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GREEN NETWORK PLANNING AT UBC

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Prepared for: Campus and Community Planning

LARC 444/ 553 Green Network Planning
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The University of British Columbia

Cover Photo: David McKenna, 2023,
Project 3, Green Network Planning, UBC.

We would like to acknowledge that the land on which we gather is the traditional, ancestral, and unceded territory of the xwməθkwəy̓əm (Musqueam) People.

SEEDS Sustainability Program

Executive Summary

This Report summarizes student projects from LARC444/553 Fall 2023 and is in collaboration with members of the SEEDS Sustainability Program, Campus and Community Planning Department and LARC 444/ 553 teaching team, Cynthia Girling and Keunhyun Park.

The course *Green Network Planning* introduces a comprehensive, landscape based approach to long-range planning of the greenspaces of cities to enhance both ecosystem and human purposes. Green Networks are an interconnected network of green patches and corridors incorporating parks, natural areas, remnant green spaces, streets and other vegetated spaces of the city. This course investigates a proactive, long-term planning approach enabling these green networks to be considered in conjunction with growth and development planning.

This report summarises the core concepts and inter-relationships between green networks, parks, urban forestry, green infrastructure and active mobility on campus. The campus and immediate surroundings were divided into 7 study areas *(see fig. 3)* and teams of students were assigned to one of the study areas. Through foundational policy context the students generated creative solutions to urban greenspace challenges. These findings can be summarised as:

- Enhancing the quality and ecological value of greenways
- Habitat protection, by enhancing the resilience of green space to climate change
- Improve water quality, by actively manage green and blue systems
- Increase connectivity and implement sustainable transportation modes by creating buffered bike lanes
- Help increase Musqueam presence on campus
- Increase native plantings to uphold and resstore ecosystems
- reinforce habitat connectivity by facilitating the movement of pollinators between fragmented areas.
- Increase accessible, safe and well lit streets.
- Increase educational nodes for students and public

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Fig. 2: UBC Campus Boundary

Course Objectives

Urban greenery, in all its forms, provides vital ecosystem services and enhances the aesthetic quality and sense of place in communities and landscapes. This course introduces students to the literature, theories, and principles of green network planning. It covers the history and governance of greenspace, approaches to systemic planning, methods of analysis and measurement, functions of green networks, and design considerations for both city and neighborhood scales. Additionally, the course emphasizes the significant aesthetic and health benefits that vegetation and green spaces bring to urban environments. Through class projects, students analyzed and measured the spatial distribution of greenspaces and proposed future improvements. The instructors, along with guest lecturers, enriched the learning experience by presenting examples of green network planning at regional, citywide, neighborhood, and site-specific levels.

Problems To Be Addressed

The analysis derived from the class projects provided a comprehensive understanding and evaluation of various aspects of the green networks within the study area. This included an in-depth look at their extent, diversity, quality, distribution, and connectivity. Through this detailed examination, the class was able to identify the principal issues that the campus needed to address. These primary problems are:

- Network connectivity
- Sensitive habitat areas
- Uneven distribution of green spaces
- Low quality of green spaces (eg. ecosystem services, fragmentation, brownfields)
- Poor rainwater management
- Unprotected bike lanes
- Low canopy cover
- Lack of attention on planning values of the host nations

Fig. 3: 100 hectare border for each site

Project 2 Introduction

ENVISIONING EQUITABLE, HEALTHY, RESILIENT GREEN NETWORKS

The following section presents future proposals for enhancing the green networks at UBC. The campus and its immediate surroundings were divided into seven study areas (see Fig. 3).

Each project situates its proposals within the relevant UBC planning and policy context, identifying at least three goals, objectives, or targets that the proposals support and aim to achieve.

The diagrams illustrates the students' ideas, showcasing their sitewide proposals on the map of the study area along with action-oriented statements.

Each project

- Introduces the team and study areas
- Summarises the diagnosis of the study area using the most important maps and metrics.
- States the main goals and strategies of their propositions (using images, maps, and diagrams if needed). Describes how the propositions addresses relevant policy/planning goals and targets.
- Explains the propositions for improving their study area. Using maps, metrics, and/or precedent images.
- Using examples of accessibility, connectivity, diversity, environmental performance, programming (cultural activities, community engagement), action items (implementation and management)

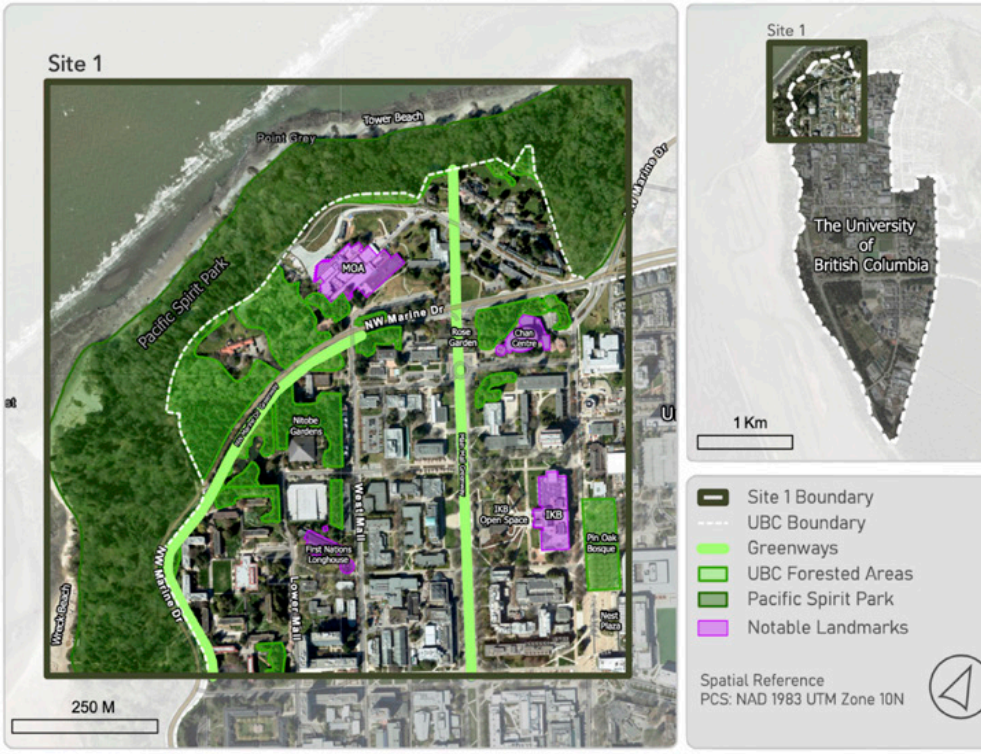
Site 1

Tyler Blackwell, Madeline Martin, Shane Hunt, & Mark Fillo

STUDY AREA

Site 1 encompasses a 1 hectare area at the NW corner of the University of British Columbia, Vancouver, BC. A range of greenspace landmarks are located within this area, such as:

- The UBC Rose Garden
- Nitobe Gardens
- Pin Oak Bosque
- First Tree Plaza
- Pacific Spirit Park

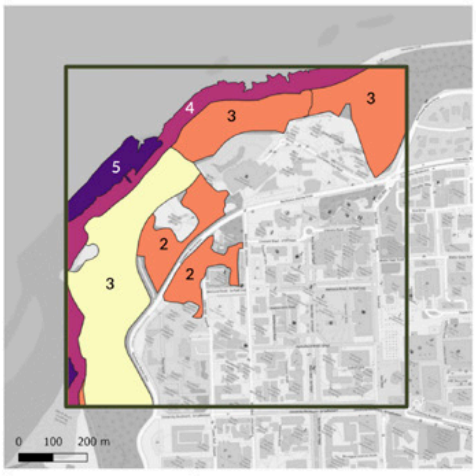


DIAGNOSIS

Networks

- Total network length is **16.7 km**.
- Total active transport length is **11.1 km** (66% of network).

Sensitive Habitat



- Total habitat area of **38.1 ha**.
- Ranked 1 (worst) to 5 (best).
- Lack of **ecological connectivity**.

Greenspaces

- Total area of greenspace is **46 ha**.
- **Pacific Spirit Park** is the greatest contributor, but unaccessible.

POLICY CONTEXT - CAMPUS VISION 2050

Big Ideas

- Restorative & Resilient Landscapes
- Connected Campus
- Climate Mitigation and Adaptation

Design Goals

- Ecological Improvements
- Network Improvements
- Access Improvements

POLICY CONTEXT - LAND USE PLAN

4.4.1 - Open Space

- **4.4.1.1** Increase Musqueam presence in landscape
- **4.4.1.4** Increase Greenways to promote accessibility and biodiversity

4.5 Mobility and Accessibility

- **4.5.2.1** Provide a safe network that facilitates active transportation for a range of device types
- **4.5.2.**Prioritize safety and comfort of vulnerable road users

Site Proposals

- Planting of culturally important species for Musqueam
- Adding Musqueam monuments
- Creating high biodiversity Greenways
- Enhancing the ecological value of existing greenways
- Incorporate AAA bikeways into the greenway network

POLICY CONTEXT - LAND USE PLAN

4.4.3 - Biodiversity and Ecology

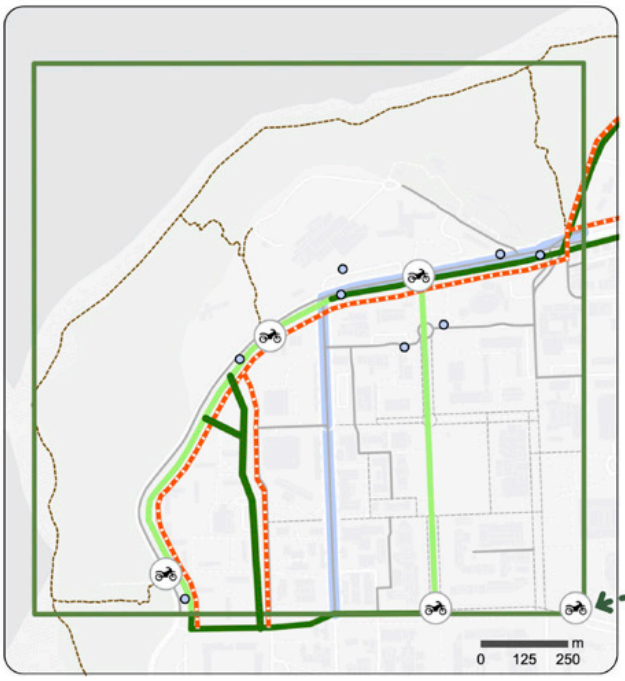
- **4.4.3.1** Identify, Enhance, and Manage Important Areas of Biodiversity
- **4.4.3.2** Extend Surrounding Forest Into Campus to Support Species Movement
- **4.4.3.3** Enhance Species Diversity & Manage Ecosystem Structure
- **4.4.3.5** Link Greenspaces on Campus to Enhance Ecological Connectivity

Site Proposals

- Enhance Existing Greenways (Structurally + Ecologically)
- Educational Tree Walk Through Pacific Spirit Park
- Wildlife Crossings

Design Recommendations

NETWORKS

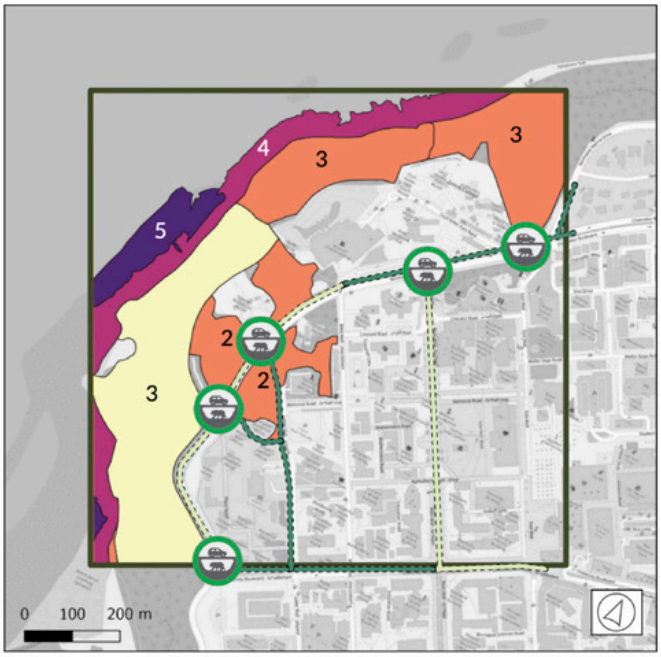


Existing Bus Stop
Bus Route
Greenway
Extension
Road
Paths
Trails
AAA Bikeway
eBike Share
Site 1 Boundary

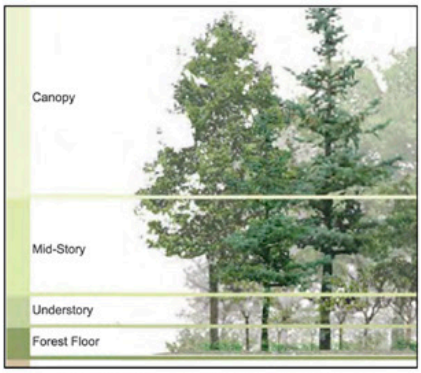
Spatial Reference
PCS: NAD 1983 UTM Zone 10N

1. Connect greenspace by expanding greenway: 1.8km
2. Implement 1.9km of AAA Bikeways
3. Introduce e-Bike share program
4. AT increased from 11 km to 14.7 km (72%) total transportation network

SENSITIVE HABITATS

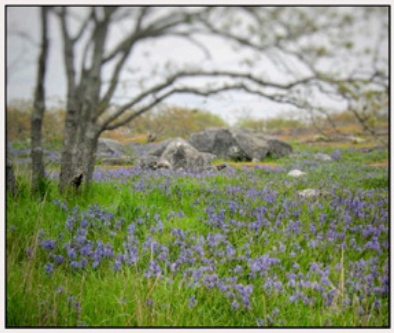


1 Implement five wildlife crossings



2 Increase ecological value of greenways by adding vertical structure

GREENSPACES



1 Transform Main Mall into a Garry Oak Meadow with continuous flowering

Monument
Greenway
Greenway (Expansion)
Canopy Walk (New)
Campus
Quasi Public
Natural Parks
Site 1 Boundary
UBC Boundary

2 Implement six Musqueam monuments

3 Implement educational tree canopy walk

Site 2

Ruixi Chen, Angellet Soh, Bernadette Uy, Ashley Zhu

LARC 444
Project 2 Site 2

Presented By :
Ruixi Chen, Angellet Soh, Bernadette Uy, Ashley Zhu

DOWNTOWN UBC

Envisioning Equitable, Healthy, Resilient Green Networks

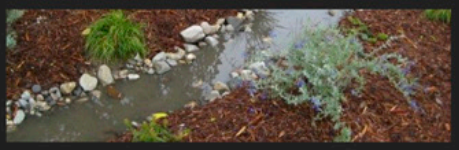
RECAP

Mostly single family residential

Extensive cycling, pedestrian, and transit network but safety and quality could be improved

15.76 ha of greenspace
Uneven distribution of greenspace

PROPOSALS AND POLICIES

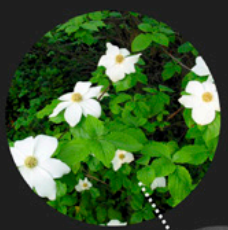
Climate Resilient Urban Forest	CV 2050	"Introduce abundant **indigenous** plants " (p. 76) "System of landscape corridors to support **ecological connectivity** and **biodiversity**, and enhance lower-value ecological areas" (p. 81)	
Rainwater Management	CV 2050 UEL	"use of green infrastructure... to enhance **water quality**, project against flossing, and reduce disruption at outflows" (p.102) "**groundwater recharging** or retention... limiting the amount of impervious surfaces"	
Connectivity & Accessibility	CV 2050 LUP	"Design streets and intersections to prioritize the **safety and comfort** of **vulnerable road users**, manage congestion and maintain access" (p.89) "...dignified, welcoming and effective for people of **all ages, abilities and backgrounds** "sustainable modes of transportation" "walking/rolling, cycling/microbility, public transit and accessibility vehicles"	

Proposition 1

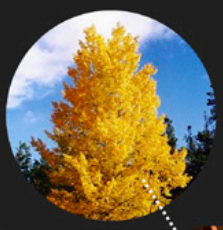
CLIMATE RESILIENT URBAN FOREST

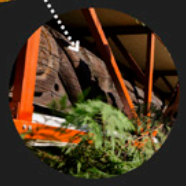
PROPOSED SPECIES

Cornus nutalli



Populus trembuloides





21%

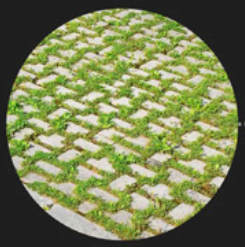
Dying or Poor Urban Trees

"Introduce abundant indigenous plants", "landscape corridors to support ecological connectivity and biodiversity, and enhance lower-value ecological areas" - Campus Vision 2050

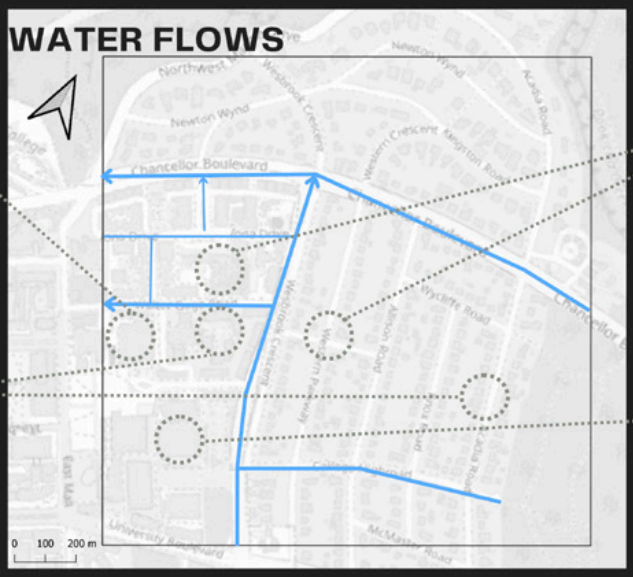
Proposition 2

RAINWATER MANAGEMENT

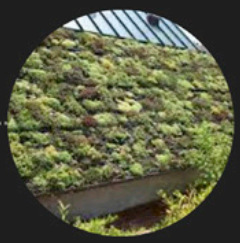
Bioswales



Permeable pavers for parking



Detention ponds



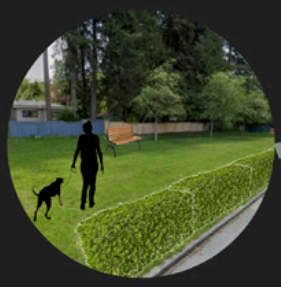
Green roofs

"use of green infrastructure... to enhance water quality, project against flossing, and reduce disruption at outflows" (p.102) - Campus Vision 2050

"groundwater recharging or retention... limiting the amount of impervious surfaces" - UEL

Proposition 3

CONNECTING GREENSPACES



Linear park/ Community park

Western Parkway
Add hedges and benches to enhance users' experience

Pollinator meadow

Along Acadia Rd. & Chancellor Blvd.
Adds colour and wildlife diversity

Community Garden

College Highway
Address community cohesion, food security, and education

"System of landscape corridors to support ecological connectivity and biodiversity, and enhance lower-value ecological areas" (p. 81) - Campus Vision 2050

Proposition 4

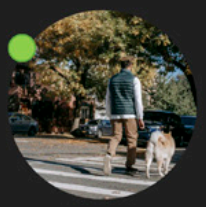
NETWORKS

Current

unfriendly bike lanes — AAA

Proposed

AAA lanes
Replace less friendly sections of cycling network with AAA lanes

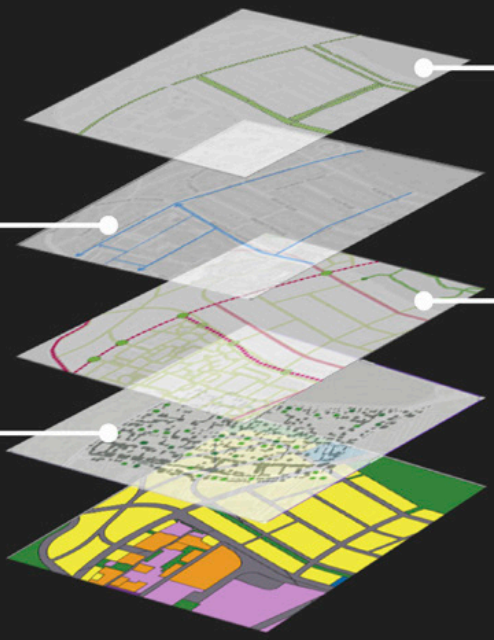


Crossings
Increase accessibility to nearby nature by increasing crossing opportunities for pedestrians and other active transportation

"Design streets and intersections to prioritize the safety and comfort of vulnerable road users, manage congestion and maintain access" -- CV 2050

"...dignified, welcoming and effective for people of all ages, abilities and backgrounds", "prioritize walking/rolling, cycling/microbility, public transit and accessibility vehicles" -- LUP

PROPOSITION SUMMARY



Proposition 3: Connecting greenspaces
Linear parks, community gardens, and pollinator meadows.
+ 4.9 ha (3%) *greenspace areas*

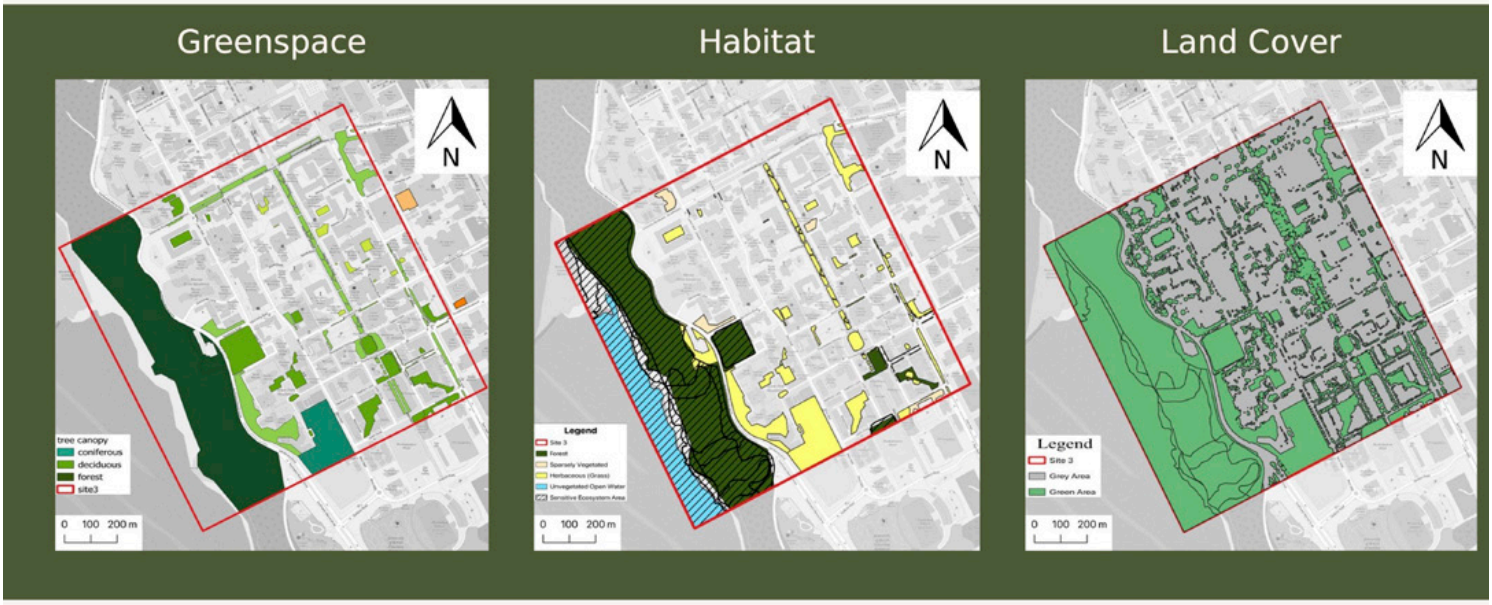
Proposition 2: Rainwater Management
Use of green infrastructure such as bioswales, green roofs, detention ponds, and permeable pavement

Proposition 4: Networks
AAA bike lanes in place of unfriendly bike lanes
Increase pedestrian crossings

Proposition 1: Climate resilient urban forest
Consider trees with indigenous uses to replace trees in poor condition
+ 10% *trees in fair or good condition*

Site 3

Samantha Huang, Larry Liu, Jiahao Lyu, Anson Pao



01 Fragmentation & Lack of Connectivity

The significant fragmentation of green spaces, characterized by the absence of green corridors or linkages, leads to reduced habitat connectivity and restricts wildlife movement. For instance, the connectivity of tree canopies and obstruction by buildings greatly influence bird diversity.

02 Edge Effects

Although UBC has constructed many greenways in campus. There are still a lot of greenspaces isolated and interspersed between the human infrasturctures. Edge effects are intensified in these areas, with an increase of human disturbance and environmental challenge.

03 Grey Area/Hardscape Issues

Grey area and hardscape absorbs more heat than natural area & landscape. Which is a source of urban heat. Moreover, Grey area and hardscape interfere tree growth as well as city runoff management.

PROPOSAL

Enhance Biodiversity on Campus

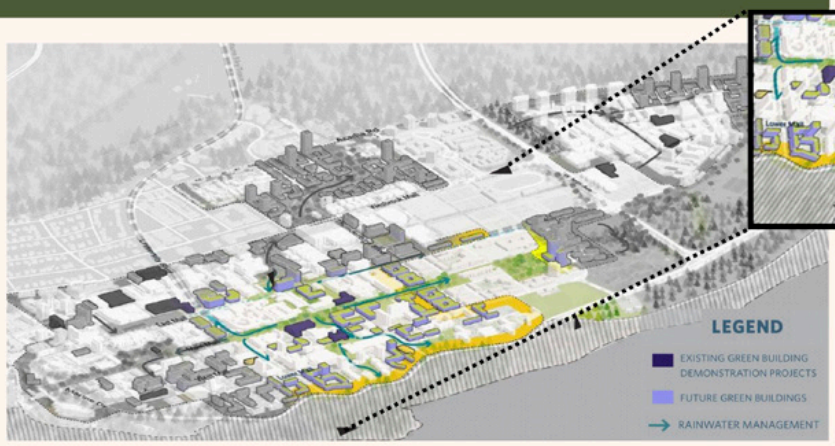
Improve Accessibility and Connectivity through Green Corridors

Promote Green and Blue Water Management Infrastructures

Goal 1

Proposal:
Enhance Biodiversity: Increase the area's diversity of flora and fauna through expanded greenspaces and wildlife habitats

Idea [I]: Utilizing the existing green building plan to increase the abundance of green roofs in UBC



Policy:

Maintain and enhance urban biodiversity as a tool for climate action through nature-based solutions, such as increased tree canopy and green roofs to reduce the impacts of increased and extreme heat

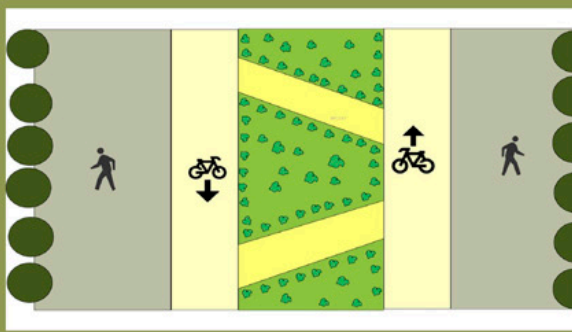
-Campus Vision 205

Goal 2

Proposal:
Improve Accessibility and Connectivity: Ensure that green spaces are easily accessible to the public and interconnected through green corridors, facilitating movement for humans and wildlife.

Idea [II]: Modify Main Mall into a multi-users and urban biodiversity friendly road that is easily accessible and interconnected within the UBC campus

Legend
- Oak Trees
- Newly planted Shrubs
- Bi-directional bikeways



https://streetmix.net/-/2369533

Policy:
4.5.5.2 Redesign and redevelop streets according to the function and priority of the street, downsizing and re-orientating streets for non-vehicular traffic and intersections to meet local and ecological functions.

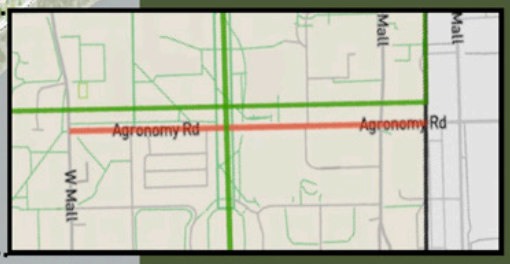
-UBC Land

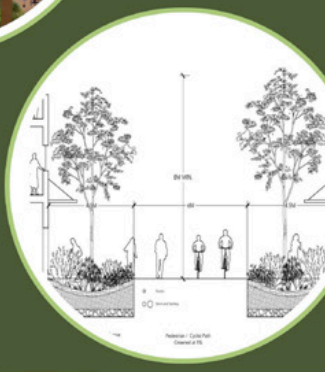
Goal 2

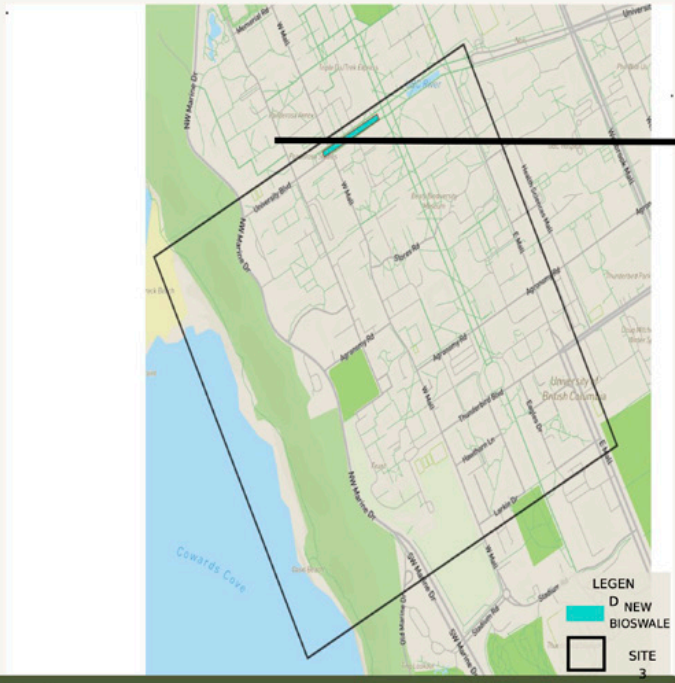
Proposal:
Improve Accessibility and Connectivity: Ensure that green spaces are easily accessible to the public and interconnected through green corridors, facilitating movement for humans and wildlife

Idea [I]: Transform Agronomy Road into a secondary green corridor that includes more trees, a wider road, and a safer pathway for cyclists and pedestrians

Policy:
4.4.3.5 Link green spaces on campus with each other an the wider peninsula network to enhance ecological connectivity and encourage use of active and sustainabl modes of transportation.
-UBC Lan
Use Plan 202





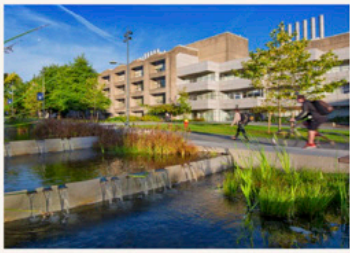


Policy:
Implementing nature-based solutions for rainwater management that address green space and climate adaptation needs
-Campus Vision 2050

Goal 3

Proposal:
Promote Sustainable Water Management: Green and Blue infrastructure

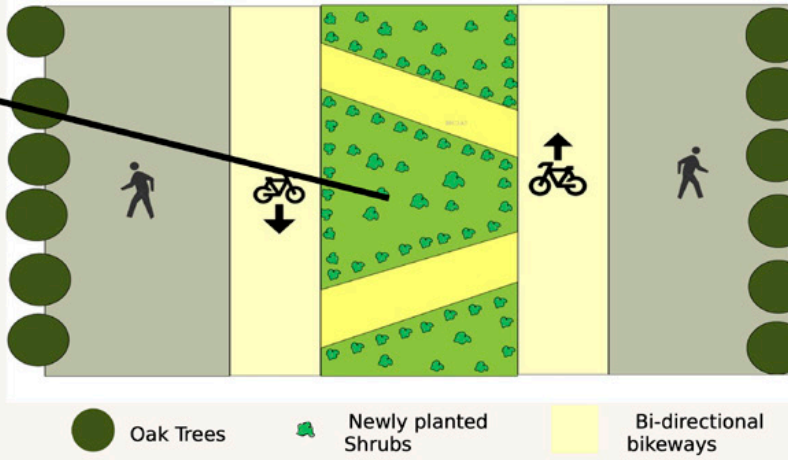
Idea [I]: Implementing the same bioswale system, build a ne bioswale on the South-West of University Blvd, on the left of Martha Piper Plaza



Goal 3

Proposal:
Promote Sustainable Water Management: Green and Blue infrastructure

Idea [II]: Enhancing the ecosystem services provided by the green lawns along the Main Mall, redesign the lawn as raingarden with more shrubs and other vegetation.



Policy:
Implementing nature-based solutions for rainwater management that address green space and climate adaptation needs

-Campus Vision 2050

Proposed Site

CONNECTIVITY:

Existing Green Corridor: 800 m
Proposed Green Corridor: 1300 m

BIODIVERSITY:

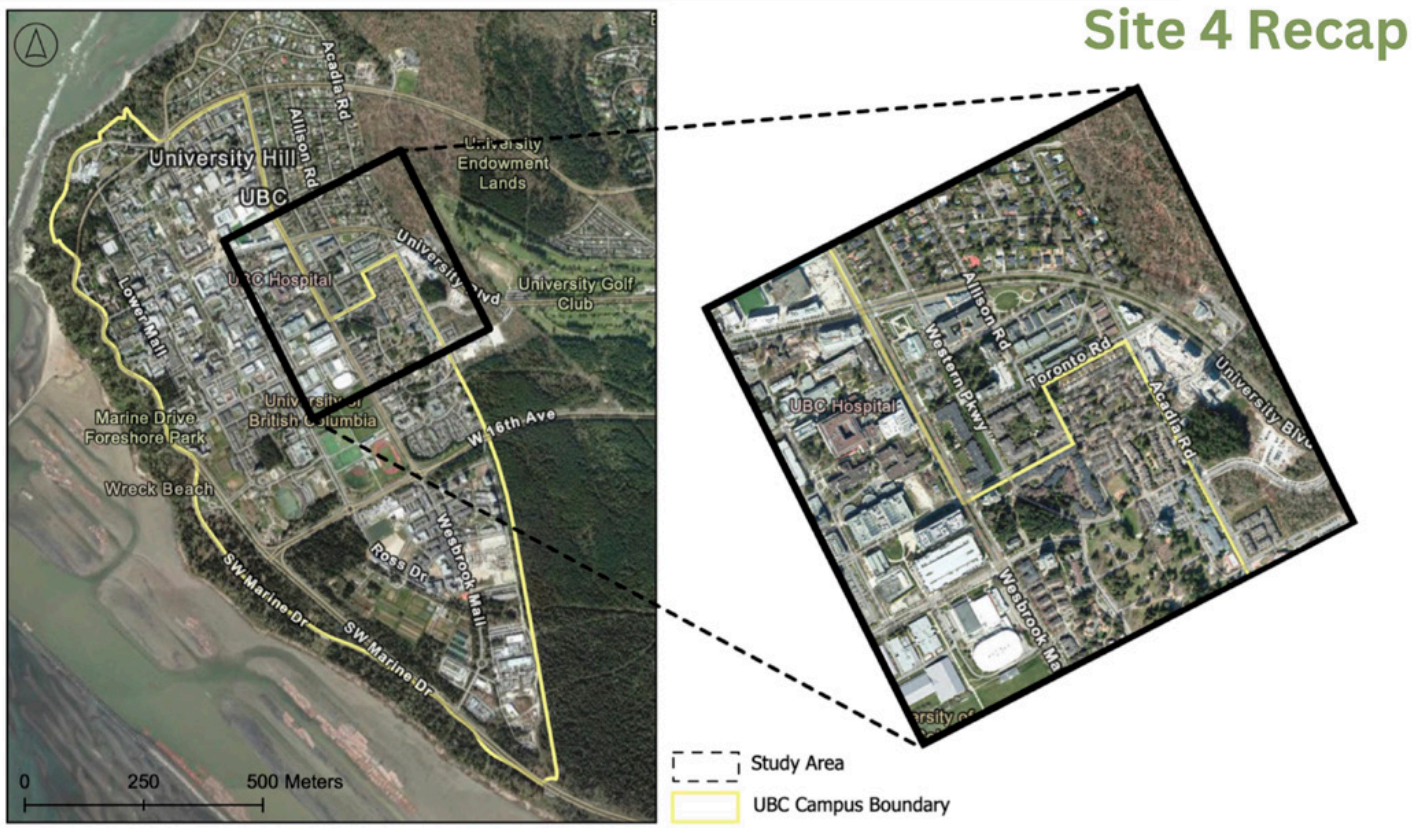
Existing Green area: 39%
Proposed Green area: 45%

HABITAT AREA:

Existing Habitat area: 53%
Proposed Habitat area: 63%

Site 4

Megan Elkin, Molly Kim, Rebecca Li, Charise Pelan-Maclean



Site 4 Recap

Land Use

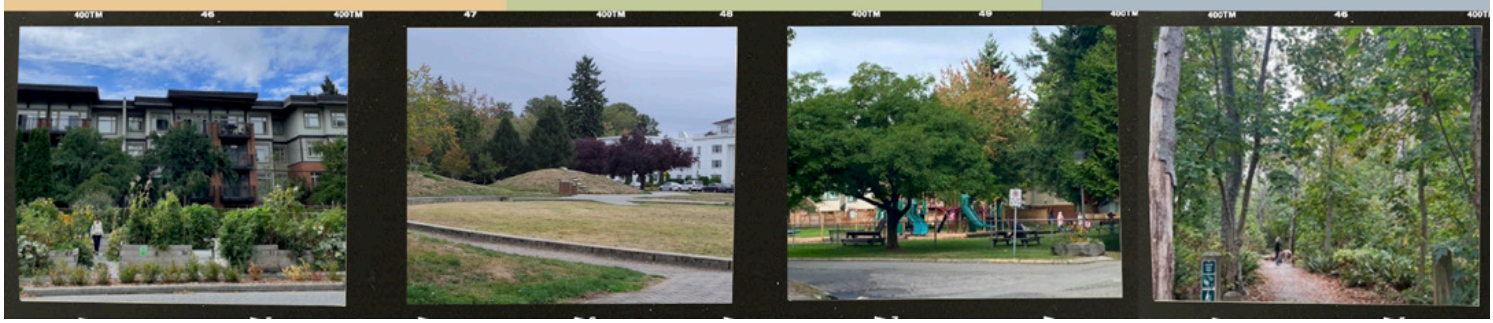
- **Residential 27.8%**
- **Greenspace 22%**

Greenspace

- **17.9%** Sensitive Forest Ecosystem Area
- **49.8%** Canopy Cover

Networks

- **4.8km** Bus Routes
- **7.5km** Bike Lanes
- **1.5km** Protected Bike Lar
- **1km** Greenway



Big Picture Changes

Connectivity Connect greenspaces together

Biodiversity Restore native habitat

Inclusivity Create greenspaces spaces for all

Policies

Campus Vision 2050

Connectivity

Use landscape corridors to extend forests into the campus to support ecological connectivity.

Biodiversity

Increase native and pollinator planting in low ecological value parks and greenways.

Van Play 2020

Inclusivity

Enhance existing facilities with amenities which appeal to a wide range of recreational interests.

Project Goals

1. Restorative and resilient landscapes
2. Inclusive parks and recreation spaces

Connectivity Goals

Over **50%** of site green spaces connected with a greenway

Introduction of **3.2km** of new bike lanes

Support ecological activity from the **Forest** Ecosystem

Connectivity

Proposals:

- Connect Greenspaces and Sensitive Ecosystem areas with Greenway
- New Bike Lane Infrastructure
- Increased Protected Bike Lanes on busy streets

Biodiversity Goals

Size:
+3% Sensitive Ecosystem Area with use of current Green Space

+5% Green Space with connecting green corridor

Condition:
Diversify Habitat Types
- Grassland
- Wetland

Connect Fragments

Landscape Context:
1. Pollinator Species
2. Native Species
3. Habitat Species

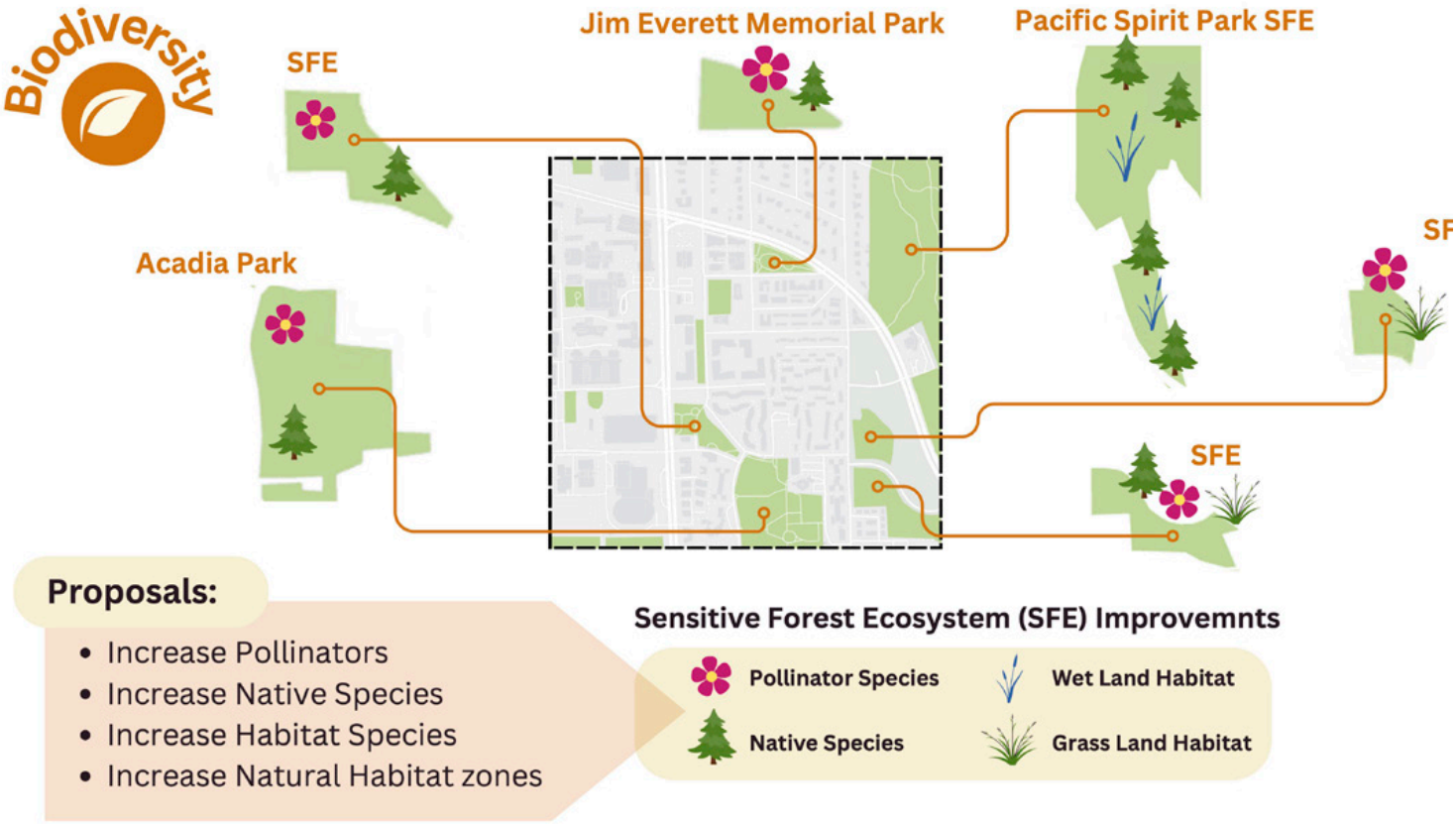
Overall Increased Quality of Sensitive Ecosystem Areas

Enhance Biodiversity

The Metro Vancouver Sensitive Ecosystem Inventory determines the quality of the sensitive ecosystem areas based on **condition**, **landscape context** and **size**.

Diversifying the canopy can:
- Provide Climate Change resilience
- Create different habitats
- Protect from disease and insect attack
- Promote Ecosystem Services

Current Site Conditions


Biodiversity
SFE
Jim Everett Memorial Park
Pacific Spirit Park SFE
Acadia Park
SF
SFE
Proposals:
Increase Pollinators
Increase Native Species
Increase Habitat Species
Increase Natural Habitat zones
Sensitive Forest Ecosystem (SFE) Improvemnts
Pollinator Species
Wet Land Habitat
Native Species
Grass Land Habitat


Inclusivity
Proposals:
Jim Everett Memorial Park
Playground
Signage
Exercise Equipment
Benches
Trail Through Park
Acadia Park

New Green Network

Connectivity

Added green connections:

- Create a diagonal greenway
- New AAA bike lanes
- Connect sensitive ecosystems areas

Transit Stops
Painted Bike Lanes
Protected Bike Lanes
Sensitive Ecosystem Area
Greenspace
New Green Network

Inclusivity

Added Inclusive Amenities:

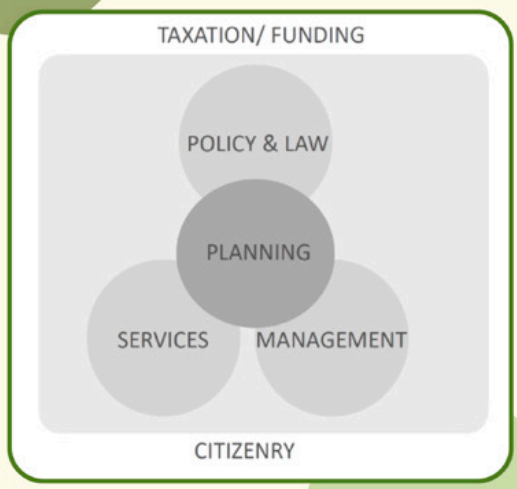
- Playground
- Benches
- Trails
- Bike paths (AAA)
- Exercise equipment

Biodiversity

Increased percentage of:

- Pollinator species
- Native species
- Habitat species
- Overall Canopy Coverag
- Overall Habitat Quality

Potential Challenges



- **Land Ownership and Management**
  - UBC
  - City of Vancouver
  - UEL
- **Coordination**
  - UBC Board of Governors
- **Funding**

Site 5

Alex Mok | Bridget Bi | Lucas Wang

DIAGNOSIS


TRANSPORTATION


URBAN FOREST

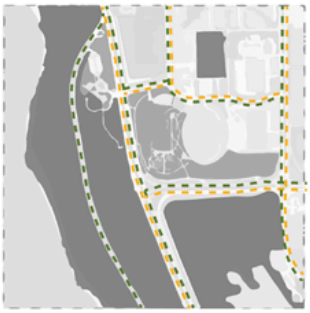

GREENSPACE


HAIBTAT


HYDROLOGY

- **FRAGMENTED** FOREST CANOPY, GREENWAY AND STORMWATER SYSTEM
- **RESTRICTED ACCESS** TO QUASI-PUBLIC GREENSPACE (I.E. BOTANICAL GARDEN, FARM & ARENA)
- **UNPROTECTED** BIKE LANES
- TWO **UNTREATED** BROWNFIELDS
- MONOCULTURE AND **LIMITED PRESENCE** OF POLLINATOR-FRIENDLY, MULTI-LAYERED NATIVE HABITATS
- INVASIVE SPECIES
- **LACK OF ATTENTION** ON PLANNING VALUES OF THE HOST NATIONS

POLICY CONTEXT AND PROPOSITIONS


1 ENHANCED BIODIVERSITY


2 INCLUSIVE GREEN TRANSPORT


3 INTERCONNECTED RAINWATER MANAGEMENT

CAMPUS VISION 2050

Guiding Principles: "Take Bold Action to Address Climate Change and Enhance Campus Ecology"

Engagement Theme: "[...] Growth and the p**reservation of green space and biodiversity...**Protect campus green space and consider the capacity of the campus to grow"

Strategies for **Enhancing Ecology and Biodiversity** on Campus, p. 81

UBC LAND USE PLAN

SECTION 4.4.3: Biodiversity and Ecology

CAMPUS VISION 2050

Stadium Neighborhood (p.63): "Knit together new and existing areas near the academic core and a future south campus **rapid transit station**...**active street level uses** will support social exchange and community building."

Landscape Corridors (p.82): "Primary landscape corridors will provide major opportunities for ecological connectivity, rainwater management and **movement of wildlife and people.** Secondary corridors will **connect and revitalize smaller green and open spaces** within the campus core."

UBC LAND USE PLAN

4.5.2. Active Transportation (p.28) " Deliver protected cycling facilities suitable for people of all ages and abilities on major active transportation corridors..."

RAIN CITY STRATEGY

P&B-6 Create a Green Network that will Connect our Parks, Waterfront and Recreation Areas: "Utilize pilot and demonstration green network projects to determine how to best integrate **green rainwater infrastructure**"

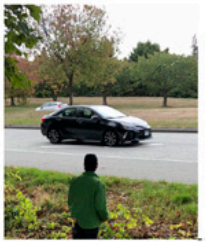
"Indigenous knowledge, values and expertise **around water**, land, and natural systems stewardship, environmental protection, food harvesting and intergenerational relationships better influence the planning, design, construction, operation and maintenance of GRI implementation."

CAMPUS VISION 2050

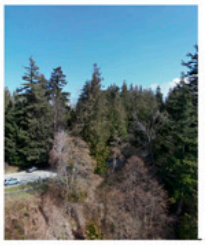
Key Strategy: "Implementing nature-based solutions for **rainwater management** that address green space..."

1 ENHANCED BIODIVERSITY
EXISTING CONDITIONS

UBC BOTANICAL GARDENS
MANY DIVERSE HABITAT TYPES, BUT LIMITED ACCESS DUE TO COST AND HOURS



MAJOR ROADS
GREEN MEDIANS, BUT LIMITED ECOLOGICAL VALUE DUE TO SPECIES HOMOGENEITY. NOISE POLLUTION FROM CARS, LIGHT POLLUTION FROM STREETLIGHTS



PACIFIC SPIRIT PARK
HIGH HABITAT VALUE AND DECENTLY PHYSICALLY ACCESSIBLE, BUT NOT TECHNICALLY PART OF CAMPUS, JOINT ADMINISTRATION DIFFICULT

RHODODENDRON WOOD
NATURAL WOODED HABITAT, BUT AGE-HOMOGENEOUS AND SPARSELY UNDERSTORIED

UBC FARM FOREST
NATURAL WOODED HABITAT, SECOND-GROWTH FOREST, BUT CURRENTLY NOT ACTIVELY MANAGED

1 ENHANCED BIODIVERSITY

INCREASE ACCESS TO BOTANICAL GARDENS: LOWER COSTS AND EXTEND HOURS

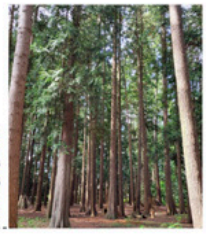
HARM-MITIGATING LIGHTING SYSTEMS

NATIVE MEDIAN PLANTINGS

SOUND DAMPENING MEASURES

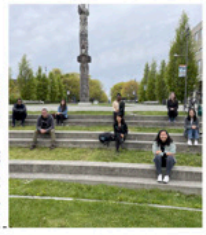
- **REWILD** NON-ESSENTIAL LAWN-GRASS SPACES
- TRANSITION PLANTINGS AWAY FROM NON-NATIVES, CULTIVARS, AND NATIVARS, AND TOWARDS **DIVERSE PLANTINGS**
- DIVERSIFY FLORA IN ROADWAY GREEN MEDIANS, TO ACT AS **NATURAL CORRIDORS** FOR WILDLIFE
- **MITIGATE NOISE POLLUTION** BY UTILIZING PLANTS WITH A VARIETY OF LEAF MORPHOLOGIES TO DIFFUSE AS MUCH TRAFFIC NOISE AS POSSIBLE AND INTEGRATING SOUND DIFFRACTORS AND WALLS
- **MITIGATE LIGHT POLLUTION** BY MODIFYING LIGHTING SYSTEMS TO USE LESS DISRUPTIVE LIGHT COLOURS AND DURATIONS

INITIATE PROGRAMS ENCOURAGING PRIVATE OWNERS TO ENGAGE IN GREENING SPACES



SURVEY AND MANAGE FORESTS WITHIN SITE

REMOVE INVASIVES, ENHANCE PLANT DIVERSITY



2 INCLUSIVE GREEN TRANSPORT
EXISTING CONDITIONS

UNBUFFERED BIKING LANE
ALONG ARTERIAL DRIVEWAYS

RESTRICTED ACCESS OF QUASI-PUBLIC GREENSPACE: BOTANICAL GARDEN, FARM AND ARENA

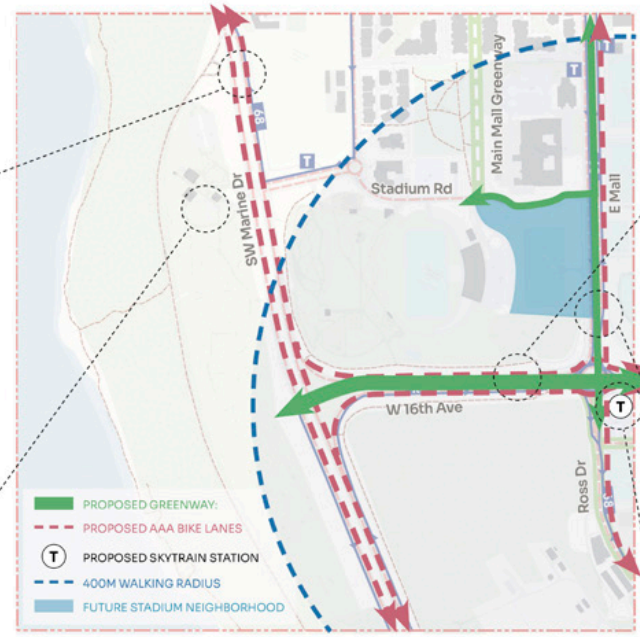
DISCONNECTED GREENWAY SYSTEM
BETWEEN MAIN MALL GREENWAY AND ROSS DRIVE

2 INCLUSIVE GREEN TRANSPORT

UPGRADE TO AAA BIKE LANES BY CREATING BARRIER/RAISED PROTECTION

IMPROVE CAMPUS SHUTTLE SCHEDULES AND PROVIDE SPECIAL BUS SERVICES TO MAJOR ATTRACTIONS DURING SOCIAL EVENTS

- **EXISTING GREENWAY:** 0.8KM
- **PROPOSED GREENWAY:** 1.26KM
- **EXISTING BIKE LANES:** 4.24KM
- **PROPOSED AAA BIKE LANES:** 2.47KM
- **AREA COVERED BY 400M WALKING RADIUS:** 0.4KM²



W 16TH AVE: REGIONAL GREENWAY TO LINK BOTH SIDES OF PACIFIC SPIRIT PARK (REGIONAL GREENWAYS 2050)

E MALL AND STADIUM ROAD:
NEIGHBORHOOD GREENWAY

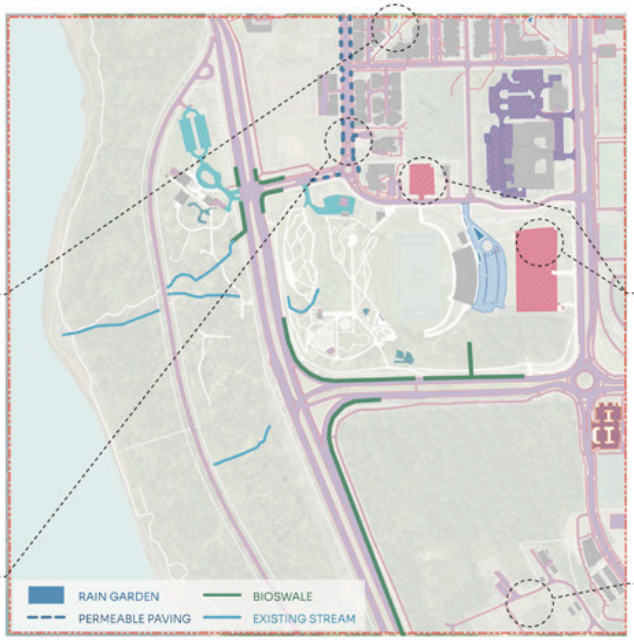
IMPROVE BIKE INFRASTRUCTURE (E.G. BIKE RACKS, PARKING & BIKE REPAIR STATIONS)

3 INTERCONNECTED RAINWATER MANAGEMENT

EXISTING CONDITIONS

RAIN GARDEN IN HAWTHORN PARK

PERMEABLE PAVING EDGES ON WEST MALL



BROWNFIELDS WITH THE PRESENCE OF INVASIVE HIMALAYAN BLACKBERRIES

DIGGING INVASIVE CREEPING BUTTERCUPS AT THE xʷc̓ic̓əsəm GARDEN, UBC FARM

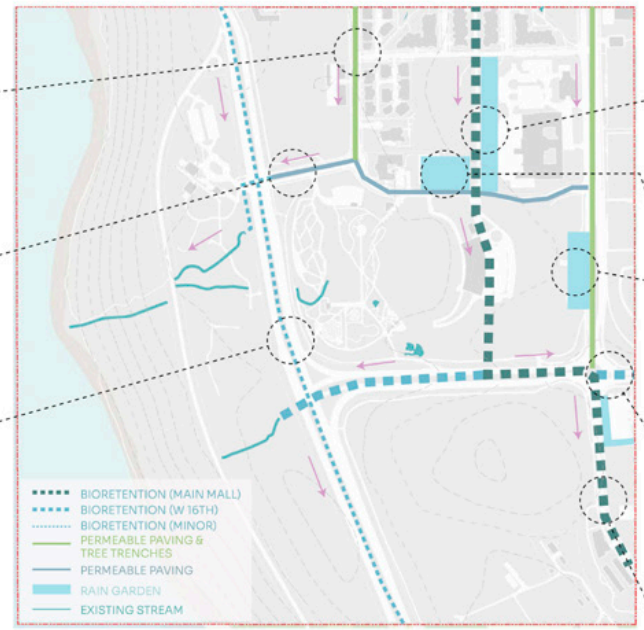
3 INTERCONNECTED RAINWATER MANAGEMENT

COMBINED TREE TRENCH LANES WITH EXISTING AND NEWLY DEVELOPED **PERMEABLE PAVING** ON WEST MALL AND EAST MALL

EXPAND EXISTING **PERMEABLE INTERLOCKING PAVING** ON THE LOW-TRAFFIC STADIUM ROAD

SWITCH BIOSWALE TO **BIORETENTION** AT THE MIDDLE OF SW MARINE DRIVE BEFORE DISCHARGING TO THE EXISTING STREAMS

- ADAPT **MAJOR CORRIDOR PLANS** OF W 16TH AVENUE AND MAIN MALL GREENWAY (CAMPUS VISION 2050)
- PERCEIVE EXISTING BLUE-GREEN INFRASTRUCTURES AS **PILOT PROJECTS**
- **TREAT AND FILTER** POLLUTANTS FROM SITE-WIDE RUN-OFFS AND **REMEDIATE** DISTURBED SOIL IN TWO BROWNFIELDS WITH **NATIVE PLANTING**
- ESTABLISH **CISTERN** UNDER PERMEABLE PAVING AND COLLECT NON-PORTABLE WATER FOR **IRRIGATION**
- **REDUCE FLOOD HAZARDS** RELATED TO LARGE STORM EVENTS (RAIN >48mm)



RAIN GARDEN ALONG THE PARKING EDGES

RAIN GARDEN AS THE BROWNFIELD REDEVELOPMENT WITH CONSTRUCTED DEPRESSION

SWITCH BIOSWALE TO **BIORETENTION** ON ROAD SIDES OF MAJOR GREENWAY, W 16TH AVENUE

BIORETENTION ACCOMPANYING BIKE LANES ON TRAFFIC-FREE EXPANDED MAIN MALL GREENWAY

3 INTERCONNECTED RAINWATER MANAGEMENT

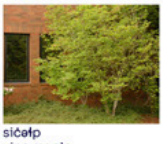
INTRODUCE **INDIGENOUS PLANT PALETTE** TO ACKNOWLEDGE HOST NATIONS AND CREATE WILDLIFE REFUGE FOR BIRDS AND POLLINATORS

EDUCATIONAL STOPS AND **NATIVE PLANT SIGNAGES** IN THE LANGUAGES OF MUSQUEAM, SQUAMISH, AND TSLEIL-WAUTUTH NATIONS

INVASIVE SPECIES MANAGEMENT FOR LANDSCAPE RECIPROCITY AND BROWNFIELD REDEVELOPMENT + **UNLEARNING OPPORTUNITIES WITH** x̱ʷc̓ic̓əsəm GARDEN, UBC FARM

ACCESSIBLE PLAY, RESTING, SOCIAL AND EDUCATIONAL HUBS FOR ALL AGES

POTENTIAL NATIVE PLANTS IN RAIN GARDEN/ BIORETENTION



sic̓əɬp
vine maple

schtxwé
red-osier dogwood

teqe?əɬp
salal

waxéɬp
mock orange

ṡənélqéw
wild ginger

sənɬ?əɬp
Dwarf Oregon grape

skwlseɬp
kinnikinnick

sθχeləm̓
sword fern

DIG ROOTS, MAINTAIN SOIL STRUCTURE, MAKE CHANGES

CAMPUS-WIDE INVASIVE SPEICES

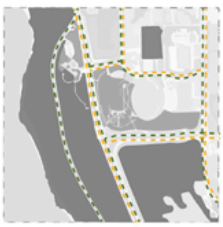
Rubus armeniacus
Himalayan Blackberry

Heracleum
mantegazzianum
giant hogweed

Ranunculus repens
creeping buttercup

Convolvulus arvensis
bindweed

PROPOSITION OVERVIEW



1 ENHANCED BIODIVERSITY

- **REWILD** NON-ESSENTIAL LAWN-GRASS SPACES
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- **MITIGATE LIGHT POLLUTION** BY MODIFYING LIGHTING SYSTEMS TO USE LESS DISRUPTIVE LIGHT COLOURS AND DURATIONS

2 INCLUSIVE GREEN TRANSPORT

- **CONNECT AND EXPAND EXISTING GREENWAYS** AT HAWTHORN PLACE AND WESBROOK PLACE
- UPGRADE EXISTING BIKE LANES AT MARINE DR., 16TH AVENUE AND E MALL TO **AAA BIKE LANES**
- RECOGNIZE **TRANSIT-ORIENTED DEVELOPMENT** AT FUTURE STADIUM LEARNING HUB UPON SKYTRAIN DEVELOPMENT
- PROMOTE **MORE FREQUENT SCHEDULES** FOR CAMPUS SHUTTLE 68 AND PROVIDE **SPECIAL BUS SERVICES** TO LARGE-SCALE SOCIAL EVENTS AT BOTANICAL GARDEN, FARM AND ARENA

3 INTERCONNECTED RAINWATER MANAGEMENT

- EXPAND AND DIVERSIFY EXISTING BLUE-GREEN INFRASTRUCTURE AND WORK TOWARD **90% EXPECTED FILTRATION RATE**
- PRACTICE SOIL AND WATER **REMEDIATION**
- COMBINE GREEN TECH WITH **NET-CARBON APPROACHES OF RAINWATER HARVEST** FOR IRRIGATION AND LAWN SPARKLING
- **EDUCATE:** UNLEARNING INDIGENOUS PLANTS TO ACKNOWLEDGE HOST NATIONS, **EXPANDING THE ACTS OF RECIPROCITY** FROM **x̱ʷc̓ic̓əsəm** GARDEN (UBC FARM) TO CAMPUS-WIDE PRACTICES
- DRAFT MAITENANCE PLAN OF **INVASIVE SPECIES MANAGEMENT** WHEN THESE PLANTS CAN EASILY RETURN ONCE LIFE CYCLES OF NATIVE ANNUALS END

Site 6

Heather Bylsma & Rose Ren

POLICY CONTEXT

NCAP

Ecology

Goal

Trees, landscapes, and other natural assets provide vital services to help UBC's neighbourhoods adapt to a changing climate. A network of resilient, connected green public spaces, courtyards, and corridors are integrated with neighbourhood buildings, help support ecosystem services, and are welcoming and restorative places that provide opportunities for connection between residents.

Targets

- By 2025, complete a climate change adaptation vulnerability and risk assessment on expected impacts to natural systems and develop actions to plan for and respond to these expected impacts.
- By 2025, update the Residential Environmental Assessment Program (a UBC-specific green building rating system that's mandatory for multi-unit residential construction in the neighbourhoods) with enhanced biodiversity and ecosystem services requirements for new construction.
- By 2025, promote climate resilient plants and materials, including Indigenous plants traditionally harvested by Musqueam.

Examples of actions to achieve this goal

- Address climate action by integrating ecosystem services into neighbourhood planning (e.g. tree canopy to address urban heat island effect, use of landscaping and other natural systems in flood regulation).
- Support development of UBC's biodiversity strategy, which will identify tree canopy targets and opportunities to create and enhance ecological corridors.
- Support the University Neighbourhoods Association in developing climate resilient landscaping practices (e.g., drought resistant plants).

Goal 3: Protect the Environment, Address Climate Change, and Respond to Natural Hazards

Metro Vancouver has a spectacular natural environment. Many of Metro Vancouver's ecosystems have global significance, such as the Fraser River estuary, which provides both internationally-important fish habitat and key feeding and resting points for migratory birds along the Pacific Flyway. The region's forests, fields, coastal and intertidal areas, wetlands, and watercourses together are integral pieces of a habitat network for birds, fish, and other wildlife.

The diverse mountain, coastal, and river areas provide the region's residents with essential ecosystem services such as fresh water, clean air, pollination, traditional Indigenous food and medicines, fertile soil, flood control, cooling, carbon storage, and opportunities for tourism, recreation, cultural and spiritual enrichment, health and well-being (Figure 5). Climate change, land development, invasive species, and other human-induced pressures are causing ecosystem change and loss in many areas, which reduces nature's capacity to provide these life-sustaining services. If planned, designed, and built in harmony with nature, communities will be healthier and more resilient over the long-term.

The tenets of the regional growth strategy (such as the ongoing focus on urban containment and land use patterns that support sustainable transportation options and carbon storage opportunities in natural areas) are critical for the region to address climate change. This section contains a strategy and associated policies that support Metro Vancouver's commitment to reaching a carbon neutral region by the year 2050. Climate change is expected to continue to cause warmer temperatures, a reduced snowpack, increasing sea levels, and more intense and frequent drought and rainfall events in the region. An additional strategy aims to improve resilience to these climate change impacts, as well as natural hazards. Many of the region's natural hazards are, and will continue to be, worsened by a changing climate.

Addressing both greenhouse gas emissions and the impacts of climate change and natural hazards simultaneously is critical, as the challenges and solutions associated with these issues are often interlinked. Given the dynamic and rapidly changing impacts of climate change on the Metro Vancouver region, and in response to best practices research and climate science, progress towards the *Metro 2050* targets and performance measures will be regularly monitored with an aim to proposing improvements to the policies and actions in the plan.

A commitment to improving social equity includes advancing equitable climate change strategies and actions that will: intentionally consider the suite of concerns that increase community vulnerability, and acknowledge current financial, health, and social disparities that may be exacerbated by low carbon solutions and the impacts of climate change.

For thousands of years Indigenous people have lived on and stewarded their respective and shared territories developing deep and special relationships with the land and waters. Indigenous knowledge systems that have been developed over many years have the potential to inform and complement regional planning policy and practice.

Strategies to achieve this goal are:

3.1 Protect and enhance Conservation and Recreation lands

3.2 Protect, enhance, restore, and connect ecosystems

3.3 Advance land use, infrastructure, and human settlement patterns that reduce energy consumption and greenhouse gas emissions, create carbon storage opportunities, and improve air quality

3.4 Advance land use, infrastructure, and human settlement patterns that improve resilience to climate change impacts and natural hazards

LAND USE PLAN (september draft)

4.5 Mobility and Accessibility

4.5.1 Mobility and Accessibility Overview

UBC promotes the use of active and sustainable modes of transportation and the continued development of a more equitable and accessible transportation system for all via both transportation and land use plans. UBC's Transportation Plan is the guiding document for transportation objectives and initiatives on campus, informed by the policies of this Land Use Plan.

LAND USE PLAN: MOBILITY AND ACCESSIBILITY POLICIES

4.5.1.1 Work towards the targets and policies of UBC's Transportation Plan.

4.5.1.2 Prioritize transportation modes in the following order:

1. walking and rolling (e.g. wheelchair, stroller, etc.);
2. cycling and micromobility (e.g. scooters, e-bikes, etc.);
3. public transit and accessibility vehicles;
4. carpool / shared use vehicles;
5. ride-hailing and taxi vehicles; and,
6. single occupancy vehicles.

4.4.1.4 Provide "Greenways" as identified on Schedule C, including a substantial "green and natural" component and a continuous, multi-use, people-oriented corridor that extends throughout the campus, promoting linkages between various uses, destinations and green and natural areas.

Designs for Greenways will:

a. vary in width and design, according to local context and conditions;
b. include a substantial green and natural component;
c. enhance natural systems and biodiversity;
d. prioritize pedestrian and slow-speed accessible movement;
e. provide for bicycle, micromobility, and where needed, service vehicles movement;
f. consider night-time safety while reducing light impacts; and,
g. connect with regional greenways, such as those identified in the Metro Vancouver Regional Greenways 2050 plan, where appropriate.

Greenways fall into the underlying land use designation where they occur (e.g. Academic, Neighbourhood).

4.4.1.5 Provide "Green Edges" as identified on Schedule C: Greenways and Green Edges, to bring the surrounding forest character and functions into the campus.

Designs for Green Edges will:

a. vary in width, while meeting ecological, buffering and aesthetic objectives;
b. vary in design and character, ranging from formal to naturalized, to reflect the part of campus in which they are located;
c. incorporate the directions of a detailed environmental assessment, where required;
d. include a tree management plan; and,
e. connect to greenways and adjacent Open Spaces where possible.

Green Edges fall into the underlying land use designation where they occur (e.g. Academic, Neighbourhood).

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Green Edges fall into the underlying land use designation where they occur (e.g. Academic, Neighbourhood).

CAMPUS VISION 2050

Big Idea: Restorative and Resilient Landscapes

UBC Vancouver in 2050... Guided by rich natural surroundings and Indigenous knowledge, the campus integrates natural systems and supports increased biodiversity. A network of connected green public spaces, courtyards, corridors, green roofs and places for respite and social connection work alongside academic and neighbourhood buildings. Indigenous plants and other features that embody Musqueam values create a sense of welcome to Musqueam territory. Biodiversity and ecological resilience are supported throughout the campus, including new tree canopy, rain gardens and green corridors for biking, walking and rolling.

KEY STRATEGIES

- Protect and enhance existing high-value ecological areas (e.g., UBC Farm forested area) and habitat for wildlife
- Working with Musqueam, identify areas of campus with significant cultural value and create campus gateways and landscapes with a strong Musqueam welcome and presence
- Create substantial new green spaces for social, recreational, research and ecological benefit
- Create and protect ecological and mobility corridors, including a new east-west diagonal connector
- Extend surrounding forests into the campus to support species movement and increase biodiversity
- Introduce abundant indigenous plants traditionally harvested by Musqueam, and work with Musqueam to plan and steward these landscapes including removal of invasive species
- Provide equitable access to nature on campus, emphasizing accessible walking, rolling and cycling paths

METRO 2050

Big Idea: Connected Campus

UBC Vancouver in 2050... Two on-campus SkyTrain stations transform the way people get to, from and around campus, better connecting it to the rest of the region. Members of the UBC community who live off campus have shorter, greener, less complicated commutes, giving them more time to study, work, play and rest. On-campus residents benefit from faster and easier transit access to other parts of the region and can easily meet their daily needs without owning a car. With more people arriving by transit, a renewed and expanded on-campus mobility network that prioritizes active and sustainable modes means people of all ages and abilities can get to where they need to go, comfortably and safely, while reducing greenhouse gas emissions. A system of connected greenspaces and separated bike lanes make active modes of transportation a pleasure, and quiet neighbourhood streets are safe for walking, rolling and playing. Lining well used pathways and corridors with active retail and community uses and good lighting supports a vibrant urban experience and improved nighttime safety.

KEY STRATEGIES

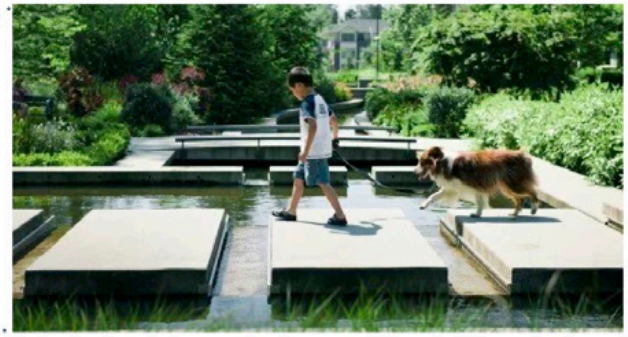
- Prioritize sustainable modes of transportation, including walking, rolling, cycling and micromobility
- Enable the extension of SkyTrain to campus with a central station on University Boulevard and a south campus station to serve Wesbrook Place, Stadium Neighbourhood and Hawthorn Place
- Expand the pedestrian priority zone in the campus core, while preserving access for essential services and accessible parking users
- Create a safe, legible and efficient cycling and micromobility network to accommodate users of all ages and abilities
- Build a network of zero-emission local transit/shuttle routes that integrate with regional services, including SkyTrain
- Design streets and intersections to prioritize the safety and comfort of vulnerable road users, manage congestion and maintain access
- Reduce the supply of parking, and increase multi-modal transportation infrastructure for both commuters and residents as parking demands decline with more transportation choices

CURRENT SITE STRENGTHS

CURRENT GREENSPACE ACCESSIBILITY

96% within 100m of greenspace

100% within 400m of greenspace



CURRENT RAIN GARDENS

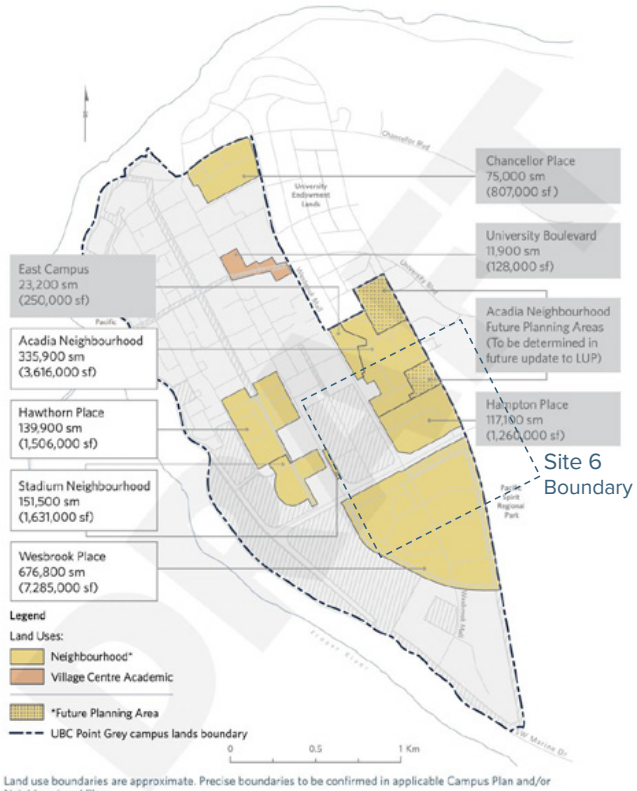
CONTEXT AND CONCERNS

September Draft Land Use Plan

POPULATION

OPEN SPACE

SCHEDULE B: MAXIMUM NEIGHBOURHOOD HOUSING GROSS BUILDABLE AREA



Land use boundaries are approximate. Precise boundaries to be confirmed in applicable Campus Plan and/or Neighbourhood Plan.

GOAL

Preserve and enhance existing site strengths despite site development & population increase

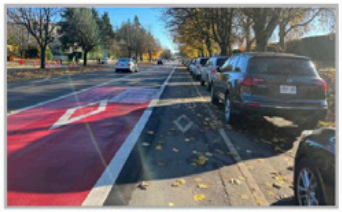
STRATEGIES

1	2	3
Extension of existing protected AAA bikeway along Wesbrook Mall	Long term urban forest protection & management	Enhancement of existing green network planning

POLICY

Land Use Plan ○ Mobility & Accessibility **Campus Vision 2050** ○ Connected Campus	**Land Use Plan** ○ Open Space Policy **Neighbourhoods Climate Action Plan (NCAP)** ○ Ecology	**Land Use Plan** ○ Biodiversity & Ecology ○ Open Space Policy **Metro 2050** ○ Goal 3: Environment, Climate Change, and Natural Hazards

1 AAA Bikeways for All Ages & Abilities



CURRENT PAINTED LANE

PROPOSED PROTECTED

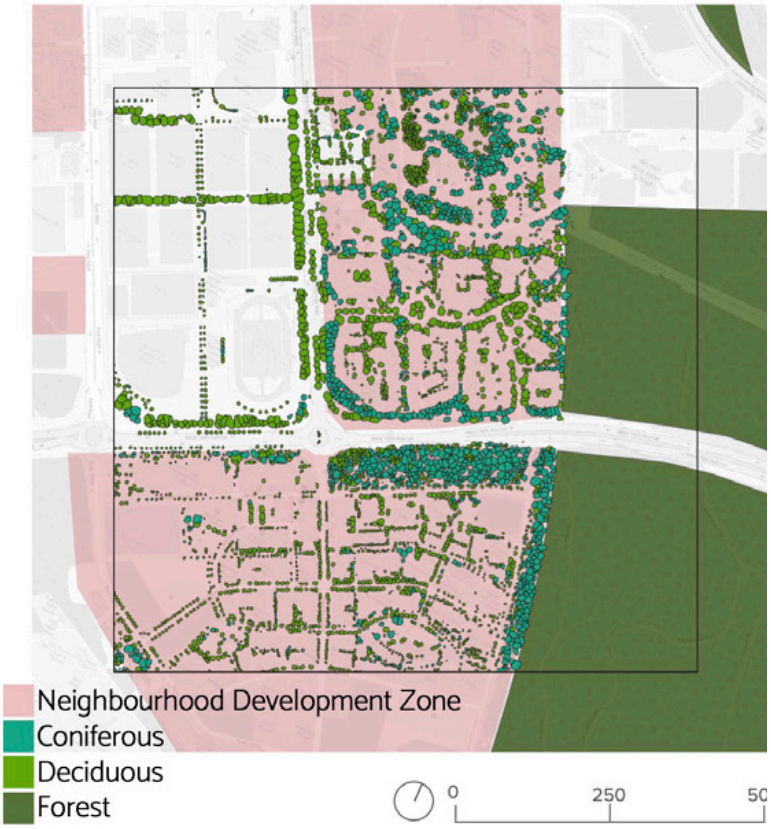
2 Long Term Management
Urban Forest

NOVEMBER 2022

NOVEMBER 2023

"For every 100 street trees that get planted, only 50 will make it to 13-20 years"

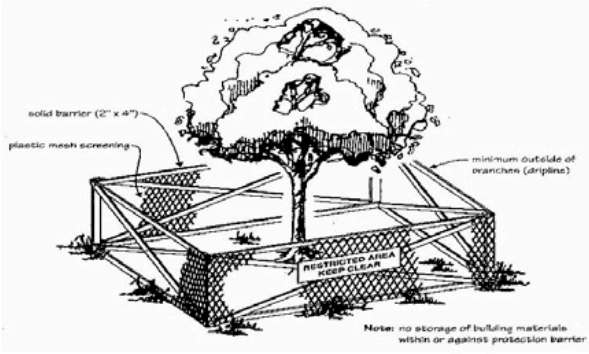
Roman, Lara. How Many Trees are Enough? Scenario Journal, 2014.



2

Land Use Plan Policy 4.4.2.4

"Replace viable mature trees over 15 cm caliper DBH that must be **removed** during the course of **residential development** in Neighbourhoods **at a ratio of 1:1"**



TREE PROTECTION

SOIL PROTECTION

Manufactured Soil Blends (MSBs)

"It appears that MSBs are not developing favourable qualities over time **to support trees** and other vegetation **experiencing climate stressors"**

- Low Carbon storage
- Low Aggregate Formation
- Low Biological activity

3 Green Networks

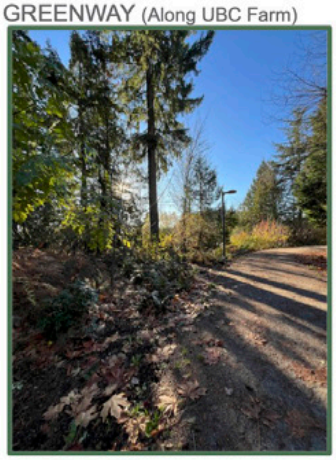
Land Use Plan Policy 4.4.1.4

"Provide "Greenways"... a continuous, multi-use, **people-oriented** corridor..."

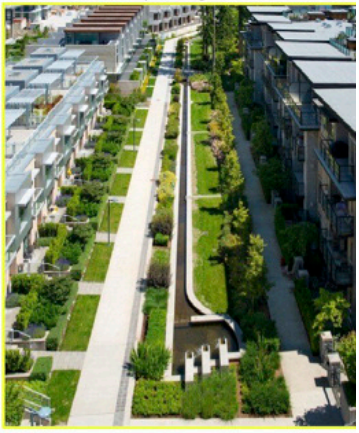
Land Use Plan Policy 4.4.1.5

"Provide "Green Edges"... meeting **ecological, buffering**, and aesthetic objectives..."

GREENWAY (Along UBC Farm)



GREENWAY (Through Wesbrook Place

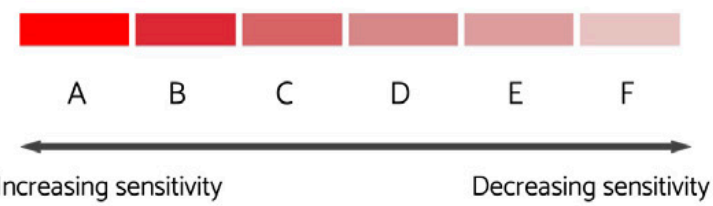


3 Green Networks

GREEN NETWORK PRIORITY

Green Edges - Ecological Corridors - Greenways - Mobility Corridors

HABITAT SENSITIVITY



CAMPUS VISION 2050

HABITAT MAPPING

Site 7

Roberta Gonzalez, Ziheng (Mark) Niu, and Karman Phuong

Gallery

UBC Farm

Greenway Trail

Wesbrook Mall

New Development

Summary of Analysis + Diagnosis

SITE NETWORKS

Bus Stops
Bikeway
Greenway
Bus Route

- 4.1 km of bikeways
- 3.1 km of bus routes
- 2/3 bus routes service this site (68 & 49)

★**Large distance between bus stops**

URBAN FOREST

Trees

- 48% conifer. / 52% deciduous
- Top 3: Acer, Thuja, & Pseudotsuga
- Acer = 34.84% (out of 3269 trees)

★ **Canopy % does meet 10-20-30 rule**

GREENSPACE

Natural Park
Campus
Quasi-Public
Park & Street

- 53.7% greenspace (LU)
- 22.3% high density (NDVI)
- 27.4 ha moderate value

★ **"Manicured" - Low vertical diversity**

Our Main Objectives

ENHANCE TRANSPORTATION NETWORKS

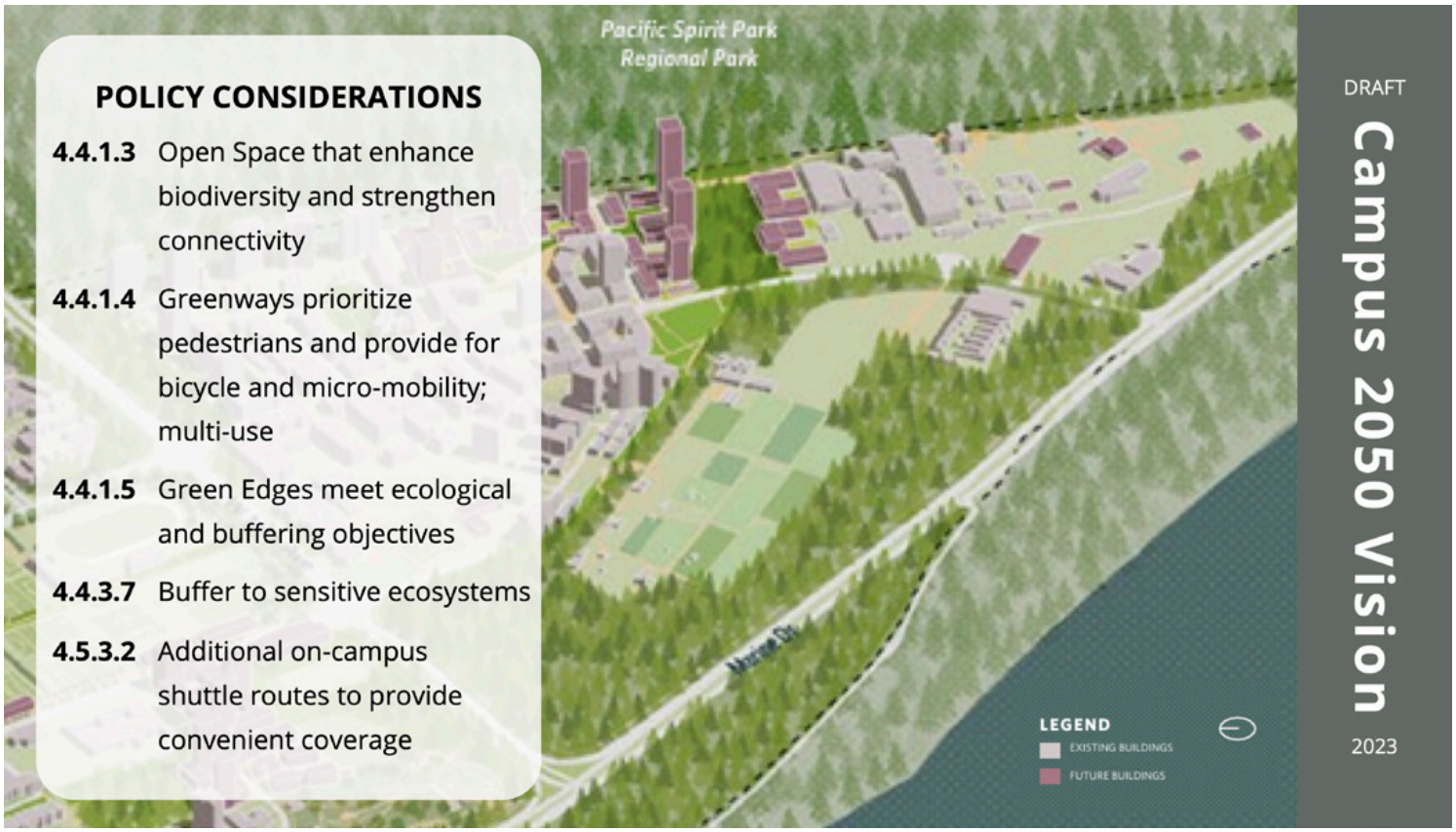
increase capacity and accessibility to transit

URBAN FOREST RESILIENCY

increase urban forest canopy and green connectivity

HABITAT PROVISIONING

increase habitat & forage opportunities for pollinators & wildlife

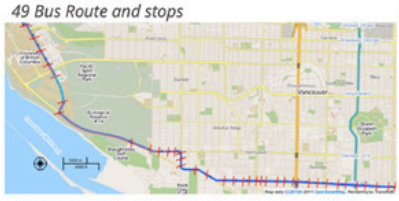


Transportation

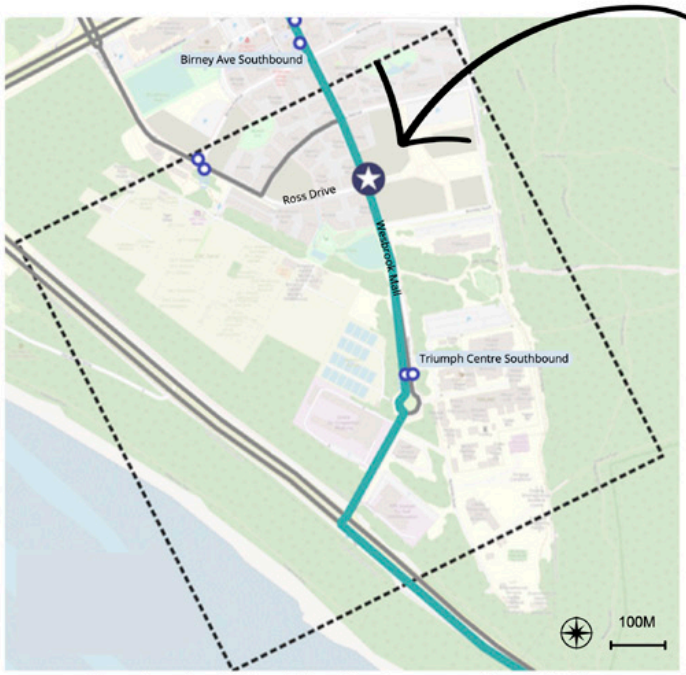
Importance of adding this bus stop:

- campus vision goal
- residential development
- connectivity
- less reliance on cars

49 Bus Route and stops



Second largest distance between 49 bus stops



Map of our site with the additional bus stop proposed, located in the intersection of Ross Drive and Wesbrook Mall

Proposed Bus Stop
Existing Bus Stops
49 Route
Other Bus Routes

Vision of our proposed bus stop located on Ross Drive & Wesbrook Mall

Native plants for our pollinator garden

Wild strawberry (*Fragaria fresca*)
Clementine red columbine (*Aquilegia vulgaris*)
Fireweed (*Epilobium agustifolium*)

Policy: 4.5.3.2 'Accessible stops that provide coverage to all parts of campus'

Green Connectivity

The greenway are designed to be walkable and bikeable

Use rain gardens to connect habitats along the greenway

Policy: 4.4.1.3 Strengthen Connectivity | 4.4.1.4 Greenways prioritize pedestrians and cycling

Urban Trees

After Improvement:

25.28%

Canopy Cover of Built Area

less than the recommended by Vancouver Board of Parks (30%)

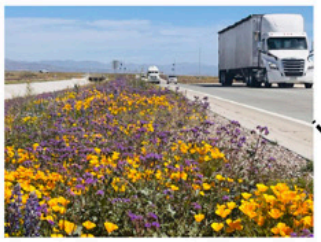
32.25%

Canopy Cover of Built Area

Exceed the recommendation of Vancouver Board of Parks

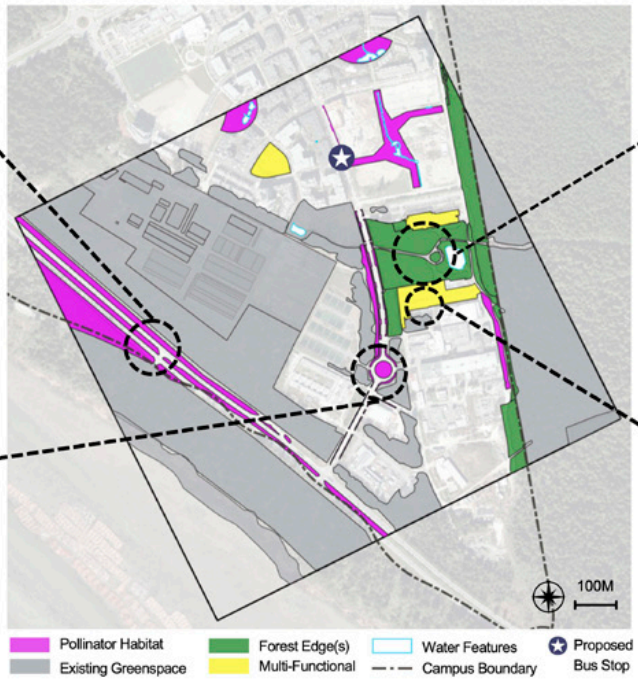
Policy: Increasing tree canopy to mitigate the urban heat island effect (UBC 2050 Vision)

Habitat Provisioning



Flowering medians support bees + butterflies

Convert road verges to pollinator beds



Protect + strengthen forest edge

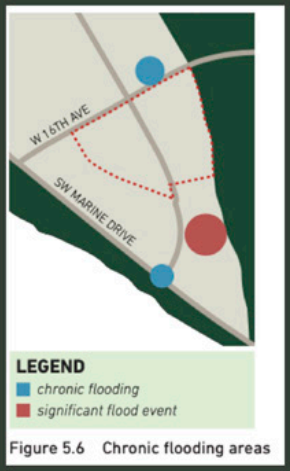
Create new multi-functional and ecological greenspaces

Policy: 4.4.1.3 Open Space + Biodiversity | 4.4.1.5 Green Edges | 4.4.3.7 Sensitive Ecosystems | 4.4.3.2 Extension

Proposal Considerations

(Land Use Plan - UBC Point Grey Campus Lands Draft, Sept. 2023)

(UBC Draft Campus 2050 Vision, Oct. 2023)



(Girling et al., 2016, Wesbrook Place Study)

Policy Statements

LAND USE PLAN: BIODIVERSITY AND ECOLOGY POLICIES

4.4.3.1 Identify, enhance and manage important areas of biodiversity on campus.

★ **4.4.3.2** Extend the surrounding forests into the campus to support species movement and increase biodiversity.

4.4.3.3 Develop biodiversity strategies as part of the Campus Plan and Neighbourhood Plans, including:

- targets (e.g. tree canopy cover for different types and scales of Open Spaces);
- enhancing species diversity;
- managing ecosystem structure at different scales to ensure ecosystem health, resiliency, and community benefits; and,
- inclusive engagement with those who have knowledge of the land (e.g. Indigenous communities and faculty).

4.4.3.4 Provide green infrastructure and nature-based solutions for rainwater management, climate adaptation and mitigation in Open Spaces.

4.4.3.5 Link green spaces on campus with each other and the wider peninsula network to enhance ecological connectivity and encourage use of active and sustainable modes of transportation.

4.4.3.6 Encourage public access to natural areas on campus to minimize impact on Pacific Spirit Regional Park.

★ **4.4.3.7** Provide an ecological buffer in areas adjacent to sensitive ecosystems surrounding the campus, including Pacific Spirit Regional Park.

4.4.1.3 Provide a range of Open Space types and sizes that are accessible, adaptable, enhance placemaking and biodiversity, and strengthen connectivity.

Open Spaces include but are not limited to:

- green spaces, Greenways and Green Edges;
- courtyards, plazas;
- outdoor learning areas, gathering areas (un-enclosed sheltered and unsheltered), picnic areas;
- outdoor sports and recreation facilities, sport fields, sport courts;
- parks, linear parks and trails, pocket parks, playgrounds, splash pads;
- gardens, community gardens, urban agriculture;
- forested and natural areas;
- water features, fountains;
- areas of respite; and,
- green roofs with public access during regular opening hours.

4.4.1.4 Provide "Greenways" as identified on Schedule C, including a substantial "green and natural" component and a continuous, multi-use, people-oriented corridor that extends throughout the campus, promoting linkages between various uses, destinations and green and natural areas.

Designs for Greenways will:

a. vary in width and design, according to local context and conditions;
b. include a substantial green and natural component;
c. enhance natural systems and biodiversity;
d. prioritize pedestrian and slow-speed accessible movement;
e. provide for bicycle, micromobility, and where needed, service vehicles movement;
f. consider night-time safety while reducing light impacts; and,
g. connect with regional greenways, such as those identified in the Metro Vancouver Regional Greenways 2050 plan, where appropriate.

Greenways fall into the underlying land use designation where they occur (e.g. Academic, Neighbourhood).

Policy Statements

4.4.1.5 Provide "Green Edges" as identified on Schedule C: Greenways and Green Edges, to bring the surrounding forest character and functions into the campus.

Designs for Green Edges will:

a. vary in width, while meeting ecological, buffering and aesthetic objectives;
b. vary in design and character, ranging from formal to naturalized, to reflect the part of campus in which they are located;
c. incorporate the directions of a detailed environmental assessment, where required;
d. include a tree management plan; and,
e. connect to greenways and adjacent Open Spaces where possible.

Green Edges fall into the underlying land use designation where they occur (e.g. Academic, Neighbourhood).

4.5.1.2 Prioritize transportation modes in the following order:

1. walking and rolling (e.g. wheelchair, stroller, etc.);
2. cycling and micromobility (e.g. scooters, e-bikes, etc.);
3. public transit and accessibility vehicles;
4. carpool / shared use vehicles;
5. ride-hailing and taxi vehicles; and,
6. single occupancy vehicles.

4.5.3.2 Work with TransLink to develop additional on-campus shuttle routes with safe and accessible stops that provide convenient coverage to all parts of the campus and integrate seamlessly with regional transit services, including SkyTrain.

Project 3- Zoom Study

IMPLEMENTING PROPOSITIONS THROUGH DESIGN

In Project 3, each student focused on a specific 1-hectare (10,000 square meters) section within their team's study area to explore the implementation of sitewide proposals. They developed strategies to enhance the quality, connectivity, and functionality of the existing green networks and fabric in their designated areas.

From a design perspective, the students aimed to understand how the broader sitewide propositions could be effectively applied at this scale. They examined potential modifications to the existing conditions to improve the quality, connectivity, and functionality of their study areas.

Some questions that were addressed by the students were:

- Can the space be re-organized to add space for greening?
- Are there existing under-utilized areas that could be planted with trees, shrubs, and or groundcovers?
- Can existing greenspaces be adapted to serve more functions, such as biodiversity?
- How can the space work better for pedestrians, cyclists, and other sustainable modes?
- How can the design engage community?

Each project includes at least one map or diagram to illustrate the proposal. Additionally, precedent images are provided to further visualize the ideas. These images depict built works that both exemplify the propositions and provide grounding.

Key Strategies

The zoom studies provides a more detailed proposition so that it can be implemented sitewide. The propositions improve the quality, connectivity, and functioning of the green networks. The focus of these projects was enhancing tree canopy, boosting biodiversity, integrating green infrastructure, improving connectivity, and facilitating community programs. The propositions offered multiple functions and ecosystem services such as:

- Enhancing the quality and ecological value of greenways
- Habitat protection, by enhancing the resilience of green space to climate change
- Improve water quality, by actively manage green and blue systems
- Increase connectivity and implement sustainable transportation modes by creating buffered bike lanes
- Help increase Musqueam presence on campus
- Increase native plantings to uphold and resstore ecosystems
- reinforce habitat connectivity by facilitating the movement of pollinators between fragmented areas.
- Increase accessible, safe and well lit streets.
- Increase educational nodes for students and public

The next section of the report expands on these services and how they can be executed on campus.

Site 1

Shane Hunt

Site Analysis & Recommendations

Preliminary observations & conceptual design recommendations relevant to the enhancement of Main Mall.

Figure 2. Greenspace design recommendations, including the extension of the greenway network, the inclusion of a tree canopy walk, and the transformation of Main Mall into a Garry oak ecosystem.

Greenspace

Pacific Spirit Park is the greatest contributor to green space on site, however it is the least accessible.

To increase resilience, aesthetics, and access to ecological valuable campus green space, we proposed:

- The planned succession of Main Mall towards a Garry Oak ecosystem.
- Supporting native pollinators with continuous flowering

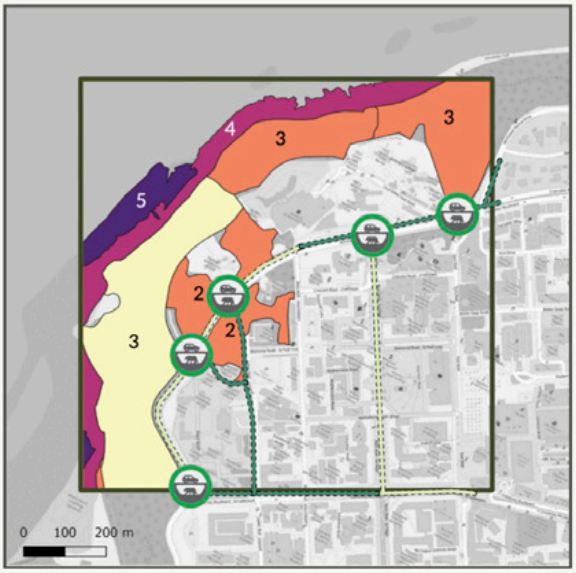


Figure 3. Sensitive habitats ranked based on their sensitivity from low (1) to high (5), including proposed wildlife crossings and adding complex vertical structure to greenways, such as Main Mall

Sensitive Habitats

Most of our ecologically sensitive areas are located outside of campus boundaries in Pacific Spirit Park, and the ecological value of campus greenspace is limited.

We proposed:

- The ecological enhancement of campus greenways through added structural complexity.

Zoom Study

Policy Context

Campus and Community Planning (C+CP) have adopted a new vision for the campus over the next 30 years (Campus Vision 2050), and have drafted a new Land Use Plan to support that vision over the next 10 years. Our proposals align with the following policies.

Campus Vision 2050

Big Ideas

- Restorative & Resilient Landscapes
- Climate Mitigation & Adaptation

Land Use Plan

Open Space

- 4.4.1.4 Designs for greenways will enhance natural systems and biodiversity.

Biodiversity and Ecology

- 4.4.3.3 Develop biodiversity strategies that support species diversity and manage ecosystem structure for resiliency. Engage with those who have knowledge of the land (e.g. Indigenous communities).
- 4.4.3.4 Provide nature-based solutions for climate adaptation.
- 4.4.3.5 Link Greespaces on campus to enhance ecological connectivity

Conceptual Design Proposals

- Enhance the ecological value of greenways:
  - Species Diversity
  - Structural Diversity
  - Lawns to Meadows
  - Continuous Flowering
- Enhance the resilience of green space to climate change
  - Assisted migration and conservation of the extremely biodiverse and endangered Garry oak ecosystem.

Precendents

Implemented examples of the conceptual design recommendations.

Lawns to Meadows

King's College, University of Cambridge

Lawn to meadow conversion in an iconic campus greenspace comparable to Main Mall.

Figure 4. The iconic King's College Chapel meadow at the University of Cambridge (Cambridge, 2021)

Continuous Flowering

Smithsonian Pollinator Garden

Continuous flowering supports pollinators by providing them with a continuous source of nectar throughout the growing season (Smithsonian, n.d.).

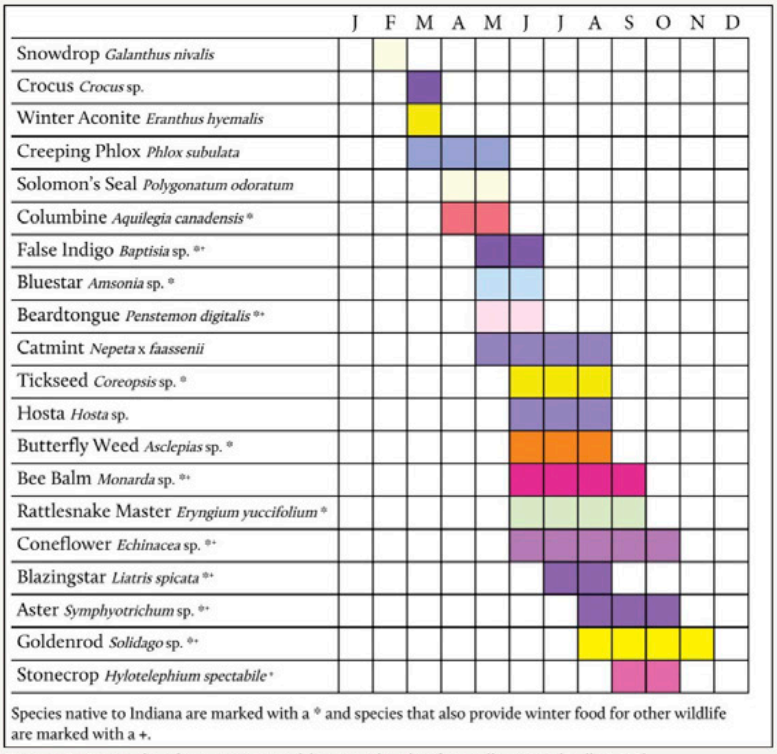


Figure 5. Example of a continuous bloom calendar for pollinators (Bell, 2019)

Zoom Study

Precendents

Implemented examples of the conceptual design recommendations

Structural Diversity

Nature Ways: National Parks Board Singapore

The board's nature ways include four layers, Emergent (dominant) layer, canopy (co-dominant) layer, understory (suppressed) layer, and shrub layer (NParks, n.d.). However, additional layers of the forest can be incorporated (right).

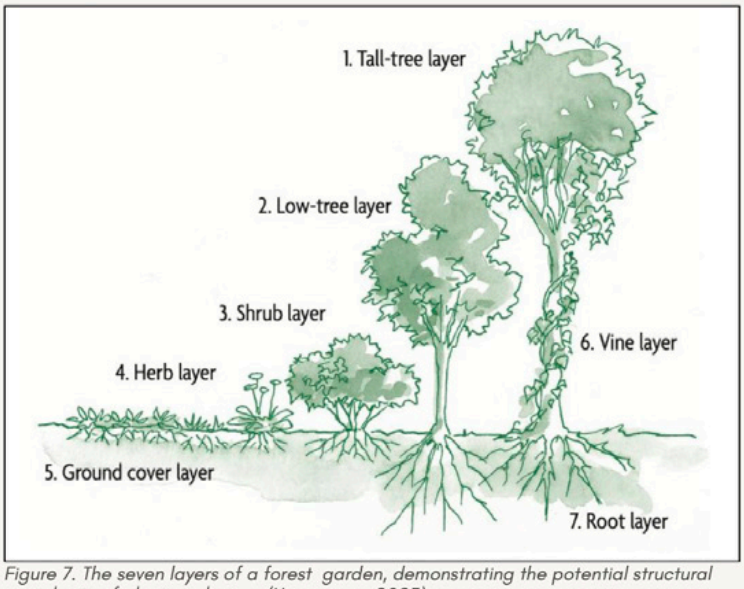


Figure 7. The seven layers of a forest garden, demonstrating the potential structural complexity of planting designs (Hemenway, 2023)

Garry Oak Meadow

Garry Oak Ecosystem Restoration Project, University of Victoria

Student-led project to restore the campus' Garry Oak Meadow Ecosystem over 5-years by planting native species and suppressing invasive species (UVIC, 2022).

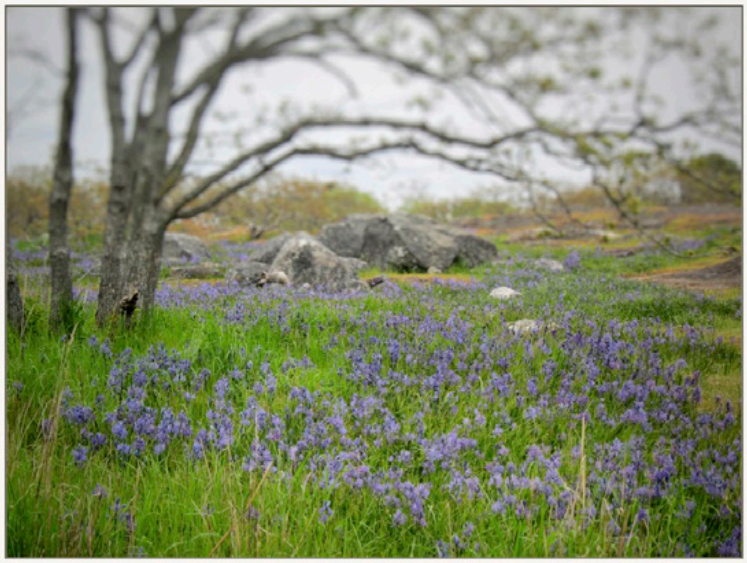


Figure 8. Image of a Garry oak ecosystem with camas flowers in bloom (Kenrick, 2017)

Zoom Study

Detailed Design

The redesign of a 1 ha portion of Main Mall will support the assisted migration of the Garry Oak Ecosystem, supporting a highly biodiverse, endangered, and climate resilient landscape. Its preservation would be a symbolic gesture by UBC towards its commitment to an ecologically sustainable future, which has been modelled by other world class universities such as the University of Cambridge.

The design will convert lawns to meadows, and vastly increase the diversity of species found along Main Mall through the use of a Garry-oak and native species inspired planting pallets (see Appendix). In addition, while the Garry Oak ecosystem is generally 2-layered, the incorporation of native shrubs and small trees will help create complex habitat structure that supports biodiversity. Further selecting flowering plants that enable continuous flowering will provide a valuable source of nectar for native pollinators.

Site Context & Design Recommendations

Figure 9. Zoom Study Context Map (Site 1)

1) Replacing end-of-life red oaks with Garry oaks

2) Increase species diversity with Garry oak inspired planting pallets (Table 1).

3) Support structural complexity through the incorporation of small trees, shrubs and herbaceous plants (Table 2).

4) Enhance the ecological value of Main Mall for pollinators by providing a continuous source of Nectar (Table 2).

5) Increase climate resilience of greenspace by assisting the migration of a heat and drought adapted ecosystem.

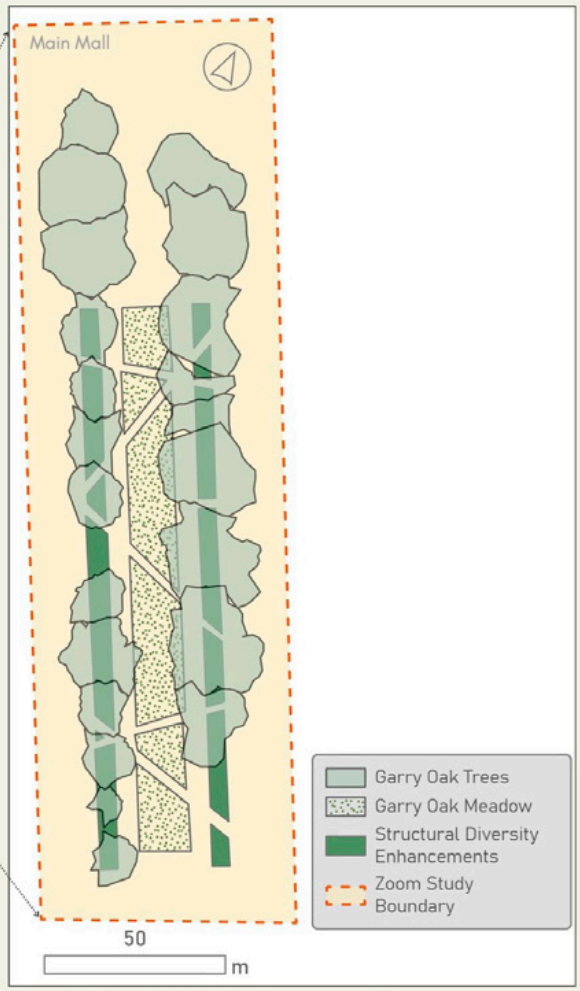


Figure 10. Zoom Study Design Recommendations

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Appendix

Planting Pallets

Table 1. Abridged list of species from the Garry Oak Ecosystem adapted from (Renninger, n.d.)

Scientific Name	Common Name
Achillea millefolium	Common yarrow
Allium cernuum	Nodding onion
Amelanchier alnifolia	Serviceberry
Anaphalis margaritacea	Pearly everlasting
Aquilegia formosa	Red columbine
Arbutus menziesii	Arbutus
Acrctostaphylos uva-ursi	Kinnikinnick
Armeria maritima	Thrift
Balsamorhiza deltoidea	Puget Balsamroot
Berberis aquifolium	Tall Oregon Grape
Brodiaea coronaria	Harvest Brodiaea
Camassia leichtlinii subsp. suksdorfii	Great Camas
Camassia quamash subsp. maxima	Common Camas
Campanula rotundifolia	Bluebell
Castilleja levisecta	Golden Paintbrush
Cerastium arvense	Field Chickweed
Collinsia grandiflora	Giant Blue Eyed Mary
Collinsia parviflora	Small Flowered Blue Eyed Mary
Cornus sericea	Red Osier
Delphinium menziesii	Menzies Larkspur
Dodecatheon hendersonii	Henderson Shooting Star
Eriophyllum lanatum	Oregon Sunshine
Fragaria vesca	Woodland Strawberry
Geum macrophyllum	Bigleaf Avens
Lonicera ciliosa	Orange Honeysuckle

Appendix

Planting Pallets

Table 2. Example of native species that could supplement those from the Garry oak ecosystem to ensure continuous flowering, adapted from (Xerces Society, 2023)

Scientific Name	Common Name	Bloom Period							Layer
		March	April	May	June	July	August	September	
Acer circinatum	Vine maple		■	■					Small Tree
Achillea millefolium	Common yarrow			■	■	■			Herbaceous
Amelanchier alnifolia	Saskatoon serviceberry				■	■			Small Tree
Asclepias speciosa	Showy milkweed			■	■	■	■	■	Herbaceous
Berberis aquifolium	Oregon grape	■	■	■					Shrub
Camassia leichtlinii	Large camas	■	■	■					Herbaceous
Camassia quamash	Small camas		■	■	■				Herbaceous
Chamerion a. ssp. angustifolium	Fireweed					■	■	■	Herbaceous
Clarkia amoena	Farewell-to-spring				■	■			Herbaceous
Eriophyllum lanatum	Common wooly sunflower			■	■	■	■		Herbaceous
Gaultheria shallon	Salal		■	■	■	■			Shrub
Heracleum sphondylium ssp. montanum	Common cowparsnip				■	■			Herbaceous
Holodiscus discolor	Oceanspray					■	■	■	Shrub
Limnanthes douglasii	Douglas' meadowfoam	■	■						Herbaceous
Lupinus polyphyllus	Bigleaf lupin			■	■	■			Herbaceous
Malus fusca	Oregon carb apple			■	■				Small Tree
Physocarpus capitatus	Pacific ninebark			■	■				Shrub
Rosa nutkana	Nootka rose			■	■				Shrub
Rubus spectabilis	Salmonberry	■	■	■	■				Shrub
Salix scouleriana	Scouler's willow	■	■						Shrub
Sambucus racemosa var. arborescens	Red elderberry					■	■		Shrub
Solidago canadensis	Canada Goldenrod					■	■	■	Herbaceous
Spiraea douglasii	Douglas' spirea				■	■	■		Herbaceous
Symphoricarpos occidentalis	Western snowberry				■	■	■		Shrub
Symphyotrichum subspicatum	Douglas' aster					■	■	■	Herbaceous
Vaccinium ovatum	Evergreen huckleberry	■	■	■					Herbaceous

Zoom Study

Site 1

April Liu

ZOOM STUDY: IMPLEMENTING PROPOSITIONS ON UBC CAMPUS

LARC 444 GreenNetwork Planning
April Liu
Dec.18

Site Introduction:
Site 1 is Located in the northwest of UBC campus. This area includes mainly academic and residential areas, as well as a portion of Pacific Spirit Park.

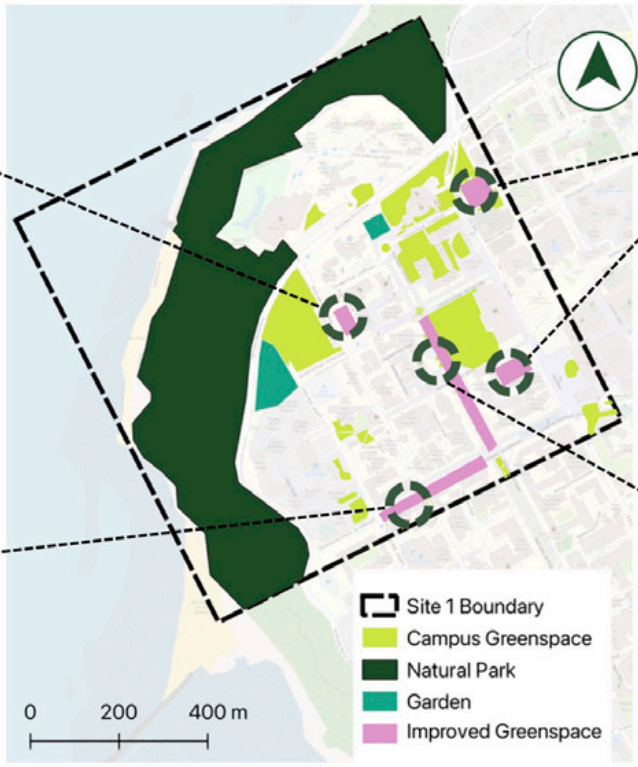
1. SIDE WIDE PROPOSITION:

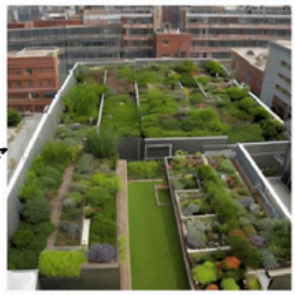
Goal: Promote a Connected, Resilient, and Sustainable Campus

Proposition 1: Enhance Greenspace Quality and Improve Campus Resilience
Proposition 2: Vitalize and Actively Manage Green and Blue Systems
Proposition 3: Increase Connectivity and implement Sustainable Transportation Modes

Integrate a **rain garden** into the existing parking Lot near Music building

Introduce **bioswales** and **naturalized streetscapes** along University Blvd.



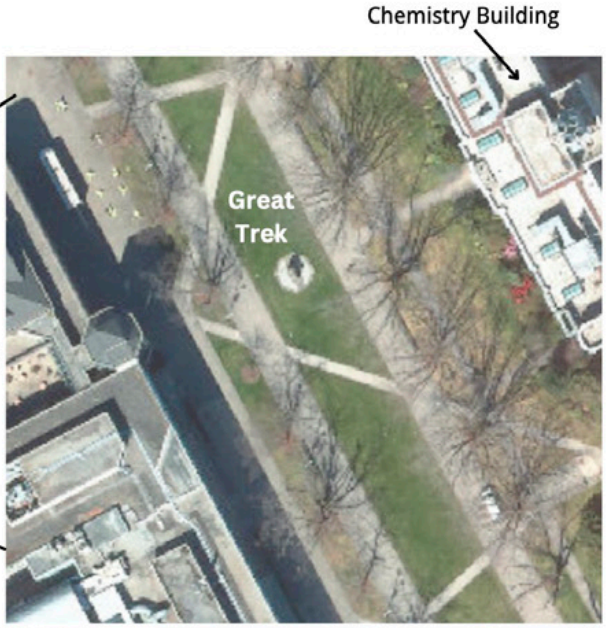


Implement **green roofs** on the Law School building and Hennings building as ecological corridors

Bring in **layers of landscape plants** on Main Mall

Images Generated by: OpenArt (November 2023)

2. ZOOM LOCATION

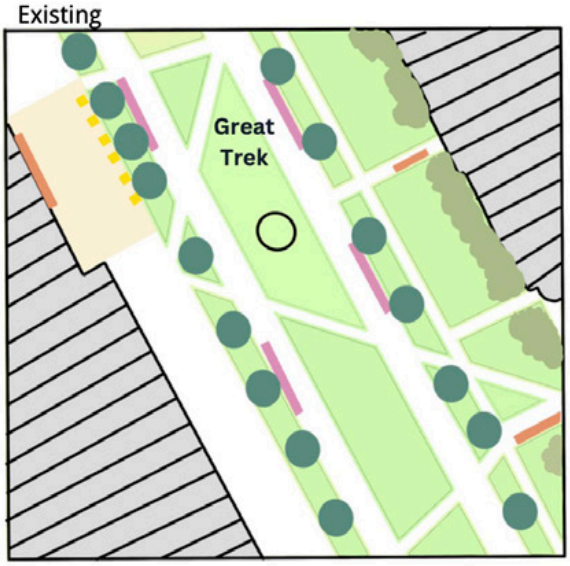


The zoom study area is located at Main Mall. To the west stands Henry Angus Building, and to the right is the Chemistry Building. One of the famous landmarks of UBC, the Great Trek Cairn, is situated on the lawn in Main Mall. The Main Mall Greenway serves as a multifunctional open space to gather students and faculty members from different disciplines.The proposed design will maintain its original function while enhancing its ecological benefits.

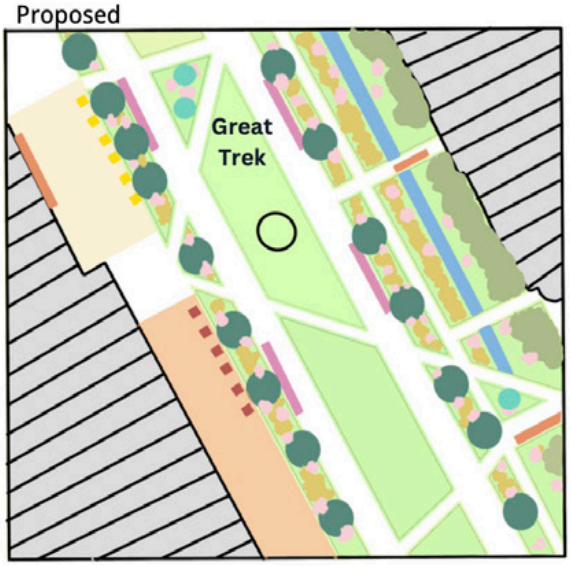
Currently, 90% of trees planted along Main Mall are oaks. Planting diverse vegetation in different forms and sizes and implement bioswales can enhance biodiversity and their ecological functions (ex. pollination), increase resilience to disturbance and improve access to small green space in southern area.

3. ZOOM LOCATION

Existing



Proposed



Proposed Shrubs and Bushes :
Bunchberry (*Cornus canadensis*)
Huckleberry - Evergreen (*Vaccinium ovatum*)
Salal (*Gaultheria shallon*)
Deer Fern- Evergreen(*Blechnum spicant*)
Kinnikinnick- Evergreen(*Arctostaphylos uva-ursi*)

Proposed Flowering Species:
Ocean spray (*Holodiscus discolor*)
Mock Orange (*Philadelphus lewisii*)
Nootka Rose (*Rosa nutkana*)

Proposed Trees:
Cascara (*Frangula purshiana*)

Concept drawing of zoom area

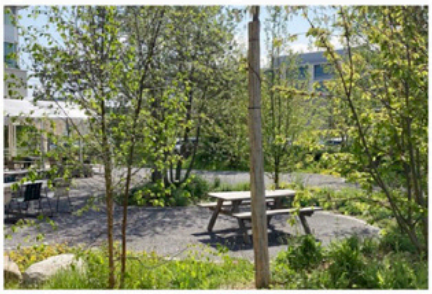
The proposed design retains the central lawns in their current state, serving as hubs for social gatherings and school events. Meanwhile, the smaller lawns beneath the oak tree canopy provide an opportunity for a vertical expansion of vegetation. Cascara trees, known for their small size and shade tolerance, can provide seeds as a food source for squirrels, birds, and small wildlife. All selected shrubs and flowering species are native to BC, easily obtainable as seedlings and well-suited to local growing conditions.

Maximizing the use of empty spaces, additional picnic tables will be placed which encourage people to gather and enjoy the green surroundings. Furthermore, a bioswale in the east lawn, with pipes underneath to collect rainwater will be implement, contributing to sustainable water management. The overall design maintains an open sight in the center while the other two sides introduce shade through dense vegetation, creating a balanced plan that preserves existing social spaces and enhances the area's greenspace quality.

4. PRECEDENTS

63rd and Yukon bioswale (MascallDance, 2021)

Combined Sewer and Drainage systems
Instead of directly discharging collected water into local waters, the project aim to filter and absorb it using soil and plant ecosystems. This process allows water to be reabsorbed into the ground, taken up by plants, and evaporated, effectively cleaning and capturing pollutants.



Basel,Switzerland (Bryum, n.d.)

Innovation Campus DSM
This new setup consolidates open space for daily campus use, relocates infrastructure and separates vehicular from non-motorized areas. Prioritizing more vegetation and less pavement is crucial for addressing climate change, while also offering new outdoor workspaces and a peaceful retreat during work hours.

Australia (UDLA, n.d.)

Bilya Marlee School of Indigenous Studies
The soft landscape showcases native species with different flowers, textures, and colours across the Noongar Six Seasons. Featuring 50+ endemic species, including 20 with medicinal and edible qualities, it aligns with the 'learning from the landscape' principle. Diverse seating options offer ample gathering spots, providing breaks from the busy campus and promoting outdoor learning.

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Site 3

Kylie Ip

Musqueam-led Planting at Thunderbird Boulevard Plaza

Date 18.12.2023
Class LARC 553 / Zoom Study / Project 3
By Kylie Ip

Project Background: Site-wide Propositions

In Project 2, our group focused on improving the study area on the UBC Campus* with policies related to cycling networks, land use and greenspace types, and habitat diversity (see Figure 1). One action to improve habitat diversity is to work with the Musqueam to plan and steward landscapes with Indigenous plants[1], and this zoom study will propose strategies for a site area to meet this goal.

*acknowledgement that I am a visitor, and this project is located, on the unceded, unsurrendered, and ancestral homelands of the xwməθkwəy̓əm (Musqueam) people.

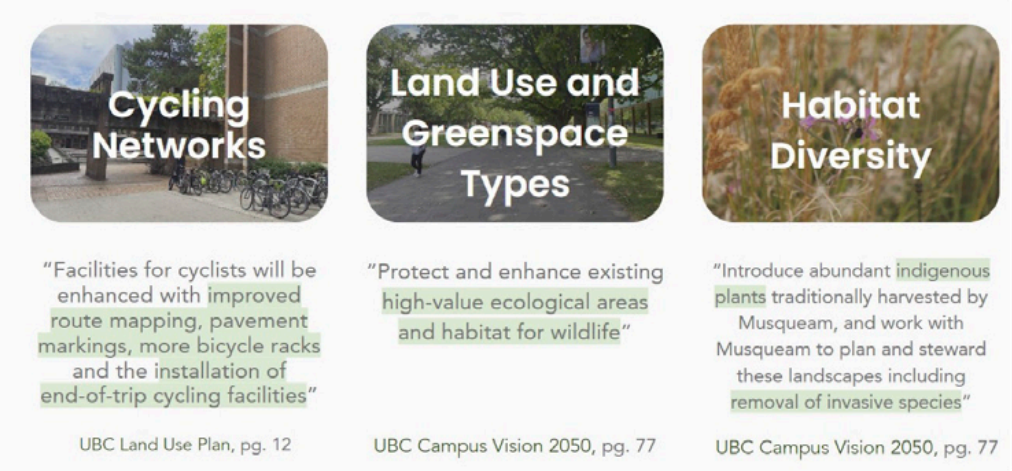

Figure 1. Three policies from the UBC Land Use Plan[2] and UBC Campus Vision 2050[1]

An important aspect of Project 2 was the consideration of the proposed green corridors envisioned for the campus in 2050[1]. Three greenways, namely the Main Mall, Diagonal, and East Mall corridors, will consist of prototype projects that shift from manicured lawn spaces to Indigenous landscapes that can help support ecology and integrated systems[1]. Figure 2 illustrates the three corridors and our group's site boundary, and the zoom study area was chosen to be located along the Main Mall corridor to support this plan.

Figure 2. Diagram showing the three proposed green corridors for the UBC campus in 2050[1]

Location of the Zoom Study Site

The zoom area that was chosen consists of the existing planted areas and lawn space around the plaza at Main Mall and Thunderbird Blvd (see Figure 3).

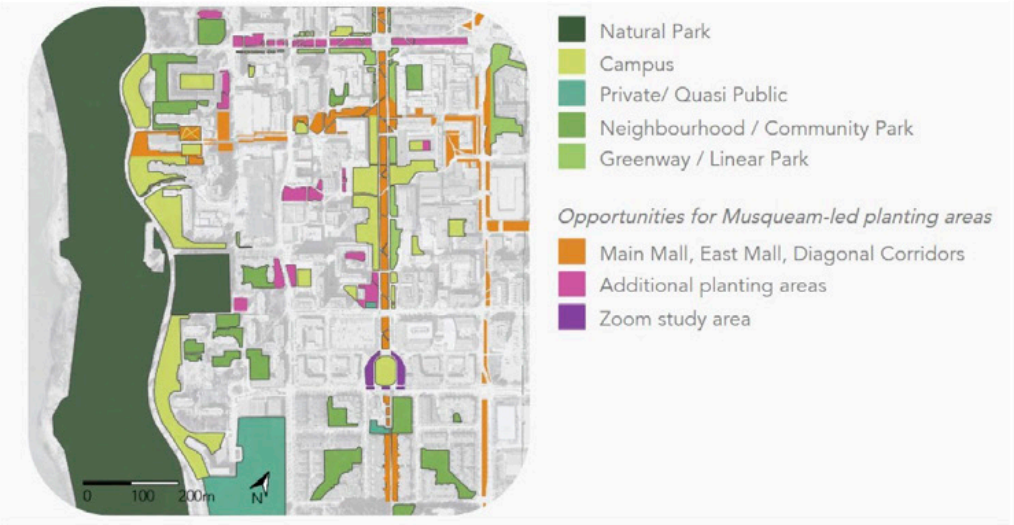

Figure 3. Zoom study area within the site boundary

This location was chosen for the following reasons:

- The zoom study area is located along the Main Mall Green Corridor envisioned for the campus in 2050[1]
- To help increase Musqueam presence on campus:
  - The Indian Residential School History and Dialogue Centre is located on the northern end of campus, and providing this planted space will help to increase presence on the southern end of campus).
  - The annual UBC National Day of Truth and Reconciliation march starts at the Indian Residential School History and Dialogue Centre and ends at the Reconciliation Pole – the garden space can provide a gathering space for event attendees at the end of the march.
- Close proximity to the Reconciliation Pole and future meadow planting – there is an opportunity for the proposed design to contribute to the connectivity of the two green spaces.
- The plaza offers seating arranged in an arena-like design and the lawn space is often used by students in the summer for picnics, field sports, etc. However, the planted area around the plaza is underutilized and there is an opportunity to enhance the existing planting with Indigenous plants.
- This plaza enjoys high foot traffic and is located close to academic buildings with faculties such as Land and Food System, Forest Sciences, and Landscape Architecture. While this designed space is open to all members of the campus, an Indigenous plant garden close to these faculties can provide learning opportunities to students and staff studying in these fields.

This project is a proposal and recognizes that continuous engagement with the Musqueam will be needed if this project is actualized. Our team also recognizes that there are opportunities for Musqueam place names for the newly planted spaces.

Precedent Study: Indigenous Garden at BCIT

An Indigenous Garden opened at the British Columbia Institute of Technology (BCIT) in 2022 as a peaceful space for staff and students to enjoy (see Figures 4 and 5). Tiered spaces provide planted areas at different heights, allowing easier access for children and seniors. The project was a collaboration between different campus partners, such as Indigenous Initiatives and Partnerships, the School of Construction and the Environment, and the BCIT Food Security group. Most importantly, this garden provides a place of belonging to Indigenous students while inviting all members on campus to participate in ceremonies to celebrate Indigenous culture[3]. The takeaways from this project are the considerations for accessibility in the designed space, collaboration between campus partners, destigmatizing food insecurity, and providing a grounding place for campus members to engage with Indigenous presence and values.

Figures 4 and 5. Photos of the newly planted Indigenous Garden at BCIT

Precedent Study: Kalamalka Indigenous Garden at Okanagan College

The K'nmaĺka? Sənqâĺtən (Kalamalka Garden) was created in 2017 as a community project and is located at the Okanagan College in BC (see Figure 6). Containing Indigenous plants from the Okanagan territory, the space features garden beds and pathways constructed from recycled materials. Workshops led by the Okanagan Indian Band (OKIB) are held to teach about medicinal plants and tours of the garden space are also planned throughout the year. Indigenous students are also hired to work in the garden during the summer months and OKIB members volunteer their time to share knowledge with garden employees[4]. This project is a good precedent in its consideration of sustainable building materials and teaching opportunities.

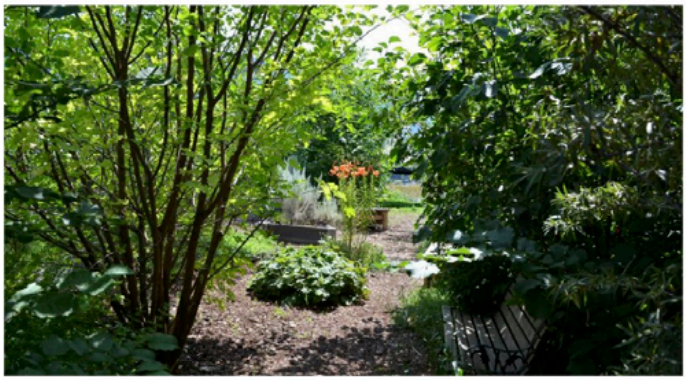

Figure 6. Photo of the Indigenous Garden at Okanagan College

Zoom Study Plan Diagram and Design

The plaza and surrounding lawn spaces are located at the intersection of Main Mall and Thunderbird Blvd (see Figure 3 and 7). As the central lawn area is frequently used by students for activities in the summer, it is proposed that parts of the lawn space be retained to sustain these activities. However, the periphery lawn areas are underutilized and can be improved with a new planting scheme to improve the quality, function, and green connectivity of the space. In terms of circulation, the existing space works well for pedestrians and cyclists as two sidewalks flank the sides of the plaza (one with a staircase and one with a gently sloped ramp). These existing paths can lead from the Main Mall down to the proposed planting areas. Figure 8 illustrates a cross-section of the site, and Figure 9 shows a perspective of the site of before versus after the design proposal.

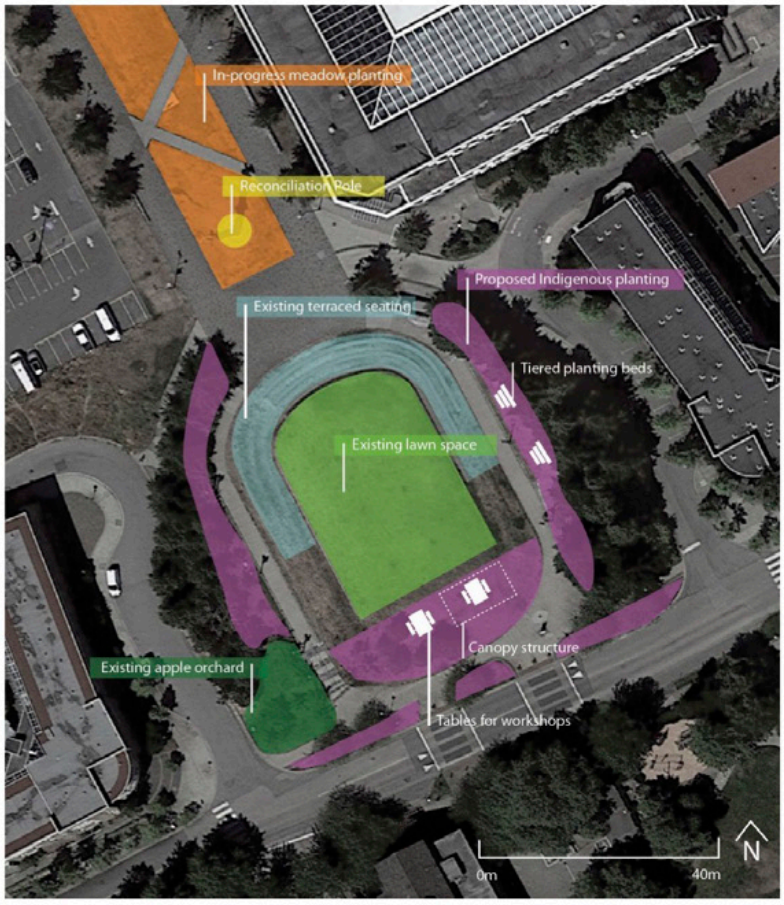

Figure 7. Proposed plan of the zoom area site

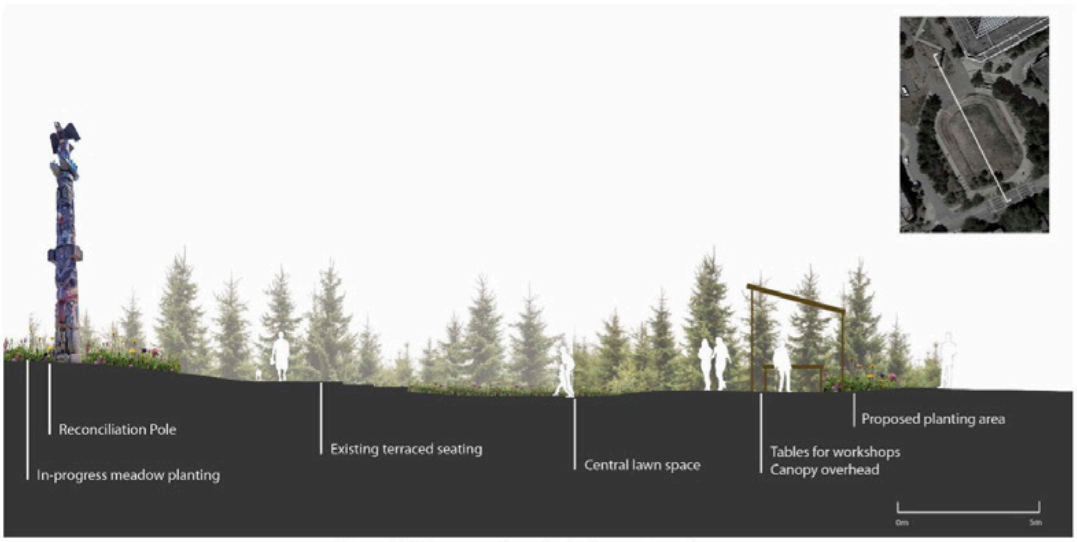

Figure 8. Cross-section of design proposal

Figure 9. Perspectives of before and after design proposal. Base imagery courtesy of Google Maps.

The planting plan of the spaces will be informed by the Musqueam. Figure 10 shows a selection of plants that are traditionally important to the Musqueam and can be considered in these planted spaces.

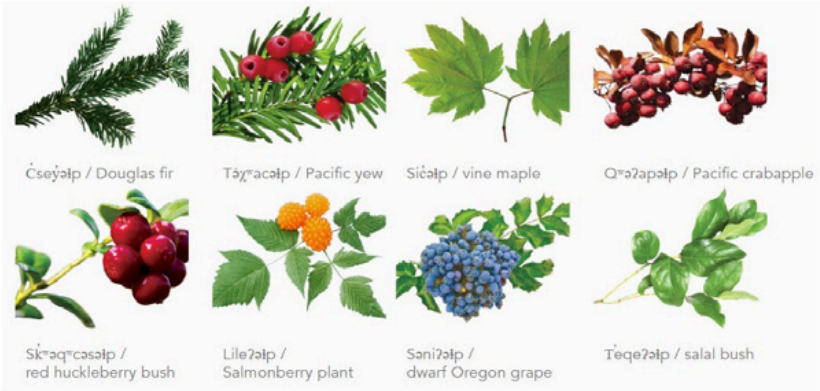

Figure 10 Examples of plants with Musqueam plant names[5]

Finally, community engagement is a key part of the proposed design. Ideas are listed below and are a suggestion of the opportunities this space can provide:

- Tables and benches are provided to allow areas to host Musqueam-led plant workshops and tours of the garden.
- Canopies can also be a welcome addition to provide shared areas for garden workers and visitors, especially for elders during the hot summer months.
- Tiered beds can provide accessible planting beds
- Signs with Musqueam and English plant names to familiarize the community with hən̓q̓əmin̓əm (the Musqueam language) and Musqueam history and traditions
- Build structures can use recycled and/or reclaimed materials, with potentials for art displays and community build workshops
- Knowledge exchange between this garden and the UBC xʷc̓c̓əsəm Garden[6]to allow for student internship programs, workshops, etc.

The proposed re-design of the plaza space offers many functions and ecosystem services, including the following:

- Strengthen and recognize Musqueam presence and land stewardship values
- Support green connectivity across campus
- Increase plant diversity and ecology
- Increase places for learning and knowledge exchange
- Contribute to food security for students and staff
- Maintain space for outdoor recreation and seating areas
- Increasing the beauty and sense of place for students and staff

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Site 3

Hoi Ying Ng

Zoom Study: Pollination Meadow

Hoi Ying Ng 46550216

In Assignment 2, our group delved into three policies, one of which focused on "Protecting and enhancing existing high-value ecological areas and habitats for wildlife" aligning with Campus 2050 (pg. 77). Within this policy, we established specific goals, including a) increase vertical, diagonal, and east mall green corridors to forested areas; b) increase pollinator patches; and c) identify lawn spaces and green spaces as intervention opportunities.

Figure 1. Ecosystem Sensitivity

Site of interest

In the zoom study, the site of interest is the lawn outside of Totem Park Residence near Northwest Marine Drive, as illustrated in the black box in Figure 1. This site was chosen due to its current use as an underutilized lawn space, occasionally hosting events such as Jumpstart. The location holds significant potential for achieving diagonal green corridors, particularly given its proximity to the Forested area near Wreck Beach and Orchard Garden. Both of these areas are highly sensitive to ecosystems, this presents an important role of the current site as a unique opportunity to enhance the overall ecosystem value.

The zoom study highlights several key goals, including 1) enhance the overall biodiversity of UBC and forested areas by promoting a diverse range of pollinator species; 2) increase native plantings to uphold and restore ecosystems; and 3) reinforce habitat connectivity by facilitating the movement of pollinators between fragmented areas between the forest and orchard garden.

Existing ecosystem species

Precedent study: Arbutus Greenway

The Arbutus Greenway project spans a 9km north-south transportation corridor, stretching from near West 1st Avenue to Milton Street. The project's overarching aim is to establish a city-wide network of interconnected parks and green spaces, thereby expanding the greenway experience and enhancing habitat connectivity, green infrastructure, and naturalized areas (see Figure). Furthermore, the greenway seeks to uphold natural corridors for pollinators by linking larger habitat patches within neighboring parks using ecologically diverse treatments. This is achieved through the strategic planting of meadows featuring pollinator-friendly species and a mix of native plants along the entire greenway. This approach is exemplified in the design of multiple zones, with a more detailed plan for a pollinator meadow presented in Figure_. Notably, Zone 3, known as "The Ridge" between West 16th Avenue and King Edward Boulevard, incorporates various programs, including gathering spaces for people to sit, relax, and enjoy the surroundings, while simultaneously enhancing wildlife habitat through the cultivation of pollinator-friendly plants. While this initiative spans the entire city, it serves as a valuable precedent for envisioning the future of UBC in the enhancement of its green corridor.

Figure 2 : Map of the Arbutus Greenway's design zone

Figure 3 : Zone 3 Perspective Drawing

Precedent study 2: Burrard slope

Zooming in on a smaller-scale pollinator park within Vancouver is the pop-up park located in Burrard Slope Park. It is a 0.3-acre pollinator park at the intersection of West 5th and Pine Street and became available following a building fire and subsequent demolition in 2014. This park prioritizes outdoor seating and group dining with long tables, hosts a colorful wildflower meadow for pollinators, integrates edible plants like berry-producing shrubs, and showcases sustainability through recycled materials and rainwater capture, notably in gabion seatings and walls. It is also a collaborative effort between the Vancouver Park Board and UBC students through City Studio Vancouver. This project sets a valuable precedent as it collaborated with students, offering learning opportunities, and revitalized a former grey space into a pollinator meadow.

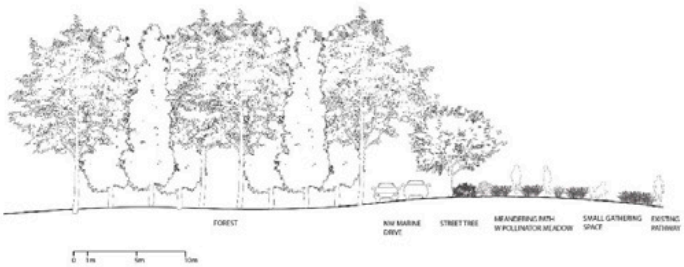
Source: Photos Taken by Hoi Ying Ng

Site Plan

Figure 4 displays the site's program plan; the whole site will be a pollinator meadow. Additionally, the site features diverse programs, including expansive lawn areas for accommodating large gatherings, intimate spaces designed for students in nearby residences, and exploratory elements like meandering paths surrounding the pollinator meadow.

Figure 4: Site Plan

Section



This section cuts from the forest to areas of meandering path in the pollinator meadow and small gathering space. The site will be surrounded by pollinator meadow.

Figure 5: Section

Perspective

Diagrams: Guiding principles

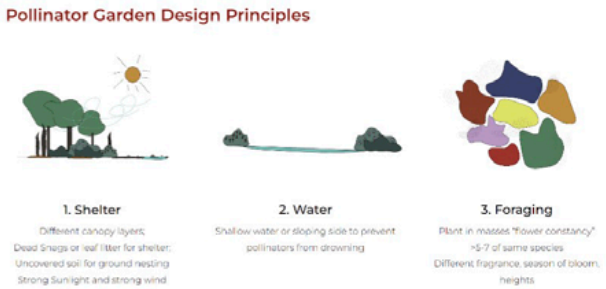


Figure 6: Design Principles

Plant Trait	Pollinator		
	Bees	Birds	Butterflies
Colour			
Nectar Guides	✓		✓
Odour	Fresh; mild; pleasant	None	Faint but fresh
Nectar	✓	Ample; Deeply hidden	
Pollen	Sticky; Scented	Modest	Limited
Flower shape	Shallow; Landing Platform; Tubular	Large funnel like; Cups	Narrow tube with spur; Wide landing pad

Figure 7: Pollinator and plant relationships

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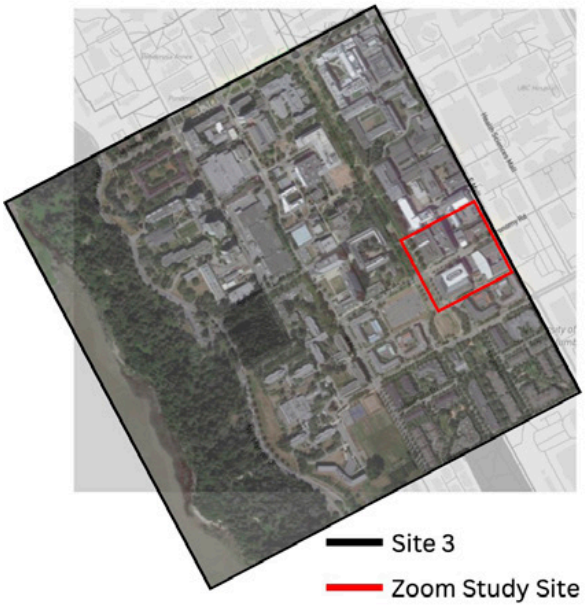
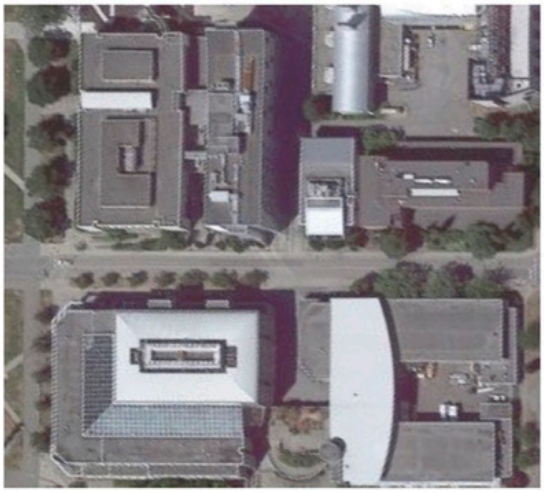
Site 3

Anson Pao





Zoom Study Site

Site 3 is bounded by University Blvd, East Mall, and Lakin Dr on the UBC campus. Our analysis indicates a need to improve human and wildlife connectivity and habitat fragmentation, restore traditional white roofs to green roofs, and mitigate excess rainwater. Our proposed proposition includes increasing the AAA bikeways within green corridors, green roofs on green buildings, and bioswales along University Blvd. On the left, this zoom study site includes a portion of Agronomy Road and Main Mall. The zoom study site appears to be not cyclist-friendly due to its lack of official bikeways. As well, trees are not connected underground, as they are planted in their individual soil cell. Rainwater management can be improved due to the vulnerability of extreme rainfall on the UBC campus.

Site 3 Context & Site-wide Propositions

credit: https://www.amherst.edu/about/sustainability/greenway

Biodiversity Habitats

Utilize the existing green building plan to increase the abundance of green roofs in UBC

Enhance urban biodiversity as a tool for climate action through nature-based solutions, such as increased tree canopy and green roof
- Campus Vision 2050

credit: https://www.amherst.edu/about/sustainability/greenway

Accessibility & Connectivity

Ensure that green spaces are easily accessible to the public and interconnected through green corridors, facilitating movement for humans and wildlife

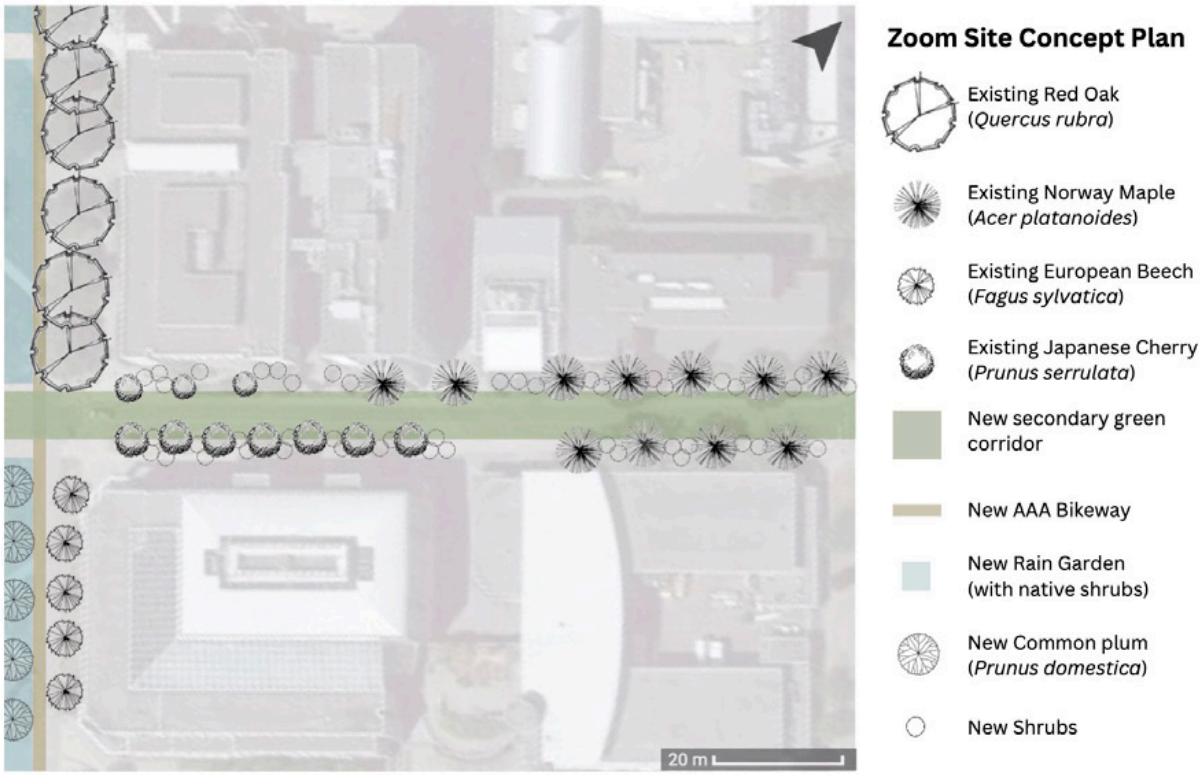
Redesign and redevelop streets according to the function and priority of the street
- UBC Land Use Plan 2023

credit: UBC Campus Vision 2050, UBC Campus + Community Planning (C+CP)

Blue and Green Water Management

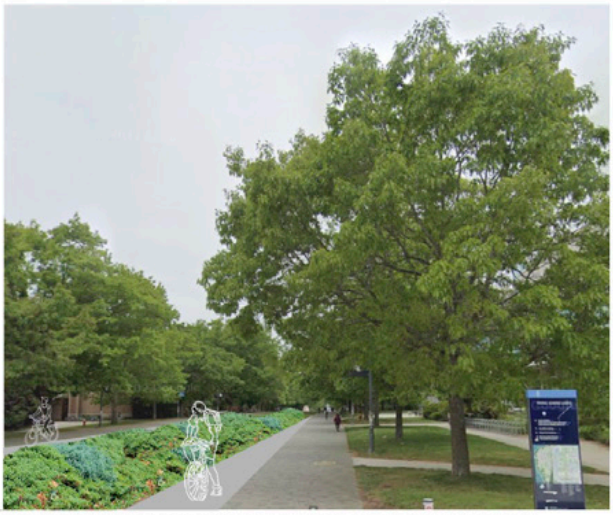
Promote Sustainable Water Management: Green and Blue infrastructure

Implementing nature-based solutions for rainwater management that address green space and climate adaptation needs
- UBC Campus Vision 2050



The zoom study site includes Agronomy Road and Main Mall, which are the major proposed redesign areas. A major change is to transform Agronomy Road into a secondary green corridor, as a restricted tidal flow road. Only authorized vehicles and bikes are allowed to enter. A new 1.5m AAA cycling route is added along Main Mall, to enhance accessibility and mobility of bikers, as Campus introduces 10 new e-bike share stations. The lawn area along Main Mall is to be transformed into a comprehensive rain garden system with additional native shrubs and hydrophilic plants. To establish a connection to the community garden next to the Landscape Annex and apple trees orchard within the forestry oval, and build a relationship with the indigenous honorable harvest concept, a new row of Common plum (*Prunus domestica*) is to be added along the bioswale system, close to the reconciliation pole. This can recognize indigenous culture and brings faculty members together.

Agronomy Road with restricted vehicle access and more native shrubs can increase the accessibility of road users and attract pollinators.
Image credit: https://www.google.com/maps



Main Mall with AAA bikeways and rain garden can manage excess stormwater, increase habitat availability, and increase connectivity.
Image credit: https://www.google.com/maps

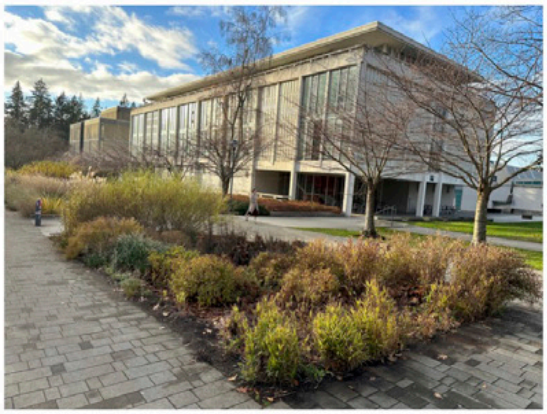
1 Secondary Green Corridor

The award-winning green corridor project in Medellin can ease the safety issues of cyclists, reduce urban heat island effects, and improve air quality. This is done through planting tens of thousands of native trees along sidewalks.

Precedent: Tree-shaded pathway in Medellin, Colombia

Image credit: https://news.trust.org/item/20210728130018-qufqy/

2 Rain Garden



This rain garden design along Memorial Road on the UBC campus includes various shrubs, grasses, and small trees. It helps to retain and infiltrate excess rainwater, as well as increase urban biodiversity habitats.

Precedent: UBC Memorial Road

Image credit: Anson Pao, Nov 22, 2023

3 AAA Bikeway

With growing numbers of people biking and walking in the cityscape, this protected AAA bikeway in Carrall Street, Vancouver is installed aiming to reduce road user conflicts and limit the traveling speed with narrower travel lanes. Street trees also calm the traffic by narrowing the driver's view. The designated AAA bikeway is crucial to protect the safety of cyclists.

Precedent: Carrall Street Greenway in Vancouver

Image credit: Paul Krueger, https://www.sightline.org/2018/08/07/how-complete-streets-can-be-green-streets/

4 Common Plum Street Tree

Common Plum (*Prunus domestica*) is famous for its purple-red color foliage. This tree likes full sun or partial shade, so it can be grown in a row without upperstory trees. Common plum's fruits are edible, with tartness and sweetness. This tree honors the honorable harvest concept due to its edible fruits and its indigenous provisioning value.

Precedent: Common Plum as ornamental street trees

Image credit: https://gardentabs.com/is-purple-leaf-plum-tree-fruit-edible/

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Site 3

Xiaofan Shen

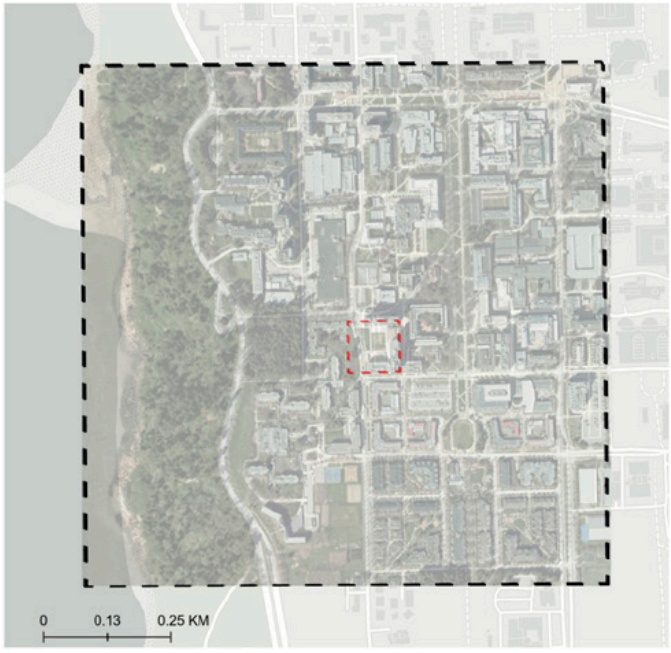
LARC 444- Green Network Planning

Term project 3-Zoom Study

Xiaofan Shen (62631445)

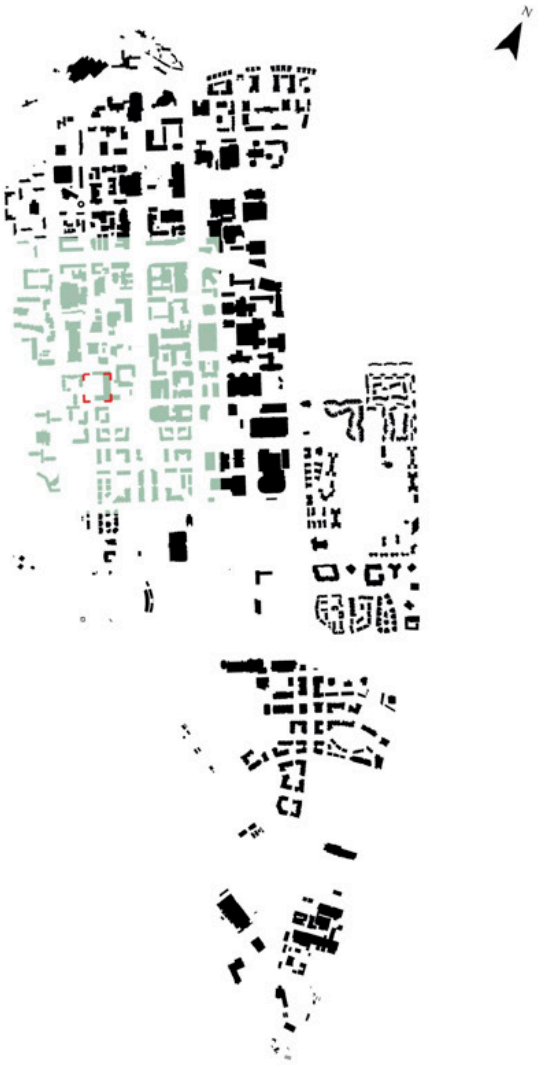
Dr. Cynthia Girling & Dr. Keunhyun Park

December 18, 2023



Site 3: West UBC Vanouver Campus

Zoom Location: Orchard Commons Student Residence



Study Site Context and Propositions

①

Proposition 1:
Greenspace Improvement & Climate Adaptation

Proposition 2:
Habitat Protection and Biodiversity

Proposition 3:
Connectivity and Greenways

Legend

- Existing Greenspaces
- Existing Trees
- Added New Trees
- Potential Greenspaces to Improve
- Existing Sensitive Habitats
- Proposed Livable Shorelines
- Proposed Green Edges
- Potential Green Roofs
- Pedestrian
- Bikeways
- Bus Routes
- Bus Stops (68)
- Existing Trails
- Proposed New Trails
- Proposed Greenways

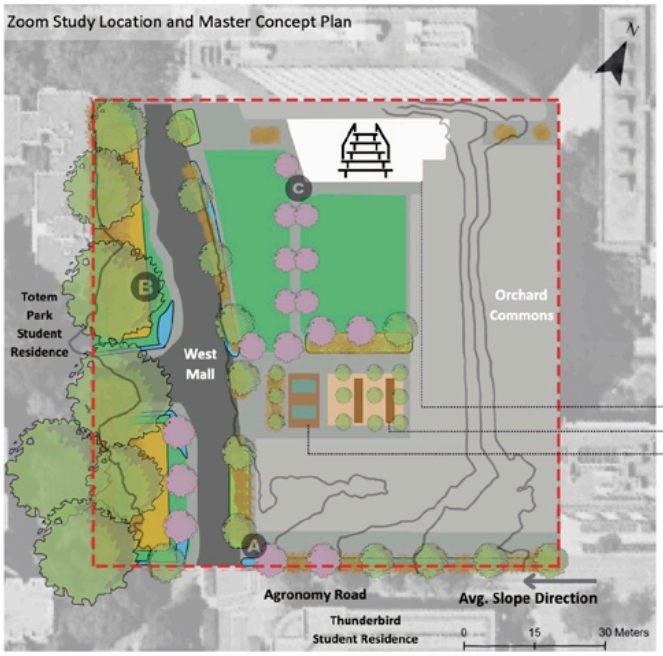
The study site (Site 3) is situated on the western side of the University of British Columbia Campus, Vancouver. It is located south of the intersection of East Mall and Thunderbird Boulevard, roughly in the central part of the UBC campus. The left third of the site is composed of coastline and the Pacific Spirit Park, while the remainder is the UBC campus, delineated by Marine Drive.

Site 3 has diverse land-use types, the dominant ones are academic buildings (32%) and greenspaces (27%), while only 0.4% is used for commercial purposes. The campus part is a pedestrian priority zone[1] with several bikeways along the main roads and a community shuttle bus route (68).

Based on our analysis, although site 3 has diverse types of greenspaces, most are monocultural and manicured. And it's important to improve connectivity between greenspaces in UBC and western sensitive habitats. Other priorities include increasing biodiversity in the face of climate change, supporting active transportation and optimizing on-site transportation networks.

Considering the above diagnoses, three proposals were developed to improve the green networks in site 3. Firstly, we propose to improve poor-quality greenspaces through specific redesigns with public engagement based on particular site conditions. More tree species which are resistant to future climate will be added as well. Secondly, we encourage building livable shorelines and green edges along Marine Drive to protect sensitive habitats. We also hope to explore the potential of roofs to be the new arena for greenspaces. Lastly, we suggest supporting active transportation via greenways and carefully creating new trails for the public to access natural areas.

Zoom Study location and Plan Design



The above plan illustrates all proposed designs, including adding trees that are resistant to climate change; naturalizing existing sparse lawns and building community gardens for public engagement. Considering overall topography and runoff direction, green infrastructures like rain gardens will be implemented and some existing planters will be improved to serve as bioswales. Another important technique for solving this issue is replacing the impervious surfaces on the sidewalks along the main roads with porous asphalt or pervious concrete.

The central sprawling lawns are essential outdoor places for recreation and enjoying the sunshine. However, existing turfgrass and vegetation are in poor conditions which could be redesigned to achieve higher biodiversity. As this site is mainly used as residences, the underutilized open spaces at the left side of this plan could be used to build more community gardens.

(2)

The zoom study is situated at the central part of Site 3 within the UBC Campus, including the greenspaces near the Totem Park Student Residence, a section of the West Mall and the open spaces surrounded by the Orchard Commons Student Residence. These greenspaces served as complementary outdoor spaces for students, faculty staff and children. Finished in 2016, new Orchard Commons buildings were built, and the main design principles for open spaces here are creating multi-purpose green pockets for different visitors considering different levels of accessibility and mobility. These greenspaces have successfully brought a sense of peace and ownership amidst the bustling campus, while there is a lot of potential for improvement based on the site-wide proposals.

Photo Credit: Xiaofan Shen, December, 2023

In terms of connectivity, cyclists share West Mall with vehicles due to the limited road width (around 7m), so it's difficult to create separate AAA cycling routes. More trees and green infrastructures would be added to provide shade, traffic calming and more ecosystem services for them and other users.

A: Proposed Design for the Intersection of Agronomy Rd and West Mall

Achillea borealis Bong. yarrow (boreal yarrow)[2] *Andromeda polifolia* L. bog-rosemary[3] *Cornus sericea* L. red-osier dogwood[4]

Runoff Direction

Big Ideas: 1) Using permeable paving to absorb stormwater and decrease the amount of runoff. 2) Creating rain gardens in the corner with native species (waterlogging-tolerant). 3) Integrating art into the streetscape with residents and children from nearby childcare.

B: Proposed Community Gardens near the Totem Park Student Residence

Design Details and Precedents

Precedents

Diagram 1: British Columbia Landscape and Nursery Association Office, Vancouver, BC, CA.

This rain garden used diverse sun-tolerant plants that were also well-adapted to manage substantial amounts of water. It excels in absorbing and filtering water, transforming the drab urban setting into a fashionable and lively haven of beauty.

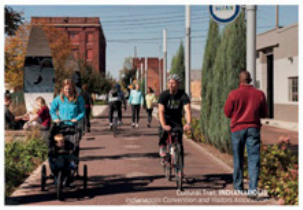


Diagram 2: Indianapolis, Indiana, USA.

This cultural trail, designed by the Indianapolis Convention and Visitors Association, decreases the amount of impervious surface cover through the use of permeable pavement materials allowing water to infiltrate through streets and sidewalks, reducing runoff.

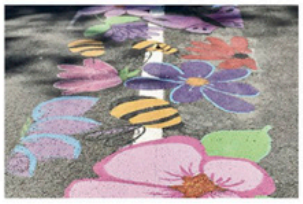


Diagram 3: Arbutus Greenway, Vancouver, BC, CA.

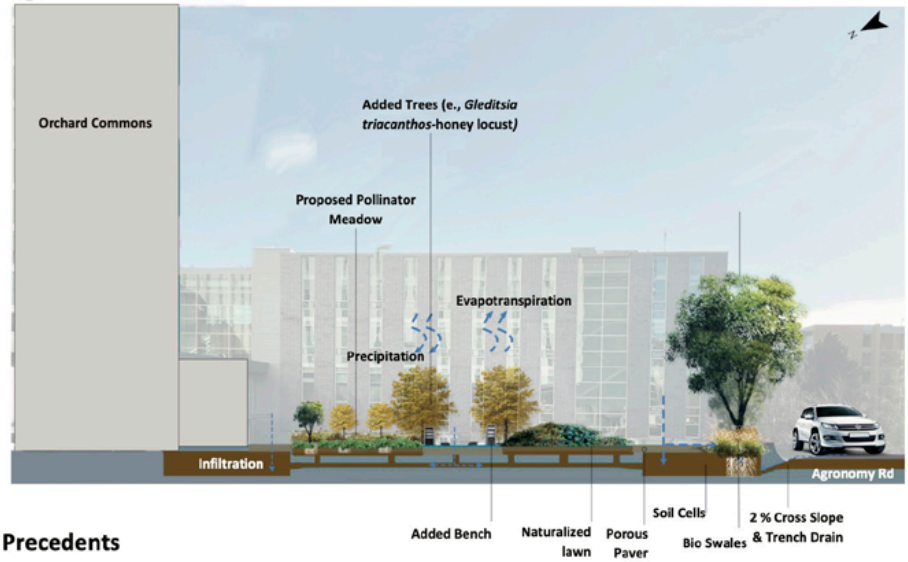
Public art along the Arbutus Greenway engages with the community and greenway users. This approach successfully enriches the experience of the Arbutus Greenway for the greenway users and the various audiences living and working in the surrounding neighbourhoods

Diagram 4: The Agronomy Garden, Vancouver, BC, CA.

This community garden is close to the zoom study site whose goal is to showcase environmental and social stewardship of plants and food. It serves as a living laboratory space for students, faculty, and staff to experiment within a visible community gardening space at UBC.

Big Ideas: 1) Engaging residents and others to co-create community gardens. This is beneficial to physical health, biodiversity improvement and food security. Community collaboration could also bring a sense of stewardship and belonging.

C : Cross-section diagram of the proposed open spaces near Orchard Commons



Big Ideas: 1) maximize the usage of stormwater with permeable paving, soil cells, and trench drains, a 2% cross slope near the lanes to enable more stormwater flows to the trench drain. The water would then be absorbed by the left plants' roots. The whole below-ground system is planned to form a sustainable cycle and enhance local resilience. 2) Naturalizing existing turfgrass with native species to create pollinator meadows. This large area has great potential for both biodiversity improvement and recreation. 3) Planting more trees which could survive considering future climate change like the Honey locust. New trees are proposed to be planted along the pedestrians near the lawns to provide shade and buffer outer traffic pollution. 4) Redesign current greenbelts to build a line of bioswale with native herbaceous and shrub plants.

Precedents

Diagram 5: Chicago, Illinois, USA.

To achieve the Green Alley Program, the city of Chicago uses porous pavers that allow water to pass through the surface and percolate through the existing subsoil. This technique reduces the rate and quantity of stormwater runoff and helps to recharge groundwater.

Diagram 6: Darrow Road Park, Hudson, Ohio, USA.

The newly restored pollinator meadow has reintroduced lost native flowers and grasses to support and restore native populations of bees, and other insects which also increase the population of songbirds. This meadow will increase wildlife biodiversity, improve soil and water quality and offer a beautiful natural environment for park visitors

Diagram 7: Central Park, Manhattan, New York, USA.

The honey locust is a medium-sized deciduous species which offers a sense of seasonality to this park. The off-white-coloured flowers appear in spring, and its dense vase-shaped canopy also provides shade for visitors in summer.

Diagram 8: Indianapolis, Indiana, USA.

The design of this cultural trail helps the city save money by not having to treat the water that is now diverted to the bioswales. These bioswales with native herbaceous and shrub species beautify the streetscape of downtown Indianapolis while providing a natural barrier from vehicle traffic.

④

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9. **Diagram 5: City of Chicago. (2010).*Porous Pavement*. https://www.chicago.gov/content/dam/city/depts/cdot/Green_Alley_Handbook_2010.pdf**
10. **Diagram 6: Friends of Hudson Parks. (n.d.). *Pollinator Meadow At Darrow Road Park*. https://friendsofhudsonparks.org/pollinator-meadow-at-darrow-road-park/**
11. **Diagram 7: Central Park Conservancy. (n.d.). *King Jagiello.* https://www.centralparknyc.org/locations/king-jagiello**
12. **Diagram 8: Rundell Ernstberger Associates. (2015). *Bioswales: Sustainability Along the Cultural Trail*. https://indyculturaltrail.org/2015/06/02/bioswales-sustainability-along-the-trail/**

Site 5

Bridget Bi

ZOOM STUDY

BRIDGET BI

LARC 553 Green Network Planning

Dec, 2023

The assigned study area is located at the southwestern side of the campus where the UBC botanical garden and the Thunderbird Arena as the key destinations. Its area diagnosis indicates the monocultural and limitated presence of pollinator-friendly, multi-layered native habitats in the fragmented blue-green system. Therefore, the design aims to develop an interconnective system of rain gardens benefiting human and widelife users. The major road Ross Drive and the parking lot beside the U-Hill Secondary School are the focus of site design as safety building and educational opportunities for students.

ZOOM STUDY AREA

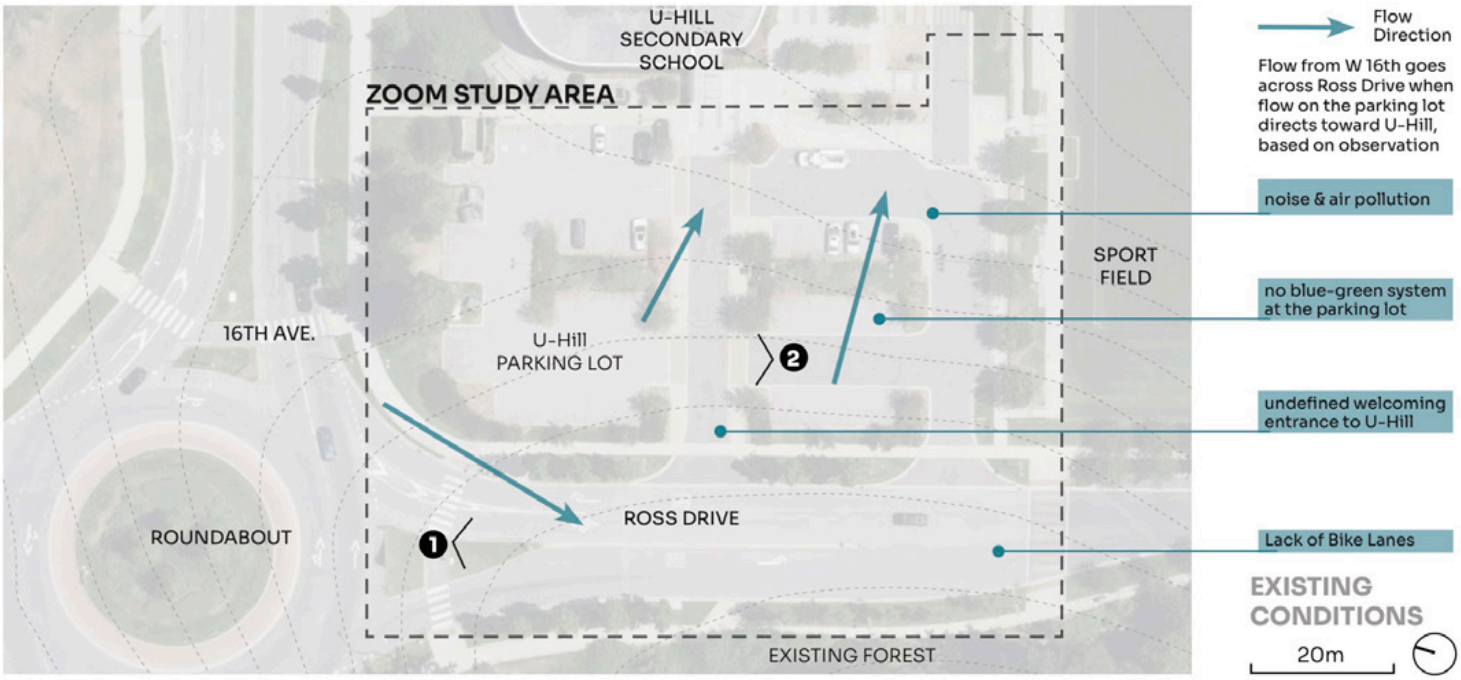
- Proposed Greenway
- AAA Bikeway
- Bioswale (Major)
- Bioswale (Minor)
- Tree Trench Lane
- Rain Garden

Bi 1

1 Facing Ross Drive near the Roundabout

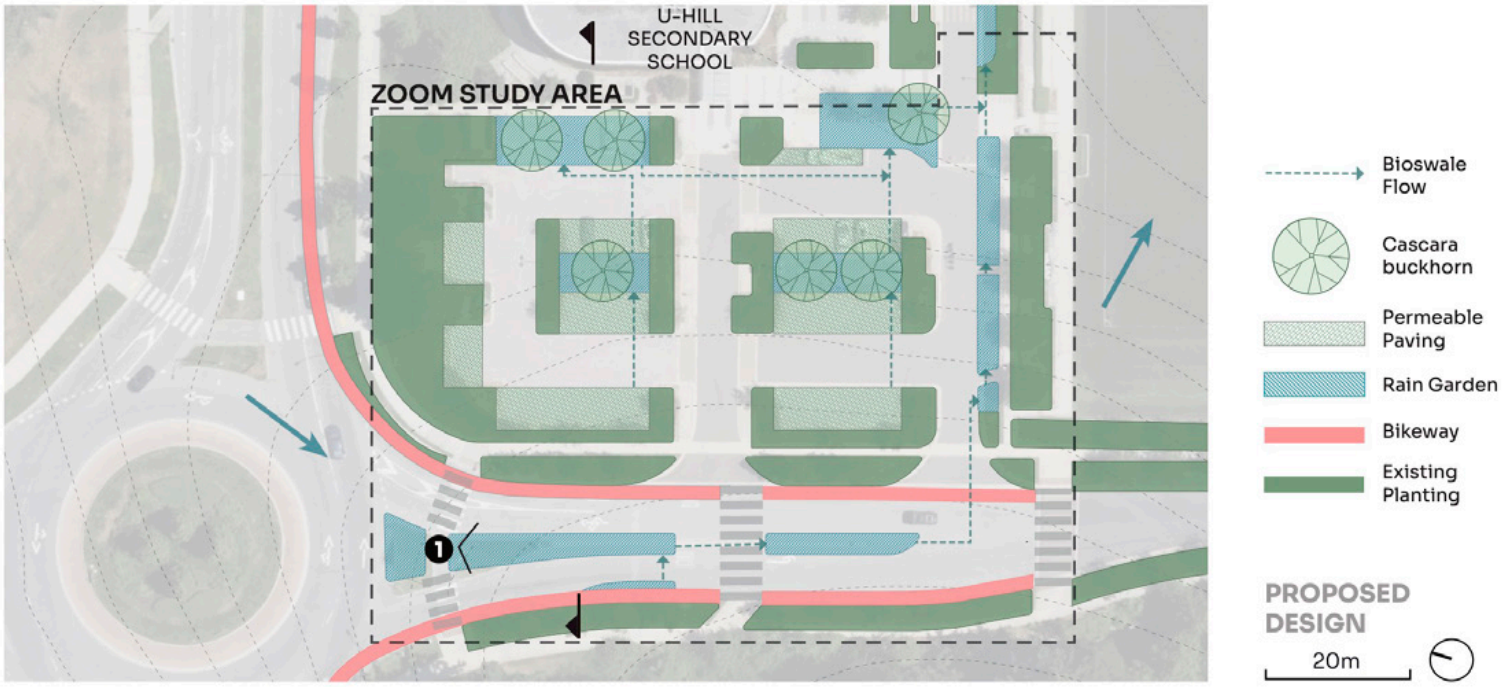
2 Facing the 16th Avenue at the U-Hill Parking Lot

On Ross Drive, the existing curb extension of the median planting does not well perform slowing down the turning traffic, increasing safety concerns. The drive also lacks bike lanes at one of the arrving entrances to the U-Hill. After rainfall, water retains and forms multiple puddles at the parking lot. Existing planters Magnolia and Acer grow sparse leaves before winter and does not form noise buffers between the school and the driveway.



❶ Facing Ross Drive near the Roundabout

The 1.8m-wide painted, buffered bike lane at both road sides are created to ensure safety and visibility of bike users, merging into a shared bikeway on Ross Drive. The median rain garden manages rainwater flow from the 16th avenue and slows down the traffic naturally at a narrower intersection after two lanes of the driveway are removed to leave space for new functionality. Interlocking turf permeable parking spaces help reduce flood risks and redirected rainwater to the nearby rain garden for filtration. While maintaining green spaces where lighting posts are located at, two median planting spaces at the parking lot are changed to rain gardens based on the site observation of large amounts of water accumulation on the asphalt paving. The parking stalls and large concrete paving space beside the school building also become rain gardens to form more effective noise buffers and increase biodiverse values. The interconnected blue-green system continues the outdoor educational oppurnities along the bioswale at the east courtyard of the secondary school.



Bi 3

1 Rain Garden/Bioswale

- Acknowledge culture and planning values of the Host Nations
- Improve water quality
- Create multi-layered planting to grow biodiverse values
- Increase buffer width to reduce air & noise pollution

Percedent: Rain Garden Project at 8th Ave. & Pine St., Vancouver

2 Curb Extention

- Slow down traffic speed near school at a narrow intersection
- Increase driving attention to see pedestrains, especially students
- Create additional space for rain garden planting

Percedent: spring street project, city of Aurora, IL.

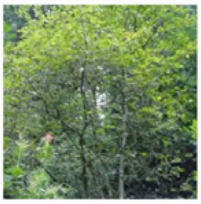
3 Painted, Buffered Bikeway

- Create buffered bike lanes to enhance users' safety and increase their visibility
- Improve eosystem services for commuting and education
- connect bikeways to the campus and west 16th ave.

Percedent: University of Washington Campus Master Plan, Sasaki

4 Permeable Paving

- Perform flood risk reduction
- Reduce pollutant concertration in the orignal pavement
- Redirect collected rainwater to the nearby rain garden for filtration and irrigation
- Help balancing ground temperature in both hot and cold weather



Frangula purshiana cascara huckhorn

- zone 4-9
- full sun to shade
- spreading cover
- silver-grey bark
- attractive to birds

Vaccinium ovatum evergreen huckleberry

- zone 7-9
- upright habit
- edible hedge
- pollinators

Cornus sericea red osier dogwood

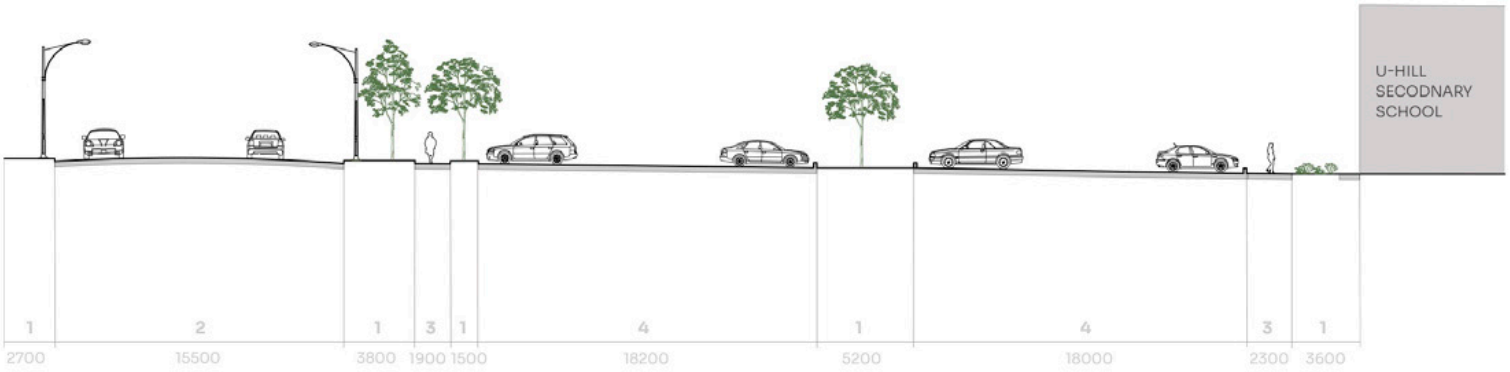
- Zone 3-8
- red stems
- pollinators
- tolerants drought and compaction

Juncus ensifolius dagger-leff rush

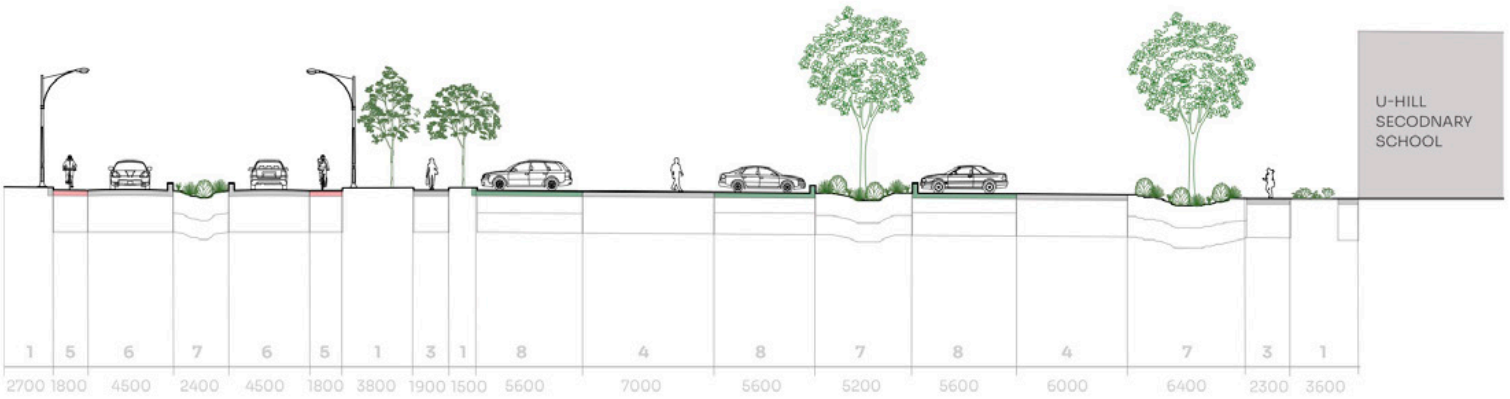
- Zone 4-9
- evergreen
- gray-blue stems
- versatile form
- drought-tolerant

5 Native Planting Palette for Rain Gardens

The native palette is drought-tolerate and mostly cold-hardy, adapting the city's changing climates. The city hardiness might become zone 8-9 based on the predication from the city's Urban Forest Strategy.



EXISTING CONDITIONS



PROPOSED DESIGN

1 Existing Planting
2 Asphalt Driveway
3 Sidewalk
4 Asphalt/Paved Parking Lot
5 Buffered Bike Lane
6 One-Lane Driveway
7 Rain Garden
8 Permeable Paving

10m

Bi 5

REFERENCE

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Site 5

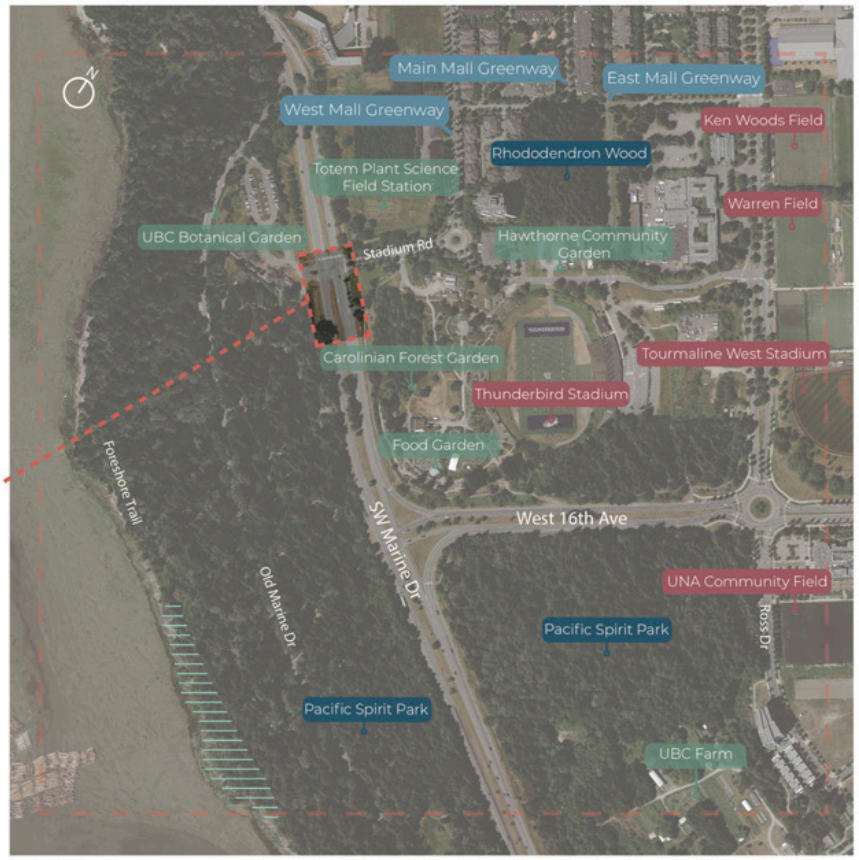
David McKenna

1 HECTARE

A GREENER MARINE DRIVE

David McKenna
LARC 553: Assignment 3
Dec 18, 2023

The initial study area looked at the southwest side of UBC campus, including the UBC botanical garden, Thunderbird Stadium and parks of Pacific Spirit Park. The initial analysis revealed there to be a high amount of both green space and biodiverse habitat however the main issues found were a lack of linear greenways, limited protection for cyclists on major bikeways, and many quasi private green spaces that were not available or easily accessible to users on site. The proposals focused on protecting established cycling routes, increasing accessibility to quasi private greenspace and connecting fragemented habitats by taking advantage of small unused lawn areas across the site. This zoom study examines the intersection of Stadium Road and Southwest marine drive in an attempt to address all three aspects of the site wide proposals.



ZOOM STUDY AREA

LEGEND

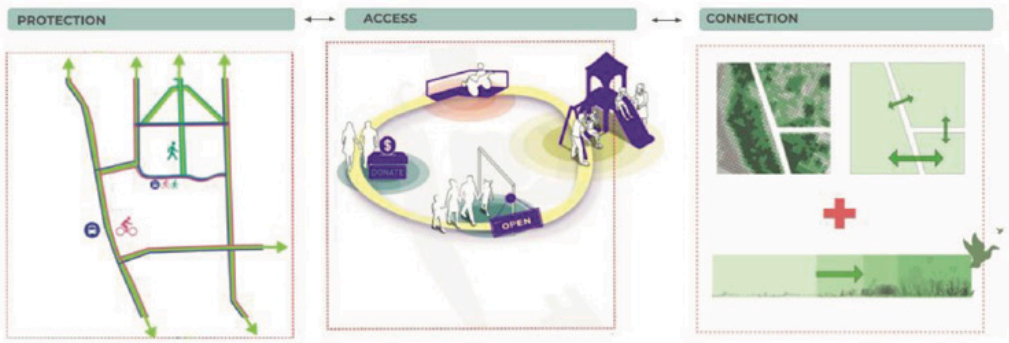
- Major Greenway
- Parks and Forests
- Sports Fields
- Site Boundary
- Ecological Restoration Area
- Farms and Gardens

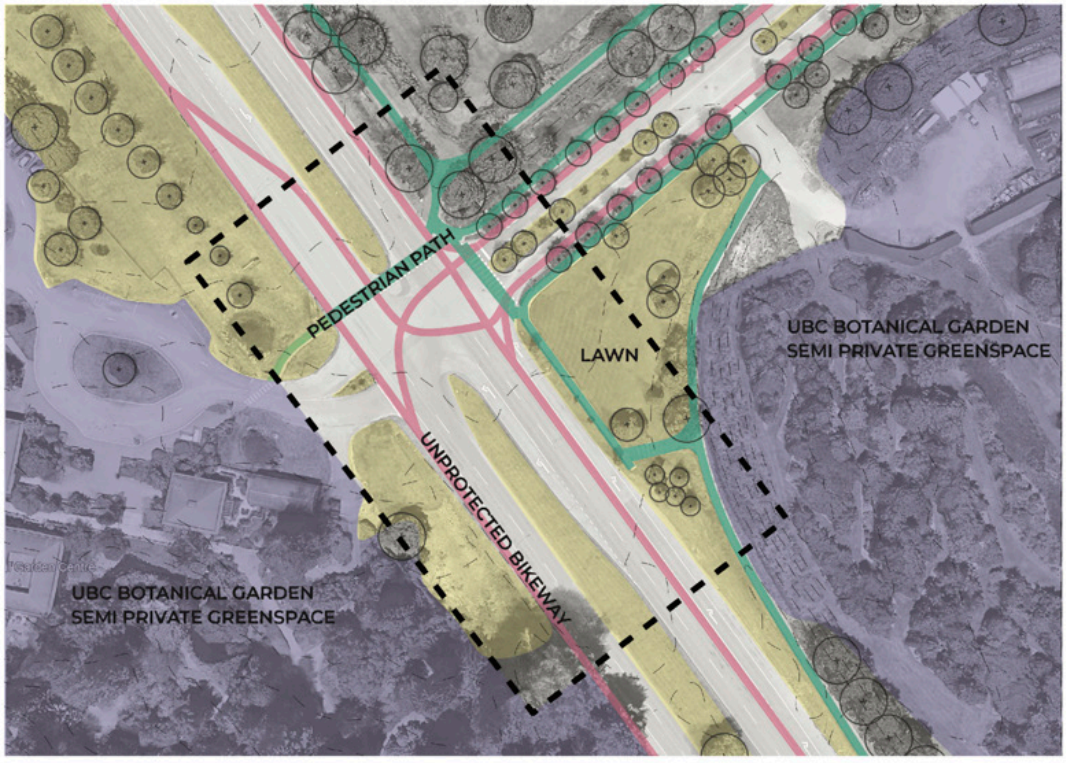
STUDY AREA

SW MARINE DRIVE - STADIUM ROAD

The existing site would require considerable multi-jurisdictional design and consulting work, as there are three governing bodies at play. This proposal takes policy and planning goals from each of these governing bodies into account.

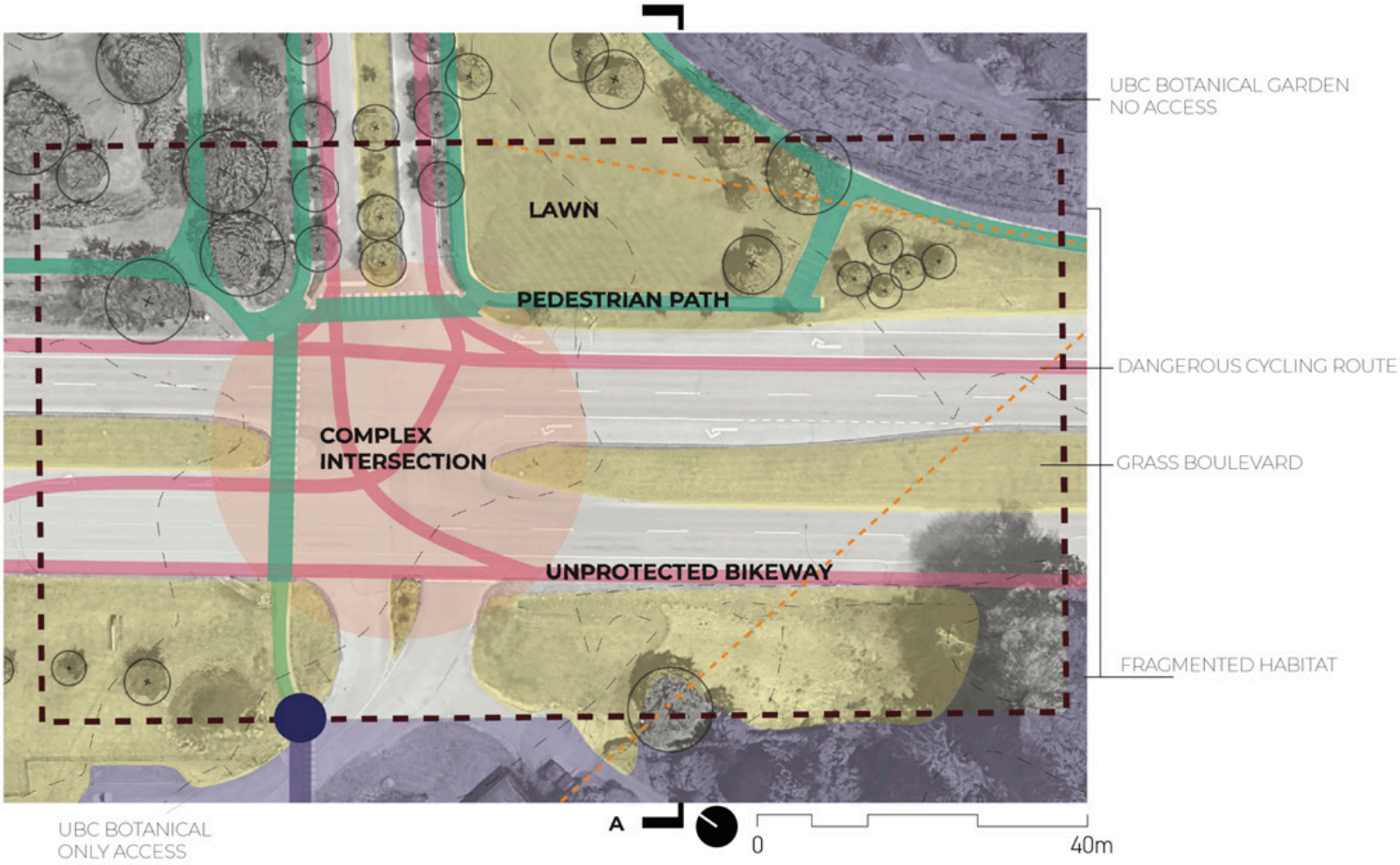
The site today is a busy road that loops around UBC. Much of the traffic on this road is commuter, (along with some public transit and residential). As UBC planning goals head towards minimizing commuter and personal vehicles, a design opportunity arises here to connect fragmented habitat, address stormwater concerns and protect cyclists on this popular route.





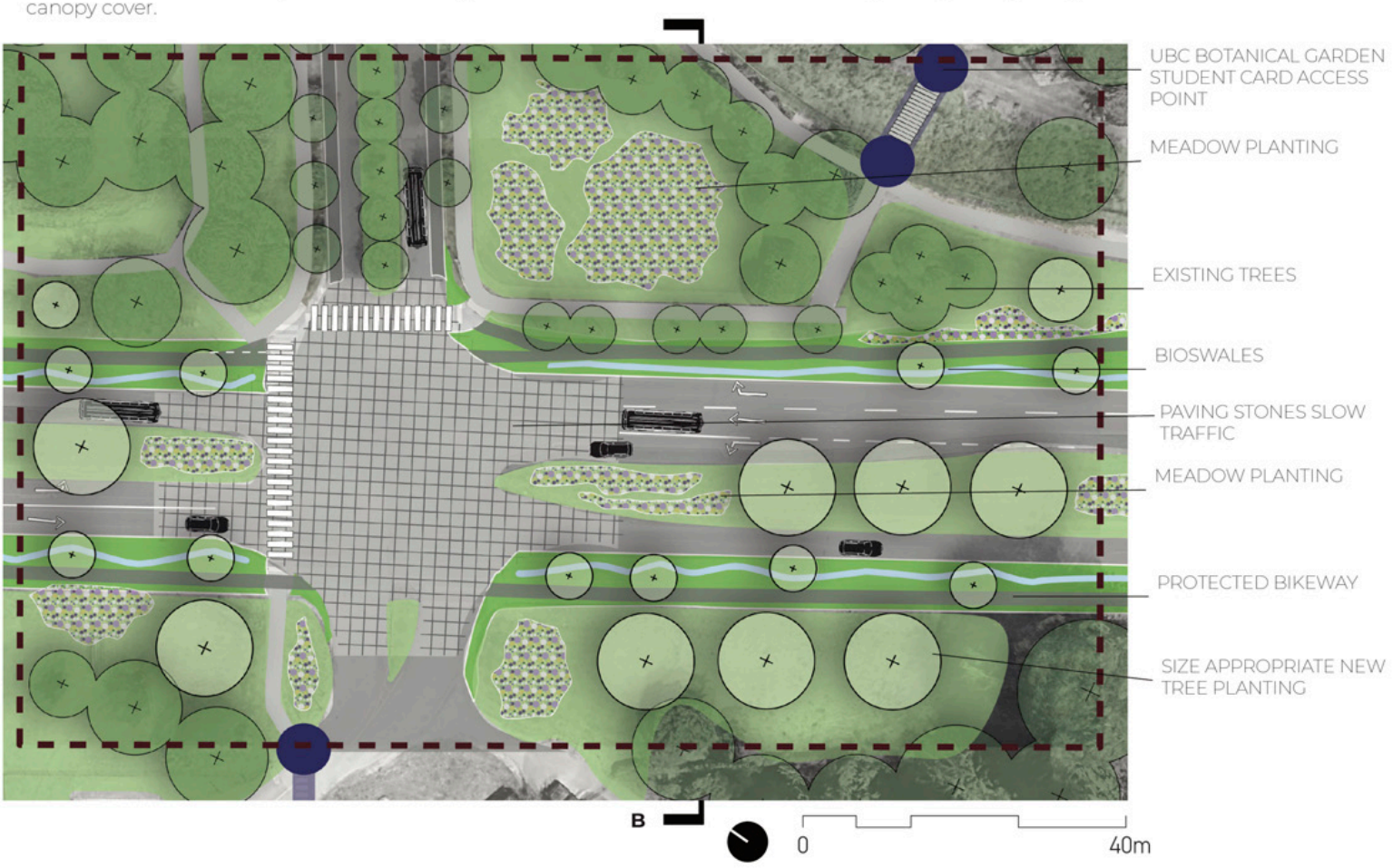
EXISTING CONDITIONS

The site has a large lawn and while the pedestrian path walks next to western side of the UBC Botanical Garden, users and students are limited both by a singular access point across the busy SW Marine Drive, and by the hours and entry price for the garden. Cyclists have to content with busy road ways are cars who are turning right crossing over their lane. The intersection is a conflict point between, vehicles, pedestrians and cyclists.

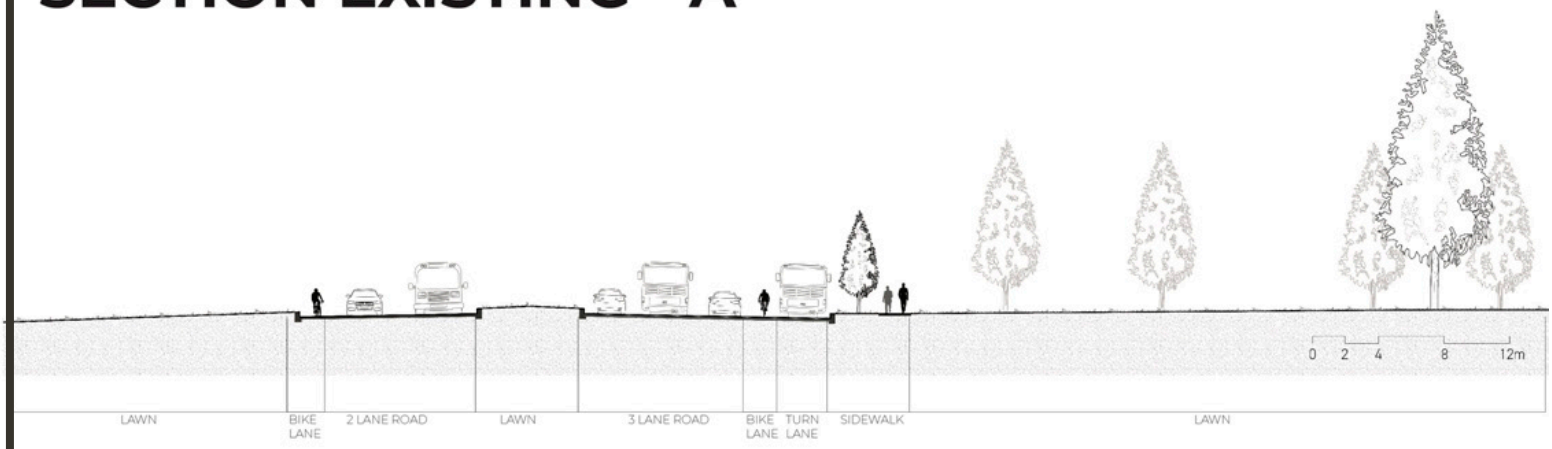


PROPOSAL

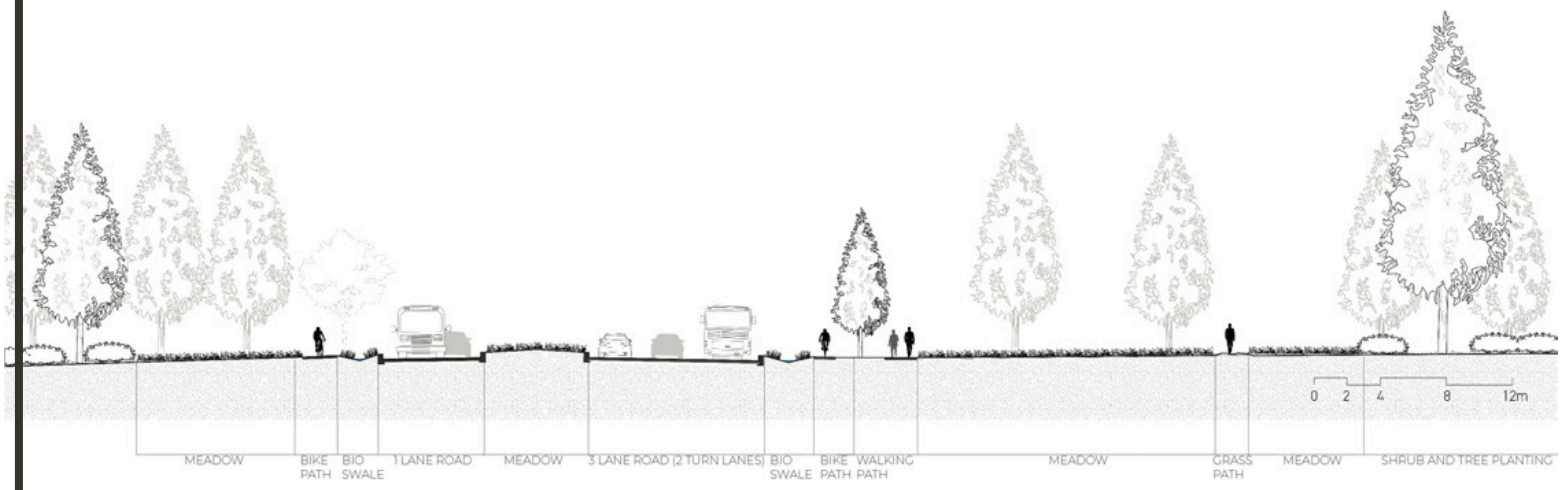
The proposal aims to take advantage of the reduced traffic, now mostly residential and public transit. The bikeway is turned into a greenway with a bioswale running along the roadside which allows for greater biodiversity and stormwater management. Additional access points are added to the UBC botanical garden and student cards access points allow for free access for extended hours. Large open lawns are converted to meadow plantings and some additional trees are planted. The existing trees are also monitored and allowed to grow larger improving the canopy cover.



SECTION EXISTING - A

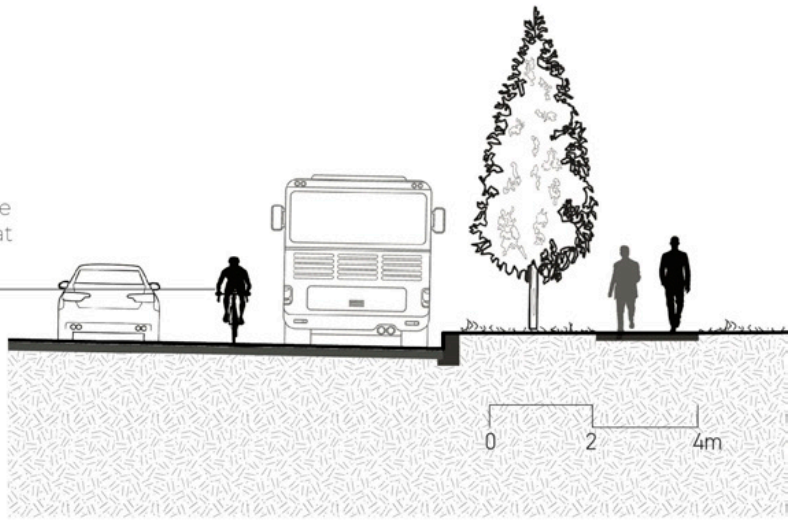


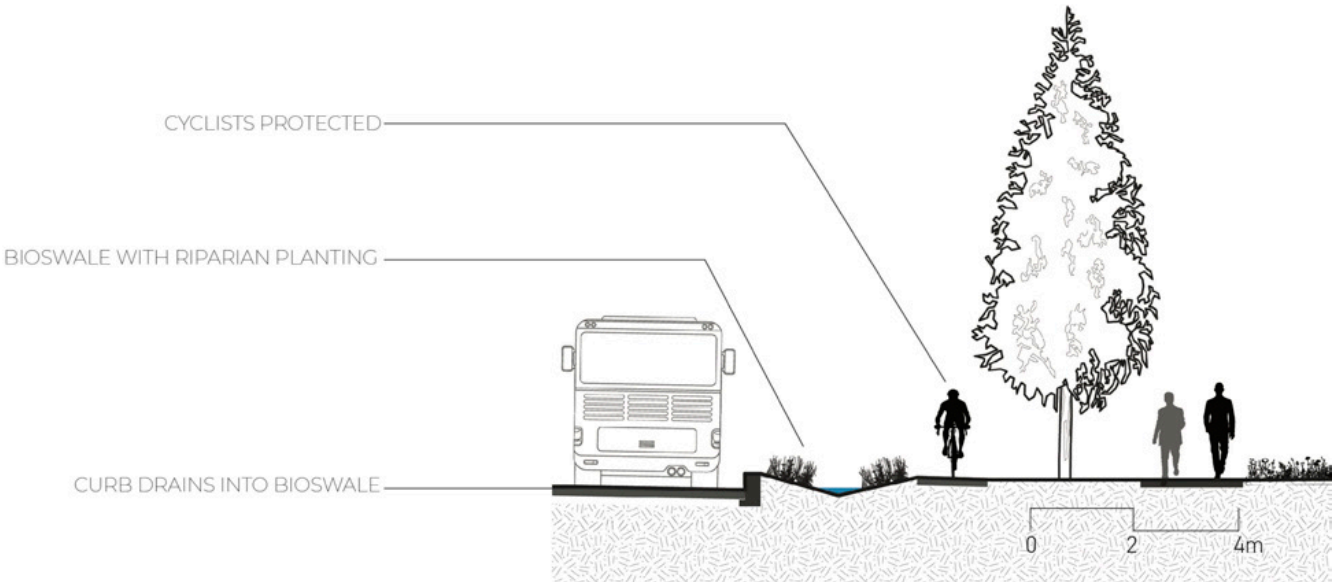
SECTION PROPOSED - B



CYCLIST SAFETY AND PLANTING

These callouts highlight the increased safety for cyclists as well as the bioswale system at a very conceptual stage. The bioswale would treat water from both the bike path and the road through gutter breaks along the curb.





PRECEDENTS

SHEFFIELD GREY TO GREEN - Nigel Dunnett

BUSY ROAD CONVERSION
BIOSWALE-GREENWAY
STORMWATER MANAGEMENT

CENTER BOULEVARD MEADOW PLANTING

https://www.nigeldunnett.com/grey-to-green

BURRARD SLOPES POLLINATOR MEADOW - City of Vancouver + SALA

POLLINATOR MEADOWS
BOULEVARD MEADOWS

https://syc.vancouver.ca/projects/burrard-slopes-park/burrard-slopes-park-round-1-info-boards.pdf

BANFF - BEAR STREET - The TULA Project

PAVING CHANGE TO CALM TRAFFIC
HIGH CONFLICT AREAS

https://www.thetulaproject.com/projects/bear

TORONTO - GREEN GUTTERS - Alta Design

PROTECTED BIKEWAY ON BUSY ROAD
BIOSWALE BIKEWAY

https://altago.com/projects/toronto-on-green-gutters-bioswales/


PERSPECTIVE

Site 5

Katie McPartlin

ENVISIONING EQUITABLE, HEALTHY, RESILIENT GREEN NETWORKS AT UBC

LARC 532: ASSIGNMENT 3
SITE 5 **ZOOM STUDY**

KATIE MCPARTLIN
DEC 14 2023

SITE INTRODUCTION

The study area is located within the University of British Columbia Vancouver campus, (Figure 1).
The site falls within a number of jurisdictions including the UBC campus, the University Endowment Lands (UEL), and Metro Vancouver.

Site 5 hosts a variety of recreational and greenspace types as well as some residential areas, (Figure 2). More family and student housing are expected to go in with the Thunder bird Stadium Development Plan, (1).

Figure 1: Context Map of Site 5

Thunderbird Stadium

UBC Botanical Garden

UBC Farm

Main Mall Greenway

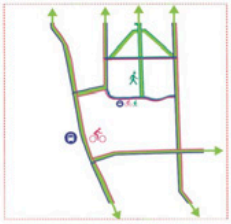
Foreshore Trail

Figure 2: Site photos depicting some typical greenspace type conditions on Site 5.

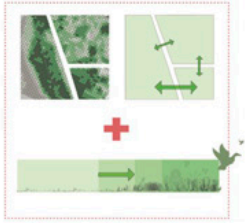
SITE ANALYSIS

With the goal of envisioning an equitable, healthy, and resilient greenspace network our findings from project 2 culminized in to three action words.

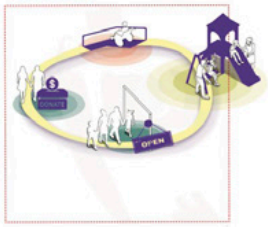
Protect



Connect



Access



PROTECT: users of active transport
The network map indicated extensive pedestrian and cyclist pathways. We observed limited protection of cyclists from busy roadways, especially on SW Marine Drive. This road divides the campus from major greenspaces including the foreshore, parts of Pacific Spirit Park and the UBC botanical gardens.

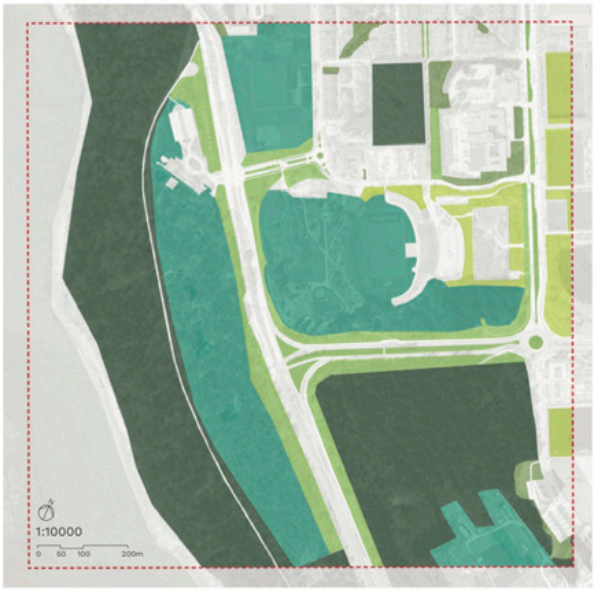
CONNECT: fragmented ecosystems
Our biodiversity and grey versus green maps indicated high habitat sensitivity for some ecosystems including Pacific Spirit Park and indicated habitat fragmentation via major road systems.

ACCESS: increase physical and social accessibility
During analysis we found that site 5 has extensive greenspace. Of the total land area, nearly

60% was classified as greenspace.

Despite this, we highlighted a need for greater accessibility within these areas The greenspace type map revealed that majority of the area is private or quasi-private including research fields, farms, and gardens, or physically inaccessible including natural park spaces, (Figure 3)

Over **35%** of this greenspace was considered private/quasi private.



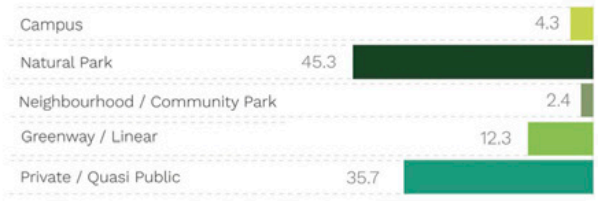
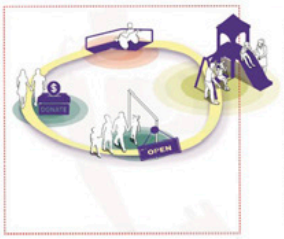


Figure 3: Greenspace type map and stats.

ZOOM STUDY : ACCESSIBILITY + INCLUSIVITY



This proposal has a focus on the third goal, accessibility and inclusivity. The project 2 interventions to address this goal were reducing financial and temporal barriers to access, creating neighborhood park space and integrating accessible trails through private or quasi public land, (Figure 4).

The design intervention for this zoom study is a series of universally accessible trails and learning nodes, integrated through private greenspace, such as the Totem Research Field Station.
The field station if fenced in and only open to those who are doing research or workshops there. This design will allow more people to be able to experience the benefit of these plants and food cultivation spaces while providing greater educational opportunities.

The three main policies from the Vancouver Campus Plan informing this design are as follows (2):

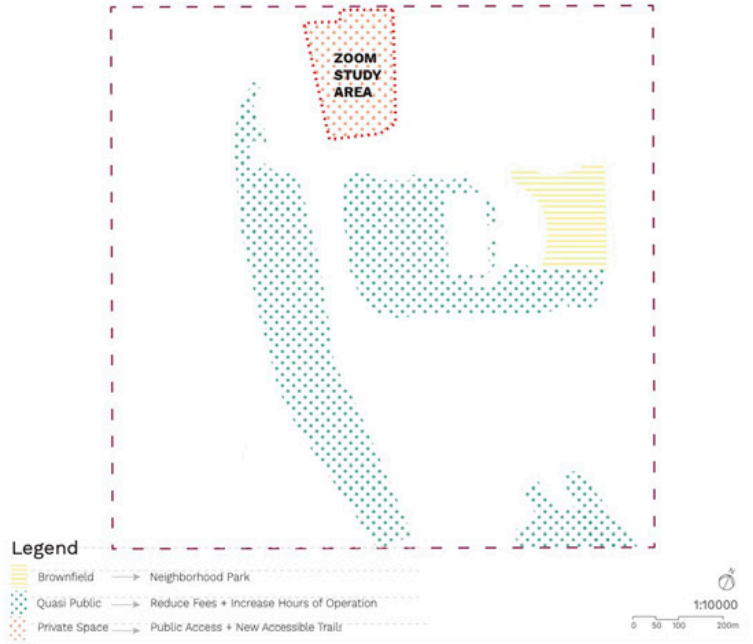


Figure 4: Accessibility interventions and zoom study area of Totem Field Station.

Policy 19: A barrier-free environment will be created on campus over time, based on the **principles of universal design**

Policy 18: The UBC Vancouver Public Realm Plan (2009) **will integrate outdoor teaching and learning spaces, Knowledge Walks and interpretative gardens**

Policy 20: Modifications to heritage resources will be supported where such **changes improve accessibility to older facilities and landscapes.**

ZOOM STUDY : DESIGN PROPOSAL

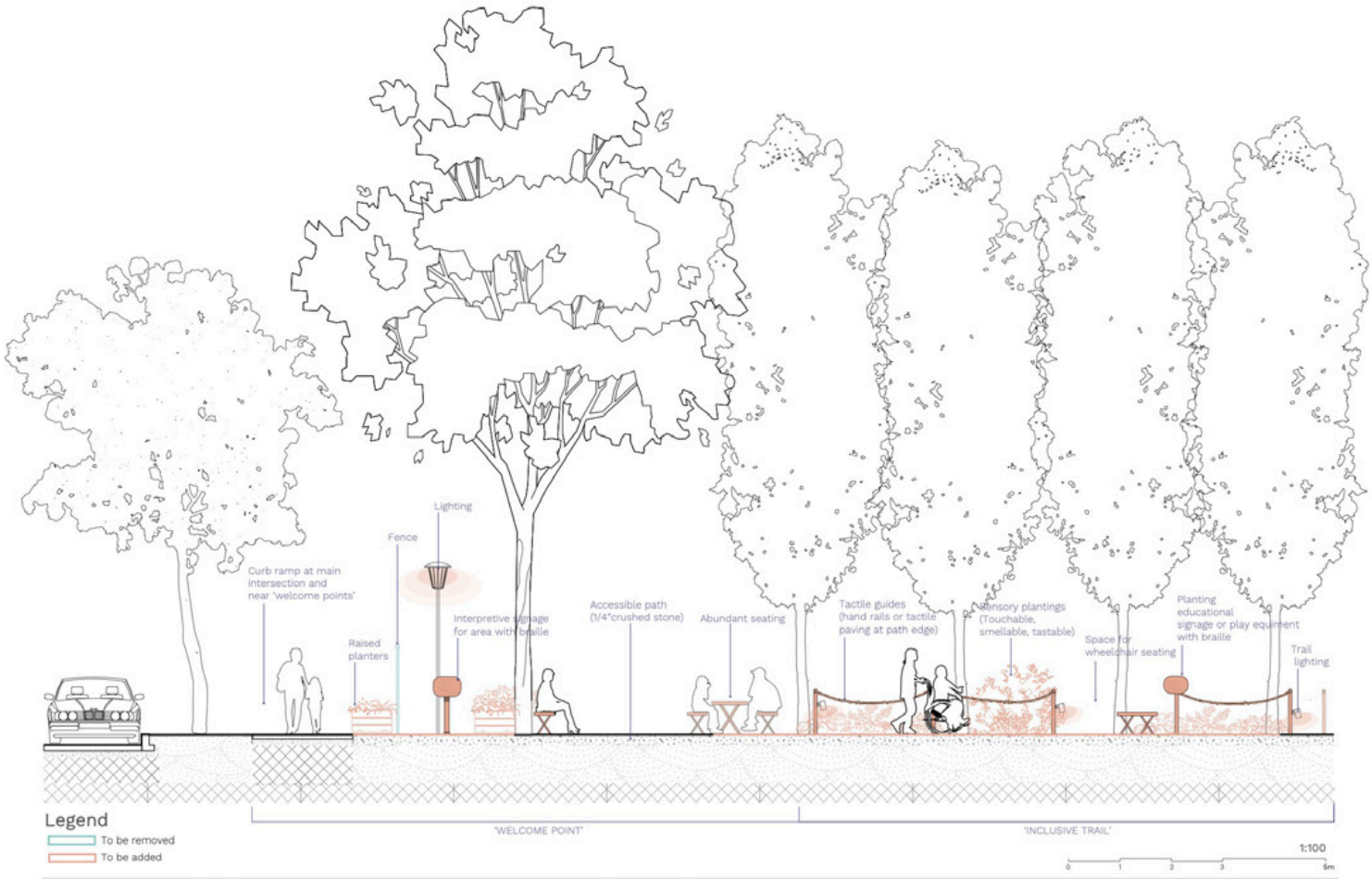
The diagrammatic plan below indicates 4 major typologies of the proposed trail system, (Figure 6) :

WELCOME POINTS - An accessible, safe, and well lit interface between sidewalks and the agricultural space.
INCLUSIVE TRAIL - Wheelchair accessible pathways with visual and textural details to accommodate visual and hearing impaired.
SENSORY PLANTING - Planted areas that will enhance the sensory experience along the trail and provide educational opportunities
EDUCATIONAL NODES - Spaces designated to learning located at the various ecosystem types (pine forest, deciduous forest, meadow / research field, and bosque.)

The location of accessible path and sensory plantings could be determined with the Totem Research Field Station to further their educational goals

Figure 5: Existing conditions of zoom study area, Totem Plant Science Research Field Station.

Figure 6: Diagrammatic plan accessibility and inclusivity pathways at Totem Plant Science Research Field Station

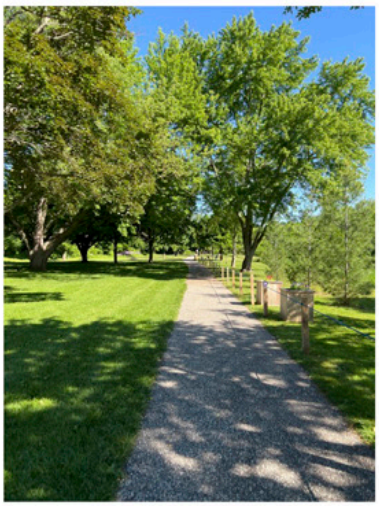


Section A: Example of a "welcome point" into trail system , through existing bosque.

ZOOM STUDY : PRECEDENTS

The design intervention is largely inspired by the Sensory Trail on the Nith River. Located in Paris Ontario, this trail weaves through an existing park and is intended for all abilities (3).

Signage with braille and sound recordings, (Image credit: County of Brant).



Accessible path through park with guide rail and planters, (Image credit: County of Brant).

Trail guide rails with braille, (Image credit: County of Brant).

Breaks in the trail allow for interactive and educational play equipment, (Image credit: County of Brant).

The sensory plantings and educational nodes shown on the digramatic plan in Figure 6, could be informed by the Magneten Sensory Garden in Denmark, (4). **With details such as these along the 'Inclusive Trail' our exisiting greenspace at ubc can be better utilized by all**

Elevated food gardens enable interaction with greenspace through taste, (Image credit: Kirstine Autzen).

Interpretive infastructure and soft plantings allow for engagment by touch, (Image credit: Kirstine Autzen).

Crushed gravel paths, elevated planters, white fencing to created higher colour contrast against plants are all details that contribute to inclusivity in greenspace and could be incorperated in the proposed inclusive trail, (Image credit: Kirstine Autzen).

REFERENCES

(1) UBC Campus Vision 2050
https://campusvision2050.ubc.ca/34249/widgets/144462/documents/115358

(2) Vancouver Campus Plan 2020.
https://planning.ubc.ca/sites/default/files/2020-12/PLAN_UBC_VCP-Part2-2020Update_0.pdf

(3) Sensity : Deafblind and Sensory Support Newtork of Canada
https://sensity.ca/news/county-of-brant-completes-sensory-trail/.

(4) Magneten Sensory Garden. MASU Planning
https://landezine.com/magneten-sensory-garden-by-masu-planning/.

*** Previous project content and Figure 1 - 3 , were completed in collaboration with David Mckenna and Adam Wojtowicz

Site 7

Roberta Gonzalez

Project 3- Zoom study: Enhancing Biodiversity and Connectivity
Roberta Gonzalez
Date: Dec 17, 2023
Course: LARC 444

Study Site Context and Propositions

The study site is located within 'Site 7' (shown in Fg.1) which encompasses several areas of South Campus of UBC Vancouver Campus including UBC Farm, residences, parts of Pacific Spirit Park and research facilities. According to the previous site analysis, the priorities for development should be focused on improving transit networks, urban forest resiliency and habitat provisioning. The study showed low vegetation diversity, with a dominating amount of tree species in the genus Acer, being equivalent to 35% of the trees present, without Pacific Spirit Park.

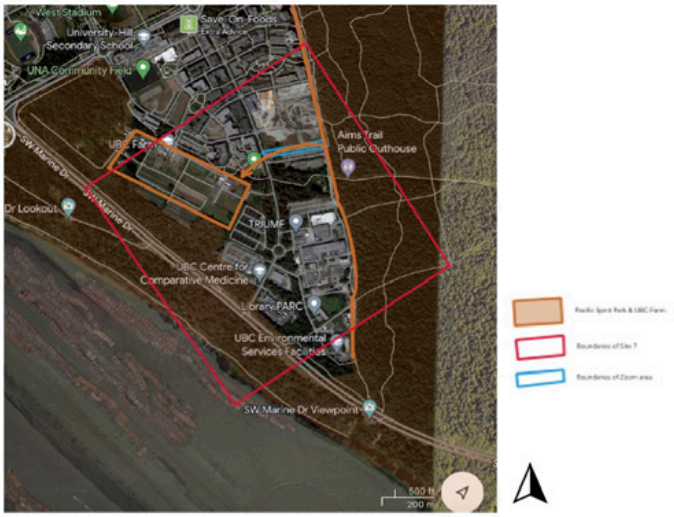
Given the low diversity, this project aims to address the issue by increasing flowering plants in the area providing habitat and connectivity between green areas on the site. The proposition will focus on a smaller area within this site, which in this report will be referred to as the 'zoom area'. The Zoom area consists of Binning Rd, which is located in the gap between two major areas of biodiversity, Pacific Spirit Park and UBC Farm (shown in Fg 2.). This location was chosen due to its strategic positioning, in terms of facilitating pollinator movement between environments (Fg. 3), as well as the current situation of the sidewalk vegetation which calls for improvement (shown in Fg. 4).

Fg.1. Map showing boundaries of Site 7, located in south UBC Campus. The map in the right hand corner shows the location of the site in a wider Vancouver context.

The proposition consists of a pollinator garden bed featuring native flowers to attract pollinators, as well as aiding the movement to and from UBC Farm. The flowers with diverse and colorful species would not only please pollinators but possibly the human residents of the area which would appreciate a bit of color in the neighborhood. The importance of creating this pollinator corridor to UBC Farm is crucial as pollination is a vital process in food production and to hold plant communities (Klein et al. 2007; Ricketts et al. 2008). A study made in 2003 by Steffan-Dewenter observed that connectivity between habitats positively influenced the number of bees, showing that semi-natural habitats play a crucial role in flow of fauna in agroecosystems (Graffigna, S., et al., 2023). The implementation of this pollinator garden would also support several policies in the Campus Vision 2050 such as 4.4.1.3 Spaces that enhance biodiversity and strengthen connectivity.

Location of Zoom area:

Fg.2. Map showing location of Zoom area within Site 7, featuring Binning Rd.



Fg. 3. Map showing the strategic location of the zoomed in site (in blue) as a major area of interest in aiding the connectivity of pollinators from both site, UBC Farm and Pacific Spirit Park (in orange).

Some of the proposed flowers for the pollinator garden:

Common Yarrow [Photo: Orest Lythechka/Shutterstock

Western Columbine [Photo: Michael Kesl, BioLib.cz]

Canada Goldenrod [Photo: splitrockenvironmental.ca]

Silky Phacelia [Photo: Eric Beckers, wildflower.org]

Showy Milkweed [Photo: shoreroadnursey.com]

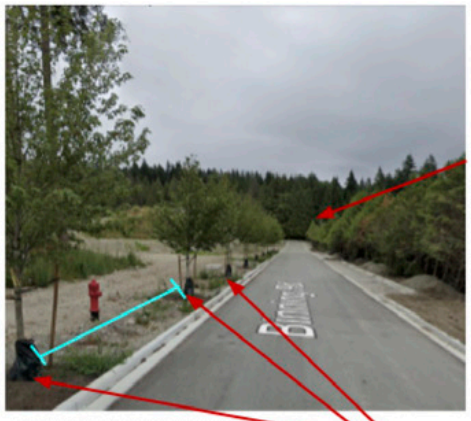
Proposed species for site, native to Lower Mainland Ecoregion of British Columbia:

Common Name	Botanical Name	Pollinators
Common Yarrow	Achillea millefolium	Bees
Red Sitka or Western Columbine	Aquilegia formosa	Hummingbirds, bees
Showy Milkweed	Ascelepias speciosa	Bees, butterflies
Fireweed	Chamaenerion angustifolium	Bees
Common Woolly sunflower	Eriophyllum lanatum	Bees, butterflies
Flat-top Goldentop	Euthamia graminifolia	Bees
Miniature lupine	Lupinus bicolor	Bees
Davidson's Penstemon	Penstemon davidsonii	Bees, hummingbirds
Serrulate penstemon	Penstemon serrulatus	Bees
Silverleaf phacelia	Phacelia hastata	Bees
Silky phacelia	Phacelia sericea	Bees
Blackeyed susan	Rudbeckia hirta	Bees, butterflies
Canada Goldenrod	Solidaog canadensis	Bees, butterflies

Source: davidsuzuki.org 'What native plants attract pollinators in British Columbia?'

In Fg.4. shows the current vegetation on the site featuring low diversity of trees, similar to most other sidewalks along Wesbrook village. Red maples *(Acer rubrum)* are the most broadly planted tree in this area, with significant distance between each tree, which could accommodate several other plants. The existing trees are all the same species and same age, which is an issue in various aspects, such as susceptibility to pests, resilience to a changing climate and low biodiversity for fauna.

Walking view of Zoom area with annotations:



Fg.4. Zoom area walking view

Proposed area as planting bed for pollinator garden:

Fg.5. Potential planting bed area between existing trees.

On the left, Fg.6 displays the vision of what the finished project would look Like, featuring a diversity of flowers allowing for flow of pollinators to and from UBC Farm.

Fg.6. Visual representation of what the project would look like once finished.

Precedents:

Some precedent examples of pollinator gardens that inspired this project.

A gardener with his successful project of a pollinator garden bed in the Como neighborhood, Fort Worth, Texas. His 'pollinator paradise' is now popular amongst locals who have followed his example.

Source:https://www.startribune.com/st-paul-gardener-is-mobilizing-neighbors-to-beautify-boulevards-and-help-pollinators/492192861/#1

This project in Connecticut Avenue was led by Kathy Sykes and several volunteers, neighbors and friends to plant bulbs and flowering plants to create a pollinator corridor and attract insects and birds to the area. They have already seen several new insects that weren't seen around before such as praying mantis

Source:https://www.foresthillsconnection.com/news/connecticut-avenues-pollinator-gardens-planted-by-volunteers-have-been-buzzing-with-activity-more-bee-and-butterfly-friendly-plantings-are-happening-this-month/

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Wildflowers photos:
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Campus vision 2050:
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List of Figures

Fig. 1: McKenna, D, 2023, Cover Page.
Fig. 2: Hirji, Z, 2024, ‘UBC Campus Boundary’.
Fig. 3: Hirji, Z, 2024, ‘100 hectare border for each site’.