Selected Works Portfolio

Benjamin Boswick
Landscape Architectural Intern
Undergraduate, Graduate, Professional Works
2019 - 2024

Contents

Gorgonio Sands

Term Summer 2022 **Class** ARCG 7102 - Summer Studio
Instructor(s) Emeka Nnadi **Duration** 4 Weeks
Programs Vectorworks, TwinMotion, Photoshop
Group Members Benjamin Gaudes, Simranpreet Kaur

The design intention of this group project was to create a development that would address sustainable energy production, water supply, food production and urban agriculture, and affordable housing. These objectives were achieved through harvesting solar and wind energy, utilizing groundwater and alluvial melt, urban orchards and greenhouses, and pre-fabricated modular housing. This development is located near Cabazon, California.

Regional Site Plan

Climate

Cabazon, California

Site Extent
Well (Water Table 350-450')
Agriculture (Avocado, Citrus, Olive)

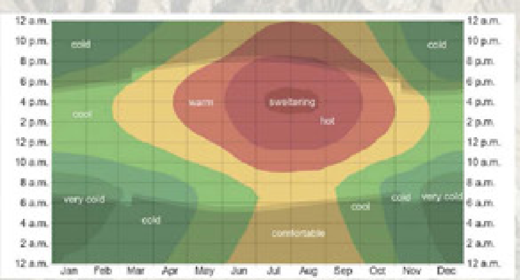
Seismic Fault Hazard Zone

The Alquist-Priolo Act requires the State Geologist (CGS) to establish earthquake fault zones around the surface traces of active faults and issue appropriate maps. Cabazon has its own category, based on the location of the community.

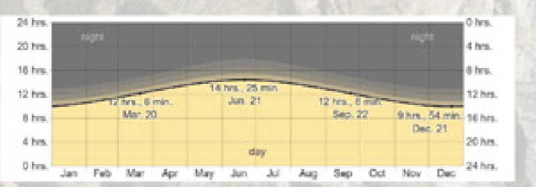
Geological Bedrock Type

Q type rock: Marine and nonmarine sedimentary rocks (Pleistocene-Holocene) Alluvium, lake, playa, and terrace deposits; unconsolidated and semi-consolidated.

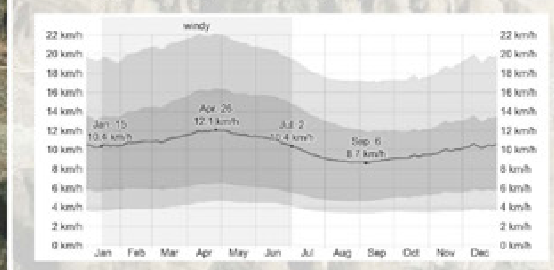
Yearly Average Temperature



Amount of Daylight Hours



Yearly Average Wind Speed



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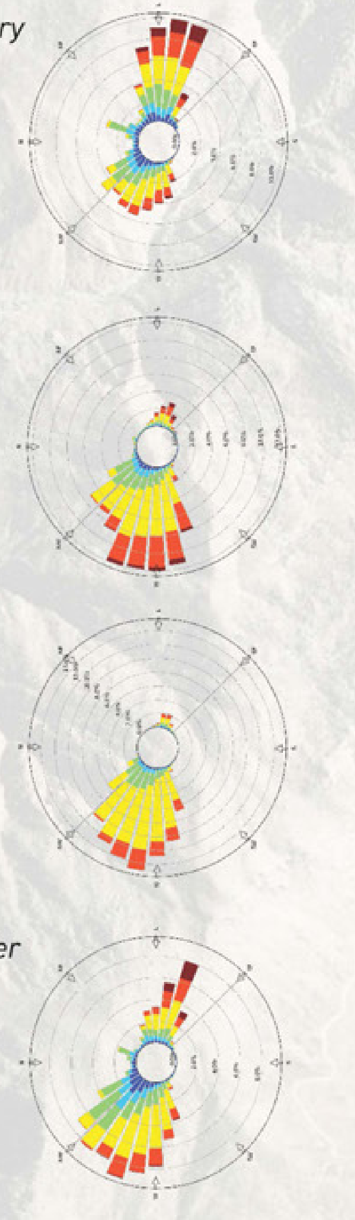
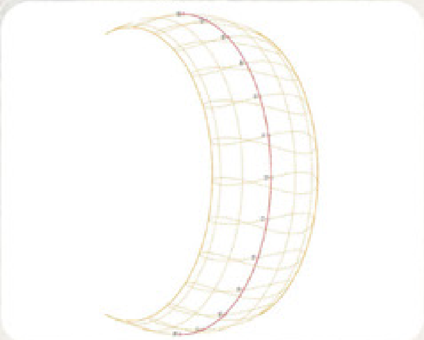
0 250 500 750 1000 m

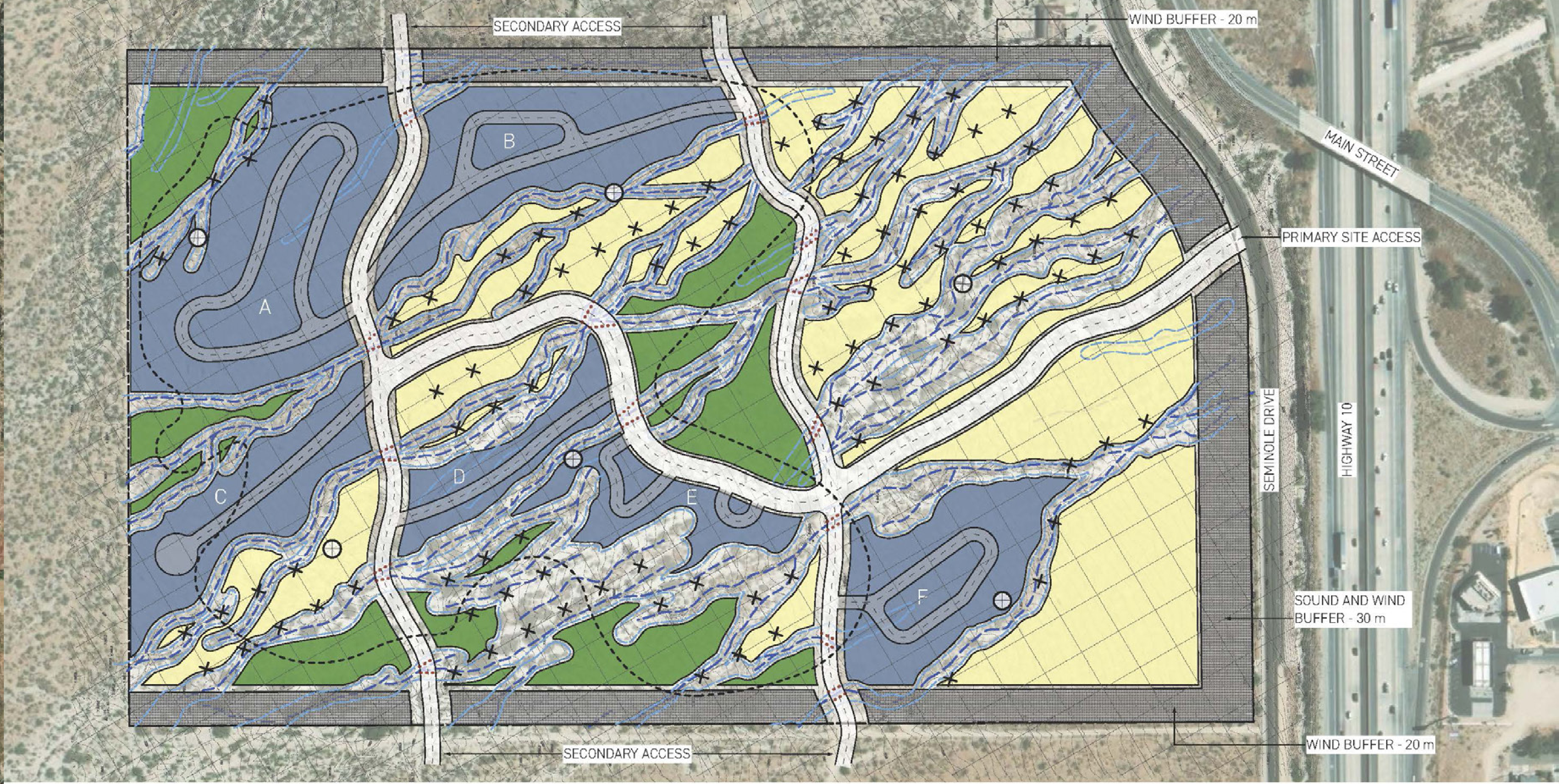


Sun Path Diagram



Solar Irradiance

Peak Sun Hours represents the production of 1 kW/m^2 per hour. On average, Southern California experiences 5 - 7.5 hours worth of peak sun. There is an annual average of 5.8 - 6 kW/m^2/day produced in this region.



Site Strategy

Strategies Overlay

Cabazon, California

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Site Extent
Riverine
Shorelines
Primary Road
Secondary Road
Water Crossing
Agriculture
Housing
Parks and Recreation
Parks Pathway
Wind and Sound Buffer
Wind Energy
Potable Water

Land Use Percentages:

37%	Natural Resource Management
22%	Housing
19%	Agriculture
13.5%	Wind and Sound Buffer
8.5%	Park Space and Recreation
100%	

Housing Area + Lot Size

	Area (Hectares)	Units	Lot Size
Housing Area A	1.80	45	0.04 hectares
Housing Area B	1.15	29	0.04 hectares
Housing Area C	0.78	19	0.04 hectares
Housing Area D	0.44	11	0.04 hectares
Housing Area E	0.45	11	0.04 hectares
Housing Area F	0.97	24	0.04 hectares
	5.58	139	

Master Plan

Gorgonio Sands

Cabazon, California

- Site Extent
- Primary Road
- Sidewalk/Shared Road
- Tertiary Road
- Park Pathway
- Pathway Bridge
- Park
- Residential Lots
- Setback
- House
- Greenhouse
- Wind Energy

0 50 100m

Site Ecology
Movement
Wind + Sound Buffer
Agriculture
Affordable Housing
Parks and Recreation
Wind Energy
Solar Energy
Potable Water

Master Plan

Render

Cabazon, California

0 50 100m

Housing Density = 132 Units / 5.25 Hectares = 25 Units/Hectare

Land Use Percentages:

35%	Natural Resource Management
21%	Housing
21.5%	Agriculture
21.5%	Wind and Sound Buffer
1%	Roads, Sidewalks, + Pathway
100%	

Solar Power Calculations

Average Daily Production per House = 240 kWh / house /day
Average Yearly Production per House = 87,600 kWh / house / year
Average Community Production (132 Houses) = 31,680 kWh / day
Average Yearly Community Production (132 Houses) =11,563,200 kWh / year

Wind Power Calculations

VORTEX Bladeless Production = 8 W / m2 @ 3.6 m/s @ 2.75m Height
VORTEX Bladeless Production = 0.124 kWh / m2 @ 13 km/h @ 2.75m Height
VORTEX Bladeless Production = 12 W / m2 @ 3.6 m/s @ 9m Height

Water Resource Management Calculations

Average Household (4 Person) Daily Use
= 200 gallons / day
Well Volume Yield = 260 gallons // Tripled
= 780 gallons
Minimum Residential Pump
= 1.5 hp @ 450' @ 6 gallons / minute

Site Ecology
Movement
Wind + Sound Buffer
Agriculture
Affordable Housing
Parks and Recreation
Wind Energy
Solar Energy
Potable Water

Detail Highlight
Site 1: Intersection

- Site Extent
- Primary Road
- Sidewalk/Shared Road
- Tertiary Road
- Park Pathway
- Pathway Bridge
- Park
- Residential Lots
- Setback
- House
- Greenhouse
- Wind Energy

N

Sheet scale: 1:1000
Sheet size: 24 x 36"

0 50 100m

Site Ecology
Movement
Wind + Sound Buffer
Agriculture
Affordable Housing
Parks and Recreation
Wind Energy
Solar Energy
Potable Water

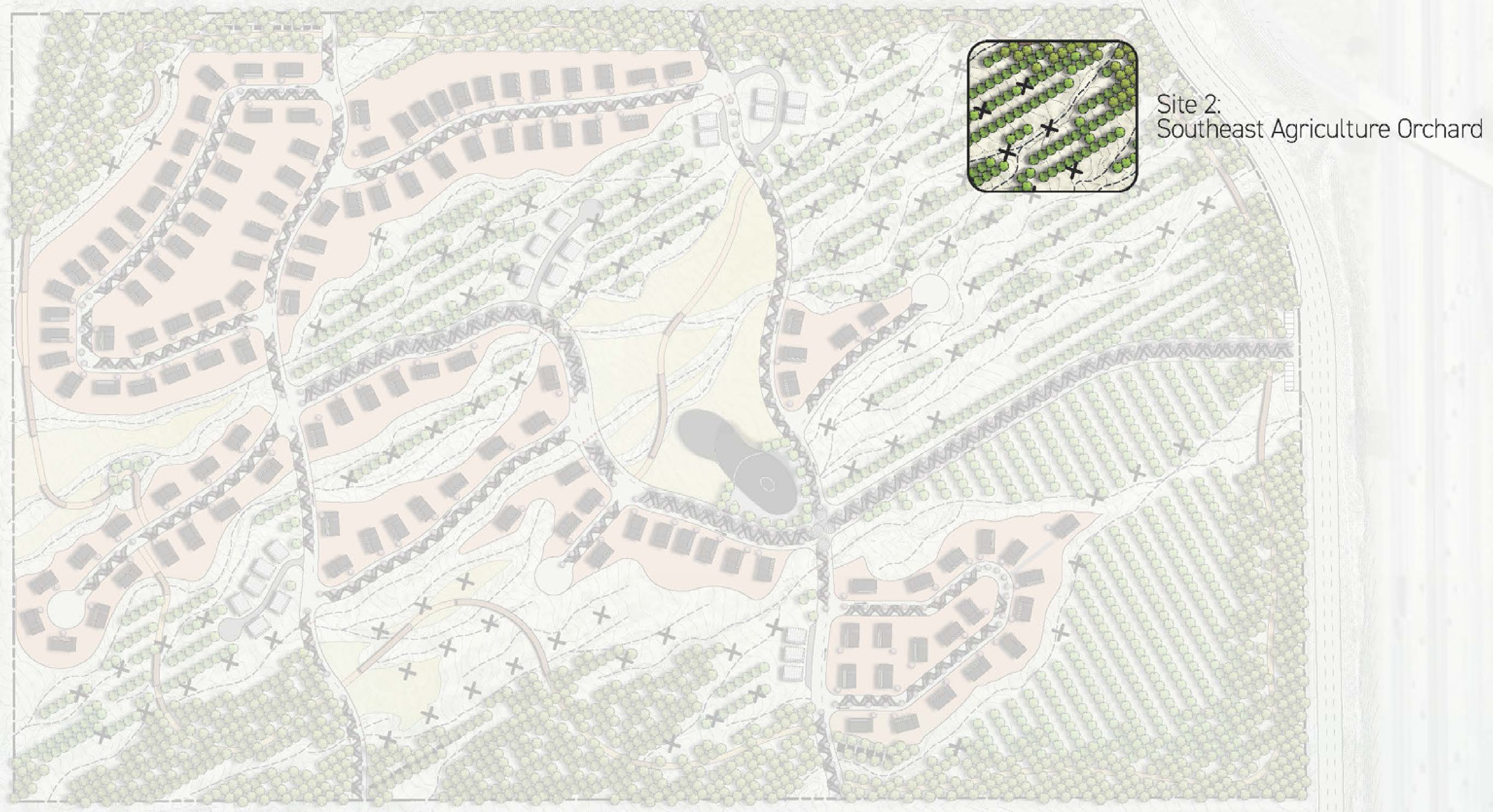
Intersection
Detailed Design

N

Sheet scale: 1:150
Sheet size: 24 x 36"

0 5 10m

Site Ecology
Movement
Wind + Sound Buffer
Agriculture
Affordable Housing
Parks and Recreation
Wind Energy
Solar Energy
Potable Water



Detailed Highlight
Site 2: Orchard

- Site Extent
- Primary Road
- Sidewalk/Shared Road
- Tertiary Road
- Park Pathway
- Pathway Bridge
- Park
- Residential Lots
- Setback
- House
- Greenhouse
- Wind Energy

N

Sheet scale: 1:1000
Sheet size: 24 x 36"

0 50 100m

Agriculture Orchard
Detailed Design

Riprap to Protect and Preserve Agriculture Area

Riverine Ground Species

Blue Elf Aloe *(Aloe 'Blue Elf')*
Elijah Blue Fescue *(Festuca glauca 'Elijah Blue')*
Matilija Poppy *(Romneya coulteri)*
Angelina Stonecrop *(Sedum rupestre 'Angelina')*
Blue Chalksticks *(Senecio serpens)*
California Fuchsia *(Zauschneria californica 'Calistoga')*

Site Ecology
Movement
Wind + Sound Buffer
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Agriculture Orchard
Detailed Design

Buffer Trees
Desert Willow *(Chilopsis linearis)*
Australian Willow *(Geijera parviflora)*
Coast Live Oak *(Quercus agrifolia)*

Abacus Planting Blends Buffer and Agriculture Trees

Agriculture Orchard
Detailed Design

Orchard Trees
Moro Blood Orange *(Citrus sinesis 'Moro')*
Brown Turkey Fig *(Ficus carica 'Brown Turkey')*
Olive Leaf *(Olea europaea L. folium)*
Hass Avocado *(Persea americana 'Hass')*

Detailed Highlight
Site 3: Housing

- Site Extent
- Primary Road
- Sidewalk/Shared Road
- Tertiary Road
- Park Pathway
- Pathway Bridge
- Park
- Residential Lots
- Setback
- House
- Greenhouse
- Wind Energy

N

Sheet scale: 1:1000
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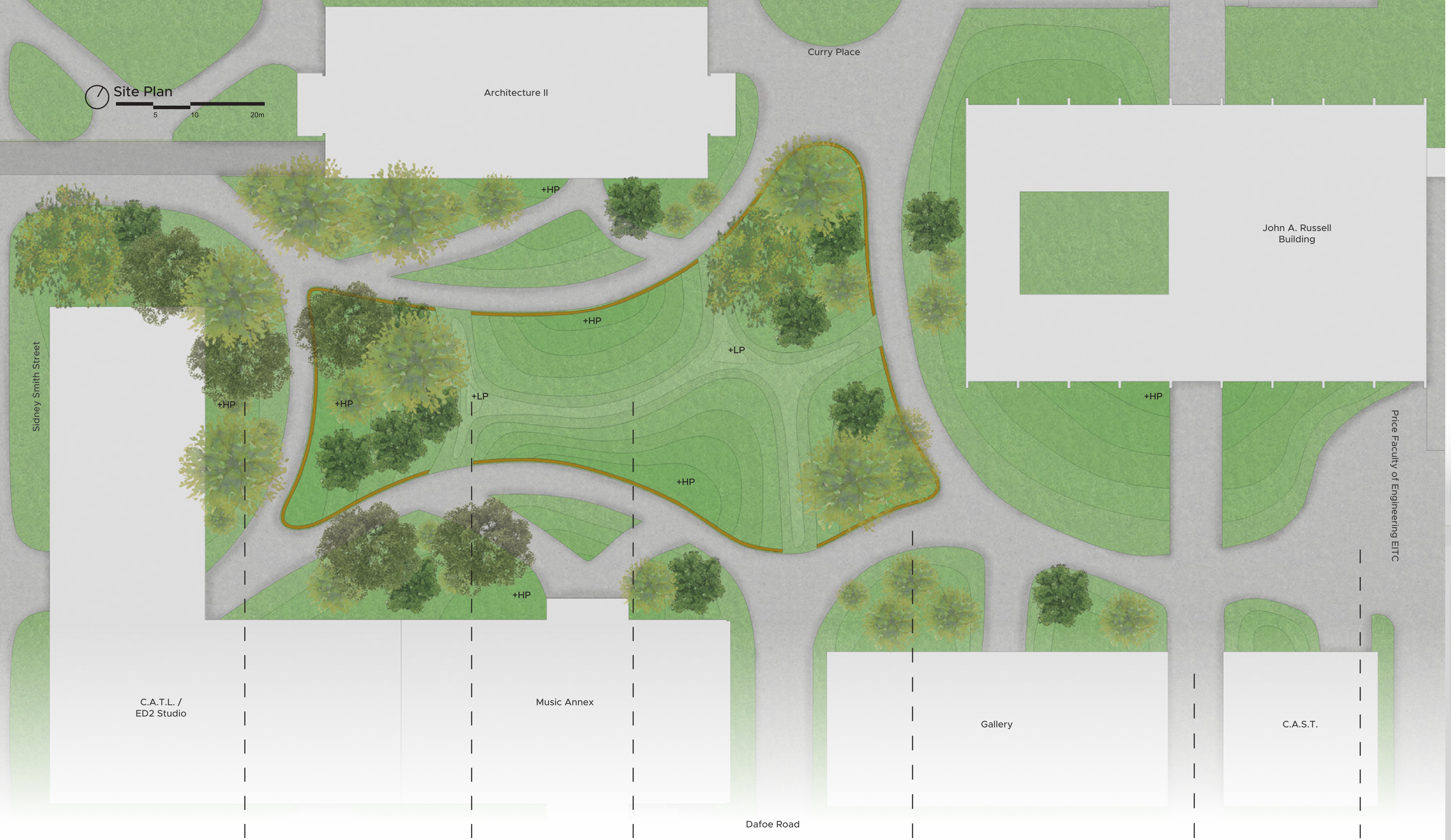
Affordable Housing
Detailed Design

Site Ecology
Movement
Wind + Sound Buffer
Agriculture
Affordable Housing
Parks and Recreation
Wind Energy
Solar Energy
Potable Water

Design Precinct

Term Winter 2020 **Class** EVLU 3008 Studio 4
Instructor(s) Brenda Brown **Duration** 6 Weeks
Programs Modelling, Photoshop, Illustrator + Rhino3D

The premise of this project was to design a new "precinct" for the Faculty of Architecture at the University of Manitoba, with input provided from members of the faculty, staff, and students. With this data in mind, sketch models were created to explore the space further. This particular layout was inspired by a plasticine and cardboard model, with the final model being constructed out of Architectural Butter Board and Preserved Reindeer Moss.



This portion of the landscape is intended to have a higher density canopy, this will also take longer to grow in over time

This area of the topography dips down to allow the site to retain more water

Central portion of topographic area is left clear of trees to provide a different experience

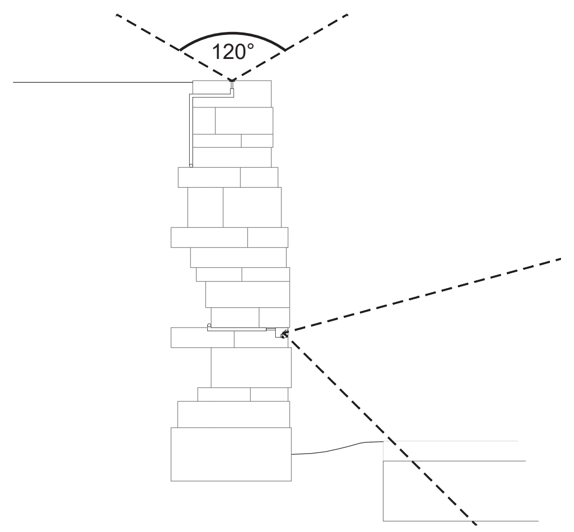
The approach to the John A. Russell Building is framed and linked to the central space through the trees

The entrance to the John A. Russell Building is framed by the Gallery and C.A.S.T.

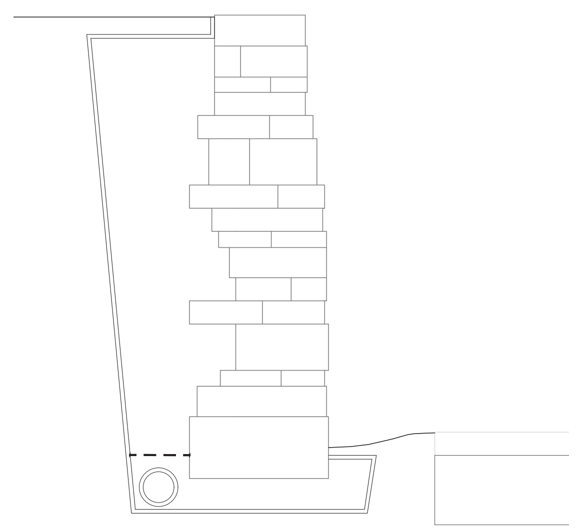
Vehicle access from Dafoe Road is maintained

Tree Species Information

Common Name	Scientific Name	Soil Type	Max. Height	Max. Canopy Size	Seasonal Gradient
American Linden (Basswood)	Tilia americana	Well-drained, Moist	80' (24.4 m)	40' (12.2 m)	
Amur Maple	Acer ginnala	Well-drained, Moist	20' (6.1 m)	18' (5.5 m)	
Dropmore Linden	Tilia x flavescens 'Dropmore'	Well-drained, Moist	25' (7.6 m)	18' (5.5 m)	
Golden Willow	Salix alba 'Vitellina'	Moist, Any	50' (15.2 m)	40' (12.2 m)	
Manitoba Maple (Boxelder)	Acer negundo	Moist, Deep	45' (13.7 m)	20' (6.1 m)	
Silver Maple	Acer saccharinum	Well-drained, Moist	80' (24.4 m)	15' (4.6 m)	



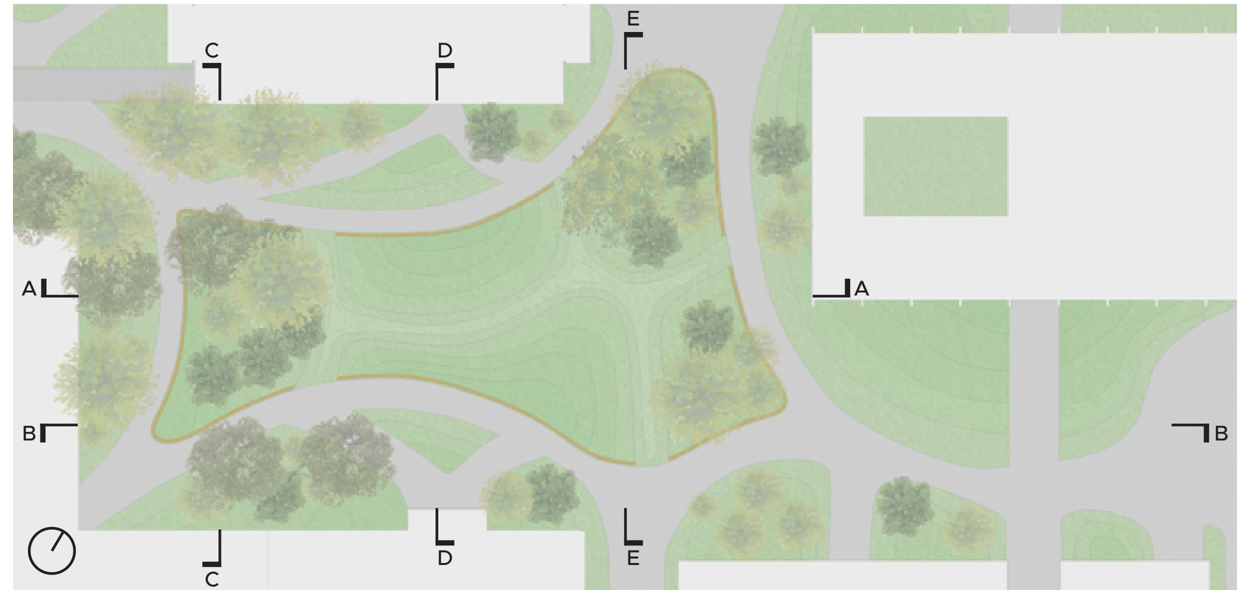
- Flexfire LEDs (Dynamic Tunable) would be used within the retaining walls to provide under-lighting to the trees along curves, and to certain stretches of pathway
- The LEDs have a beam angle of 120° which is similar to a Wide Flood
- This particular type of LED is IP65 graded and would run at 4200K

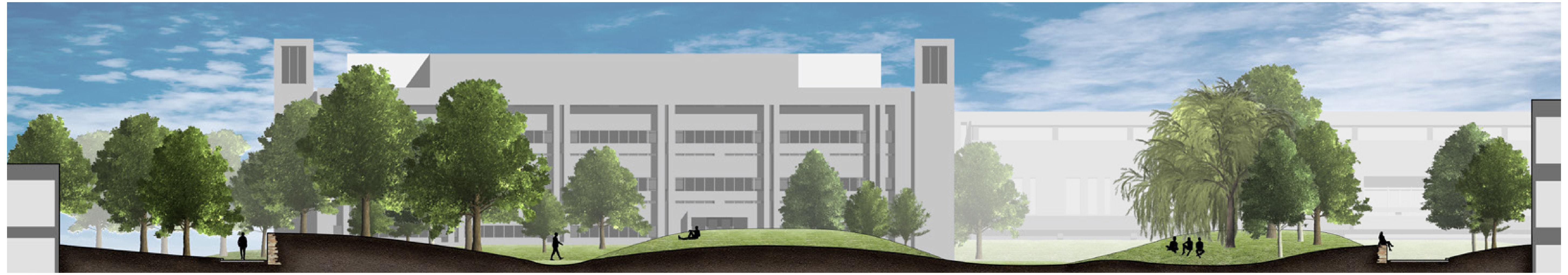


- A standard form of drainage would be used for the retaining walls specifcally
- A strip of grass would be allowed to grow between the wall and pathway which will allow for water flow off the pathway
- While spring time may cause the site to be more heavily saturated, the main portion of lawn will be allowed to retain water

Sectional Perspectives

The purpose behind these sections is to communicate the spatial experience and the scale of the individual within the site. Elevations of the undulating central landscape are also communicated here, with people for scale.

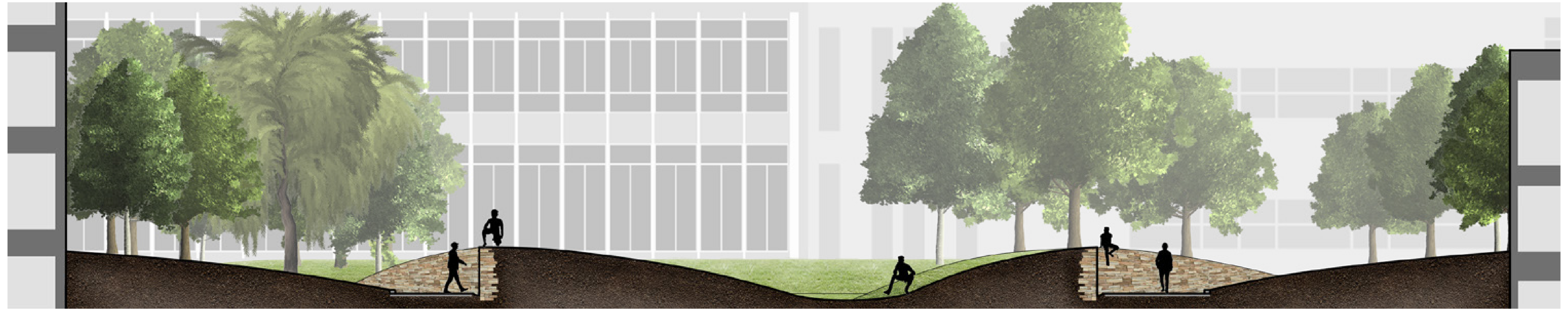




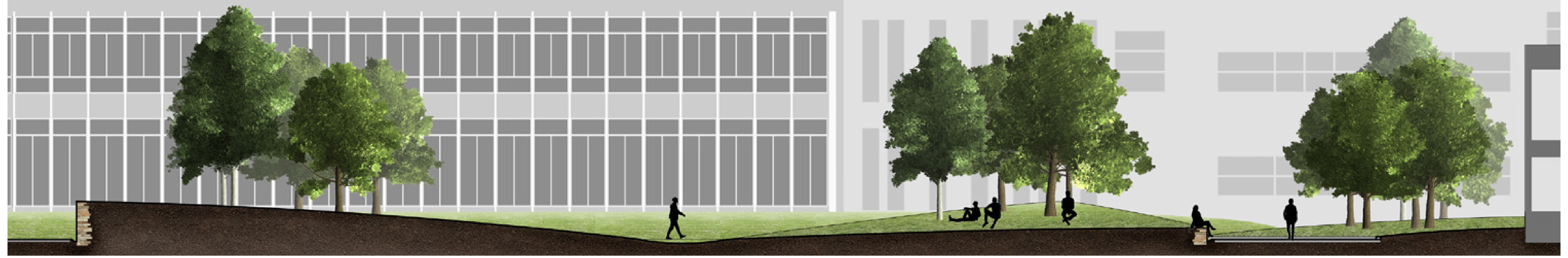
Section AA | View facing north-west through site

Section BB | View facing south-east through site

Section CC | View of southern portion of central topography space



Section DD | View of central topography space with retaining walls



Section EE | View of northern portion of central topography space

Perspective facing North

Perspective facing Northeast

Perspective facing South

Perspective facing Southwest

Re-Naturalizing the Norquay Channel
A Strategy to Improve Water Quality

Term Winter 2023 - Summer 2024 **Class** Thesis Practicum
Advisor(s) Brenda Brown, Kamni Gill, Daniel Reault
Programs VectorWorks, Rhino3D, TwinMotion, QGIS, Photoshop

Wetlands are necessary to maintain the health of landscapes and water bodies. Wetlands, especially in grassland prairies, typically referred to as wet prairies, are one of the most endangered landscapes in the world. Not only do they mitigate flooding in prairie landscapes, but they also act as carbon sinks. A wet prairie landscape used to dominate in southeast Manitoba, but now agriculture dominates. For this reason, I have worked to design a landscape in which wetlands, grasslands, and agriculture coexist. My project is aimed at creating wetlands alongside man-made drainage, to improve water quality and limit the amount of nutrients entering downstream waterways.

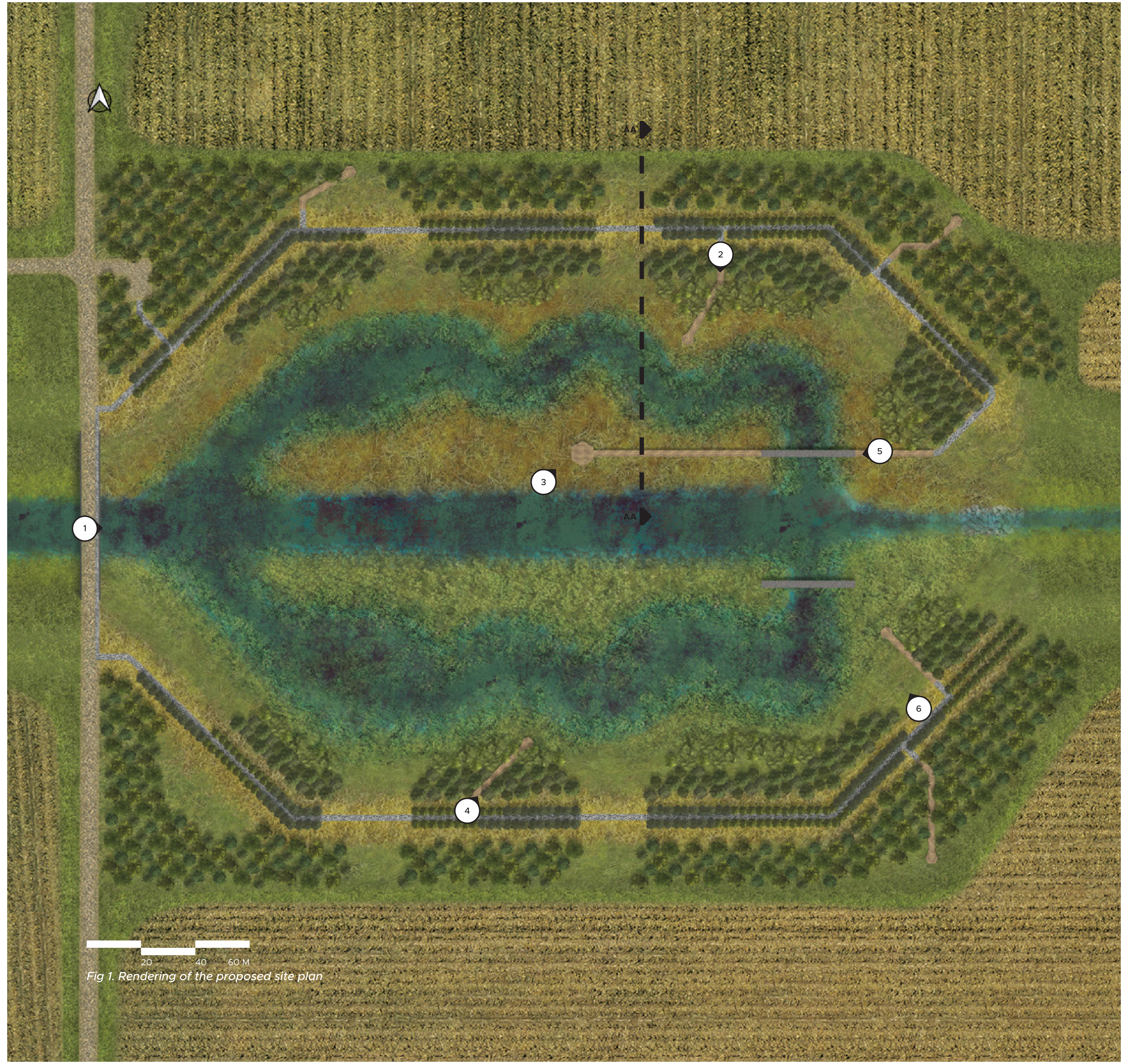


Fig 1. Rendering of the proposed site plan

Research Questions

Two research questions drive this practicum: how can we, as landscape architects, integrate ecologically functioning wetlands into major tributaries of the Red and Assiniboine Rivers to improve their water quality? What form might these wetlands take within the Red River Valley, given its physio-geographical specifics?

Primary Design Objective

Water Quality Improvement

The primary design objective is to improve the Norquay Channel's water quality. This involves manipulating the form of the landscape and devising a plant palette to retain and absorb nutrients that would otherwise later lead to eutrophication. Phosphorus and nitrogen are the primary nutrients that lead to eutrophication in the waterway. Water quality is improved by purposefully diverting and slowing down some of the water, allowing suspended solids to settle in a sedimentation pond, and by increasing the surface area and creating a more gradual slope. Increasing the water-to-bank contact to get more plants to interact with more water.

Secondary Design Objectives

Biodiversity Improvement

Wetlands facilitate the growth of diverse vegetation due to water's changing levels at different times of the year. Diverse vegetation creates a desirable environment for different animal species to inhabit. Although many existing plant species on site will be maintained, additional species will be necessary to enhance the wetland and adjacent spaces. A list of the proposed plant species is provided on Page 9.

Recreational / Interpretative Qualities

A space such as this, offering ecological services and varying plant species, will allow people to visit and learn about the components and functions of the landscape before them. This project would be a significant addition as there are no other constructed wetlands southwest of Winnipeg. Being close to several smaller communities and the population center of Carman, there would be amenities nearby, making it a great recreational spot to visit year-round.

Promoting Irrigation Access

The primary function of the Norquay Channel is to remove excess water from agricultural lands during high precipitation or periods of melt, while simultaneously providing a canal for water to be drawn from for irrigation and stock water. Maintaining water access for irrigation will become increasingly important as climate change continues to create highly variable conditions across the years and seasons.


Fig 2. View walking through wet meadow and wetland trees


Fig 3. Approach to one of the boardwalk destinations


Fig 4. Boardwalk destination in the middle of the wetland on the north side of the channel


Fig 5. View over the water control structure on the north side of the channel

Proposed Tree Species

Two categories of tree species were chosen for this design based on anticipated soil saturation, duration of saturation, and proximity to the wetland. Wetland species may experience 30 to 120 days of saturated soil yearly, whereas wet meadow species can survive up to 30 days in saturated soils. The coniferous species were chosen to add winter interest and protection to the site. Similarly, Ohio Buckeye, Golden Willow, and American Larch were selected for their autumn seasonal interest. The trees planted with the primarily wet meadow plant species tend to fare better during high water. These species include Silver Maple, Red Maple, River Birch, and Eastern Cottonwood. Northern Catalpa, Black Tupelo, and Golden Willows are planted closer to the water as they can withstand moderate to highly saturated soil for longer. Since hardiness zones are expected to change from Zone 2 to 4 and beyond due to climate change, additional species were included for added diversity.

As no trees are currently on the existing design site, all proposed tree species will have to be introduced to the site. Trees may be planted in five- to ten-gallon pots. A watering and pruning schedule would need to be made for each species, as required attention may vary. All drawings will present trees at their expected mature size.

Proposed Plant Species

Three main categories of plant species were chosen based on anticipated soil saturation and its duration. The three categories are not exclusive; two or more are expected to mix in some areas. Mixing species would also be beneficial when there is a fluctuation in water levels. The tall grass prairie species are located at higher elevations, further away from the wetland. The wet meadow species are expected to have moderate soil saturation and are situated between the higher and lower elevations. The wetland/emergent plant species are located adjacent to and within the water at the projected summer depth and would be temporarily submerged during high projected spring water depths. All species listed fall within hardiness Zones 2 to 4.

The tall grass prairie plant species would need to be reintroduced to the design site as they are native to the area but are not currently prominent on the site. All proposed wet meadow plant species currently exist on-site in varying quantities, but additional plantings would be done in specific areas to achieve the expected mixture of species. All proposed wetland/emergent plant species would need to be introduced to the design site as there was no current evidence of these species there. These wetland/emergent plant species were selected for their ability to facilitate nutrient uptake from the water and soil.

Seeding for the first season will be required, followed by the next year with plugs of species that are more rare or that did not take root. A yearly harvest of most wetland/emergent species would be required to encourage the plants to uptake nitrogen and phosphorus. Mowing may be necessary for the wet meadow and tall grass prairie plants.

Proposed Wet Meadow Tree Species

Acer rubrum (Red Maple)
Acer saccharinum (Silver Maple)
Aesculus glabra (Ohio Buckeye)
Tilia americana (American Linden)
Picea glauca (White Spruce)
Picea mariana (Black Spruce)

Proposed Wetland Tree Species

Betula nigra (River Birch)
Catalpa speciosa (Northern Catalpa)
Larix laricina (American Larch)
Nyssa sylvatica (Black Tupelo)
Populus deltoides (Eastern Cottonwood)
Salix alba (Golden Willow)

Proposed Wetland Plant Species

Beckmannia syzigachne (Sloughgrass)
Juncus effusus (Soft Rush)
Panicum virgatum (Switchgrass)
Sagittaria lancifolia (Arrowhead)
Typha latifolia (Broadleaf Cattail)

Proposed Wet Meadow Plant Species

Melilotus albus (White Sweet Clover)
Melilotus indicus (Sweet Clover)
Solidago canadensis (Canadian Goldenrod)
Symphoricarpos occidentalis (Snowberry)
Veronica serpyllifolia (Speedwell)

Proposed Tall Grass Prairie Species

Andropogon gerardii (Big Bluestem)
Hesperostipa spartea (Needlegrass)
Schizachyrium scoparium (Little Bluestem)
Spartina pectinata (Prairie Cord Grass)
Sporobolus heterolepis (Prairie Dropseed)

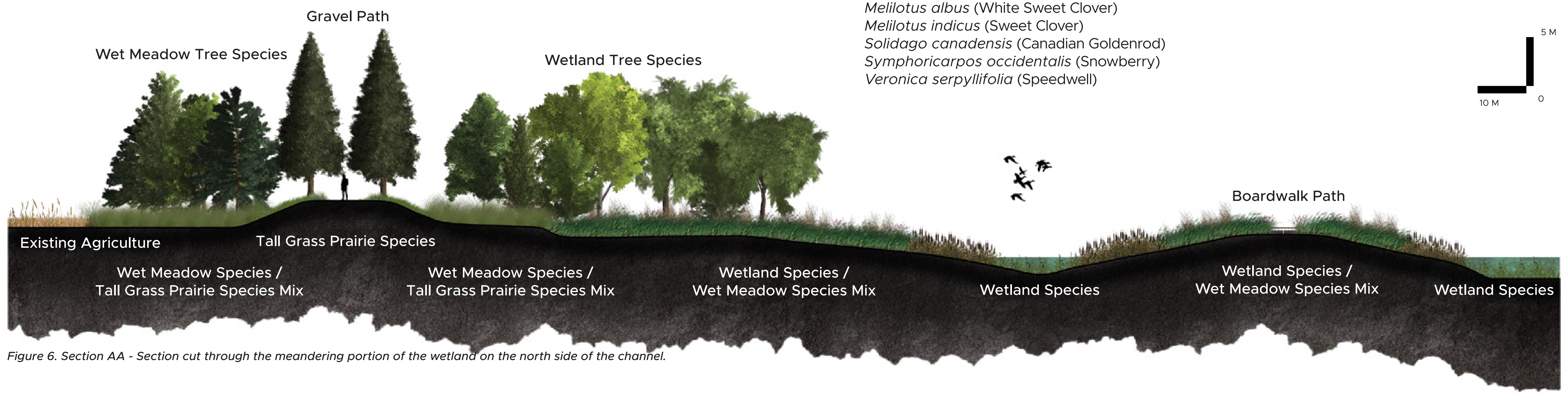
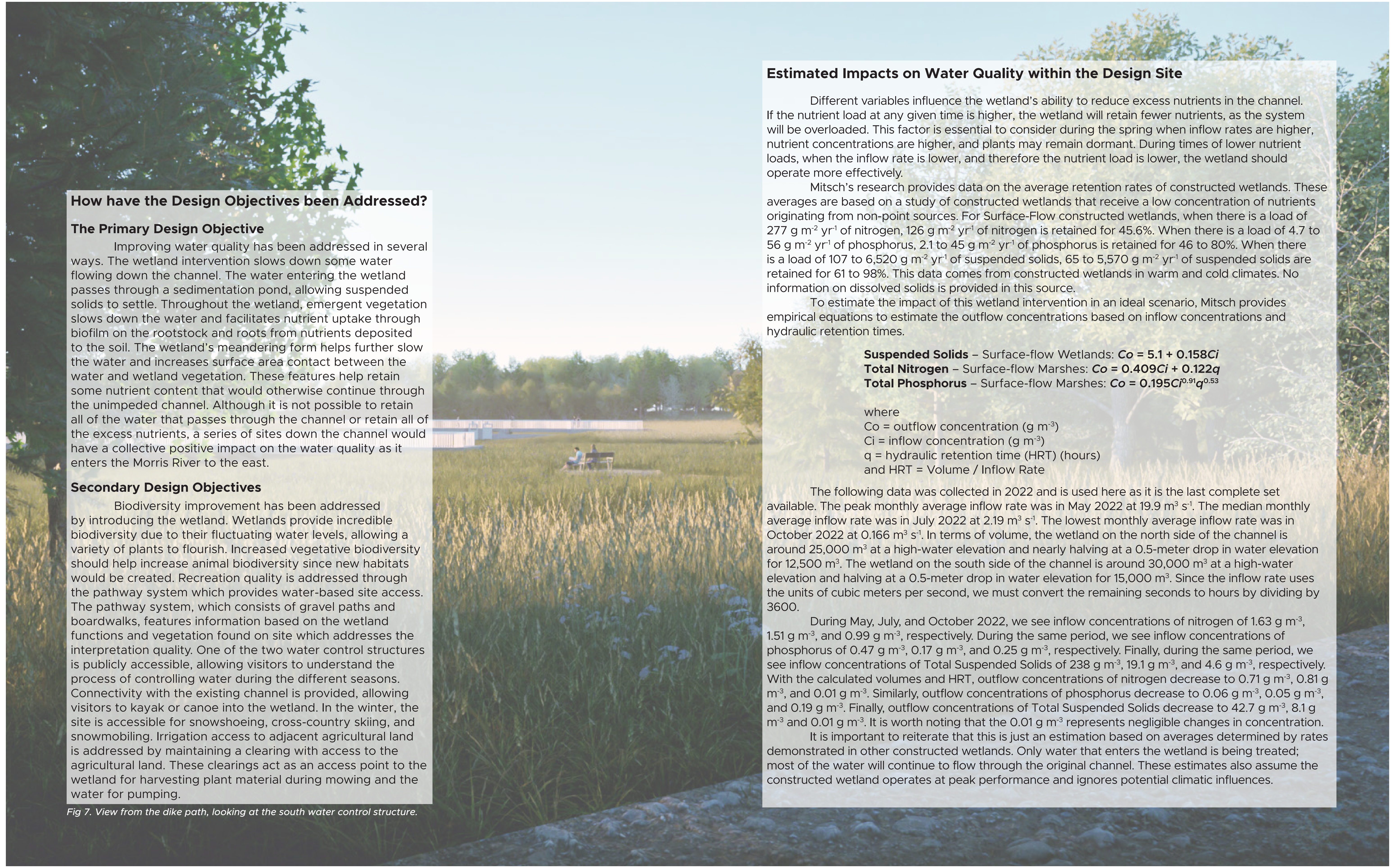


Figure 6. Section AA - Section cut through the meandering portion of the wetland on the north side of the channel.



How have the Design Objectives been Addressed?

The Primary Design Objective

Improving water quality has been addressed in several ways. The wetland intervention slows down some water flowing down the channel. The water entering the wetland passes through a sedimentation pond, allowing suspended solids to settle. Throughout the wetland, emergent vegetation slows down the water and facilitates nutrient uptake through biofilm on the rootstock and roots from nutrients deposited to the soil. The wetland's meandering form helps further slow the water and increases surface area contact between the water and wetland vegetation. These features help retain some nutrient content that would otherwise continue through the unimpeded channel. Although it is not possible to retain all of the water that passes through the channel or retain all of the excess nutrients, a series of sites down the channel would have a collective positive impact on the water quality as it enters the Morris River to the east.

Secondary Design Objectives

Biodiversity improvement has been addressed by introducing the wetland. Wetlands provide incredible biodiversity due to their fluctuating water levels, allowing a variety of plants to flourish. Increased vegetative biodiversity should help increase animal biodiversity since new habitats would be created. Recreation quality is addressed through the pathway system which provides water-based site access. The pathway system, which consists of gravel paths and boardwalks, features information based on the wetland functions and vegetation found on site which addresses the interpretation quality. One of the two water control structures is publicly accessible, allowing visitors to understand the process of controlling water during the different seasons. Connectivity with the existing channel is provided, allowing visitors to kayak or canoe into the wetland. In the winter, the site is accessible for snowshoeing, cross-country skiing, and snowmobiling. Irrigation access to adjacent agricultural land is addressed by maintaining a clearing with access to the agricultural land. These clearings act as an access point to the wetland for harvesting plant material during mowing and the water for pumping.

Fig 7. View from the dike path, looking at the south water control structure.

Estimated Impacts on Water Quality within the Design Site

Different variables influence the wetland's ability to reduce excess nutrients in the channel. If the nutrient load at any given time is higher, the wetland will retain fewer nutrients, as the system will be overloaded. This factor is essential to consider during the spring when inflow rates are higher, nutrient concentrations are higher, and plants may remain dormant. During times of lower nutrient loads, when the inflow rate is lower, and therefore the nutrient load is lower, the wetland should operate more effectively.

Mitsch's research provides data on the average retention rates of constructed wetlands. These averages are based on a study of constructed wetlands that receive a low concentration of nutrients originating from non-point sources. For Surface-Flow constructed wetlands, when there is a load of 277 g m^{-2} yr^{-1} of nitrogen, 126 g m^{-2} yr^{-1} of nitrogen is retained for 45.6%. When there is a load of 4.7 to 56 g m^{-2} yr^{-1} of phosphorus, 2.1 to 45 g m^{-2} yr^{-1} of phosphorus is retained for 46 to 80%. When there is a load of 107 to 6,520 g m^{-2} yr^{-1} of suspended solids, 65 to 5,570 g m^{-2} yr^{-1} of suspended solids are retained for 61 to 98%. This data comes from constructed wetlands in warm and cold climates. No information on dissolved solids is provided in this source.

To estimate the impact of this wetland intervention in an ideal scenario, Mitsch provides empirical equations to estimate the outflow concentrations based on inflow concentrations and hydraulic retention times.

Suspended Solids – Surface-flow Wetlands: $Co = 5.1 + 0.158Ci$
Total Nitrogen – Surface-flow Marshes: $Co = 0.409Ci + 0.122q$
Total Phosphorus – Surface-flow Marshes: $Co = 0.195Ci^{0.91}q^{0.53}$

where
Co = outflow concentration (g m^{-3})
Ci = inflow concentration (g m^{-3})
q = hydraulic retention time (HRT) (hours)
and HRT = Volume / Inflow Rate

The following data was collected in 2022 and is used here as it is the last complete set available. The peak monthly average inflow rate was in May 2022 at 19.9 m^3 s^{-1}. The median monthly average inflow rate was in July 2022 at 2.19 m^3 s^{-1}. The lowest monthly average inflow rate was in October 2022 at 0.166 m^3 s^{-1}. In terms of volume, the wetland on the north side of the channel is around 25,000 m^3 at a high-water elevation and nearly halving at a 0.5-meter drop in water elevation for 12,500 m^3. The wetland on the south side of the channel is around 30,000 m^3 at a high-water elevation and halving at a 0.5-meter drop in water elevation for 15,000 m^3. Since the inflow rate uses the units of cubic meters per second, we must convert the remaining seconds to hours by dividing by 3600.

During May, July, and October 2022, we see inflow concentrations of nitrogen of 1.63 g m^{-3}, 1.51 g m^{-3}, and 0.99 g m^{-3}, respectively. During the same period, we see inflow concentrations of phosphorus of 0.47 g m^{-3}, 0.17 g m^{-3}, and 0.25 g m^{-3}, respectively. Finally, during the same period, we see inflow concentrations of Total Suspended Solids of 238 g m^{-3}, 19.1 g m^{-3}, and 4.6 g m^{-3}, respectively. With the calculated volumes and HRT, outflow concentrations of nitrogen decrease to 0.71 g m^{-3}, 0.81 g m^{-3}, and 0.01 g m^{-3}. Similarly, outflow concentrations of phosphorus decrease to 0.06 g m^{-3}, 0.05 g m^{-3}, and 0.19 g m^{-3}. Finally, outflow concentrations of Total Suspended Solids decrease to 42.7 g m^{-3}, 8.1 g m^{-3} and 0.01 g m^{-3}. It is worth noting that the 0.01 g m^{-3} represents negligible changes in concentration.

It is important to reiterate that this is just an estimation based on averages determined by rates demonstrated in other constructed wetlands. Only water that enters the wetland is being treated; most of the water will continue to flow through the original channel. These estimates also assume the constructed wetland operates at peak performance and ignores potential climatic influences.

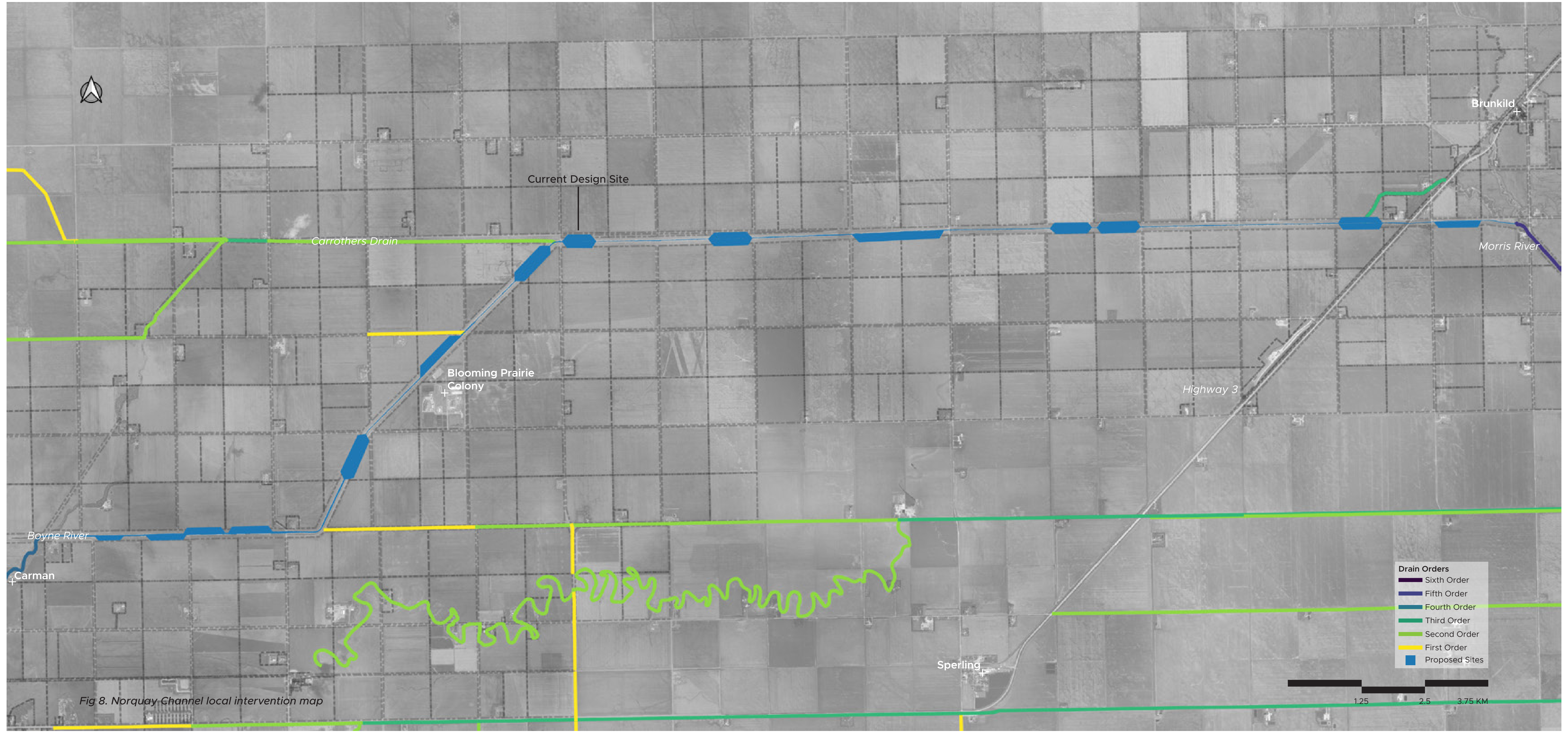


Fig 8. Norquay Channel local intervention map

Potential Intervention Sites along the Norquay Channel

Although the proposed site design will positively impact water quality, its contribution to lowering Lake Winnipeg's nutrient loading is like a drop in the bucket. Therefore, within the Norquay Channel designated drainage area, I propose other sites along the channel where interventions are possible. These sites are similar to my proposed site design, although water depths and land available for the intervention will vary. In total, approximately twenty agricultural parcels would be affected by the proposed layout in Figure 10.

These proposed sites were chosen because they minimize the amount of agricultural land being taken, do not require demolition or moving of existing structures, and are close to existing road infrastructure, so that there is access to the sites for maintenance and public access. As suggested before, these sites' designs may vary from that I have proposed. Sites may extend perpendicular to the channel, be narrower, or extend for longer distances parallel to the channel. There is a wide array of possibilities. Given that each parcel is 160 acres, twenty parcels would add up to 3,200 acres. The total area of the proposed intervention would compose approximately 400 acres.

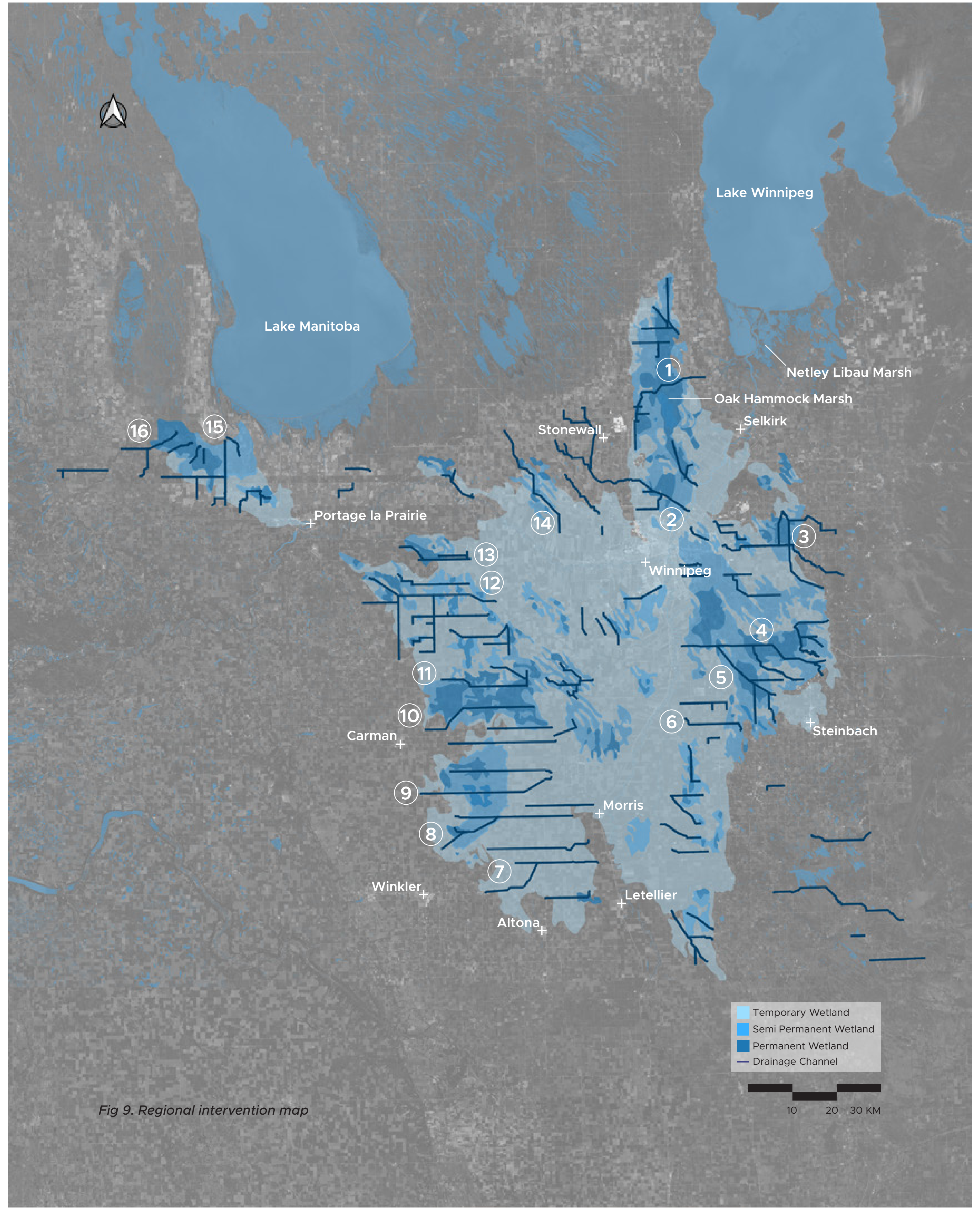


Fig 9. Regional intervention map

1. **Wavey Creek (Fourth Order)**
   Original Wetland: **Balmoral Marsh**
2. **Grassmere Creek Drain (Fifth Order)**
   Original Wetland: **St Andrews Bog**
3. **Cooks Creek (Fourth Order)**
   Original Wetland: **St Anne Bog**
4. **Seine River Diversion (Fourth Order)**
   Original Wetland: **St Anne Bog**
5. **Manning Canal (Fifth Order)**
   Original Wetland: **St Anne Bog**
6. **Tourond Creek (Fourth Order)**
   Original Wetland: **St Anne Bog**
7. **Deadhorse Creek (Fifth Order)**
   Original Wetland: **Tobacco Creek Swamp**
8. **Shannon Creek (Fifth Order)**
   Original Wetland: **Tobacco Creek Swamp**
9. **Tobacco Creek (Fifth Order)**
   Original Wetland: **Tobacco Creek Swamp**
10. **Norquay Channel (Fifth Order)**
    Original Wetland: **Boyne Marsh**
11. **11-A Drain (Fourth Order)**
    Original Wetland: **Boyne Marsh**
12. **Elm Creek Channel (Fifth Order)**
    Original Wetland: **Elm Creek Swamp**
13. **Elm River (Fourth Order)**
    Original Wetland: **Elm Creek Swamp**
14. **Sturgeon Creek (Fourth Order)**
    Original Wetland: **St Andrews Bog**
15. **Westbourne Drain (Fifth Order)**
    Original Wetland: **Westbourne Bog**
16. **Pine Creek (Fifth Order)**
    Original Wetland: **Westbourne Bog**

Interventions at a Regional Scale

The Norquay Channel is just one of many Fifth-Order drains within southern Manitoba. Approximately twelve miles south of the Norquay Channel is the Tobacco Creek Channel. Shannon Creek is three and a half miles south of the Tobacco Creek Channel. Three miles north of the Norquay Channel is the 11-A Drain. These are just a few examples of other substantial drains near the Norquay Channel. Each of these drains offers similar potential as the Norquay Channel does. As shown in Figure 11, many of these channels overlap with the previously existing wetlands. When selecting waterways here, I prioritized third-, fourth--, fifth-- and Sixth-Order waterways that appear artificial or have semi-artificial portions. These waterways would be similar in scale to the Norquay Channel and be expected to handle a similar volume of water during peak times. The best place to restore wetlands is where they used to exist. Although each waterway's conditions may vary and need to be adequately evaluated, I propose that wetland interventions should be considered along all viable waterways shown in Figure 11.

The site design I proposed in this document would have a positive local impact, but minimally, on Lake Winnipeg. The effect of the design becomes greater when several sites are located in series along the Norquay Channel, and the idea is expanded to other significant waterways in the Red River Valley. These agricultural waterways provide a means of reanimating the wetlands that once existed in the same area. Draining the original wetlands was a large-scale effort over a short period, and now, the same ambition should be applied to recover the wetlands. This effort is done to address climate change in general, as well as the eutrophication of Lake Winnipeg. Manitoba has a history of managing water, but now, it is for a different purpose.

Carlton Grove
CentreVenture Development

Term Winter 2022 **Class** LARC 7330 Studio 3
Instructor(s) Alan Tate **Duration** 6 Weeks
Programs Photoshop, Rhino3D, TwinMotion, QGIS

The entire studio studied the CentreVenture development area of downtown Winnipeg, with groups of individuals having a specific aspect of analyzing. As a result, a personal framework for the area's development was produced, followed by site selection. Carlton Grove is located east of the RBC Convention Centre, bordered by York Avenue to the north, Hargrave Street to the east, and Carlton Street, the namesake, to the west. The nature of the on-site climate, mainly summer sunlight and winter wind, informed the site's layout, including the orientation of trees, boardwalks, and pathways.

Framework Overview

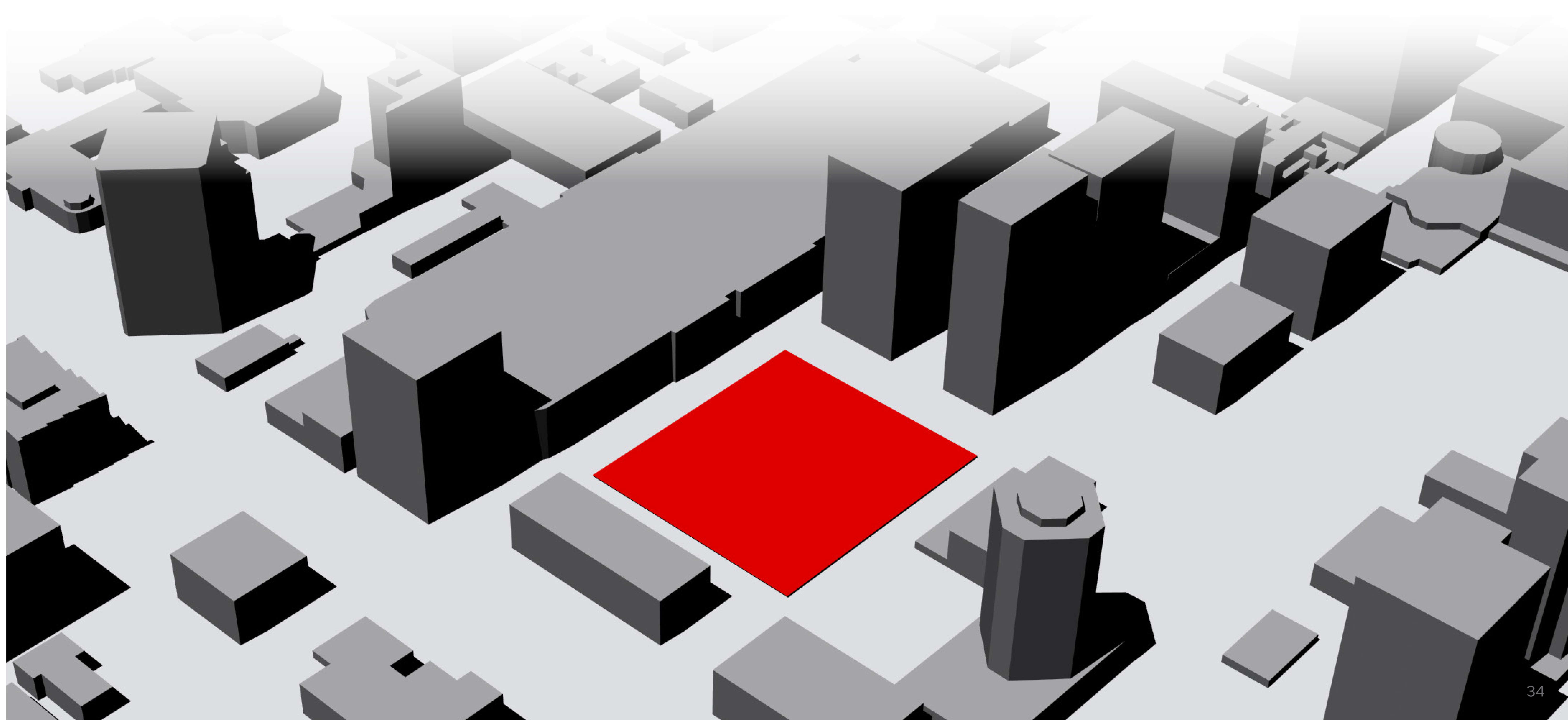
Buildings
Paved Roads
Surface Parking

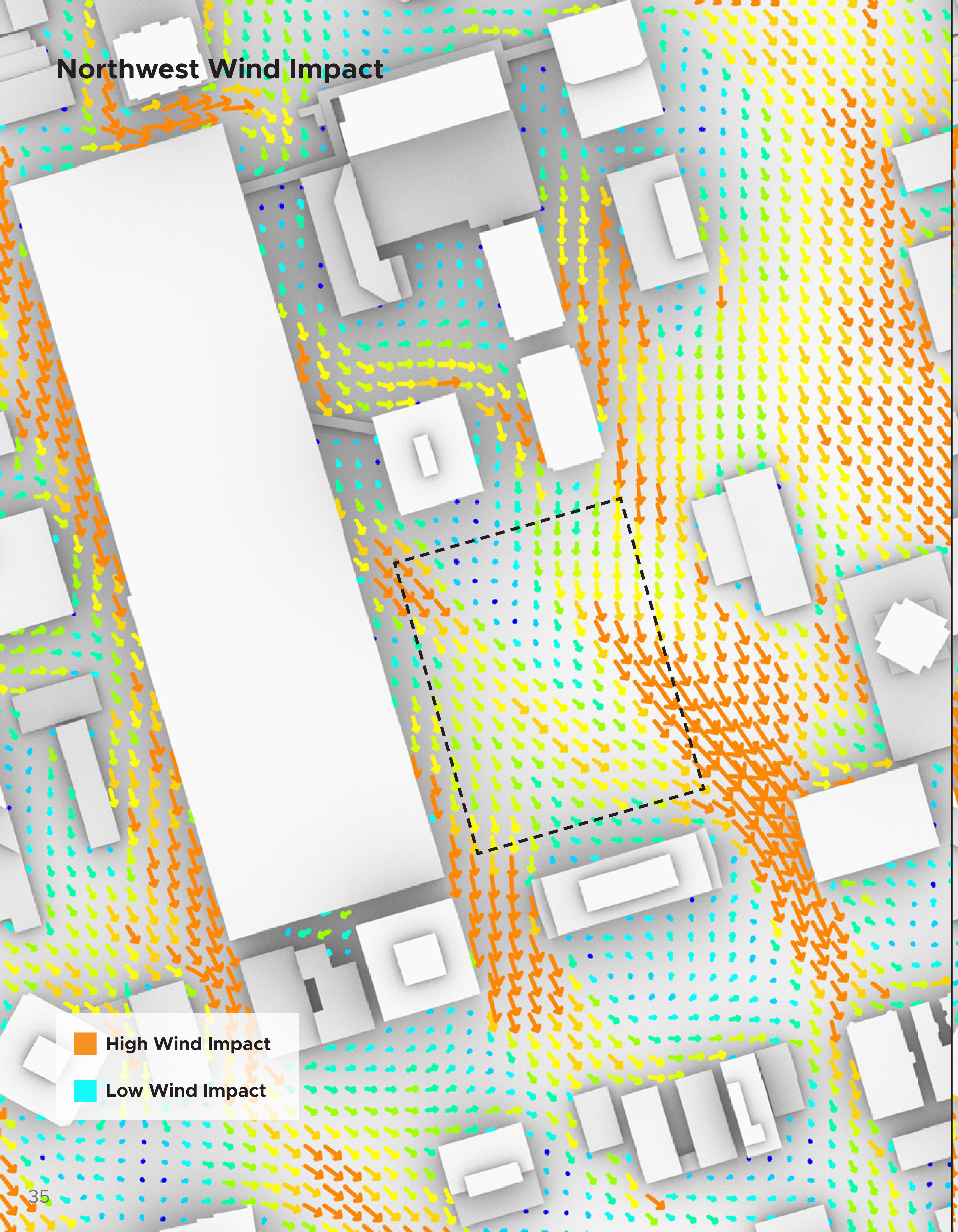
This framework addresses the CentreVenture region of downtown Winnipeg. The framework looks to reform the nature of vehicular and pedestrian movement within the downtown and public transit. A movement system that classifies vehicular streets as either Arterial or Support routes will inform the amount of traffic allowed on these routes. Existing repetitive streets create Active Routes, a network exclusive to pedestrian and cyclist access. Adjacent to these routes is surface parking lots, some of which have pre-existing proposals for building developments. The lots adjacent to Active trails will be recommended to develop public green spaces, which will be required every number of square kilometres in the downtown. It is expected that environmentally conscious design practices will develop these sites. Native species and reinforcement of the urban canopy are encouraged. At the same time, many surface parking lots will be retained for use by residents, businesses, and offices adjacent to Arterial and Support routes. The Winnipeg Transit Master Plan will continue to be executed with modifications to several lines' courses.

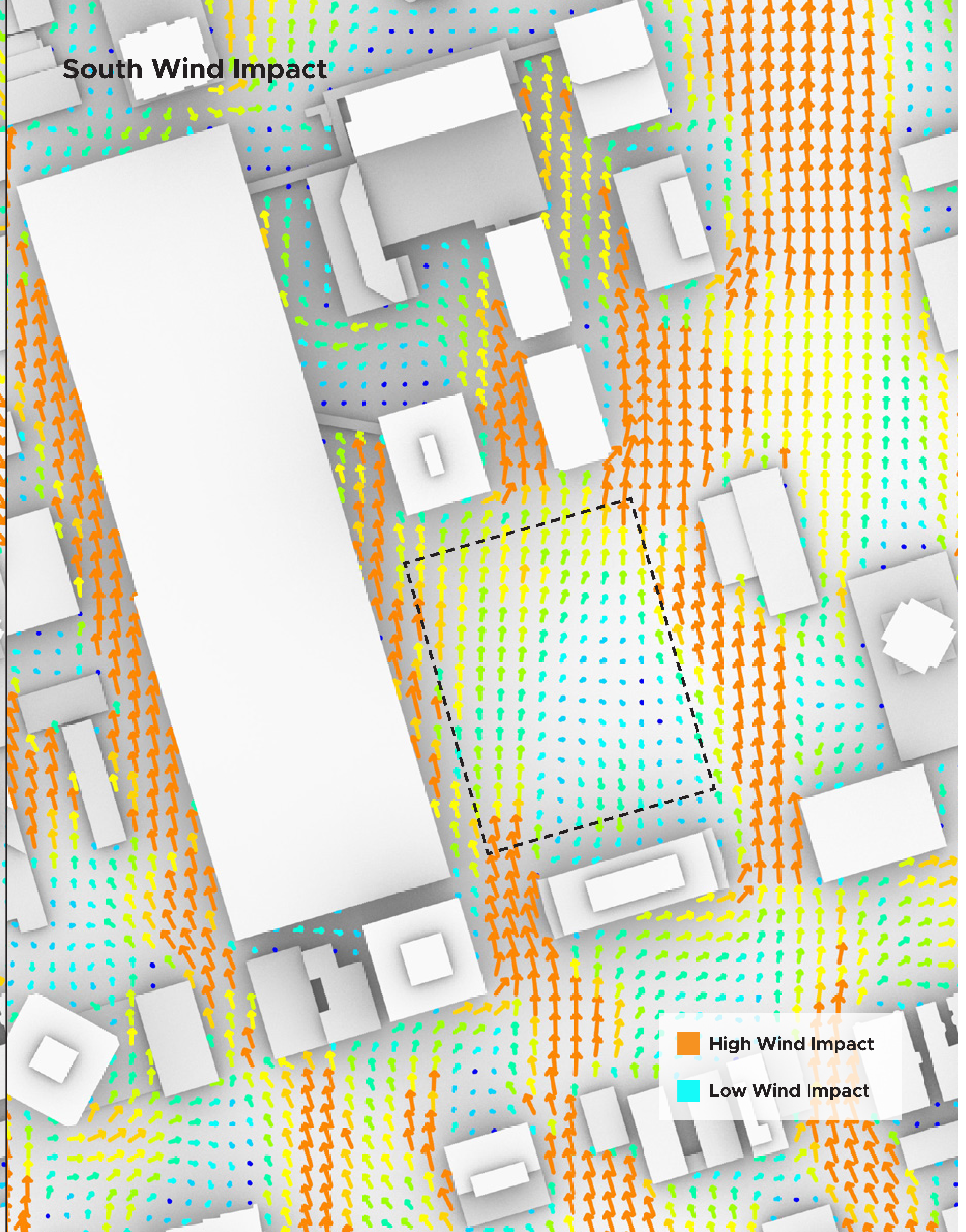
Site Development

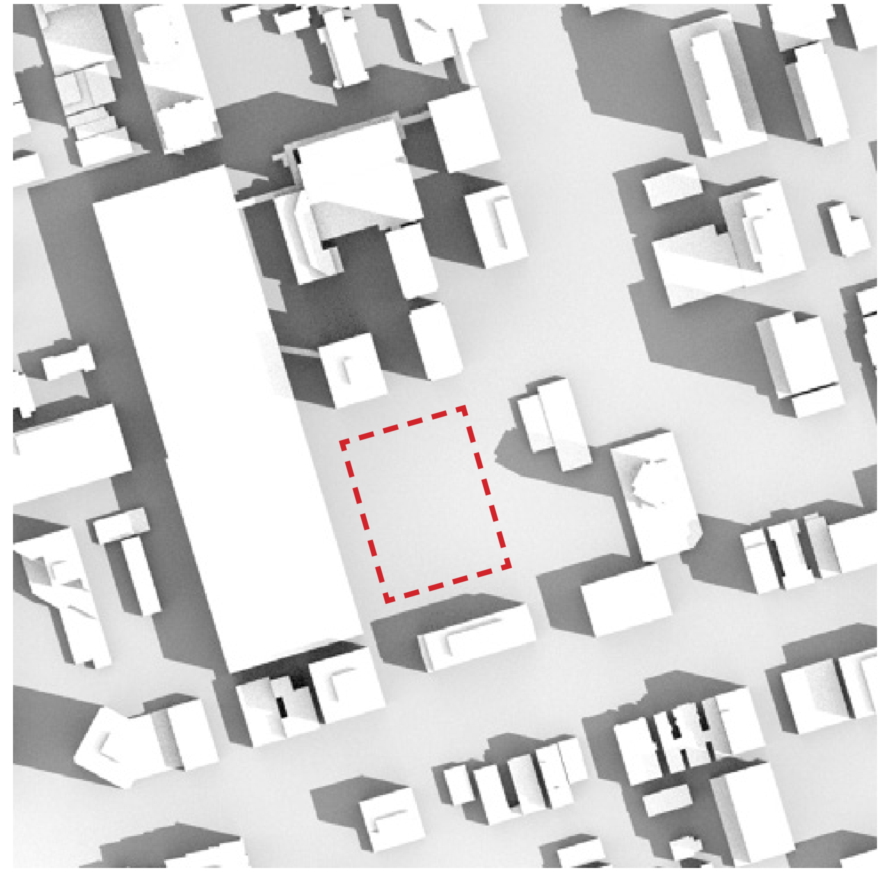
Buildings
Movement Routes
Development Lots

To the east of the RBC Convention Centre and north of Broadway, this surface parking lot will be developed as a public green space to serve as a precedent for other site developments within the CentreVenture region of downtown Winnipeg. Since there is an Active Route to the east of the site with other lots slated for development, the design of this site should break down the borders created by the presence of the previously existing roadway. This site was selected because of its proximity to Broadway and centrality within the neighbourhood. In addition, it may serve as exterior expansion space for the RBC Convention Centre.

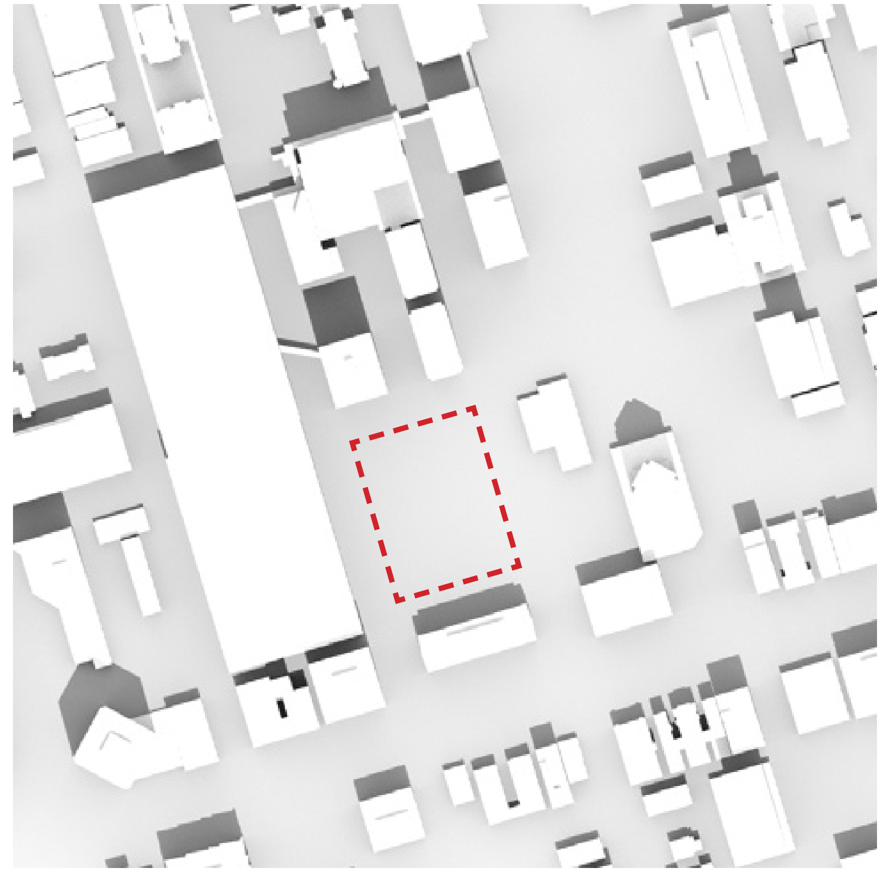




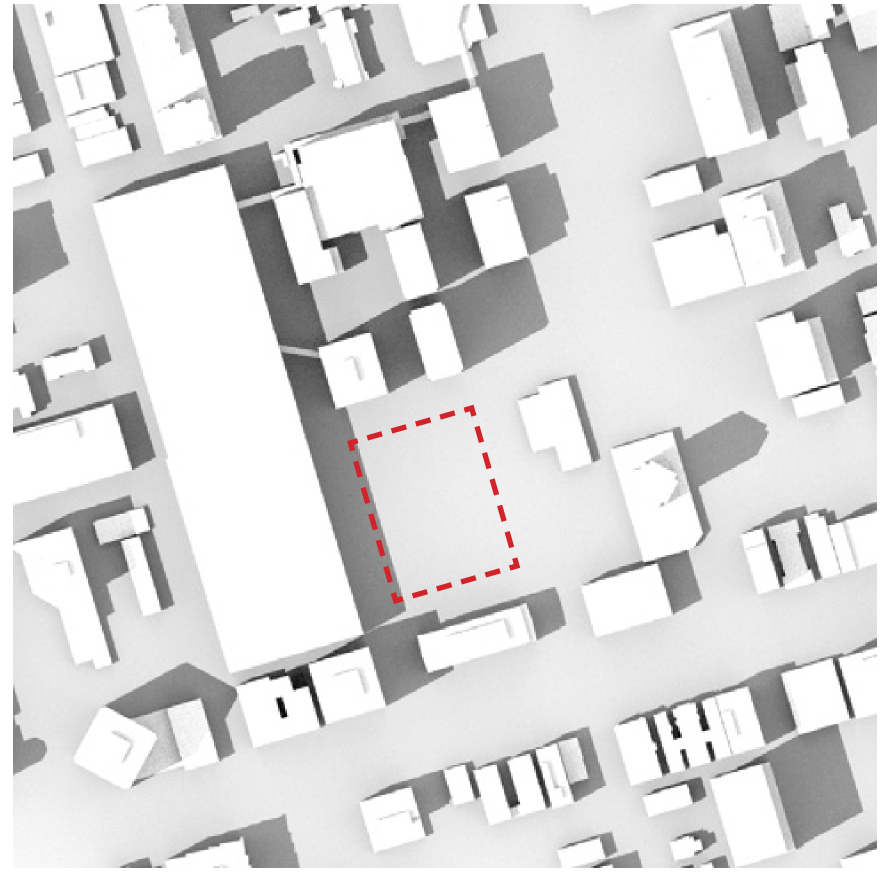




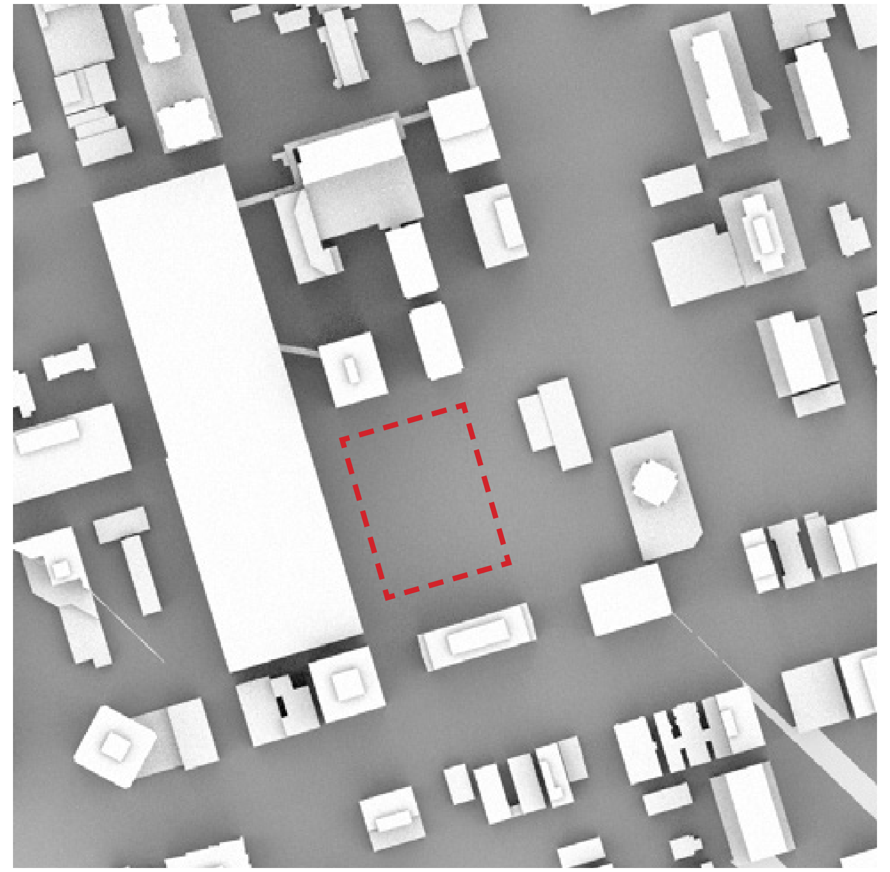
June 22nd - 0900



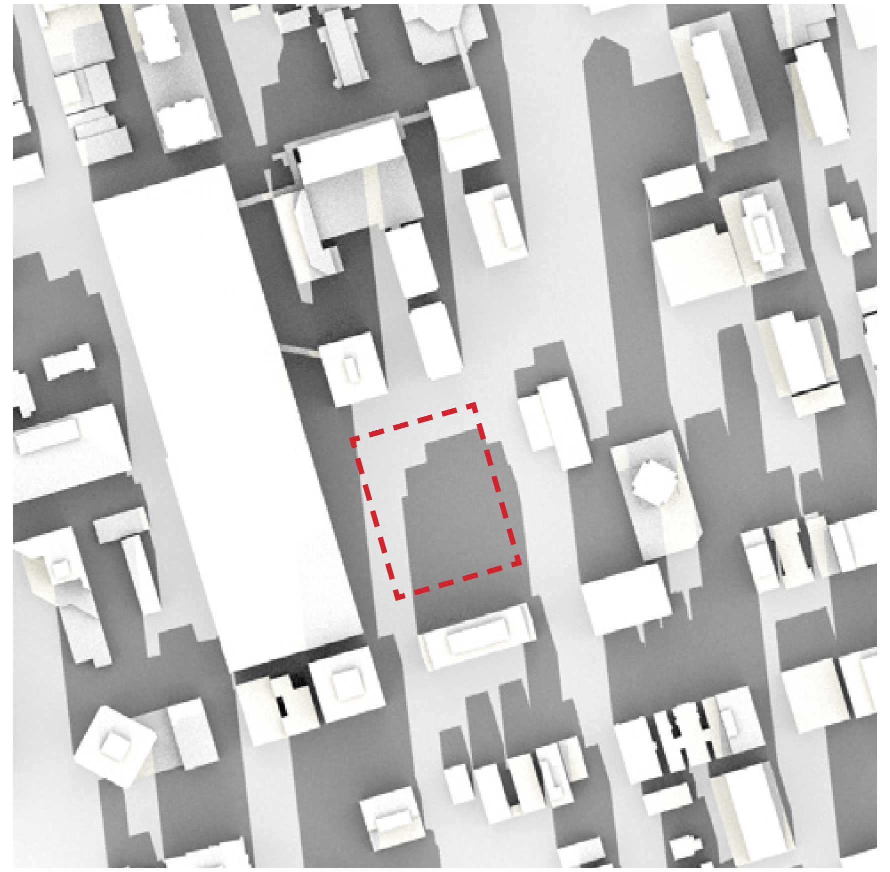
June 22nd - 1200



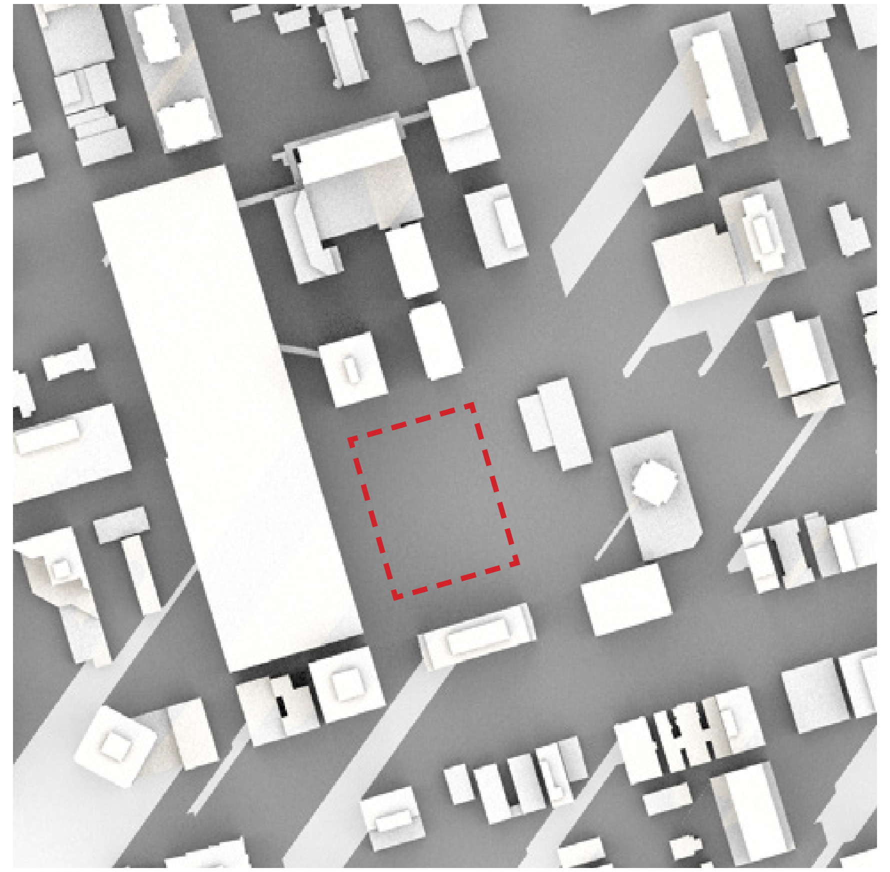
June 22nd - 1500



December 22nd - 0900



December 22nd - 1200



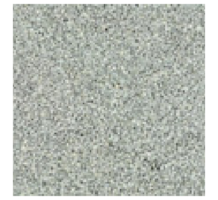
December 22nd - 1500

Site Materials

1. ***Barkman Concrete Paver***
Broadway Plank 100MM Ash

2. ***Dimensional Cedar Lumber***
Decking / Pergola

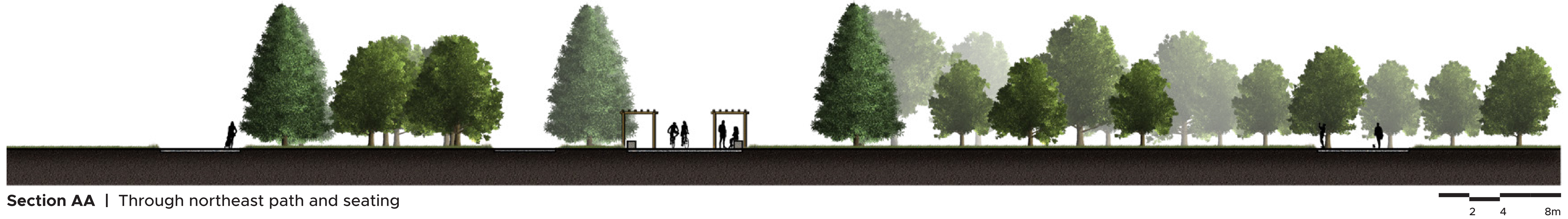
3. ***Fine Rolled Gravel***



4. ***Poured Concrete***
Seating and Slab

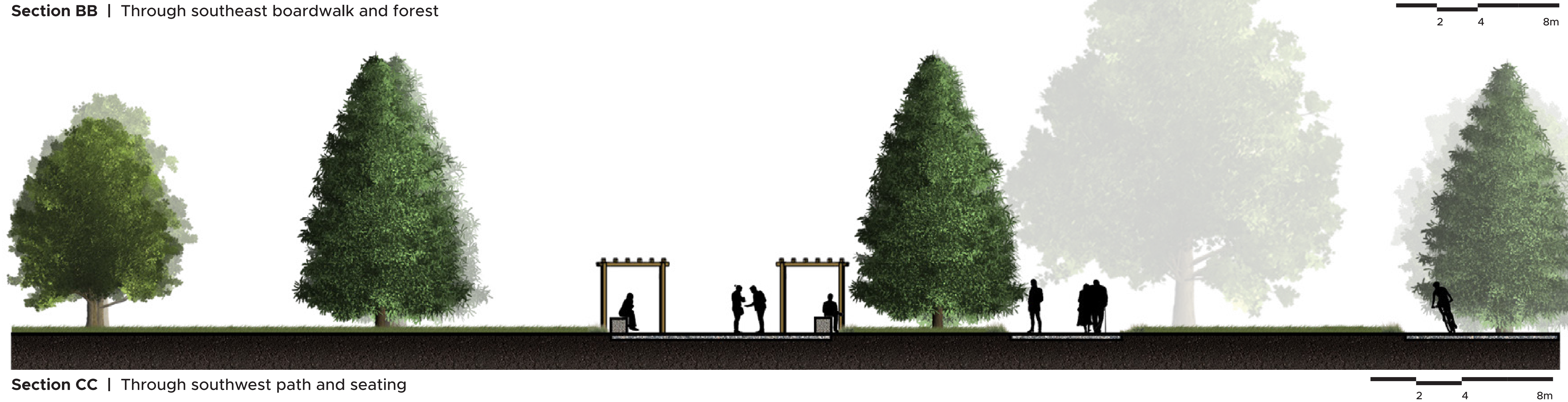
5. ***Repurposed Concrete Flagstone***

Rendered Site Plan



Section AA | Through northeast path and seating

Section BB | Through southeast boardwalk and forest



Section CC | Through southwest path and seating

Perspective One | Central Path Facing Northeast

Perspective Two | Curved Path Facing Southwest

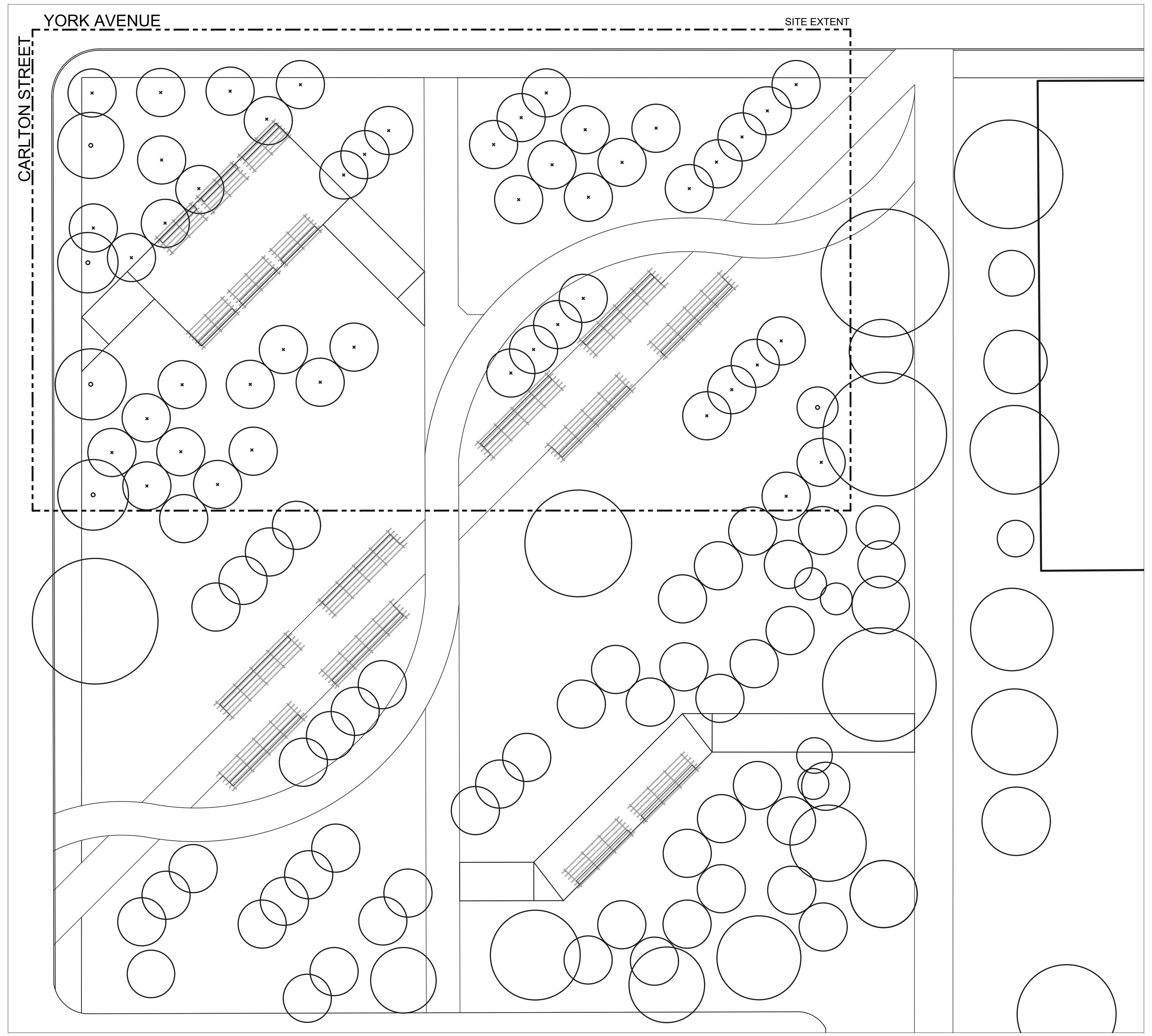
Perspective Three | Aerial View from 160 Hargrave St

Perspective Four | View from RBC Convention Centre

Carlton Grove Drawing Set
CentreVenture Development

Term Winter 2022 **Class** LARC 7330 Studio 3
Instructor(s) Alan Tate **Duration** 2 Weeks
Programs AutoCAD

This landscape architectural drawing set relates to the Carlton Grove design project. Working drawings were developed to ensure a realistic design was possible, beginning with a demolition plan, followed by materials, elevations, layouts, plantings, and details. From the details, a 1:2 model of the pergolas had been built.

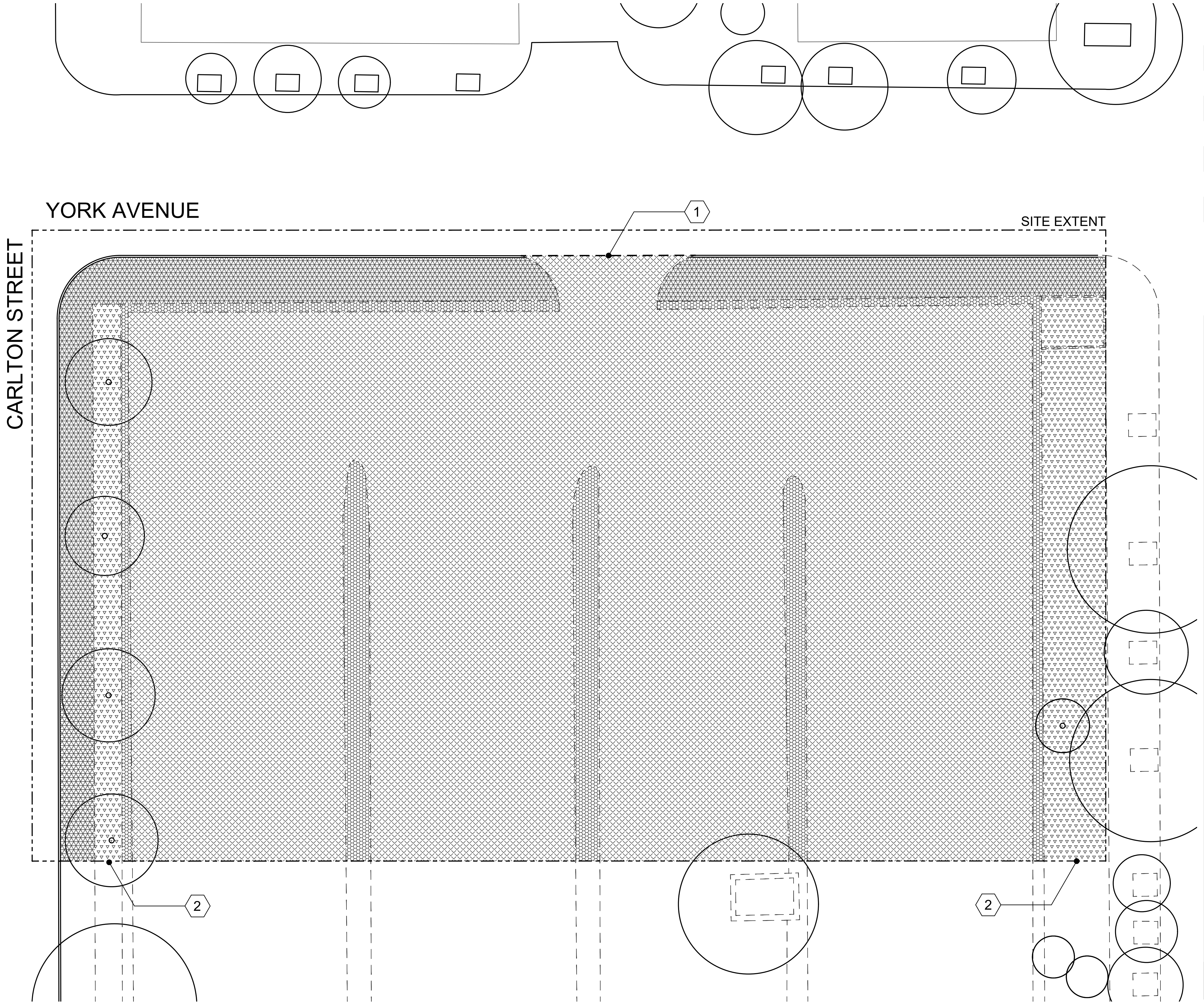


CARLTON GROVE

NORTH SECTION

WINNIPEG, MANITOBA, CANADA

BENJAMIN BOSWICK
LARC 7330 STUDIO 3
WINTER 2022
PROF. ALAN TATE
05 APRIL 2022



PAVED PARKING LOT EXCAVATED TO A DEPTH OF 1 METER

CONCRETE SIDEWALK EXCAVATED TO A DEPTH OF 0.3 METERS

RAISED CURB AND GABION WALL REMOVED TO EXISTING GROUND LEVEL

FIRM GROUND EXCAVATED TO SAME ELEVATION AS EXISTING CURB

1 CURB TO BE CONSTRUCTED TO JOIN TWO EXISTING SECTIONS OF RETAINED CURB

2 VEHICLES WILL NOT BE ALLOWED TO DRIVE OVER SOIL UNDER THE TREE DRIP LINE - EXCAVATE OUTSIDE OF TREE CANOPY DRIP LINE

GOOD FOR CONSTRUCTION

General Notes

- This drawing is the property of ATLAS Design and shall not be used or reproduced in any manner without their written permission.
- The CONTRACTOR is required to co-relate all relevant drawings, any errors or discrepancies are to be brought to the notice of CONSULTANTS before commencement of work
- All existing trees on site shall be retained
- Existing trees on the site shall have a protective perimeter established with some form of barrier around the drip line of the crown to prevent compression of the soil
- The trunks of existing site trees will be covered to prevent surface damage
- Debris from excavations will be brought to the northwest corner of the site for removal from the site

REV	DATE	DESCRIPTION

Client
CITY OF WINNIPEG
WINNIPEG, MANITOBA, CANADA

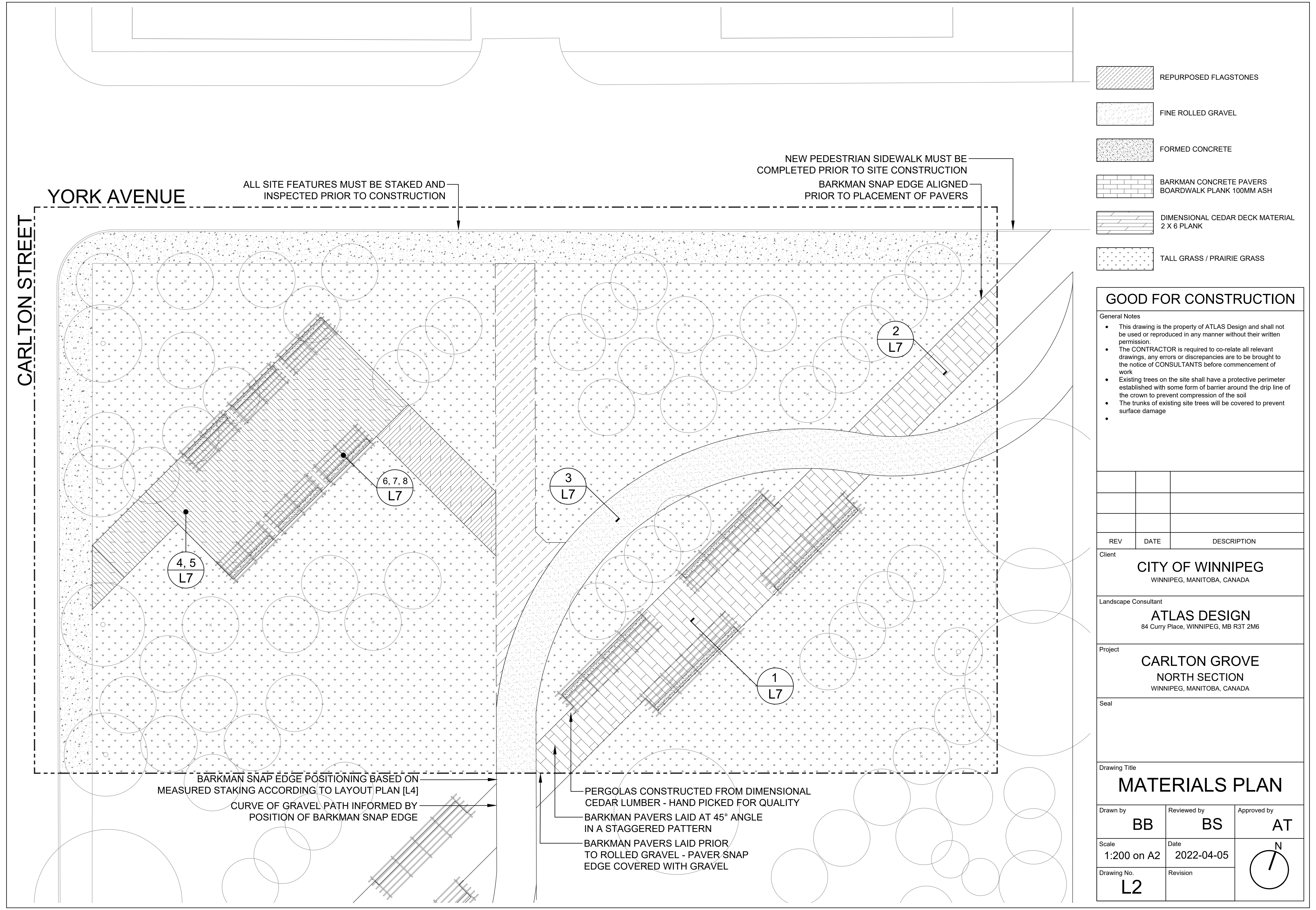
Landscape Consultant
ATLAS DESIGN
84 Curry Place, WINNIPEG, MB R3T 2M6

Project
CARLTON GROVE
NORTH SECTION
WINNIPEG, MANITOBA, CANADA

Seal

Drawing Title
DEMOLITION PLAN

Drawn by	Reviewed by	Approved by
BB	BS	AT
Scale: 1:200 on A2	Date: 2022-04-05	N
Drawing No.: L1	Revision	


YORK AVENUE
CARLTON STREET
ALL SITE FEATURES MUST BE STAKED AND INSPECTED PRIOR TO CONSTRUCTION
NEW PEDESTRIAN SIDEWALK MUST BE COMPLETED PRIOR TO SITE CONSTRUCTION
BARKMAN SNAP EDGE ALIGNED PRIOR TO PLACEMENT OF PAVERS
BARKMAN SNAP EDGE POSITIONING BASED ON MEASURED STAKING ACCORDING TO LAYOUT PLAN [L4]
CURVE OF GRAVEL PATH INFORMED BY POSITION OF BARKMAN SNAP EDGE
PERGOLAS CONSTRUCTED FROM DIMENSIONAL CEDAR LUMBER - HAND PICKED FOR QUALITY
BARKMAN PAVERS LAID AT 45° ANGLE IN A STAGGERED PATTERN
BARKMAN PAVERS LAID PRIOR TO ROLLED GRAVEL - PAVER SNAP EDGE COVERED WITH GRAVEL
2 L7
6, 7, 8 L7
3 L7
4, 5 L7
1 L7
REPURPOSED FLAGSTONES
FINE ROLLED GRAVEL
FORMED CONCRETE
BARKMAN CONCRETE PAVERS BOARDWALK PLANK 100MM ASH
DIMENSIONAL CEDAR DECK MATERIAL 2 X 6 PLANK
TALL GRASS / PRAIRIE GRASS
GOOD FOR CONSTRUCTION
General Notes
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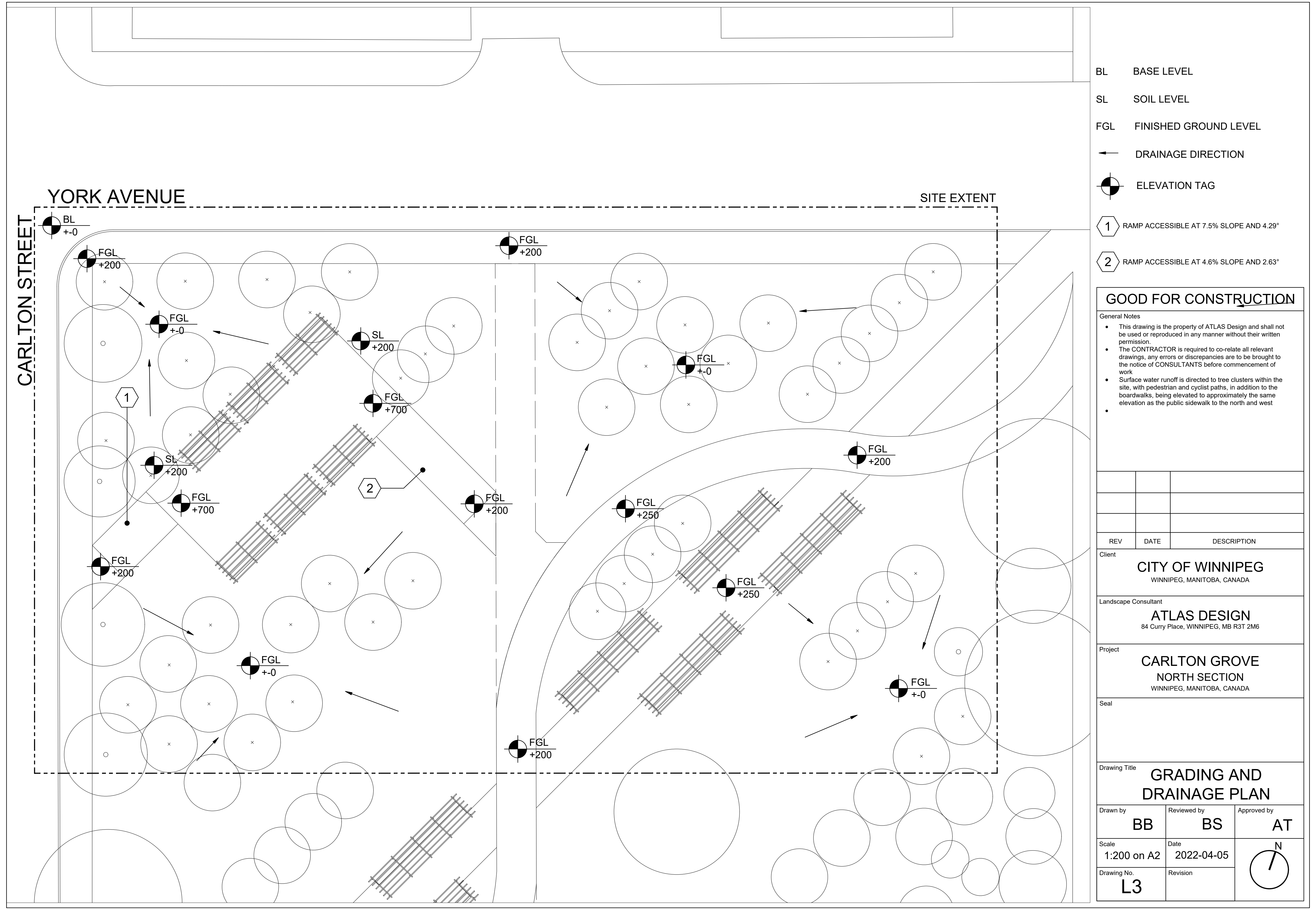
The CONTRACTOR is required to co-relate all relevant drawings, any errors or discrepancies are to be brought to the notice of CONSULTANTS before commencement of work
Existing trees on the site shall have a protective perimeter established with some form of barrier around the drip line of the crown to prevent compression of the soil
The trunks of existing site trees will be covered to prevent surface damage
REV DATE DESCRIPTION
Client
CITY OF WINNIPEG
WINNIPEG, MANITOBA, CANADA
Landscape Consultant
ATLAS DESIGN
84 Curry Place, WINNIPEG, MB R3T 2M6
Project
CARLTON GROVE
NORTH SECTION
WINNIPEG, MANITOBA, CANADA
Seal
Drawing Title
MATERIALS PLAN
Drawn by BB
Reviewed by BS
Approved by AT
Scale 1:200 on A2
Date 2022-04-05
N
Drawing No. L2
Revision


YORK AVENUE
SITE EXTENT
CARLTON STREET
BL +-0
FGL +200
FGL +-0
SL +200
FGL +700
FGL +250
1
2
BL BASE LEVEL
SL SOIL LEVEL
FGL FINISHED GROUND LEVEL
DRAINAGE DIRECTION
ELEVATION TAG
1 RAMP ACCESSIBLE AT 7.5% SLOPE AND 4.29°
2 RAMP ACCESSIBLE AT 4.6% SLOPE AND 2.63°
GOOD FOR CONSTRUCTION
General Notes
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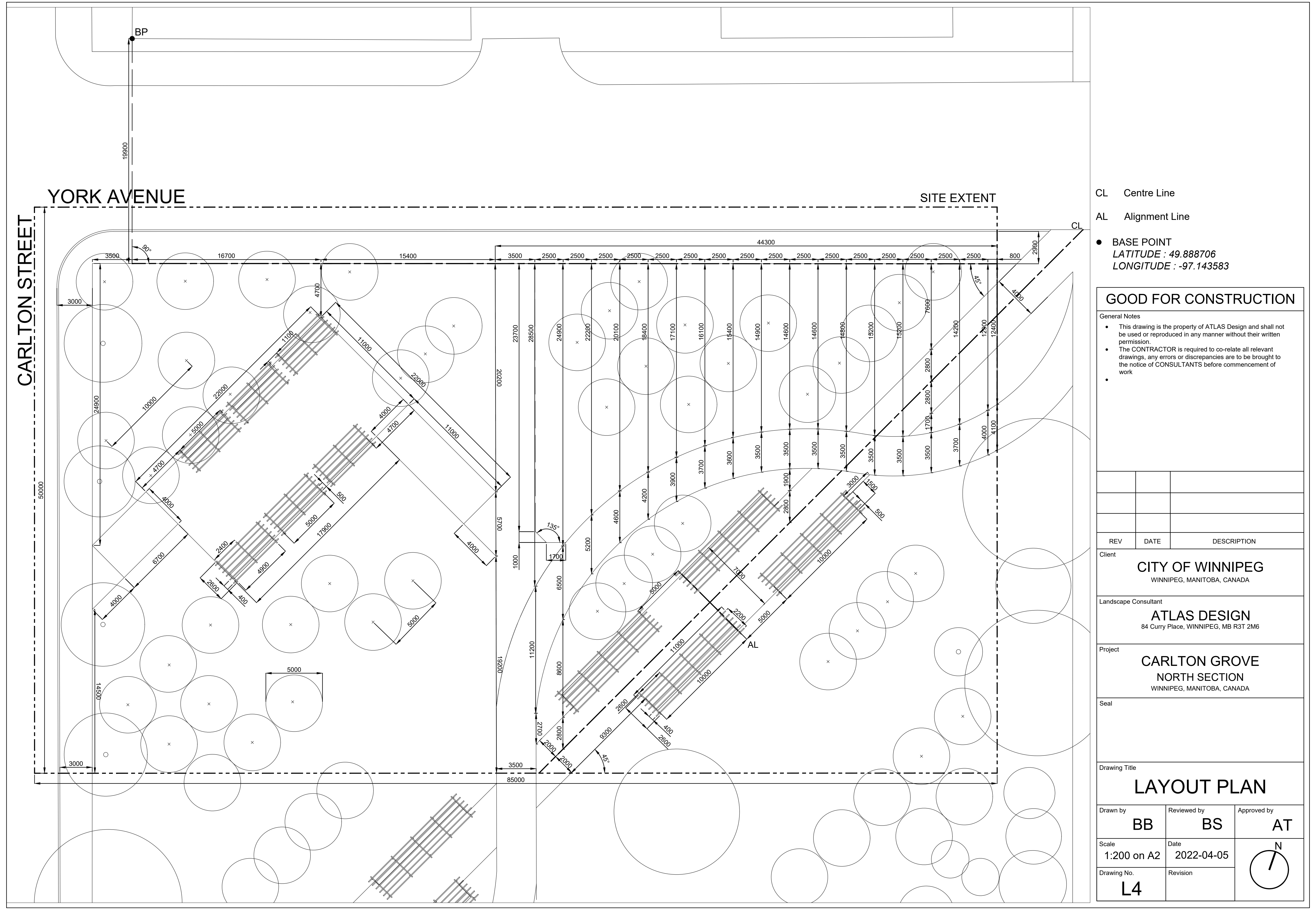
The CONTRACTOR is required to co-relate all relevant drawings, any errors or discrepancies are to be brought to the notice of CONSULTANTS before commencement of work
Surface water runoff is directed to tree clusters within the site, with pedestrian and cyclist paths, in addition to the boardwalks, being elevated to approximately the same elevation as the public sidewalk to the north and west
REV DATE DESCRIPTION
Client
CITY OF WINNIPEG
WINNIPEG, MANITOBA, CANADA
Landscape Consultant
ATLAS DESIGN
84 Curry Place, WINNIPEG, MB R3T 2M6
Project
CARLTON GROVE
NORTH SECTION
WINNIPEG, MANITOBA, CANADA
Seal
Drawing Title
GRADING AND DRAINAGE PLAN
Drawn by BB
Reviewed by BS
Approved by AT
Scale 1:200 on A2
Date 2022-04-05
N
Drawing No. L3
Revision



BP
YORK AVENUE
SITE EXTENT
CARLTON STREET
CL
AL
CL Centre Line
AL Alignment Line
BASE POINT
LATITUDE : 49.888706
LONGITUDE : -97.143583
GOOD FOR CONSTRUCTION
General Notes
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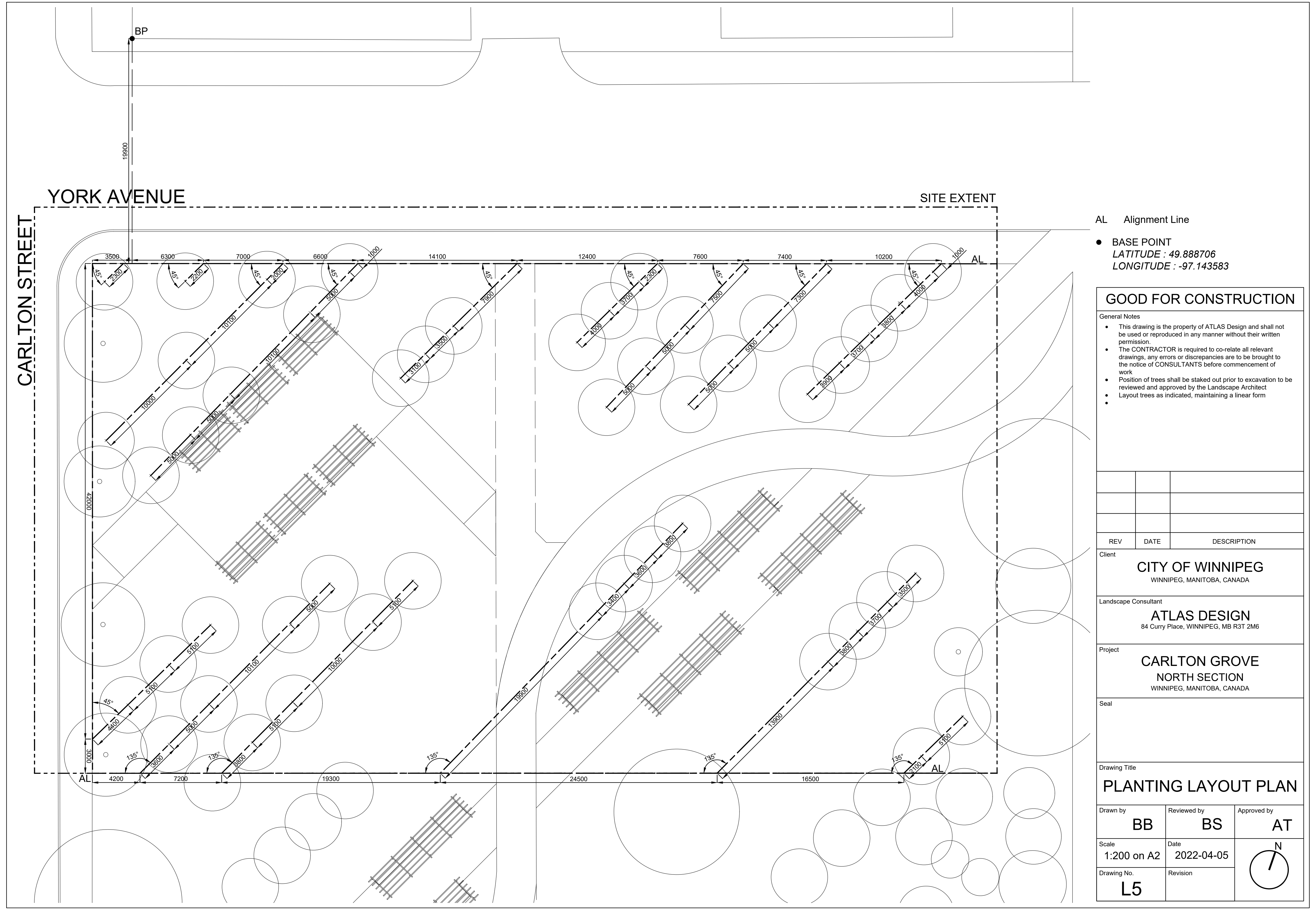
The CONTRACTOR is required to co-relate all relevant drawings, any errors or discrepancies are to be brought to the notice of CONSULTANTS before commencement of work
REV
DATE
DESCRIPTION
Client
CITY OF WINNIPEG
WINNIPEG, MANITOBA, CANADA
Landscape Consultant
ATLAS DESIGN
84 Curry Place, WINNIPEG, MB R3T 2M6
Project
CARLTON GROVE
NORTH SECTION
WINNIPEG, MANITOBA, CANADA
Seal
Drawing Title
LAYOUT PLAN
Drawn by
BB
Reviewed by
BS
Approved by
AT
Scale
1:200 on A2
Date
2022-04-05
N
Drawing No.
L4
Revision



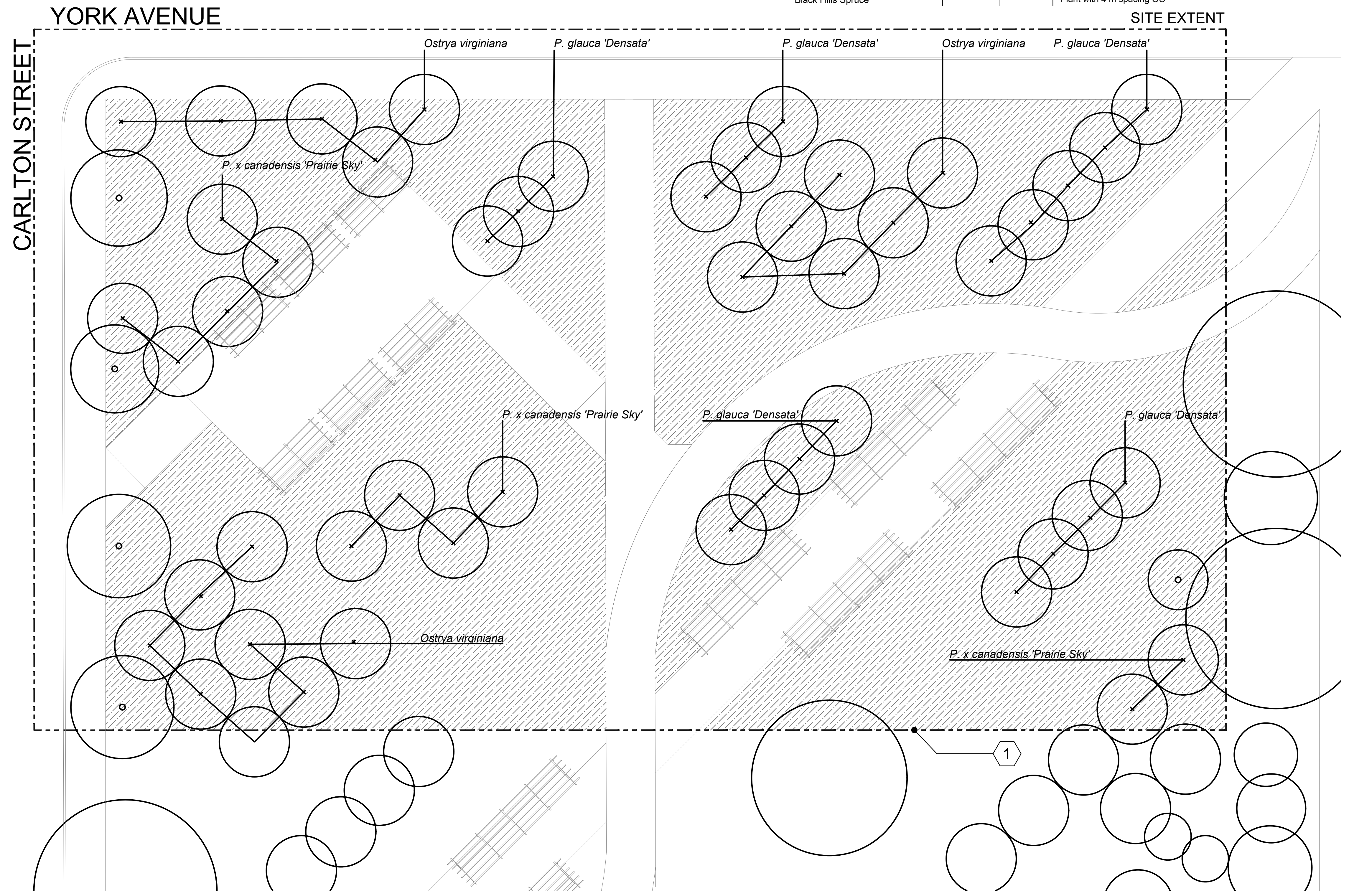
BP
YORK AVENUE
SITE EXTENT
CARLTON STREET
AL
AL Alignment Line
BASE POINT
LATITUDE : 49.888706
LONGITUDE : -97.143583
GOOD FOR CONSTRUCTION
General Notes
This drawing is the property of ATLAS Design and shall not be used or reproduced in any manner without their written permission.
The CONTRACTOR is required to co-relate all relevant drawings, any errors or discrepancies are to be brought to the notice of CONSULTANTS before commencement of work
Position of trees shall be staked out prior to excavation to be reviewed and approved by the Landscape Architect
Layout trees as indicated, maintaining a linear form
REV
DATE
DESCRIPTION
Client
CITY OF WINNIPEG
WINNIPEG, MANITOBA, CANADA
Landscape Consultant
ATLAS DESIGN
84 Curry Place, WINNIPEG, MB R3T 2M6
Project
CARLTON GROVE
NORTH SECTION
WINNIPEG, MANITOBA, CANADA
Seal
Drawing Title
PLANTING LAYOUT PLAN
Drawn by
BB
Reviewed by
BS
Approved by
AT
Scale
1:200 on A2
Date
2022-04-05
N
Drawing No.
L5
Revision

Prairie Grass Schedule

Botanical / Common Name	*Aquilegia alpina* Alpine Columbine	*Bouteloua gracilis* Blue Grama	*Bromis inermis 'Skinner's Gold'* Skinner's Gold Brome Grass	*Carex muskingumensis* Palm Sedge	*Cerastium tomentosum* Snow-In-Summer	*Stipa tenuissima 'Pony Tails'* Pony Tails Mexican Feather Grass
Distribution Quantity	3 per M²	9 per M²	9 per M²	6 per M²	6 per M²	12 per M²
Pot Size	Plug	Plug	Plug	Plug	Plug	Plug

Deciduous and Coniferous Tree Schedule

Botanical / Common Name	Quantity	Pot Size	Comments
Ostrya virginiana Hop Hornbeam	19	#15	1.5 m height, 1 m spread at time of planting Plant with 5 m spacing OC
Populus x canadensis 'Prairie Sky' Prairie Sky Poplar	11	#15	1.5 m height, 1 m spread at time of planting Plant with 5 m spacing OC
Picea glauca 'Densata' Black Hills Spruce	19	#15	2 m height, 1.5 m spread at time of planting Plant with 4 m spacing OC



MIXED GRASSES
150MM PLUG SPACING - 45 PLUGS PER M²

(1) ENTIRE SITE SOIL DEPTH EXCAVATED TO 150MM TREE PITS EXCAVATED 750MM DOWN BY 900MM WIDE - TOP SOIL ADDED UP TO 150MM AFTER TREE PLANTING IS COMPLETE

GOOD FOR CONSTRUCTION

General Notes

- This drawing is the property of ATLAS Design and shall not be used or reproduced in any manner without their written permission.
- The CONTRACTOR is required to co-relate all relevant drawings, any errors or discrepancies are to be brought to the notice of CONSULTANTS before commencement of work
- Plants must be laid out on site accordingly prior to planting
- Sample area for grass plugs will be made available for trial placements prior to planting
- Trees with broken branches or other damage will not be accepted for planting
- Layout trees as indicated, maintaining a linear form
-

REV	DATE	DESCRIPTION

Client
CITY OF WINNIPEG
WINNIPEG, MANITOBA, CANADA

Landscape Consultant
ATLAS DESIGN
84 Curry Place, WINNIPEG, MB R3T 2M6

Project
CARLTON GROVE
NORTH SECTION
WINNIPEG, MANITOBA, CANADA

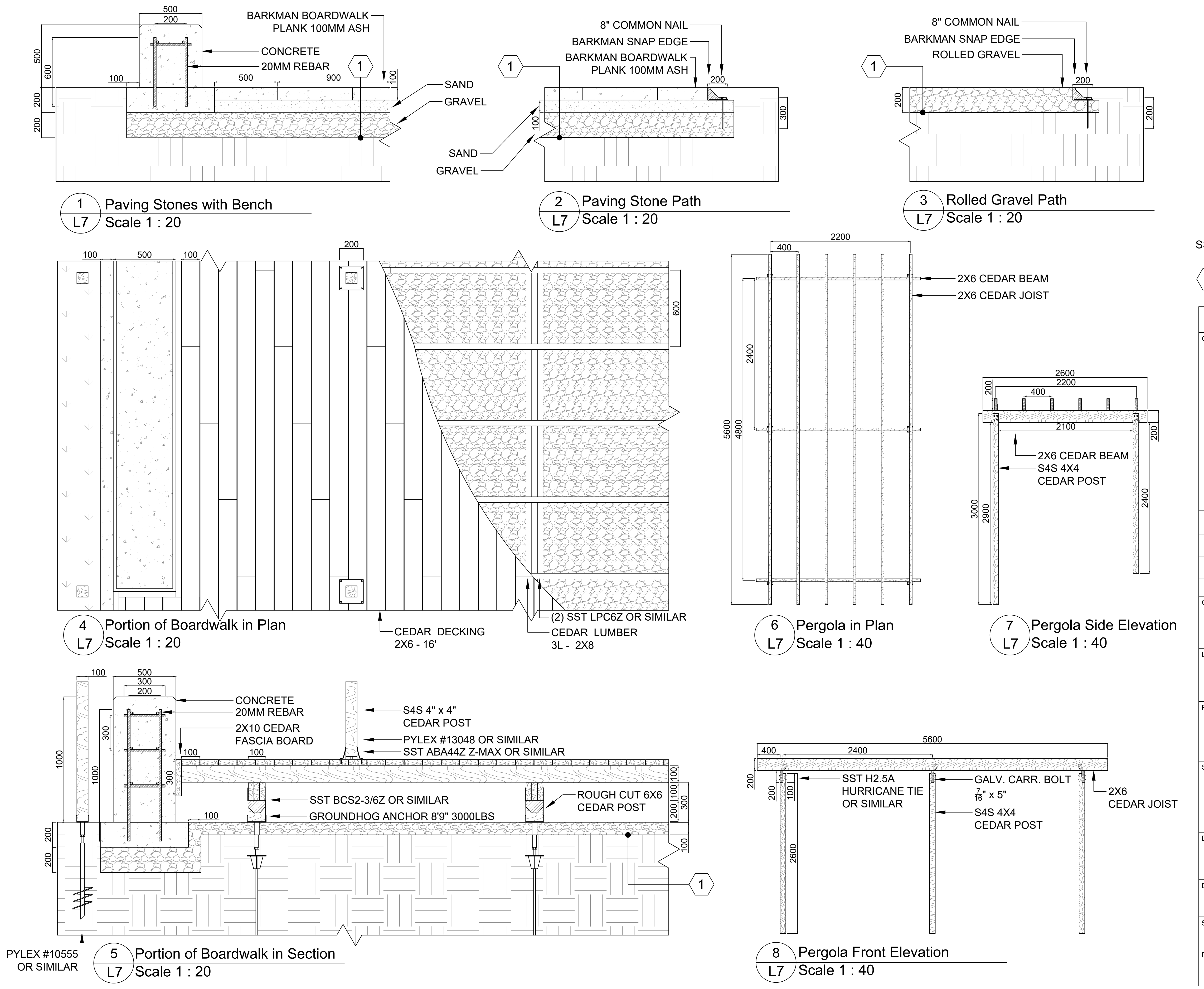
Seal

Drawing Title
PLANTING PLAN

Drawn by	Reviewed by	Approved by
BB	BS	AT

Scale	Date
1:200 on A2	2022-04-05

Drawing No. L6 | Revision



SST SIMPSON STRONG TIE ®

(1) GEO TEXTILE MEMBRANE LAID IN EXCAVATION PRIOR TO PLACEMENT AND COMPACTION OF GRAVEL AND SAND BASES

GOOD FOR CONSTRUCTION

General Notes

- This drawing is the property of ATLAS Design and shall not be used or reproduced in any manner without their written permission.
- The CONTRACTOR is required to co-relate all relevant drawings, any errors or discrepancies are to be brought to the notice of CONSULTANTS before commencement of work
-

REV	DATE	DESCRIPTION

Client
CITY OF WINNIPEG
WINNIPEG, MANITOBA, CANADA

Landscape Consultant
ATLAS DESIGN
84 Curry Place, WINNIPEG, MB R3T 2M6

Project
CARLTON GROVE
NORTH SECTION
WINNIPEG, MANITOBA, CANADA

Seal

Drawing Title
DETAILS-01

Drawn by	Reviewed by	Approved by
BB	BS	AT

Scale	Date
As Indicated	2022-04-05

Drawing No. L7 | Revision

Personal Work

Term Summer 2019, Summer 2020, 2021, 2022, On-going
Programs Photoshop, AutoCAD, Rhino3D + TwinMotion, Other

My personal work includes projects that I have done for family and myself. This has allowed me to experiment with methods of representation, as well as contribute directly to the design process of other projects. This work also includes hobby interests that are separate from the field of landscape architecture.

Personal Construction Project

After working several years at a retail hardware store, I became accustomed to creating material estimations. I have used this knowledge to assist in personal construction projects.

Cottage Deck Extension

Located in the cottage area of Grand Beach Provincial Park, the original cottage was constructed in the 1970s. Two previous additions had been constructed in 1990 - 91 to the west and south sides of the cottage.

Prior to the construction of the original structure in the 1970s, another cottage known as the 'Nifty Inn' had existed in southeast corner of the lot, roughly where the existing shed is located.

This extension of the deck would add approximately 144 sq ft. of deck surface to the south side of the cottage. In addition to the extension, the existing deck area would be screened in.

Material Estimation

Beams

2 x 6 x 12' (2)
2 x 8 x 8' (4)
2 x 8 x 16' (4)

Deck Surface

2 x 3 x 8' (2)
2 x 6 x 8' (12)
2 x 6 x 12' (19)
2 x 6 x 16' (12)

Ledger

2 x 8 x 12' (1)
2 x 8 x 16' (1)

Railing

2 x 4 x 12' (4)

** Front Stairs are pre-built*

Posts and Footings

6 x 6 x 8' Treated Post (1)
18 x 18 x 4 Footing Pad (5)

Joists

2 x 6 x 12' (11)

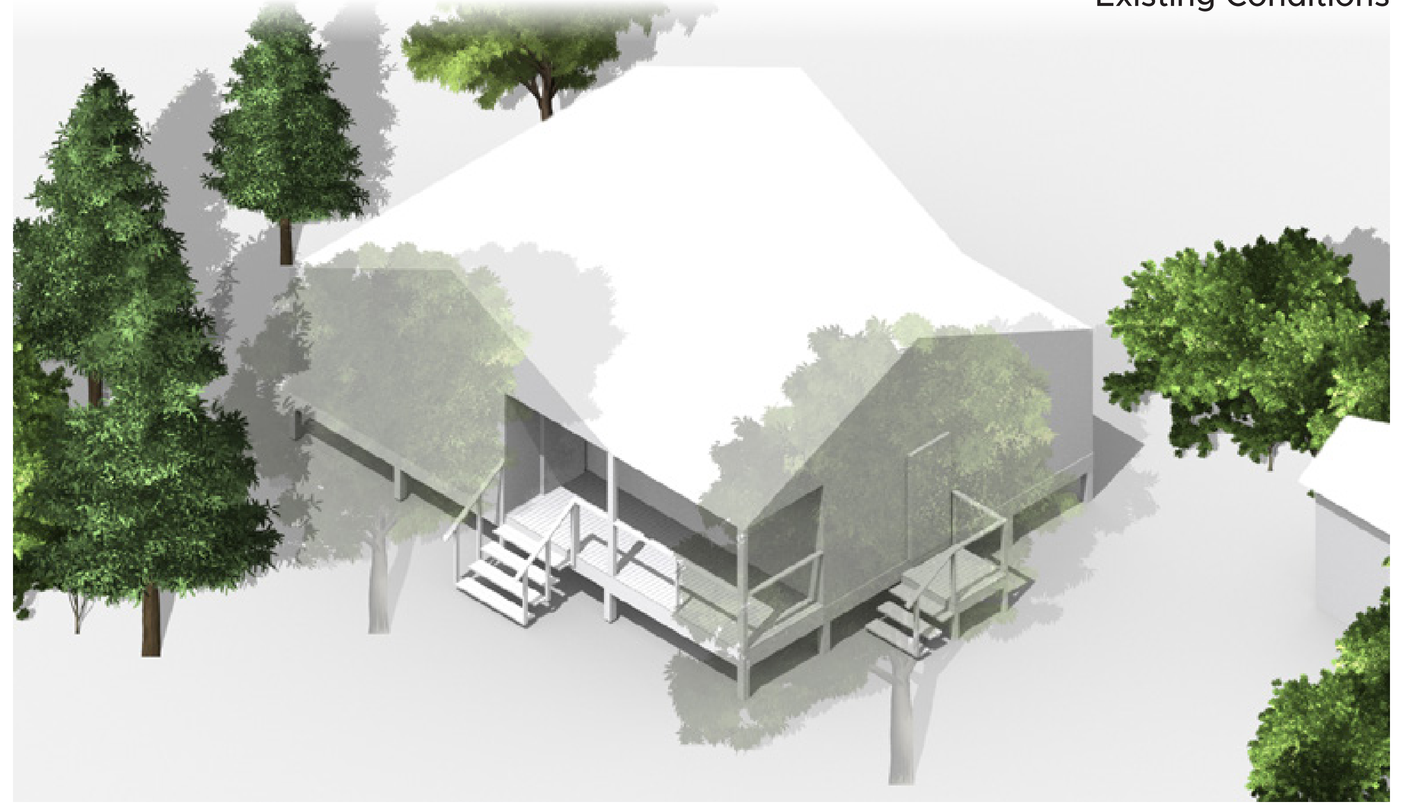
Fasteners

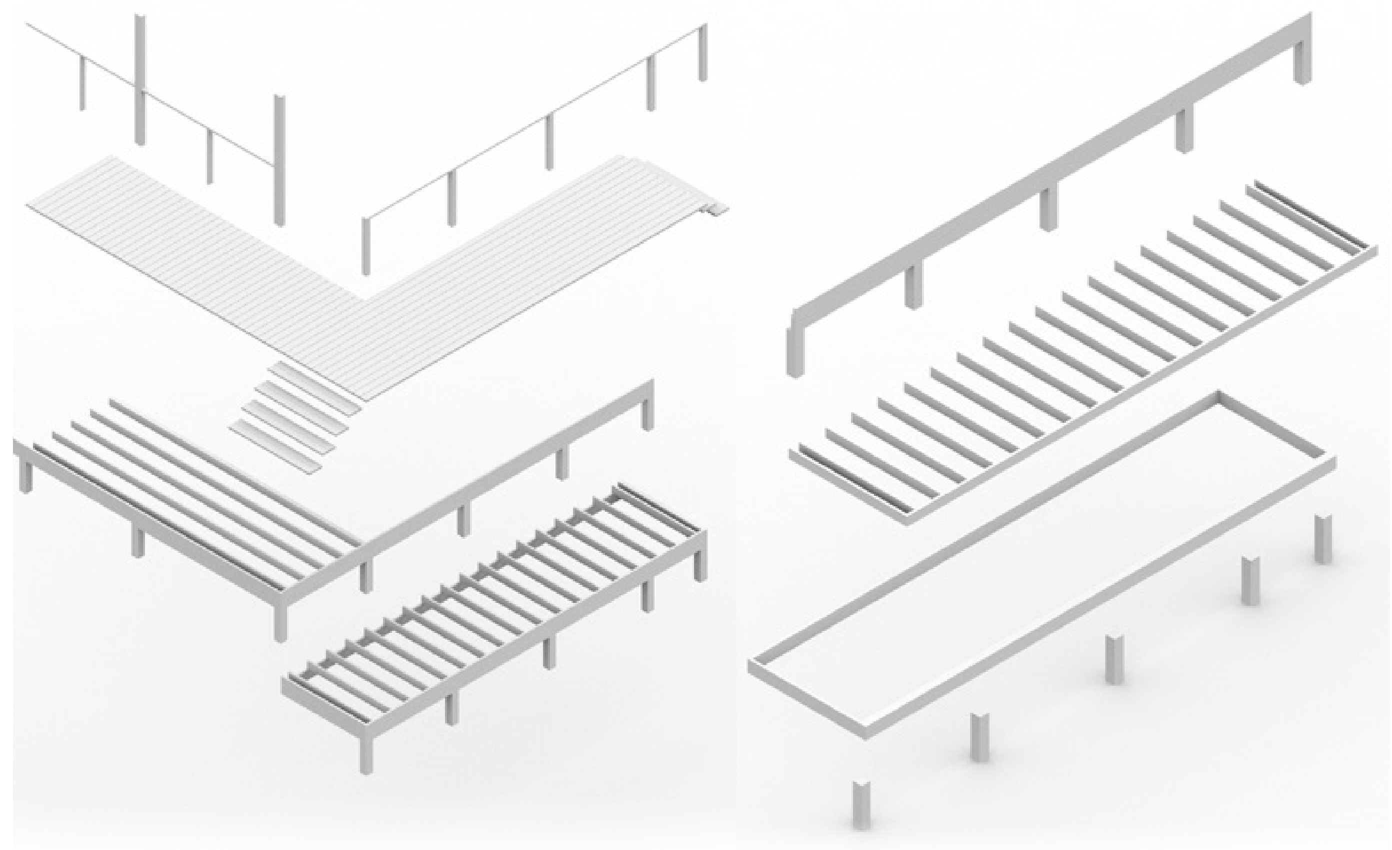
2 x 6 Joist Hangers (19)
2 x 6 - 2 Joist Hangers (1)
1/2" x 5" Galv. Lag Screws (18)
1/2" Galv. Flat Washers (18)
2-1/2" Deck Screws (±1500)

Back Stairs

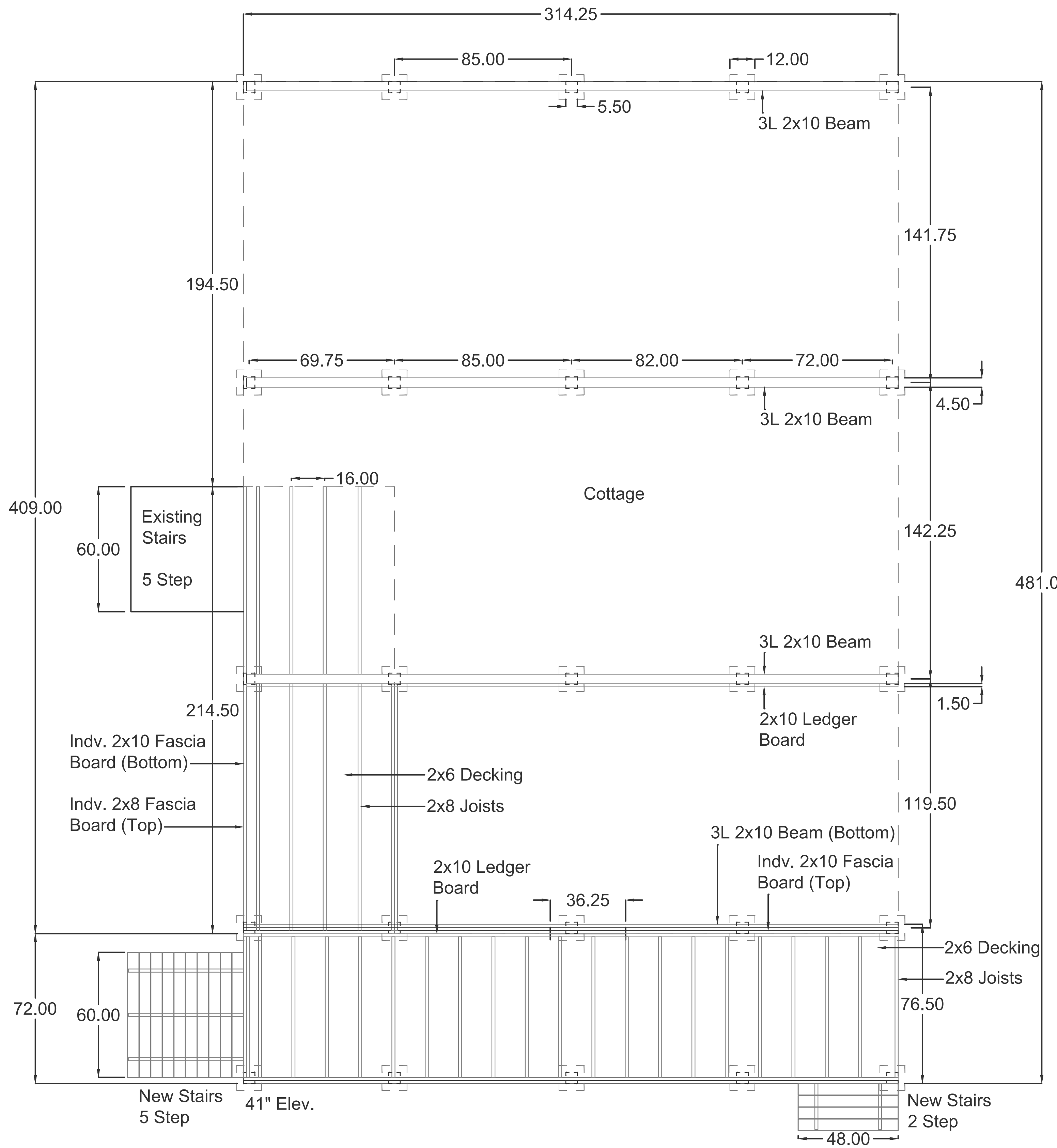
2 Step Metal Stringer (3)
2 x 6 x 12' (2)
3/8" x 2-1/4" Carridge Bolts (24)
3/8" Flat Washer (24)
3/8" Hex Nut (24)

Existing Conditions





Proposed Conditions



Cottage Deck Extension Plan

Photography

I have enjoyed photography for a long time, especially as a way to remember specific moments from various trips near and far. Although it's nowhere near professional, I have enjoyed experimenting with filters and colour adjustments to enhance the visual. These are some of my favourite photos from trips to Grand Beach, Manitoba, as well as Vancouver, British Columbia, Cartagena, Colombia, and Amsterdam, Netherlands.