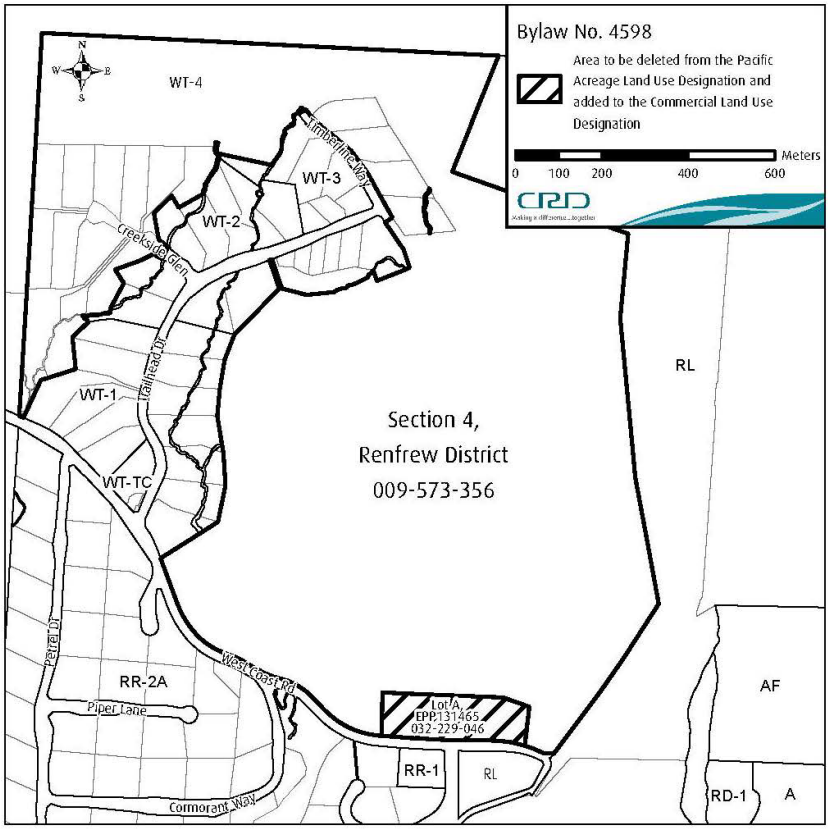
(f) By deleting the text in Schedule A, Section 484 R, and replacing with the following:

"For lands designated Renewable Resource and Restricted Development on Schedule B, a density of one parcel per 120 hectares is supported. One dwelling per parcel is supported for those lands designated Renewable Resource.

**B. SCHEDULE B – LAND USE DESIGNATIONS**

(a) By deleting Lot A, Section 4, Renfrew District, Plan EPP131465, PID 032-229-046 (formerly that part of Section 4, Renfrew District Except Those Parts In Plans 427R, 23879, VIP68644, VIP79213, VIP80549, VIP82411 And EPP69011, PID-009-573-356), from the Pacific Acreage land use designation and adding to the Commercial land use designation, as outlined in black hatching on Plan No. 1.

**Plan No. 1 of Bylaw 4598, an amendment to Bylaw No. 4001**



2. This bylaw may be cited as "Shirley – Jordan River Official Community Plan, Bylaw No. 5 2018, Amendment Bylaw No. 2, 2024".

READ A FIRST TIME THIS day of , 2024.

READ A SECOND TIME THIS day of , 2024.

READ A THIRD TIME THIS day of , 2024.

ADOPTED THIS day of , 2024.

CHAIR CORPORATE OFFICER

Appendix B: Proposed Bylaw No. 4599

**CAPITAL REGIONAL DISTRICT**
**BYLAW NO. 4599**

**********

**A BYLAW TO AMEND BYLAW NO. 2040, THE "JUAN DE FUCA LAND USE BYLAW, 1992"**

**********

The Capital Regional District Board, in open meeting assembled, enacts as follows:

1. Bylaw No. 2040 being the "Juan de Fuca Land Use Bylaw, 1992" is hereby amended as follows:

**A. SCHEDULE A, PART 2, SECTION 6G.0 WILDWOOD TERRACE NEIGHBOURHOOD COMMERCIAL ZONE - C-1A**

(a) By amending section 6G.01 Permitted Uses by adding new subsections under Principal Uses as follows:

(f) Restaurant;
(g) Personal Services;
(h) Offices;
(i) Health Services;

(b) By amending section 6G.01 by deleting the following text from Section 6G.01:

Accessory Uses:

(f) Residential;
(g) Screened storage yard;
(h) Buildings or structures accessory to the above uses pursuant to Part 1, Subsection 4.01.
(i) Onsite store, picnic area, lounge and special event area accessory to a manufacturer liquor licence subject to the Liquor Control and Licensing Act.

(c) By adding a new section 6.02G with the following and renumerating the subsequent sections in the C-1A zone:

**6G.02 Permitted Accessory Uses:**

In addition to the uses permitted by Section 6G.01 of Part 2 of this Bylaw, the following Accessory Uses in conjunction with a permitted Principal Use and no others shall be permitted in the C-1A Zone:

(a) Residential;
(b) Screened storage yard;
(c) Buildings or structures accessory to the above uses.
(d) Onsite store, picnic area, lounge and special event area accessory to a manufacturer liquor licence subject to the Liquor Control and Licensing Act.

(d) By deleting section 6G.02 Minimum Parcel Size for Subdivision Purposes and replacing with the following:

**6G.03 Minimum Parcel Size for Subdivision Purposes:**

(a) The minimum parcel size for subdivision purposes is 0.4 ha;
(b) Notwithstanding Section 6G.03(a) of Part 2 of this Bylaw, lot averaging is permitted with an average lot size of 0.4 ha and a minimum lot size of 0.2 ha.

(e) By amending section 6G.04 Height by deleting the text "9 m" and replacing with "12.0m".

(f) By deleting section 6G.07 Maximum Size of Principal Buildings and replacing with the following:

**6G.08 Maximum Size of All Buildings and Structures:**

The Total Floor Area and sum of all principal and accessory buildings and structures on a parcel shall not exceed a Floor Area Ratio of 0.4.

(g) By replacing section 6G.08 Yard Requirements with the following:

**6G.09 Setback Requirements:**

All principal and accessory buildings and structures must meet the following yard requirements:

(a) Principal buildings and structures are required to be:
  (i) A minimum of 7.5m from the lot line of a street and or public highway; and
  (ii) A minimum of 3.0m from the lot line of a parcel; and
  (iii) Notwithstanding Part 2 Section 6G.09 (a) (ii) above; a minimum of 9.0m is required from the lot lines of parcels in Residential, Rural Residential, or Multiple Family Residential zones.

(b) Accessory buildings and structures are required to be:
  (i) A minimum of 7.5m from the lot line of a street and or public highway; and
  (ii) A minimum of 3.0m from a lot line of a parcel.

(h) By adding a new section 6G.10 Parking Setbacks as follows:

**6G.10 Parking Setbacks:**

(a) Bare land strata lots may provide parking spaces in accordance with this bylaw sited on common property registered on title to those strata lots;
(b) For lot lines that abut a public highway, parking spaces provided in accordance with this bylaw shall be a minimum of 7.5m; and
(c) For lot lines that do not abut a public highway, parking spaces provided in accordance with this bylaw shall be a minimum of 3.0m from a lot line.

2. This Bylaw may be cited as "Juan de Fuca Land Use Bylaw, 1992, Amendment Bylaw No. 162, 2024".

| | | |
|---|---|---|
| READ A FIRST TIME THIS | day of | 2024 |
| READ A SECOND TIME THIS | day of | 2024 |
| READ A THIRD TIME THIS | day of | 2024 |
| ADOPTED THIS | day of | 2024 |

CHAIR CORPORATE OFFICER

Appendix C: Report of Public Hearing

**REPORT OF PUBLIC HEARING**
held at the Shirley Community Hall
2795 Sheringham Point Road, Shirley, BC
January 28, 2025, at 7:00 pm

---

**SUBJECT:** **BYLAW NO. 4598**, cited as "Shirley-Jordan River Official Community Plan Bylaw No. 5., 2018, Amendment Bylaw No. 2, 2024", and

**BYLAW NO. 4599**, cited as "Juan de Fuca Land Use Bylaw, 1992, Amendment Bylaw No. 162, 2024"

**PRESENT:** **Director A. Wickheim**, Chair by Resolution of the Capital Regional District Board on Wednesday, November 13, 2024
**CRD Staff:** D. Lucas, Planner, Juan de Fuca Local Area Services;
W. Miller, Recorder

**PURPOSE OF THE HEARING:**

Bylaw No. 4598 will amend the Shirley-Jordan River Official Community Plan (OCP), Bylaw No. 4001, by redesignating Lot A, Section 4, Renfrew District, Plan EPP131465 from Pacific Acreage (PA) to Commercial (CO) with amendments.

Bylaw No. 4599 will amend the Juan de Fuca Land Use Bylaw, Bylaw No. 2040, Wildwood Terrace Neighbourhood Commercial (C-1A) Zone by including additional commercial uses and a smaller average and minimum parcel size to facilitate subdivision of Lot A, Section 4, Renfrew District, Plan EPP131465.

**NOTICE:** Notice was published on the CRD website, and in the Sooke News Mirror on January 23, 2025.

**ATTENDANCE:** 13

The Chair provided a Territorial Acknowledgement.

The Chair declared the public hearing open at 7:02 pm.

The guidelines and procedures of the public hearing and the Notice of Public Hearing were read to those present.

At the request of the Director, the location of the subject property and uses currently permitted by the C-1A zone were clarified in response to questions raised by the public.

No members of the public spoke to the application. No written public hearing submissions were received prior to the close of the public hearing.

The Chair called three times for further discussion on the bylaw and hearing none closed the public hearing on Bylaw No. 4598 and Bylaw No. 4599 at 7:16 pm.

CHAIR, Director A. Wickheim

BRITISH
COLUMBIA

February 5 2025 Reference: 275167

Colin Plant
Chair
Capital Regional District
PO Box 1000
Victoria BC V8W 2S6
Email: cjenkinson@crd.bc.ca

Dear Chair Plant:

Thank you for your correspondence of July 24, 2024, sharing your support for reform of the *Local Government Act* (LGA), a topic discussed at the 2024 Union of BC Municipalities (UBCM) Convention. As Minister of Housing and Municipal Affairs, I am pleased to now have the opportunity to respond.

Spurred in part by the efforts of the Regional District of Nanaimo, the Ministry of Housing and Municipal Affairs is hearing renewed interest in legislative changes to the LGA to better support regional districts.

I recognize that while regional districts have proven to be a successful and flexible model to meet the varied needs of their communities, we hear that there are areas where there may be barriers to regional districts addressing these needs. I know that the social, political, and economic environments that regional districts operate in also continue to evolve and modern approaches to the diverse issues such as climate change, environmental stewardship, and First Nations' participation in regional governance are needed.

As the Minister responsible for local governments, I am always interested in ensuring that the regional district legislative framework works effectively. At the same time, I recognize that any legislative change has to be focused on resolving issues that are a priority for communities across British Columbia. The Ministry will need to have a comprehensive picture of what the barriers and challenges are for regional districts, and whether these are the same in all regional districts or specific to certain geographic areas.



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I want to draw your attention to the session that UBCM is facilitating during the 2025 Electoral Area Director's Forum in this area. Please see the 2025 agenda items at the following link: www.ubcm.ca/about-ubcm/latest-news/agenda-items-2025-electoral-area-directors-forum

Ministry staff are also available to support the exploration and identification of areas for further work.

Thank you again for taking the time to write.

Sincerely,

Ravi Kahlon
Minister of Housing and Municipal Affairs