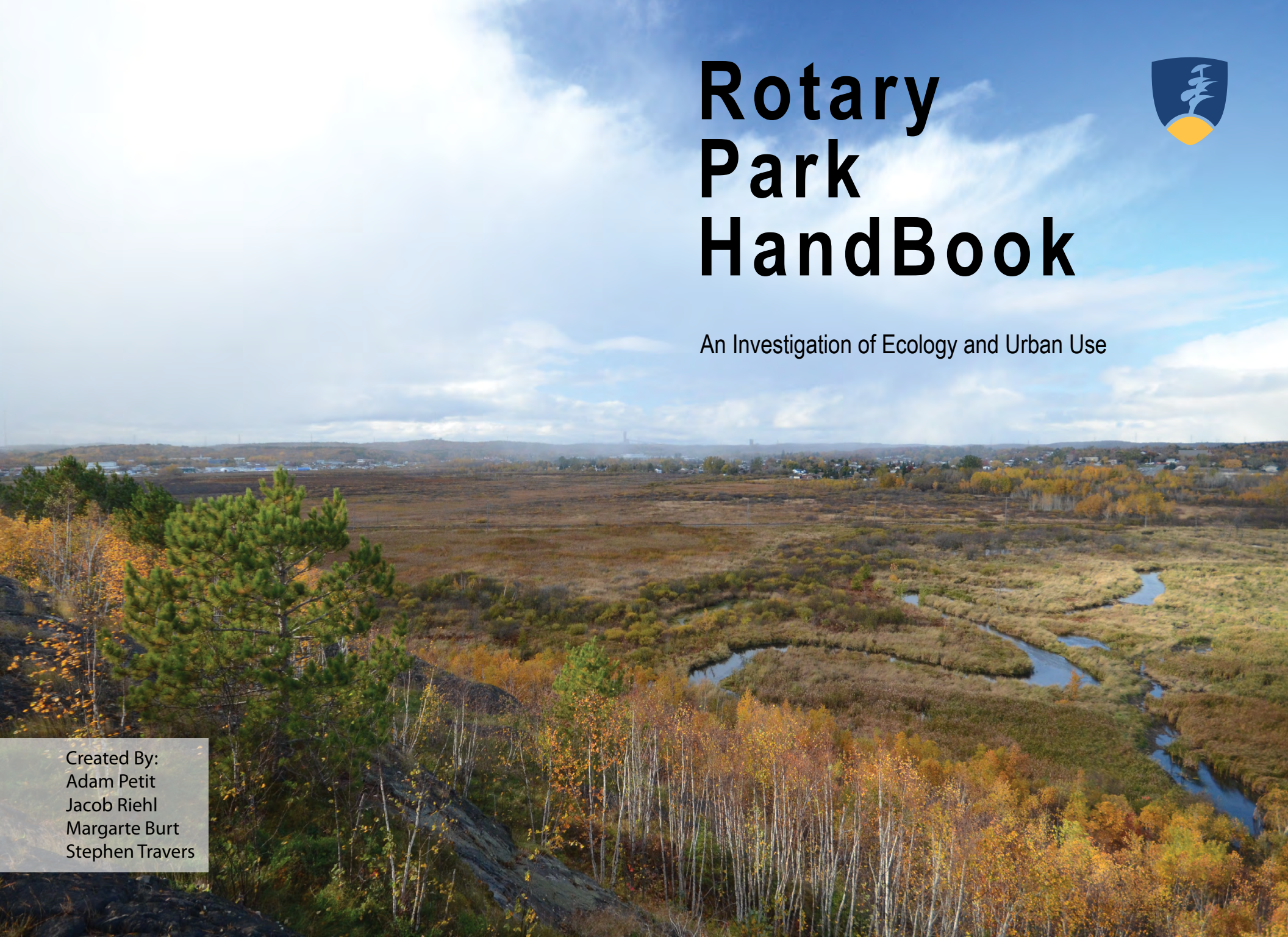
Rotary Park HandBook

An Investigation of Ecology and Urban Use



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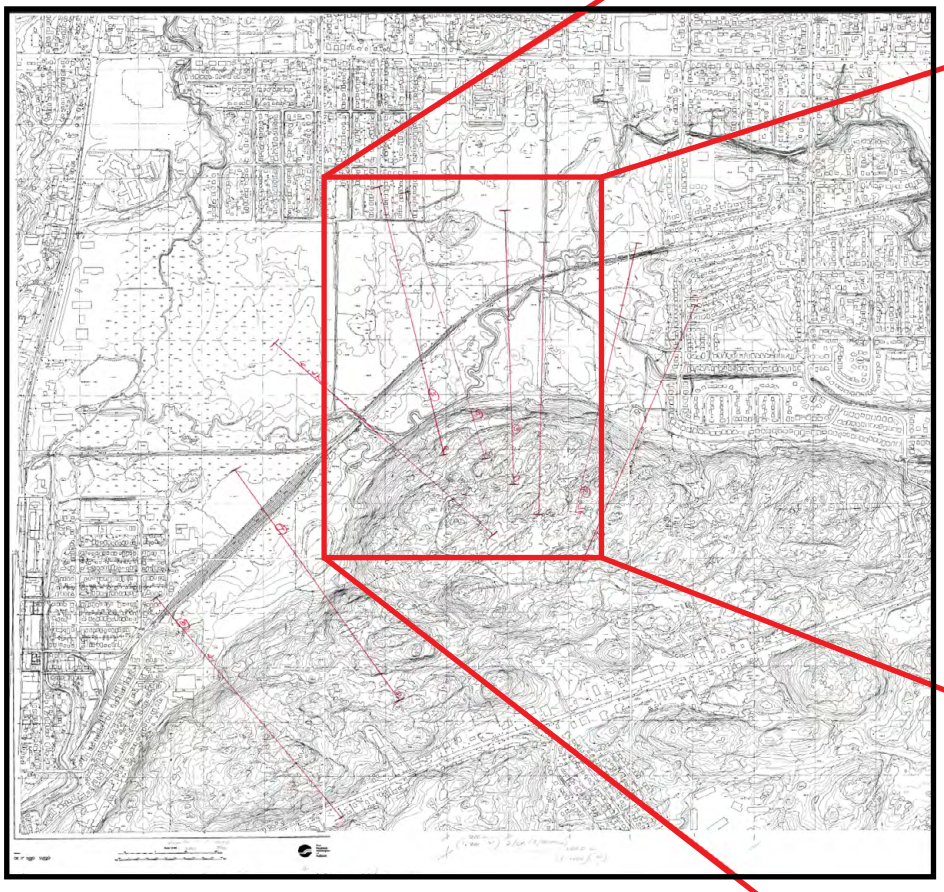
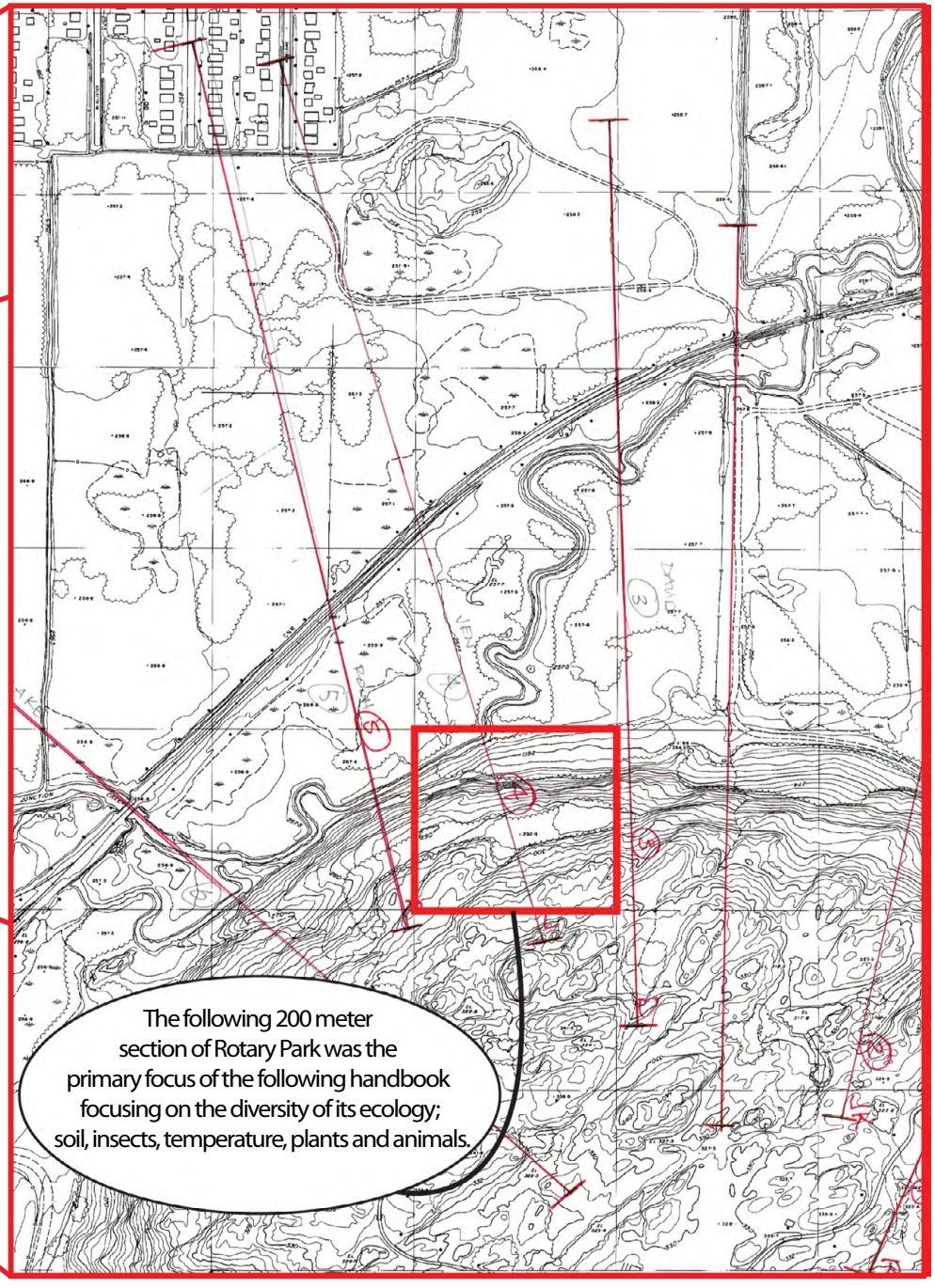
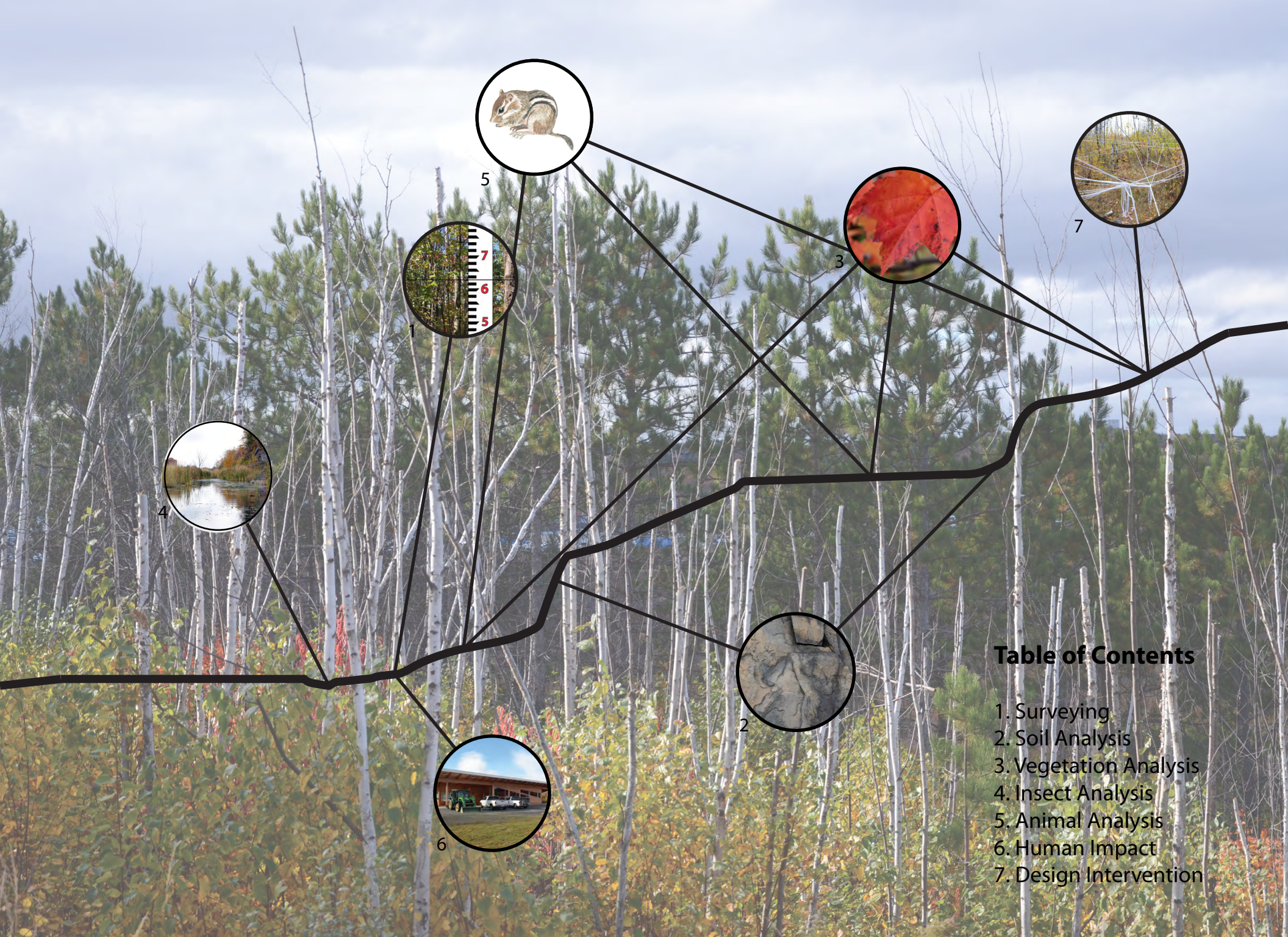




The following 200 meter section of Rotary Park was the primary focus of the following handbook focusing on the diversity of its ecology; soil, insects, temperature, plants and animals.

A unique ecological landscape in the center of Sudbury, Ontario. Comprised of a wetland, exposed bedrock cliffs and the Great Lakes - St. Lawrence Forest. Sudbury is situated upon the Canadian Shield, causing Sudbury to have a shallow layer of soil on top of the bedrock. Sudbury's landscape was altered by a meteorite 1.8 billion years ago, and then shaped by the Wisconsin Glacier. Left behind was a landscape consisting of earth moved and formed from natural events as well as leftover glacial melt. Upon the urbanization of Sudbury, Rotary Park was created, as a way to revitalize an ecosystem that was uninhabitable and unique to Sudbury's landscape. Since, it has included a ski hill, soccer fields, walking/biking paths, a lookout and a railway for a nearby mine. Urbanization has polluted Rotary Park due to near by construction, smelting and the use of fertilizer.

The following handbook is a study of Rotary Park; its diverse and exclusive contribution to Sudbury's ecology and urban use.



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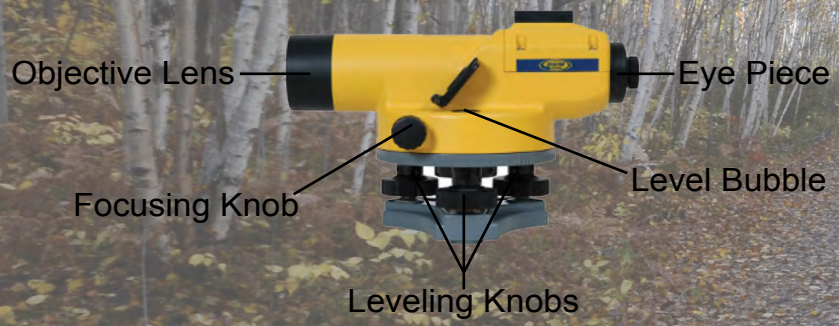
Surveying

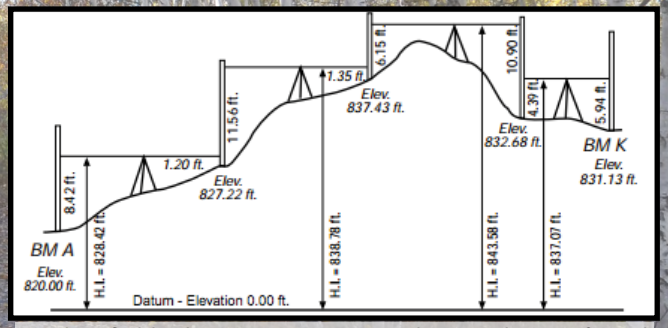
To understand Rotary Park and its varying landscape and forms of ecosystems, land surveying was conducted of the primary park path running East to West. The contour of the landscape was determined as well as the varying styles of ecosystems, ranging from wetlands to rock faces and forest. Upon surveying, a true understanding of the shape of the landscape was established.



Plane Surveying: During the surveying process we completed plane surveying. Plane surveying considereds the surface of the earth as a plane, and its true spheroidal shape is neglected. Plane surveying is done in order to get a rough understanding of elevations over a large area.

Sta	BS (+)	H.I.	FS (-)	Elev	Description
BM A	8.42			820.00	BM A: Top of Iron Pipe, 3" diameter
		828.42			at corner of Wishburn and Oak Dr.
TP 1	11.56		1.20	827.22	
		838.78			
TP 2	6.15		1.35	837.43	
		843.58			
TP 3	4.39		10.90	832.68	
		837.07			
BM K			5.94	831.13	BM K: Top of iron pipe, 2" diameter
					Corner of Wishburn and Oxford.
BS Sum = 30.52		FS Sum = 19.39			CHECK: Begin Elevation = 820.00
					BS/FS Difference = 11.13
Difference = 30.52 - 19.39 = 11.13					Ending Elevation = 831.13

Elevation = H.I. + FS H.I. =Elevation +B.S.



In order to find the elevation a measurement is taken using the transit forward (foresight) and then backwards (backsight) to determine the new elevation

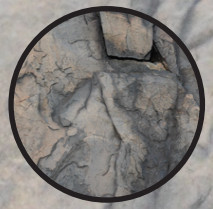
A surveying Rod is used to determine height while looking through the transit

N

The above line is the1:1000 section surveyed of Rotary Park

N

Above is the studied 1:200 section line

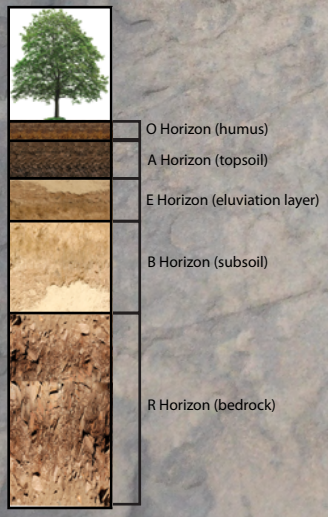


Soil Analysis

Sudbury is located on the Canadian Shield, which consists of Precambrian Igneous and Metamorphic rock. Sudbury is rich in natural metals such as nickel and copper, a result from the crater formed by the meteorite impact. The smelting of these resources has resulted in a black layer of soot on the rocks of Rotary Park. Smelting contamination has also caused an acidification of the soils.

Soil samples were taken through the course of our line using augers. Due to the relatively shallow topsoil in Sudbury the samples were taken from the top foot of soil.

One of the steps during the site analysis was to study the soils that were located on the 200 meter site. Wetlands have very unique soil, due to the large humus layer from plant decay. It is very important to study the humus layer as well as the others, especially in Sudbury, to see the chemical makeup and metal contamination. Two samples were collected from the site using augers and then tests were undertaken. The results can be seen in the following pages.



O Horizon: This layer forms above the mineral soil or in an organic soil profile. It is a surface layer dominated by large amounts of organic material from dead plants or animals in varying stages of decomposition. This layer is vital in wetland ecosystems.

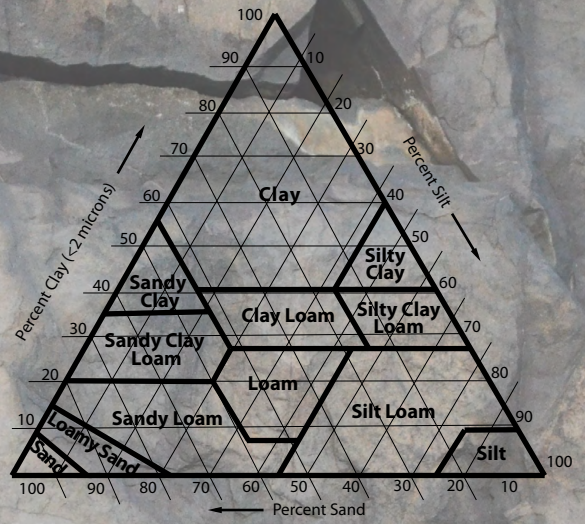
A Horizon: Is the topmost mineral horizon, and is referred to as the 'topsoil'. This layer contains partially decomposed organic matter that gives the soil a darker rich brown colour. This layer sees the most biological activity.

E Horizon: The E horizon often has a pale color due to significant leaching of clay, iron, and aluminum oxides. E horizons are often found in soils under forests, but are rare in soils developed under grasslands.

B Horizon: The B horizon is referred to as the "subsoil". This layer often shows maximum accumulation of materials such as silicate clays, iron and aluminum oxides, and organic material.

R Horizon: R horizons are layers of bedrock at the base of the soil profile. Unlike the above layers, R horizons are made largely of hard rock that cannot be easily dug up

	4c	4d
PH test	slight acid (6.5)	neutral (7.0)
Nitrogen	depleted (N0)	depleted (N0)
Potash	surplus (K4)	sufficient (K3)
Phospohrous	adequate (P2)	surplus (P4)



Size of particle influences water and air movement through soil. Clay has smallest influence, sand has the largest. A healthy wetland should be an even mix of all three types (loam).

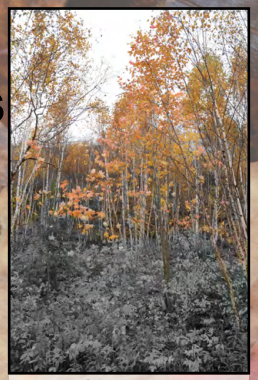
Soil Sample 4c

Soil Sample 4d

Vegetation Analysis

At one point Sudbury was a wasteland or "moon-scape" with very little vegetation. This was due to the polution in the soil from smelting, the roast yards and the logging industry. Over the last decade Sudburians have worked tirelessly to replant and revive the ecological health of the area. Rotary Park is an example of the remarkable results this movement created and is now a healthy ecosystem. We did several studies of the plants in the area.

In a forest ecosytem, there are 4 basic vegetation types that compose the forest. Each section has its own attributes and depend on different environmental impacts in order to survive. These four layers of vegetation are as follows:
trees and super canopy trees; shrubs and small trees; herbs, shrubs and tree seedlings; algae, lichen and moss.



Trees and super canopy trees, compose the upper layer

Shrubs and small trees are the 2nd tier of vegitation

Algae, lichen and moss compose the 4th and final layer of vegitation

Herbs, shrubs and tree seedlings compose the 3rd level of vegitation

One of the tasks completed was a temperature analysis to see how plants affected the temperature. The results showed that, where there was very little vegetation (site 1), there was also very little alteration to temperature. Very little change in the protection of the forest (site 2) was noted. The short vegetation showed the greatest variation of temperature with it getting colder the closer the thermometer got to the ground (site 3). There was a large variation in site temperatures with site 3 being the warmest and site 2 being the coldest.

	Site 1	Site 2	Site 3
Description	This area was very windy and exposed to full sunlight. It was also located in Junction Creek.	This area was in the birch forest where there was no sun but it was still fully exposed to the wind.	This area was located on the boardwalk in hip high shrubbery. It was exposed to partial sun and the wind had died down as well.
2m	12 °C	11.2 °C	12.4 °C
1m	12.3 °C	11.3 °C	13.4 °C
10 cm	12.2 °C	11.1 °C	13.0 °C
1cm	12.1 °C	11.0 °C	12.0 °C
Water	13.5 °C		

Vegetation Analysis

Vaccinium augustifolium

Abies Balsamea

Pinus Resinosa

Pteridium

Thuja Occidentalis

Insect Analysis

To determine the health of a wetland, the water quality is established by which insects are present in the ecosystem. To collect insect samples, sweep nets and seine nets are used to gather insects from Junction Creek. The insects collected are compare to a category chart, comparing the insects to 3 levels of water quality.

SUCCESSFUL LOCATIONS
OF
INSECTS COLLECTED

CLEAN WATER

MAYFLY NYMPH
WATER BEETLE LARVA
STONEFLY NYMPH

MODERATELY
CLEAN WATER

SCUD
CRAYFISH
ALDERFLY LARVA
WATER STRIDER
WATER SCORPIAN
WATER BEETLE ADULT
DAMSELFLY/ DRAGONFLY NYMPH
HORSEFLY/DEERFLY LARVA
CRANEFLY/ CADDISFLY LARVA
WATER BOATMAN
BLACKFLY LARVA
WATER MITE
CLAM

UNCLEAN WATER

BACKSWIMMER
GIANT WATER BUG
MOSQUITO LARVA
AQUATIC WORM
MIDGE LARVA
LEECH
SNAIL

66% OF INSECTS
COLLECTED:

CRAYFISH
WATERSCORPIAN
DAMSELFLY NYMPH
DRAGONFLY NYMPH
CRANEFLY LARVA

33% OF INSECTS COLLECTED:
LEECH
SNAIL

Junction Creek's quality of water is determined to be moderately clean as the primary insects collected were of the grey category. As very few yellow category insects were collected as a class, the tests show that Junction Creek is still polluted. Junction Creek and Rotary Parks wetland are greatly effected from pollution, so the inects collected represent a postive sign of rehabilitation.

NO LEGS

ALDERFLY
CRAYFISH
SCUD
BACKSWIMMER
WATER STRIDER
WATER BOATMAN
WATER MITE
WATER SCORPIAN

6 LEGS

WATER BEETLE
MAYFLY NYMPH
GIANT WATER BUG
DAMSELFLY NYMPH
DRAGONFLY NYMPH
STONEFLY NYMPH
CADDISFLY LARVA

MORE OR LESS THAN 6 LEGS

LEECH
BLACKFLY LARVA
MOSQUITO LARVA
MIDGE LARVA
CRANEFLY LARVA
AQUATIC WORM
CLAM
HORSEFLY/DEERFLY LARVAE
SNAIL

Animal Analysis

At first, Rotary Park doesn't seem to have much animal activity, however, it is home to many different species. There are many species of fish, birds, and mammals in Rotary Park. An active element of the park is Junction Creek. This body of water is abundant with life and is an important contribution to the Rotary Park ecosystem. Despite it being full of life, it is also quite fragile. For instance, the Blanding's Turtle is an endangered species that can be found in the park. This species is endangered due to constant housing developments, which destroy the wetlands where turtles live. As well, this development leads to the construction of roadways , which often separate the ponds where the turtles hibernate from the areas in which they nest. Therefore, it's important to study the landscape before making the decision to urbanize it. Since the rehabilitation of Rotary Park, many species have returned and thrived, as it is a unique and vital landscape within Sudbury.

Blanding's Turtle (Emydoidea Blandingii)

Great Blue Heron (Andrea Herodias)

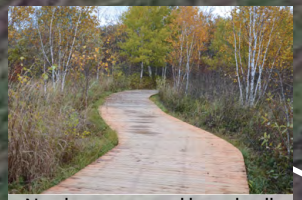
Chipmunk (Tamias)

Muskrat (Ondatra Zibethicus)

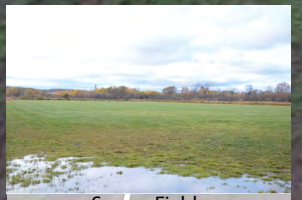
Mallard (Anas Platyrhynchos)

Human Impact

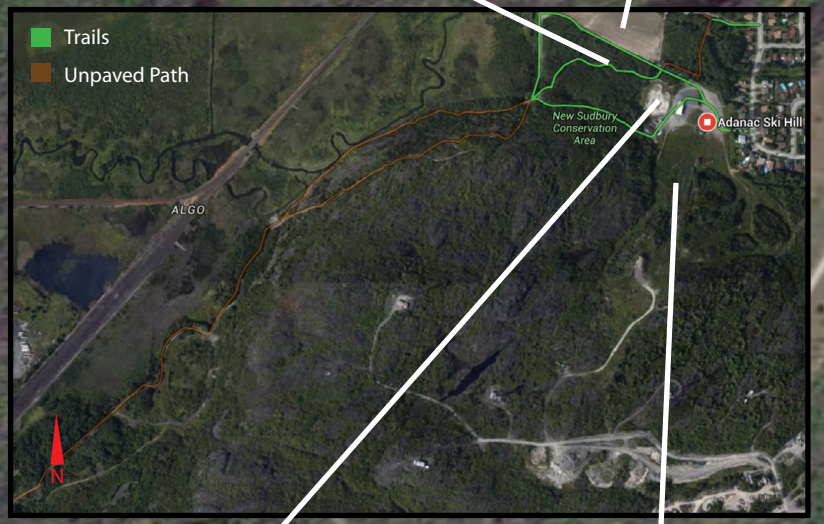
Naturally, humans have taken advantage of a beautiful landscape such as Rotary Park. Currently, Rotary Park is protected by Parks Canada controlling the negative impact on the park while maintaining its health. During the summer, Rotary Park has one primary path through the park running East to West for walkers and bikers. There is also a soccer field, a dirt bike racing track and unmarked hiking trails, as efforts are taken to limit the hiking through unmarked areas. During the winter, Rotary Park includes Adanac Ski Hill, as well as cross country skiers and hikers using the path through the park. A lookout facing North on top of Rotary Parks hill is used all year round to fully embrace the parks users. As Rotary Park is mostly a wetland, and steep cliffs, a metal stair case was created leading to the lookout. Recently a floating boardwalk was also added to safely cross a section of the wetland with minimal damage to the ecosystem.



Newly constructed boardwalk

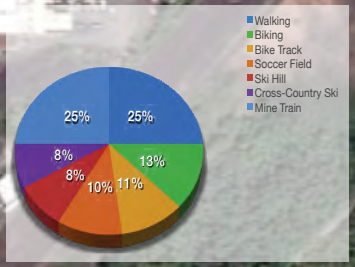


Soccer Fields



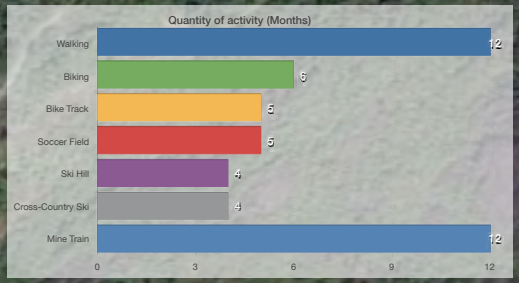
Bike Track

Adanac Ski Hill

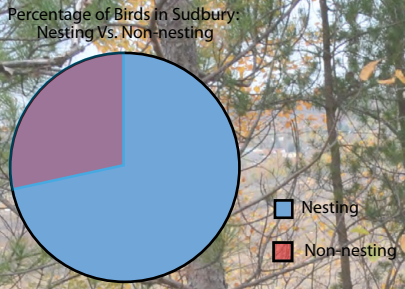


Primary uses of Rotary Park

HUMAN USE	QUANTITY OF ACTIVITY (MONTHS)
Walking	12
Biking	6
Bike Track	5
Soccer Field	5
Ski Hill	4
Cross-Country Ski	4
Mine Train	12



Design Intervention



There are 183 species of nesting birds located in Sudbury, many of which are located in Rotary Park. In response, we decided that our design intervention would assist these animals in their nest-building practice. It is a common practice for animal lovers to leave materials such as animal fur, string, horsehair, fabric, and so on. This is to assist birds with their nest building because, in certain areas, it might be challenging for the species to find materials otherwise.

Our proposal is to use string to make an artistic installation, but have non-fundamental pieces be loose enough and short enough (4-8 inches long) that birds can pull it off. This would allow for a functional purpose while still being an artistic expression. The string used would be a natural fibre, which will compost after about two seasons so there is not environmental damage caused. The installation would be set up in spring and would then be taken down in fall. This would ensure that it is accessible during the entire season of nest building.

When visiting Rotary Park, their involvement with the community was actively expressed, and they also mentioned that they were interested in more possibilities. This project could help accomplish it by having it be a community installation. It could be built by a high school art class or Laurentian University Architecture students.

Gloria Lamson

The above photo is a string design made by the artist Sebastien Preschoux, it was an inspiration for our string sculpture