

SUSTAINABILITY SCHOLARS PROGRAM

Summer 2020

The UBC Sustainability Initiative (USI) is pleased to offer current UBC graduate students the opportunity to work on funded sustainability internship projects. Successful candidates work under the mentorship of a partner organization, and are immersed in real world learning where they can apply their research skills and contribute to advancing sustainability across the region.

- Visit the [Sustainability Scholars Program website](#) to learn [how the program works](#) and to [apply](#).
- Be sure to review the [application guide](#) to confirm your eligibility before applying.
- **Applications close at midnight on Sunday February 2, 2020.**

Research project title: Exploring Opportunities & Challenges Associated with Managing Rainwater from Private Properties on Public Lands

Research supports the following policies

- Greenest City Action Plan
 - 6. Clean Water – reduce the City’s potable water use, contributing towards the City of Vancouver’s target of reducing per capita water consumption by 33% from 2006 levels, minimize discharge of rainwater discharged from new and existing development thereby reducing inputs to sewers and combined sewer overflows.
 - 9. Green Economy – rainwater from private sites can potentially be diverted off-site and used as a source of supply for adjacent street trees and landscaping, with parks or shared more widely to nearby businesses and residents, providing an opportunity for a ‘waste’ stream from one site to become input stream to another.
 - 11. Walking the Talk – potential opportunity to use rainwater instead of potable water from the City’s service vehicle fleet of landscape watering trucks. City streets and plazas (the city’s Right-of-Way) can potentially be used to infiltrate rainwater where it lands, reducing inputs to the city’s sewer system.
- Healthy City Strategy
 - Environments to thrive in: Rainwater runoff from private sites can be directed to the city’s street trees and landscaping, enhancing the health of these natural systems. Trees help to reduce heat island effect, which improves human health during periods of extreme heat.
- Vancouver Citywide Integrate Rainwater Management Plan
 - Minimize discharge of ‘rainwater from new and existing development thereby reducing inputs to sewers and combined sewer overflows.

Problem Statement

As part of the recently adopted Rain City Strategy, the City of Vancouver is currently embarking on an ambitious approach that treats rainwater as a valuable resource and mimics the natural hydrologic cycle by capturing and treating rainwater where it lands using decentralized 'green' rainwater infrastructure (GRI), rainwater design standards, and targets that span both public lands and private lands across the city. Although the intent is for private lands to manage a large proportion of the rainwater falling on their site, this may not always be possible due to particular site characteristics. Other opportunities need to be considered, and one option is to manage rainwater from these private sites using GRI on adjacent public lands, typically within adjacent streets, laneways, boulevards, plazas and other spaces. Transferring rainwater from private lands to the public realm raises financial, equity, and legal issues such as what is the threshold (or policy trigger) for considering such transfer, who is responsible for the construction, operation, and maintenance of the GRI, how should responsibility and costs be apportioned between parties, and how should risk be managed to protect public and private assets from unintended consequences.

Purpose

The purpose of this project is to understand best practices most applicable to the City of Vancouver for managing rainwater in the public realm that has been received from lands in the private realm, and that addresses topics such as rainwater transfer consideration criteria, design standards/guidelines, operation and maintenance requirements, lifecycle costs, funding mechanisms for apportioning costs, and mechanisms to manage risk. Variations in approach to new development versus existing stock/retrofits, as well as to different uses and densities of private development should be considered.

Outline scope of project and why it is of value to City and describe how and when the scholar's work will be actionable

The City of Vancouver is currently embarking upon an ambitious approach that reimagines how we manage rainwater in the city now and over the coming three decades to 2050 through the City's recently adopted *Rain City Strategy*. The strategy calls for a paradigm shift in how we value and manage our water resources. At its core, the *Rain City Strategy* advocates for a transition towards a water sensitive city that strives for holistic and intergenerational water thinking and integrates land use planning, development, urban design and water management services to help communities and ecosystems thrive. These directions are embodied in Vancouver's 'One Water' approach to integrated water management.

As part of a 'One Water' approach to managing water in the city, the city is implementing rainwater management design standards and targets that span both public and private lands across the city. These standards and targets encourage managing rainfall where it lands – by using rainwater to water trees and landscaping, infiltrating rainwater into the ground, and/or re-using the rainwater for non-potable purposes like toilet flushing and irrigation. This suite of tools for managing rainwater is called Green Rainwater Infrastructure (GRI).



In some limited cases it may not be possible to manage all or a majority of the rainwater falling on a particular site using on-site GRI practices, and other opportunities may need to be considered. One such option is to manage rainwater from private sites on adjacent public lands, typically within adjacent streets, laneways, boulevards, plazas and other spaces.

Managing rainfall from private sites on public lands raises a number of questions and issues that need to be considered, however. For instance, what party(ies) are responsible for:

- Design and construction of GRI practices on public lands that manage rainwater from private lands?
- Operation and maintenance of GRI practices on public lands that manage rainwater from private lands?
- Lifecycle costs of GRI practices on public lands that manage rainwater from private lands, including: design, construction, operation and maintenance, rehab and replacement costs (and associated funding or other mechanisms to address the transfer of water from the private realm to the public realm)?
- Mitigating negative impacts and managing risks to public infrastructure at the street surface and below ground in the 'utility corridor' from accepting rainwater from private lands (and associated legal or other mechanisms to address these risks)?

The City of Vancouver requires assistance to research these issues and provide recommendations on how to take advantage of this opportunity to implement a 'One Water' approach in the city while ensuring that challenges and risks are properly considered and addressed.

Scope of Work:

To support the City evaluate and identify best practices to implement this new approach to managing rainwater, the scholar will be completing the following tasks as part of their project scope:

- Review City policies and speak with staff to gain an understanding of current rainwater management policies at the City of Vancouver, identifying opportunities, challenges and gaps.
- Develop topics to help guide your literature review, including: design standards /guidelines, operation and maintenance requirements, lifecycle costs, funding mechanism(s) for apportioning costs, mechanisms to manage risk, key implementation challenges, implementation solutions, etc. Consider any variations in how new developments versus existing stock/ retrofits were managed, as well as variations in approach to different uses/ densities of private development.
- Develop a means to assess the 'best' cities using criteria/factors such as similar climate, similar dense urban environment, available data, available case studies, and similarities (or differences) to the City of Vancouver.

- Undertake a literature review to identify cities in Canada and the US that have managed rainwater from private sites on public lands, with a focus on cities within our climate region (Lower Mainland and western Washington), if possible.
- Select three of the best cities from your literature review, based upon the developed criteria/factors. For each of the 'top 3' cities:
 - Summarize how they meet the criteria.
 - Summarize the context of each city (location, population, climate, why rainwater from private sites is being managed on public lands).
 - Review regulations and policies to gather information on how they implement and regulate managing rainwater from private sites on public lands.
 - Perform phone interviews with key staff from each of the cities selected (where applicable and possible).
 - Summarize the key facts/details on how each city implements and regulates managing rainwater from private sites on public lands, focusing on:
 - overarching objectives (i.e. why is the City accommodating this activity)
 - trigger mechanisms/criteria where managing rainwater from private sites on public lands would be considered,
 - design standards and guidelines,
 - operation & maintenance requirements,
 - how lifecycle costs are assessed (methodology) in the City,
 - mechanisms (funding, other) - how lifecycle costs are apportioned between the various parties (i.e., between the city and a developer and/or strata/management entity),
 - mechanisms (legal, other) to mitigate negative impact and manage risk to public infrastructure at the street interface,
 - overview of the key implementation challenges, and the solutions that overcame the challenges,
 - variations in approach to new development versus existing stock/retrofits,
 - variations in approach to different uses/ densities of private development.
 - Identify and compile case studies from each city showcasing successful and/or unsuccessful examples of projects that manage rainwater from private sites on public lands.
- Develop recommended approaches for the City of Vancouver based upon the research above.
- Prepare a summary report on your literature review (see details below in the 'Deliverables' section).

Deliverables

The Scholar will deliver a final report containing a summary of their completed work. The report must be completed in Microsoft Word and should be no more than 20 pages with any additional content included as appendices. The report will be complemented by a final presentation to key stakeholders. The report should include:



- Brief summary of current rainwater management policies in the City of Vancouver.
- Details and discussion regarding the top 3 cities selected for the literature review (on topics as outlined under Scope of Work above, particularly the summary of 'key facts and details').
- A summary table comparing and contrasting the key facts/details compiled for each of the top 3 cities and the City of Vancouver.
- Discussion on how each of the top 3 cities implemented and regulated management of rainwater from private sites on public lands, including the pros and cons of each city approach. Key implementation challenges, solutions to key challenges, funding mechanisms, and mechanisms to manage risk should be part of this discussion.
- Recommendations on approach(es) that the City of Vancouver should take to implement management of rainwater from private sites on public lands in the city.

Time Commitment

- This project will take **500** hours to complete.
- This project should be completed between April 29 to August 14, 2020
- The scholar is to complete hours between Monday-Friday, 8am-5pm, for approximately 30-35 hours per week.

Skill set/background required/preferred

From Standardized List:

- Excellent research and writing skills.
- Demonstrated interest in rainwater, water conservation and water efficiency, water re-use, green rainwater infrastructure
- Strong technical writing skills
- Familiarity with research methodologies and survey techniques
- Strong analytical skills
- Ability to work independently
- Demonstrated time management skills
- Deadline oriented
- Project management and organizational skills
- Understanding of green rainwater infrastructure, water quality, water conservation and water efficiency is preferred.
- Experience in literature reviews, regulatory and policy reviews, and case studies would be an asset.
- Proficiency in Microsoft Word and Excel is required.
- Particularly suitable for a student in the Civil Engineering Program or Planning Program, but recruitment should be open to other departments.

Additional Project Needs

- The scholar may accompany City staff to private sites and/or public lands with green rainwater infrastructure practices. Any necessary personal protection equipment will be provided by the Branch. If required for the particular site being visited the scholar should bring their own pair of steel-toed boots, but a loaner pair could be provided if needed.



Applications close **midnight Sunday February 2, 2020.**

Apply here: <http://sustain.ubc.ca/scholarsapply>

Contact Karen Taylor at sustainability.scholars@ubc.ca if you have questions

Useful Resources

Below are some links to useful resources to help you with your resume and cover letter (there are many more online). Some of these resources also provide information on preparing for your interview.

<https://students.ubc.ca/career/career-resources/resumes-cover-letters-curricula-vitae>

<https://www.grad.ubc.ca/current-students/graduate-pathways-success>

<https://www.grad.ubc.ca/cover-letter-cv-resume-templates-ubc-career-services>

The Centre for Student Involvement & Careers will host a resume & cover letter webinar tailored for graduate students on Tuesday, January 21, 2020 from 12:00-1:30. Registration will open approximately two weeks before the webinar, and can be accessed at Careers Online.

