

LID: A Tale of Two Sites

Partnering with GLSLCI and RBC to Further Low Impact Developments in Thunder Bay



GREAT LAKES & ST. LAWRENCE CITIES INITIATIVE A.M. | JUNE 18, 2015

Introduction | **Objective**

Intent of RBC funded LID project

Lessons learned

Next steps to complete project



Introduction | **Intent of Project**

Stormwater Quality

Reduce peak flow

Urban forest canopy

Aesthetics along our image route

Educational Opportunities

Climate Change/Adaptation



Introduction | **Intent of Project**



These two climate change impacts will increase



Introduction | **LID's Defined**

An land planning and engineering design approach to manage stormwater runoff

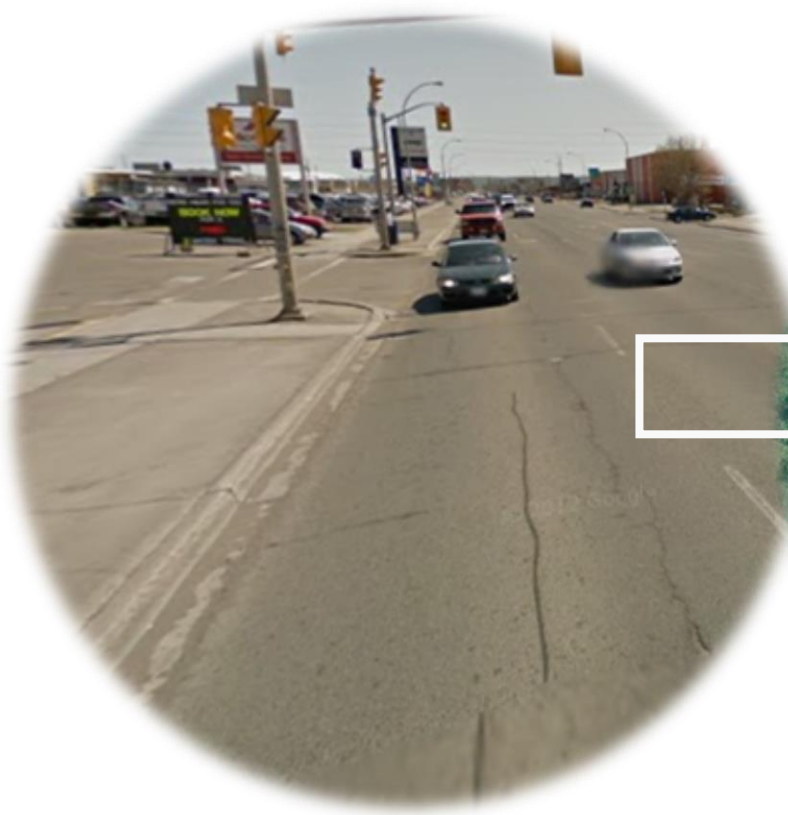
Quality and quantity

Decentralized facilities

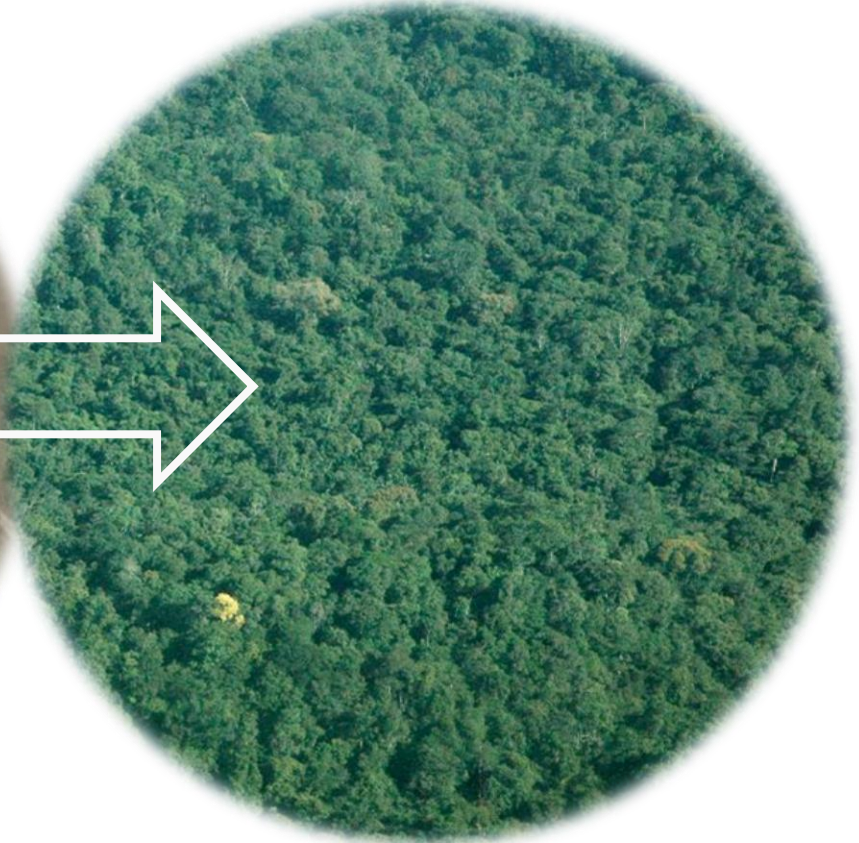
Newer concept in stormwater management in
Thunder Bay



Introduction | **Function of LID**



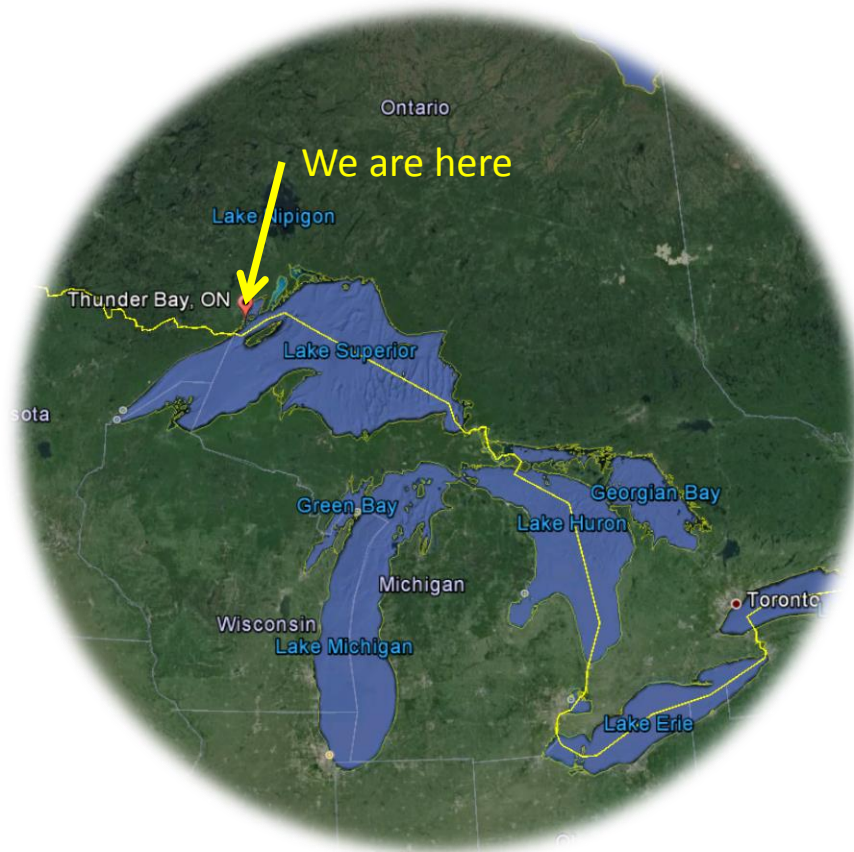
Typical Thunder Bay Arterial



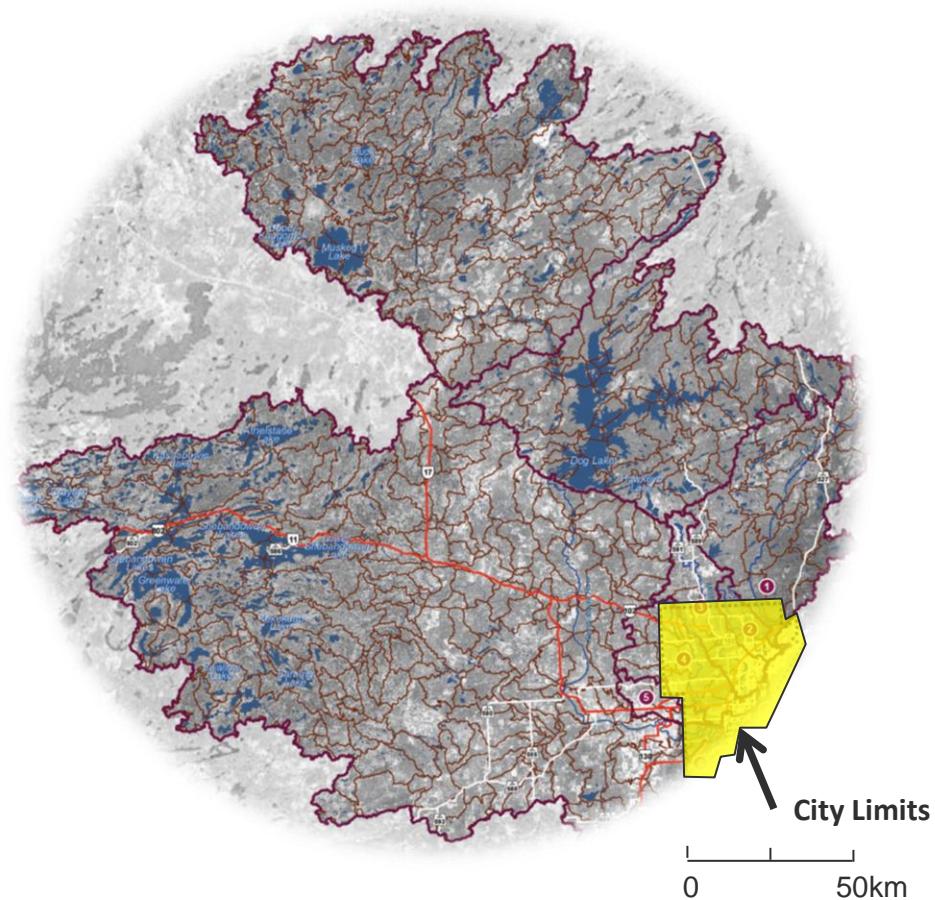
Pre-developed Watershed



Introduction | Site



Great Lakes



Lakehead Watershed



Introduction | Site



City of Thunder Bay



Project Location



Design Process | **A Tale of Two Sites**



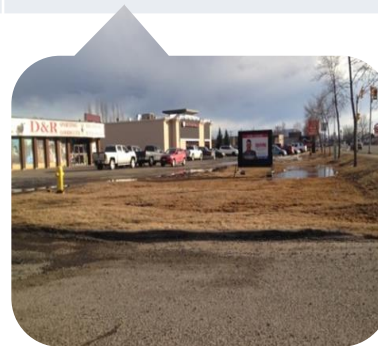
Design Process | Site Contrasts

Site Attribute	Beverley LID (2013)	Memorial LID (2015)	consequence
Ground Water Table	2000-3000 mm below existing grade	Less than 1000mm below grade	Not as suitable for bioretention so required change in LID type and budget
Soil type	Dry course fill material	Silt and muskeg	Not as suitable for bioretention so required change in LID type and budget



Design Process | Site Contrasts

Site Attribute	Beverley LID (2013)	Memorial LID (2015)	consequence
Topography	Berm of fill material , little ex. moisture	Existing low area, predominantly wet	Less excavation required, but requires more subtle grading and less tolerance for error.
Utilities	None present to restrict	2 ex. 600mm storm trunk lines bisect site and close to surface	Design constraint and requires more cover than existed.



Design Process | Site Contrasts

Site Attribute	Beverley LID (2013)	Memorial LID (2015)	consequence
Pedestrian Circulation	Adjacent sidewalks but no desire lines through site	Adjacent sidewalks but desire line from signalized intersection to businesses	Future pedestrian placeholder required and accommodation for grades
Visibility	View of LID filtered from main 2 streets with ex. berm	View of LID highly visible from main street and adjacent businesses	Public perception higher resulting in additional aesthetic consideration and additional consultation with adjacent business owners



Approaches

Beverly Biorentention LID



Financial support for this project was provided by:



Curb Openings

Bioretention Area

Monitoring Wells

Benches & Educational Signs

Memorial Biofiltration LID



SCALE = 1:25

Symbol	Quantity	Scientific Name	Common Name	Size	Cost	Type
SL	6	Carya (pecan)	Turnerbark	40 mm	2000	Simple Stems
	6	Total				

Deciduous Shrub Planting Schedule - Memorial Ave. Biofiltration Facility						
Symbol	Quantity	Scientific Name	Common Name	Size	Type	Spacing
CD	63	<i>Cornus alternifolia</i> 'Forsyth	Arctic Fire Dogwood	600mm	45 Cont.	30 O.C.
DL	18	<i>Desmodium illinoense</i>	Dwarf Bush Honeysuckle	600mm	45 Cont.	30 O.C.
BT		Shrub Total				

Parental Planting Schedule - Memorial Ave. Biofiltration Facility						
Species	Quantity	Scientific Name	Common Name	Size	Type	Spacing
ex 100	100	<i>Rubus cuneifolius</i>	Rubus cuneifolius	6" dia	Shrub	3' x 3' D
ex 104	604	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
ex 105	105	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
ex 112	112	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
ex 113	113	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
ex 114	114	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
ex 115	115	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
ex 116	116	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
ex 117	117	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
ex 118	118	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
ex 119	119	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
ex 120	120	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
ex 121	121	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
ex 122	122	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
ex 123	123	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
ex 124	124	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
ex 125	125	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
ex 126	126	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
ex 127	127	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
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ex 130	130	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
ex 131	131	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
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ex 137	137	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
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ex 143	143	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
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ex 146	146	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D
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ex 156	156	<i>Asclepias tuberosa</i>	Common Tuberose	6" dia	Flwr	6" x 6" D

Lessons Learned | Design



Every site is different

Can not use cookie cutter design

Must choose design from suite of solutions
involving a multi-disciplinary team

Development of in-house expertise is required

Site analysis prior to design is critical

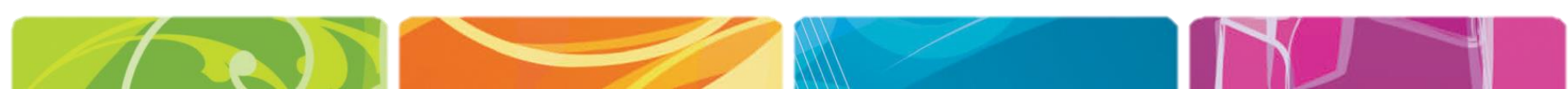


Lessons Learned | **Construction**

Education of staff and operators

Locally sourced materials

Soil media mixture, plants and seed mix, concrete formations (fibrecrete)



Next Steps | Education

- Education and awareness
 - Benefits of LID infrastructure
 - Promotional opportunities for businesses
 - Volunteer opportunities
 - Educational signage







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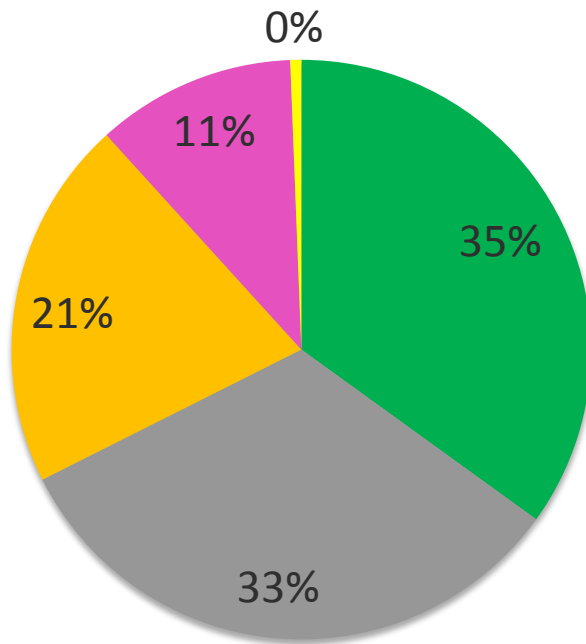


Construction | Administration

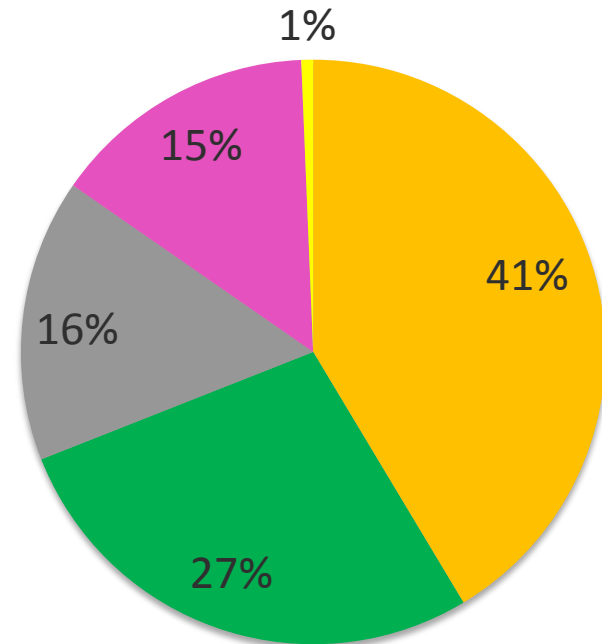
	Beverly LID	Memorial LID
Estimated cost	\$102,183.20	\$130,079.22
Actual cost	\$56,655.61	TBD
Funding amounts	CN EcoConnexions \$25,000 CAN	RBC Blue Water \$36,000 CAN

Construction | Administration

Beverly LID Actual Costs

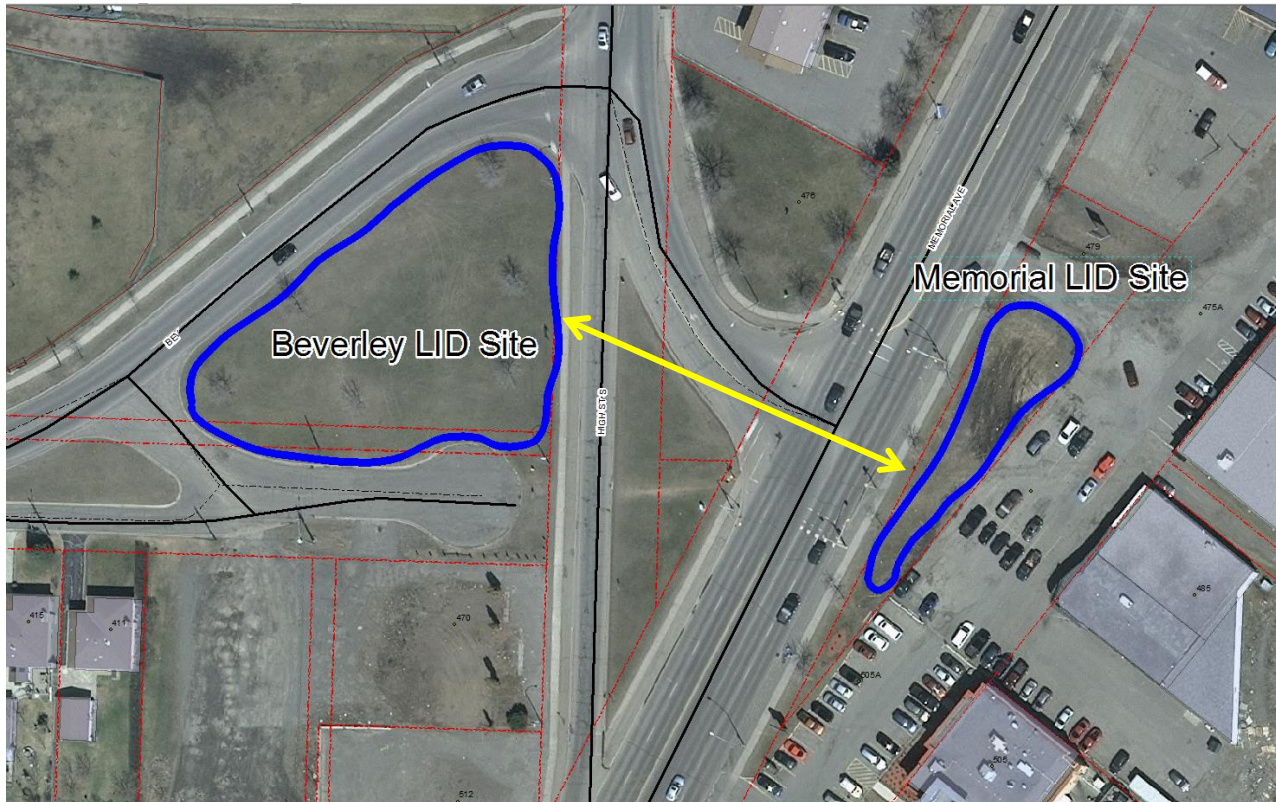


Memorial LID Estimated Costs



- Greening
- Construction
- Materials
- Concrete
- Events

Design Process | **A Tale of Two Sites**



Introduction | Team



City Structure

Team members

- EarthCare Thunder Bay
- Engineering Division
- Environment Division
- Parks Division
- Realty Services

Partners

