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2025
Conference

Canada's Premier
Stormwater and Erosion
and Sediment Control
Conference

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Incorporating Indigenous Knowledge into Green Infrastructure



Introductions

Aaron Ward, P. Eng.

Project Engineer
Engineering & Operations Division

A GREEN ENGINEER?

- Project Manager / Engineer For The City Of Thunder Bay (Apr. 2012 – Present)
- Private Sector Land Development Engineer, Richardson Foster Ltd. & Trow / EXP Services Inc. (Sept. 2003 – Mar. 2012)
- Member P. Eng. Ontario, 2007
- B. Eng., McMaster University, Hamilton, ON 2003



Werner Schwar, OALA

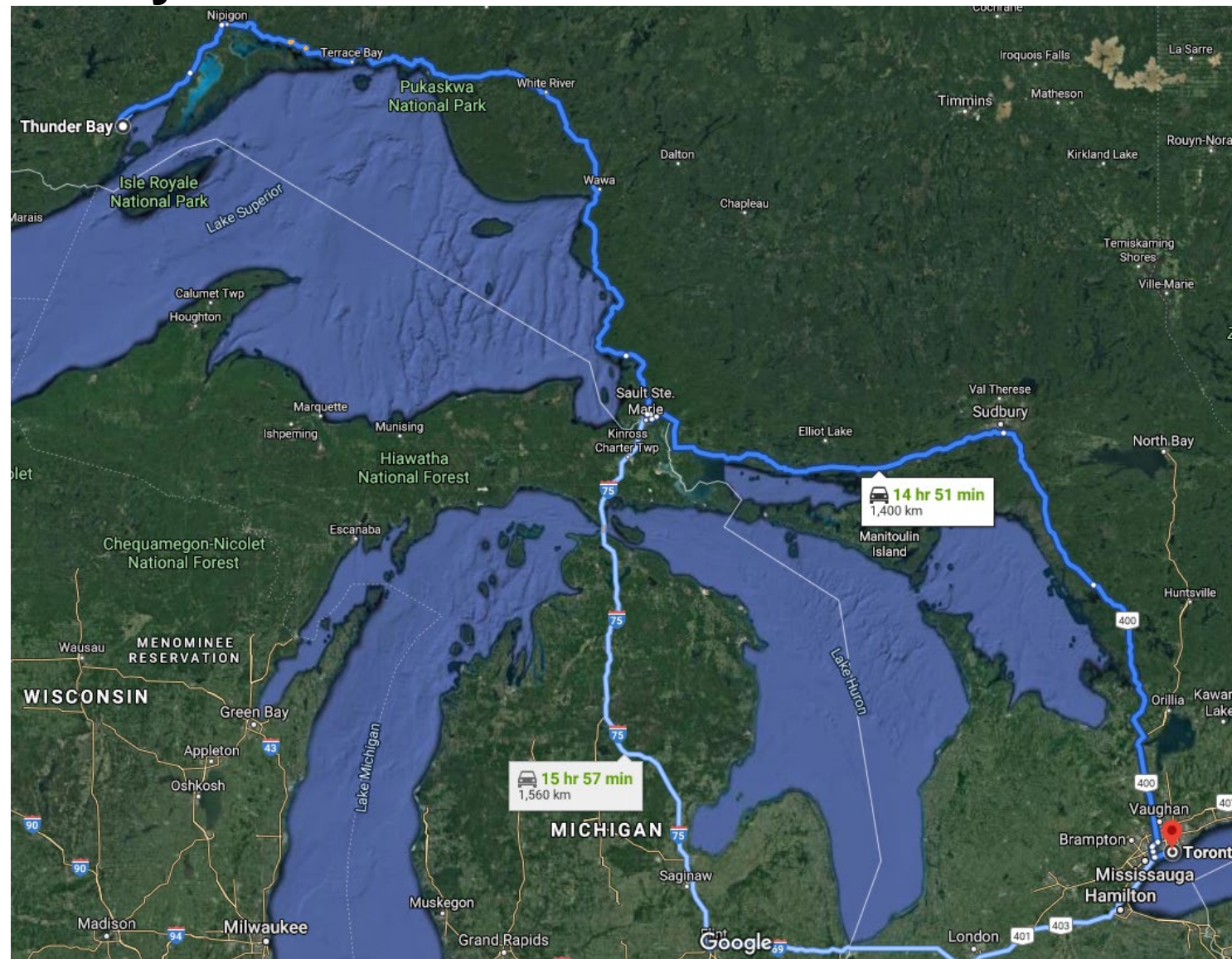
Supervisor – Parks & Open Space Planning
Parks & Open Spaces Section

AN ENGINEERING LANDSCAPE ARCHITECT?

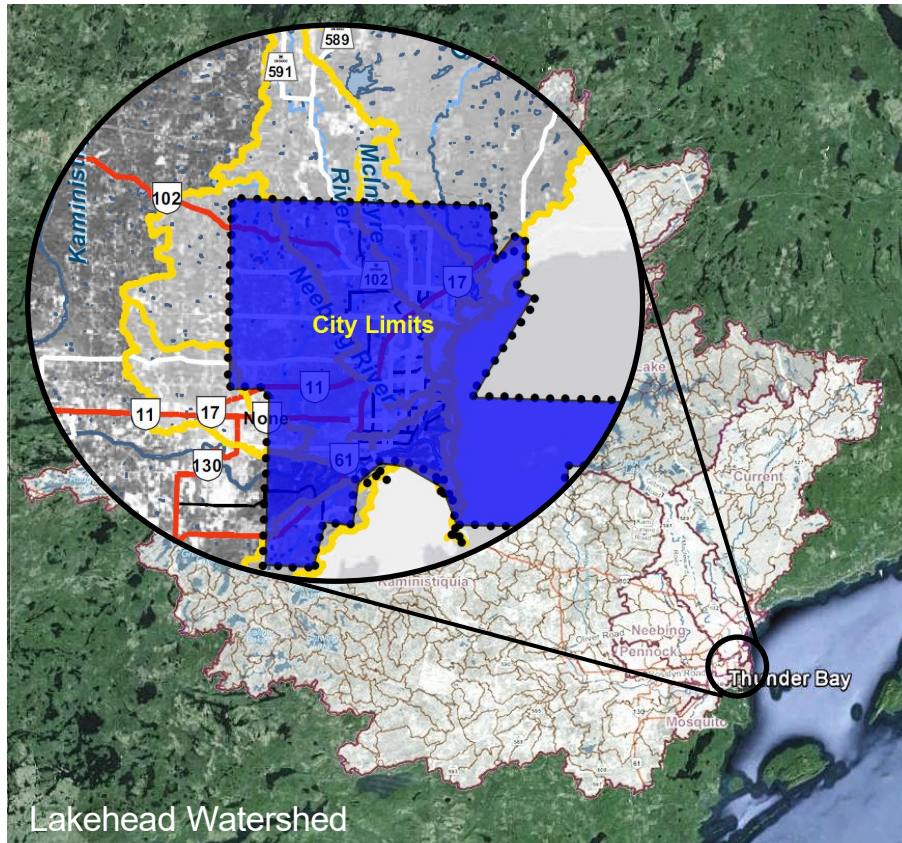
- Supervisor – Parks & Open Space Planning For The City Of Thunder Bay Parks & Open Spaces Section (Jan. 2010 – Present)
- Sole Proprietor – Werner Schwar Landscape Architect (Oct 1993 – Present)
- Basciano O'Connor & O'Connor Consultants (1988-1992)
- Full Member OALA, 1994
- BLA, University of Toronto 1989
- Worked In Landscape Construction in Family Business at the age of 10 for 15 years



Thunder Bay – Where are we?



Thunder Bay – Overview



- 109,000+ people (2021 census)
- Lakehead watershed – 8,930km²
- 323km² total area of which 130km² is an urban developed area
- 8 sub-watersheds
 - Current River
 - Kaministiquia River
 - McVicar Creek
 - McIntyre River
 - Mosquito Creek
 - Neebing River
 - Pennock Creek
 - Waterfront Watershed
- 712mm annual precipitation
 - 559mm rainfall & 188cm snowfall
- 90th percentile rainfall depth = 29mm
- **Frost depth 2.1m (7ft)**

Stormwater Management Infrastructure

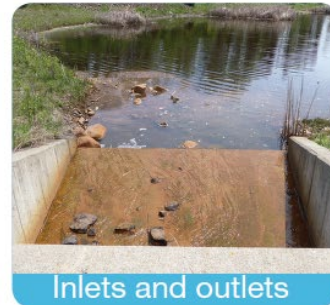
– What is the City's Stormwater Infrastructure?



Storm sewers



Catchbasins



Inlets and outlets



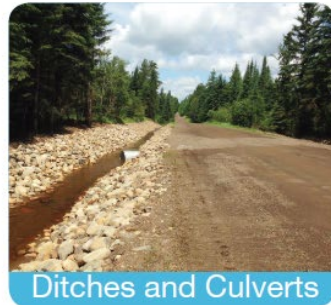
Oil-grit separators



Urban Forest



Bridges



Ditches and Culverts



Watercourse



Stormwater treatment facilities, including Green Infrastructure



Wetlands & Marshes

*350km of sewers, 4,800 manholes, 11,500 catch basins, 486km ditches, 400+ outfalls,
97 stormwater treatment facilities, 4 pumping stations,
1 major flood diversion system (1 dam & 5km of floodway channel)*

Stormwater Management Plan

- Approved in Principle by Council in 2016. This plan will guide the City's stormwater management actions for the next 20 years, based on the following goals:



ECOSYSTEM HEALTH



WATERSHED QUALITY



WATER QUANTITY



OPERATIONS and MAINTENANCE



MONITORING and DATA ASSESSMENT



FUNDING and ORGANIZATION



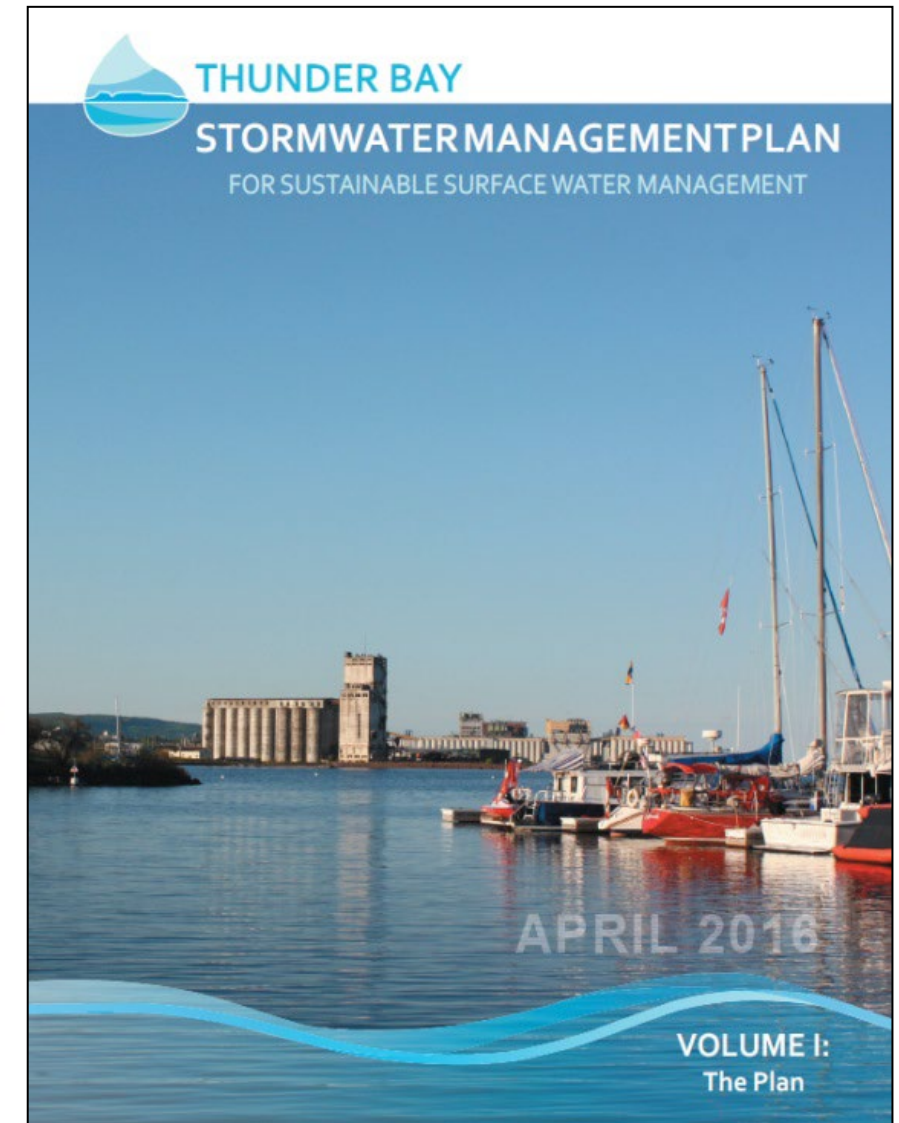
CLIMATE CHANGE



REGULATION and ENFORCEMENT



EDUCATION and OUTREACH



Stormwater Management Plan

Watershed	Total # of BMPs	Benefits		
		Total TP Removal (kg/yr)	Total TSS Removal (kg/yr)	Total Volume Reduction (m ³ /yr)
Current	83	233	81,780	260,100
Kaministiquia	62	716	803,700	691,700
McIntyre	136	968	647,400	656,000
McVicar	27	17	4,922	19,350
Mosquito	17	5	1,359	12,590
Neebing	161	513	338,400	779,000
Pennock	9	3	1,273	8,347
Waterfront	57	311	169,200	355,800
Total	552	2,765	2,048,034	2,782,887

Range in Total Present Cost (CAD)	Number of BMPs
\$0 – 10,000	39
\$10,000 - \$50,000	117
\$50,000 - \$100,000	108
\$100,000 - \$500,000	236
\$500,000 - \$1,000,000	36
\$1,000,000 - \$3,000,000	16

- In 2012, only had 12 City-owned stormwater facilities.
- By end of 2024, 97 City owned stormwater facilities, including 50 Oil-Grit Separators. Of remaining 47 facilities, 37 are considered Green Stormwater Infrastructure (or LID) facilities.
- For Green Infrastructure, +/-32 ha (79 acres) drain through these facilities.

The Project: Northwood Splash Pad



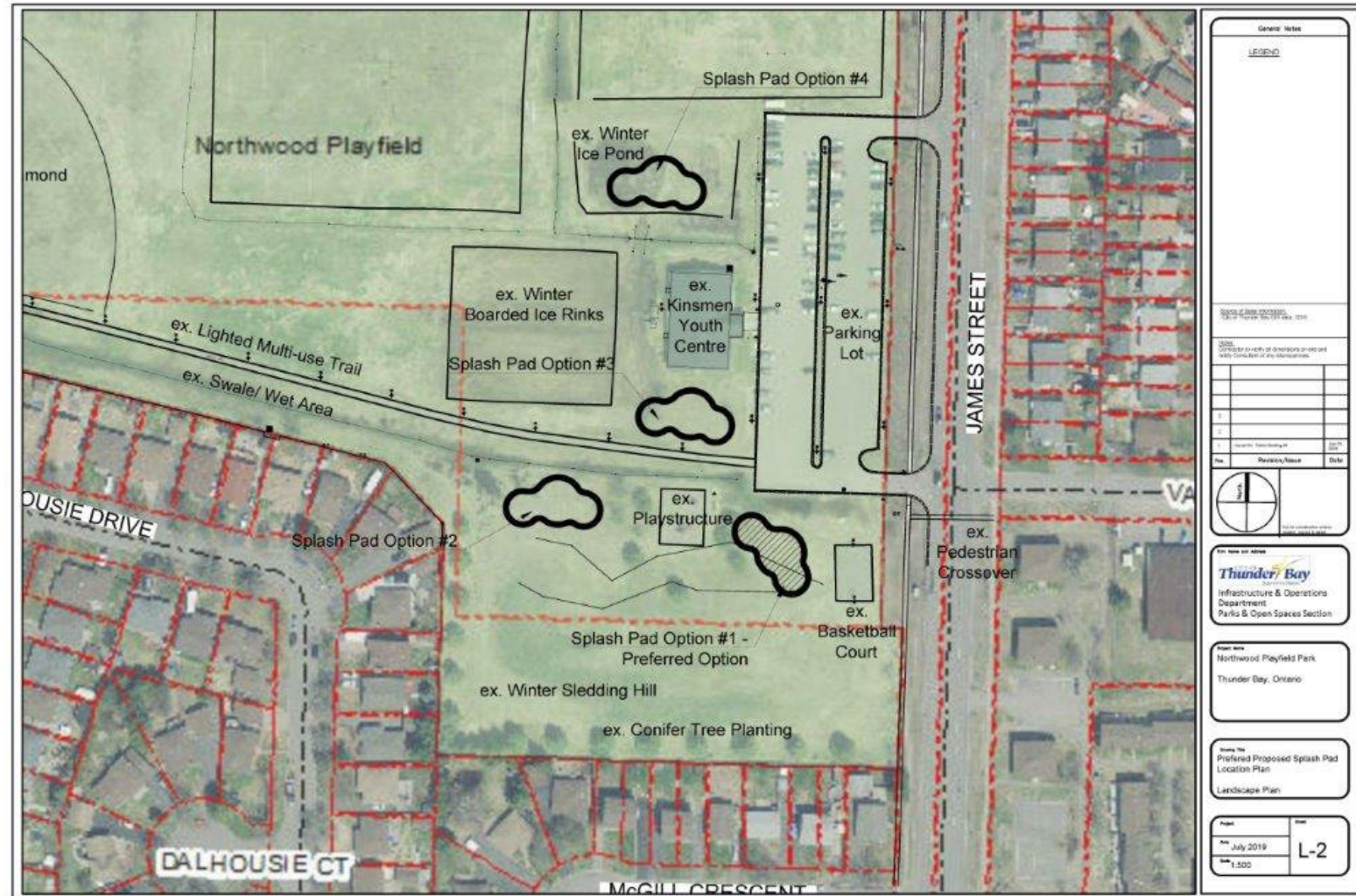
Northwood Splash Pad – Background

The Site:

- Community Park 5.5 ha in size
- South central part of City
- Adjacent to large area of public housing with high Indigenous population
- A community and youth centre, sports fields and playground are also in park

The Budget:

- Dedicated capital budget, divided into two years, \$50,000 first year for servicing and/or planning, and \$450,000 in the second year to construct the project



Northwood Splash Pad – Engagement

- 3-year engagement process from 2019 to 2021
- Stakeholder & Service Agency meetings to determine wants and needs for park amenities to be associated with new splash pad and best location of the splash pad in the park to suit their programing needs
- **Key Outcome:** Identified as an opportunity for reconciliation using the theme “**Water is Life**”, an important Anishinaabe teaching
- Neighbourhood information session reviewing the project and proposed locations and theme of splash pad discussed
- On-line information and comment on City’s Get Involved web portal <https://getinvolvedthunderbay.ca/>
- **Key Outcome:** Preferred splash pad location selected and general buy-in from the community

Proposed Splash Pad at Northwood Playfield



Consultation has concluded on the proposed Northwood Splash Pad.

As part of the City of Thunder Bay's strategy to provide splash pads across the city, the Parks & Open Spaces Section is now in the planning stages to implement its next splash pad. It is recommended that the next splash pad be located at Northwood Playfield. We would like determine if this is the appropriate location and obtain feedback from area residents and the general public. We are also looking to obtain feedback on longer-term features and initiatives for the Northwood Playfield.

Public Open House

Citizens were invited to a Public Open House on Wednesday, July 3, 2019, at the Kinsmen Youth Centre, James Street N.

Survey

For those who were unable to attend the Public Open House, an online survey was then made available until July 31, 2019. This online survey has now closed.

The results of the feedback will determine the future plans for Northwood Playfield. Updates will be provided throughout the process on this web page.



sign up. stay engaged.

have
your
say

Who's listening

Cory Halvorsen

Manager - Parks & Open Spaces
City of Thunder Bay



Werner Schwar

Supervisor - Parks & Open Space
Planning
City of Thunder Bay



Key Dates

Public Open House
July 03 2019

Survey Closes
July 31 2019



Northwood Splash Pad – Engagement

Water is Life

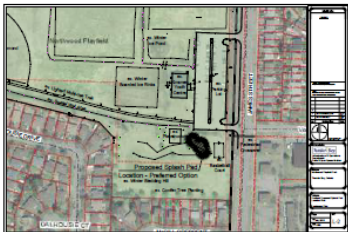
Theme Exploration for the Northwood Playfield Proposed Splash Pad
Your Opinion Matters

OVERVIEW

As part of the City of Thunder Bay's strategy to provide splash pads across the city, the Parks & Open Spaces Section is now in the planning stages to implement its next splash pad. The City of Thunder - Parks and Open Spaces Section is seeking your feedback regarding the potential use of the theme "Water is Life" for the Northwood playfield splash pad.

Theme Exploration & Design Considerations

We need your feedback. As Indigenous stakeholders and users in Thunder Bay you will play a fundamental role in the design to respectfully incorporate the theme. We want to know how you understand the term "Water is Life" and what that means to you in every context. What is the significance of the theme to you and how do you see the City of Thunder Bay using it in a way that respects and promotes Indigenous inclusion and reconciliation?



For further information or to get involved please contact

Werner Schwar
Supervisor - Parks and Open Space Planning
(807) 625-2806
wschwar@thunderbay.ca



Process

Ingaged – Creative Productions Inc. is an Indigenous owned and operated marketing, events and communications start-up located on Fort William First Nation.

Within the scope of the project, Ingaged will work as facilitators in an advisory capacity to the City of Thunder Bay by engaging with local Indigenous stakeholders, residents and service groups to collect feedback to define theme components, methods of expression and design considerations that will support how the theme will be expressed in the final product.

Contact Ingaged – Creative Productions Inc.

Corey Anderson, Project Facilitator
(807) 629 - 5356

canderson@ingaged.ca
www.ingaged.ca
@ingagetheworld



FOLLOW US



- A local Indigenous Marketing and Consultation firm was contracted to further engage the Indigenous stakeholders, user groups and community Elders to receive feedback on how the “Water is Life” theme may be expressed.
- A presentation was made to the City of Thunder Bay Elder Council to receive support for using the “Water is Life” theme and determine what design elements they might like to help reinforce the teaching
- **Key Outcome:** Summary report to inform the scope of the RFP for splash pad was produced, and general buy-in from the Indigenous Community

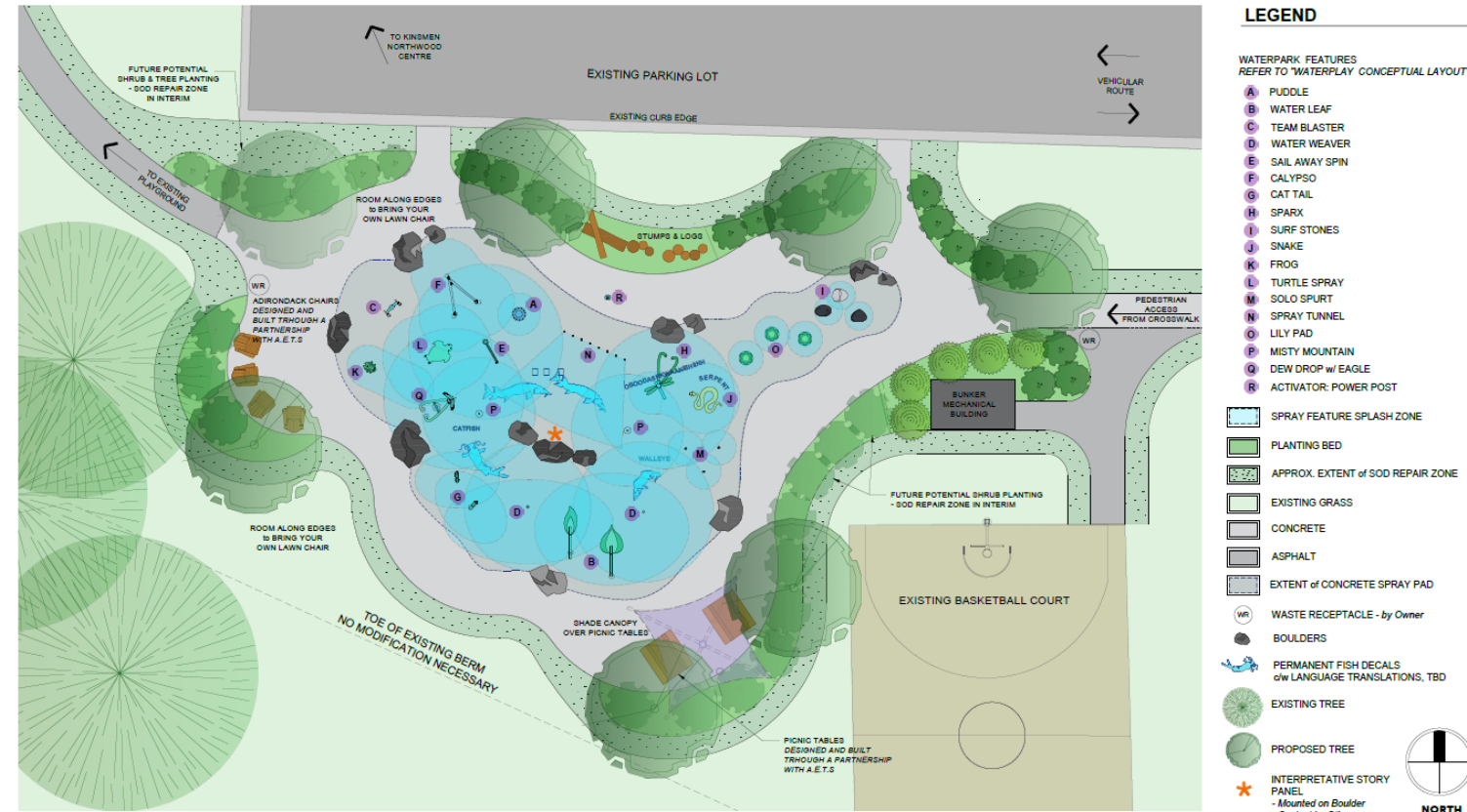
Recommendations for the Respectful
Incorporation of “Water is Life”
into the Proposed Northwood Playfield Splashpad

Printed: December 3rd, 2019

PREPARED FOR: City of Thunder Bay – Parks and Open Spaces Section, Victoriaville Civic Centre
111 Syndicate Avenue South, 2nd Floor P.O. Box 800, Thunder Bay, ON P7C 5K4

Northwood Splash Pad – Procurement & Design

- The City releases an RFP for the design, supply, delivery and installation of splash pad components, concrete pad, shaded sitting area and servicing
- The RFP contains specific “Water is Life” thematic objectives and site parameters and a key caveat that design revisions may be required after a design review by the Elder Council
- Review of awarded Proposal design with Elder Council for cultural sensitivities and to ensure the teaching message conveyed is appropriate
- Proponent revised the design and then re-presented to Elder Council for information



DETAILED CONCEPTUAL SITE PLAN for NORTHWOOD SPRAY PARK
CITY of THUNDER BAY, ONTARIO
MAY 26, 2020
SCALE 1:150



Northwood Splash Pad – The BIG Question?

What do we do with all that water?

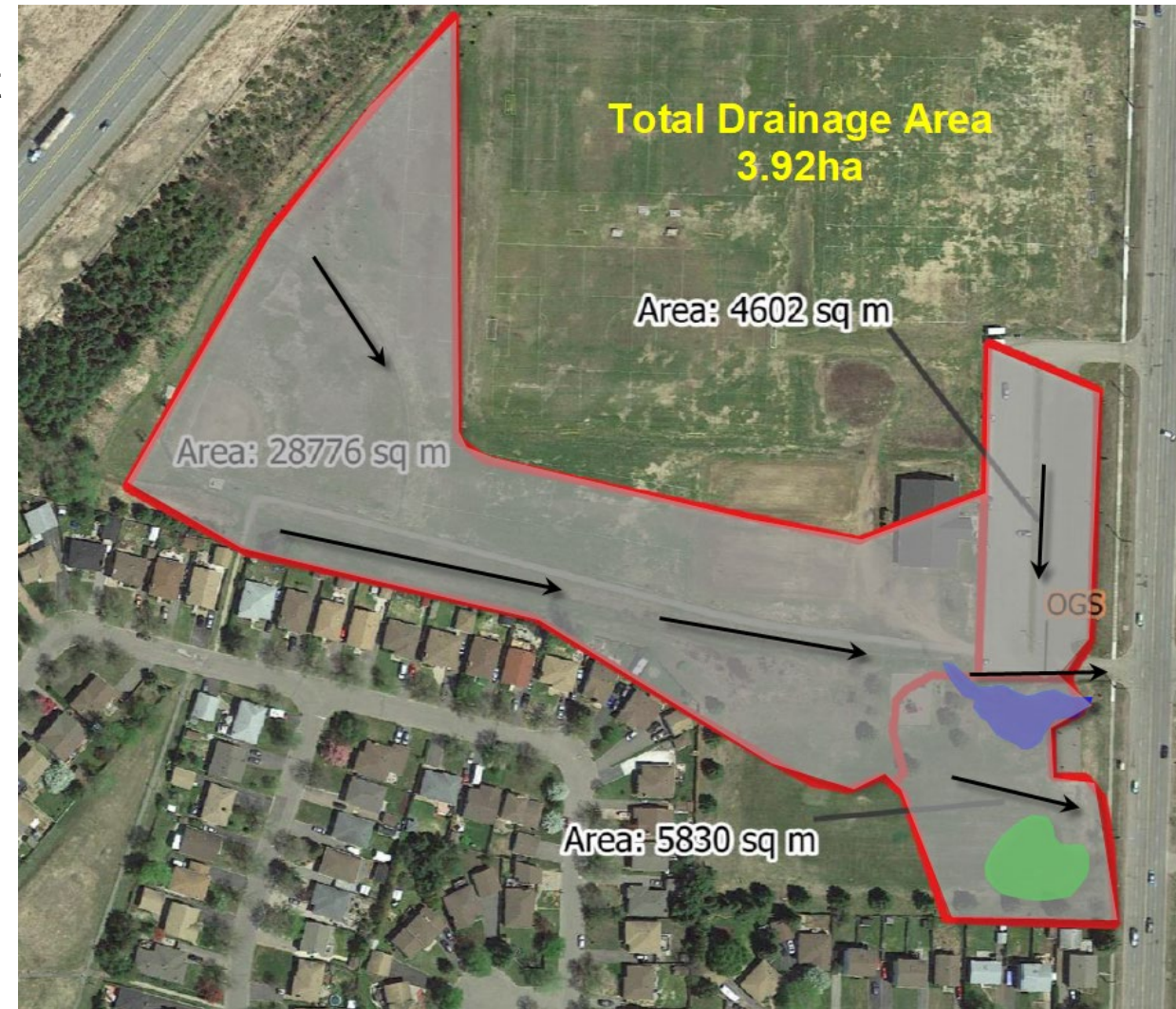
ANSWER:

To allow the water to tell a story and to
provide a beneficial use.

“Water is life.”

Northwood Splash Pad – Green Infrastructure Design

- Feasibility Review – completed internally
 - **Opportunity:** Sufficient space to provide treatment for more than just splash pad drainage
- Screened for Archaeological potential
- Geotechnical investigation – Request for quotations
 - 2 boreholes to support GI
- Topographic site survey supplemented by LiDAR (by City)
- Design package – Request for quotations
 - Conceptual & detailed design, tender drawings & support (no tender specs)
 - Design brief, O&M guidance
 - Erosion control, landscape & planting plan
- GI designed for external (untreated) drainage area + splash pad discharge → 136m³/day (over 8-hour period)



Northwood Splash Pad – Green Infrastructure Design

- Review for utility conflicts
 - \$40,000 problem, \$8,000 solution!
- Flush & CCTV existing storm system
- Significant coordination between multiple parties
 - Splash pad design team & GI design team
 - Coordination of designs, grading, pipe elevations
 - Establish clear boundary between 2 “separate” projects
- Total GI design costs = **\$30,000**
(plus countless internal staff hours!)

Another problem – what to do with surplus soil from splash pad & GI construction?

Solution: Keep on-site and add a new feature & benefit for public use
→ Bike jumps & sliding hill

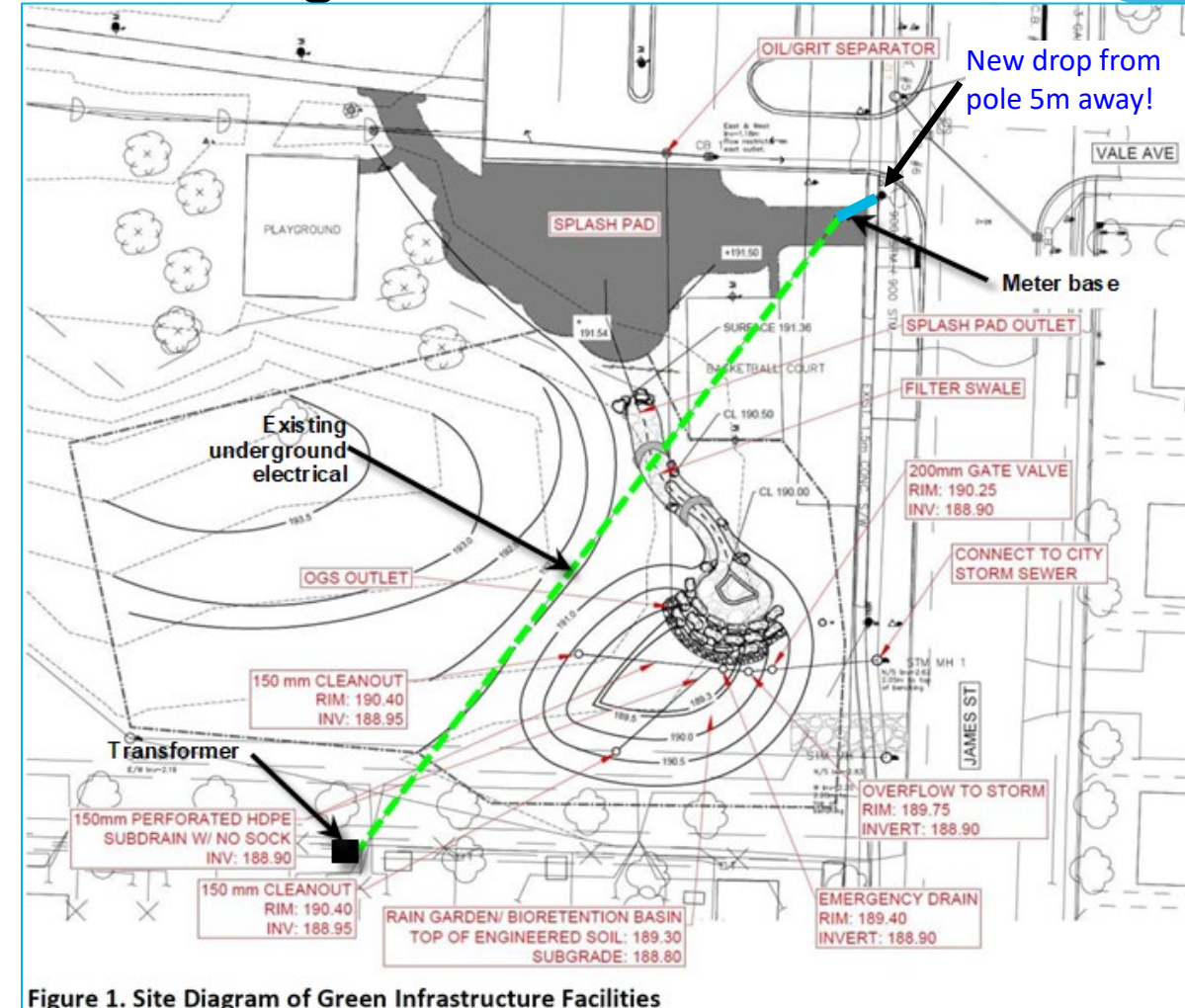


Figure 1. Site Diagram of Green Infrastructure Facilities

Northwood Splash Pad – “Water is Life” Design Elements

- Animals –
 - fish, snake, frog, turtle & eagle
- Plants –
 - cattail, lily pad, & leaves
- Canoe
- Stylistic Lake Superior
- Anishinaabe language text –
 - walleye, frog & dragonfly
- Grandfather Stones
- Amenities –
 - picnic tables & benches
 - recognition signage



Northwood Splash Pad & Green Infrastructure - Construction



BEFORE



BEFORE



AFTER



AFTER



Northwood Splash Pad – Construction

- Prior to the ground being broken for construction, at the Elders request, a private ceremony was held with two Elders, Contractor and Parks staff to bless the site
- Fort William First Nation offered to supply the boulders and the 7 Grandfather Stones for the project. Involved close coordination and protocol
- Regular updates to the status of the project were provided to the Elders Council



Northwood Splash Pad – Green Infrastructure Construction



Phase 1 (Spring 2020)

- Heavy civil (grey infrastructure) construction
- Catch basins, oil-grit separator, storm sewers & connection to trunk sewer
- Relocation of electrical feed



Phase 2 (Summer 2020)

- Excavation / grading, engineered soil mix, river stone & waterfall
- Light civil works (sub-drains, gate valve, etc.).
- Short & long-term erosion control

Northwood Splash Pad – Green Infrastructure Construction



Phase 3 (Spring 2022)

- Landscaping, mulch, trees (3), shrubs (65), perennials (510)
- Complete 2-years after Phase 2 – WHY?



- Thunder Bay Conservatory Staff now complete most of the plant installations & maintenance (excluding trees, mulch & seeding).
- All plants are grown from seeds within City greenhouses at Thunder Bay Conservatory.
- Resulted in significant capital cost savings, increased utilization of City staff & facilities, and improved plant mortality (higher survival rates).

Northwood Splash Pad – Completion

- At project completion of Labour Day weekend 2021, prior to official opening, a private ceremony with Parks staff and two Elders to bless the completed splash pad was undertaken
- In the summer of 2022, a grand public official opening took place to recognize Indigenous involvement with a [Water Ceremony](#) and the “[Water is Life](#)” teaching



Northwood Splash Pad – Green Infrastructure Results



- Very popular with local neighbourhood & broader public
- Used for school field trips
- Opportunity for Indigenous Knowledge sharing
- Opportunity for teaching Climate Resilience & Adaptation

- Total catchment area of 3.92ha
- Water quality volume exceeds 90th percentile storm (35mm vs 29mm)
- Total flood storage volume of 714m³
- Estimated annual runoff volume treated / infiltrated → 6,360m³



Green Infrastructure Total Cost \$261,000

- \$30,000 design
- \$231,000 construction
- All costs 50% 3rd party funded (DMAF)

Northwood Splash Pad – Lessons Learned

- **Meaningful** Neighbourhood, Stakeholder and Indigenous **Engagement** is extremely rewarding but will add time to the planning process and requires very specific internal and external resources.
- Including very specific theming and design parameters in RFP's is essential.
- When involving Elders, knowing and following protocols, as well as **listening**, is appreciated. Be prepared to open your mind and heart for an oral history transfer of information and recognize **it is a privilege to receive traditional knowledge** being shared.
- Recognize there can be different cultures and traditions within local Indigenous groups.
- Look for opportunities for **Indigenous Economic Development** within the project.
- No matter how hard you try, there will be missteps in the path to reconciliation. Recognize these; have **courage and humility**.



Northwood Splash Pad – Lessons Learned

- There can be benefits to staging and sequencing construction works and tender packages but needs to be balanced by additional administrative efforts.
- Use each new GI facility to learn how to improve the design & construction process for the next one
 - Wear & tear from the public
 - Iron Ochre



Results in more frequent sub-drain maintenance!



Green Infrastructure - Public Engagement

<https://www.youtube.com/watch?v=UJpK2OhBTMc>

<https://www.youtube.com/watch?v=Jtctcf1O2fk>

<https://www.youtube.com/watch?v=V3vZGtfscIk>

<https://www.youtube.com/watch?v=fOpnsc-3R4E>

<https://www.youtube.com/watch?v=j7OuCOSZfPE>

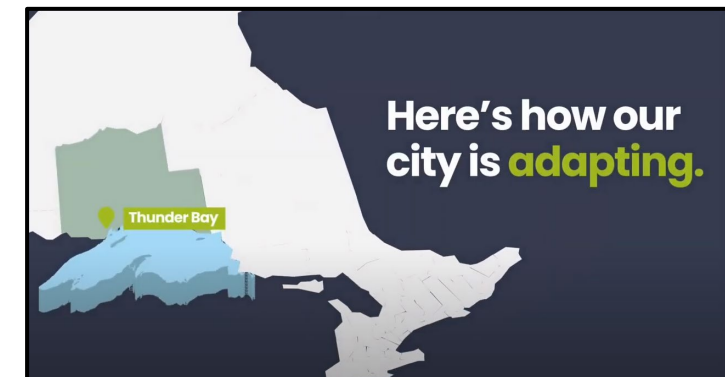
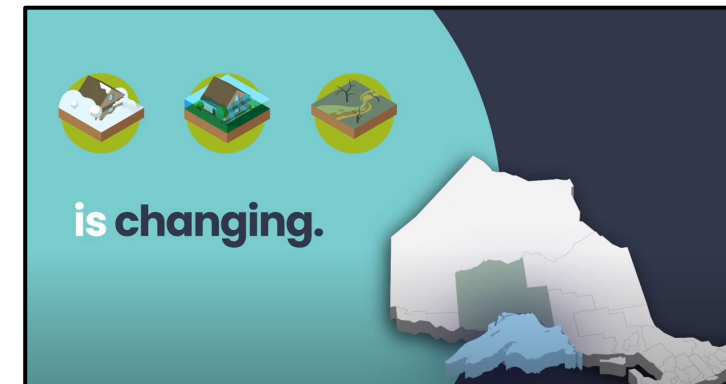
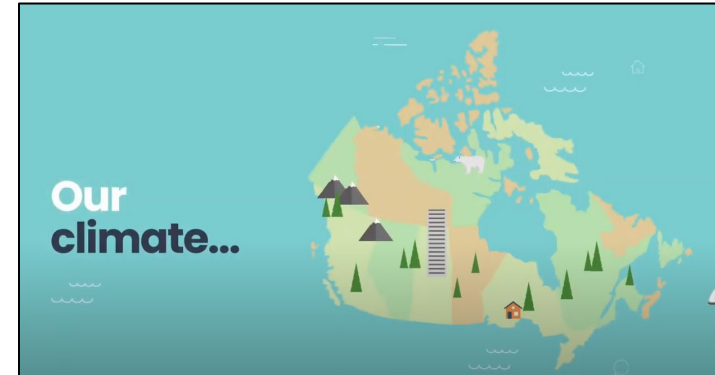
<https://www.tbnewswatch.com/video/eco-tips/eco-tips-rain-gardens-3765169>

<https://www.youtube.com/watch?v=8Ow9N9SQKCA>

(Residential Rain Garden Design & Installation Workshop)

<https://www.lakeheadu.ca/about/sustainability/office-of-sustainability/braun-building-rain-garden>

https://www.linkedin.com/posts/aaron-ward-3789962b_thunderbay-greeninfrastructure-stormwater-activity-6894049477368639488-XhVV?utm_source=share&utm_medium=member_desktop



3rd Party Funding Sources for Green Infrastructure

Funding Program Name / Agency	
Clean Water and Wastewater Fund	Great Lakes Sustainability Fund
MNRF Great Lakes Protection Funding	Eco-Action Community Funding Program
Great Lakes Guardian Community Fund	CN Eco-Connexions From the Ground Up
Lake Superior Lakewide Action and Management Plan	Tree Canada
Canada-Ontario Great Lakes Agreement	TD Friends of the Environment Fund
Ontario Great Lakes Strategies	RBC Blue Water Project Community Action Grants
Federation of Canadian – Municipalities Green Municipal Fund	Federation of Canadian – Municipalities for Climate Innovation Program
National Disaster Mitigation Program	Green Communities Canada
Ontario Trillium Foundation	Disaster Mitigation & Adaptation Fund

Thank you!

Aaron Ward, P. Eng.
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Engineering & Operations Division
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werner.schwar@thunderbay.ca



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