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# Low Impact Development in the Coquitlam River Watershed: Barriers and Facilitators in Municipal Laws

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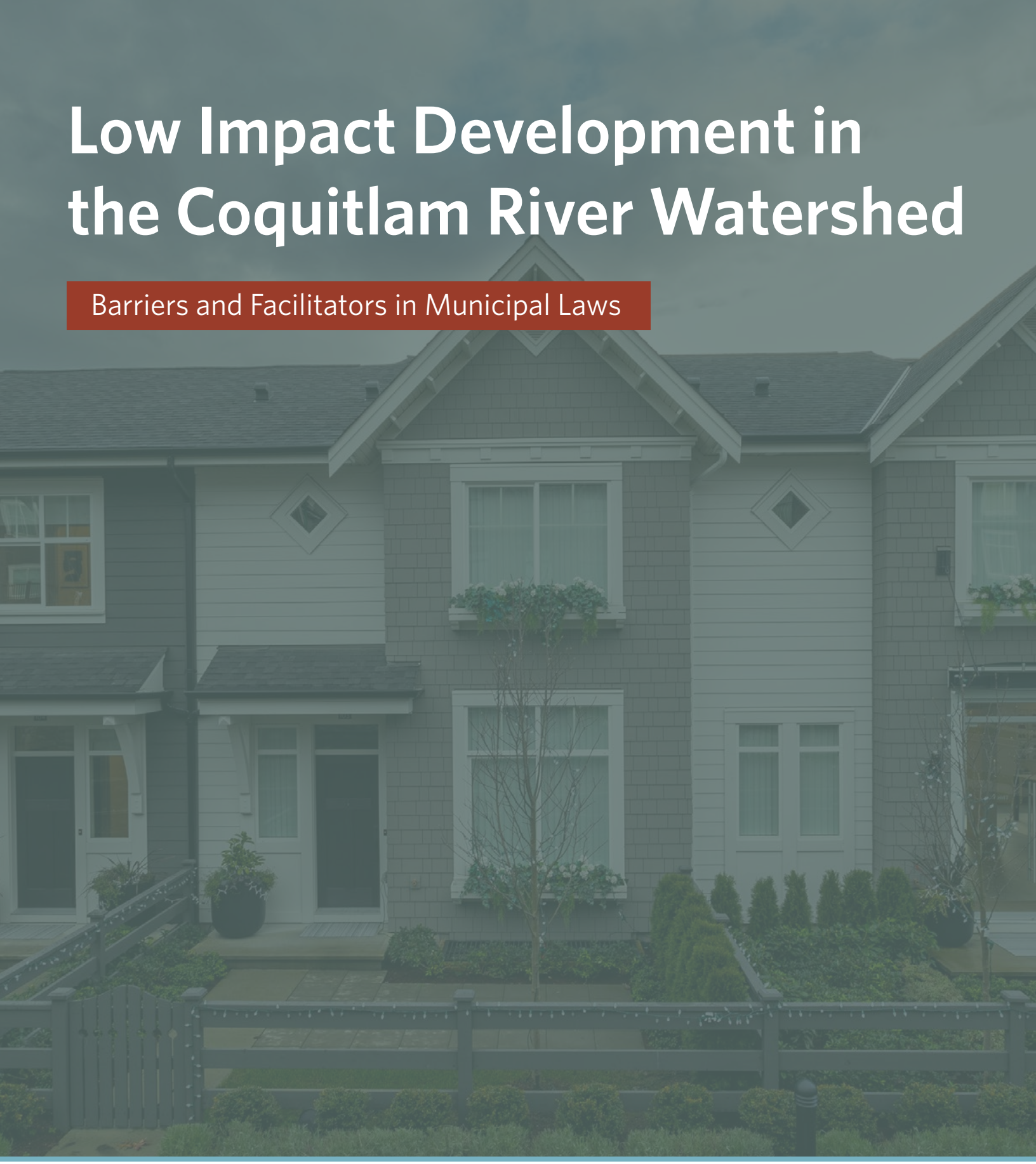
## Barriers and Facilitators in Municipal Laws



Coquitlam River Watershed Roundtable

CENTRE FOR LAW & THE **ENVIRONMENT**

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# Executive Summary

This report examines whether and how legally binding local government bylaws and regulations in the cities of Coquitlam and Port Coquitlam promote or hinder **low impact development (LID)**. It finds that local government bylaws and regulations in Coquitlam and Port Coquitlam are generally favourable to LID. They contain numerous provisions that support LID explicitly or implicitly. They do not contain any fundamental barriers to LID. In short, local government laws and regulations do not prevent the two cities from making LID an integral part of land use planning and development. That said, there are numerous opportunities, big and small, to make the current framework of local bylaws and regulations more supportive of LID.

## Low impact development

Low impact development refers to systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration or use of stormwater in order to protect water quality and associated aquatic habitat. More broadly, it refers to practices that seek to minimize or reverse the adverse ecological impacts of urban development and redevelopment by using or mimicking the functions and processes of healthy, intact ecosystems.

LID works with nature to manage stormwater at the source and reduce runoff volume, velocity and pollutant loads. It treats stormwater as a resource. By minimizing impervious surfaces and preserving or recreating natural landscape features, it reduces the environmental impacts of development, promotes natural movement of water in ecosystems and creates functional and attractive features such as rain gardens, vegetated swales, porous surfaces, green roofs, enhanced tree cover, greenways, wildlife corridors and restored streams and wetlands. At a large scale, LID can maintain or restore watershed ecology and hydrology.

## Framework for local LID bylaws and regulations

Governments at various levels can cooperate to create a comprehensive approach to LID that includes **regional growth strategies (RGSs)**, **official community plans (OCPs)** and sub-plans, **integrated stormwater management plans (ISMPs)**, **integrated watershed management plans (IWMPs)**, **development permit areas (DPAs)**, zoning bylaws, regulatory bylaws, stormwater policy and design manuals, and financial bylaws.

LID has been a core element of stormwater and watershed management guidelines in BC for more than two decades. Metro Vancouver's current regional growth strategy (RGS), Metro 2050, for the first time defines LID. It puts more emphasis on LID and LID-supportive policies and practices than previous RGSs. It encourages LID via integrated stormwater management, **amenity density bonusing**, tax exemptions, environmental **development permits (DPs)**, urban containment and clustering, preservation of conservation and recreation lands, expansion of urban forests, promotion of ecosystem connectivity and enhancement of **green infrastructure**. RGSs are not directly binding on municipalities or developers, but municipalities must include a **regional context statement (RCS)** in their **official community plan (OCP)** that describes how the OCP addresses the matters covered by the RGS.

Also at the regional level, Metro Vancouver's **Integrated Liquid Waste and Resource Management Plan** urges local governments to treat stormwater as a resource, minimize runoff, recover and reuse it, or return it to the environment as part of the hydrological cycle. It also urges them to develop and implement integrated stormwater management plans (ISMPs) at a watershed scale and integrate them into land use planning and development. Another regional initiative, the Metro Vancouver **Monitoring and Adaptive Management Framework for Stormwater**, provides municipalities with an approach for selecting stormwater management practices and tracking their effectiveness. It includes a range of LID stormwater management practices aimed at reducing stormwater at source and restoring natural hydrology, water quality and aquatic habitat. These regional documents are not directly binding on municipalities or developers, but they form part of the framework within which binding requirements are developed.

# LID bylaws and regulations in the two cities

The report examines local government bylaws and regulations in Coquitlam and Port Coquitlam in six categories: OCPs, zoning bylaws, subdivision and development servicing bylaws, development procedures bylaws, regulatory bylaws and financial bylaws. The report is restricted to LID rules, standards and criteria that are **legally binding** by virtue of being incorporated into binding laws and regulations. It does not include many non-binding policy documents, strategies and guidelines developed by the two cities that are home to many of the tools supporting LID.

## *Official Community Plans*

### Explicit references to LID

LID is endorsed explicitly in one of Coquitlam's four area plans and three of its nine neighbourhood plans, with numerous details of how it should be achieved. It is mentioned once in Port Coquitlam's OCP, with qualified endorsement.

### Stormwater and watershed management

The stormwater and watershed management provisions of Coquitlam's citywide OCP support LID by, among other things, emphasizing integrated watershed management planning, integrating IWMPs into neighbourhood planning and DPA designation, and committing to implement the city's Stormwater Management Policy and Design Manual and site-specific stormwater best management practices. It expresses caution about innovative LID approaches, however. Coquitlam's area and neighbourhood plans endorse LID to varying degrees, with those in northeast Coquitlam exhibiting the most support.

The stormwater management provisions of Port Coquitlam's OCP say little about LID stormwater management approaches apart from committing to explore integrated stormwater management practices and alternative standards for increasing pervious surfaces, improving on-site water management and revising infrastructure specifications.

### Environmentally sensitive areas

Coquitlam's citywide OCP and sub-plans support LID by committing to protect and improve **environmentally sensitive areas (ESAs)** including watercourses and riparian areas, and to integrate ESAs and natural drainage systems into neighbourhood design. Some of these plans recognize the link between ESAs, stormwater management and LID.

Port Coquitlam's OCP supports LID by committing to protect ESAs including watercourses and riparian areas and enhance the connectivity of parks and open spaces. It also prioritizes avoidance of harm to ESAs over mitigation or compensation.

### Urban forest

Coquitlam's OCP supports LID via various commitments to limit tree cutting and maintain and enhance urban trees and forests, including for the purpose of protecting riparian areas and controlling drainage and erosion. A couple of area plans commit to establish optimal post-development tree cover targets and develop urban forest management strategic plans.

Port Coquitlam's OCP recognizes that there are forest remnants in the city, encourages native vegetation in landscaping and promotes the preservation and planting of trees via various legal tools, but it does not commit expressly to protect or expand urban forest.

### Urban containment and clustering

Coquitlam's OCP supports LID by committing to a more ambitious urban containment target than the Metro 2050 RGS's, providing policies and frameworks for achieving compact, complete, transit-oriented communities, and contemplating **amenity density bonuses** that could be used for amenities with LID benefits. One area plan, however, identifies a development reserve, which can inhibit LID by reducing pressure to build out existing urban areas fully.

Port Coquitlam's OCP supports LID by committing to pursue compact, complete, transit-oriented development and to consider amenity density bonuses for environmentally high performing developments.

### Green infrastructure

Some of Coquitlam's area and neighbourhood plans support LID by committing to creation of comprehensive green space networks, albeit in some cases with more emphasis on human recreation and mobility than on natural ecosystems and wildlife. Coquitlam's citywide OCP does not mention **green infrastructure** by name, and emphasizes the need for predictable and sustainable funding for stormwater infrastructure.

Port Coquitlam's OCP does not mention green infrastructure by name and says little about creating a network of connected ecosystems and wildlife movement corridors.

### Natural hazards

Coquitlam's citywide OCP recognizes the connection between LID and **natural hazard** management by supporting tree retention, encouraging vegetation for slope stability, encouraging topsoil retention for infiltration, and requiring certain developments to respond to the city's hilly topography, minimize cut and fill excavation and use slope-adaptive architecture. Its area and neighbourhood plans promote LID by avoiding development on floodplains and hazardous slopes.

Port Coquitlam's OCP commits to develop a comprehensive approach to flood protection and to ensure that all floodplain development complies with flood proofing requirements.

### Green buildings

Coquitlam's OCP contains scattered provisions encouraging **green building** design and construction. Port Coquitlam's OCP encourages green building design and LEED certification in certain cases, but also notes that the city faces a challenge in establishing building design standards that balance environmental, economic, aesthetic and other considerations.

### Development permit areas

**Development permit areas (DPAs)**, including **watercourse protection DPAs** and other **environmental DPAs**, are a potentially powerful tool to support LID, especially if they are combined with **development approval information areas**.

Both cities have multiple DPAs, including for watercourse protection, natural hazards and other environmental concerns. Coquitlam's watercourse protection, unstable slopes, interface wildfire and other environmental DPAs cover specified parts of the city. Its DPA guidelines support LID in varying ways by encouraging green roofs, tree retention, native vegetation, stream and habitat protection, permeable surfacing, topography-sensitive development, on-site infiltration, and innovative stormwater management practices.

Port Coquitlam's watercourse protection, environmental conservation, natural environment protection, and natural hazards DPAs cover specific areas of the city. Its DPA guidelines are quite supportive of LID, especially those for the watercourse protection DPA, which aim to protect, conserve, restore or enhance riparian ecosystems and biodiversity. DPA requirements and guidelines include maintenance of natural hydrology, drainage and flood control functions; control of erosion and sediment; aquatic and riparian habitat protection; pollution prevention; preservation of native vegetation; tree and shrub retention; and stream restoration or enhancement. Port Coquitlam's other DPA guidelines also support LID by encouraging permeable surfacing, innovative stormwater management techniques, tree retention and environmentally appropriate vegetation.

Both cities require certain work to be done by **qualified professionals** with specified credentials, but these credentials do not explicitly include experience or training in LID, green infrastructure or integrated stormwater management.

Finally, both cities offer reduced **development permit (DP)** application fees for certain developments, but these reductions are not linked to implementation of LID best practices.

### Site-level customization tools

Coquitlam's OCP provides several tools that could support LID via comprehensive, fine-grained, tailor-made regulation of individual developments, including **comprehensive development zones (CDZs)** and **master development plans (MDPs)**. The rules

governing these tools include some attention to sustainability and stormwater management, but do not require any particular LID practices. Port Coquitlam's OCP provides some support for LID by authorizing CDZs for high-density residential developments that, among other things, achieve a high level of environmental performance.

### Monitoring

Coquitlam's OCP recognizes that developing a framework to monitor progress toward its goals is a huge and complex task and commits to monitor certain indicators, but contains few concrete provisions for monitoring indicators relevant to LID. Port Coquitlam's OCP contains no provisions for monitoring progress.

### *Zoning Bylaws*

Neither city's zoning bylaw mentions the terms LID, watershed management or green infrastructure, but both support LID in various ways and to varying degrees.

Coquitlam's zoning bylaw supports LID by requiring protection of riparian areas in accordance with the provincial **Riparian Areas Protection Regulation (RAPR)**. Beyond this, it supports LID modestly via a complicated mix of rules for minimum lot size, maximum floor area, maximum **floor area ratio (FAR)**, maximum number of buildings or units per lot or hectare, minimum lot area per dwelling unit and maximum lot coverage. It also contains reduced parking standards or concealed/indoor parking in specific areas; bicycle parking requirements; environmental setbacks in certain zones; tree retention and planting requirements; requirements for landscaped strips and screens; an elaborate multi-step amenity density bonus system; limits on construction in slope and flood hazard areas; and LID-supportive provisions scattered across multiple CDZs. That said, it contains no limits on impermeable surfaces, and mentions permeable pavement as an option only in connection with secondary suites and laneway houses.

Port Coquitlam's zoning bylaw supports LID modestly via limits on impermeable surfaces and lot coverage in some zones; reduced parking standards or encouragement of concealed/indoor parking for certain developments; modest environmental setbacks in certain zones; requirements for landscaped strips and screens; minimum lot sizes; maximum FAR; amenity density bonuses; limits on construction in flood zones; and environmental provisions in multiple CDZs. That said, the bylaw's LID-supportive requirement for green roofs on large commercial and industrial buildings, a Canadian first, was removed in 2022.

### *Subdivision and Development Servicing Bylaws*

Coquitlam's subdivision and development servicing bylaw is generally supportive of LID, including by requiring compliance with the city's **Stormwater Management Policy and Design Manual** and preparation of **stormwater management plans (SMPs)**. The Manual includes numerous objectives, criteria, guidelines and **best management practices (BMPs)** that substantially support LID stormwater management. The bylaw also requires SMPs to conform to the requirements and criteria of any completed watershed studies, thus giving **integrated stormwater and watershed management plans (ISMPs and IWMPs)** legal teeth. Several of Coquitlam's IWMPs and ISMPs endorse LID explicitly or implicitly. In addition, the bylaw supports LID by requiring the city's LID-friendly Rainwater Management Source Control Guidelines to be followed whenever an IWMP or ISMP recommends the use of source controls. One limitation of otherwise LID-supportive IWMPs and ISMPs is that they rely on conventional stormwater management approaches when a watershed's natural hydrological capacities are exceeded, instead of committing to keep development within those natural limits.

Coquitlam's bylaw also includes numerous other provisions that could support LID, including limits on earthworks and ravine crossings, and requirements for bike lanes, trails, greenways and street trees. Obversely, some provisions may be in tension with LID including rules about curbs, surfacing and boulevard landscaping and irrigation.

Port Coquitlam's subdivision and development servicing bylaw supports LID modestly, including a requirement to consider preserving natural drainage courses. That said, Port Coquitlam does not have a standalone stormwater management design and policy manual, and the bylaw's stormwater management criteria and specifications do not appear to have been drafted with LID or ISMPs/IWMPs in mind.

### *Development Procedures Bylaws*

Coquitlam's development procedures bylaw gives some support to LID by requiring some LID-relevant information with development applications. That said, its definition of "qualified professional" does not include LID expertise, its security requirements are not based directly on the cost of performing the secured work, and the use of security may not extend to LID-related permit conditions.

Port Coquitlam's development procedures bylaw supports LID by requiring some LID-relevant information with development applications, adopting an open-ended definition of "qualified professional" that could encompass LID-related expertise, and requiring security to cover 110% of the cost of landscaping or watercourse protection work.

Both cities' development procedures bylaws could increase their support for LID by extending the detailed information requirements for watercourse protection DPs to other development applications with environmental or LID implications. In addition, both cities' bylaws delegate certain smaller development applications to city staff for speedy handling. In Port Coquitlam this includes green roofs, but otherwise delegation in both cities is not explicitly linked to LID criteria.

### *Regulatory Bylaws*

#### Sewerage and Drainage

Neither city's sewer and drainage bylaw contains explicit LID provisions but both contain some provisions that could support LID by, for example, exercising the city engineer's approval power to allow or require LID stormwater BMPs, or by protecting LID stormwater infrastructure against interference or damage.

#### Screening and Landscaping

The two cities do not have standalone screening and landscaping bylaws but address these requirements via zoning bylaws and DPAs, which are discussed elsewhere in the report.

#### Tree Protection

Both cities' tree protection bylaws support LID by prohibiting removal of certain trees, imposing stricter limits in environmentally sensitive and naturally hazardous areas, and requiring the planting of replacement trees. Port Coquitlam's bylaw provides additional support by limiting exemptions to emergency situations, requiring tree protection zones during construction and offering enhanced protection for native, wildlife, heritage and large trees. In Coquitlam, security is based on the cost of replacement trees and site restoration, whereas in Port Coquitlam it is a fixed amount that may or may not correspond to actual costs. Finally, some features of Coquitlam's bylaw could be in tension with LID, including exemptions, administrative discretion and tree replacement formula.

#### Soil Deposit and Removal

Both cities' soil deposit and removal bylaws support LID by regulating activities that can have major impacts on hydrology, drainage and ecology. They require detailed LID-relevant plans, specifications and information prepared by qualified professionals, and provide LID-friendly grounds for issuing or refusing permits. Coquitlam's bylaw provides additional protection for environmentally sensitive areas, while Port Coquitlam's provides additional protection by applying to non-natural substances like petroleum products, chemicals and construction waste and by requiring applicants to post security.

#### Watercourse Protection

On top of the provincial Riparian Areas Protection Regulation, which Coquitlam implements through its zoning bylaw and Port Coquitlam via development permits, both cities have bylaws that protect both natural watercourses and built stormwater infrastructure by prohibiting and prescribing penalties for pollution or obstruction of any watercourses, waterworks, drainage works or sewers. Coquitlam's bylaw contains detailed rules for pollution prevention, spills, ESC, security and remedial action.

#### Building

Coquitlam's building bylaw supports LID by requiring building permit applications to address lot grading, drainage, watercourse setbacks, flood protection and slope hazards. Developments involving excavation or fill must maintain pre-development runoff levels. The

city may approve storm drain connections to alternative drainage systems, which could in principle include LID stormwater management BMPs. Port Coquitlam's Building and Plumbing bylaw supports LID modestly by requiring building permits to identify watercourse boundaries, flood levels and flood setbacks.

### Boulevard Maintenance

Both cities' boulevard maintenance bylaws support LID by restricting tree removal and impervious surfaces in boulevards, allowing adjacent owners to plant vegetation in boulevards (within limits), and requiring them to water vegetation they planted. Coquitlam's bylaw provides additional support for LID by requiring adjacent owners to water city-planted vegetation, while Port Coquitlam's bylaw provides additional support for LID by requiring city permission for actions that interfere with infrastructure, affect drainage or change the grade in boulevards. It also allows the city to remove owner improvements from boulevards without compensation, which could facilitate installation of municipal LID stormwater facilities. On the other hand, it does not require adjacent owners to water city-planted vegetation.

### Pesticides and Invasive Species

Both cities have bylaws banning the cosmetic use of pesticides on residential or city land, with some exceptions. These bylaws support LID by reducing the release of toxic chemicals that could enter aquatic ecosystems. Neither city has adopted a comprehensive invasive species bylaw, however. Coquitlam bylaws outlaw 18 listed invasive plant species in boulevards and one species on private property (Giant Hogweed). Port Coquitlam's noxious weeds bylaw does not explicitly regulate any invasive plant species.

### *Financial Bylaws*

In principle, municipalities may vary or reduce **development cost charges (DCCs)** and other fees and charges depending on whether and to what extent a proposed development contributes to LID. Neither city's DCCs or other fees and charges appear to vary based on a development's contribution to LID, however, with the exception of a DCC exemption for "tiny houses" in Coquitlam. Municipalities may also, in principle, offer **property tax exemptions** for certain types of properties that deliver LID benefits or services, but neither city appears to do so at present. Finally, municipalities may, in principle, create and/or use certain **reserve funds** to finance the creation or maintenance of LID facilities and other green infrastructure, but this report does not investigate the extent to which the two cities have done so beyond noting that both have various reserve funds that could be used for such purposes.

## Opportunities

The report identifies numerous opportunities to increase the support for LID in local government bylaws and regulations. It is important to emphasize that these are not recommendations. It is up to the Roundtable, the cities and their stakeholders to determine which, if any, to pursue. Furthermore, the report generally refrains from identifying features of one city's bylaws as opportunities for improvement of the other's, so as not to imply that either city's approach is better than the other's. That said, each city may be able to learn from the other's experiences and build on the strengths of the other's bylaws and regulations.

All the opportunities identified in the report are compiled in one place at the end of this report, along with references to the section of the report where they are found.

# 1. Introduction

This report surveys provisions of the **bylaws and regulations of the cities of Coquitlam and Port Coquitlam** that could facilitate or hinder **low impact development (LID)** in the Coquitlam River watershed.

## 1.1 What is low impact development?

Urban development can have a wide range of adverse effects on the ecosystems that support the life and well-being of human and other inhabitants. These effects have become increasingly evident in the era of global climate change and biodiversity loss. **Low Impact Development (LID)** has emerged as one response to this problem.

At its broadest, LID refers to practices that seek to minimize or reverse the adverse ecological impacts of urban development and redevelopment by using or mimicking the functions and processes of healthy, intact ecosystems. For purposes of this report, however, LID is defined more narrowly to focus on stormwater management:

*The term low impact development (LID) refers to systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration or use of stormwater in order to protect water quality and associated aquatic habitat. (United States Environmental Protection Agency)*[1]

Stormwater can carry a variety of pollutants and can cause or exacerbate a range of problems including combined sewer overflows, soil erosion, flooding, and degradation of aquatic environments. LID works with nature to manage stormwater as close to its source as possible. It employs practices that remove pollutants from stormwater and reduce the volume and velocity of stormwater flows. By preserving or recreating natural landscape features and minimizing impervious surfaces, it can decrease the environmental impacts of built-up areas, promote natural movement of water in an ecosystem and watershed, and create functional and attractive site drainage that treats stormwater as an asset rather than waste. Applied on a large scale, LID can maintain or restore the ecological and hydrological functioning of watersheds.[2]

LID is related to other concepts and approaches. It is often understood as a strategy for promoting and protecting **green infrastructure**, which Metro Vancouver's new **regional growth strategy (RGS)** defines as the "natural, enhanced, and engineered assets that collectively provide society with ecosystem services."[3] Green infrastructure employs a "design with nature" approach to mitigate adverse environmental impacts of existing and future development and provide ecological services.[4] LID practices are also often key elements of **integrated stormwater management** and **integrated watershed management**.

In 2002 the BC government issued a non-binding stormwater planning guidebook with substantial input from Metro Vancouver, Coquitlam and other local

## LOW IMPACT DEVELOPMENT PRACTICES

Low impact development can employ a wide range of practices. Some common examples (and associated stormwater management benefits) include:

- Rain gardens, vegetated swales and strips, infiltration ponds, infiltration trenches and bioretention areas (enhancing retention and infiltration, reducing soil erosion)
- Porous surfacing, and grading of hard surfaces towards porous ones (reducing runoff)
- Green roofs and walls (reducing runoff, enhancing evapotranspiration)
- Increased tree cover (promoting evapotranspiration)
- Rain chains, rain barrels, cisterns and irrigation systems to harvest and reuse rainwater (reducing runoff)
- Soil stockpile protection, silt fences, settling ponds and check dams (limiting erosion and sediment movement)
- Daylighting buried watercourses, enhancing natural streams, increasing riparian setbacks and restoring wetlands (improving water quality, recreating natural hydrology and reducing flood hazards).

1 United States Environmental Protection Agency, "Urban Runoff: Low Impact Development," online: http://www.epa.gov/nps/lid ("USEPA LID").

2 USEPA LID.

3 Metro Vancouver, *Metro 2050: Regional Growth Strategy* (February 2022) at 102, online: http://www.metrovancouver.org/metro2050 ("*Metro 2050*").

4 Susan Rutherford, *The Green Infrastructure Guide: Issues, Implementation Strategies and Success Stories* (Vancouver: West Coast Environmental Law Research Foundation, 2007) at 5, online (pdf): https://www.waterbucket.ca/gi/sites/wbcgi/documents/media/336.pdf ("Green Infrastructure Guide").

governments.[5] The Guidebook embraced LID as a core element of integrated stormwater management. It treated stormwater as a resource for aquatic species, groundwater recharge, water supply and recreation.

The Guidebook urged the use of "integrated stormwater solutions that mimic the most effective stormwater management system of all – a naturally vegetated watershed."[6] This means capturing rainfall from frequent small storms for infiltration or re-use, storing runoff from large storms for gradual release and conveying runoff from extreme storms safely.

The Guidebook also called for stormwater management planning at regional, watershed, neighbourhood and site scales, and an adaptive approach to setting and revising performance targets and management practices.

At the site level, the Guidebook gave detailed guidance on LID practices that minimize detrimental changes like impervious surfacing, vegetation removal and soil compaction, and that preserve beneficial natural features such as wetlands, riparian forests, natural infiltration areas and floodplains. It suggested minimizing impervious area by reducing road widths, structural footprints, **parking standards** (number of spaces per dwelling unit) and surface parking, and building compact communities.[7] It also detailed four types of source control practices: absorbent landscaping (surface soil and vegetation, with particular preference for forests), infiltration facilities, green roofs and rainwater reuse.[8]

Province-wide approaches to LID have continued to evolve since the Guidebook's publication. Numerous reports and guides are available on the websites of the Partnership for Water Sustainability in BC[9] and the Stewardship Centre for BC.[10] These include a guide to Green Infrastructure[11] and a Green Bylaws Toolkit, now in its third edition.[12]

Although these resources are not binding on municipalities or developers, they are valuable sources of information about LID. The Green Bylaws Toolkit is especially valuable in evaluating the strengths and opportunities for improvement of municipal bylaws related to LID.

## 1.2 A comprehensive approach

There is no single correct approach to establishing local bylaws and regulations that support LID. For most LID principles and techniques, there are multiple legal avenues to achieve the same goal. Local governments can choose different legal tools or packages of legal tools to achieve the same objectives. The choice of tools will depend on various factors including local ecology, historic and projected land use patterns, the capacity and expertise of the local government and developers, and the existing framework of bylaws and permitting processes.

The Green Bylaws Toolkit recommends that regional districts and municipalities collaborate to adopt a comprehensive, integrated approach that includes the following elements:

1. A **regional growth strategy (RGS)** that establishes an urban containment boundary and secures a commitment from member local governments that a specified percentage of growth over the life of the strategy will happen within the urban containment boundary.

2. **Official community plans (OCPs)** and **integrated watershed management plans (IWMPs)** that:
   - Map and designate **environmentally sensitive areas (ESAs)**;
   - Designate land uses and prescribe densities that concentrate development in areas away

5 British Columbia, Ministry of Water, Land and Air Protection, *Stormwater Planning: A Guidebook for British Columbia* (2002), online (pdf): https://www2.gov.bc.ca/assets/gov/environment/waste-management/sewage/stormwater_planning_guidebook_for_bc.pdf ("BC Stormwater Guidebook").

6 BC *Stormwater Guidebook*, p ES-4.

7 BC *Stormwater Guidebook*, s 7.2.

8 BC *Stormwater Guidebook*, ss 7.3-7.8.

9 The Partnership for Water Sustainability in BC, "Guidance Documents and Resources," https://waterbucket.ca/guidance-resources/.

10 Stewardship Centre for BC, online: https://stewardshipcentrebc.ca/.

11 *Green Infrastructure Guide*.

12 *Stewardship Centre for BC, Green Bylaws Toolkit for Protecting and Enhancing the Natural Environment and Green Infrastructure*, 3d ed (2021), online: https://stewardshipcentrebc.ca/green-bylaws-toolkit/ ("*Green Bylaws Toolkit*").

from ESAs;
- Describe how the local government will halt the loss of existing ESAs; and
- Establish clear and rigorous amenity bonus and density policies.

3. **Development Permit Area (DPA)** guidelines that:
   - Require a permit from the local government before development occurs in an ESA;
   - Establish a development review process, including an environmental/green infrastructure impact assessment process; and
   - Create guidelines for best management practices.

4. **Zoning bylaw standards** that:
   - Preserve large lots outside the urban containment boundary (UCB);
   - Encourage mixed-use, nodal development within the UCB;
   - Establish setbacks for watercourse management areas and sensitive ecosystems;
   - Set specific density bonuses for specific zones;
   - Establish the maximum percentage of impervious surface for each zone;
   - Set standards for, and regulate the provision of, landscaping and screening to preserve, protect, restore and enhance the natural environment; and
   - Enable development to be clustered away from ESAs in specific zones.

5. **Regulatory bylaws** that set out, for the entire local government area, regulatory prohibitions in such areas as tree protection, soil removal and deposit, water quality, pesticide use and invasive species.

6. A **Stormwater Policy and Design Manual** that focuses on infiltrating rainwater at its source, and that is adopted into the Subdivision and Development Services Bylaw.[13]

Although this comprehensive approach is aimed at "green" bylaws generally, it provides a useful reference point when considering the extent to which local bylaws and regulations support LID. One additional element discussed in this report is financial arrangements (including fees, charges, property tax rules and reserve funds) that give developers incentives and provide local governments with resources to implement LID. It is also worth noting that public awareness and public investment are also important pieces of a comprehensive LID strategy.[14]

## 1.3 Flexibility versus certainty

Another issue to consider is whether LID bylaws and regulations should be flexible or rigid in terms of specifying how regulated actors should or should not behave. Historically, many local governments have relied on **prescriptive standards** that dictate precisely how certain things are to be done, for example engineering standards that specify precisely how drainage works are to be constructed.

**Performance standards**, on the other hand, specify the result to be achieved and allow the regulated actor to choose how to achieve the result, for example stormwater management rules requiring runoff not to exceed pre-development levels, or development permit conditions requiring developers to maintain natural hydrologic regimes, normal wetland processes or intact riparian ecosystems. Performance standards are specific about the outcomes to be achieved, but flexible about the means to achieve them. A disadvantage of performance standards is that, compared to prescriptive standards, they require more staff resources and expertise to evaluate solutions proposed by landowners and developers and monitor their effectiveness once implemented. On the plus side, they enable solutions to be tailored to the ecological and technical circumstances of individual sites and projects.

More generally, there is a tradeoff between flexibility and certainty when designing legal requirements. An advantage of flexible, open-ended requirements is that they allow local governments and developers to tailor solutions to individual circumstances, but a downside is that they can create uncertainty regarding exactly what is required or will be accepted.

13 Green Bylaws Toolkit, pp 40-41.

14 "Well-balanced stewardship initiatives will include not only regulation, but will also integrate planning, public awareness and public investment actions." Lanarc Consultants Ltd, *Stewardship Bylaws: A Guide for Local Government*, revised edition (Ottawa: Government of Canada; Victoria: Government of British Columbia, 1999) 1 (*Stewardship Bylaws Guide*).

It is up to local governments to decide which legal tools to use, whether and how to combine them into a comprehensive package, and how to balance prescriptiveness and flexibility.

## 1.4 About this report

The Coquitlam River Watershed Roundtable commissioned this report to consider whether and how local government bylaws and regulations in force in the cities of Coquitlam and Port Coquitlam promote or hinder LID in the two cities.

The Coquitlam River Watershed Roundtable is a collaborative governance organization that seeks to preserve or enhance the health of the Coquitlam River watershed by means of collaboration, education and advisory action. To guide its activities, the organization developed the *Lower Coquitlam River Watershed Plan*, which identifies the top pressures affecting watershed health and various strategies to address these pressures.[15] The plan ranks development as the biggest pressure in the watershed and recognizes encouragement for the use of LID techniques as a strategy to address the issue.

### DISCLAIMER

This report does not constitute legal advice and must not be relied on as such.

The report is intended as a resource both for readers who are not familiar with the existing laws and regulations, and for city staff who know these laws and regulations inside out. As a result, it contains a lot of descriptive information that will already be familiar to the latter.

The scope of this report is restricted to legally binding local government bylaws and regulations. Numerous provincial and federal laws are potentially relevant to LID, including provincial legislation on riparian areas, the Agricultural Land Reserve, farming, wildlife, forestry and water sustainability, and federal laws relating to fish, migratory birds and endangered species. These provincial and federal laws are beyond the scope of this report. So are local First Nation governments and Indigenous laws.

Also outside the scope of this report are plans, strategies, policies and guides that guide decisions but are not legally binding. The two cities have adopted numerous such documents. Coquitlam issued a *Low Impact Development Policy and Procedure Manual* in 2004 (LID Manual),[16] a *Guide to Best Site Development Practices in 2005*[17] and a *Green Development Guide* in 2008,[18] all of which explicitly endorsed LID techniques. The LID Manual was superseded by *Rainwater Management Source Controls: Design Requirements and Guidelines* in 2009,[19] which reportedly functions in a similar manner but is not as prescriptive.[20] The city's voluntary "Building Better Green Star" program, which recognizes developments that implement practices that mimic nature, lists numerous LID techniques amongst its eligible features.[21] Numerous LID projects have been recognized via this program. [22]

Coquitlam's *Environmental Sustainability Plan*,[23] adopted in 2022, also supports LID. Among other things, it commits the City to manage stormwater to mimic natural hydrology and reduce pollution,[24] complete its network of integrated watershed management plans to cover the whole city,[25] pursue opportunities to daylight

15 Coquitlam River Watershed Roundtable, *Lower Coquitlam River Watershed Plan* (2015), online: https://www.coquitlamriverwatershed.ca/roundtable/watershed-plan/.

16 City of Coquitlam, *Low Impact Development Policy and Procedure Manual* (December 2004), no longer available on city website.

17 City of Coquitlam, *Guide to Best Site Development Practices* (April 2005), online (pdf): https://www.coquitlam.ca/documentcenter/view/317.

18 City of Coquitlam, Green Development Guide (February 2008), online: https://www.coquitlam.ca/293/Green-Development-Guide.

19 City of Coquitlam, *Rainwater Management Source Controls: Design Requirements and Guidelines* (March 2009), online (pdf): https://waterbucket.ca/cfa/files/2014/01/Coquitlam_Rainwater-Management-Source-Controls-Design-Requirements-and-Guidelines_March-2009.pdf.

20 Green Bylaws Toolkit, p 154.

21 City of Coquitlam, "Building Better," online: https://www.coquitlam.ca/377/Building-Better; "Apply for a Green Star," online: https://www.coquitlam.ca/378/Apply-for-a-Green-Star.

22 City of Coquitlam, "Featured Projects," online: https://www.coquitlam.ca/379/Featured-Projects.

23 City of Coquitlam, *Environmental Sustainability Plan* (January 2022), online: https://www.coquitlam.ca/898/Environmental-Sustainability-Plan ("Coquitlam ESP").

24 Coquitlam ESP, p 50.

25 Coquitlam ESP, p 52, Action 97.

buried waterways,[26] apply its Rainwater Management Guidelines citywide,[27] enhance erosion and sediment control measures including for single family developments,[28] explore ways to increase onsite rain and stormwater retention with a focus on single family developments,[29] consider rainwater, groundwater and greywater reuse systems for larger developments,[30] protect and expand green infrastructure elements (street trees, bioswales, green walls, etc) and the regional green infrastructure network,[31] develop a citywide Urban Forest Management Plan,[32] implement strategies to increase tree canopy cover on private and public lands [33]and extend tree replanting requirements citywide.[34]

Port Coquitlam also has LID-friendly guides and policies. As an example, its *Environmental Strategic Plan*,[35] adopted in 2011, committed the city to protect watershed hydrology and aquatic ecosystems through best management practices in water quality and rainwater management,[36] achieve no net loss of forest, watercourse or foreshore habitat,[37] develop an interconnected network of green spaces to support wildlife, recreation and ecosystem services,[38] protect and manage the urban forest,[39] promote transit-oriented development,[40] and design financial tools to encourage green development.[41]

Furthermore, the cities have technical specifications and standards for LID projects. For example, Coquitlam's *Supplementary Specifications and Detailed Drawings and Streetscape Design Guidelines* include criteria for boulevard retention trenches, curb bulge rain gardens, linear rain gardens permeable pavement, green lanes and Specifications and standards like these are not included in this report because they are not incorporated directly into legally binding bylaws.

Policies, strategies and specifications such as these are crucial for the achievement of LID, but the present report is restricted to documents that are legally binding either on their own or by virtue of being incorporated into binding laws and regulations.

### OPPORTUNITIES

Opportunities are presented in blue boxes throughout the report. These are not recommendations. They are merely options to consider. It is up to the Roundtable, the cities and their respective stakeholders to determine which, if any, of these opportunities to pursue.

The two cities are discussed in alphabetical order in Part 3 (Coquitlam before Port Coquitlam), and in reverse alphabetical order in Part 4 (Port Coquitlam before Coquitlam).

Finally, some key terms are presented in bold font for emphasis.

## 1.5 Acknowledgements

The author is grateful to the Coquitlam River Watershed Roundtable, the members of the Roundtable's Development Project Committee and the cities of Coquitlam and Port Coquitlam for their contributions to this research.

26 Coquitlam ESP, p 52, Action 98.

27 Coquitlam ESP, p 52, Action 100.

28 Coquitlam ESP, p 52, Action 102.

29 Coquitlam ESP, p 52, Action 103.

30 Coquitlam ESP, p 48, Action 86.

31 Coquitlam ESP, p 33, Action 60; p 58, Action 117.

32 Coquitlam ESP, p 59, Action 121.

33 Coquitlam ESP, p 59, Action 124.

34 Coquitlam ESP, p 59, Action 125.

35 City of Port Coquitlam, *EnviroPlan Port Coquitlam: An Environmental Strategic Plan for the City of Port Coquitlam* (March 2011), online: http://www.portcoquitlam.ca/wp-content/uploads/2017/01/EnviroPlan-Final-Version.pdf ("Port Coquitlam EnviroPlan").

36 Port Coquitlam EnviroPlan, p 52.

37 Port Coquitlam EnviroPlan, p 17.

38 Port Coquitlam EnviroPlan, pp 22, 41, 43.

39 Port Coquitlam EnviroPlan, p 41.

40 Port Coquitlam EnviroPlan, p 431.

41 Port Coquitlam EnviroPlan, p 60.

## ABBREVIATIONS AND ACRONYMS USED IN THIS REPORT

| | |
|---|---|
| **AHNP** | Austin Heights Neighbourhood Plan (Coquitlam) |
| **AMF** | Adaptive management framework |
| **AMP** | Adaptive management practice |
| **BMP** | Best management practice |
| **CCAP** | City Centre Area Plan (Coquitlam) |
| **CDZ** | Comprehensive development zone |
| **CWOCP** | Citywide Official Community Plan (Coquitlam) |
| **DCC** | Development cost charge |
| **DP** | Development permit |
| **DPA** | Development permit area |
| **DWMP** | Drinking water management plan |
| **EIA** | Environmental impact assessment |
| **ESA** | Environmentally sensitive area |
| **ESC** | Erosion and sediment control |
| **FAR** | Floor area ratio |
| **GVRD** | Greater Vancouver Regional District |
| **FBSDD** | Greater Vancouver Sewerage and Drainage District |
| **ILWRMP** | Integrated Liquid Waste and Resource Management Plan (Metro Vancouver) |
| **ISMP** | Integrated stormwater management plan |
| **IWMP** | Integrated watershed management plan |
| **KPI** | Key performance indicator |
| **LHCVNP** | Lower Hyde Creek Village Neighbourhood Plan (Coquitlam) |
| **LID** | Low impact development |
| **LWMP** | Liquid waste management plan |
| **MDP** | Master development plan |
| **MNP** | Maillardville Neighbourhood Plan (Coquitlam) |
| **NECAP** | Northeast Coquitlam Area Plan |
| **NWCAP** | Northwest Coquitlam Area Plan |
| **OCP** | Official community plan |
| **PCNP** | Partington Creek Neighbourhood Plan (Coquitlam) |
| **PocoPlan** | Port Coquitlam Official Community Plan |
| **RAPR** | Riparian Areas Protection Regulation |
| **RCS** | Regional context statement |
| **RGS** | Regional growth strategy |
| **SCNP** | Smiling Creek Neighbourhood Plan (Coquitlam) |
| **SMP** | Stormwater management plan |
| **SPEA** | Streamside Protection and Enhancement Area |
| **SWCAP** | Southwest Coquitlam Area Plan |
| **UCB** | Urban containment boundary |
| **UHCVNP** | Upper Hyde Creek Village Neighbourhood Plan (Coquitlam) |
| **WPA** | Watercourse protection area |
| **WVCNP** | Waterfront Village Centre Neighbourhood |

# 2. Legal framework for LID in BC

In BC, the authority to enact laws and regulations affecting LID is shared among all governments—federal, provincial, local and First Nations. This report focuses on the role of local governments.

Provincial law gives local governments power and responsibility over a range of matters central to LID, including zoning, land use planning, drainage, sewerage, runoff, screening and landscaping, subdivision servicing, floodplain construction, development permit areas, development cost charges and **amenity density bonusing**, along with limited powers in relation to tree protection, soil removal and deposit, and environmental protection.[42]

These powers are distributed between regional districts (for example, Metro Vancouver) and individual municipalities (for example, Coquitlam and Port Coquitlam). The main avenue for a regional district to influence LID within municipalities is via a **regional growth strategy (RGS)**. Regional districts also have power to enact bylaws, but these bylaws apply only in the portions of a regional district that fall outside member municipalities' boundaries. Since this report is restricted to laws and regulations applicable within the cities of Coquitlam and Port Coquitlam, it does not consider Metro Vancouver regional bylaws.

## 2.1 Regional growth strategy

### *2.1.1 Introduction*

An RGS is basically an agreement between a regional district and its member municipalities to guide decisions on development in the district. The purpose of an RGS is "to promote human settlement that is socially, economically and environmentally healthy and that makes efficient use of public facilities and services, land and other resources."[43]

The *Local Government Act* says that RGSs "should" work towards several goals that include avoiding urban sprawl, protecting environmentally sensitive areas and protecting the quality and quantity of ground and surface water.[44] RGSs can support LID in numerous ways, including by promoting integrated watershed management, creating commitments to protect green infrastructure and environmentally sensitive areas, setting **urban containment boundaries (UCBs)**, and designating regional greenways and wildlife habitat corridors.

RGSs are not directly binding on municipalities or developers. They get their legal teeth through member municipalities' **Official community plans (OCPs)**. Member municipalities, such as Coquitlam and Port Coquitlam, must first accept the RGS and then adopt a **regional context statement (RCS)** as part of their OCPs.

The RCS describes how the OCP addresses the matters covered by the RGS. The regional district must then accept the municipality's RCS. OCPs are expected (but not strictly required) to be generally consistent with the RGS. If an OCP is not consistent with the RGS, the RCS must explain how the OCP will be made consistent with the RGS over time. A municipality's RCS and the rest of the OCP must be consistent with each other, however.[45]

### *2.1.2 Metro Vancouver's RGS*

Metro Vancouver's *Metro 2050* Regional Growth Strategy, which is currently in the acceptance phase,[46] encourages LID in several ways, including via integrated stormwater management, amenity density bonusing, tax exemptions, environmental development permits, urban containment and clustering, preservation of conservation and recreation lands, expansion of urban forests, promotion of ecosystem connectivity and enhancement of green infrastructure.

42 These powers and responsibilities are set out in the Community Charter, SBC 2003, c 26 and the *Local Government Act*, RSBC 2015, c 1. The powers described as "limited" are limited in the sense that their exercise requires provincial government approval in certain circumstances. This report does not discuss the exact scope and limits of local government powers and responsibilities in relation to LID.

43 *Local Government Act*, s 428.

44 *Local Government Act*, s 428.

45 *Local Government Act*, s 428.

46 Metro Vancouver, Updating the Regional Growth Strategy, http://www.metrovancouver.org/metro2050.

For the first time, *Metro 2050* includes a definition of LID. It defines LID to include not just stormwater management but also ecosystem connectivity and extreme weather event mitigation.

### *Metro 2050's Definition of LID*

***Low Impact Development** - Development that works with nature to: manage stormwater quantity and quality by preserving trees and other natural features where possible; support ecosystem connectivity; minimize impervious surfaces; and create dispersed multi-functional landscapes that minimize pollutant runoff, the need for stormwater infrastructure, and extreme flooding and heat events.*[47]

*Metro 2050* puts considerably more emphasis on LID than did the previous RGS, *Metro Vancouver 2040*.[48] Although *Metro 2040* is still in force, *Metro 2050* will soon replace it, and member municipalities will have to update their RCSs to demonstrate how their OCPs are consistent or will be made consistent with the new RGS.

The provisions of the *Metro 2050* RGS most relevant to LID can be described briefly as follows.

The new RGS promises to collaborate with member municipalities to identify and support a regional green infrastructure network and protect, enhance and restore sensitive ecosystems.[49] It also commits Metro Vancouver to collect, maintain and share with member municipalities data relevant to LID, including the Sensitive Ecosystem Inventory, tree canopy cover and imperviousness, and to provide guidance on methodologies, tools and decision-making frameworks for incorporating natural assets and ecosystem services into planning and asset management.[50]

The RGS sets an **urban containment boundary (UCB)** and a target of containing 98% of residential growth within it.[51] It directs the Greater Vancouver Sewerage and Drainage District not to allow connections to regional sewerage services to rural, agricultural or conservation and recreation lands unless the connection is necessary to manage a public health or environmental contamination risk or would have no significant impact on containing urban development within the UCB and protecting agricultural, rural, conservation or recreation lands.[52] This exemption can weaken the effectiveness of the UCB by enabling development outside the boundary in the absence of pressing public health or environmental reasons.

#### OPPORTUNITY

Advocate amendment of the RGS to eliminate "no significant impact" on urban containment or protection of rural, agricultural, conservation or recreation lands as a ground for exemption from the sewerage connection ban.

47 *Metro 2050*, p 102.

48 Metro Vancouver, *Metro Vancouver 2040: Shaping Our Future* (July 2011, updated to February 28, 2020), online: http://www.metrovancouver.org/services/regional-planning/metro-vancouver-2040/about-metro-2040/Pages/default.aspx ("*Metro 2040*"). *Metro 2040* mentions low-impact development only once, in an illustrative figure about how land use and transportation actions can address climate change. *Metro 2040*, p 41, Figure 3.

49 *Metro 2050*, Strategy 3.2.3. *Metro 2040* contains broadly similar but not as explicit commitments surrounding green infrastructure and ecological connectivity. It commits Metro Vancouver to collaborate with municipalities to develop and manage the regional recreation greenway network; protect, enhance and restore ecologically important systems, features and corridors and establish buffers; and "incorporate into land use decision-making and land management practices planning tools, incentives, green technologies and infrastructure that support ecological innovation, minimize negative impacts on ecologically important features and maximize ecosystem function through restoration." *Metro 2040*, Strategies 3.2.1, 3.2.2.

50 *Metro 2050*, Strategy 3.2.2. *Metro 2040* contains no such commitments.

51 *Metro 2050*, Strategy 1.2.13(a). This target is slightly different than Metro 2040's, which is to accommodate all urban development with the UCB. *Metro 2040*, Strategy 1.1.2.

52 *Metro 2050*, Strategies 1.1.1, 1.4.1, 2.3.1, 3.1.1. Similar commitments appear in *Metro 2040*, Strategies 1.1.1, 1.3.1, 2.3.1, 3.1.1.

The RGS also promotes cluster development by setting regional targets for focusing growth in designated urban centres (40%) and rapid transit hubs and corridors (28%).[53] It also sets targets for increasing protected natural areas (50% of the region's land base by 2050) and urban tree canopy cover (40% of the UCB area by 2050).[54]

The RGS contains numerous requirements for RCSs that support LID. Starting with stormwater and watershed management, it requires RCSs to include policies that "support watershed and ecosystem planning, the development and implementation of Integrated Stormwater Management Plans, and water conservation objectives."[55] **Integrated stormwater management plans (ISMPs)** and **integrated watershed management plans (IWMPs)** provide detailed, location-specific information and guidance that is critical for implementing LID techniques.

On the topic of ecosystem protection, The RGS requires RCSs to:

- Support the protection, enhancement, restoration, and expansion of modified and sensitive ecosystems to maintain ecological integrity, enable ecosystem connectivity, increase natural carbon sinks and enable adaptation to the impacts of climate change;[56]
- Identify local ecosystem protection targets and show how they contribute to the corresponding regional target;[57]
- Include policies that "support the protection, enhancement, and restoration of ecosystems through measures such as land acquisition, density bonusing, development permit requirements, subdivision design, conservation covenants, land trusts, and tax exemptions";[58]
- Include policies that discourage ecosystem fragmentation, through "low impact development practices that enable ecosystem connectivity";[59] and
- Indicate how the interface between ecosystems and other land uses will be managed to maintain ecological integrity, for example via physical buffers or development permit requirements.[60]

To protect and enhance urban tree cover, the RGS requires RCSs to identify local tree canopy targets and show how they contribute to the corresponding regional target;[61] and to include policies and tools for retention and expansion of urban forests, including urban forest management strategies, tree regulations, development permit requirements, land acquisition, street tree planting, and reforestation or restoration policies.[62]

On urban containment and clustering, the RGS requires RCSs to depict the UCB on a map and show how local plans will work towards keeping growth within it in accordance with the regional 98% target;[63] include policies to focus growth in urban centres and transit corridors; and show how such growth will contribute to regional targets for focusing growth in

53 *Metro 2050*, Strategy 1.2.13. These targets are unchanged from *Metro 2040*, Strategy 1.2, Table 2.

54 *Metro 2050*, Strategy 3.2.1. *Metro 2040* contains no such targets.

55 *Metro 2050*, Strategy 3.2.7(c)(iv). *Metro 2040* contains broadly similar requirements to "implement land use policies and development control strategies which support integrated storm water management and water conservation objectives," and to "consider watershed and ecosystem planning and/or Integrated Stormwater Management Plans in the development of municipal plans." *Metro 2040*, Strategies 3.2.7, 3.3.4.

56 *Metro 2050*, Strategy 1.4.3(e). *Metro 2040* contains no direct equivalent but does contain a more generic requirement to identify where appropriate measures to protect, enhance and restore ecologically important systems and features. *Metro 2040*, Strategy 3.2.6.

57 *Metro 2050*, Strategy 3.2.7(a). *Metro 2040* contains no such requirement.

58 *Metro 2050*, Strategy 3.2.7(b)(i). *Metro 2040*, Strategy 3.2.6 contains a less demanding requirement to "identify where appropriate measures to protect, enhance and restore ecologically important systems, features, corridors and establish buffers" along ecologically important features, and mentions a narrower range of tools (conservation covenants, land trusts, tax exemptions and ecogifts).

59 *Metro 2050*, Strategy 3.2.7(b)(iii). *Metro 2040* contains no such requirement.

60 *Metro 2050*, Strategy 3.2.7(b)(iv); see also Strategies 3.1.9(b) and (c) (requirements for policies that support the protection, enhancement and integrity, and discourage the fragmentation, of conservation and recreation lands). *Metro 2040*, Strategies 3.1.4 and 3.2.4 contain broadly similar but less detailed and demanding requirements.

61 *Metro 2050*, Strategy 3.2.7(a). *Metro 2040* contains no such requirement.

62 *Metro 2050*, Strategy 3.2.7(c)(ii). *Metro 2040* contains no such requirement.

63 *Metro 2050*, Strategy 1.1.9; *Metro 2040*, Strategy 1.1.3 contains a similar requirement except that the goal is to contain all urban development within the UCB.

these areas.[64] Outside the UCB, it requires RCSs to support agricultural uses and limit the scale, form and density of rural land development consistent with rural land use designation and on-site sewer servicing.[65]

Finally, the RGS requires RCSs to consider implementing green infrastructure and to include policies that support the consideration of natural assets and ecosystem services in land use decision-making and management, support ecosystem connectivity in a green infrastructure network, and increase green infrastructure in priority areas.[66]

### *2.1.3 Coquitlam and Port Coquitlam's RCSs*

Both cities' OCPs include an RCS and an appendix detailing how the OCP implements specific RGS actions.[67] Both relate to the previous RGS (*Metro 2040*), and state that their OCPs are consistent with *Metro 2040*'s five goals.[68]

*Metro 2050*'s five goals are very similar as far as LID is concerned, but its specific strategies and actions put considerably greater emphasis on LID and LID-supportive policies and practices, as described above. Both cities will update their RCSs to indicate how they will implement the numerous LID-related actions in the new *Metro 2050* RGS.

**OPPORTUNITY**

Approach the process of updating the cities' regional context statements as a chance to showcase what the cities are doing to support LID and to amend their OCPs to put more emphasis on supporting LID.

64 *Metro 2050*, Strategy 1.2.24(b)(ii). *Metro 2040*, Strategy 1.2.6 contains similar requirements.

65 *Metro 2050*, Strategy 1.4.3(b), (c). *Metro 2040*, Strategy 1.3.3 contains similar requirements.

66 *Metro 2050*, Strategies 1.2.24(b)(vii), 3.2.7(b)(ii) and 3.2.7(c)(i) and (v). There are no similar requirements in *Metro 2040*.

67 City of Coquitlam, *Citywide Official Community Plan*, Part 1, s 1.4 and Part 5, Attachment 1, online: https://www.coquitlam.ca/616/Citywide-Official-Community-Plan (consolidated with updates) ("CWOCP"); PocoPlan, s 6.0 and Appendix 1.

68 CWOCP, Part 1, s 1.4.2; PocoPlan, s 6.0.

## 2.2 Regional water management plans

In 2001, Metro Vancouver and its member municipalities adopted a **liquid waste management plan (LWMP)** that sought to treat stormwater as a resource that can be managed to protect and enhance watershed health. Under the plan, member municipalities committed to develop ISMPs for all urban and semi-urban watersheds by 2014. In 2010, the original LWMP was replaced by the Greater Vancouver Sewerage and Drainage District's **Integrated Liquid Waste and Resource Management Plan (ILWRMP)**.[69] The long-term goal of this plan is that all elements of liquid waste, including stormwater, will be reduced at the source, "efficiently recovered … or else returned to the environment as part of the hydrological cycle in a way that protects public health and the environment."[70] The ILWRMP calls on member municipalities to integrate ISMPs with land use and community development policies, and to emphasize site-level rainwater management to minimize runoff.[71]

The ILWRMP also asks municipalities to review and enhance sewer use bylaws to reduce liquid waste at source, "develop and implement inflow and infiltration management plans," update bylaws "to require on-site rainwater management sufficient to meet criteria established in municipal integrated stormwater plans or baseline region-wide criteria," and "update municipal utility design standards and neighbourhood design guidelines to enable and encourage on-site rainwater management."[72]

The plan also strives to treat liquid waste as a resource, including by exploring "alternatives to potable water for nondrinking purposes, such as rainwater harvesting."[73] Finally, the plan encourages development and

69 Metro Vancouver, *Integrated Liquid Waste and Resource Management: A Liquid Waste Management Plan for the Greater Vancouver Sewerage & Drainage District and Member Municipalities* (May 2010), online: http://www.metrovancouver.org/services/liquid-waste/plans-reports/management-plans/Pages/default.aspx

70 ILWRMP, p 5.

71 ILWRMP, p 13.

72 ILWRMP, p 16.

73 ILWRMP, p 22.

implementation of ISMPs at the watershed scale.[74]

As a condition for approval of the ILWRMP, the province required Metro Vancouver and its member municipalities to develop a coordinated program to monitor stormwater and assess the implementation and effectiveness of ISMPs. The **Monitoring and Adaptive Management Framework for Stormwater ("Stormwater AMF")** was published in 2014 to fulfill this condition.[75] Among other things, it provides an approach for selecting stormwater management practices and tracking their effectiveness. It identifies a menu of options that municipalities may use as a reference tool for selecting **adaptive management practices ("AMPs")**. The framework notes that AMPs include engineered infrastructure but increasingly incorporate non-structural measures aimed at restoring natural pre-development hydrology, water quality and aquatic habitat. It also urges municipalities to use the AMPs recommended in an ISMP or IWMP, since they are customized to the conditions of the specific watershed.[76]

The Stormwater AMF recommends AMPs in several functional categories relevant to LID, including source controls, runoff detention and infiltration, runoff pollution control, runoff treatment, and mitigation of construction impacts. Recommended source control practices include absorbent landscapes, bio-retention facilities (eg rain gardens), vegetated swales, pervious paving, infiltration structures (trenches, sumps and drywells), green roofs, riparian vegetation, downspout disconnection, rainwater harvesting, minimal excavation foundations and tree retention.[77]

As alternatives for sites with limited opportunities for source control, the Stormwater AMF recommends runoff detention ponds, tanks, vaults and control structures. For runoff pollution control, it recommends a sequential system of operational and structural control measures. For runoff pollution treatment it recommends an array of processes "such as sedimentation, filtration, bioremediation, ion exchange, adsorption, bacterial decomposition, and physical separation."[78] Specific recommended facilities include wetpools, biofiltration, oil/water separation, bioretention/infiltration, and filtration.

The framework also identifies various techniques for in-stream and riparian habitat rehabilitation and for mitigating construction impacts. It specifically highlights the need to protect LID best management practices (eg bioretention facilities) during construction.[79] Finally, the Stormwater AMF encourages tracking the spatial extent of LID-relevant variables such as percent intact riparian habitat and effective impervious area.[80]

Metro Vancouver also published useful **Stormwater Source Control Design Guidelines** in 2012 to help member municipalities develop ISMPs.[81]

Another regional management plan relevant to LID is Metro Vancouver's **drinking water management plan (DWMP)**, adopted in 2011.[82] It commits Metro Vancouver to evaluate the use of rainwater harvesting for irrigation, greywater and reclaimed wastewater for residential and other uses, groundwater for irrigation and river and seawater for waterfront businesses.[83] It calls on member municipalities to update bylaws, utility design standards and neighbourhood design guidelines "to enable and encourage on-site rainwater management as appropriate, so that it can be used for non-potable purposes such as irrigation."[84]

These water management plans are not directly binding on municipalities, landowners or developers,

74 ILWRMP, p 27.

75 Metro Vancouver, *Monitoring and Adaptive Management Framework for Stormwater* (September 2014), online: http://www.metrovancouver.org/services/liquid-waste/LiquidWastePublications/Monitoring_Adaptive_Management_Framework_for_Stormwater.pdf. ("Stormwater AMF").

76 Stormwater AMF, p 50.

77 Stormwater AMF, p 51. Several of these AMPs are drawn from Greater Vancouver Sewerage & Drainage District, *Stormwater Source Control Design Guidelines 2012: Final Report*, online: https://metrovancouver.org/services/liquid-waste/Documents/stormwater-source-control-design-guidelines-2012.pdf.

78 Stormwater AMF, p 53.

79 Stormwater AMF, p 57.

80 Stormwater AMF, pp 63-64.

81 Greater Vancouver Sewerage & Drainage District, *Stormwater Source Control Design Guidelines 2012: Final Report*, online: https://metrovancouver.org/services/liquid-waste/Documents/stormwater-source-control-design-guidelines-2012.pdf.

82 Metro Vancouver, *Drinking Water Management Plan* (June 2011), online: http://www.metrovancouver.org/services/water/about/plans/Pages/default.aspx ("Metro Vancouver DWMP").

83 Metro Vancouver DWMP, Strategy 2.2.2.

84 Metro Vancouver DWMP, Strategy 2.2.3.

but they form part of the regional framework within which binding requirements are developed.

# 3. Official community plans

## 3.1 Introduction

OCPs lay out goals and policies to guide decisions on land use planning and management.[85] OCPs and sub-plans such as area or neighbourhood plans may contain policies regarding environmental protection, restoration and enhancement.[86] They provide policies and detailed directions to councils, city staff, approving officers and developers on environmentally responsible development, including LID.

OCPs have legal teeth in the sense that any development projects undertaken and bylaws enacted by the municipality must be consistent with the OCP.[87] That said, this requirement leaves substantial wiggle room as courts generally defer to local governments' interpretations of consistency.

OCPs can support LID in a variety of ways, including by:[88]

- Delineating and mapping watercourses, riparian areas, wetlands, floodplains and other **environmentally sensitive areas (ESAs)** and green infrastructure that play significant hydrological roles;
- Declaring policies to protect, enhance and restore ESAs and ecological connectivity;
- Committing to an integrated watershed management approach that integrates ISMPs, IWMPs, green infrastructure and water supply management in a coordinated way;
- Designating environmental **development permit areas (DPAs)** and setting clear and robust permit requirements including stormwater management, limits on runoff quantity and quality, erosion and sediment control, vegetation protection, landscaping, riparian setbacks, environmental studies and monitoring, wildlife habitat restoration and ecological connectivity, in addition to covenants and security deposits to ensure proper installation, operation and maintenance of required systems;
- Creating a framework for **comprehensive development zoning** that is flexible yet ecologically rigorous and encourages the use of LID techniques;
- Authorizing creative tools to incentivize LID, such as tax incentives and **amenity density bonusing** (see Parts 3.6 and 4.1), and establishing clear criteria for such incentives including density ceilings, priority amenities and bonus formulae;
- Encouraging or requiring development best practices and site designs that support LID and maintain or mimic natural hydrological cycles;
- Strengthening urban containment, for example by establishing an **urban containment boundary (UCB)**, increasing the minimum lot size outside it, allowing extension of municipal sewers outside it only where necessary to protect public health or the environment, and/or requiring popular referenda for major changes to the boundary;[89]
- Within the UCB, encouraging cluster development that avoids sensitive ecosystems and concentrates growth in urban centres; and providing incentives to build up existing urban areas fully by setting tough criteria for greenfield development and eliminating urban development reserves; and
- Defining LID targets and indicators and committing to monitor progress against them (for example, effective impervious area; volume of runoff infiltrated or reused; number of combined sewer overflows; amount of absorbent landscaping; total green roof area; total or per-unit surface parking area; extent of wetlands or watercourses restored; kilometres of healthy riparian ecosystems; total area of urban tree canopy; and stream water quality and flow).

To be most effective, OCPs should integrate these general and site-specific policies and tools into a

85 *Local Government Act*, s 471(1).

86 *Local Government Act*, s 471(1).

87 *Local Government Act*, s 478.

88 Many of these options are drawn from the *Green Bylaws Toolkit* referred to in note 12 above.

89 For example, the District of Saanich's OCP requires any major expansion of the UCB to be approved by electors via a referendum or plebiscite. District of Saanich, *Official Community Plan 2008*, online: https://www.saanich.ca/EN/main/community/community-planning/official-community-plan-ocp.html, section 4.2.1, p 4-11.

comprehensive policy framework for LID, which in turn supports comprehensive bylaws.

Municipalities have the option to adopt a single OCP covering the entire municipality, multiple plans covering different areas or neighbourhoods, or a combination of both.[90] Coquitlam has a **Citywide OCP ("CWOCP")**, [91] four area plans and nine neighbourhood plans. All together they comprise 26 separate documents. The area and neighbourhood plans are chapters of the CWOCP, but they are more or less self-contained and freestanding. To avoid confusion, this report uses the terms "Citywide plan" and "CWOCP" to refer only to the citywide portions of Coquitlam's OCP, unless specified otherwise. Coquitlam's citywide, area and neighbourhood plans have many provisions directly relevant to LID, including several explicit commitments to support LID.

Port Coquitlam has a single citywide OCP and no area or neighbourhood plans.[92] Its **Official Community Plan ("PocoPlan")** does not say a lot about LID.

Separate chapters of OCPs are often adopted and revised at different times. For example, some of Coquitlam's area and neighbourhood plans are more than 20 years old, others very recent. The process for adopting and updating them takes a lot of time and resources, and many years can pass between revisions. As a result, differences in how particular chapters of OCPs address LID may be a function of when they were adopted rather than deliberate policy choices.

This report examines the approaches to LID in the Coquitlam and Port Coquitlam OCPs under eleven headings:

3.2 Express references to "low impact development";
3.3 Stormwater and watershed management;
3.4 Environmentally sensitive areas (ESAs), including watercourses and riparian areas;
3.5 Urban forest;
3.6 Urban containment and clustering;
3.7 Green infrastructure;
3.8 Natural hazards;
3.9 Green buildings;
3.10 Development permit areas;
3.11 Site-level customization tools; and
3.12 Monitoring.

## 3.2 Low impact development

### *3.2.1 Coquitlam*

#### Citywide plan

Coquitlam's CWOCP does not mention the term "low impact development" but supports LID practices in several areas including stormwater and watershed management, development permit areas, comprehensive development zoning, master development plans, ESAs (including watercourses), urban forest, urban containment and natural hazards. These are discussed in subsequent sections, below.

#### Area and neighbourhood plans

LID is mentioned explicitly in one of the city's four area plans and three of its nine neighbourhood plans. The **Northeast Coquitlam Area Plan ("NECAP")** commits to supplementing the city's Stormwater Policy and Design Manual and relevant IWMPs with "low impact development policy and procedures" in watershed and stormwater management plans.[93] The **Upper Hyde Creek Village Neighbourhood Plan ("UHCVNP")**, **Lower Hyde Creek Village Neighbourhood Plan ("LHCVNP")** and **Smiling Creek Neighbourhood Plan ("SCNP")**, all within the areas covered by NECAP and the **Hyde Creek IWMP**, contain an entire section devoted to LID that is similarly worded in all three plans.[94]

The LID sections of these three neighbourhood plans

90 *Local Government Act*, s 472.

91 CWOCP.

92 Port Coquitlam has a Downtown Plan from 1998, but it was not adopted as an OCP and does not form part of the OCP. Some of its key components are incorporated into the policies and DPA guidelines of the OCP, however.

93 City of Coquitlam, *Northeast Coquitlam Area Plan*, Part A, s 2.7; online: https://www.coquitlam.ca/463/Northeast-Coquitlam-Area-Plan ("NECAP").

94 City of Coquitlam, *Upper Hyde Creek Village Neighbourhood Plan*, s 3.1.3, online: https://www.coquitlam.ca/471/Upper-Hyde-Creek-Neighbourhood-Plan ("UHCVNP"); *Lower Hyde Creek Village Neighbourhood Plan*, s 3.1.3, online: https://www.coquitlam.ca/467/Lower-Hyde-Creek-Neighbourhood-Plan ("LHCVNP"); *Smiling Creek Neighbourhood Plan*, s 3.1.3, online: https://www.coquitlam.ca/472/Smiling-Creek-Neighbourhood-Plan ("SCNP").

note that the Hyde Creek IWMP study determined that LID measures would contribute to two goals: reducing effective impervious area to improve watershed health, and complementing major stormwater management facilities to maintain pre-development flows. They also emphasize the importance of evapotranspiration due to the limited infiltration capacity of local soils, and encourages "slope-adaptive development and the retention of significant trees and natural features where it is safe and practical to do so."[95] And they list a suite of LID policies, varying slightly amongst them (see the box on the next page for an example).

These neighbourhood plans illustrate the power of IWMPs to drive LID into planning frameworks and decisions. As noted earlier, the CWOCP states that neighbourhood plans should be completed after IWMP studies.[96] This helps ensure that neighbourhood plans include stormwater management provisions that reflect IWMP findings and recommendations. The Hyde Creek IWMP embraced LID principles and techniques, and the neighbourhood plans in the Hyde Creek watershed therefore did likewise.

The SWCAP offers something of a contrast on this point. At one point it acknowledges that IWMPs should be completed before neighbourhood plans,[97] but in another place it says that they may be developed at the same time.[98] This could reduce somewhat the power of IWMPs to drive the neighbourhood planning process.

**OPPORTUNITY**

Extend explicit LID commitments like those contained in the Northeast Coquitlam sub-plans to all of Coquitlam and amend the SWCAP to confirm that neighbourhood plans should be developed after IWMPs.

The SWCAP also contrasts with the Northeast Coquitlam sub-plans' approach to LID by emphasizing voluntary approaches, for example by encouraging "active living roofs" and using the Coquitlam "Green Guide" (presumably a reference to the *Green Development Guide*) to encourage developers and others to "improve the environmental performance of buildings and development."[99] The CCAP similarly encourages the use of "green development … as identified in the *Green Development Guide*" in relation to green building, green infrastructure and natural infrastructure.[100]

Another way to drive LID into planning decisions is by making implementation of IWMPs' stormwater management provisions a requirement of subdivision and development servicing bylaws. This is discussed in Part 4.2, below.

### *3.2.2 Port Coquitlam*

Smart growth and sustainable development are the main organizing ideas in the PocoPlan.[101] There is just one mention of "low impact development" in the plan, and it gives limited support to the concept. The chapter on environment commits to "consider" LID standards for implementation through its Building, Subdivision Servicing and Zoning bylaws.[102] The PocoPlan contains policies to encourage development that achieves a high level of environmental performance,[103] but this is not necessarily the same thing as LID.

**OPPORTUNITY**

Make promotion and implementation (rather than just consideration) of LID a policy of the PocoPlan.

## 3.3 Stormwater and watershed management

### *3.3.1 Coquitlam*

#### Citywide plan

95 UHCVNP, LHCVNP & SCNP, s 3.1.3.

96 CWOCP, Part 2, s 3.2, Objective 3, Policy (b).

97 City of Coquitlam, *Southwest Coquitlam Area Plan*, s 9.3, Policy 12, online: https://www.coquitlam.ca/450/Southwest-Coquitlam-Area-Plan ("SWCAP").

98 SWCAP, s 3.3, Policy HE1, paragraph 1.

99 SWCAP, s 3.3, Policy HE4, paragraphs 15 & 16.

100 CCAP, s 4.2, Policy (h).

101 PocoPlan, s 7.1, Policy 1.

102 PocoPlan, s 7.4, Policy 7.

103 Eg PocoPlan, s 7.2, Policies for Housing, Policy 8; s 7.6, Policies 8(b), 12.

## UPPER HYDE CREEK VILLAGE NEIGHBOURHOOD PLAN LID POLICIES

1. Amend the Stormwater Management Policy and Design Manual to include LID measures as recommended in the HCIWMP for both private and public property.
2. To further reduce [effective impervious area], support the use of green street pilot projects in the neighbourhood in suitable locations to maximize stormwater infiltration and minimize impervious pavement....
3. Based on the Comprehensive Landscape Strategy findings for optimal tree cover in the Plan area, determine planting requirements for private and public property, and:
   - establish the optimal tree cover target to be achieved post-development on private and public property;
   - amend the Subdivision and Development Servicing Bylaw Supplementary Specifications for boulevard trees to include suitable street tree species, size at planting, and Best Management Practices for planting and maintenance requirements;
   - include target tree planting requirements in all zones and/or guidelines used in the UHCNVP area that will achieve the optimal tree cover target post-development.
4. Continue to seek opportunities to retain existing tree cover where possible through the subdivision and development permit approval process.
5. Promote responsible landscape maintenance and conservation practices on private property through leadership by example in parks and open spaces, as well as through awareness programs in partnership with local stewardship groups and educational institutions.
6. Use the NECAP policy (A-2.2.10) and Guide to Best Site Development Practices, to:
   - achieve development suitable to the hillside conditions, and retain significant natural features where safe and practical; and
   - support public interest in and voluntary stewardship for conservation and enhancement efforts.
7. Encourage the use of LEED (Leadership in Energy and Environmental Design) standards in public and private projects as complementary to the LID approaches described above.

Stormwater and watershed management are crucial to LID and will only become more challenging as climate change increases both average annual precipitation and the frequency and duration of severe storms—a challenge that Coquitlam's Climate Adaptation Strategic Plan, released in 2020, recognizes.[104] The city's approach to this issue is reflected partly in the CWOCP and in area/neighbourhood plans (discussed in this section), as well as the **Stormwater Management Policy and Design Manual**,[105] ISMPs and IWMPs (discussed in Part 4.2).

The CWOCP commits to implementing Metro Vancouver's LWMP and places particular emphasis on integrated watershed management planning.[106] It promises a strategic and consistent approach to development and implementation of ISMPs, so that they eventually cover the entire City.[107]

The CWOCP takes seriously the LWMP's direction to integrate IWMPs/ISMPs with land use and community development processes, by stating a policy that neighbourhood plans should be completed after applicable watershed studies and that land use and **Development Permit Area (DPA)** designations should respond to watershed study results.[108] This ensures that watershed protection takes priority in planning processes and that all City departments and disciplines collaborate in developing IWMPs and neighbourhood plans.

104 City of Coquitlam, *Climate Adaptation Strategic Plan* (October 2020), p 10, online: https://www.coquitlam.ca/DocumentCenter/View/3209/Climate-Adaptation-Strategic-Plan-PDF.

105 City of Coquitlam, *Stormwater Management Policy and Design Manual* (July 2003, consolidated with amendments), online (pdf): https://www.coquitlam.ca/DocumentCenter/View/343 (Coquitlam Stormwater Manual).

106 CWOCP, Part 2, s 7.4, Objective 5.

107 CWOCP, Part 2, s 3.2, Objective 3, Policy (a).

108 CWOCP, Part 2, s 3.2, Objective 3, Policy (b).

At the site level, the CWOCP states a policy to adopt and implement the City's Stormwater Management Policy and Design Manual. It specifically directs that implementation of the Manual should include reviewing security provisions, fee structures and construction specifications, and setting subdivision servicing standards that "promote infiltration opportunities and additional pervious cover including appropriate vegetation."[109] Although the Manual is not legally binding on its own, the city's Subdivision and Development Servicing Bylaw makes it legally binding by requiring **stormwater management plans (SMPs)** to be prepared in accordance with it. See Part 4.2.2, below, for more details.

The CWOCP also commits to "apply site-specific, best management measures for mitigating the impacts of stormwater runoff through the development process (e.g. oil-water separators, sediment control and other technologies)" and to "recommend appropriate performance criteria" for new technologies.[110] The CWOCP recognizes that the City "has an opportunity to require adequate water quality measures for stormwater runoff, as well as to encourage infiltration of clean stormwater runoff to increase groundwater recharge."[111] The OCP does not actually commit to take this opportunity, however.

The CWOCP also strikes a note of caution about LID. It recognizes that new infrastructure approaches, including stormwater management practices that emphasize on-site storage and infiltration, present both opportunities and challenges. It takes a cautious approach to such innovations, warning that "Because such approaches have not yet been widely implemented, and still pose effectiveness and cost uncertainties, they need careful assessment prior to being enacted."[112] The City's policy is to continue to implement proven approaches, monitor and assess new approaches and initiate pilot projects to assess new stormwater management approaches.[113] While this approach exhibits prudence in the management of public infrastructure, it could send a mixed signal about the City's commitment to support LID practices in private development projects.

**OPPORTUNITY**

Amend the CWOCP to commit to implement requirements for stormwater runoff quality and for clean stormwater infiltration where feasible, and to signal greater openness to innovative LID techniques.

### Area and neighbourhood plans

#### *Northeast Coquitlam*

The NECAP endorses LID stormwater management principles including treating stormwater as a resource and taking an integrated approach to watershed management that recognizes the interrelatedness of water, air and land.[114] It envisions the development of a master watershed plan and ISMPs for Northeast Coquitlam incorporating bylaws, policies and guidelines that encourage onsite stormwater detention, enhance stormwater quality and reduce impervious surfaces.[115]

Northeast Coquitlam neighbourhood plans include various policies to foster low-impact stormwater management, including to:

- Incorporate Low Impact Development (LID) techniques to reduce impervious surfaces and increase ground-water infiltration throughout the neighbourhood, as recommended in the Hyde Creek IWMP;[116]
- Ensure that stormwater management facilities conform to the relevant IWMP[117] and the Stormwater Management Policy and Design Manual;[118]
- Amend the city's Stormwater Management Policy and Design Manual to include the LID measures recommended in the Hyde Creek IWMP for both

109 CWOCP, Part 2, s 3.2, Objective 3, Policy (c).

110 CWOCP, Part 2, s 3.2, Objective 3, Policy (d).

111 CWOCP, Part 2, s 3.2, Issues.

112 CWOCP, Part 2, s 7.4, Issues.

113 CWOCP, Part 2, s 7.4, Objective 3.

114 NECAP, Part B, s 2, Policy A-9.2.

115 NECAP, Part B, s 2, Policy A-9.3(a).

116 UHCVNP & SCNP, s 4.2.3, Policy 3; LHCVNP, s 4 2.3, Policy 4.

117 UHCVNP & SCNP, s 4.2.3, Policy 1; LHCVNP, s 4.2.3, Policy 2; City of Coquitlam, *Partington Creek Neighbourhood Plan*, s 3.8.2, Policy (a), online: https://www.coquitlam.ca/474/Partington-Creek-Neighbourhood-Plan ("PCNP").

118 UHCVNP & SCNP, s 4.2.3, Policy 7; LHCVNP, s 4.2.3, Policy 8.

private and public property;[119]
- Remove barriers to fish movement and encourage streamside enhancement programs;[120]
- Utilize "innovative low-impact stormwater management solutions";[121]
- Support "green street" pilot projects to provide multifunctional, pedestrian-oriented public spaces that reduce effective impervious area and maximize stormwater infiltration (eg via swales, infiltration devices, absorbent topsoil and planted beds).[122]

The *Partington Creek Neighbourhood Plan ("PCNP")* does not lay out as detailed stormwater management policies as the other Northeast Coquitlam neighbourhood plans, but it indicates that the plan is "coordinated with" the *Partington Creek IWMP* and reiterates the IWMP's key goals to maintain natural hydrology through site-level rainwater management and maintain or improve watercourse ecology through monitoring, evaluation, restoration, enhancement and responsive management.[123]

***Northwest Coquitlam***

The NWCAP says almost nothing about stormwater management, and nothing at all about ISMPs or IWMPs. It does encourage permeable site surface treatments at high-density residential developments in areas with elevated slope or flood hazards, if feasible and functional.[124] For a largely undeveloped area that is expected to accommodate more than 6,000 dwelling units and a population of 16,700, this relative neglect of stormwater management is remarkable.

***City Centre***

The CCAP recognizes that protecting watercourses and riparian areas will protect and improve stormwater management,[125] but it does not articulate specific stormwater management policies other than to:
- Explore the use of innovative infrastructure practices to achieve the stormwater management goals and objectives in the Scott Creek IWMP;[126]
- Apply the City's Rainwater Management Source Controls Design Requirements and Guidelines to all subdivision and building permit applications; [127]and
- Encourage the integration of rainwater management features into mid-block walkways and privately-owned, publicly-accessible open spaces where possible.[128]

Although the CCAP recognizes that implementing the stormwater management practices outlined in the Scott Creek IWMP "will improve the ecology and hydrology of watercourses,"[129] it does not – unlike some neighbourhood plans canvassed in this section – actually commit to ensure that stormwater management facilities conform to the relevant IWMP or the Stormwater Management Policy and Design Manual.

Furthermore, while the CCAP encourages the use of green streets for additional space for gathering, leisure and relief from the built environment, it does not approach this as a stormwater management issue.[130]

***Southwest Coquitlam***

The SWCAP's stormwater management policies are less ambitious than those in Northeast Coquitlam. The SWCAP states a goal to "manage stormwater and preserve natural stream systems that recognize, integrate and balance the role of watercourses as fundamental components of the City's drainage and flood control system and in providing and contributing to valuable fish habitat."[131] The SWCAP commits to implement stormwater management guidelines to reduce stormwater impacts; manage stormwater in a manner consistent with the Stormwater Management Policy and Design Manual; "work towards" stormwater

119 UHCVNP & LHCVNP, s 3.1.3, Policy 1.

120 UHCVNP & SCNP, s 4.2.3, Policy 5; LHCVNP, s 4.2.3, Policy 6; PCNP, s 3.5, Policy (a).

121 SCNP, s 2.1, Principle 3(d); PCNP, s 2.2, Principle (c).

122 UHCVNP & SCNP, s 3.1.3, Policy 2; s 4.1.1.

123 PCNP, s 3.8.2.

124 City of Coquitlam, N*orthwest Coquitlam Area Plan*, Part B, Policy F-1-3, paragraph 2(j), online: https://www.coquitlam.ca/461/Northwest-Coquitlam-Area-Plan ("NWCAP").

125 CCAP, s 4.1.

126 CCAP, s 4.2, Policy (a).

127 CCAP, s 4.2, Policy (b).

128 CCAP, s 6.3, Policy (q); s 6.3.6, Policy (d).

129 CCAP, s 4.2.

130 CCAP, s 6.5, Policy (f); see also s 6.2, Policy (e)(ii) (Downtown Promenade).

131 SWCAP, Schedule E, Neighbourhood Planning Framework, s 2.0.

management approaches consistent with the "broader objectives" of applicable IWMPs; encourage roof treatments on large buildings that improve stormwater management;[132] and incorporate increased stormwater management efficiency into landscape planting and management.[133] The SWCAP also commits to completing IWMPs for the entire area.[134]

At the neighbourhood plan level, the SWCAP commits to consider "land-based stormwater management" in the neighbourhood planning process[135] and calls on the **Waterfront Village Centre Neighbourhood Plan ("WVCNP")** to include an integrated stormwater management system that restores natural systems in the area.[136] The WVCNP itself promises to:

- Control stormwater runoff "in a manner that provides flood protection for the site, while ensuring that all stormwater released is of higher quality than baseline conditions";
- Implement best practices for road and parking areas "to collect and direct 'first flush' runoff through hydrodynamic separators, prior to discharging into proposed biofiltration areas";
- Integrate stormwater biofiltration areas into the overall site landscape design; and
- Minimize impervious areas and maximize pervious areas.[137]

The **Austin Heights Neighbourhood Plan ("AHNP")** recognizes that local stream corridors and riparian areas can perform an important stormwater control function and improve downstream water quality and fish habitat.[138] In addition, Southwest Coquitlam neighbourhood plans other than the WVCNP commit to apply Coquitlam's Rainwater Management Source Control Design Requirements and Guidelines in areas not covered by IWMPs and ensure that stormwater management facilities conform to IWMPs in areas where IWMPs exist or will exist.[139]

Southwest Coquitlam neighbourhood plans also contain a variety of "green streets" policies. The **Burquitlam-Lougheed Neighbourhood Plan ("BLNP")** commits to encourage green streets that convert portions of roads into public open green spaces;[140] the **Maillardville Neighbourhood Plan ("MNP")** commits only to identify suitable locations for green streets;[141] and the AHNP commits to consider developing a residential street design that minimizes hard surfacing and narrows vehicle travel lanes.[142]

***Parking policies***

Parking policies can support LID. For the most part Coquitlam's area and neighbourhood plans are silent on this point, but three Northeast Coquitlam neighbourhood plans commit to consider reducing on-site parking standards by up to 30% in the "Street-Oriented Village Homes" land use designation "if justified through the demonstration of lower automobile ownership, shared parking opportunities and other long-term incentives for occupants."[143] In Southwest Coquitlam, the Burquitlam-Lougheed neighbourhood plan promises to "provide reductions in the number of required parking spaces" as guided by the Zoning bylaw.[144] Some area and neighbourhood plans urge that all off-street parking be concealed underground in certain larger commercial and residential developments.[145] Depending on how they are implemented, parking policies like these could support LID.

### *3.3.2 Port Coquitlam*

132 SWCAP, s 3.3, Policy HE1, paragraphs 3-5.

133 SWCAP, s 3.3, Policy HE4, paragraph 6.

134 SWCAP, s 3.3, Policy HE2, paragraph 2.

135 SWCAP, s 7.3, Policy CS7.

136 SWCAP, s 2.3, Policy CC33, paragraph 4(c).

137 City of Coquitlam, *Waterfront Village Centre Neighbourhood Plan*, s 4.3, online: https://www.coquitlam.ca/459/Waterfront-Village-Centre-Neighbourhood- ("WVCNP").

138 City of Coquitlam, *Austin Heights Neighbourhood Plan*, s 4.3, online: https://www.coquitlam.ca/451/Austin-Heights-Neighbourhood-Plan ("AHNP").

139 AHNP, s 4.2.1, Policies (e) & (f); City of Coquitlam, *Maillardville Neighbourhood Plan*, s 3.10, Policies (a) & (b), online: https://www.coquitlam.ca/457/Maillardville-Neighbourhood-Plan ("MNP"); BLNP, s 3.7, Policies (a) & (b).

140 BLNP, s 4.1, Policy (f).

141 MNP, s 3.7, Policy (e).

142 AHNP, s 4.1.5, Policy (d).

143 UHCVNP, s 3.2.6, Policy 6; LHCVNP, s 3.2.3, Policy 6; SCNP, s 3.2.5, Policy 6.

144 BLNP, s 3.6.6, Policy (d).

145 CCAP, s 5.1.7, Policy (d); MNP, 3.9, Policy (aa); BLNP, s 3.6.6, Policy (g). Compare NWCAP, Part B, Policy F-1-3, paragraph 2(i) (all resident parking in certain high density residential developments should be accommodated underground "with limited areas of well-designed surface parking").

The PocoPlan recognizes the impacts of development on runoff, drainage, groundwater, watercourses, riparian areas. It notes that integrated stormwater and watershed management "seeks to incorporate techniques that better manage the water as it is conveyed through creeks and streams" and "looks to better on-site management by considering the amount of pervious versus impervious surface on land and introducing best management practices."[146] As far as policy commitments go, the PocoPlan is fairly general, committing to "explore integrated stormwater management practices and alternative development standards for managing stormwater by increasing pervious surfaces, improving on-site water management and revising City infrastructure specifications."[147]

The PocoPlan notes that LEED (Leadership in Energy and Environmental Design) certification can be used for LID practices including limiting impervious surface, naturescaping, and on-site drainage source control, but it also states that the city faces a challenge in establishing design standards that balance different priorities.[148]

The PocoPlan does not contain any policies encouraging the creation of "green streets" or modification of parking standards to enhance stormwater management, though it does encourage planting of street trees.[149]

The PocoPlan mentions the term "integrated stormwater management plan" just once, in the Environmental Conservation DPA guidelines (section 3.10.2, below). It does not refer to any particular ISMPs or IWMPs, despite the fact that two IWMPs are in place (for Hyde Creek and Maple Creek, both developed jointly with Coquitlam) and several more are planned.

## 3.4 ESAs, including watercourses and riparian areas

### *3.4.1 Coquitlam*

146 PocoPlan, s 7.8.

147 PocoPlan, s 7.8, Policy 4

148 PocoPlan, s 7.6.

149 PocoPlan, s 7.6, Policy 7.

**OPPORTUNITY**

Include in the PocoPlan commitments to adopt and implement a Stormwater Management Policy and Design Manual; treat stormwater as a resource and apply stormwater best management practices throughout the development process; encourage innovative low-impact stormwater management solutions; increase onsite stormwater infiltration and reuse; reduce impervious surfaces; encourage green roofs and green streets; reconsider minimum parking standards; enhance runoff water quality; maintain, restore or mimic natural hydrology; develop IWMPs to cover the whole area; ensure that stormwater management facilities conform to IWMPs where they exist or are planned; and ensure that DPA designations respond to watershed study results.

#### Citywide plan

The CWOCP commits to protect and enhance the ecological features and functions of environmentally sensitive areas, including watercourses and riparian areas.[150] It expresses moderate support for ecological connectivity, for example by committing to "consider" protecting wildlife corridors "where feasible and desirable" and to develop other strategies to enhance connectivity, which "may include consideration" of "varied land use planning tools."[151] It does not, however, adopt a hierarchy in which mitigation and compensation are considered only if avoidance of harm to ESAs is not possible.

**OPPORTUNITY**

Revise the CWOCP to embrace an explicit avoid-mitigate-compensate hierarchy, emphasize the positive role of LID in the protection of watercourses, riparian areas and ESAs, and encourage specific LID tools (eg amenity density bonusing) for protecting and managing ESAs and watercourses.

150 CWOCP, Part 2, s 3.2, Objective 3; s 3.3.1; s 3.3.2, Objective 2, Policy (c).

151 CWOCP, Part 2, s 3.3.1, Objective 2, Policies (a) & (b).

## Area and neighbourhood plans

### *Northeast Coquitlam*

ESAs in Northeast Coquitlam relate mainly to watercourses and ravines. The NECAP commits to protect watercourses for fisheries values, drainage capacity and flood control functions[152] and to integrate ESAs and natural drainage systems into neighbourhood design.[153] Northeast Coquitlam neighbourhood plans include policies to:

- Limit human activity within ESAs to maintain the integrity of the natural environment and preserve their function as wildlife habitat and movement corridors;[154]
- Extend the functional benefit of ESAs by locating parks and open spaces contiguously wherever possible and through the use of vegetated riparian setbacks beyond the top of bank of watercourses;[155]
- Update and pursue habitat restoration and enhancement measures with land development in accordance with the Hyde Creek Watershed Habitat Enhancement Opportunities Strategy;[156]
- Encourage reestablishment of historical natural watercourse connections;[157]
- Limit access to steep ravines and sensitive riparian areas to prevent soil erosion and habitat disturbance;[158]
- Fence riparian area setback boundaries to reduce the risk of human-bear conflicts;[159] and
- Design road crossings over watercourses and riparian area setbacks to allow free movement of wildlife underneath.[160]

The PCNP recognizes the link between ESAs, stormwater management and LID, adopting a land use concept in which ESAs and natural corridors "protect important watercourses and aquatic and wildlife habitat, and provide low-impact stormwater and downstream water quality management infrastructure."[161]

### *Northwest Coquitlam*

The NWCAP says little about ESAs. It proposes to protect riparian areas, maintain major watercourses in their natural state and dedicate major ravines as public parks.[162] It also says, however, that "most ravines on the upper reaches of larger tributaries and the minor ravines of small tributaries can probably be filled and incorporated with adjacent lands."[163]

**OPPORTUNITY**

Eliminate any suggestion in the CWOCP and sub-plans that it is appropriate to fill existing natural ravines.

### *City Centre*

The CCAP seeks to "protect and improve water quality and aquatic habitat, wildlife habitat and natural areas,"[164] and states policies to, among other things:

- Implement recommended watercourse improvements as identified through the Scott Creek IWMP,[165]
- Improve natural areas and wildlife corridors around particular streams and pursue opportunities to rehabilitate natural areas for improved environmental function and quality;[166]
- Improve the riparian areas, channels and banks of particular streams to reduce flood risk and improve water quality, fish habitat and stream health;[167] and
- Where warranted, consider clear-span bridges or large culverts that allow wildlife passage when designing new or replacement watercourse crossings.[168]

152 NECAP, Part B, s 2, Policy A-9.5.

153 NECAP, Part B, s 2, Policy D-1.0(a).

154 UHCVNP, LHCVNP & SCNP, s 3.1.1, Policy 3.

155 UHCVNP & LHCVNP, s 3.1.1, Policy 5.

156 UHCVNP, LHCVNP & SCNP, s 3.1.2; PCNP, s 3.5, Policy (b).

157 SCNP, s 3.1.2, Policy 6.

158 UHCVNP & LHCVNP, s 3.4, Policy 8; SCNP, s 3.3, Policy 10.

159 PCNP, s 3.9.2, Policy (d).

160 PCNP, s 3.9.2, Policy (h).

161 PCNP, s 2.3.

162 NWCAP, Part A, ss 11.2.4, 12.3.3 (b) & (c); Part B, Policies H-1 – H-3.

163 NWCAP, Part A, s 12.3.3 (b).

164 CCAP, s 4.1.

165 CCAP, s 4.1, Policy (c).

166 CCAP, s 4.1, Policies (d), (f).

167 CCAP, s 4.1, Policy (e).

168 CCAP, s 4.1, Policy (j).

***Southwest Coquitlam***

The SWCAP is less elaborate than Northeast Coquitlam's sub-plans when it comes to ESAs. It commits to protect riparian areas via the *Riparian Areas Protection Regulations*;[169] implement unidentified strategies to manage ESAs; explore the use of DPAs to protect ESAs; explore ways to connect natural areas while recognizing the challenges of doing so in a heavily urbanized area; and encourage the use of native plant species through enhancement and restoration of ecologically significant sites.[170]

Within the SWCAP area, neighbourhood plans commit variously to:

- Improve connectivity of natural areas and wildlife corridors;[171]
- Require a DP for all development within watercourses and associated riparian areas;[172]
- Pursue opportunities to rehabilitate or enhance natural areas;[173]
- Improve specified watercourses and riparian areas to enhance wildlife and fish habitat, improve water quality and stream health, and reduce flood risk;[174]
- Prevent human access to certain ESAs;[175]
- Implement watercourse improvements and stream daylighting opportunities identified in IWMPs;[176]
- Require the use of native plant species in landscape plans for new development where appropriate,[177] or maximize the use of native plant species in new development landscaping;[178]
- Design watercourse crossings to allow free passage of wildlife and protect watershed health;[179]
- Amend city bylaws to require the use of native plant species in landscape plans for new developments, and for the improvement and restoration of riparian and wildlife habitat, and to apply the use of native plant material in the interface with natural areas.[180]

### *3.4.2 Port Coquitlam*

Protection of ESAs and establishment of links between public open spaces are among the PocoPlan's central objectives.[181] The PocoPlan commits to "protect watercourses and adjacent riparian areas through the DP process and consider variances to development regulations to support protection of the environment."[182] It also supports improved connectivity of parks and open spaces.[183] The PocoPlan identifies and distinguishes between high and moderate sensitivity ESAs, and states a policy not to permit development in high sensitivity ESAs.[184] It also requires development in ESAs to "provide environmental studies and plans

**OPPORTUNITY**

Make the PocoPlan's avoid-mitigate-compensate hierarchy clearer; and include commitments to:

- Limit human access to ESAs, steep ravines and sensitive riparian areas to maintain their ecological integrity, preserve their function as wildlife habitat and movement corridors and prevent human-wildlife conflict;
- Design watercourse and riparian crossings to allow free passage of wildlife and protect watershed health;
- Enhance ecological connectivity of ESAs, watercourses and green spaces;
- Emphasize the connection between protecting ESAs and managing stormwater;
- Integrate ESAs and natural drainage systems into urban design; and
- Implement applicable IWMPs' recommendations for ESA and watercourse protection, rehabilitation and enhancement.

169 SWCAP, s 3.3, Policy HE1, paragraph 3.

170 SWCAP, s 3.3, Policy HE3; s 9.3, Policy 15.

171 AHNP, s 4.3.1, Policy (a); MNP, s 3.6, Policy (b); BLNP, s 3.5, Policy (d).

172 MNP, s 3.6, Policy (a); BLNP, s 3.5, Policy (a).

173 MNP, s 3.6, Policy (c); BLNP, s 3.5, Policy (f); WVCNP, s 3.1, Policy 1.

174 BLNP, s 3.5, Policy (e); s 3.7, Policy (c); WVCNP, s 3.1.4.

175 WVCNP, s 3.1.4.1, Policy 2.

176 BLNP, s 3.5, Policy (c); s 5.6, Policy (g).

177 BLNP, s 3.5, Policy (g).

178 MNP, s 3.6, Policy (f).

179 MNP, s 3.6, Policy (h); BLNP, s 3.5, Policy (k).

180 BLNP, s 7.1, Policy (f).

181 PocoPlan, ss 3.0, 7.4.

182 PocoPlan, s 7.4, Policies for Environment, Policy 4.

183 PocoPlan, s 7.4, Policies for Parks, Policy 6.

184 PocoPlan, s 7.4, Policies for Environment, Policy 2.

to minimize the impact on and to preserve as much of the significant, natural site features, such as creeks, streams, trees and vegetation, as possible, and where this is not possible to provide compensation and mitigation."[185] While this prioritizes avoidance, it does not create a clear hierarchy between mitigation and compensation.

## 3.5 Urban forest

### *3.5.1 Coquitlam*

#### Citywide plan

The CWOCP chapter on DPAs encourages retention of mature trees.[186] The provisions on improving community linkages note the desirability of tree-lined streets.[187] The environmental chapter emphasizes the importance of maintaining healthy forests and reinforcing the City's forested character through its Parks policies.[188] The provisions on natural hazard management emphasize the importance of enforcing the tree cutting bylaw on steep slopes, and encourage tree retention and native tree planting in hazard lands that are preserved as environmentally sensitive areas.[189] The neighbourhood design provisions encourage retention and augmentation of mature trees and refer to the possibility of developing a comprehensive urban forest policy.[190]

#### Area and neighbourhood plans

***Northeast Coquitlam***

The NECAP encourages preservation of natural vegetation and retention or planting trees to protect riparian areas and to control drainage and erosion.[191] Northeast Coquitlam's neighbourhood plans contain various policies to support urban tree cover, including to:

- Establish optimal post-development tree cover targets, set tree planting requirements to achieve the target, and amend boulevard tree specifications to include suitable species, size at planting and best practices for planting and maintenance;[192]
- Retain existing tree cover where possible through the subdivision and development permit approval process;[193]
- Protect significant trees and vegetation through the design of parks and other public open spaces.[194]

***Northwest Coquitlam***

The NWCAP says almost nothing about protecting urban forest. It designates all duplex development as a DPA, to ensure that duplex developments consider preservation or enhancement of tree and vegetation cover.[195]

***City Centre***

The CCAP says little about urban forest beyond committing to enforce the Tree Management bylaw to regulate the conservation, cutting, removal and replacement of trees.[196]

***Southwest Coquitlam***

The SWCAP commits to develop an urban forest management strategic plan[197] and to complete and implement a comprehensive landscape strategy that includes a goal to "maintain or expand the current tree canopy wherever possible."[198]

It is worth noting that beyond the OCP, Coquitlam's *Environmental Sustainability Plan* identifies goals, strategies and actions for the city's urban forest.[199]

### *3.5.2 Port Coquitlam*

The PocoPlan recognizes that forests occur in Port Coquitlam, especially in riparian corridors and in

185 PocoPlan, s 7.4, Policies for Environment, Policy 3.
186 CWOCP, Part 2, ss 2.5.2(a), 3.3.3(g)(vi).
187 CWOCP, Part 2, s 2.3.1.
188 CWOCP, Part 2, s 3.3.2, Objective 1, Policy (g).
189 CWOCP, Part 2, s 3.4, Objectives 1 & 2.
190 CWOCP, Part 2, s 4.2, Objective 1 and sidebar.
191 NECAP, Part B, s 2, Policy A-9.15.
192 UHCVNP & LHCVNP, s 3.1.3, Policy 3.
193 UHCVNP, s 3.1.3, Policy 4; LHCVNP & SCNP, s 3.1.3, Policy 3.
194 UHCVNP & LHCVNP, s 3.4, Policy 9; SCNP, s 3.3, Policy 11.
195 NWCAP, Part B, Policy F-2-2, paragraph 5.
196 CCAP, s 4.1, Policy (o).
197 SWCAP, s 7.3, Policy CS18, paragraph 6.
198 SWCAP, s 3.3, Policy HE4, paragraph 5; s 9.3, Policy 16.
199 Coquitlam ESP, p 59.

isolated stands.[200] It expresses a preference for the use of native vegetation in landscaping and promotes the preservation and planting of trees through DPAs and development control, road infrastructure projects, and the Tree Protection Bylaw.[201]

**OPPORTUNITY**

Make protecting existing urban forest and expanding the urban tree canopy policies of the PocoPlan.

## 3.6 Urban containment and clustering

### *3.6.1 Coquitlam*

#### Citywide plan

The CWOCP includes a commitment "to help prevent regional urban sprawl by providing locally for compact, complete communities."[202] It sets a target to concentrate 44% of residential growth in urban centres and transit corridors, which is more ambitious than *Metro 2050*'s targets of 40% and 28%, respectively. Outside these areas it directs growth into local centres.[203] It provides a framework and policies for focusing development in urban centres and local centres. The CWOCP mentions the urban containment boundary (UCB) briefly and depicts it on maps,[204] but does not state explicitly how municipal plans will accommodate growth within it, as required by the RGS.[205]

**OPPORTUNITY**

Indicate explicitly in the CWOCP how municipal plans will accommodate growth within the UCB.

#### Area and neighbourhood plans

***Compact, clustered development***

The NECAP and its associated neighbourhood plans contain numerous policies to concentrate development in compact, complete, transit-oriented urban village centres that respects natural topography and environmentally sensitive ravines.[206] The other area and neighbourhood plans also contain policies to support compact and transit-oriented development, but they are not as explicit about respecting topography and ecosystems,[207] though the NWCAP notes that clustered housing "could in theory allow more tree retention than has occurred to date within residential sites on the Westwood Plateau,"[208] and requires duplex developments to respect natural topography.[209]

***Development reserves***

The NECAP is alone amongst Coquitlam's area plans in identifying a development reserve.[210] Development reserves can inhibit large-scale LID by reducing the pressure to build out existing urban areas fully.

**OPPORTUNITY**

Eliminate reference to development reserves from the CWOCP.

***Amenity density bonusing***

Amenity density bonuses can link compact, clustered development to the pursuit of LID. Density bonusing

200 PocoPlan, s 7.4.

201 PocoPlan, s 7.4, Policies for Environment, Policies 8-9.

202 CWOCP, Part 2, s 3.3.1, Issues.

203 CWOCP, Part 1, s 1.4.2. The CWOCP also states a policy to "focus the majority of growth within 800 metres of high frequency transit service." CWOCP, Part 2, s 3.1, Policy (j). The Coquitlam *Environmental Sustainability Plan* states that the CWOCP directs more than 50% of new development to designated transit-oriented development areas in City Centre and Burquitlam-Lougheed, and a further 30% to existing neighbourhood centres and to infill housing in existing neighbourhoods, but we were unable to find those quantitative targets in the CWOCP. Coquitlam *Environmental Sustainability Plan*, p 25.

204 CWOCP, Part 1, s 1.4; Part 5, Schedules A & B.

205 CWOCP, Part 5, Attachment 1, RGS Strategy 1.1.3(b). The requirement is found in Metro 2040, Action 1.1.3(b) and Metro 2050, Action 1.1.9(b).

206 NECAP, Part A, s 2.1.

207 NWCAP, Part A, ss 11.1, 11.3; CCAP, ss 1.3, 2.2 (guiding principle 2), 3.1, 3.3, ; SWCAP, ss 2 & 9.2.

208 NWCAP, Part A, s 11.3.1.

209 NWCAP, Part B, Policy F-2-2.

210 NECAP, Part A, s 2.11.

policies in Coquitlam's OCP and sub-plans vary in their support of LID. The Partington Creek neighbourhood plan contemplates allowing higher density residential development in low density suburban areas if the developer can demonstrate enhanced preservation of topography, natural areas, watercourses and environmentally sensitive areas.[211] The Burquitlam-Lougheed neighbourhood plan proposes density transfers in which developers purchase "donor sites" in an area proposed for a new watercourse-centred linear park, transfer its residential density to "receiver sites" in an area designated for medium-density development, dedicate the land to the city for a park that includes an enhanced and protected riparian area, and in return receive permission for high-density development of the receiver site.[212] Some plans contemplate density bonuses for provision of amenities that could have LID benefits depending on the circumstances, such as parks and greenways.[213] And some contemplate bonuses for provision of amenities that are not directly linked to LID. [214]

The SWCAP commits to explore and apply incentive-based development measures such as density bonusing.[215] The AHNP commits to develop a voluntary, incentive-based density bonus strategy that directs how bonus contributions will be allocated.[216] Neither the CWOCP nor the area and neighbourhood plans specify bonus formulae or maxima, however.

Notably, Coquitlam has a Transfer of Development Rights and Obligations Policy and Procedure Manual that allows for the reallocation of development rights from donor sites to receiver sites.[217]

**AMENITY DENSITY BONUSING**

Amenity density bonusing allows developers to increase the density of land use above the limits normally applicable to a zone in return for providing public amenities. It can support LID by offering increased density if developers provide ecological amenities such as creation or restoration of wetlands or watercourses. Amenity density bonuses can be specified in zoning bylaws or negotiated case by case under OCP policies. Bonusing is often combined with amenity zoning, in which the area devoted to the amenity is rezoned into a zoning category specific to that amenity. In addition to the discussion in this Part, see Part 4.1 for more information about these bonuses.

**OPPORTUNITY**

Include more specific, LID-supportive criteria for density bonusing in the CWOCP and/or sub-plans.

### *3.6.2 Port Coquitlam*

The PocoPlan endorses the RGS's goal of creating compact, complete communities and declares that the city's overall development trend is toward "a compact, mixed use community focused on a vibrant commercial core."[218] It addresses this goal through policies that encourage:

- Complete communities with amenities, services and better jobs/labour force balance;[219]
- Public transit, cycling and walking;[220] and
- Smaller lots, duplexes, secondary suites and innovative infill development such as triplexes and coach houses, in some cases in exchange for public benefits such as land dedication for parks,

211 PCNP, s 3.1, Policy (i).

212 BLNP, s 5.7. The BLNP refers to this scheme as "transfers of development rights." The *Green Bylaws Toolkit* considers this terminology, which comes from the US, inappropriate for Canada where zoning is not generally understood to confer "rights." The Toolkit suggests that amenity density bonusing, which does not carry any connotation of a right to develop the subject land, is a more appropriate tool to achieve the same result. *Green Bylaws Toolkit*, pp 65-66.

213 CCAP, s 6.5, Policy (d); AHNP, s 3.1.3, Policy (g); BLNP, s 4.1, Policy (b).

214 SWCAP, s 4.3, Policy DN2 (affordable housing); UHCVNP, s 3.2.6, Policy 7 (affordable and accessible housing); AHNP, s 3.1.3, Policy (g) (affordable housing, community facilities, urban plazas, pedestrian corridors, public art and a footbridge); MNP, s 3.8 (heritage building revitalization).

215 SWCAP, s 9.2, Policy 7.

216 AHNP, s 5.1, Policy (e).

217 City of Coquitlam, Transfer of Development Rights and Obligations Policy and Procedure Manual (July 25, 2022).

218 PocoPlan, Appendix 1, s 4.2.4(a).

219 PocoPlan, s 7.1, Policies 3 & 4; s 7.2, Policies for Neighbourhoods, Policy 1; s 7.3.

220 PocoPlan, s 7.5.

trails or watercourse protection.[221]

It also commits to contain future commercial development to established commercial centres,[222] "support the regional Urban Centres concept and transit-oriented development" in the development of commercial lands[223] and ensure that development in designated Frequent Transit Development areas is transit-oriented.[224]

The PocoPlan promises to consider an amenity density bonus program for development providing public amenities "or a high level of environmental performance."[225] This program could be used to support LID.

**OPPORTUNITY**

Make implementation (rather than just consideration) of amenity density bonusing for developments that provide specified public LID amenities a PocoPlan policy, and specify criteria for such bonuses.

The PocoPlan depicts the urban containment boundary on a map, mentions it in the city's regional context statement and explains how growth will be accommodated within it.[226]

## 3.7 Green infrastructure

### *3.7.1 Coquitlam*

#### Citywide plan

The CWOCP does not mention the term "green infrastructure." As noted earlier, the infrastructure chapter strikes a note of caution about innovative approaches to infrastructure provision. It insists on carefully assessing new approaches prior to implementation, continuing to implement proven approaches, and initiate pilot projects to assess new approaches.[227] It also emphasizes the challenge of infrastructure funding, the need to explore innovative approaches to infrastructure funding and the need for "a more predictable and sustainable source of funding for the maintenance, rehabilitation and replacement of the storm drainage system."[228]

**OPPORTUNITY**

Make identification, protection and enhancement of a green infrastructure network a priority of the CWOCP alongside built infrastructure, and encourage innovative low impact approaches to built infrastructure.

**OPPORTUNITY**

Link Coquitlam area plans' support for networks of interconnected green spaces more explicitly to LID benefits such as healthier natural ecosystems and movement of fish and wildlife.

#### Area and neighbourhood plans

The NECAP does not mention "green infrastructure" but it envisions a comprehensive green space network that supports natural ecosystems and provides fish and wildlife movement corridors.[229]

Provision of green infrastructure is one of the CCAP's guiding principles.[230] Among other things, the CCAP commits to promote the provision of green infrastructure features on designated "character" streets and to require development along greenways to include street trees and low-maintenance landscaping that also serves as green infrastructure.[231] Like the NECAP, the CCAP envisions a network of interconnected green spaces, but unlike the NECAP it justifies this network in terms of human recreation,

221 PocoPlan, s 7.2, Policies for Housing, Policies 2-6.

222 PocoPlan, s 7.3, Policies for Commercial Lands and Development, Policy 3.

223 PocoPlan, s 7.3, Policies for Commercial Lands and Development, Policy 7.

224 PocoPlan, s 7.6, Policy 13.

225 PocoPlan, s 7.2, Policies for Housing, Policy 8.

226 PocoPlan, s 6.0 and Appendix 1, RGS Strategy 1.1.3(b).

227 CWOCP, Part 2, s 7.4, Objective 3.

228 CWOCP, Part 2, s 7.4, Objective 4.

229 NECAP, Part B, Policy A-6.7.

230 CCAP, s 2.2, guiding principle 11.

231 CCAP, s 5.1.3, Policy (b)(iv); s 6.2, Policy (e)(xii).

culture, connection and mobility rather than ecological benefits.[232]

Similarly, the Southwest Coquitlam Area Plan states a goal to "increase and develop a multi-functional 'green infrastructure' consisting of natural areas, open spaces, greenways, urban forest and parklands"[233] and includes policies to establish greenways and increase connectivity of parks, trails and natural areas; but it ties this to human recreation, not to ecology or wildlife.[234]

The NWCAP does not mention green infrastructure and has little to say about creating an interconnected network of green spaces except as a vague long-term opportunity.[235]

### *3.7.2 Port Coquitlam*

The PocoPlan does not mention green infrastructure and, as noted in the section on ESAs, above does not say much about creating a network of connected ecosystems and movement corridors. The utilities and services section of the plan does commit to consider revising the city's infrastructure specifications to encourage alternative stormwater management practices and standards.[236]

**OPPORTUNITY**

Make identification, protection and enhancement of a green infrastructure network a PocoPlan priority, and encourage innovative low impact approaches to built infrastructure.

## 3.8 Natural hazards

There is a close connection between natural hazards management and LID. Among other things, LID can reduce the frequency and severity of natural hazards like landslides and flooding.

232 CCAP, ss 3.1, 3.6.1, 3.6.2, 5.1.3.

233 SWCAP, s 3.2.

234 SWCAP, s 7.3, Policy CS18. See also AHNP, s 4.3 (preserve and respect multifunctional green infrastructure); WVCNP, s 3.1, Policy 2 (recognize naturalized areas as an appropriate locale for green infrastructure).

235 NWCAP, Part A, ss 2.1, 11.6.2.

236 PocoPlan, s 7.8, Policy 4.

### *3.8.1 Coquitlam*

#### Citywide plan

Coquitlam's topography includes many steep slopes and ravines, along with floodplain. The CWOCP recognizes the connection between LID and natural hazards by, among other things, supporting tree retention, encouraging the use of native vegetation, emphasizing the importance of vegetation in maintaining slope stability, and encouraging topsoil retention to promote infiltration.[237] It also requires single-family residential developments to respond to natural topography, minimize cut and fill excavations, and apply slope-adaptive architectural elements.[238] More generally, the CWOCP requires development permits for development in a designated area of Northwest Coquitlam that has unstable slopes as a result of long-term gravel quarrying.[239]

**OPPORTUNITY**

Extend the CWOCP's requirements for cut-and-fill minimization, topography-responsive site design and slope-adaptive architecture to all development on sloping terrain.

#### Area and neighbourhood plans

***Northeast Coquitlam***

The NECAP includes policies to avoid development on hazardous slopes and floodplains.[240] It undertakes to employ best site development practices suitable to the area's hilly terrain, to ensure that house design is sensitive to the area's natural features and steep topography and that significant trees are retained whenever safe and practical.[241] The City's *Guide to Best Site Development Practices* (formerly *Hillside Development Standards and Guidelines*) was initially prepared to fulfill this policy commitment and was

237 CWOCP, Part 2, s 3.4, Objectives 1-2.

238 CWOCP, Part 2, s 4.2, Objective 4.

239 CWOCP, Part 4, s 5.3. See the section on Development Permit Areas, below.

240 NECAP, Part B, Policies A-9.11, A-9.13.

241 NECAP, Part B, Policy A-2.2.10.

later extended to apply citywide.[242]

Northeast Coquitlam neighbourhood plans commit to use this policy and Guide "to achieve development suitable to the hillside conditions, and retain significant natural features where safe and practical."[243] The Partington Creek Neighbourhood Plan urges developers to "build with the slope to help preserve the natural topography of the hillside and minimize cut and fill excavations."[244]

***Northwest Coquitlam***

The NWCAP manages slope-related hazards via minimum lot sizes, slope setbacks and development variance permits for the steepest slopes.[245] It limits floodplain development in accordance with the Zoning bylaw.[246] It designates certain areas that are particularly susceptible to slope and flood hazards as a development permit area, the guidelines for which require (among other things) retention of existing vegetation; special provisions for drainage works, earth retention works and revegetation; and environmental impact assessment of watercourse areas by a professional biologist.[247]

***Southwest Coquitlam***

The SWCAP also includes policies to avoid development on hazardous slopes and in the floodplain, by among other things, continuing existing programs to assess and mitigate slope hazards; recognizing that vegetation enhances slope stability; applying the Zoning bylaw to avoid construction on slopes and the floodplain; applying the Tree Management bylaw to preserve trees on steep slopes and promote replanting; and ensuring that IWMPs take into account the effects of climate change (including severe storms and increased risk of floods and droughts).[248]

242 City of Coquitlam, *Guide to Best Site Development Practices* (April 2005), online: https://coquitlam.ca/DocumentCenter/View/317/Guide-to-Best-Site-Development-Practises-PDF.

243 UHCVNP, s 3.1.3, Policy 6; LHCVNP & SCNP, s 3.1.3, Policy 5. See also UHCVNP, LHCVNP & SCNP, s 3.2; PCNP, s 3.6, Policy (d).

244 PCNP, s 3.6, Policy (f).

245 NWCAP, Part A, s 12.3.3 (a); Part B, Policy I-3.

246 NWCAP, Part A, s 12.3.3 (d); Part B, Policy I-2.

247 NWCAP, Part B, Policies F-1-1 – F-1-3.

248 SWCAP, s 3.3, Policy HE2.

Southwest Coquitlam neighbourhood plans commit variously to "ensure development and infrastructure projects build with the slope to help preserve the topography of hillside areas and minimize cut and fill excavations";[249] and to ensure flood proofing and shoreline protection along the Fraser River by, among other things, adding a 1 metre safety factor to the flood control level.[250]

### *3.8.2 Port Coquitlam*

**OPPORTUNITY**

> Designate all floodplains in Port Coquitlam as a DPA and/or add a safety factor to the flood control level.

Port Coquitlam's topography is mostly low relief, making steep and hazardous slopes less of an issue than in Coquitlam. 45% of the city lies in floodplains and relies on dikes and other works for flood protection.[251] The PocoPlan commits to ensure that all development in floodplain complies with flood proofing requirements,[252] and to develop a comprehensive approach to flood protection including regulation of development in the floodplain.[253]

## 3.9 Green buildings

### *3.9.1 Coquitlam*

#### Citywide plan

The CWOCP contains few specific references to green building outside the chapter on development permit areas, which is discussed below. A section on environmental awareness commits to explore demonstration projects for environmentally beneficial products including green building materials.[254] As with numerous other issues relevant to LID discussed in this report, green building is addressed in Coquitlam's *Environmental Sustainability Plan*, which is not part of

249 MNP, s 3.7, Policy (c).

250 WVCNP, s 3.1.2.

251 PocoPlan, s 7.4.

252 PocoPlan, s 7.6, Policy 11.

253 PocoPlan, s 7.8, Policy 5.

254 CWOCP, Part 2, s 3.6, Objective 1, Policy (a).

its OCP.

**OPPORTUNITY**

Encourage all development in both cities to employ green building design principles and practices that emulate nature and promote LID.

### Area and neighbourhood plans

The SWCAP commits to encourage voluntary green building design and explore the feasibility of incentives for "green development."[255] The CCAP promises to encourage and recognize the use of "sustainable building approaches and purpose-built features which emulate nature" through Coquitlam's voluntary *Building Better* program.[256]

## *3.9.2 Port Coquitlam*

The PocoPlan recognizes that urban and building design presents opportunities to incorporate sustainability into development, and notes that LEED standards can be used to reduce impervious surfaces, increase the use of native and drought-resistant plants, and control water drainage on site. It goes on to say, however, that "the City faces a challenge in establishing design standards and guidelines, which contain a balance between local government design requirements, architectural originality and creativity, and development economics."[257] It points out that building and urban design "must also consider technical requirements such as flood proofing and accessibility, parking and transportation, physical constraints and environmental impacts."[258] Its policies for design do not explicitly encourage green buildings, though they do encourage LEED certification or a high level of environmental performance standards for certain residential developments.[259]

255 SWCAP, s 3.3, Policy HE4, paragraphs 1 & 4; s 6.3, Policy VE16.

256 CCAP, s 4.1, Policy (k).

257 PocoPlan, s 7.8.

258 PocoPlan, s 7.8.

259 PocoPlan, s 7.8, Policies 8, 12.

# 3.10 Development permit areas

**ABOUT DPAs**

Section 488 of the Local Government Act authorizes OCPs to designate development permit areas (DPAs) for a range of purposes including protection of the environment, ecosystems and biodiversity; water conservation; and protection of development against hazardous conditions. An OCP must describe the conditions or goals that justify the designation and specify guidelines for how they will be addressed, including through the issuance of development permits.

DPAs are a powerful tool to manage development, because no subdivision or construction is allowed in a DPA without first obtaining a development permit. Designating an ***environmental*** DPA is even more powerful, because it also prohibits all alteration of the land without a permit. Alteration includes soil removal and deposit, regrading, addition of impervious surfaces, modification of drainage patterns, changes to a stream or its banks, and removal of vegetation. As a result, designation of an environmental DPA allows a local government to protect sites before they are disturbed. That said, an OCP may specify exemptions from development permit requirements, for example for minor renovations or landscaping.

Development permits can do a wide range of things including varying subdivision and zoning regulations (except for land use and density), imposing conditions or requiring works or measures to protect environmental features, specifying areas that may not be developed, regulating the character of development and requiring applicants to provide reports or plans prepared by qualified professionals.

Development permits cannot vary land use or density. They also require substantial staff expertise. Notwithstanding these limitations, they facilitate a more flexible and granular approach to development than zoning can

DPAs are a powerful tool to support LID by imposing permit criteria and conditions such as development setbacks; vegetation management and habitat restoration measures; stormwater and watershed management measures (rainwater infiltration, stream restoration, in-stream structures, etc); covenants to operate and maintain those systems properly; erosion and sediment control measures; environmental monitoring; wildlife corridors; and standards for volume, direction and quality of surface runoff.

### Environmental DPAs

Environmental DPAs can protect any ecosystem type including watercourses, wetlands, wildlife movement corridors and habitat, and rare or endangered terrestrial ecosystems. They can be used to require applicants to conduct a variety of studies before development is permitted; define buffer areas or setbacks around ESAs; and regulate disturbance within ESAs and setbacks. They can establish a disturbance management hierarchy (avoid-mitigate-compensate) to give clear direction to developers and staff to put first priority on avoiding impacts and consider mitigation or compensation only for unavoidable impacts. To reinforce this hierarchy, they can include a "no net loss" principle or even a "net gain" principle, and require unavoidable losses to be replaced at an elevated ratio (eg 2:1).[260] This would complement the "net environmental benefit" approach taken in many IWMPs (see Part 4.2.2, below).[261]

One type of environmental DPA that is particularly relevant to LID is a **watercourse protection DPA**. Such DPAs can support LID by, among other things, specifying substantial riparian setbacks, requiring fences and signage to keep people out of setbacks, excluding setbacks from calculation of minimum lot size, encouraging landowners to dedicate setbacks to the municipality or grant covenants where setbacks are not easily accessible to city staff, and prohibiting development in setbacks unless historical development patterns make compliance impossible.

Watercourse protection DPAs are very common in BC. Both Coquitlam and Port Coquitlam have them. Another type of DPA that is less common but also highly relevant to LID is an *aquifer or groundwater protection DPA*. Such DPAs require development and land use to be carried out in a manner that does not contaminate any aquifer or groundwater with hazardous chemicals, sewage or other pollutants, and that protects natural groundwater recharge. To be effective, such DPAs need to integrate surface water and groundwater management. LID stormwater management techniques can play a key role in this integration. Several BC local governments have aquifer or groundwater protection DPAs.[262] That said, provincial legislation covers much of this same ground, making such DPAs attractive only where the aquifer in question is a drinking water source.

The *Green Bylaws Toolkit* recommends designating the entire municipality as an environmental DPA to recognize that environmental protection depends upon ecological connectivity and that all areas of a municipality impact the health of the environment, and cites Whistler and the Village of Cumberland as examples.[263]

### Development approval information areas

If a DPA is also designated as a **development approval information area**, the local government may require developers to provide a report or impact assessment before issuing a development permit.[264] Such requirements can help determine what conditions to include in the permit.

260 The City of Nanaimo applies a "net gain" principle in its environmental DPA: City of Nanaimo, Zoning Bylaw No 4500, Part 18, Development Permit Area (DPA) Guidelines, s 18.1.4(g), https://www.nanaimo.ca/bylaws/ViewBylaw/4500.pdf. The City of Abbotsford applies "no net loss" principle and a 2:1 replacement ratio to riparian habitat: City of Abbotsford, Official Community Plan Bylaw, 2016, Part V, Development Permit Guidelines, Chapter 6, Guidelines NE2 and NE3, https://municipal.qp.gov.bc.ca/civix/document/id/coa/coabylaws/ocp56.

261 City of Coquitlam, "Integrated Watershed Management," https://www.coquitlam.ca/228/Integrated-Watershed-Management.

262 Examples include Cowichan Valley, Cranbrook, Nanaimo and Whistler. For more information about groundwater protection DPAs, see Okanagan Basin Water Board, *Groundwater Bylaws Toolkit* (Kelowna: Okanagan Basin Water Board, 2009), online: https://www.obwb.ca/library/groundwater-bylaws-toolkit/.

263 Green Bylaws Toolkit, p 99.

264 The *Local Government Act*, s 485, authorizes OCPs to designate the areas and/or circumstances in which development approval information is required.

### Fees and security

Municipalities sometimes provide for reduced development permit fees for certain types of projects, for example those only involving in-stream restoration and enhancement.[265] This approach could be extended to projects employing LID best practices, to incentivize LID. Another approach to DP fees that could be applied to LID projects is to require development permit applicants to pay "peer review" fees enabling the municipality to retain an independent reviewer to review the application, if needed. These fees are reimbursed if not required.[266] This could give municipalities a flexible tool to obtain LID expertise on a case by case basis if they lack in-house expertise. Opportunities in this respect are discussed under each city, below.

Municipalities may also require developers to post security as a condition of a development permit.[267] Such requirements can be contained in a bylaw or in DPs themselves. This issue is discussed in Part 4.3, below.

### Qualified professionals

Applicants for environmental and natural hazard DPs are often required to hire qualified professionals to conduct certain studies. Applicants for Watercourse Protection DPs, for example, may have to conduct riparian area assessments, significant natural features reports, windfirm or hazard tree assessments, top-of-bank surveys, and/or evaluations of fish habitat values, hydrology and biophysical characteristics.

In some cases, DPA guidelines, municipal bylaws or provincial legislation require qualified professionals to have quite specific expertise. For example, Coquitlam's interface wildfire DPA guidelines require that fuel hazard assessments be conducted by professionals who are "qualified by training or experience in fire protection."[268] Its stream protection bylaw requires **erosion and sediment control (ESC)** supervisors to be qualified professionals with recognized expertise in the design, inspection and monitoring of ESC facilities and **best management practices (BMPs)**.[269] The provincial *Community Charter* defines a "qualified professional" for purposes of building in a geohazard zone as a professional engineer or geoscientist "with experience or training in geotechnical study and geohazard assessments."[270]

Port Coquitlam's Watercourse DPA guidelines define "qualified professional" as "an applied scientist or technologist specializing in an applied science or technology relevant to the matters dealt with in this watercourse protection DPA designation including, but not necessarily limited to, agrology, biology, engineering, geology, hydrogeology, landscape architecture, architecture, land surveying, or land use planning" and "who, through demonstrated suitable education, experience, and accreditation and knowledge relevant to the particular matter, may be reasonably relied upon to provide advice within their area of expertise."[271] This definition could, in principle, be applied to require qualified professionals to have expertise and qualifications in LID in appropriate circumstances.

Another way to support LID would be to require qualified professionals who conduct studies or prepare plans with LID components to have expertise in LID.

**OPPORTUNITY**

Consider amending both cities' environmental DPA guidelines and relevant bylaws to allow studies relevant to LID to be conducted by qualified professionals with experience or training in low impact development, green infrastructure and/or integrated stormwater management.

265 The City of Nanaimo offers such a reduction: City of Nanaimo, "Development Permits," https://www.nanaimo.ca/property-development/development-applications/development-permits.

266 Corporation of the Village of Cumberland, Development Procedures and Fees Bylaw No. 1073, 2018, at Schedule B, s. 10 (PDF p 13), online: https://cumberland.ca/wp-content/uploads/2019/02/Bylaw-1073-Dev-Proc-Fees-2018.pdf. This example is discussed in the *Green Bylaws Toolkit*, p 104.

267 *Community Charter*, ss 8(8)(c), 17 & 19; *Local Government Act*, s 502.

268 CWOCP, Part 4, s 5.3.2(d).

269 City of Coquitlam, bylaw no 4403, Stream and Drainage System Protection Bylaw, 2013 (9 September 2013) (consolidated with amendments).

270 *Community Charter*, s 56.

271 PocoPlan, s 9.8 (Watercourse Protection DPA), s 1.

### Relation to other tools

As instruments for fine-grained control of development, environmental DPAs work best if nested within a framework of general environmental policies contained in OCPs and environmental or green infrastructure strategies. Furthermore, DPAs and zoning bylaws can be mutually reinforcing, for example in requiring riparian area studies and setbacks. DPAs can also be reinforced by regulatory bylaws such as tree protection, soil removal and flood prevention. Such regulatory bylaws have the added advantage that they can be enforced through ticketing.

## *3.10.1 Coquitlam*

### Citywide plan

Coquitlam's CWOCP designates DPAs for multiple purposes including environmental protection, natural hazards management, and regulating the character of commercial, industrial and multi-unit residential development. It contains three general kinds of DPA guidelines: citywide guidelines that apply to all DPAs; neighbourhood-specific guidelines; and guidelines for environmental and natural hazard DPAs. The DPA chapter does not mention ISMPs or IWMPs, and contains no indication that the DPA designations respond to watershed study results, as urged by the CWOCP.[272]

**OPPORTUNITY**

Designate a general environmental DPA that covers all ESAs, or even the entire city of Coquitlam, with DPA guidelines that embrace an "avoid-mitigate-compensate" hierarchy, a "net gain" or "no net loss" principle and an elevated replacement ratio for unavoidable losses.

Coquitlam does not have a general environmental DPA, but its watercourse and natural hazard DPA guidelines are relevant to LID. The purpose of the **Watercourse Protection DPA** is to ensure that development proceeds in accordance with the provisions of the Zoning bylaw related to the provincial ***Riparian Areas Protection Regulation*** **("RAPR")**. This DPA covers the area within 50 m of top of bank of all watercourses within the NECAP and within 30 m of top of bank in the CCAP and the Burquitlam-Lougheed, Austin Heights and Maillardville neighbourhood plans.

The Watercourse Protection DPA guidelines are very brief (less than a page long) and provide that watercourse Protection DPs may modify applicable regulations to enhance or protect watercourses, but must ensure that:

- Environmentally sensitive areas and features are identified, protected, restored, replaced or enhanced;
- The post-development quality and rate of runoff to receiving watercourses is as close to pre-application conditions as possible, or improved;
- Development does not cause erosion, sloughing, landslip or flooding; and
- Riparian areas are protected in accordance with bylaws and senior government approvals.[273]

The brevity of these guidelines may reflect a decision to rely mainly on other tools (including ISMPs/IWMPs and RAPR review under the Zoning bylaw) to protect watercourses and riparian areas. Coquitlam's 2022 *Environmental Sustainability Plan* commits to explore opportunities to expand watercourse protection DPA requirements citywide.[274]

**OPPORTUNITY**

Expand Coquitlam's watercourse DPA to cover all watercourses in the city and amend the corresponding DPA guidelines to require permanent fencing and signage of riparian setbacks, exclusion of setbacks from minimum lot size calculations, and encouragement of dedication of setbacks to the city.

Coquitlam has environmental DPA guidelines for two specific small areas: the confluence of Scott Creek and the Coquitlam River, and the Braid Street former landfill site. The **Scott Creek DPA** requires developers to ensure that construction activity does not impinge on fisheries habitat areas and to ensure that grading,

272 CWOCP, Part 2, s 3.2, Objective 3, Policy (b).

273 CWOCP, Part 4, s 5.1.1(a)(ii).

274 Coquitlam ESP, p 32, Action 57.

drainage and siting of buildings and parking areas do not adversely affect fisheries values in adjacent streams.[275] The **Braid Street Fill Site DPA** focuses on site remediation and proper handling of dangerous gases and leachates.[276]

The **Unstable Slopes DPA** covers a limited area of Northwest Coquitlam where there were extensive earthworks to reshape former gravel pits. Guidelines include retention of existing vegetation, provision of geotechnical reports, detailed grading plans, and an environmental inventory and impact assessment related to watercourses.[277]

The **Interface Wildfire Risk Management Boundary DPA** covers a narrow strip in Northeast Coquitlam. Guidelines include large setbacks, removal of flammable vegetation and planting of less flammable and widely spaced vegetation around buildings at the urban interface boundary.[278] While this serves fire protection goals, it reduces the LID benefits of vegetation and trees in this very limited area – likely a reasonable tradeoff.

Several guidelines applicable to all DPAs citywide are supportive of LID, including:

- Consider rooftop designs that incorporate landscaping, vegetation, intensive green roof systems, and stormwater management;[279]
- Give priority to retention of mature vegetation in site planning;[280]
- Prefer native plants in landscaping[281] and require them "where appropriate to strengthen and restore riparian/wildlife habitat and support biodiversity";[282]
- Use "existing site topography and natural features to inform earthworks, planting, soil, drainage and water detention that work to support the natural functions of the building and site (e.g. provide screening, windbreak, infiltration, etc.)";[283]
- "Conduct site grading, site drainage and the siting and construction of buildings and parking areas near watercourses in a manner that promotes protection of fisheries and wildlife habitat"; [284]
- Install permeable surface treatments and subsurface water storage systems wherever possible, and consider grading hard surfaces towards landscaped areas;[285]
- Ensure that off-street parking is landscaped, including trees, perimeter landscape buffer and natural drainage;[286]
- Ensure that at least 65% of row houses' street-facing yards to be soft landscaping;[287]
- Design any large hard surfaces in residential infill developments, such as driveways, parking areas and patios, using permeable surface materials;[288]
- "Incorporate measures to allow for natural on-site filtration of rainwater" in residential infill developments;[289] and
- Encourage retention of existing mature trees in residential infill developments.[290]

Finally, of the four neighbourhood-specific DPA guidelines, only those for Partington Creek (which lies within the relatively LID-friendly NECAP and Partington Creek IWMP areas) express substantial support for LID, including:

- Encouragement of innovative strategies to integrate rainwater management into building and landscape design, for example via rain gardens or other retention elements.[291]
- Encouragement of visible rainwater detention features in the public realm, such as rain gardens, surface channels and "public art that is integrated with and designed to make rainwater management visible";[292]
- Encouragement of planted surface stormwater detention basins.[293]

275 CWOCP, Part 4, s 5.1.2(a).

276 CWOCP, Part 4, s 5.2.1(a).

277 CWOCP, Part 4, s 5.3.1(a).

278 CWOCP, Part 4, s 5.3.2.

279 CWOCP, Part 4, ss 2.1.1(h), 2.1.2(c).

280 CWOCP, Part 4, 2.5.2(a).

281 CWOCP, Part 4, ss 2.3.2(b)(v), 2.5.2(c).

282 CWOCP, Part 4, s 2.6.1(c).

283 CWOCP, Part 4, 2.6.1(a).

284 CWOCP, Part 4, s 2.6.2(a).

285 CWOCP, Part 4, s 2.6.2(c).

286 CWOCP, Part 4, s 2.7.1.

287 CWOCP, Part 4, s 3.2.4(a).

288 CWOCP, Part 4, s 3.3.3(g)(VI)(iii).

289 CWOCP, Part 4, s 3.3.3(g)(VI)(iv).

290 CWOCP, Part 4, s 3.3.3(g)(VI)(vi).

291 CWOCP, Part 4, s 4.4.1(2)(a).

292 CWOCP, Part 4, s 4.4.7, "Landscape elements," "Stormwater features," (i).

293 CWOCP, Part 4, s 4.4.7, "Landscape elements," "Planting and plant materials," (iv).

The Waterfront Village DPA guidelines require off-street parking to include landscaping to break up impervious surfaces.[294]

Coquitlam charges a reduced watercourse DP application fee for single family developments and refunds 50% of other watercourse DP application fees if the city determines that a DP is not required.[295]

Coquitlam's OCP does not formally designate any development approval information areas or any circumstances in which development approval information is required, although the Development Procedures Bylaw seems to assume that it does.[296]

**OPPORTUNITY**

Reduce Coquitlam's DP application fees for developments that employ LID best practices that substantially exceed requirements; collect refundable "peer review" fees that enable the city to retain independent LID experts if needed for DP applications (see Fees and security, above); and amend the CWOCP to designate all environmental and natural hazard DPAs, and perhaps all IWMP/ISMP areas, as development approval information areas (see Development approval information areas, above), to provide a stronger foundation for the development permit information requirements in s 5.4 of the Development Procedures Bylaw.

### Area and neighbourhood plans

The CCAP and BLNP state policies to require watercourse development permits for all development within riparian assessment areas.[297] These policies may be redundant, since the watercourse protection DPA already covers these areas. Several of Coquitlam's neighbourhood plans state policies to require DPs for all developments falling in certain categories, including:

- Commercial developments;[298]
- Industrial developments;[299]
- Mixed use developments;[300]
- Multi-family developments;[301]
- Specific residential designations;[302] or
- All development within specified Neighbourhood Centres.[303]

These policies may present opportunities to incorporate LID criteria into these development permit processes.

## *3.10.2 Port Coquitlam*

The PocoPlan designates nine DPAs. Four are environmental: for watercourses, environmental conservation, natural environment protection, and natural hazards. Three relate to particular development types (commercial, industrial and intensive residential), and two are neighbourhood-specific (Downtown and Northside Centre).

### Watercourse Protection DPA

The **Watercourse Protection DPA** applies to all lots any portion of which is within 50 m of the top of bank (or dike crest or natural boundary, in the case of rivers) of designated watercourses.[304] The guidelines proclaim conservation of the city's watercourses to be essential to the public interest.[305] The overall goal of the guidelines is to protect these watercourses through conservation and restoration of riparian areas while recognizing that they also provide other amenities like

294 CWOCP, Part 4, s 4.2.1(xx).

295 City of Coquitlam, Development Applications: 2023 Fee Calculation Guide, https://www.coquitlam.ca/DocumentCenter/View/374/Development-Planning-Application-Fees-Schedule-2023-PDF.

296 City of Coquitlam, bylaw No 4068, Development Procedures Bylaw, 2009 (8 February 2010), s 5.4.

297 CCAP, s 4.1, Policy (a); BLNP, s 3.5, Policy (a).

298 PCNP, s 3.6, Policy (a); MNP, s 3.7, Policy (a); BLNP, s 4.1, Policy (a).

299 MNP, s 3.7, Policy (a).

300 MNP, s 3.7, Policy (a); BLNP, s 4.1, Policy (a).

301 PCNP, s 3.6, Policy (a); s 5, Policy (b); MNP, s 3.7, Policy (a); BLNP, s 4.1, Policy (a).

302 "Housing Choices" (MNP, s 3.7, Policy (a); BLNP, s 4.1, Policy (a)); "Street-Oriented Village Homes" (UHCVNP, s 3.2.6, Policy 2; LHCVNP, s 3.2.3, Policy 2; SCNP, s 3.2.5, Policy 2); "Conventional Townhomes" (UHCVNP, s 3.2.7, Policy 2; SCNP, s 3.2.6, Policy 2); duplexes in the "Small Village Single Family" designation (SCNP, s 3.2.4, Policy 5); and all duplexes (NWCAP, Part B, Policy F-2-1).

303 PCNP, s 5, Policy (a); AHNP, s 3.1.3, Policy (e).

304 PocoPlan, s 9.8 (Watercourse Protection DPA), s 2.

305 PocoPlan, s 9.8 (Watercourse Protection DPA), s 3.

trails, yards and gardens.[306] The guidelines list four specific objectives and sixteen means for achieving those objectives, which taken together are quite supportive of LID. The four objectives are:

- To protect and conserve the watercourses' natural environments, ecosystems, and biological diversity, and to restore or enhance these habitats to an ecologically healthy condition;
- To maintain the watercourses' drainage and flood protection functions;
- To facilitate development that is compatible with conservation of the watercourses; and
- To regulate development activities within and near the watercourses and rivers to achieve the above goals.[307]

The means to achieve these objectives include:

- Maintaining natural runoff regimes;
- Controlling erosion and sediment in runoff;
- Maintaining drainage capacity and flood control systems;
- Protecting, restoring, enhancing and preventing harmful alteration of aquatic and riparian habitat;
- Prohibiting pollution, obstruction and diversion of watercourses;
- Conserving wildlife and wildlife habitat;
- Avoiding slope instability near watercourses;
- Using best management practices for development near watercourses; and
- Using flexible and innovative regulations and incentives compatible with watercourse conservation.[308]

The watercourse protection DPA guidelines focus mainly on determining and managing **Watercourse Protection Areas (WPAs)**, within which no development is allowed, except in accordance with terms and conditions specified by the city on the basis of the Environmental Protection Plan and Watercourse Protection Area Management Plan prepared by the applicant pursuant to the Development Procedures bylaw.[309] WPA boundaries are determined based on ecological criteria related to vegetation conditions, habitat value and potential impact from adjacent development.[310]

The guidelines allow for variation of WPA boundaries either to provide greater watercourse protection or to allow development where strict application of the criteria would prevent a use permitted under existing zoning.[311] The first type of variation could enhance LID; the second could hinder it but is dictated by the requirement that DPAs must not make permitted uses impossible.

Numerous LID-supportive requirements and guidelines govern the management of WPAs unless the city determines that they are unnecessary or inappropriate for WPA conservation. WPA management *requirements* include:

- Existing natural vegetation must be preserved, protected, restored or enhanced;
- All mature and significant trees and shrubs must be retained, except with city approval;
- Vegetation species planted in a WPA must be riparian species native to the area and selected for erosion control and fish and habitat values;
- Vegetation in a WPA must include at least one tree for every 25 m2;
- Bark mulch, gravel, polyethylene sheeting and cinder stone must not be used for erosion control in riparian areas (temporary matting, straw or leaf mulch should be used instead); and
- Vegetation maintenance in a WPA must preserve, restore or enhance fish and wildlife habitat values; use appropriate environmental protection measures; use best management practices for riparian habitat protection; and avoid harmful alteration, disruption or destruction of natural features, functions or conditions that support fish or wildlife.[312]

WPA management *guidelines* include:

- A DP may require construction of works to preserve, protect, restore or enhance watercourses or WPAs;
- A DP may require protection measures to preserve, protect, restore, or enhance fish habitat or riparian areas; control drainage; control erosion; or protect banks;

306 PocoPlan, s 9.8 (Watercourse Protection DPA), s 3.

307 PocoPlan, s 9.8 (Watercourse Protection DPA), s 3(a)-(d).

308 PocoPlan, s 9.8 (Watercourse Protection DPA), s 3(a)-(d).

309 PocoPlan, s 9.8 (Watercourse Protection DPA), s 5(A)(i).

310 PocoPlan, s 9.8 (Watercourse Protection DPA), s 4(A).

311 PocoPlan, s 9.8 (Watercourse Protection DPA), s 4(B).

312 PocoPlan, s 9.8 (Watercourse Protection DPA), ss 6, 7.

- Where possible, riparian plant species should be salvaged from the development site and replanted;
- Native shrubs and groundcover should cover at least 50% of the WPA; and
- Native soil from the site should be used for riparian planting, where possible.[313]

The guidelines require owners to preserve and protect all areas that might be within a WPA pending establishment of the WPA, and authorize the city to impose DP conditions that require restoration or enhancement of a WPA to a natural condition if it is disturbed prior to WPA establishment.[314] The guidelines also require that any access to WPAs be carefully planned, designed and managed.[315] In addition, they allow tree protection and soil removal or deposit permits required by other bylaws to be incorporated into DPs.[316]

A watercourse protection DP is not required for certain activities, two of which are directly relevant to LID: maintenance of drainage systems, storm water discharge sites and drainage works or structures approved by the city; and reconstruction of a driveway with pervious materials, a width less than 4 m, and alignment that minimizes potential impacts. Such activities are exempted only if they preserve, restore or enhance fish and wildlife habitat values; use appropriate environmental protection measures; use best management practices for riparian habitat protection; and avoid harmful alteration, disruption or destruction of natural features, functions or conditions that support fish.[317]

### Environmental Protection DPAs

The **Environmental Conservation DPA** focuses on greenhouse gas reduction and energy and water conservation.[318] It applies to the Downtown, Northside Centre, Intensive Residential, Commercial and Industrial Development Permit Areas and most lands zoned Institutional. It requires an integrated stormwater management plan (ISMP) and says that the design (whether of the site or of the ISMP is not specified) must consider several LID tools and techniques, namely:

- Pervious surface areas and permeable or porous paving materials in on-grade parking areas;
- Bioswales and rain gardens;
- Stormwater capture, treatment and storage for landscape irrigation or other purposes;
- Retention or restoration of forest, wetland, and other high-value vegetation;
- Automated, high-efficiency mechanical irrigation systems;
- Sufficient depth of topsoil or composted materials for well-rooted plantings; and
- Drought-tolerant and indigenous tree, shrub, and plant species and other xeriscaping techniques.[319]

The guidelines also encourage green roofs and require surface parking areas to include trees and other landscaping.[320]

The **Natural Environment Protection DPA** applies to five geographically limited areas outside the city's major built-up area: Douglas Island, Colony Farm, the Pitt River shore north of Lougheed Highway, the Argue Street waterfront at the mouth of the Pitt River, and the Citadel Landing area on the Fraser River shore.[321] Some of the DPA guidelines could support LID, including:

- Encouragement to retain mature trees (but no encouragement or requirement to use native species);[322]
- Requirement to use trees in landscaping fronting streets, wherever possible;[323]
- Requirement to abut all surface parking areas with continuous landscaping borders comprised of ground cover, shrubs and trees;[324]
- Douglas Island, Colony Farm and northern Pitt River shore: Requirement for an **environmental**

313 PocoPlan, s 9.8 (Watercourse Protection DPA), s 6.

314 PocoPlan, s 9.8 (Watercourse Protection DPA), s 5(A)(ii)-(iii).

315 PocoPlan, s 9.8 (Watercourse Protection DPA), s 5(B).

316 PocoPlan, s 9.8 (Watercourse Protection DPA), s 5(C)(i)-(ii).

317 PocoPlan, s 9.8 (Watercourse Protection DPA), s 8.

318 PocoPlan, s 9.11 (Environmental Conservation DPA).

319 PocoPlan, s 9.11 (Environmental Conservation DPA), s 3(b)(i).

320 PocoPlan, s 9.11 (Environmental Conservation DPA), s 3(a)(i)-(ii).

321 PocoPlan, s 9.9 (Natural Environment Protection DPA).

322 PocoPlan, s 9.9 (Natural Environment Protection DPA), s 3(b)(i).

323 PocoPlan, s 9.9 (Natural Environment Protection DPA), s 3(b)(ii).

324 PocoPlan, s 9.9 (Natural Environment Protection DPA), s 3(b)(iii).

**impact assessment (EIA)** that addresses, among other things, proposed soil handling procedures, site drainage methods, "potential buffer zones to ensure that modifications to surface and ground water regimes and vegetation cover do not contribute to the loss of important vegetation," mitigation of "fish impacts on rivers and streams," enhancement of fish habitat, and (for Colony Farm only) offsite and onsite drainage implications of flood-proofing any potential development area to the 200-year flood line;[325] and

- Argue Street waterfront and Citadel Landing: Requirement for an EIA that identifies impacts of the development on the Pitt River edge and foreshore and indicates mitigation measures.[326]

Port Coquitlam's environmental DPAs do not appear to overlap exactly with its ESAs as depicted in the PocoPlan.[327] It might be worth considering whether to designate all ESAs as a DPA to ensure that development in or affecting all ESAs is managed appropriately.

**OPPORTUNITY**

Consider designating all ESAs in Port Coquitlam as a DPA to ensure that development in or affecting all ESAs is managed appropriately.

### Natural hazards DPA

The **Hazardous Conditions DPA** covers a small area of steep slopes along Shaughnessy Street in the Citadel Heights area. It requires slope retention measures and grading and excavation works designed by a geotechnical expert. It does not, however, require development on steep slopes to accommodate natural topography, retain trees, use vegetation for slope retention, minimize cut and fill excavation, or apply slope-adaptive architectural elements.

### Other DPAs

Port Coquitlam's other DPAs contain some guidelines that could support LID, including:

- Encouragement to locate parking in high intensity buildings underground or in multi-level structures (but not necessarily within the main building footprint);[328]
- Requirements to inter-plant parking areas with trees, use trees in landscaping fronting on streets, or provide street trees;[329]
- Encouragement to retain mature trees and use native vegetation in landscaping;[330]
- Requirements for development in the Dominion Riverfront area to include "street trees, rain gardens and planting native and drought-tolerant plant species;"[331]
- Requirements for developments in the Small Lot zone to limit driveway width, minimize impervious parking surfaces and provide at least one front yard tree;[332]
- Requirements for coach house developments to have at least two trees;[333]
- Requirements for duplex developments to limit driveway width, minimize driveway paving, maximize permeable surfaces, and have at least two trees.[334]

One DPA guideline discourages relaxation of parking requirements in the Argue Street neighbourhood.[335] This could be in tension with promoting LID, but there may be a rationale for it.

### Other DPA issues

Port Coquitlam charges lower DP fees for agricultural, single residential and duplex developments,[336] but

325 PocoPlan, s 9.9 (Natural Environment Protection DPA), s 3(a)(i)-(ii).

326 PocoPlan, s 9.9 (Natural Environment Protection DPA), s 3(a)(iii).

327 PocoPlan, s 7.4, Map 7.

328 PocoPlan, s 9.3 (Downtown DPA), 3(c)(i); s 9.4 (Northside Centre DPA), 3(d)(i); s 9.5 (Intensive Residential DPA), 3(e)(xiv); s 9.6 (Commercial DPA), 3(h)(ii), (iv), (iix), s 9.7 (Industrial DPA), 3(g)(iii).

329 PocoPlan, s 9.3 (Downtown DPA), 3(e)(i)-(iii); s 9.4 (Northside Centre DPA), 3(e)(i)-(ii); s 9.5 (Intensive Residential DPA), 3(c)(i)-(ii), s 9.6 (Commercial DPA), 3(d)(i)-(ii), s 9.7 (Industrial DPA), 3(c)(i)-(ii), 3(g)(iii)-(iv).

330 PocoPlan, s 9.3 (Downtown DPA), 3(e)(i); s 9.4 (Northside Centre DPA), 3(e)(ii-iii); s 9.5 (Intensive Residential DPA), 3(c)(ii-iii), 3(e)(iii); s 9.6 (Commercial DPA), 3(d)(ii), (iv), s 9.7 (Industrial DPA), 3(c)(ii)-(iii).

331 PocoPlan, s 9.5 (Intensive Residential DPA), 3(e)(xiv).

332 PocoPlan, s 9.5 (Intensive Residential DPA), 3(e)(xiii).

333 PocoPlan, s 9.5 (Intensive Residential DPA), 3(e)(xvi).

334 PocoPlan, s 9.5 (Intensive Residential DPA), 3(e)(xvii).

335 PocoPlan, s 9.5 (Intensive Residential DPA), 3(e)(xi).

336 Port Coquitlam, Fees and Charges Bylaw No. 4289,

**OPPORTUNITY**

Reduce Port Coquitlam's DP application fees for developments that employ LID best practices that substantially exceed requirements; collect refundable "peer review" fees that enable the city to retain independent LID experts if needed for DP applications; and amend the PocoPlan to designate all environmental and natural hazard DPAs, and perhaps all IWMP/ISMP areas, as development approval information areas.

not for development that implements LID practices. The PocoPlan does not explicitly designate any development approval information areas or any circumstances in which development approval information is required.

## 3.11 Site-level customization

### *3.11.1 Coquitlam*

#### Citywide plan

Coquitlam's CWOCP provides several tools for comprehensive, fine-grained, tailor-made regulation of development of individual sites, including **comprehensive development zoning** and **master development plans** (MDPs).

**Comprehensive development zoning** provides a flexible framework for applying a suite of tools such as rezoning, subdivision, density averaging, amenity density bonusing and development permits to large development sites. It allows local governments to tailor detailed requirements to site-specific constraints and opportunities in an integrated way, including LID practices for stormwater management, watercourse protection, landscaping and vegetation. Each comprehensive development zone is unique to a particular site. It can specify permitted uses, the location of those uses on the site, the maximum densities of those uses, the public amenities to be provided, and requirements for the protection and maintenance of natural areas, parkland and ecosystems.

Coquitlam's CWOCP provides broad and flexible authority for comprehensive development zoning. Such zoning is available for any land use designation and in a wide variety of scenarios, including sites over 2.5 hectares with multiple buildings and uses; small sites with significant constraints; developments with multiple phases, uses and ownership types; developments providing significant public amenities and benefits; and complex developments requiring variances, incentives and innovations.[337]

A **master development plan** (MDP) provides a bridge between the OCP's high-level directions and the site-specific details of a standard rezoning or development permit application, for large, multi-phase developments that involve complexities or tradeoffs that cannot be accommodated through the latter processes.[338] The CWOCP requires MDPs for all development sites greater than 2.5 ha, other than single-family subdivisions. Smaller developments may be directed into the MDP stream at the City's discretion.[339] MDPs build upon the policies in area and neighbourhood plans to "provide a finer level of detail for how a site will be developed by establishing the general locations of land uses and densities, street, lane and pathway networks, utility servicing, parks and open spaces, amenities, public benefits and development phasing."[340] MDPs must include, among other things, a minimum 5% public parkland dedication (or cash-in-lieu), a stormwater management plan (SMP) and a sustainability plan that includes details of the natural environment, watercourses, wastewater and stormwater management.[341] The detailed requirements for the contents of MDPs do not refer explicitly to any particular LID practices, however.

Schedule D, online: https://www.portcoquitlam.ca/wp-content/uploads/2022/12/4289-Fees-and-Charges-Bylaw.pdf.

337 CWOCP, Part 2, s 2.1.1.

338 City of Coquitlam, "Master Development Plan," https://www.coquitlam.ca/1079/Master-Development-Plan.

339 City of Coquitlam, Master Development Plan Rezoning Policy & Procedure Manual (28 September 2020), online: https://www.coquitlam.ca/DocumentCenter/View/3989/Master-Development-Plan-Rezoning-Policy-and-Procedure-PDF ("Coquitlam MDP Policy & Procedure Manual").

340 CWOCP, Part 2, s 2.1.2(a).

341 CWOCP, Part 2, s 2.1.2(b); Coquitlam MDP Policy & Procedure Manual, s 5.0.

**OPPORTUNITY**

Require MDPs in Coquitlam to specify factors such as total effective impermeable area, total tree cover or native vegetation, and LID techniques to be used.

### Area and neighbourhood plans

Coquitlam's area and neighbourhood plans call for site-level customization in the form of MDPs or CDZs for certain areas.[342]

### *3.11.2 Port Coquitlam*

The PocoPlan contemplates the use of comprehensive development zoning for high-density residential developments that, among other things, achieve a high level of environmental performance (LEED Silver or higher).[343]

## 3.12 Monitoring

Monitoring is crucial to achievement of LID and, indeed, any goals and policies. The choice of what to monitor has key implications for which goals are achieved – there is some truth to the cliché that "what gets measured gets done." To best support LID, official community plans should set LID-related targets, identify indicators for achievements of those targets, and commit to monitor those indicators as part of plan implementation.

### *3.12.1 Coquitlam*

Coquitlam's OCP says little about monitoring in general and even less about monitoring of indicators relevant to LID.

### Citywide plan

The CWOCP recognizes that developing a monitoring framework is a huge and complex task.[344] It commits to develop a comprehensive Community Sustainability monitoring framework that measures progress towards achieving the goals expressed in the citywide portions of the OCP,[345] but we were unable to determine the status of this framework.

### Area and neighbourhood plans

The area and neighbourhood plans make differing and uneven commitments to monitor LID-relevant indicators, including:

- Effectiveness of IWMPs;[346]
- Performance of the stormwater management system in relation to applicable IWMPs;[347]
- Implementation and effectiveness of wildlife management BMPs;[348]
- Implementation and effectiveness of strategies to improve natural areas and wildlife corridors;[349]
- Improvements and frequency of new developments that use native plant species;[350]
- Provision of public amenities (which could, in principle, include LID amenities such as restored ESAs or riparian areas).[351]

This monitoring is to be done by city staff, with one exception: the **Waterfront Village Centre Neighbourhood Plan ("WVCNP")** requires the developer, not the city, to "monitor and report on constructed habitats to assess their efficacy" in fulfilling external government agencies' performance requirements.[352]

Outside the OCP, the Coquitlam *Environmental Sustainability Plan* sets out a framework of **key performance indicators (KPIs)** against which to monitor progress towards the plan's goals. KPIs relevant to LID include percent of stream water quality samples within Metro Vancouver Stormwater AMF guidelines; amount of native vegetation planted

342 Eg CCAP, ss 3.2 (Downtown core), 6.1.2 (Lincoln SkyTrain Station Precinct), 7.2 (malls and other large consolidated properties); BLNP, s 5.6, Policy (a) (Coquitlam College site); WVCNP, s 5.3 (Fraser Mills site).

343 PocoPlan, s 7.6, Policy 8(b).

344 CWOCP, Part 2, s 8.3.

345 CWOCP, Part 2, s 8.3, Objective 1.

346 CCAP, s 7.5.

347 PCNP, s 6.2, Policy (e); MNP, s 6.2; BLNP, s 7.2, Policy (e).

348 MNP, s 6.2; BLNP, s 7.2, Policy (f).

349 CCAP, s 7.5; BLNP, s 7.2, Policy (g).

350 BLNP, s 7.2, Policy (h).

351 PCNP, s 6.2, Policy (c); AHNP, s 5.2; MNP, s 6.2.

352 WVCNP, s 3.1, Policy 4.

annually on city land; and amount of natural areas restored annually.[353] Progress on ESP goals and actions is reported on annually. The Stormwater AMF's monitoring framework is limited to stream water quality, flows and benthic invertebrates.[354] It does not monitor conditions that contribute to those indicators, such as combined sewer overflows, stormwater runoff, erosion and habitat destruction.

### *3.12.2 Port Coquitlam*

The PocoPlan contains no provisions for monitoring of progress against plan goals and policies.

**OPPORTUNITY**

Amend both cities' OCPs to specify LID targets, indicators and commitments to monitor those indicators, which could include effective impervious area; volume of runoff infiltrated or reused; number of combined sewer overflows; amount of absorbent landscaping installed; total green roof area; total or per-unit surface parking area; extent of healthy or restored natural ecosystems; extent of urban tree canopy; and stream water quality and flow. Alternatively, these could be specified in IWMPs/ISMPs and OCPs could require implementation thereof.

# 4. Bylaws

Bylaws play a key role in LID. As a 1999 guide to environmental stewardship bylaws noted, "the design of local government bylaws can have an impact – good or bad – on land use development practices and their effect on riparian vegetation, watercourses, wetlands and other environmentally sensitive areas,"[355] not to mention stormwater management, infiltration, flooding, erosion and other LID issues. By the same token, the same report emphasized that local bylaws and regulations are just one piece of the puzzle: "Well-balanced stewardship initiatives will include not only regulation, but will also integrate planning, public awareness and public investment actions."[356]

Both cities' bylaws are available online.[357] This report surveys them in five categories: zoning, subdivision, development procedures, regulatory and financial.

## 4.1 Zoning

Zoning bylaws regulate the character of land use by dividing the local territory into multiple zones and prescribing permitted uses, densities, lot sizes, building sizes and other variables for each zone. Zoning bylaws can support LID by:

- Requiring large lot sizes outside the urban containment boundary (UCB);
- Encouraging mixed-use, nodal, complete (work-live-play), walkable and rollable development within the UCB;
- Enabling development to be clustered away from environmentally sensitive areas (ESAs) and watercourses;
- Prescribing setbacks, large lot sizes, low densities and other special rules in or near ESAs and watercourse protection areas;
- Limiting the effective impervious area[358] of lots, thus encouraging onsite stormwater infiltration or reuse;
- Reducing or eliminating minimum off-street parking standards and encouraging walking, rolling and transit-oriented development;[359]
- Prescribing LID-friendly landscaping and screening requirements;
- Authorizing density averaging, density transfers and amenity density bonuses, and setting specific formulae and maximums for specific zones; and
- Creating comprehensive development zones

353 Coquitlam ESP, pp 65-66.

354 Stormwater AMF.

355 *Stewardship Bylaws Guide*, 1.

356 *Stewardship Bylaws Guide*, 1.

357 City of Coquitlam, "Bylaw Search," online: https://www.coquitlam.ca/548/Bylaw-Search; City of Port Coquitlam, "Bylaws," online: https://www.portcoquitlam.ca/city-government/bylaws/.

358 Effective impervious area (impervious surfaces that are connected via sheet flow or discrete conveyance to a drainage system) is generally considered a better indicator than total impervious area: Stormwater AMF, p 64.

359 The environmental and social benefits of eliminating minimum parking standards are discussed in Hamzah Jhaveri, "How Eliminating Parking Minimums Actually Makes Cities Better," Environmental and Energy Studies Institute (3 June 2021), online: https://www.eesi.org/articles/view/how-eliminating-parking-actually-makes-cities-better.

(CDZs) that allow requirements to be fine-tuned to the environmental conditions of individual development sites.

Zoning bylaws achieve urban containment and clustering largely via the designation and spatial distribution of zones of differing uses, lot sizes and densities, as represented on a detailed zoning map. How effective the spatial distribution of zones is at achieving clustered, complete development and concentrating development away from watercourses and other ESAs in the two cities is beyond the scope of this report.

In general, zoning regulations are not fine-grained enough to deal with site-specific environmental conditions. This limitation can be overcome by designating site-specific CDZs or by combining zoning with other tools such as development permits, subdivision, density averaging or transfer, and amenity density bonusing. Although amenity density bonus policies can be contained in OCPs (see Part 3.6, above), specifying the details in the zoning bylaw can help provide certainty and reduce the public controversy that can accompany this tool. Details specified in the bylaw can include specific bonus formulae for specific zones, the maximum allowable density increase, and priority amenities.

### *4.1.1 Port Coquitlam*

Port Coquitlam's zoning bylaw designates 25 zones (not counting site-specific CDZs), which are represented on a detailed zoning map.[360] It does not mention the terms LID, watershed management or green infrastructure, but this does not mean that it is unsupportive of LID.

#### Stormwater management

The zoning bylaw mentions stormwater only once, in the definition of "green roof."[361] Port Coquitlam became the first municipality in Canada to mandate green roofs in 2006, when it amended its zoning bylaw to require all new commercial or industrial buildings larger than 5000 m2 (53,820 sf) to provide a green roof on at least 75% of the roof area of the building, not including any roof area occupied by mechanical equipment. The bylaw also required maintenance of green roof planting media and plant material in accordance with generally accepted landscape maintenance practices. These requirements were repealed in 2022[362] because they conflicted with the new provincial *Building Act*.[363]

Port Coquitlam's Zoning bylaw regulates impervious surfaces via a combination of limits on **total impervious surface** and limits on **lot coverage**.

The bylaw prohibits impervious surface area in excess of limits specified for a zone,[364] but most zones specify no such limits. Those that do vary from 65% for most single-family dwelling and duplex residential zones, to 80% for two industrial zones.

All else being equal, lower limits on total impervious area would be more supportive of LID. At a watershed scale, total impervious area greater than 30% leads to changes in hydrology and habitat that jeopardize the watershed's ability to sustain self-supporting populations of cold water fish. Even at 8% to 12% total impervious area, irreversible impacts to fish habitat are observed.[365]

The bylaw defines impervious surface area as "any hard-surfaced, man-made area that does not readily absorb or retain rainwater, including but not limited to roofs, driveways, parking spaces, patios, sidewalks, grouted pavers, sport courts, ornamental pools, swimming pools or any other hard surface."[366] Green roofs and driveways, gravel parking and patio areas, ungrouted pavers less than 0.37 m2 (4 sq ft) in area, grasscrete and similar porous materials are excluded from the definition. Limiting the exemption

360 City of Port Coquitlam, bylaw No 3630, Zoning Bylaw, 2008 (12 May 2008) (consolidated with amendments) (PoCo Zoning Bylaw), Schedule A. An interactive version of the map is available online: City of Port Coquitlam, PoCoMap, https://www.portcoquitlam.ca/business-development/pocomap/.

361 City of Port Coquitlam, bylaw No 3630, Zoning Bylaw, 2008 PoCo Zoning Bylaw, Section I, "green roof."

362 City of Port Coquitlam, bylaw No 4281, Zoning Amendment Bylaw, 2022 (20 September 2022), s 2.3.5.

363 Personal communication from Port Coquitlam city staff.

364 PoCo Zoning Bylaw, Section II (initial portion), s 16.

365 Cities of Coquitlam, Port Moody and Burnaby, and Metro Vancouver, *Stoney Creek Integrated Stormwater Management Strategy* (February 1999), https://www.coquitlam.ca/DocumentCenter/View/3361/Stoney-Creek-Integrated-Watershed-Management-Plan-PDF, Part 2.3, p 7.

366 PoCo Zoning Bylaw, Section I, "impervious surface area."

for ungrouted pavers to smaller sizes (eg 0.09 m2 / 1 sq ft) or to a single row of pavers arranged in a line to form a walkway would be more LID-supportive. Exempting water surfaces of structures designed to retain water, such as pools, from the definition of impervious surface, would also be consistent with LID.

Other ways to support LID through the regulation of impervious surfaces could include requiring developers to submit a **stormwater management plan (SMP)**, prepared by a qualified professional, that includes permeable surfaces; encouraging permeable surfacing designs that direct surface runoff onto landscaped areas, for example by exempting such designs from otherwise applicable curb and gutter requirements; limiting *effective* rather than total impervious area; allowing increases in total impervious area if rainwater infiltration measures are taken to limit effective imperviousness; or limiting the portion of a lot that may be used for surface parking, except where the principal use is for parking.

**OPPORTUNITY**

Limit impervious area in all zones in Port Coquitlam; exempt water surfaces and small (0.09 m2) ungrouted pavers; limit effective rather than total impervious area; allow increases in total impervious area if effective imperviousness is maintained; encourage permeable surfacing designs that direct runoff onto landscaped areas; require permeable surfacing designs as part of a stormwater management plan; and/or limit the area devoted to surface parking.

Lot coverage limits are 35% - 55% in residential zones, 30% - 90% in commercial zones, 40% - 60% in institutional and industrial zones, and 20% - 75% in agricultural zones. Several zones have no lot coverage limits.

Lot coverage is an incomplete indication of impermeable surface area, since hardened land surfaces such as driveways, parking lots, walkways, patios, sports courts and the like are not part of lot coverage.[367] All things being equal, LID becomes more difficult as lot coverage increases.

**OPPORTUNITY**

Limit lot coverage in all zones in Port Coquitlam, and consider lower limits.

Parking standards are set out in a separate bylaw. Residential parking standards range from 1-2 spaces per dwelling unit (0.5 for seniors' homes and the like).[368] The bylaw supports LID by reducing minimum parking standards for 3-bedroom apartments and non-market rental housing, and by allowing payment in lieu of parking spaces for affordable housing and throughout Downtown.[369]

Two requirements appear to be in tension with LID: that all parking areas be bordered with curbs (which prevent surface runoff to permeable areas), and surfaced with asphalt, concrete or similar pavement (with no mention of permeability).[370]

**OPPORTUNITY**

Relax Port Coquitlam's requirement for curbs around all parking areas to permit runoff to suitable permeable surfaces; and allow permeable pavement.

Finally, reducing minimum standards for the dimensions of parking spaces, maneuvering aisles, driveways, sidewalks and roads—all of which typically have impervious surfaces—could be an opportunity to support LID, but evaluation of these standards is beyond the scope of this report.

### Environmentally sensitive areas

Zoning bylaws can reinforce environmental and riparian setbacks found in other bylaws and in DP guidelines by prohibiting the siting of buildings,

367 PoCo Zoning Bylaw, Section I, "lot coverage."

368 City of Port Coquitlam, bylaw No 4078, Parking and Development Management Bylaw, 2018 (9 October 2018) (consolidated with amendments), s 8 (PoCo Parking Bylaw).

369 City of Port Coquitlam, "Housing," online: https://www.portcoquitlam.ca/business-development/planning/housing/; PoCo Parking Bylaw, s 9.1.

370 PoCo Parking Bylaw, ss 12.4, 12.5.

structures or impervious surfaces within them. Port Coquitlam's zoning bylaw specifies only one environmental setback: at least 30 m from all streams in agricultural zones.[371] Setbacks apply only to buildings and other structures and do not necessarily prevent hard surfacing of a setback area in concrete, asphalt or similar materials.[372]

**OPPORTUNITY**

Amend Port Coquitlam's Zoning Bylaw to specify setbacks from watercourses, water bodies, wetlands and ESAs, and prohibit the siting of buildings, structures or impervious surfaces within them.

Port Coquitlam implements the provincial ***Riparian Areas Protection Regulation*** **(RAPR)** through a separate bylaw, which is discussed in Part 4.4.6.

### Urban forest

The zoning bylaw requires landscape screens (rows of trees or shrubs) in various circumstances, to screen unsightly uses. It also requires landscaped strips on certain commercial and industrial properties.[373] Such requirements support LID in a modest way by ensuring some vegetated and permeable areas.

### Urban containment and clustering

The zoning bylaw regulates density via minimum lot size, maximum **floor area ratio (FAR)**, maximum lot coverage, maximum number of residential buildings or dwelling units per lot, and minimum lot area per dwelling unit. Such rules influence LID by affecting impermeable area. Some of these rules are uniform for an entire zone, others vary greatly within a single zone. In townhouse zones, for example, minimum lot area per dwelling unit varies from 150 to 465 m2, with numerous site-specific rules and exceptions. The reasons for this variation, and whether they have any connection to environmental considerations, are not evident from the bylaw itself.

Port Coquitlam's zoning bylaw contemplates **amenity density bonuses** in certain circumstances. Some bonuses are applicable to an entire zone, others are site-specific. The default FAR of 1.0 can be increased to a maximum of 2.0 in one residential apartment zone if the developer contributes $50 per square foot of floor area created by this bonus provision to City reserve funds for provision of unspecified community and social housing amenities.[374]

The bylaw also authorizes density bonuses for provision of indoor or underground parking, which can promote LID by reducing impermeable surface area. In residential apartment zones, the default FAR of 1.0 can be increased by either 50% or 150% of the proportion of required off-street parking provided indoors or underground, to a maximum of either 1.5 or 2.5, depending on the zone. In addition, the maximum lot coverage of 35% in residential apartment zones can be increased by either 15% or 25% of the portion of required off-street parking provided indoors or underground, to a maximum of 50% or 60%, depending on the zone.

Such bonuses can support LID even if they do not provide a public amenity as normally understood, provided that they reduce the amount of impervious surfacing on a lot. FAR bonuses seem more likely than lot coverage bonuses to achieve this result, since they do not necessarily increase the proportion of the lot covered by buildings. An even more direct approach would be to offer density bonuses for reducing lot coverage and/or impervious surface area.

**OPPORTUNITY**

Consider offering density bonuses in Port Coquitlam for keeping lot coverage or effective impervious area substantially below standard limits.

The bylaw also creates numerous ad hoc, site-specific density bonuses in townhouse residential zones. Some of these offer increased density in return for environmental and park amenities, others for unspecified community or social housing amenities.

371 PoCo Zoning Bylaw, Section II, Table 1.4, note 5.

372 PoCo Zoning Bylaw, Section I, "setback area," "structure."

373 PoCo Zoning Bylaw, Section II, subsections 3.5(3)-(5), 4.5(1)-(2); Section III, subsection 4-4.

374 PoCo Zoning Bylaw, Section II, Table 2.4, note 10.

The formulae for these bonuses vary greatly,[375] and the reasons for variation are not evident from the bylaw itself.

The bylaw also supports urban containment and clustering by prohibiting residential use of lots less than 0.4 ha that are not serviced by municipal water and sewer systems,[376] setting a minimum lot size of 8 ha in agricultural zones and requiring all farm residential facilities to be clustered in a small portion of the lot.[377]

The bylaw does not, however, provide explicitly for clustering development away from environmentally sensitive areas. This can be accomplished in numerous ways, for example transferring density from parts of sites that contain special ecological amenities to parts that will be developed; or providing density bonuses that increase with the portion of such sites set aside as park or natural area. Density bonuses or transfers of this type are more LID-supportive if they are restricted to sites that contain special ecological amenities such as watercourses, wetlands, sensitive ecosystems, grasslands, mature forest, wildlife corridors or other ecological connectivity.[378]

Other ways to help cluster development away from ESAs include prescribing minimum lot depth for lots abutting ESAs or watercourse DPAs; excluding the portion of a lot falling within a watercourse or environmental protection DPA from the lot area for the purposes of calculating permitted density; but also including land dedicated for the provision of ecological amenities in the lot area for purposes of calculating permitted density.

**OPPORTUNITY**

Amend Port Coquitlam's Zoning Bylaw to specify priority amenities for which density bonuses are offered, in order of importance, including LID-supportive amenities such as ESAs, natural areas, parks and green infrastructure; include land preserved or dedicated for such amenities in the lot area for purposes of calculating permitted density; allow density to be transferred from such amenity areas to the portion of a site that will be developed; increase amenity density bonuses with the portion of the lot area preserved or dedicated for such amenities; and exclude the portion of a lot covered by a watercourse or environmental protection DPA from the lot area for purposes of calculating permitted density.

Port Coquitlam's zoning bylaw could also identify and rank priority amenities, something the Green Bylaws Toolkit considers essential for any amenity density bonusing policy.[379]

### Natural hazards

The zoning bylaw supports LID by prohibiting construction of habitable rooms below the flood construction level, with a few exceptions.[380]

### Comprehensive development zones

Port Coquitlam's Zoning bylaw designates 38 comprehensive development zones. None of them refers to LID stormwater management practices, though scattered provisions could support LID, such as density bonuses for financial contributions to parks, open space, trails and pathways (CD30 zone); for LEED Silver certification (CD30 & CD31 zones); and for outdoor landscaped area, onsite trees, landscaped strips and/or landscaped parking area islands (CD25 & CD30-CD34 zones). Other potentially LID-supportive

375 Site-specific bonuses for environmental and park amenities include a density increase from 243.1 to 197.5 m2 of lot area per dwelling unit in return for dedicating 1,062 m2 of land fronting the Coquitlam River as a riparian reserve; from 220 to 192 m2 per dwelling unit in return for dedicating 1475.9 m2 of property including Maple Creek for a riparian reserve; and from 300 to 220 m2 per dwelling unit in return for contributing $1,500 per unit in excess of the permitted maximum for provision of community parks, open space and recreation facilities. Bonuses for unspecified community and social housing amenities include a density increase from 220 to as little as 140.57 m2 per dwelling unit for contributing $12,571 per dwelling unit; from 220 to 202 m2 for contributing $8,750 per dwelling unit; from 220 to 208 m2 for contributing $17,500 per dwelling unit; and from 220 to 202 m2 for contributing $38,750 per dwelling unit. PoCo Zoning Bylaw, Section II, subsection 2.5.

376 PoCo Zoning Bylaw, Section II (initial portion), subsection 6(a).

377 PoCo Zoning Bylaw, Section II, subsections 1.2, 1.4.

378 Green Bylaws Toolkit, pp 211, 215.

379 Green Bylaws Toolkit, p 89.

380 PoCo Zoning Bylaw, Section III, s 1.

provisions include requirements (CD13, CD27, CD30, CD31, CD35 & CD36 zones) or density bonuses (CD29 zone) for provision of off-street parking indoors or underground; and limits on surface parking area (CD 21, CD22 & CD29 zones). On the other hand, one zone requires a minimum of 2 parking spaces per dwelling unit (CD34), which could be in tension with LID. A detailed review of CD zone rules is beyond the scope of this report.

### *4.1.2 Coquitlam*

Coquitlam's zoning bylaw designates 33 zones (not counting CDZs), which are represented on a detailed zoning map.[381] The bylaw does not mention the terms LID, watershed management or green infrastructure, but this does not mean that it is unsupportive of LID.

#### Stormwater management

The zoning bylaw mentions stormwater once, in the definition of "movement-sensitive or vulnerable infrastructure," which is discussed under Natural Hazards, below. It does not mention green roofs. Nor does it mention impervious surfaces.[382] Stormwater management is addressed mainly via the subdivision and development servicing bylaw and Stormwater Management Policy and Design Manual, discussed in Part 4.2.2, below.

There are no limits on total or effective impervious area in the bylaw. Lot coverage limits are 30% - 90% in residential zones, 55% - 90% in commercial zones, 20% - 95% in institutional zones, and 30% in agricultural and resource zones. Several zones have no lot coverage limits.

The zoning bylaw does not state explicitly that impervious driveways and surface parking areas are included in lot coverage. Lot coverage limits generally apply to buildings and structures. "Structure" means "any construction fixed to, supported by or sunk into land or water."[383] The definition does not say whether this includes surfacing, but parking is considered a structure under the RAPR and is treated as such when RAPR is enforced in Coquitlam.

**OPPORTUNITY**

Set limits on lot coverage and on effective or total impervious area in all zones.

Furthermore, off-street parking areas must be surfaced with asphalt, concrete or similar pavement unless a professional engineer certifies that this is impractical due to soil or drainage conditions, and the parking area is graded and drained to dispose of surface water properly.[384] In some zones, unenclosed storage areas must be surfaced in asphalt, concrete or other dust-free surfaces.[385] The only mention of the use of permeable pavement for parking or loading is for secondary suites and laneway houses, where "similar permeable pavement" is acceptable.[386] Permeable pavement can be problematic in areas used by heavy vehicles, but the city is piloting its use on micromobility and multi-use pathways.

**OPPORTUNITY**

Make permeable pavement a permitted or preferred option for all off-street parking in Coquitlam in areas with infiltration potential.

Another way to limit impervious surfacing is to reduce the amount of required off-street parking. The bylaw does this in the Evergreen Line Core and Shoulder Station Areas between the Lougheed Town Centre and Lafarge Lake-Douglas stations. In those areas parking standards range from 0.65 to 1.25 spaces per dwelling unit, instead of 1 to 1.5. This reduction appears to be aimed mainly at promoting clustered, transit-oriented, pedestrian-friendly development as well as rental and social housing, but it may have incidental benefits for stormwater management. Parking standards may be reduced by a further 5-15% in these areas in return

381 City of Coquitlam, bylaw No 3000, Zoning Bylaw, 1996 (19 February 1996) (consolidated with amendments) (Coquitlam Zoning Bylaw), Schedule A. An interactive version is available online: City of Coquitlam, QtheMap, https://coquitlam.maps.arcgis.com/apps/webappviewer/index.html?id=2d58aee859754918ae54d30da4bbba49.

382 Except for enclosed balconies, which must have impervious floors. Coquitlam Zoning Bylaw, s 529. This seems unlikely to have a significant effect on total impervious area or LID.

383 Coquitlam Zoning Bylaw, s 201.

384 Coquitlam Zoning Bylaw, s 705(8)(a).

385 Coquitlam Zoning Bylaw, ss 1801(3)(f) (business), 1901(3)(d), 1902(3)(e) (industrial).

386 Coquitlam Zoning Bylaw, s 705(8)(b).

for payment of $20,000 to $35,000 per space, and up to 25% where certain uses in those areas share the same parking structures. Reductions are not available for single family, duplex, triplex or multiplex housing, which require 2 spaces per dwelling unit, not counting the 1 space required for each secondary suite or laneway house.[387] Parking standard reductions are also offered in a few CDZs.[388]

**OPPORTUNITY**

Offer reduced parking standards in Coquitlam on a more systematic, citywide basis to encourage LID.

A further way to limit impervious surfacing is to require off-street parking to be concealed within a building or underground. The bylaw does this in most apartment residential and some commercial zones.[389] It also limits off-street parking area in four residential zones.[390]

The bylaw supports LID by requiring off-street bicycle parking for apartment and townhouse developments (1.25 spaces per dwelling unit) as well as certain non-residential uses. It also requires end-of-trip and bicycle maintenance facilities in certain developments.[391]

All off-street parking must have "appropriate landscaping and perimeter buffering."[392] This represents a small opportunity to support LID by encouraging or requiring landscaping that promotes stormwater infiltration and is integrated into stormwater management approaches.

That said, the bylaw emphasizes the need to bring non-conforming lots into conformity with off-street parking standards.[393] It could better support LID by putting equal or more emphasis on reducing the amount of space dedicated to surface parking, where practicable.

Another issue is that parking lots of more than 100 spaces must have raised sidewalks and curb planters.[394] Raised sidewalks can impede stormwater infiltration, and curb planters do little to promote it (as opposed to rain gardens or vegetated swales, for example).

Common amenity areas must be surfaced with lawn, pavers, decking, sport court paving or similar features that enable recreation, and may incorporate trees and gardens.[395] The bylaw does not encourage or require vegetation or permeable surfacing, but the city's *Streetscape Design Guidelines* encourage rain gardens, boulevard infiltration galleries and infiltration bulges.

**OPPORTUNITY**

Amend Coquitlam's Zoning Bylaw to encourage landscaping and perimeter buffering around off-street parking that promotes stormwater infiltration; encourage curb cuts or swales around large parking lots to allow surface drainage to infiltration areas; and encourage use of trees, gardens and permeable surfacing in common amenity areas.

Finally, reducing standards for the dimensions of parking spaces, maneuvering aisles, driveways, sidewalks and roads—all of which typically have impervious surfaces—could be an opportunity to support LID, but evaluation of these standards is beyond the scope of this report. Some of these standards are contained in the zoning bylaw, others in the subdivision servicing bylaw (see Part 4.2). It is worth noting that the latter bylaw contemplates a range of potentially LID-friendly provisions for reduced street and sidewalk standards, as well as ravine crossings, bicycle lanes, walkways, trails, multi-use pathways and greenways.[396]

### Environmentally sensitive areas

387 Coquitlam Zoning Bylaw, ss 706(1), 713, 716.

388 Coquitlam Zoning Bylaw, ss 2101, 2102, 2103, 2122 (CD-1, CD-2, CD-3 & CD-22 zones).

389 Coquitlam Zoning Bylaw, ss 1204-1208, 1505, 1507 (RM-2 – RM-6, C-5 (some uses), C-7 zones).

390 Coquitlam Zoning Bylaw, ss 1009-1011, 1101 (RS-9 – RS-11 & RT-1 zones).

391 Coquitlam Zoning Bylaw, ss 711, 712.

392 Coquitlam Zoning Bylaw, s 705(10).

393 Coquitlam Zoning Bylaw, s 703.

394 Coquitlam Zoning Bylaw, s 705(5).

395 Coquitlam Zoning Bylaw, s 507.

396 City of Coquitlam, bylaw No 3558, Subdivision and Development Servicing Bylaw, 2003 (24 July 2003) (consolidated with amendments), Schedule A, Design Criteria, ss 5.03 – 5.06, 6.05 (Coquitlam Subdivision & Development Servicing Bylaw).

The zoning bylaw reinforces the rule that a DP is required before altering land in an environmental DPA.[397] It exempts certain projects from DP requirements, including renovations under $150,000, repair of fire or water damage to building exteriors, and construction or modification of a building or structure for single family residential use.[398] In practice, different exemptions outlined in the development procedures bylaw apply to Watercourse Protection DPs (see Part 4.3.2). Moreover, the ***Riparian Areas Protection Regulations* (RAPR)** takes precedence over these exemptions. Furthermore, protection of environmentally sensitive areas is accomplished more through Watercourse Protection DPs and **RAPR** enforcement than through these provisions of the zoning bylaw.

Section 523 of the zoning bylaw supports LID by implementing the **RAPR**.[399] The details of the RAPR bylaw are dictated by provincial legislation, leaving little room for local governments to deviate or innovate. With few exceptions,[400] a development in the **riparian assessment area** of a stream that provides habitat to certain fish species must not proceed unless a qualified environmental professional conducts an assessment that identifies a **streamside protection and enhancement area (SPEA)**, and the development proceeds in accordance with the assessment. Section 523 applies to the City's exercise of all its planning and land use management powers under Part 14 of the *Local Government Act*, which include OCPs, zoning, subdivision and development permits.

The riparian assessment area is 30 m on both sides of a stream unless the stream is in a ravine, in which case it is 30 m beyond the top of bank of a ravine less than 60 m wide, or 10 m beyond the top of bank of a ravine 60 m or more wide. There are two assessment methods. A simple assessment identifies the SPEA based on fish presence, stream flow permanence, and average width of streamside vegetation, and is measured from the stream boundary or top of bank. Simple assessment SPEA setbacks have been predetermined for all watercourses in Coquitlam, and are available under the Environment layer on the city's interactive mapping application, QtheMap.[401] A detailed assessment identifies the SPEA based on the location of natural elements that support fish life processes; in addition, a detailed assessment must identify the hazards posed by the development to elements of the SPEA that support fish life processes, measures to avoid the hazards, whether enforcement of RAPR requirements would cause the developer undue hardship, and whether the development will meet the riparian protection standard. The SPEA is the portion of the riparian assessment area next to the stream that links aquatic to terrestrial ecosystems and is capable of supporting streamside vegetation. In the case of a detailed assessment, the SPEA must extend far enough upland that development outside the SPEA will not cause harm to natural elements in the SPEA that support the life processes of protected fish.

Beyond the RAPR rules, the bylaw contains a handful of zone-specific environmental setbacks that might support LID. It specifies 30 m setbacks from streams for some zones and/or uses.[402] On the other hand, rear setbacks are reduced in some residential zones for lots backing onto parks, open spaces or natural areas.[403] These reductions could be in tension with LID.[404]

## OPPORTUNITY

Examine rear setback reductions in Coquitlam's Zoning Bylaw for lots that border parks, open spaces or natural areas to ensure they do not hinder LID.

397 Coquitlam Zoning Bylaw, s 401(c).

398 Coquitlam Zoning Bylaw, s 401(a).

399 BC Reg 178/2019 (RAPR).

400 Developments that are authorized by a federal *Fisheries Act* permit, consist only of non-structural work on buildings or other structures that will remain on their existing foundations and within their existing footprints, or consist only of maintenance of an area of human disturbance other than a building or other structure, are exempt from the RAPR and from Section 523. Coquitlam Zoning Bylaw, ss 523(3), (7).

401 City of Coquitlam, "City Maps," https://www.coquitlam.ca/701/City-Maps.

402 Coquitlam Zoning Bylaw, ss 801 (A-3 zone), 1002 (RS-2 zone), 2003 (P-3 zone).

403 Coquitlam Zoning Bylaw, ss 1201, 1204, 1205 (RT-2, RM-2, RM-3 zones).

404 Rear setbacks are reduced for properties backing onto SPEAs because the SPEA is often still within the property boundary under covenant and so the reduction in setback from the covenant reflects the fact that the owner does not have use of the area of their land under the covenant. Personal communication from city staff.

### Urban forest

The bylaw sets out minimum requirements for tree retention and planting in Northeast Coquitlam.[405] It also requires landscaped strips between certain commercial or industrial uses and residential lots,[406] and around some off-street parking areas.[407] These provisions have the potential to make a minor contribution to LID.

### Urban containment and clustering

The zoning bylaw regulates the density, clustering and containment of development via a mix of minimum lot size, maximum floor area, maximum FAR, maximum number of buildings or dwelling units per lot or hectare, minimum lot area per dwelling unit, and maximum lot coverage (which is also discussed under Stormwater Management, above).

The bylaw supports urban containment by setting a minimum lot size of 8.1 ha in the agricultural zone, 1.25 ha for lots not connected to municipal water or sewer, 0.4 ha for those connected to municipal water but not sewer, and 0.4 ha in a suburban zone.[408] Aside from this, minimum lot sizes are specified zone by zone, with exceptions for lots created to provide a residence for a relative, lots created by subdivision through consolidation, lots created by road cancellation and lots affected by road widening.[409] There are also exceptions for single family homes on older lots.[410]

Some of these rules are uniform for an entire zone, others vary greatly within zones. Maximum FAR is specified in almost all zones except one-family residential and varies from 0.1 in two institutional zones[411] to 3.5 in one commercial zone.[412] Minimum lot sizes also vary immensely. For example, in the townhouse zone it varies from 330 to 1110 $m^2$, depending on the type of building.[413] In one-family residential zones, the maximum number of dwelling units per hectare varies from 2.5 to 48, and even up to 89 for social and special needs housing.[414] Maximum floor area (as opposed to FAR) is specified in four residential zones and in certain parts of Southwest Coquitlam.[415] Minimum lot area per unit is specified in one zone.[416] The reasons for these variations, and whether they have any connection to environmental considerations, are not evident from the bylaw itself.

FAR limits are supplemented by an elaborate multi-step system of **amenity density bonuses** involving some combination of the following standard elements:

- Up to 0.5 FAR for payment of 75% of the land value of the extra density towards amenities as identified in the Citywide Official Community Plan (CWOCP);
- Up to 0.5 FAR for payment of 65% of the land value of the extra density towards amenities as identified in the CWOCP;
- Up to 0.5 FAR for payment of 50% of the land value of the extra density, divided 50/50 between amenities and affordable housing as identified in the CWOCP (which payment can be waived if below- or non-market rental units are provided);
- Up to 0.5 FAR for payment of 35% of the land value of the extra density towards amenities as identified in the CWOCP;
- Up to 0.5 FAR for payment of 25% of the land value of the extra density towards amenities as identified in the CWOCP; and
- Up to 1.0 FAR if at least 20% of the extra density is used for priority unit types as identified in the CWOCP and the remainder for purpose-built rental units.

These bonuses are available in three residential

405 Coquitlam Zoning Bylaw, s 506.

406 Coquitlam Zoning Bylaw, ss 1501(7)(b) (minimum width 1.8 m), ss 1502(7)(b), 1505(7)(b), 1506(7)(b), 1507(7)(b), 1601(7)(b), 1701(7)(b) (minimum width 3 m).

407 Coquitlam Zoning Bylaw, ss 1203(3)(d), 1502(11), 1506(11), 2001(3)(a), 2002(3)(a), 2003(3)(a), 2004(3)(a), 2005(3) (minimum width 0.6 m).

408 Coquitlam Zoning Bylaw, ss 602(2), 801 (A-3 zone), 1002 (RS-2 zone). The restrictions related to municipal water and sewer connection do not apply in agricultural, resource and golf course zones.

409 Coquitlam Zoning Bylaw, ss 602, 604, 605.

410 Coquitlam Zoning Bylaw, s 511(2).

411 Coquitlam Zoning Bylaw, ss 2003, 2005 (P-3 & P-5 zones).

412 Coquitlam Zoning Bylaw, s 1505 (C-5 zone, Maillardville only).

413 Coquitlam Zoning Bylaw, s 1201 (RT-2 zone).

414 Coquitlam Zoning Bylaw, Part 10.

415 Coquitlam Zoning Bylaw, ss 524 (Southwest Coquitlam), 1009-1011 (RS-9 – RS-11 zones), 1101 (RT-1 zone, laneway houses only).

416 Coquitlam Zoning Bylaw, s 1203 (RM-1 zone).

zones,[417] two commercial zones[418] and most comprehensive development zones (CDZs).[419] The precise combination of steps varies from zone to zone but in general, the higher the permitted density, the more steps are available. The bylaw does not specify eligible amenities but refers to the CWOCP. As discussed in Part 3.6, the CWOCP authorizes bonuses for some amenities that are directly related to LID (eg enhanced preservation of topography, natural areas, watercourses and environmentally sensitive areas; or creation of a watercourse-centred linear park), and for some that could support LID depending on the circumstances (eg parks and greenways). Some community-scale LID amenities are already funded by drainage development cost charges (discussed in Part 4.5.2), and site-level LID features are already required via the Stormwater Management Policy and Design Manual and IWMPs (discussed in Part 4.2.2), but it may be worth considering whether to incentivize them further via amenity bonuses.

**OPPORTUNITY**

Consider making LID amenities such as stormwater infiltration facilities, green infrastructure and creation or restoration of wetlands or watercourses eligible for density bonuses in Coquitlam, and consider adding them to the list of amenities the city may require to be supplied in kind in return for density bonuses.

For all multi-step bonuses, the city may require the developer to provide the amenity in kind rather than cash if the amenity consists of public facilities, space for non-profit community service groups or extraordinary public realm improvements. [420]

Several other types of density bonus are available in certain zones, including for provision of commercial uses, job-creating uses and strategic housing, but none of these has any obvious LID benefits with the exception of one for concealed parking, available in just one CDZ.[421]

Certain areas are excluded from density calculations in many zones. The only exclusions that appear directly relevant to LID are those excluding lot area that is reduced due to road dedication.[422] This may have the effect of increasing impervious surface, which is in tension with promotion of LID.

The minimum dwelling unit size is 29 $m^2$ (312 sf). This precludes some "tiny homes," which typically range between 100 and 400 sf. Tiny homes can support LID by reducing dwelling unit area. Some BC municipalities have eliminated minimum dwelling unit sizes to support sustainable living, affordable housing and creative land use.[423]

**OPPORTUNITY**

Relax Coquitlam's minimum dwelling unit sizes to encourage construction of "tiny homes."

### Natural hazards

Buildings and structures are not allowed within designated floodplains and habitable rooms are not allowed below the flood construction level or less than 1.5 m above the natural boundary of a watercourse, with limited exceptions. These rules support LID by creating setbacks from watercourses (30 m for major rivers, 15 m for others) and helping preserve floodplain hydrology.[424] Some of the exceptions may, however, be in tension with the goal of restoring natural floodplains, by encouraging reliance on dikes[425] or investment to increase the value of existing buildings

417 Coquitlam Zoning Bylaw, ss 1206-1208 (RM-4 – RM-6 zones).

418 Coquitlam Zoning Bylaw, ss 1505, 1507 (C-5 zone (Austin Heights only), C-7 zone (City Centre and Transit Village only)).

419 Numerous CDZs add a further bonus step of up to 0.5 FAR if at least 40% of the extra density is used for below-market and non-market housing and the remainder for purpose-built rental.

420 For example, Coquitlam Zoning Bylaw, ss 1206-1208 (RM-4 – RM-6 zones).

421 Coquitlam Zoning Bylaw, s 2112 (CD-12 zone, the Burke Mountain Discovery Centre).

422 For example, Coquitlam Zoning Bylaw, s 517(2).

423 The District of Squamish eliminated its minimum dwelling unit size and development cost charges for secondary suites in 2016 to support smaller infill housing. District of Squamish, "Tiny Homes," online: https://squamish.ca/business-and-development/home-land-and-property-development/tiny-homes/.

424 Coquitlam Zoning Bylaw, s 519(2).

425 Such exceptions include livestock barns and certain industrial buildings that are located behind dykes. Coquitlam Zoning Bylaw, s 519(2).

within floodplains.[426]

**OPPORTUNITY**

Consider phasing out floodplain development exceptions in Coquitlam that are in tension with restoration of natural floodplains.

The designated design flood for purposes of determining floodplain and flood construction level is a 200-year flood, or the infamous 1894 flood in the case of the Fraser River. Anthropogenic climate change is greatly increasing the frequency and magnitude of extreme weather events[427] and may make it necessary to recalibrate these measures. Coquitlam is alert to this issue. The flood construction level takes account of anticipated sea level rise,[428] and the city plans to update its rainfall models to reflect future impacts of climate change.[429]

Coquitlam's Zoning bylaw requires all development to comply with the city's Slope Hazard Regulation.[430] The Slope Hazard Regulation provides criteria for addressing slope hazards in development or building permit applications for structures on or adjacent to slopes.[431] These criteria are used to determine what type of slope hazard assessment, if any, will be required, who must prepare it, what information it must contain, and whether it must be peer reviewed. The professional who does the assessment must consider water table, groundwater and stormwater management practices. The regulation supports LID by providing a consistent, systematic and detailed approach to identifying and managing development-related slope hazards in the city. It does not, however, say anything explicitly about LID stormwater management BMPs.

**OPPORTUNITY**

Consider revising Coquitlam's Slope Hazard Regulation to discuss whether and how LID stormwater management BMPs might support slope hazard management.

The Zoning Bylaw specifies that a slope hazard assessment must be done before any building, structure or "movement-sensitive or vulnerable infrastructure" is constructed, located or rebuilt on or adjacent to a slope steeper than 18 degrees or a slope with known slope issues.[432] "Movement-sensitive or vulnerable infrastructure" is infrastructure that can discharge water and damage habitable areas and includes stormwater conveyance and infiltration facilities, including rock pits, infiltration fields and galleries; trenches, dry wells and landscaping ponds.[433] Subjecting "movement-sensitive or vulnerable infrastructure" to slope hazard assessment requirements supports LID by ensuring that LID stormwater management facilities do not exacerbate or fall victim to slope hazards.

### Comprehensive development zones

Coquitlam's zoning bylaw designates 25 CDZs. None of them refers to LID stormwater management practices, though scattered provisions could support LID, including reduced parking standards;[434] amenity density bonuses (if they are used to supply LID amenities);[435] and a density bonus for concealed parking.[436] A detailed review of the CD zone plans is beyond the scope of this report.

426 Such exceptions include renovation of an existing home that does not involve an addition; addition of less than 25% of the floor area of a building that existed in 2008; and addition to a home by raising the building and creating non-habitable space underneath. Coquitlam Zoning Bylaw, s 519(2).

427 See, for example, Nathan P Gillett et al, "Human Influence on the 2021 British Columbia Floods" (2022) 36 *Weather and Climate Extremes*, article 100441, https://doi.org/10.1016/j.wace.2022.100441.

428 Coquitlam Zoning Bylaw, s 519(1).

429 Coquitlam ESP, p 50, Action 101.

430 Coquitlam Zoning Bylaw, s 519(3)(b).

431 City of Coquitlam, Slope Hazard Assessment Report Criteria and Checklists (no date), https://www.coquitlam.ca/DocumentCenter/View/7006/Slope-Hazard-Regulations- ("Slope Hazard Regulation").

432 Coquitlam Zoning Bylaw, s 519(3)(a).

433 Coquitlam Zoning Bylaw, ss 519(1), (3).

434 Reduced parking standards apply in four CDZs for certain apartment types, purpose-built rental units and social housing units, with further reduction for provision of transportation demand management measures in one zone. Coquitlam Zoning Bylaw, ss 2101-2103, 2122 (CD-1, CD-2, CD-3 & CD-22 zones).

435 Amenity density bonuses are available in 16 of Coquitlam's 25 CDZs, but it is not apparent whether they have been or will be used to provide LID amenities.

436 Coquitlam Zoning Bylaw, s 2112 (CD-12 zone, the Burke Mountain Discovery Centre).

## 4.2 Subdivision and Development Servicing

Subdivision and development servicing bylaws specify requirements for subdivision design, servicing requirements, procedures, and technical details for drainage systems. They can exert a variety of positive and negative influences on LID. On the plus side, they can set comprehensive stormwater management requirements and landscaping requirements that support LID. They can also require subdivision design and construction to adhere to specified design and policy manuals (for example, for stormwater management) or integrated watershed or stormwater management plans (IWMPs/ISMPs), thus making such manuals and plans legally binding.

In deciding whether to pursue LID goals through bylaws, policy and design manuals, or IWMPs/ISMPs, it is worth considering the degree of democratic accountability and multistakeholder involvement in their development, because these tend to support greater acceptance and implementation. Bylaws are deliberated and adopted by democratically elected representatives with substantial opportunities for public input. IWMPs and ISMPs are typically developed with robust multistakeholder consultation and engagement. Manuals are typically developed by city staff with more limited multistakeholder participation. That said, the upside is that they can be modified more easily to reflect changing needs and values.

### *4.2.1 Port Coquitlam*

Port Coquitlam's Subdivision Servicing bylaw does not mention LID but has several provisions relevant to it. Subdivision applications must consider preservation of natural drainage courses via rights of way or land dedication.[437] The stated goal of this requirement is to ensure that the subdivision does not cause upstream or downstream drainage problems. This could provide support for LID, depending on how it is applied.

All subdivision lots must be connected to the City drainage system via a complete stormwater system. This requirement does not mention any LID stormwater management techniques, though they could be captured by the term "appurtenances."[438]

**OPPORTUNITY**

Require subdivision applications in Port Coquitlam to consider not just preservation but restoration or enhancement of natural drainage courses, not just to avoid drainage problems but to support natural hydrology or other LID goals.

**OPPORTUNITY**

Mention LID stormwater techniques in the list of drainage infrastructure that subdivision applicants in Port Coquitlam may be required to provide.

Where stormwater infrastructure constructed for one subdivision benefits other lands, the bylaw provides for cost-sharing among the benefiting lands. This applies only to mains and does not extend to other elements of stormwater infrastructure, such as source controls, that benefit other lands by reducing runoff and flooding.[439]

**OPPORTUNITY**

Extend cost-sharing in Port Coquitlam to all stormwater infrastructure that benefits other lands.

Port Coquitlam does not have a standalone stormwater management design manual. Instead, all works and services required by the bylaw must comply with design criteria and construction specifications set out in Schedules to the bylaw.[440]

The criteria and specifications do not appear to have been drafted with LID in mind. The City Engineer may require the provision of detention facilities to limit

437 City of Port Coquitlam, bylaw No 2241, Subdivision Servicing Bylaw, 1987 (23 March 1987) (consolidated with amendments), s 304 (g) (PoCo Subdivision Servicing Bylaw).

438 PoCo Subdivision Servicing Bylaw, s 408.

439 PoCo Subdivision Servicing Bylaw, ss 409-411

440 PoCo Subdivision Servicing Bylaw, s 401.

post-development peak runoff to pre-development levels, but this is not a universal requirement.[441] The rainfall coefficients for roofs and pavements, which are used for calculating design flows, do not appear to make allowance for permeable surfacing or green roofs.[442] Normally, every lot should be graded to drain to the municipal storm drainage system.[443] The only acceptable stormwater storage alternatives are roof storage with controlled outflow drain, parking lot ponding, and dry detention basins.[444] In addition, the roadwork specifications do not make any provision for curb cuts or curbless verges to accommodate stormwater infiltration facilities.[445] Indeed, there does not appear to be any mention of LID techniques in the design criteria or construction specifications for storm drainage, roadworks or sidewalks.

**OPPORTUNITY**

Revise Port Coquitlam's design criteria and construction specifications to accommodate LID techniques; revise design flow calculation formulae to reflect current and anticipated changes due to climate change.

The minor system must convey flows of a 5-year frequency; the major system (which carries runoff in excess of the minor system's capacity) must convey 100-year return frequency flows.[446] Rainfall intensity, duration and frequency calculations appear to be based on 1971-1980 data[447] and may need reconsideration in light of current and anticipated impacts of climate change. The city is currently working on a bylaw update that includes having the minor system convey 10-year frequency flows. Rainfall intensity, duration and frequency curves, as well as drainage design criteria, were updated in 2023 to include recent rainfall events and climate change considerations. The changes will be reflected in the bylaw update.

Furthermore, the design criteria and construction specifications do not refer to or require adherence to any ISMPs or IWMPs. Two IWMPs are in place, for Hyde and Maple Creeks. They are discussed in Part 4.2.2. A third is in development (South PoCo), and there are plans to complete the last two after that (North and West PoCo). Rainwater capture criteria and source controls specific to each watershed are outlined in each IWMP. A citywide Rainwater Management Policy is planned for implementation after completion of the plans, and will reference the criteria in each. Furthermore, the city is updating its subdivision and development servicing bylaw to include updated rainfall intensity, duration and frequency (IDF) curves and drainage design criteria that account for climate change. It will further update the bylaw to incorporate the citywide Rainwater Management Policy and IWMPs once complete, and to include LID design criteria.[448]

**OPPORTUNITY**

Develop and implement a Stormwater Management Policy and Design Manual for Port Coquitlam that is made binding through the Subdivision Servicing Bylaw; and require that stormwater management facilities conform to IWMPs/ISMPs where they exist or are planned.

### *4.2.2 Coquitlam*

Coquitlam's Subdivision and Development Servicing bylaw does not mention LID but is generally supportive of it. The main way it supports LID is by adopting the policies, goals, guidelines and design criteria set out in the city's **Stormwater Management Policy and Design Manual** and requiring s**tormwater management plans (SMPs)** to be prepared in accordance with the Manual and any completed watershed studies.[449] Preliminary SMPs must be submitted in accordance with the Manual at the preliminary planning stage.[450] This helps ensure that stormwater best management practices (BMPs), including LID approaches, are considered from

441 PoCo Subdivision Servicing Bylaw, Schedule C, s 6.1.2.

442 PoCo Subdivision Servicing Bylaw, Schedule C, s 6.3.5.

443 PoCo Subdivision Servicing Bylaw, Schedule C, s 6.3.22.1.

444 PoCo Subdivision Servicing Bylaw, Schedule C, s 6.3.23.2.

445 PoCo Subdivision Servicing Bylaw, Schedule C, s 4.8.

446 PoCo Subdivision Servicing Bylaw, Schedule C, s 6.2.

447 PoCo Subdivision Servicing Bylaw, Schedule C, s 6.3.2.

448 Personal communication from city staff.

449 Coquitlam Subdivision & Development Servicing Bylaw, Schedule A, Design Criteria, ss 2.01, 2.02.

450 Coquitlam Subdivision & Development Servicing Bylaw, Schedule A, Design Criteria, s 1.01; see also Coquitlam Stormwater Manual, Section B, Part 5.1.

the start. At the other end of the process, developers must provide operation and maintenance manuals for all stormwater management BMPs and major drainage systems.[451] This helps ensure that stormwater BMPs continue to operate properly after development is complete.

### Stormwater Management Policy and Design Manual

The Manual sets out objectives that stormwater management solutions must satisfy, technical criteria for drainage design and stormwater management plans, and guidelines for selecting stormwater management practices that meet the technical criteria and simulate pre-development conditions or improve hydrological conditions. Stormwater management objectives that support LID include:

- Minimize the potential stormwater impacts of development, such as changes in the groundwater regime, alteration of fish and wildlife habitat, increased pollution, increased erosion and sediment transport, and increased or decreased stream flows;
- Maintain the natural shape, composition, biological and flow conditions of streams and ravines, where feasible;
- Employ stream protection measures to avoid adverse hydrological and water quality impacts on all recognized watercourses;
- Restore enclosed watercourses to open channels, where feasible; and
- Treat stormwater as a resource.[452]

All applicants for rezoning, subdivision, development permits or building permits must prepare SMPs that meet specified criteria, unless such plans are otherwise included in a watershed study or ISMP. No plans are required for single- or two-family subdivisions not requiring new storm drainage systems; building permits for individual single- or two-family dwellings; or developments with total impervious area less than 500 $m^2$.[453]

In the absence of a watershed study, SMPs must be completed according to the Manual. If watershed studies have been completed, SMPs must incorporate any additional or alternative requirements and criteria identified in them.[454] See "IWMPs and ISMPs," below.

The Manual focuses on setting performance requirements and gives developers substantial leeway to determine how to satisfy them. Requirements supporting LID include:

- Stormwater release and storage must not increase the frequency or magnitude of stream erosion;
- Stormwater storage ponds should be wet ponds or engineered wetlands and must not create adverse effects on fish or fish habitat;
- Discharges must be managed and streams protected to control erosion and downstream sedimentation, using bio-engineering techniques where possible;
- Stream crossings must consider flood protection and protection of fisheries;
- Pollution sources must be excluded, including temperature, organic matter, toxic substances and sediment; and
- Particular attention must be given to sustaining adequate base flows in streams and protecting fish habitat.[455]

Drainage systems must be designed to safely contain the 10-year storm runoff in the minor (piped) drainage system (25 years for high value commercial or industrial development and downtown business areas), safely convey the 100-year storm runoff via the major (overland) system to a suitable receiving water body, and ensure that the quantity and quality of flows do not adversely effect receiving waters.[456] Watercourse erosion protection may be required up to the 200-year flood level.[457]

As noted earlier, design storm flows may need to be updated to reflect the impacts of anthropogenic climate change, and the city plans to do so.[458] The Manual provides design rainfall intensity-duration-frequency (IDF) curves for 2021 and 2050. The 2050 curves must be used for new or replacement

451 Coquitlam Subdivision & Development Servicing Bylaw, Schedule A, Design Criteria, s 1.12.

452 Coquitlam Stormwater Manual, Section A, Parts 1.2-1.3.

453 Coquitlam Stormwater Manual, Section B, Part 1.1.

454 Coquitlam Stormwater Manual, Section B, Part 5.0.

455 Coquitlam Stormwater Manual, Section A, Part 2.1.2.

456 Coquitlam Stormwater Manual, Section B, initial portion and Parts 2.1, 3.0.

457 Coquitlam Stormwater Manual, Section B, Part 2.9.

458 See Parts 4.1.2 and 4.2.1, above.

infrastructure.[459] It is not clear from the Manual itself whether these curves reflect the promised update or still need to be updated.

The rainfall and runoff models support the use of LID practices by allowing runoff from pervious and impervious surfaces to be calculated separately.[460]

Peak flow and runoff volume control must protect downstream infrastructure and natural streams and must not increase downstream detrimental impacts. Post-development peak flows should not exceed pre-development peak flows in magnitude or duration as far as possible, and the peak runoff rate from the 2-year design storm should be half of the pre-development rate.[461] Both the number of stormwater control facilities and increases in peak storm flows and volumes to major watercourses must be minimized.[462]

Groundwater infiltration can help reduce storm flows, recharge groundwater and maintain stream base flows. The Manual encourages its use in managing major storm runoff only where watershed studies show it to be appropriate, but requires its use in managing minor runoff where technically feasible and shown by watershed studies to be appropriate, or otherwise approved by the City.[463] Roof downspouts that discharge to the ground may be required for new single-family homes and duplexes where local conditions are suitable. Infiltration of contaminated runoff is not allowed.[464]

The Manual also requires measures to control runoff water quality, including treatment before infiltration, bio-retention or dry swale systems for parking areas, and sediment capture.[465]

SMPs must be developed in two phases: a preliminary planning report and a detailed design. The preliminary planning report must identify (among other things) major infrastructure requirements, potential drainage constraints, infiltration potential and constraints, impervious surface cover (existing and proposed), major stormwater management facilities and their justification, and modelling of pre- and post-development conditions showing how the Manual's runoff criteria will be met.[466] LID practices are not mentioned in the instructions for this phase.

## OPPORTUNITY

Encourage attention to LID stormwater practices in the preliminary stormwater planning phase in Coquitlam.

The Manual raises awareness of the need for LID by noting the adverse impacts of development (including increased impervious surface, infilling of natural detention storage, removal of trees and other natural vegetation, reduction of species diversity and increased water pollution), the limitations of traditional stormwater management approaches, and the contemporary emphasis on **best management practices (BMPs)** that protect natural hydrologic processes and water quality in addition to controlling erosion and flooding.[467] It also explains why it is not enough just to maintain the frequency and duration of post-development peak flows at pre-development levels:

> since the total volume of runoff is significantly increased by development, the duration of the peak runoff flow rate will be longer for the post development condition if the peaks of pre and post development peak flow rates are simply matched. In addition, the frequency of occurrence of the predevelopment peak runoff flow rate will be greater after development occurs, since this runoff flow rate will be generated by a smaller (more frequent) storm event.

The increased frequency and duration of peak runoff flow rates resulting from relatively small, frequent storm events after development has occurred has a detrimental impact on streams, due to increased erosion. It is therefore important to further reduce both the frequency and duration of the peak flow release

459 Coquitlam Stormwater Manual, Section B, Part 4.2.2(a).

460 Coquitlam Stormwater Manual, Section B, Part 4.2.2(g).

461 Coquitlam Stormwater Manual, Section B, Part 2.4.

462 Coquitlam Stormwater Manual, Section B, Part 2.4.1.

463 Coquitlam Stormwater Manual, Section B, Parts 2.4.1(d), 2.10, 3.10.

464 Coquitlam Stormwater Manual, Section B, Parts 2.4.1(d), 3.10.

465 Coquitlam Stormwater Manual, Section B, Parts 3.10-3.11.

466 Coquitlam Stormwater Manual, Section B, Parts 5.1.1, 5.1.2.

467 Coquitlam Stormwater Manual, Section C, initial portion.

rate for the post development condition, particularly for smaller storms.[468]

To achieve this reduction, the Manual emphasizes the use of BMPs that promote infiltration and holdup of precipitation, mimicking as closely as possible the pre-development condition. As far as possible, this should be done by preserving and restoring the natural hydrologic condition.[469]

The Manual identifies a wide range of acceptable BMPs. It encourages non-structural BMPs, which preserve the pre-development natural hydrologic conditions as far as possible. Structural BMPs replace components of the natural hydrologic system removed or destroyed by development infiltration, such as natural detention storage, evapotranspiration and holdup by trees and vegetation, and removal of contaminants by aquatic and terrestrial microorganisms and plants. Innovative approaches not included in the Manual will be considered where the proponent shows that they will meet the requirements of the Manual and other applicable policies and laws.[470]

Non-structural BMPs endorsed by the Manual include:
- Creation of buffer zones around key natural drainage and habitat features;
- Reduction of impervious areas;
- Elimination of direct connections between impervious areas and the drainage conveyance system;
- Low impact developments that concentrate housing into compact areas on smaller lots;
- Concentration of development in urban cores;
- Linkage of open spaces;
- Protection of watercourses, riparian areas and environmentally sensitive areas via development permit areas;
- Avoidance of development on floodplains, steep slopes or unstable terrain; and
- Minimization of disturbance of vegetation and slopes, and revegetation of disturbed soils.[471]

Acceptable structural BMPs that support LID include:
- Dry detention basins;
- Wet ponds;
- Dry or wet detention vaults;
- Constructed wetlands;
- Dry or wet vegetated swales;
- Vegetated filter strips;
- Off-line infiltration basins;
- Roof downspout infiltration systems;
- Porous pavement;
- Concrete grid and modular pavers;
- Bio-retention and dry swales with underdrains; and
- Sand or organic filters.[472]

The Manual also acknowledges the "considerable potential" of green roofs to assist in stormwater management, and the importance of integrating landscaping standards into stormwater management with the objective of "retaining substantial areas at the highest possible level of infiltration and moderating flow rates."[473] LID-supportive landscaping BMPs not already listed above include:
- Direction of runoff from paved areas into landscaped or other collection areas that slow their arrival in drainage conveyance systems;
- Use of soil with a composition and depth to promote permeability;
- Selection and planting landscaping materials other than extensive lawns;
- Site grading to maximize runoff control;
- Reuse in the landscape of collected and stored rainwater;
- Tree protection; and
- Street and landscape maintenance practices that avoid release of pollutants and debris into stormwater systems or watersheds.[474]

The Manual is generally very supportive of LID. One of the few opportunities for improvement concerns fencing riparian areas, which is important to prevent both human damage and human-wildlife contact. Some provisions of Coquitlam's OCP recognize this need, for example insisting on fencing riparian area setback boundaries with tall chain-link fences to reduce the risk of bear-human conflicts.[475] The Manual, however, states that fencing of riparian areas

468 Coquitlam Stormwater Manual, Section C, initial portion.
469 Coquitlam Stormwater Manual, Section C, initial portion.
470 Coquitlam Stormwater Manual, Section C, initial portion.
471 Coquitlam Stormwater Manual, Section C, Part 1.2.
472 Coquitlam Stormwater Manual, Section C, Part 1.3.
473 Coquitlam Stormwater Manual, Section C, Parts 1.6, 1.7.
474 Coquitlam Stormwater Manual, Section C, Part 1.7.
475 PCNP, s 3.9.2, Policy (d); MNP, s 3.6, Policy (g).

"should be restricted as far as possible to minimize interference with maintenance work in the stream."[476]

**OPPORTUNITY**

Consider updating Coquitlam's Stormwater Manual to reflect that riparian area fencing should be designed and built to facilitate maintenance works at key locations while also minimizing human disturbance and human-wildlife conflict.

Another question mark relates to the Manual's requirement that detention and retention facilities for major storm runoff must be designed to allow overtopping release to a major floodway without causing undue erosion or damage, and downstream channels are to be protected from erosion by channel lining and/or energy dissipation.[477] It is not clear whether these and other structural requirements might lead the City to demand hard structures that inhibit the use of designs that mimic natural wetlands or watercourses.

Finally, the Manual requires qualified professionals (engineers, geoscientists, landscape architects, biologists) to conduct studies, prepare plans and oversee work. In some cases they must have specific experience, for example in hydrologic analysis.[478] One option would be to require or encourage such professionals to have training or experience in LID stormwater BMPs. See the discussion of professional qualifications in Part 3.10, above.

### IWMPs and ISMPs

Above and beyond the Manual, SMPs must conform to the requirements and criteria of any completed watershed studies.[479] Such requirements and criteria are contained in IWMPs and ISMPs. As noted in Part 3.2.1, IWMPs and ISMPs can infuse LID into OCPs; subdivision and development servicing bylaws are an even more powerful tool for giving IWMPs and ISMPs legal teeth.

Coquitlam has completed ten IWMPs and ISMPs. The earliest was completed in 1999, the most recent in 2021. Two are shared with Port Coquitlam.[480] A few of them mention LID by name and three endorse it explicitly.[481] Even those that do not refer to LID explicitly explore the feasibility and recommend the use of numerous LID techniques, mostly at the site or lot level and mostly to deal with frequent small precipitation events.

A detailed review of all ten IWMPs and ISMPs is beyond the scope of this report. Common themes that emerge across most or all of the plans include short-term goals of net benefit to fish and fish habitat and no net loss of watershed health, and a longer-term goal of improving watershed health; reliance on LID stormwater source controls on individual sites or lots as well as in roadways to capture and either infiltrate or detain runoff from small, frequent storms; and reliance on more conventional, larger-scale diversion and detention systems for larger storms, due to limited infiltration capacity in most areas. Most IWMPs and ISMPs require on-site capture of 50% of the 2-year, 24-hour design storm (between 34 and 66 mm/24 hrs depending on the rainfall and infiltration characteristics of the watershed). Several plans repeat the Manual's requirement that the peak runoff rate from the 2-year design storm should be half of the pre-development rate.

Almost all IWMPs and ISMPs require the use of rainwater source controls, in accordance with the city's Rainwater Management Source Control Guidelines. The Manual reinforces the Guidelines by requiring

476 Coquitlam Stormwater Manual, Section A, Part 2.2.

477 Coquitlam Stormwater Manual, Section B, Parts 2.4.4 and 2.5.

478 Coquitlam Stormwater Manual, Section B, Part 1.1.

479 Coquitlam Subdivision & Development Servicing Bylaw, Schedule A, Design Criteria, ss 2.01, 2.02; Coquitlam Stormwater Manual, Section B, Parts 1.1, 5.0.

480 Cities of Coquitlam and Port Coquitlam, *Hyde Creek Integrated Watershed Management Plan* (April 2004), online: https://www.portcoquitlam.ca/wp-content/uploads/2017/05/Hyde-Creek-Integrated-Watershed-Management-Plan.pdf ("Hyde Creek IWMP"); Cities of Coquitlam and Port Coquitlam, *Maple Creek Integrated Watershed Management Plan* (July 2021), online: https://www.coquitlam.ca/DocumentCenter/View/7271/Maple-Creek-Integrated-Watershed-Management-Plan-PDF ("Maple Creek IWMP").

481 Hyde Creek IWMP; Maple Creek IWMP; City of Coquitlam, *Como Creek Integrated Watershed Management Plan* (May 2014) (updated; originally adopted as an Integrated Stormwater Management Plan in 2002), https://www.coquitlam.ca/DocumentCenter/View/3356/Como-Creek-Integrated-Watershed-Management-Plan-PDF ("Como Creek IWMP").

them to be followed whenever an IWMP or ISMP recommends the use of source controls. The Guidelines require preservation of the natural hydrologic regime to the greatest extent possible. All developments must have at least 300 mm of absorbent top soil in all grassed and vegetated areas. For single family lots, all pervious areas must have 300 mm of absorbent top soils, hard surfaces must be graded toward lawns, planted areas and rain gardens, and rain barrels and permeable paving are encouraged. Volume reduction, water quality treatment and onsite retention/ infiltration systems are required for commercial, institutional, industrial and multi-family residential lots. And city roadways in urban residential areas must use techniques such as below-grade retention systems, rain gardens or biofiltration areas. The city will consider alternative designs that are certified by applicable professionals.[482]

## OPPORTUNITY

Encourage or require application of the Rainwater Management Source Control Guidelines throughout Coquitlam, not just in areas covered by IWMPs.

For purposes of illustration of the features of IWMPs, we can look at the Hyde Creek IWMP, adopted in 2004, in a bit more detail. It sets overall goals for the watershed. For stormwater management, the goals are flood control, progressive stormwater management practices (for example limitation of effective impervious area and infiltration of frequent occurrence storms), and maintenance of the minimum base flows and overall hydrology needed to maintain or enhance fish and wildlife populations and habitat. Environmental goals include to maintain or improve the ecological function of watercourses and wetlands through restoration and enhancement of fish and wildlife habitat, minimize erosion and soil instability, improve water quality and reduce downstream degradation.

The IWMP documents existing conditions and challenges in the watershed, explores a range of stormwater management alternatives, endorses LID, explores the feasibility and constraints of numerous specific LID techniques in the watershed, evaluates three overall stormwater management alternatives, describes the role of LID techniques in each, chooses a preferred strategy, develops it in detail, and makes specific recommendations.

It concludes that soil conditions in the watershed limit the use of LID techniques to frequent small storms and site- or lot-level approaches, and that conventional techniques are required for larger storms and at the community level. Within these constraints, it recommends infiltration of as much of the rainfall volume of small storms as possible. It sets a target for all development to infiltrate up to 45 mm of rainfall in 24 hours but emphasizes the need for failsafe measures to prevent flooding and other problems when infiltration capacity is exceeded.

It recommends numerous LID stormwater BMPs:

- Promote streets that drain to grass-lined swales, ditches or infiltration trenches.
- Provide grassed or other vegetated areas with a minimum of 300 mm of organic absorbent soil cover. This should include boulevards, developed park areas, and private property to the greatest extent possible.
- Utilize permeable (porous) paving in lightly travelled areas such as lanes, pathways and emergency accesses.
- Minimize the interception of subsurface flow by ditches, road cuts or the drainage system, except where necessary to address localized drainage problems.
- Minimize the disruption to, or removal of, the existing permeable soil layers, except where required for foundation or other construction considerations. Wholesale stripping of existing permeable soils should be avoided.
- Maximize infiltration of rainfall in areas where soil conditions are suitable by:
    - Disconnecting impervious surfaces such as parking lots and driveways.
    - Disconnecting roof leads.
    - Routing runoff from disconnected areas to on-site infiltration trenches or chambers.
    - Providing curb cuts to allow runoff from roads and parking areas to infiltrate to adjacent green spaces.
- Maximize on-site pervious areas through best management practices, including porous surfaces

482 Coquitlam Rainwater Management Source Control Guidelines.

and landscaping.[483]

It urges use of multiple BMPs rather than depending on one type of approach. Although it endorses LID techniques for small-scale stormwater management, it says that they should be used only if "a high degree of confidence in the effectiveness and long term performance can be established."[484]

As for the major stormwater management system, it recommends that detention ponds be wet ponds planted with aquatic plant species, to provide water quality benefits (capture of sediment and first flush contaminants) in addition to attenuating peak flows.

The Hyde Creek IWMP does not account for the impact of climate change on storm frequency or intensity in its stormwater management approach.[485] As noted elsewhere in this report, this is a significant limitation.

The IWMP has an extensive appendix that makes recommendations for environmental enhancements. These are presented as opportunities to be considered rather than criteria or requirements to be followed. They include various specific LID techniques for impervious area reduction, runoff water quality control, peak flow attenuation, base flow augmentation, riparian corridor protection, groundwater protection and stream rehabilitation.

Overall, the Hyde Creek IWMP is quite supportive of the use of LID techniques within the limitations of the watershed's natural hydrological capacities. When those capacities are exceeded, it relies on conventional stormwater management techniques, including large-scale high-flow diversion structures, to accommodate existing and anticipated patterns of development. A more radical approach to LID might instead keep development entirely within the watershed's hydrological capacities, using human-made solutions where necessary to mimic natural hydrology. This could, admittedly, have a substantial impact on the nature and extent of urban development.

The most recent IWMP to be adopted, for Maple Creek, offers an informative comparison to the Hyde Creek IWMP, which is now almost 20 years old. Like the Hyde Creek plan (but unlike most others adopted in the last decade), it explicitly endorses LID. In fact it goes farther, and recommends maximizing the use of LID techniques to reduce runoff volume, maintain baseflows and minimize downstream erosion and habitat degradation. It recommends that all future development and redevelopment in the watershed use LID approaches. It urges inclusion of LID planning at the initial stages, because "the most important aspect of LID is to retain existing natural hydrologic elements as much as possible."[486] It emphasizes that development plans must allow enough open, green or underground space to implement source controls, "so that the mitigation is not just an afterthought."[487]

Alone among Coquitlam's IWMPs and ISMPs, the Maple Creek IWMP requires all new development or redevelopment to implement source controls to capture and infiltrate or detain 72% (rather than 50%) of the 2-year, 24-hour design storm, and to treat runoff quality up to the same level. It is not clear whether this target reflects greater political will or greater natural infiltration capacity in this watershed. In any event, IWMPs generally strive to adopt the highest on-site rainfall capture and quality treatment targets that local soils and hydrology can accommodate.

Like the Hyde Creek IWMP, the Maple Creek IWMP encourages a range of LID source control and water quality treatment techniques, including bio-retention rain gardens or swales, pervious pavers, absorbent soil layers, green roofs, and rainwater harvesting and reuse. It also recommends regional storm water quality facilities such as wetlands and wet ponds. Beyond this, it emphasizes protection and maintenance of forest cover, rigorous protection of riparian areas (including increasing riparian setbacks where possible), enhancement of aquatic habitat (including stream daylighting) and reduction of impervious surfaces where possible (including by reducing road widths, surface parking standards, and building sprawl). It also recommends updating the major drainage system models for 100 and 200 year storms, and associated bylaws, to account for climate change and sea level rise. All of these provisions support LID.

483 Hyde Creek IWMP, Executive Summary, p v.

484 Hyde Creek IWMP, Part 6.1.1, p 6-2.

485 Hyde Creek IWMP, Part 6.1.1, p 6-4.

486 Maple Creek IWMP, Part 6.2, p 6-1.

487 Maple Creek IWMP, Part 6.2, p 6-1.

### Other provisions

Coquitlam's subdivision and development servicing bylaw contains numerous LID-relevant provisions beyond the Manual and IWMPs/ISMPs. Many of these support LID. No land clearing, stripping of topsoil, excavation, filling, construction or installation of any kind is allowed on a subdivision or development site until the City Manager provides written permission.[488] Like the statutory prohibition on altering land in environmental DPAs before the issuance of a development permit,[489] this supports LID by allowing the city to protect sites before they are disturbed. Before highways are constructed on steep slopes, the developer must complete a geotechnical evaluation of surface runoff, potential changes to the groundwater regime, and plans for stormwater management and mitigation of negative hydrological impacts.[490]

As mentioned earlier (in Part 4.1.2), the bylaw specifies requirements for ravine crossings, bicycle lanes, walkways, trails, multi-use pathways and greenways, all of which promote LID.[491] Street trees must be planted in boulevards or medians at 8-10 m intervals, with tree size corresponding to street size.[492]

**OPPORTUNITY**

Modify Coquitlam's Subdivision and Development Servicing Bylaw to allow curb cuts or curbless verges to accommodate surface drainage to infiltration areas; installation of LID stormwater BMPs in boulevards and medians; and permeable pavement of sidewalks and pathways.

Some bylaw provisions could be more supportive of LID. The design criteria make no explicit provision for road curb cuts or curbless verges to accommodate stormwater infiltration facilities,[493] the installation of stormwater BMPs in boulevards or medians,[494] or the use of permeable surfacing on sidewalks and multi-use pathways. Sidewalks and pathways "should be" surfaced in asphalt or concrete. This leaves potential room for permeable surfacing, provided that it meets the requirement that the surface "shall be firm, stable, slip resistant, smooth and free of rough textures and gaps,"[495] but this could be clearer. The city's supplemental specifications and detail drawings do include many LID features, but the bylaw itself could clarify its support for such features.

Some boulevard and median landscaping requirements are potentially problematic. Boulevards and medians must be planted with grass, and owners must supply underground sprinkler systems where necessary for the maintenance of trees, grass or other landscaping.[496]

**OPPORTUNITY**

Modify Coquitlam's Subdivision and Development Servicing Bylaw to encourage or require planting of native vegetation in boulevards and medians, including species that are resilient to climate change.

## 4.3 Development Procedures

Development procedures bylaws specify procedures, public notice rules and financial security requirements for a range of development applications, including for subdivision, zoning changes and development permits.

### *4.3.1 Port Coquitlam*

Port Coquitlam's Development Procedures Bylaw applies to a range of development applications including for zoning amendments, development permits, development variance permits and temporary

488 Coquitlam Subdivision & Development Servicing Bylaw, s 10.0.

489 See box "About DPAs" in Part 3.10, above.

490 Coquitlam Subdivision & Development Servicing Bylaw, Schedule A, Design Criteria, s 5.01.

491 Coquitlam Subdivision and Development Servicing Bylaw, Schedule A, Design Criteria, ss 5.03 – 5.06, 6.05.

492 Coquitlam Subdivision and Development Servicing Bylaw, Schedule A, Design Criteria, ss 8.01, 8.03 – 8.05.

493 Coquitlam Subdivision & Development Servicing Bylaw, Schedule A, Design Criteria, s 5.15.

494 Coquitlam Subdivision & Development Servicing Bylaw, Schedule A, Design Criteria, s 8.02.

495 Coquitlam Subdivision & Development Servicing Bylaw, Schedule A, Design Criteria, s 6.06.

496 Coquitlam Subdivision & Development Servicing Bylaw, Schedule A, Design Criteria, ss 8.02, 8.07.

use permits.[497]

### Delegation

The bylaw authorizes a committee of Council to make decisions on development and temporary use permit applications, which may be more expeditious than full Council deliberation.[498] It delegates decision-making authority to city staff for certain applications, including for buildings with green roofs and for watercourse development permits in agricultural, single residential or duplex zones, but staff may not vary or depart from the city's DPA guidelines or Zoning Bylaw.[499] This delegation could expedite approval of certain small-scale LID-friendly projects, but it is not clear why green roofs are the only LID technique mentioned explicitly.

**OPPORTUNITY**

Add some additional small-scale developments that meet clear LID criteria to the list of permits delegated to Port Coquitlam city staff.

### Information

The bylaw requires every application to include—if deemed applicable by city staff—a completed Development Checklist, a statement assessing the development's potential environmental impacts, and a site plan showing structures, paving materials, trees and landscaping.[500] For applications in an environmental conservation DPA, the site plan must include details illustrating energy and water conservation components. The city's Development Permit Application form (which is the closest thing to a "Development Checklist" on the city's website) asks for some LID-relevant information, including plans for on-site stormwater management "in accordance with best practices."[501]

As in Coquitlam, watercourse protection DP applications must include additional information relevant to LID, including watercourse descriptions, identification of significant natural biophysical features (hazards, trees, other vegetation, wildlife and wildlife habitat), structures, impervious surfaces, grading, drainage works showing effects on pre-development runoff rates, areas to be disturbed, an environmental assessment (including mitigation measures), an environmental protection plan (including stormwater, erosion and sediment management), and a watercourse protection area management plan. These information requirements may be waived in agricultural, single residential and duplex zones.[502] The bylaw does not set out similarly detailed information requirements for environmental conservation, natural environment protection or hazardous conditions DPs.

**OPPORTUNITY**

Apply Port Coquitlam's detailed information requirements for watercourse protection DPs to other DPs with substantial environmental or LID components.

The bylaw defines "qualified professional" for purposes of a watercourse protection DP as "an applied scientist or technologist specializing in an applied science or technology relevant to the matters dealt with" in the permit, "including but not necessarily limited to," specified disciplines, and who, "through demonstrated suitable education, experience, and accreditation and knowledge relevant to the particular matter, may be reasonably relied upon to provide advice within their area of expertise."[503] This definition is more open-ended than Coquitlam's and could be used to require LID-related information to be provided by professionals with LID-related training or experience.

497 City of Port Coquitlam, bylaw No 3849, Development Procedures Bylaw, 2013 (28 October 2013) (consolidated with amendments) (Poco Development Procedures Bylaw). The bylaw's scope of application is defined by reference to a version of the Local Government Act that was repealed in 2015: Poco Development Procedures Bylaw, s 1(2). The bylaw should be amended to refer to the current Local Government Act.

498 Poco Development Procedures Bylaw, s 7(1). Development variance permit applications are decided by Council. Poco Development Procedures bylaw, s 9(1).

499 Poco Development Procedures Bylaw, s 7(3).

500 Poco Development Procedures Bylaw, s 3(3).

501 City of Port Coquitlam, Application for Development Permit (version of April 2021), https://www.portcoquitlam.ca/wp-content/uploads/2021/05/DP-application-Apr-2021.pdf.

502 Poco Development Procedures Bylaw, ss 10(3)-(4).

503 Poco Development Procedures Bylaw, s 10(2).

### Security

Port Coquitlam requires security for landscaping in the amount of 110% of the value of landscaping work, except for development in a single family or duplex residential zone, where security is set at $5,000. For watercourse protection DPs, the amount of security is 110% of the cost "to ensure compliance with the watercourse protection area management plan including the value of landscaping work to restore areas intended to be kept in a natural state," except in an agricultural, single residential or duplex zone, in which case the amount is limited to 110% of the cost of the landscaping requirements.[504]

The requirement for security to cover the cost of complying with watercourse protection area management plans certainly encourages LID, but it is not entirely clear that this use of the security is legally permissible. The bylaw states that the security is "for landscaping," not for other purposes such as watercourse protection area management plan compliance, and as noted earlier, provincial law requires security to be used only for the purpose for which it is taken.[505]

**OPPORTUNITY**

Amend Port Coquitlam's Development Procedures Bylaw to specify clearly and unambiguously the purposes for which security may be required, including not just landscaping but also compliance with watercourse protection area management plans and completion of LID-relevant conditions of a permit or zoning change.

## *4.3.2 Coquitlam*

Coquitlam's Development Procedures Bylaw sets out procedures for applications for zoning changes, development permits and development variance permits, among other things.[506]

### Delegation

It delegates to the General Manager Planning and Development the power to issue, amend or decline certain development permits, including watercourse development permits and permits for building improvements of $500,000 or less and for duplexes, triplexes, fourplexes and multiplex residential developments.[507] This delegation allows for expedited review while preserving full Council consideration for larger and more significant projects. It might be useful to offer similarly delegated review for certain small-scale LID projects, such as green roofs, as Port Coquitlam does.[508]

**OPPORTUNITY**

Add some small-scale developments that meet clear LID criteria, such as green roofs, to the list of permits delegated to city staff in Coquitlam.

### Information

The information that the city may require in connection with a watercourse protection development permit application includes many items directly relevant to LID, including a site plan showing structures, land alterations, impervious surfaces, watercourse boundaries and top of bank; identification of ESAs and development impacts on them; slope and flood hazards; drainage, erosion and sediment control plans showing effects on pre-development runoff rates; trees and undergrowth; and recommendations to avoid or mitigate adverse environmental impacts.[509] The bylaw specifies which qualified professionals must supply this information. As noted in Part 3.10, it could enhance support for LID by requiring that information relevant to LID be supplied by qualified professionals with experience or training in low impact development, green infrastructure and/or integrated stormwater management.

The information required with other applications

504 Poco Development Procedures Bylaw, ss 14(1)-(2).

505 Community Charter, s 19.

506 City of Coquitlam, bylaw No 4068, Development Procedures Bylaw, 2009 (8 February 2010) (consolidated with amendments).

507 Coquitlam Development Procedures Bylaw, ss 4.5, 5.6.

508 See Part 4.3.2, below.

509 Coquitlam Development Procedures Bylaw, ss 5.2, 5.4.

is left to city staff to determine.[510] It is unclear why the bylaw's detailed environmental information requirements apply only to watercourse protection DPs but not environmental and neighbourhood-specific DPs. In addition, if Coquitlam were to adopt a more general environmental DPA, it would make sense to apply these detailed information requirements to it.

**OPPORTUNITY**

Apply Coquitlam's detailed information requirements for watercourse protection DPs to other DPs with substantial environmental or LID components.

Coquitlam's Development Procedures Bylaw refers to development approval information that the city may require from a DP applicant,[511] but the city's OCP does not appear to designate any areas or circumstances in which development approval information may be required.[512]

### Security

The bylaw also authorizes the city to require the applicant to post security to ensure satisfactory completion of all conditions of a development permit or temporary use permit pertaining to landscaping, or to ensure removal of an unsafe condition resulting from a contravention of a permit condition. The amount of the security must be at least 2.5% of the construction cost of any buildings.[513] Another section authorizes the city to require security to ensure satisfactory completion of all conditions of a development variance permit.[514]

These security requirements have two limitations from the perspective of encouraging LID.

First, in the case of development permits and temporary use permits, security may be used only to ensure fulfillment of conditions related to landscaping or to remedy contraventions that create safety hazards. The bylaw does not authorize the city to require security for completion of LID-related conditions in development permits or temporary use permits, unless these are encompassed within landscaping or the developer contravenes them in a way that creates an unsafe condition. This is a significant limitation because a municipality may use security only for the purpose for which it was provided.[515] Municipalities may require security for performance of permit conditions unrelated to landscaping (for example environmental restoration) or to remedy environmental damage caused by development activity.[516]

Second, the amount of security (at least 2.5% of building construction cost) may or may not correspond to the cost of the work it is intended to secure. One purpose of security is to enable the municipality to do the required work if the developer fails to do it. To make this possible, bylaws may require applicants to submit cost estimates for the relevant work, and require security to equal or exceed the estimated cost.[517] This is the approach Coquitlam takes to erosion and sediment control works, for example (see section 4.4.6, below).

**OPPORTUNITY**

Require applicants in Coquitlam to (a) provide security for completion of LID-related conditions; (b) submit cost estimates for completing the work, prepared by qualified professionals with LID training or experience; and (c) post security equal to or more than the estimated cost as confirmed by the city.

510 The city's Application Form, which must be included with an application, requires environmental, arborist, geotechnical and stormwater management information for some kinds of applications, but this information is not required by the bylaw itself. City of Coquitlam, Development Application Form (version of March 2022), https://www.coquitlam.ca/DocumentCenter/View/308/Development-Application-Form-PDF.

511 Coquitlam Development Procedures Bylaw, s 5.4.

512 See Part 3.10.1, above.

513 Coquitlam Development Procedures Bylaw, ss 4.6 (development permits), 7.6 (temporary use permits).

514 Coquitlam Development Procedures Bylaw, s 6.6.

515 Community Charter, s 19.

516 Community Charter, ss 8(8)(c), 17, 19; Local Government Act, s 502(2).

517 Eg Regional District of Central Okanagan, bylaw No 944, Development Applications Procedures Bylaw, 2002 (28 January 2002), s 6.6(a) (security deposit must be 125% of estimated cost). The *Green Bylaws Toolkit*, pp 257-260, contains detailed model language for environmental and LID-related security deposit bylaws.

## 4.4 Regulatory Bylaws

Regulatory bylaws are another tool for supporting LID alongside OCPs, DPAs, zoning, subdivision and development procedures. Regulatory bylaws regulate specific types of activity by banning certain activities, requiring permits for carrying out others, establishing conditions for permits, requiring security deposits, and imposing fines on violators. They can also require reporting and monitoring when activities are undertaken in hazardous or environmentally sensitive areas. Regulatory bylaws most likely to be relevant to LID include those for sewers and drainage, screening and landscaping, tree protection, soil deposit and removal, and watercourse protection. Bylaws related to building, boulevard maintenance, pesticides and alien invasive species are also potentially relevant to LID. Alternatively, some municipalities have comprehensive environmental protection or green infrastructure bylaws.[518]

Many regulatory bylaws could relate to LID in a generic or indirect way. This report focuses on bylaw provisions that engage with LID practices clearly and directly.

It is not uncommon for one LID issue to be addressed by multiple regulatory bylaws, or even by a mix of regulatory bylaws, zoning bylaws and DPA rules. For example, in some municipalities erosion and sediment control (ESC) might be scattered across soil deposit and removal, sewerage and drainage, watercourse protection, slope hazard and tree protection bylaws. In others it might be addressed in one place, such as environmental DPA rules. In Coquitlam, ESC requirements are found in the Conservation bylaw (discussed under Soil Deposit and Removal, below) and Stream and Drainage System Protection bylaw (discussed under Watercourse Protection, below). In Port Coquitlam, ESC requirements are imposed mainly via development permits, discussed in Part 3.10, above. There is no single preferable approach. The comparative advantages and disadvantages of regulatory bylaws versus environmental DPAs are discussed in the Green Bylaws Toolkit, which also points out that they can often complement each other.

518 Eg District of North Vancouver, Environmental Protection and Preservation Bylaw, Bylaw 6515 (8 November 1993) (consolidated up to Bylaw 8559, 30 May 2022), online: https://www.dnv.org/bylaws/environmental-protection-and-preservation-bylaw.

### *4.4.1 Sewerage and Drainage*

Municipalities have broad authority to regulate drainage and sewerage works under Section 69 of the *Community Charter*. These bylaws cover a variety of topics, including responsibilities of users, the powers and duties of the city engineer, fees, and penalties for non-compliance. They typically give the city engineer authority over the design, operation, maintenance and repair of sanitary sewer and storm drainage systems. They require prior approval of any work that may affect these systems and authorize the city engineer to specify the terms of such approval. They authorize the city engineer to refuse approvals if, among other things, the proposed works would jeopardize the proper operation of the sewer or drainage system, damage either system or harm the environment.

These bylaws also impose a range of responsibilities on property owners and users of sewer and drainage systems. They require, or authorize the city engineer to require, owners to connect their properties to the city sewer or drainage system. They prohibit people from modifying or interfering with the systems, discharging stormwater into the sewer system or sewage into the drainage system, or discharging anything into either system that could harm the environment. They require property owners to take reasonable steps to prevent pollution from entering the drainage system. If drainage or sewage escapes from the respective system, property owners must take reasonable steps to minimize any resulting damage.

Few of these requirements directly support or hinder LID practices, but they can affect them incidentally. For example, the city engineer's approval power could be used to require the use of LID stormwater best practices. Or, where LID stormwater management practices exist, these bylaws can help protect them against interference or damage.

Neither Port Coquitlam's nor Coquitlam's sewer and drainage bylaw contains LID-specific provisions beyond generic rules like these.[519] One example of a

519 City of Coquitlam, bylaw no 4429, Sewer and Drainage Bylaw, 2015 (15 June 2015) (consolidated with amendments) (Coquitlam Sewer & Drainage Bylaw); City of Port Coquitlam, bylaw no 1091, Sanitary Sewer and Storm Drain Connection Bylaw, 1971 (14 June 1971) (consolidated with amendments) (PoCo Sewer & Drainage Bylaw).

provision that could incidentally support LID is Port Coquitlam's provision that a property located near an existing storm drain does not have to be connected to the storm system if the city engineer is satisfied that an effective alternate method for the disposal of storm water is available and is being utilized.[520] In principle, one option would be to amend sewer and drainage bylaws to authorize, encourage or direct the city engineer to require LID stormwater best practices, where feasible.

**OPPORTUNITY**

Amend sewer and drainage bylaws to authorize, encourage or direct the city engineer to require LID stormwater best practices in the design, operation, maintenance, repair, improvement or extension of drainage systems.

See Part 4.2.2, above, for discussion of Coquitlam's Stormwater Management and Policy Design Manual, which is incorporated into its subdivision and development servicing bylaw.

### *4.4.2 Screening and Landscaping*

Screening refers to the use of fences, walls or vegetation to mask different or unattractive land uses. Landscaping refers to modification or preservation of the natural features of a site through the addition, removal or manipulation of such elements as soil, rock, vegetation, patios, decks, walkways, paths, fences and walls. Local governments may enact bylaws to regulate screening and landscaping for purposes of environmental protection, hazard prevention, or masking or separating land uses.[521] Such bylaws can support LID by enabling ecological rehabilitation (including restoration of native plant species and removal of invasive species) and separating environmentally sensitive areas from developed uses.

Coquitlam and Port Coquitlam do not have standalone screening and landscaping bylaws. They address these requirements through instruments discussed elsewhere in this report, including zoning bylaws and DPAs.

520 PoCo Sewer & Drainage Bylaw, s 2(b).

521 *Local Government Act*, s 527.

### *4.4.3 Tree Protection*

Municipalities have power to enact bylaws to protect trees, with certain limitations.[522] These bylaws typically apply to private properties throughout the municipality. They typically do not apply to work carried out by the municipality or to trees on municipally-owned land. Those may be regulated by boulevard maintenance bylaws, discussed below.

Tree protection bylaws typically prohibit cutting, damaging or removing trees larger than a specified size without a permit. In many cases they require permit applicants to submit reports and plans by qualified tree professionals. They may also require the creation of tree protection zones to prevent damage to existing trees during construction. They can support LID by preserving and regenerating urban forest, which can support stormwater infiltration and evapotranspiration. They can also set tougher standards for sensitive ecosystems, for example by prohibiting removal of trees from riparian, steeply sloped or environmentally sensitive areas. In addition to laying down rules about which trees may be cut, they can set maximum treeless area, minimum canopy cover and tree replacement ratios. They may not, however, operate to preclude permitted uses or densities.

The two cities' tree protection bylaws are broadly similar.[523] They both prohibit cutting, removing or damaging any tree of a certain size,[524] any replacement tree or any tree planted as a condition of a development-related permit, without a permit. Port Coquitlam's bylaw provides enhanced protection for designated rare native tree species, wildlife trees, heritage trees and most large trees (diameter 45 cm or more). It is also worth noting that Coquitlam's Watercourse Protection DPs require confirmation of compliance with federal migratory bird legislation, including surveying for Pileated Woodpecker nesting sites.

522 *Community Charter*, ss 8(3)(c) & 50.

523 City of Coquitlam, bylaw no 4091, Tree Management Bylaw, 2010 (15 February 2010) (consolidated with amendments); City of Port Coquitlam, bylaw no 4108, Tree Bylaw, 2019 (26 February 2019).

524 In Port Coquitlam, 15 cm or more in diameter or 5 m or more tall; in Coquitlam, 20 cm or more in diameter or, only on steep slopes, 5 m or more tall.

**OPPORTUNITY**

Introduce enhanced protection for native tree species, wildlife trees and large trees into Coquitlam's tree protection bylaw.

Both cities provide an exemption for emergency removal of hazard trees that pose an imminent danger to people or property. This is Port Coquitlam's only exemption. Coquitlam has several others. Owners may cut up to 2 protected trees per year without a permit on lots with less than 40 protected trees, or up to 5% of the trees on lots with more than 40. There is no limit on which kinds of trees may be cut under this exemption or how many may be cut over time. Cutting protected trees is also allowed without a permit on a property that is in an approved neighbourhood plan area and has an active zoning, subdivision or development permit application. The latter exemption is based on the assumption that the neighbourhood plans, zoning, subdivision and DP processes provide adequate tree protection.

**OPPORTUNITY**

Remove or limit the 2 trees/year exemption in Coquitlam's tree protection bylaw.

Tree protection requirements in both cities are stricter in environmentally sensitive and naturally hazardous areas. Port Coquitlam's bylaw authorizes refusal of a permit if the tree is located in a DPA where hazardous conditions such as steep slopes are present and its removal would impact site retention. Applicants may be required to submit an engineering report certifying that the removal will not destabilize slopes, cause flooding or erosion, and specifying conditions to protect "other environmental features or functions," which could in principle include LID stormwater facilities and other green infrastructure. Also, the city may refuse a permit in a DPA where hazardous conditions such as steep slopes are present, if the removal of the tree would impact site retention. In Coquitlam, protection is greater in designated steep slope or streamside protection and enhancement areas, where a permit is always required except in a hazard tree emergency.

The content of tree cutting permit applications is similar in both cities, as is the city's authority to require expert studies and reports and to impose terms and conditions it deems appropriate. Port Coquitlam's bylaw expressly notes that the latter may include conditions to control erosion, manage runoff and protect retained trees.

Neither city's bylaw sets requirements for maximum treeless area or minimum canopy cover, but both provide for replacement trees. In Port Coquitlam, every tree cutting permit application must include a tree replacement plan, and the tree replacement formula is specified in the bylaw itself.[525] Coquitlam's bylaw gives the General Manager discretion to decide whether a tree replacement plan is required. The tree replacement formula is specified in the city's Tree Resource Guide.[526] The two cities' formulae are quite different: Port Coquitlam's is typical of tree protection bylaws and is a ratio of the number of trees removed, while Coquitlam's is unusual in being based on the number of trees that remain after trees are cut.

**OPPORTUNITY**

Base Coquitlam's tree replacement formula on the number of trees cut rather than retained; and consider including minimum tree cover standards in both cities' bylaws.

Both bylaws require security deposits when replacement trees are required. In Port Coquitlam this is set at $500 per replacement tree, which may or may not bear a direct relation to the cost of planting and nurturing replacement trees and restoring the site. In Coquitlam the applicant must submit a security deposit equal to the full value of the required replacement trees and site restoration measures.

525 Trees must be replaced at a ratio of 1:1, with two exceptions: the ratio is 2:1 for larger trees (diameter 60 cm or more), and no replacement is required for trees within 5 m of another tree.

526 The formula varies with the size of the lot and the species of replacement trees. On small lots (up to 500 $m^2$), replacement trees are required only if no trees are left. On medium sized lots, replacement trees are required only if fewer than 3 or 4 trees remain. On lots over 1250 $m^2$, replacement trees are required only if fewer than 1 tree is left per 250 $m^2$. The number of required replacement trees ranges from 1 for small lots, to 16 for intermediate lots, to 1 per 65 $m^2$ on large lots, depending on replacement tree species. City of Coquitlam, City of Coquitlam Standards for Tree Cutting Permit Applicants (no date).

**OPPORTUNITY**

Base Port Coquitlam's replacement tree security deposit on the cost of tree replacement and site restoration.

Finally, Port Coquitlam's bylaw requires the erection of protective barriers that meet the bylaw's specifications whenever construction or similar work is proposed within 4 m of the drip line of a tree that is subject to the bylaw. Coquitlam's construction-related tree protection requirements are imposed via development permitting processes, not through its tree management bylaw.[527]

Speaking generally, the more rigorously a tree protection bylaw protects trees, the more it supports LID. Both cities could consider taking an example from the strengths of the other's bylaw.

Beyond tree bylaws, it could be beneficial for both cities to develop citywide, Council-endorsed Urban Forest Management Strategies that consider tree retention, stewardship, forest and ecosystem health, public safety, and impacts including urban growth and climate change.

### *4.4.4 Soil Deposit and Removal*

Soil deposit and removal is another subject on which local governments have limited bylaw powers.[528] Such bylaws typically ban the deposit or removal of soil anywhere in the municipality without a permit, with specified exceptions. They are aimed primarily at soil removal and deposit associated with urban development, as opposed to commercial sand, gravel or rock quarrying activities. They typically do not apply to soil deposit or removal on municipal land or by the municipality. They specify information (including plans, data and specifications) to be included with applications, grounds for refusing permits, the kinds of terms and conditions that can be included in permits, permit fees and security deposits.

These bylaws can support LID by controlling a class of activities that can have major impacts on hydrology, drainage and environmentally sensitive areas. They usually regulate erosion and sediment control (ESC)—though as noted earlier, both Coquitlam and Port Coquitlam also regulate ESC via other bylaws and DP processes. Soil deposit and removal bylaws can require production of information and implementation of measures to avoid interference with watercourses or with hydrological functions and drainage patterns on development sites and adjacent lands. They can also reinforce environmental DPAs by providing a means to enforce the prohibition against altering land in an environmental DPA without a permit.

The two cities' soil deposit and removal bylaws are broadly similar.[529] Coquitlam actually has two soil permitting regimes, under two separate bylaws. One is aimed at urban development-related activities and will be the focus here.[530] The other applies to commercial quarrying operations in areas specially designated for such operations.[531] Unlike the general soil deposit and removal permitting system, it has no environmental or hydrological requirements or goals and is aimed at the "safe orderly and economical exploitation of the soil substance deposits in the Coquitlam River Valley." An assessment of its contribution to LID is beyond the scope of this report.

Both cities' bylaws define "soil" broadly to include earth, sand, gravel, rock, silt, clay, peat and any other substance of which land is naturally composed. Both also cover wood waste. Port Coquitlam's bylaw also covers other materials that can adversely impact the environment, including chemical waste, tree stumps, petroleum products, construction or demolition waste, and unchipped lumber. In addition to exempting municipal lands and works, both cities' bylaws exempt low volume activities from permit requirements.[532] Coquitlam offers additional exemptions: no permit is required for soil deposit or removal that is a condition

527 See City of Coquitlam, "Trees & Development," https://www.coquitlam.ca/560/Trees-Development.

528 *Community Charter*, ss 8(3)(m) & 9(1)(e).

529 City of Coquitlam, bylaw no 2454, Conservation Bylaw, 1994 (18 July 1994) (consolidated with amendments) (Coquitlam Conservation Bylaw); City of Port Coquitlam, bylaw no 3331, Soil Removal and Deposit Bylaw, 2002 (12 May 2003).

530 Coquitlam Conservation Bylaw.

531 City of Coquitlam, bylaw no 1914, Soil Removal and Deposit Regulation Bylaw, 1988 (22 August 1988) (consolidated with amendments).

532 In Port Coquitlam, under 200 $m^3$/year/property; In Coquitlam, under 500 m3/year/property but only for landscaping and only if the activity will not affect a watercourse or other lot and will be less than 1 m deep.

of a preliminary subdivision approval; for preloading lands (ie adding soil to compact the underlying soil in preparation for construction) for which a building permit has been issued; for deposit or removal of soil that will be retained on the same site where a building permit has been issued; or for quarrying activities permitted under the sand and gravel bylaw.

**OPPORTUNITY**

Expand Coquitlam's soil deposit and removal bylaw to cover additional materials like chemical waste, petroleum products and construction/demolition waste.

Coquitlam's bylaw offers enhanced protection for environmentally sensitive areas. First, its low volume exemption is available only if the activity will not affect a watercourse. Second, additional protective measures including siltation control and temporary or permanent fencing may be required for soil deposit or removal adjacent to watercourses or vegetation protection areas.

**OPPORTUNITY**

Limit Port Coquitlam's low volume soil deposit and removal exemption to activities unlikely to affect watercourses or other ESAs.

In both cities, applications must include detailed plans, specifications and information prepared by a qualified professional covering, among other things, topography, hydrology, vegetation, drainage, slope stability, ESC and watercourses. Coquitlam's bylaw goes into more detail about the information, plans and studies that may be required, but the thrust of both bylaws is similar. Both bylaws are also similar in terms of grounds for refusing a permit, which include where soil deposit or removal would pollute, obstruct, divert, damage or destroy any watercourse or drainage works; damage or destroy any amenities (which could include LID stormwater facilities); or make soil susceptible to erosion, slippage, landslide, slumping or settling.

Port Coquitlam's bylaw requires a security deposit of $5,000 plus $5,000 for each hectare of land to be disturbed. Coquitlam's bylaw does not require any security.

**OPPORTUNITY**

Introduce security deposits into Coquitlam's soil deposit and removal bylaw, and set the amount of security in both cities to cover actual costs.

Finally, in Port Coquitlam the required technical reports must be prepared by an engineer, geoscientist, agrologist or land surveyor who is registered with a professional association that is regulated by a statute. In Coquitlam, geotechnical reports must be prepared by a professional engineer who has specialized expertise in geotechnical engineering. Given the relevance of soil deposit and removal, and especially ESC, for LID, it might be worthwhile to consider adding a reference to LID-related expertise in the descriptions of qualified professionals. See the discussion of qualified professionals in Part 3.10, above.

### *4.4.5 Watercourse Protection*

Municipalities have the power to enact bylaws to "regulate, prohibit and impose requirements in relation to polluting or obstructing, or impeding the flow of, a stream, creek, waterway, watercourse, waterworks, ditch, drain or sewer, whether or not it is located on private property."[533] Such bylaws can support LID by regulating both the water quality and physical alteration of watercourses. LID-supportive provisions can include prohibitions on enclosing open streams, special protections for riparian setbacks and streamside protection and enhancement areas, and requirements for ESC plans to protect watercourses during construction.

The provincial Riparian Areas Protection Regulation (RAPR) sets the floor for municipal regulation of riparian areas that support fish. As discussed earlier, Coquitlam implements the RAPR via its Zoning Bylaw (see Part 4.1), while Port Coquitlam implements it via watercourse protection DPs (see Part 3.10). Municipalities can support LID by going beyond the floor set by the RAPR, for example by applying RAPR requirements to all riparian areas, not just those that support fish; requiring consideration or use of specific

533 *Community Charter*, ss 8(3)(j) & 9(3)(a); *Spheres of Concurrent Jurisdiction – Environment and Wildlife Regulation*, BC Reg 144/2004, s 2(1)(a) ("*Concurrent Jurisdiction Regulation*").

BMPs; or setting requirements for native revegetation, stormwater management, or preservation of natural hydrologic regimes, wetlands or intact ecosystems. This can be done through a range of tools, including DPAs[534] and regulatory bylaws.[535]

Port Coquitlam's Waterways Protection Bylaw is short and simple.[536] It prohibits anyone from polluting, obstructing or impeding the flow of any stream, creek, waterway, watercourse, waterworks, ditch, drain, or sewer anywhere in the city, and provides penalties for violations. This general language has the advantage of covering a wide range of situations but the disadvantage of not specifying clearly where the line is between lawful and unlawful activity.

### OPPORTUNITY

Consider incorporating detailed water quality indicators, ESC criteria and requirements into Port Coquitlam's Waterways Protection bylaw, so they apply throughout the city.

Coquitlam's Stream and Drainage System Protection Bylaw supports LID by specifying prohibitions in more detail and supplementing them with stop work orders, remedial action and detailed ESC rules.[537] It prohibits anyone from obstructing or impeding the flow of the drainage system, which it defines as any streams, creeks, waterways, watercourses, waterworks, ditches, drains or sewers. It bans pollution via a three-pronged approach. First, no one may place, store, transport or dispose of any waste or "deleterious substance"[538] so that it is likely to escape into the drainage system. This supports LID by seeking to prevent pollution before it happens. Second, no one may release any waste or deleterious substance into the drainage system, directly or indirectly. This is aimed at catching pollution at the point of release, before it has done too much harm. Third, no one may release earth, sediment, construction waste, concrete or other substances that will result in water having a pH outside a specified range or turbidity above specified levels. This is aimed mainly at ensuring ESC at development sites. As for remedial action, Coquitlam's bylaw authorizes the city to order any person who is violating or likely to violate the bylaw to stop work and to take steps to prevent further violation. If they do not do so, the city may enter and take the steps itself.

The bylaw also sets out a detailed scheme of ESC requirements. Developers must install and maintain all ESC facilities necessary to ensure compliance with the bylaw. For single family and duplex residential developments, this includes at a minimum certain basic ESC facilities described in the city's guide to ESC BMPs.[539] For larger developments, the developer must submit a detailed ESC plan and cost estimate; post advisory signage; obtain pre-development approval; and install and maintain the ESC facilities identified in the approved ESC plan. ESC plans must be prepared by a professional engineer and include, among other things, the mandatory minimum ESC facilities described above, measures to prevent erosion as much as possible, details of ESC facilities and how they will meet the bylaw's criteria, restoration of disturbed areas, and a monitoring and inspection schedule. The City may require a single family or duplex development to comply with some or all of these additional requirements if necessary to protect the drainage system. Certain developments in the Stoney Creek watershed must, in addition, install, operate and maintain real-time monitoring facilities that measure numerous water quality parameters and have automated alarm and discharge shutoff systems.

The bylaw also sets out detailed provisions for ESC implementation, maintenance, monitoring and reporting. The developer must appoint an ESC supervisor who must be a qualified professional with recognized expertise in the design, inspection and monitoring of ESC Facilities. The ESC supervisor must, among other things, attend a pre-development meeting

534 For example, Regional District of Central Okanagan, Aquatic Ecosystem Development Permits (August 2022), https://www.rdco.com/Aquatic-DP-Brochure-2022.pdf.

535 For example, City of Abbotsford, bylaw no 1465, Streamside Protection Bylaw, 2005 (20 June 2005) (consolidated with amendments).

536 City of Port Coquitlam, bylaw no 917, Waterways Protection Bylaw, 1969 (14 April 1969) (consolidated with amendments).

537 City of Coquitlam, bylaw no 4403, Stream and Drainage System Protection Bylaw, 2013 (9 September 2013) (consolidated with amendments).

538 This term has the same meaning as in the federal *Fisheries Act*, namely any substance that, if added to any water, would make the water harmful to fish.

539 City of Coquitlam, Erosion and Sediment Control Best Management Practices (April 2023). The guide is updated periodically with new and improved BMPs.

with the city, inspect and repair ESC facilities two days before forecasted significant rainfall events, file reports during and within 24 hours after a significant rainfall event, carry out regular monitoring weekly in the wet season and biweekly in the dry season, and file reports biweekly in the wet season and monthly in the dry season. Furthermore, if at any time discharges from a construction site exceed the pH or turbidity limits, or obstruct or impede the flow of the drainage system, the developer must immediately notify the city, province and federal government.

Finally, the city has the discretion to require a security deposit of 110% of the certified ESC facilities cost or $5,000, whichever is more. Such deposits are not mandatory in all cases but are standard practice for most developments.

**OPPORTUNITY**

Make ESC security deposits mandatory for larger developments in Coquitlam.

### *4.4.6 Building*

Building bylaws regulate construction and demolition and help implement the provincial *Building Code*. Coquitlam's Building bylaw[540] contains provisions related to stormwater management and slope hazard control, while Port Coquitlam's touches on construction in flood-prone areas. Stormwater management rules are centrally relevant to LID. Flood and slope hazard management rules are also relevant, since LID techniques can help reduce both types of hazards.

Port Coquitlam's Building and Plumbing bylaw supports LID by requiring building permits to identify watercourse boundaries, flood levels and flood setbacks.[541] Beyond this, however, it says little of direct relevance to LID.

Coquitlam's Building bylaw supports LID by requiring building permit applications to address lot grading, drainage, watercourse setbacks and slope hazards.[542] Applications involving buildings on or adjacent to slopes must demonstrate compliance with the Slope Hazard Regulation,[543] discussed earlier in Part 4.1.2. Applications involving excavation or fill must include drainage control measures to reduce runoff to predevelopment volumes and locations, eliminate hazardous or nuisance runoff and provide an emergency runoff flow path for a 100-year storm.[544] The Building bylaw also reinforces the Zoning Bylaw's rules for minimum floor elevation in flood-prone areas.[545]

The Coquitlam Building bylaw ensures integrity of the stormwater management system by requiring all building storm drains to be connected to the city's storm drainage system unless the General Manager of Planning and Development approves connection to a private drainage system or "other suitable disposal system,"[546] but it does not mention LID stormwater management BMPs as eligible for connection.

**OPPORTUNITY**

Mention LID stormwater management BMPs as part of a "suitable disposal system" in Coquitlam's building bylaw.

### *4.4.7 Boulevard Maintenance*

Boulevard maintenance bylaws constrain what property owners and occupiers may do to adjacent boulevards (the area between the paved street and the property line). Both cities restrict tree removal and installation of impervious surfaces in boulevards. Port Coquitlam additionally requires city permission for actions that affect boulevard drainage. This provision has the potential to promote and protect LID drainage techniques implemented in boulevards, such as bioswales.

A few sections of Port Coquitlam's Boulevard Maintenance bylaw support LID. First, no one may

540 City of Coquitlam, bylaw no 3598, Building Bylaw, 2003 (17 November 2003) (consolidated with amendments).

541 City of Port Coquitlam, bylaw no 3710, Building and Plumbing Bylaw, 2009 (27 July 2009) (consolidated with amendments), ss 9.1.4, 10.1.4.

542 Coquitlam Building Bylaw, ss 23.1(g)-(i).

543 Coquitlam Building Bylaw, s 23.1(i).

544 Coquitlam Building Bylaw, s 23.1(k).

545 Coquitlam Building Bylaw, s 31.

546 Coquitlam Building Bylaw, s 32.3.

install an impervious surface on a boulevard, cut down a boulevard tree larger than 6 cm diameter, interfere with or damage any municipal or utility infrastructure in the boulevard (which could include LID stormwater facilities), or do anything that would change the grade or affect drainage patterns of the boulevard, without the Director's consent.[547] Second, the city may, without compensation, remove any improvements made to a boulevard by an adjacent owner if the boulevard is required for a municipal purpose.[548] This provision could be used to facilitate installation of LID stormwater management infrastructure in boulevards. Third, property owners are allowed, with some restrictions, to plant a boulevard and are then required to water it.[549] This provision supports LID by authorizing boulevard vegetation that absorbs some surface runoff. On the other hand, owners are not required to maintain boulevard improvements installed by the city, including vegetation.[550] Making owners responsible for watering city-planted trees, shrubs and other vegetation could help ensure that they remain healthy and provide the ecological services that support LID.

**OPPORTUNITY**

Make property owners responsible for watering city-planted boulevard vegetation in Port Coquitlam.

Coquitlam's Boulevard Maintenance bylaw is broadly similar.[551] With some caveats, it prohibits adjacent owners from installing impervious surfaces, cutting or damaging trees, or installing anything in the boulevard that the City Engineer identifies as an environmental concern.[552] No one may plant trees in boulevards without City permission, but adjacent owners may plant a boulevard with other vegetation, subject to some restrictions; and they are required to water all boulevard vegetation including that planted by the city.[553] The bylaw's support for LID could be strengthened by requiring prior approval for activities that affect infrastructure, grades or drainage, and authorizing the city to remove owner improvements from boulevards without compensation if needed for public purposes, including LID BMPs.

**OPPORTUNITY**

Amend Coquitlam's boulevard maintenance bylaw to restrict activities that impact boulevard infrastructure, grades or drainage, and to authorize removal of private improvements without compensation.

### *4.4.8 Pesticides and Invasive Species*

Municipalities may enact bylaws regulating pesticide use, invasive species and noxious plants, within certain limits.[554] These can support LID by, among other things, helping to control water pollution and protect or rehabilitate native ecosystems.

Unlike most provinces, BC has no province-wide ban on "cosmetic" or non-essential uses of pesticides, leaving this issue to local governments. Both cities have cosmetic pesticide use restrictions in place. The two cities' bylaws are almost identical and prohibit the use of pesticides on lawns, trees and ornamental gardens on residential or city land, with some exceptions.[555] These laws support LID by reducing the release of toxic chemicals that could enter aquatic ecosystems.

Pesticide use control bylaws can be in tension with invasive species management if they prohibit the use of pesticides for invasive species control. This does not appear to be a problem in the two cities. Their pesticide use bylaws restrict the use of pesticides only for the purpose of maintaining desired ornamental vegetation, not for eradicating invasive species. That said, it could be useful to exempt invasive species explicitly so that synthetic herbicides may be used when alternatives are ineffective.

547 City of Port Coquitlam, bylaw no 3965, Boulevard Maintenance Bylaw, 2018 (12 June 2018) (consolidated with amendments) (PoCo Boulevard Maintenance Bylaw), s 7.

548 PoCo Boulevard Maintenance Bylaw, s 11.

549 PoCo Boulevard Maintenance Bylaw, s 7.

550 PoCo Boulevard Maintenance Bylaw, s 10.

551 City of Coquitlam, bylaw no 4853, Boulevard Maintenance Bylaw, 2018 (7 May 2018) (consolidated with amendments).

552 Coquitlam Boulevard Maintenance Bylaw, ss 5.1, 6.2, 6.3.

553 Coquitlam Boulevard Maintenance Bylaw, ss 5.1, 6.1, 7.1.

554 *Community Charter*, ss 8(3)(h)-(k), 9(3)(a), 64(1); *Concurrent Jurisdiction Regulation*, s 2(1)(b)(ii)-(iii).

555 City of Coquitlam, bylaw no 4254, Pesticide Use Control Bylaw, 2012 (23 April 2012); City of Port Coquitlam, bylaw no 3767, Pesticide Use Control Bylaw, 2011 (13 June 2011).

Turning to invasive species, municipalities can enact bylaws to regulate an extensive range of invasive plant and animal species. Depending on which *Community Charter* enabling provisions are used to do so, the bylaws may or may not require provincial approval. The Invasive Species Council of BC has published a toolkit for local governments that contains guidance and examples of regulatory and non-regulatory approaches to invasive species management.[556]

Neither city has adopted a comprehensive invasive species bylaw. Port Coquitlam has a bylaw requiring all property owners to clear their property of "brush, trees, noxious weeds, or other growths" (presumably limited to those the city considers a nuisance, but the bylaw does not say so) and to keep it free of noxious or destructive insects.[557] The bylaw does not refer to invasive species explicitly.

**OPPORTUNITY**

Amend or adopt a bylaw in Port Coquitlam to regulate invasive species explicitly.

In Coquitlam, owners must keep adjacent boulevards free of 18 listed invasive plant species,[558] but their own properties free of just one species, Giant Hogweed.[559] They must also eradicate brush, trees, weeds or other growths, but only if they harbour organisms that are disease vectors.[560]

**OPPORTUNITY**

Expand the list of invasive species that owners in Coquitlam must control or eradicate on their own property to include other high priority species that can be controlled at reasonable cost.

Both cities have the option to regulate invasive plants directly under the provincial *Weed Control Act*, but this is limited to species listed in the *Weed Control Act* regulations, and for the purpose of protecting agriculture.[561] Neither city appears to have done so.

## 4.5 Financial Bylaws

Municipalities can support LID by enacting bylaws that give developers financial incentives to implement LID BMPs and other green infrastructure or that provide municipal revenues to install and maintain such practices and infrastructure on public land. First, municipalities can impose a variety of fees and charges that could have implications for LID. Some are discussed in earlier sections, including development permit (Part 3.10), sewer and drainage (Part 4.4.1) and soil deposit and removal fees (Part 4.4.4). In addition, general fees and charges bylaws specify a wide variety of other fees (Part 4.5.1). Municipalities can also impose development cost charges (DCCs) for subdivision and building permit applications (Part 4.5.2), grant property tax exemptions (Part 4.5.3) and establish and use reserve funds (Part 4.5.4). All of these can support LID.

### *4.5.1 General Fees and Charges*

Within certain limits,[562] municipalities have broad powers to charge fees for services, use of municipal property or exercise of regulatory authority. Bylaws may base fees on any factor specified in the bylaw, establish different fees in relation to different factors, and provide for discounts, refunds and penalties.[563] This is in addition to municipalities' general variation power, which authorizes municipal bylaws to make different provisions for different areas, times, conditions or circumstances; establish different classes of persons, places, activities, property or things; and make

556 Invasive Species Council of BC, *Invasive Species Toolkit for Local Government, Real Estate Professionals and Land Managers* (Williams Lake: Invasive Species Council of BC, 2018).

557 City of Port Coquitlam, bylaw no 3220, Vector Control Bylaw, 1999 (12 July 1999).

558 Coquitlam Boulevard Maintenance Bylaw, s 7.1.

559 City of Coquitlam, bylaw no 4181, Noxious Weed Bylaw, 2010 (13 December 2010).

560 City of Coquitlam, bylaw no 4284, Wildlife and Vector Control Bylaw, 2012 (23 April 2012) (consolidated with amendments).

561 *Weed Control Act*, RSBC 1996, c 487.

562 For instance, Local governments may only charge fees authorized by statute or by a bylaw made under statutory authority. *Local Government Act*, s 462(6); *Community Charter*, s 193(1). Fees for zoning changes, official plan amendments, subdivision applications, development permits and various other land use permits must not exceed the estimated average costs of processing, inspection, advertising and administration that are usually related to the type of application or other matter to which the fee relates. *Local Government Act*, s 462(2).

563 *Community Charter*, s 194(2).

different provisions, including exceptions, for different classes.[564] In principle, therefore, fees for various applications and services may vary depending on whether and to what extent a proposed development contributes to LID.

Neither city's general fees and charges vary based on a development's contribution to LID. Looking at Port Coquitlam's 2023 Fees and Charges Bylaw,[565] for example, fees for building, plumbing and on-site service permits; development services (eg, zoning changes, official plan amendments and development permits); and engineering works and services (eg, storm sewer connections and curb, gutter and sidewalk restoration) do not vary depending on whether the development for which the fees are charged implements LID BMPs and thereby provides green infrastructure services or reduces the burdens on municipal infrastructure. Nor is it evident whether the tree cutting permit fee of $100 per tree reflects the value of the ecological services provided by the removed tree. Similarly, the fees in Coquitlam's general Fees and Charges Bylaw[566] do not vary depending on whether the development at issue contributes to LID, and it is unclear whether tree cutting and replacement fees, which range from $65 to $628, reflect the value of the ecological services of the removed trees.

**OPPORTUNITY**

Reduce development-related fees and charges for developments that implement LID BMPs or otherwise contribute to LID.

### *4.5.2 Development Cost Charges*

Development cost charges (DCCs) can also support LID. Municipalities may impose DCCs on developers to help cover the capital costs of sewage, water, drainage, highway and park facilities that service the development.[567] Significantly, municipalities must consider LID when setting DCCs. In particular, they must consider how "development designed to result in a low environmental impact" may affect these capital costs and whether the DCCs will discourage such development.[568] Municipalities may waive or reduce DCCs in limited circumstances, including for developments that are designed to have low environmental impact. Such reductions and waivers must be established in a bylaw that specifies which developments are eligible for waivers or reductions, the amounts of such waivers or reductions, the requirements that must be met to obtain them, and the conditions that may be imposed along with them.[569]

Port Coquitlam updated its DCC bylaws in December, 2023, replacing formerly separate bylaws for sewage, water, drainage and highway DCCs with a consolidated bylaw.[570] It declares that the Council considered how development designed to result in a low environmental impact may affect the capital costs of sanitary sewer, water, drainage, and roads, and determined that the DCCs imposed by the bylaw will not discourage low environmental impact development. The bylaw has one exemption that is potentially relevant to LID: residential developments with dwelling units no larger than 29m$^2$, which appears aimed at encouraging "tiny houses."[571] The city has a separate bylaw for parks acquisition and improvement DCCs.[572]

Coquitlam has a single consolidated DCC Bylaw that was last updated in 2022.[573] It provides for six types of DCCs: drainage, parkland acquisition, park improvement, sanitary sewer, transportation and water. Its preamble states that Council took into consideration section 560 of the *Local Government Act*, which provides that the DCC bylaws must be approved by the provincial inspector, who may refuse approval if the local government has not properly

564 *Community Charter*, s 12(1).

565 City of Port Coquitlam, bylaw no 4289, Fees and Charges Bylaw, 2023 (22 November, 2022).

566 City of Coquitlam, bylaw no 5285, Fees and Charges Bylaw, 2022 (12 December 2022).

567 *Local Government Act*, s 559.

568 *Local Government Act*, s 564(4)(d), (f). These provisions were added by the *Local Government (Green Communities) Statute Amendment Act*, SBC 2008, c 23, ss 27-28. The same act made similar changes to the DCC provisions of the Vancouver Charter, SBC 1953, c 55 and the *Greater Vancouver Sewerage and Drainage District Act*, SBC 1956, c 59.

569 *Local Government Act*, s 563.

570 City of Port Coquitlam, bylaw no 4320, Development Cost Charge Bylaw, 2023 (12 December 2023).

571 Port Coquitlam Development Cost Charge Bylaw, s 4.1(b).

572 City of Port Coquitlam, bylaw no 3182, Parkland Acquisition and Development Development Cost Charge Bylaw, 1998 (12 April 1999) (consolidated with amendments).

573 City of Coquitlam, bylaw no 5222, Development Cost Charges Bylaw, 2022 (4 July 2022) (Coquitlam DCC Bylaw).

considered the things the Act says must be considered in setting DCCs. As noted earlier, those mandatory considerations include LID. It is probably reasonable to infer that Council indeed considered LID when enacting the bylaw, but the bylaw does not say so explicitly.

In any event, the Coquitlam bylaw exempts certain types of developments from DCCs. This includes residential developments with units of 29m$^2$ or less. [574] While this supports "tiny house" developments, it is in tension with the Zoning Bylaw's minimum unit size of 29m$^2$.[575]

**OPPORTUNITY**

Amend DCC bylaws to make specific types of LID projects eligible for DCC reductions or waivers.

### *4.5.3 Property Tax Exemptions*

Certain types of land are statutorily exempt from taxation, including municipally-owned land, public libraries, hospitals, care homes, places of worship, cemeteries, schools and sewage treatment plants other than septic systems.[576] In addition, local governments have the power to grant permissive tax exemptions to non-profit properties and a variety of properties that are similar to but not covered by the statutory exemptions.[577] Significantly for LID, local governments may also pass bylaws and enter special agreements granting tax exemptions for certain types of property, including property whose owner uses it to provide a municipal service under a partnering agreement, and riparian land subject to a covenant under the *Land Title Act*.[578] Both of these could be used to incentivize LID: the first one by exempting properties used for the provision of LID stormwater services pursuant to partnering agreements; the second by exempting riparian land that is protected by binding covenants. Eligibility requirements must be specified by bylaw. Conditions for the exemptions may be specified in property-specific exemption agreements.

**OPPORTUNITY**

Enact bylaws and conclude exemption agreements to exempt riparian land and/or land used for LID stormwater management from property taxes.

### *4.5.4 Reserve Funds*

Reserve funds are a fourth financial tool municipalities can use to support LID. Provincial legislation authorizes municipalities to establish reserve funds for a range of purposes. Some of these are to spend money collected as development cost charges (DCCs). DCCs must be deposited into reserve funds and used for the purposes for which they were collected—namely, to pay for parks, sewage, water, drainage and highway facilities that service the development in question.[579] DCC bylaws can support LID in two ways: first, by reducing or waiving DCCs for developments that advance LID (discussed in Part 4.5.2, above), and second, by using DCC reserve funds to service the developments in question with LID facilities and green infrastructure. Determining whether the two cities have used DCC reserve funds for this purpose would require further research that is beyond the scope of this report.

**OPPORTUNITY**

Use, or increase the use of, DCC reserve funds to create LID facilities and green infrastructure to service developments.

Other statutorily authorized reserve funds relevant to LID include those for payments received in lieu of park land or off-street parking spaces.[580] Money in lieu of park land must be used for acquiring park lands.[581] Both cities have established reserve funds for payments in lieu of park land.[582] These can support LID, depending

574 Coquitlam DCC Bylaw, s 6.1(e).

575 See Part 4.1.2, above.

576 *Community Charter*, s 220.

577 *Community Charter*, s 224.

578 *Community Charter*, s 225.

579 *Local Government Act*, s 566.

580 *Local Government Act*, ss 510, 567.

581 *Local Government Act*, s 510(14); *Community Charter*, s 188(2)(b).

582 City of Coquitlam, bylaw no 5288, Reserve Fund Establishment Bylaw, 2022 (12 December 2022), s 2(e) (Coquitlam Reserve Fund Bylaw); City of Port Coquitlam, bylaw no 2705, Park

on the character, location and use of such park lands. Whether the two cities have used park land acquisition reserve funds to advance LID would require further research that is beyond the scope of this report.

**OPPORTUNITY**

Use, or increase the use of, park land acquisition funds to acquire park lands that advance LID.

Money in lieu of off-street parking must be used either to provide off-street parking or to provide infrastructure that supports walking, bicycling, public transit or other alternative modes of transportation.[583] The latter purpose supports LID by fostering a shift away from personal automobiles to lower impact modes of transportation. Coquitlam has established a reserve fund for this purpose.[584] It appears that Port Coquitlam has not.[585]

**OPPORTUNITY**

Establish a reserve fund in Port Coquitlam to use payments in lieu of off-street parking to provide alternative transportation infrastructure.

Beyond these specific statutorily-authorized reserve funds, municipalities may also establish reserve funds for any specified purpose.[586] These can include purposes related to LID. Both cities have created a range of special-purpose reserve funds that can, in principle, be used to support LID. Port Coquitlam's Environmental Reserve Fund, for example, may be used for environmental projects including "new or replacement environmental land improvements, studies, and other expenditures that are not part of regular operations."[587] Similarly, it has reserve funds to support drainage, sewer, parks and recreation infrastructure projects including "new or replacement infrastructure components, studies, major repairs and maintenance, and other expenditures that are not part of regular operations."[588] It also has reserve funds for community amenities,[589] capital projects[590] and operating expenses[591] that could be used to support LID.

Coquitlam also has a range of reserve funds for such purposes as community amenities, climate action, park- and transportation-related community benefits, non-DCC eligible parks amenities, and park, sewer and drainage infrastructure replacement.[592] It also has a reserve fund for public amenities and infrastructure financed by density bonus fees, which can support LID, as discussed in Parts 3.6 and 4.1.

**OPPORTUNITY**

Create, use, or increase the use of, special purpose reserve funds to support LID.

Determining whether the cities already use these special-purpose reserve funds to support LID is beyond the scope of this report. The important point for present purposes is that the cities could use many of them for this purpose, or create a new reserve fund specifically for research, development, implementation, maintenance or repair of LID best practices and infrastructure.

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Land Reserve Fund Establishment Bylaw, 1992 (24 August 1992).

583 *Local Government Act*, s 525; *Community Charter*, s 188(2)(d).

584 Coquitlam Reserve Fund Bylaw, s 2(c).

585 Port Coquitlam's Parking Reserve Bylaw is limited to providing downtown parking. City of Port Coquitlam, bylaw no 3686, Parking Reserve Fund Bylaw, 2009 (14 April 2009), s 2. Port Coquitlam's Parking Bylaw provides that payments in lieu of off-street parking must be used to provide off-street parking. PoCo Parking Bylaw, s 9.3.

586 *Community Charter*, s 188(1).

587 City of Port Coquitlam, bylaw no 3679, Environmental Reserve Fund Bylaw, 2009 (14 April 2009), s 2.

588 City of Port Coquitlam, bylaw no 3687, Parks and Recreation Infrastructure Reserve Fund Bylaw, 2009 (14 April 2009), s 2; City of Port Coquitlam, bylaw no 3689, Roads and Drainage Infrastructure Reserve Fund Bylaw, 2009 (14 April 2009), s 2; City of Port Coquitlam, bylaw no 3690, Sewer Infrastructure Reserve Fund Bylaw, 2009 (14 April 2009), s 2.

589 City of Port Coquitam, bylaw no 3682, Community Amenities Reserve Fund Bylaw, 2009 (14 April 2009).

590 City of Port Coquitam, bylaw no 3496, Capital Reserve Fund Bylaw, 2005 (25 April 2005).

591 City of Port Coquitam, bylaw no 3497, Operating Expense Reserve Fund Bylaw, 2005 (25 April 2005).

592 Coquitlam Reserve Fund Bylaw, Schedule A.

# Summary of Opportunities

## Regional Growth Strategy

**Both cities:**

- Advocate amendment of the RGS to eliminate "no significant impact" on urban containment or protection of rural, agricultural, conservation or recreation lands as a ground for exemption from the sewerage connection ban. (Part 2.1.2)
- Approach the process of updating the cities' regional context statements as a chance to showcase what the cities are doing to support LID and to amend their OCPs to put more emphasis on supporting LID. (Part 2.1.3)

## Official Community Plans

**Both cities:**

- Consider amending both cities' environmental DPA guidelines and relevant bylaws to allow studies relevant to LID to be conducted by qualified professionals with experience or training in low impact development, green infrastructure and/or integrated stormwater management. (Part 3.10)
- Amend both cities' OCPs to specify LID targets, indicators and commitments to monitor those indicators, which could include effective impervious area; volume of runoff infiltrated or reused; number of combined sewer overflows; amount of absorbent landscaping installed; total green roof area; total or per-unit surface parking area; extent of healthy or restored natural ecosystems; extent of urban tree canopy; and stream water quality and flow. Alternatively, these could be specified in IWMPs/ISMPs and OCPs could require implementation thereof. (Part 3.12)

**Coquitlam:**

- Extend explicit LID commitments like those contained in the Northeast Coquitlam sub-plans to all of Coquitlam and amend the SWCAP to confirm that neighbourhood plans should be developed after IWMPs. (Part 3.2.1)
- Amend the City Wide OCP (CWOCP) to commit to implement requirements for stormwater runoff quality and for clean stormwater infiltration where feasible, and to signal greater openness to innovative LID techniques. (Part 3.3.1)
- Revise the CWOCP to embrace an explicit avoid-mitigate-compensate hierarchy, emphasize the positive role of LID in the protection of watercourses, riparian areas and ESAs, and encourage specific LID tools (eg amenity density bonusing) for protecting and managing ESAs and watercourses. (Part 3.4.1)
- Eliminate any suggestion in the CWOCP and sub-plans that it is appropriate to fill existing natural ravines. (Part 3.4.1)
- Indicate explicitly in the CWOCP how municipal plans will accommodate growth within the UCB. (Part 3.6.1)
- Eliminate reference to development reserves from the CWOCP. (Part 3.6.1)
- Include more specific, LID-supportive criteria for density bonusing in the CWOCP and/or sub-plans. (Part 3.6.1)
- Make identification, protection and enhancement of a green infrastructure network a priority of the CWOCP alongside built infrastructure, and encourage innovative low impact approaches to built infrastructure. (Part 3.7.1)
- Link Coquitlam area plans' support for networks of interconnected green spaces more explicitly to LID benefits such as healthier natural ecosystems and movement of fish and wildlife. (Part 3.7.1)
- Extend the CWOCP's requirements for cut-and-fill minimization, topography-responsive site design and slope-adaptive architecture to all development on sloping terrain. (Part 3.8.1)
- Encourage all development in both cities to employ green building design principles and practices that emulate nature and promote LID. (Part 3.9.1)
- Designate a general environmental DPA that covers all ESAs, or even the entire city of Coquitlam, with DPA guidelines that embrace an "avoid-mitigate-compensate" hierarchy, a "net gain" or "no net loss" principle, and an elevated replacement ratio for unavoidable losses. (Part 3.10.1)
- Expand Coquitlam's watercourse DPA to cover all watercourses in the city and amend the corresponding DPA guidelines to require permanent fencing and signage of riparian setbacks, exclusion of setbacks from minimum lot size calculations, and encouragement of dedication of setbacks to the city. (Part 3.10.1)
- Reduce Coquitlam's DP application fees for developments that employ LID best practices

that substantially exceed requirements; collect refundable "peer review" fees that enable the city to retain independent LID experts if needed for DP applications; and amend the CWOCP to designate all environmental and natural hazard DPAs, and perhaps all IWMP/ISMP areas, as development approval information areas, to provide a stronger foundation for the development permit information requirements in s 5.4 of the Development Procedures Bylaw. (Part 3.10.1)

- Require MDPs in Coquitlam to specify factors such as total effective impermeable area, total tree cover or native vegetation, and LID techniques to be used. (Part 3.11.1)

**Port Coquitlam:**

- Make promotion and implementation (rather than just consideration) of LID a policy of the PocoPlan. (Part 3.2.2)
- Include in the PocoPlan commitments to adopt and implement a Stormwater Management Policy and Design Manual; treat stormwater as a resource and apply stormwater best management practices throughout the development process; encourage innovative low-impact stormwater management solutions; increase onsite stormwater infiltration and reuse; reduce impervious surfaces; encourage green roofs and green streets; reconsider minimum parking standards; enhance runoff water quality; maintain, restore or mimic natural hydrology; develop IWMPs to cover the whole area; ensure that stormwater management facilities conform to IWMPs where they exist or are planned; and ensure that DPA designations respond to watershed study results. (Part 3.3.2)
- Make the PocoPlan's avoid-mitigate-compensate hierarchy clearer; and include commitments to:
  - Limit human access to ESAs, steep ravines and sensitive riparian areas to maintain their ecological integrity, preserve their function as wildlife habitat and movement corridors and prevent human-wildlife conflict;
  - Design watercourse and riparian crossings to allow free passage of wildlife and protect watershed health;
  - Enhance ecological connectivity of ESAs, watercourses and green spaces;
  - Emphasize the connection between protecting ESAs and managing stormwater;
  - Integrate ESAs and natural drainage systems into urban design; and
  - Implement applicable IWMPs' recommendations for ESA and watercourse protection, rehabilitation and enhancement. (Part 3.4.2)
- Make protecting existing urban forest and expanding the urban tree canopy policies of the PocoPlan. (Part 3.5.2)
- Make implementation (rather than just consideration) of amenity density bonusing for developments that provide specified public LID amenities a PocoPlan policy, and specify criteria for such bonuses. (Part 3.6.2)
- Make identification, protection and enhancement of a green infrastructure network a PocoPlan priority, and encourage innovative low impact approaches to built infrastructure. (Part 3.7.2)
- Designate all floodplains in Port Coquitlam as a DPA and/or add a safety factor to the flood control level. (Part 3.8.2)
- Consider designating all ESAs in Port Coquitlam as a DPA to ensure that development in or affecting all ESAs is managed appropriately. (Part 3.10.2)
- Reduce Port Coquitlam's DP application fees for developments that employ LID best practices that substantially exceed requirements; collect refundable "peer review" fees that enable the city to retain independent LID experts if needed for DP applications; and amend the PocoPlan to designate all environmental and natural hazard DPAs, and perhaps all IWMP/ISMP areas, as development approval information areas. (Part 3.10.2)

## Zoning Bylaws

**Coquitlam:**

- Set limits on lot coverage and on effective or total impervious area in all zones. (Part 4.1.2)
- Make permeable pavement a permitted or preferred option for all off-street parking in Coquitlam in areas with infiltration potential. (Part 4.1.2)
- Offer reduced parking standards in Coquitlam on a more systematic, citywide basis to encourage LID. (Part 4.1.2)
- Amend Coquitlam's Zoning Bylaw to encourage landscaping and perimeter buffering around off-street parking that promotes stormwater infiltration; encourage curb cuts or swales around large parking lots to allow surface drainage to infiltration areas; and encourage use of trees,

gardens and permeable surfacing in common amenity areas. (Part 4.1.2)
- Examine rear setback reductions in Coquitlam's Zoning Bylaw for lots that border parks, open spaces or natural areas to ensure they do not hinder LID. (Part 4.1.2)
- Consider making LID amenities such as stormwater infiltration facilities, green infrastructure and creation or restoration of wetlands or watercourses eligible for density bonuses in Coquitlam, and consider adding them to the list of amenities the city may require to be supplied in kind in return for density bonuses. (Part 4.1.2)
- Relax Coquitlam's minimum dwelling unit sizes to encourage construction of "tiny homes." (Part 4.1.2)
- Consider phasing out floodplain development exceptions in Coquitlam that are in tension with restoration of natural floodplains. (Part 4.1.2)
- Consider revising Coquitlam's Slope Hazard Regulation to discuss whether and how LID stormwater management BMPs might support slope hazard management. (Part 4.1.2)

**Port Coquitlam:**
- Limit impervious area in all zones in Port Coquitlam; exempt water surfaces and small (0.09 m2) ungrouted pavers; limit effective rather than total impervious area; allow increases in total impervious area if effective imperviousness is maintained; encourage permeable surfacing designs that direct runoff onto landscaped areas; require permeable surfacing designs as part of a stormwater management plan; and/or limit the area devoted to surface parking. (Part 4.1.1)
- Limit lot coverage in all zones in Port Coquitlam, and consider lower limits. (Part 4.1.1)
- Relax Port Coquitlam's requirement for curbs around all parking areas to permit runoff to suitable permeable surfaces; and allow permeable pavement. (Part 4.1.1)
- Amend Port Coquitlam's Zoning Bylaw to specify setbacks from watercourses, water bodies, wetlands and ESAs, and prohibit the siting of buildings, structures or impervious surfaces within them. (Part 4.1.1)
- Consider offering density bonuses in Port Coquitlam for keeping lot coverage or effective impervious area substantially below standard limits. (Part 4.1.1)
- Amend Port Coquitlam's Zoning Bylaw to specify priority amenities for which density bonuses are offered, in order of importance, including LID-supportive amenities such as ESAs, natural areas, parks and green infrastructure; include land preserved or dedicated for such amenities in the lot area for purposes of calculating permitted density; allow density to be transferred from such amenity areas to the portion of a site that will be developed; increase amenity density bonuses with the portion of the lot area preserved or dedicated for such amenities; and exclude the portion of a lot covered by a watercourse or environmental protection DPA from the lot area for purposes of calculating permitted density. (Part 4.1.1)

## Subdivision and Development Servicing Bylaws

**Coquitlam:**
- Encourage attention to LID stormwater practices in the preliminary stormwater planning phase in Coquitlam. (Part 4.2.2)
- Consider updating Coquitlam's Stormwater Manual to reflect that riparian area fencing should be designed and built to facilitate maintenance works at key locations while also minimizing human disturbance and human-wildlife conflict. (Part 4.2.2)
- Encourage or require application of the Rainwater Management Source Control Guidelines throughout Coquitlam, not just in areas covered by IWMPs. (Part 4.2.2)
- Modify Coquitlam's Subdivision and Development Servicing Bylaw to allow curb cuts or curbless verges to accommodate surface drainage to infiltration areas; installation of LID stormwater BMPs in boulevards and medians; and permeable pavement of sidewalks and pathways. (Part 4.2.2)
- Modify Coquitlam's Subdivision and Development Servicing Bylaw to encourage or require planting of native vegetation in boulevards and medians, including species that are resilient to climate change. (Part 4.2.2)

**Port Coquitlam:**
- Require subdivision applications in Port Coquitlam to consider not just preservation but restoration or enhancement of natural drainage courses, not just to avoid drainage problems but to support natural hydrology or other LID goals. (Part 4.2.1)

- Mention LID stormwater techniques in the list of drainage infrastructure that subdivision applicants in Port Coquitlam may be required to provide. (Part 4.2.1)
- Extend cost-sharing in Port Coquitlam to all stormwater infrastructure that benefits other lands. (Part 4.2.1)
- Revise Port Coquitlam's design criteria and construction specifications to accommodate LID techniques; revise design flow calculation formulae to reflect current and anticipated changes due to climate change. (Part 4.2.1)
- Develop and implement a Stormwater Management Policy and Design Manual for Port Coquitlam that is made binding through the Subdivision Servicing Bylaw; and require that stormwater management facilities conform to IWMPs/ISMPs where they exist or are planned. (Part 4.2.1)

## Development Procedures Bylaws

**Coquitlam:**

- Add some small-scale developments that meet clear LID criteria, such as green roofs, to the list of permits delegated to city staff in Coquitlam. (Part 4.3.2)
- Apply Coquitlam's detailed information requirements for watercourse protection DPs to other DPs with substantial environmental or LID components. (Part 4.3.2)
- Require applicants in Coquitlam to (a) provide security for completion of LID-related conditions; (b) submit cost estimates for completing the work, prepared by qualified professionals with LID training or experience; and (c) post security equal to or more than the estimated cost as confirmed by the city. (Part 4.3.2)

**Port Coquitlam:**

- Add some additional small-scale developments that meet clear LID criteria to the list of permits delegated to Port Coquitlam city staff. (Part 4.3.1)
- Apply Port Coquitlam's detailed information requirements for watercourse protection DPs to other DPs with substantial environmental or LID components. (Part 4.3.1)
- Amend Port Coquitlam's Development Procedures Bylaw to specify clearly and unambiguously the purposes for which security may be required, including not just landscaping but also compliance with watercourse protection area management plans and completion of LID-relevant conditions of a permit or zoning change. (Part 4.3.1)

## Regulatory Bylaws

**Both cities:**

- Amend sewer and drainage bylaws to authorize, encourage or direct the city engineer to require LID stormwater best practices in the design, operation, maintenance, repair, improvement or extension of drainage systems. (Part 4.4.1)
- Consider including minimum tree cover standards in both cities' tree protection bylaws. (Part 4.4.3)
- Set the amount of security for soil deposit and removal in both cities to cover actual costs. (Part 4.4.4)

**Coquitlam:**

- Introduce enhanced protection for native tree species, wildlife trees and large trees into Coquitlam's tree protection bylaw. (Part 4.4.3)
- Remove or limit the 2 trees/year exemption in Coquitlam's tree protection bylaw. (Part 4.4.3)
- Base Coquitlam's tree replacement formula on the number of trees cut rather than retained (Part 4.4.3)
- Expand Coquitlam's soil deposit and removal bylaw to cover additional materials like chemical waste, petroleum products and construction/demolition waste. (Part 4.4.4)
- Introduce security deposits into Coquitlam's soil deposit and removal bylaw. (Part 4.4.4)
- Make ESC security deposits mandatory for larger developments in Coquitlam. (Part 4.4.5)
- Mention LID stormwater management BMPs as part of a "suitable disposal system" in Coquitlam's building bylaw. (Part 4.4.6)
- Amend Coquitlam's boulevard maintenance bylaw to restrict activities that impact boulevard infrastructure, grades or drainage, and to authorize removal of private improvements without compensation. (Part 4.4.7)
- Expand the list of invasive species that owners in Coquitlam must control or eradicate on their own property to include other high priority species that can be controlled at reasonable cost. (Part 4.4.8)

**Port Coquitlam:**

- Base Port Coquitlam's replacement tree security deposit on the cost of tree replacement and site restoration. (Part 4.4.3)
- Limit Port Coquitlam's low volume soil deposit and removal exemption to activities unlikely to affect watercourses or other ESAs. (Part 4.4.4)
- Consider incorporating detailed water quality indicators, ESC criteria and requirements into Port Coquitlam's Waterways Protection bylaw, so they apply throughout the city. (Part 4.4.5)
- Make property owners responsible for watering city-planted boulevard vegetation in Port Coquitlam. (Part 4.4.7)
- Amend or adopt a bylaw in Port Coquitlam to regulate invasive species explicitly. (Part 4.4.8)

## Financial Bylaws

**Both cities:**

- Reduce development-related fees and charges for developments that implement LID BMPs or otherwise contribute to LID. (Part 4.5.1)
- Amend Coquitlam's development cost charges (DCC) bylaw to make specific types of LID projects eligible for DCC reductions or waivers. (Part 4.5.2)
- Enact bylaws and conclude exemption agreements to exempt riparian land and/or land used for LID stormwater management from property taxes. (Part 4.5.3)
- Use, or increase the use of, DCC reserve funds to create LID facilities and green infrastructure to service developments. (Part 4.5.4)
- Use, or increase the use of, park land acquisition funds to acquire park lands that advance LID. (Part 4.5.4)
- Create, use, or increase the use of, special purpose reserve funds to support LID. (Part 4.5.4)

**Port Coquitlam:**

- Establish a reserve fund in Port Coquitlam to use payments in lieu of off-street parking to provide alternative transportation infrastructure. (Part 4.5.4)

Low Impact Development in the Coquitlam River Watershed
Barriers and Facilitators in Municipal Laws

Prepared by the Centre for Law and the Environment at the University of British Columbia for the Coquitlam River Watershed Roundtable

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