

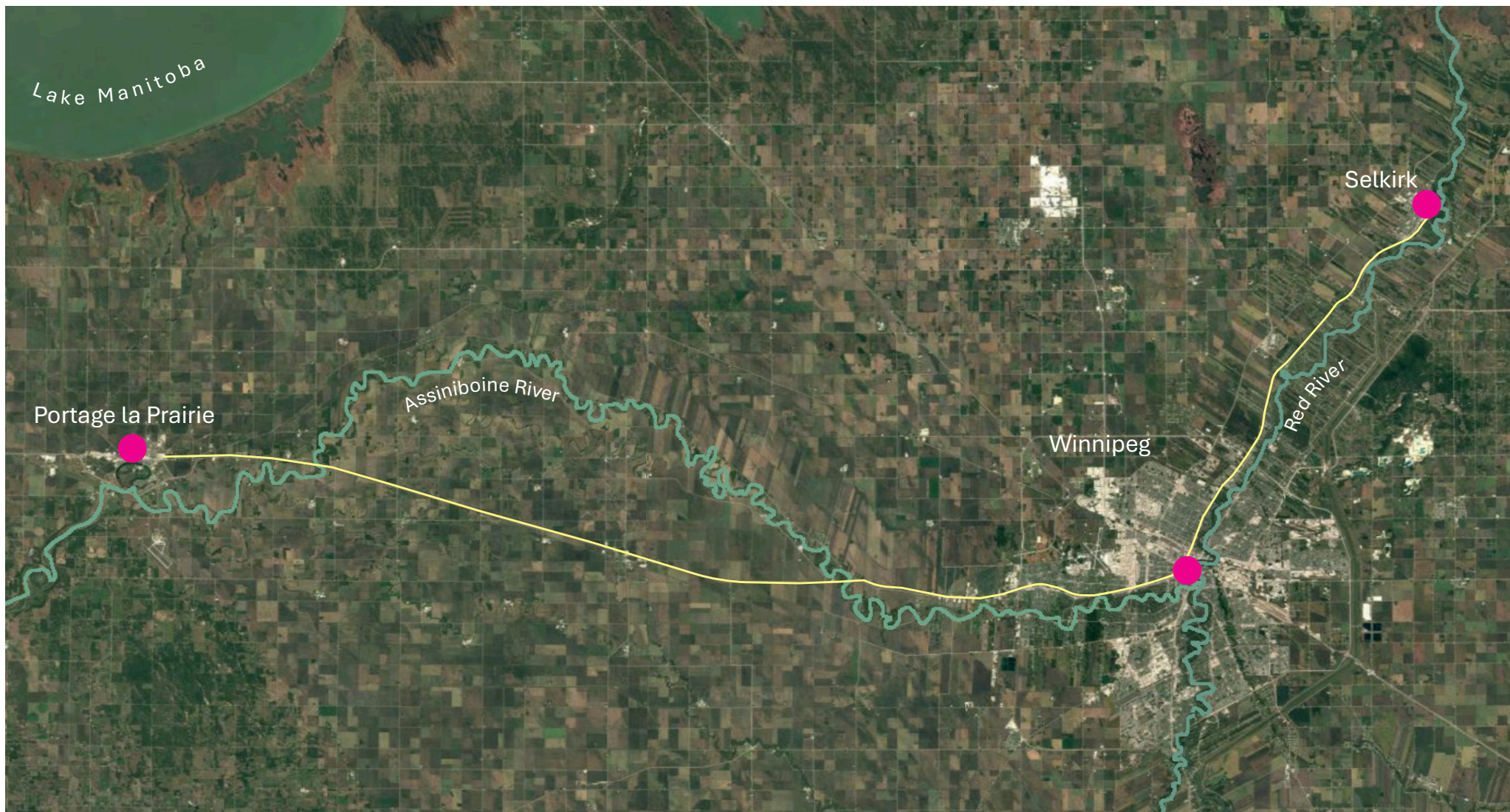


DESIGNING SUSTAINABLE STREETS

LESSONS FROM IMPLEMENTING GREEN INFRASTRUCTURE
IN MUNICIPAL TRANSPORTATION PROJECTS

Kaili Brown MALA, CSLA





CASE STUDY LOCATIONS



**SASKATCHEWAN AVENUE
WEST RECONSTRUCTION:**
PORTAGE LA PRAIRIE, MANITOBA





Saskatchewan Avenue, City of Portage la Prairie: late 1940s
Population: 7,620 (Manitoba Historical Society)



Saskatchewan Avenue, City of Portage la Prairie: 2021
Population: 13,270 (Manitoba Historical Society)

- FEATURES:**
- New, 3.0m wide, multi-use path connecting to the Fisher Avenue pathway along the north side of the Avenue to 18th Street
 - New, accessible 2.0m wide sidewalk along the south side of the Avenue
 - Green Infrastructure: streetside and median bioswales capture water run off from the roadway, reducing surface contamination before reaching the land drainage sewer outfalls in Crescent Lake.
 - Existing timber MB Hydro Street Lights will be replaced with upgraded steel street light poles.
 - On-street parking is realigned from perpendicular to parallel
 - Accesses are defined and organized
 - New street trees to provide shade and reduce heat island effect
 - Raised planters provide seasonal colour, texture and seating opportunities
 - Increased frequency of bicycle racks to support cycling infrastructure



MULTI-USE PATH



STREETSIDE BIOSWALE



BIOSWALE

LEGEND

CIP CONCRETE SIDEWALK	CIP CONCRETE UNIT PAVERS	SOD	GREEN INFRASTRUCTURE	NEW TREE	RENEWED ROADWAY LIGHTING	CROSSWALK WITH CURB RAMP	PUBLIC ART
MULTI-USE PATH 3.0m WIDE	CYCLING LANE RAISED (1.8m)	CYCLING LANE AT-GRADE (1.8m)	40" HIGH WOOD FENCE	EXISTING TREE TO REMAIN	NEW PEDESTRIAN STREET LIGHT	SITE FURNISHING	RAISED CIP CONCRETE PLANTERS



SECTION A-A



SECTION B-B

RURAL RECONSTRUCTION: Elm to 18th Street
SASKATCHEWAN AVENUE WEST ROADWAY IMPROVEMENT PROJECT
 Portage la Prairie, Manitoba
 November 2021



FEATURES:

- Existing roadway grade is lowered to facilitate drainage and prevent flooding
- Accesses are defined and organized
- Medians are introduced to provide safer, better traffic control.
- New, accessible 2.0m wide sidewalk along both sides of the Avenue
- New, 1.8m wide, uni-directional cycling lanes on both sides of the street raised to sidewalk level
- New pedestrian crossing is added at 16th Street to reduce the distance between signalized intersection crossings between 18th and 12th Streets. Curbs are extended for shorter, accessible crossings.
- Green Infrastructure:
 - Medians capture water run off from the roadway and reducing surface contamination before reaching land drainage sewer outfalls in Crescent Lake.
 - Raingardens within boulevards filter and transpire stormwater while enhancing the landscape
 - Silva Cells below the pavement of the urban street trees provide ample growing medium while treating stormwater
- Existing timber MB Hydro Street Lights will be replaced with upgraded steel street light poles
- Additional lighting at the pedestrian level to enhance the streetscape
- On-street parking is realigned from perpendicular to parallel to improve road safety
- New street trees to provide shade and reduce heat island effect
- Raised planters provide seasonal colour, texture and seating opportunities
- Increased frequency of bicycle racks to support cycling infrastructure
- Design mitigates many healthy existing trees
- Allocates space and opportunities for future public art



LEGEND

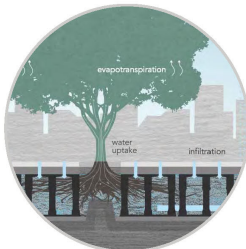
CIP CONCRETE SIDEWALK	CIP CONCRETE UNIT PAVERS	SOD	GREEN INFRASTRUCTURE	NEW TREE	RENEWED ROADWAY LIGHTING	CROSSWALK WITH CURB RAMP	PUBLIC ART
MULTI-USE PATH 3.0m WIDE	CYCLING LANE RAISED (1.8m)	CYCLING LANE AT-GRADE (1.8m)	40' HIGH WOOD FENCE	EXISTING TREE TO REMAIN	NEW PEDESTRIAN STREET LIGHT	SITE FURNISHING	RAISED CIP CONCRETE PLANTERS



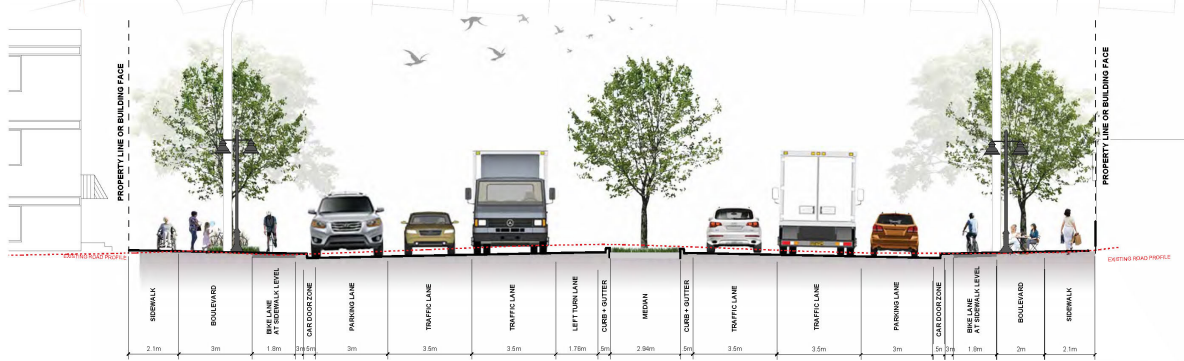
2 CURB EXTENSION



RAISED CYCLING LANE



3 SILVA CELL



SECTION C-C



URBAN RECONSTRUCTION: 18th to 8th Streets
 SASKATCHEWAN AVENUE WEST ROADWAY IMPROVEMENT PROJECT
 Portage la Prairie, Manitoba
 November 2021



- FEATURES:**
- Renewed, accessible 2.0m wide sidewalk along both sides of the Avenue and increased space for seating
 - New, 1.8m wide, uni-directional cycling lanes on both sides of the street at road level. Protected from traffic by the parking lane. Delineated with paint and polyposts.
 - Curb extensions create shorter, accessible pedestrian crossings
 - Existing mid-block pedestrian crossing is relocated centrally to 6th Street
 - Existing timber MB Hydro Street Lights will be replaced with upgraded steel street light poles
 - Additional lighting at the pedestrian level to enhance the streetscape experience
 - New street trees to provide shade and reduce heat island effect
 - Raised planters provide seasonal colour, texture and seating opportunities
 - Increased frequency of bicycle racks to support cycling infrastructure
 - Design mitigates many healthy existing trees
 - Allocates space and opportunities for future public art

LEGEND

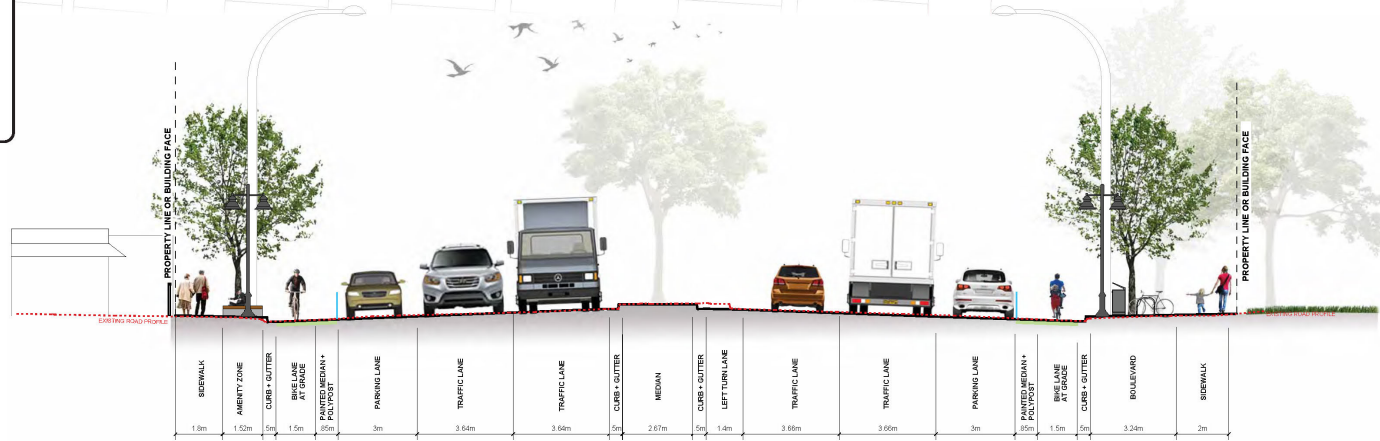
CIP CONCRETE SIDEWALK	CIP CONCRETE UNIT PAVERS	SOD	GREEN INFRASTRUCTURE	NEW TREE	RENEWED ROADWAY LIGHTING	CROSSWALK WITH CURB RAMP	PUBLIC ART
MULTILISE PATH 3.0m WIDE	CYCLING LANE RAISED (1.8m)	CYCLING LANE AT-GRADE (1.8m)	4' HIGH WOOD FENCE	EXISTING TREE TO REMAIN	NEW PEDESTRIAN STREET LIGHT	SITE FURNISHING	RAISED CIP CONCRETE PLANTERS



AT-GRADE CYCLING LANE WITH POLYPOSTS



WIDENED PEDESTRIAN SIDEWALKS AND ENHANCED STREETSCAPE



SECTION D-D

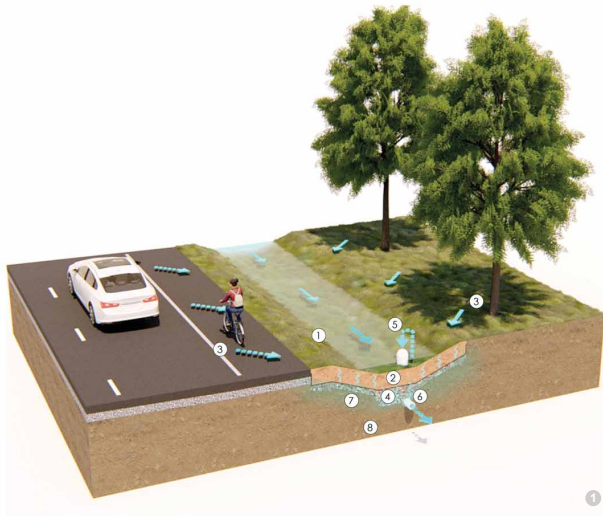
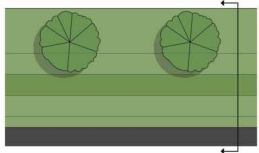
URBAN REHABILITATION: 8th to 4th Streets
 SASKATCHEWAN AVENUE WEST ROADWAY IMPROVEMENT PROJECT
 Portage la Prairie, Manitoba
 November 2021



Streetside Bioswale

(Curbless)

- 1 Site-specific vegetation filters and transpires stormwater while enhancing the streetscape
- 2 Engineered soil media filters stormwater and provides environment for vegetation to grow
- 3 Stormwater runoff from roadway and surrounding landscape flows into system via overland flow
- 4 Drainage rock, soil, or modular storage system provides stormwater storage
- 5 Overflow (Optional) limits amount of surface ponding, connected to traditional infrastructure
- 6 Underdrain ensures proper drain-down of stormwater runoff, connected to traditional infrastructure
- 7 Stormwater infiltrates into subgrade
- 8 Leveled subgrade

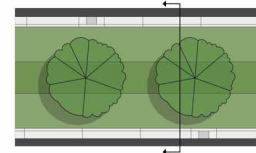


*Refer to the Complete Streets Typical Sections for application of roadway features adjacent to the proposed travel lanes for various context applications.

MOVEBR

Median Bioswale

- 1 Site-specific vegetation filters and transpires stormwater while enhancing the streetscape
- 2 Engineered soil media filters stormwater and provides environment for vegetation to grow
- 3 Stormwater runoff from roadway and sidewalk flows into system through curb cuts and catch basins*
- 4 Drainage rock, soil, or modular storage system provides stormwater storage
- 5 Overflow limits amount of surface ponding, connected to traditional infrastructure
- 6 Underdrain ensures proper drain-down of stormwater runoff, connected to traditional infrastructure
- 7 Stormwater infiltrates into subgrade
- 8 Leveled subgrade



MOVEBR

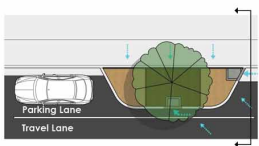


*Refer to the Complete Streets Typical Sections for application of roadway features adjacent to the proposed travel lanes for various context applications.

Curb Extension

Mid-block

- 1 Site-specific vegetation filters and transpires stormwater while enhancing the streetscape
- 2 Engineered soil media filters stormwater and provides environment for vegetation to grow
- 3 Stormwater runoff from roadway and sidewalk flows into system through curb cuts, trench drains or catch basins*
- 4 Overflow limits amount of surface ponding, connected to traditional infrastructure
- 5 Underdrain ensures proper drain-down of stormwater runoff, connected to traditional infrastructure
- 6 Stormwater infiltrates into subgrade
- 7 Leveled subgrade

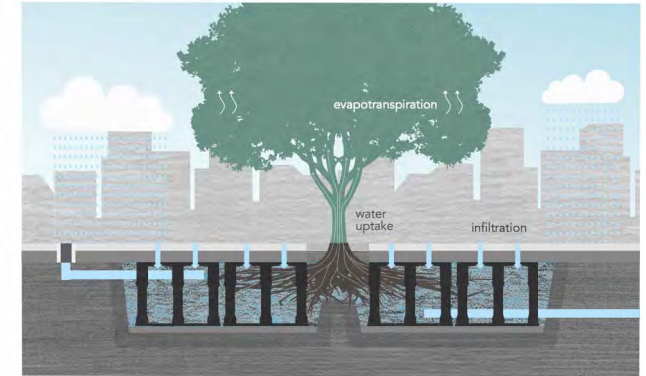


*Refer to the Complete Streets Typical Sections for application of roadway features adjacent to the proposed travel lanes for various context applications.

MOVEBR

CREATING HIGH-PERFORMANCE GREEN INFRASTRUCTURE

The integration of green utilities like soil, trees, and water into urban areas can help alleviate some of our most pressing ecological challenges - including air and water quality, rising temperatures, flooding, and erosion from daily rainfall events.



DeepRoot.com

3



Roadside soak away, Saskatchewan Avenue West, Portage la Prairie



VIEW TO THE WEST FROM 18TH STREET NW
 SASKATCHEWAN AVENUE WEST ROADWAY IMPROVEMENT PROJECT

Portage la Prairie, Manitoba



Roadside soak away, Saskatchewan Avenue West, Portage la Prairie





EVELINE STREET RECONSTRUCTION: SELKIRK, MANITOBA





EVELINE STREET: BEFORE (1910)



EVELINE STREET: BEFORE (2020)



EVELINE STREET: AFTER



SILVA CELL INSTALLATION



EVELINE STREET: DURING CONSTRUCTION & AFTER



EVELINE STREET: AFTER



Mike Pratt Photography, 2025



EVELINE STREET: AFTER

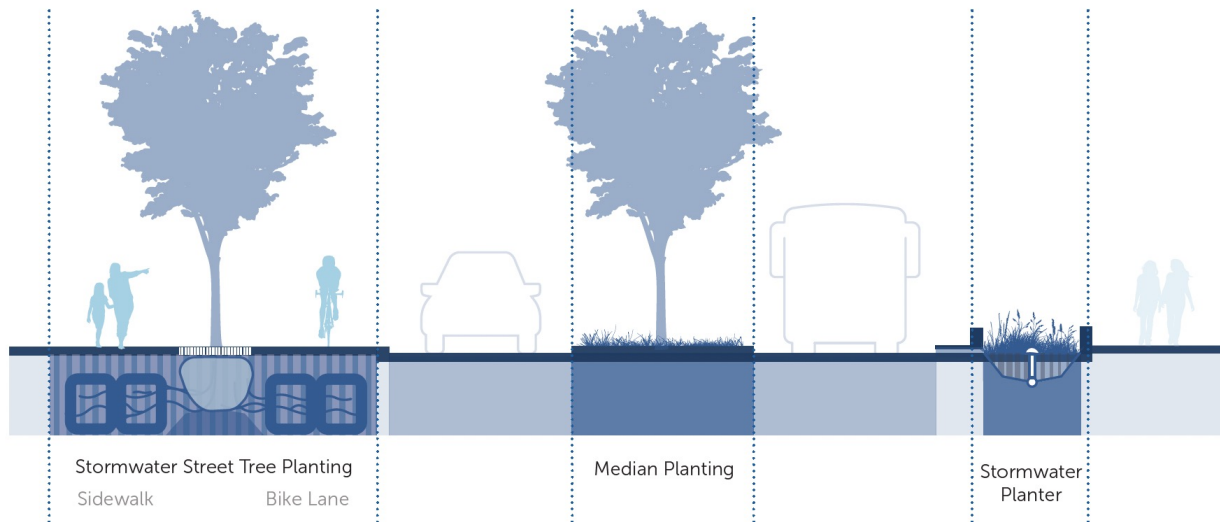
Street Component		Roadway Type				
		Residential Local Street (22m)	Residential Collector (27m)	Commercial Collector (30m)	Industrial Collector (30m)	Minor Arterial (45m)
● REQUIRED ■ HIGH PRIORITY □ LOW PRIORITY ▲ APPROPRIATE IN LIMITED CIRCUMSTANCES — NOT RECOMMENDED						
1.0 Pedestrian	a. Sidewalks (2.1m min. width)	●	●	●	—	●
	b. Curb Ramps	●	●	●	●	●
	c. Pedestrian Crossings	□	▲	●	▲	●
2.0 Streetscape	a. Furnishing Zone (min. 2.5 - 3.0m width)	—	□	●	□	●
	b. Bicycle Parking	—	□	●	▲	●
	c. Pedestrian Level Lighting	●	●	●	□	□
	d. Benches & Street Furniture	—	—	■	—	■
	e. Sidewalk Cafés (requiring extra space outside the sidewalk)	—	—	▲	—	▲
	f. Street Trees	●	●	●	●	●
	g. Planters (for annuals or perennials and shrubs)	—	—	●	□	■
	h. Waste & Recycling Bins	—	—	●	●	●
	i. Public Art	□	■	●	●	●
3.0 Active Transportation	a. Raised or Protected bicycle lane	—	—	●	—	●
	b. Multi-Use Path	—	●	●	●	●
	c. Bicycle Boulevard (painted shared lane, on-road)	●	—	—	—	—
	d. Roadway Treatment (Bike Box) @ intersection and conflict areas	—	—	▲	—	▲
	e. Bicycle Route Signage	●	●	●	●	●
4.0 Curbside Management	a. On-Street Parking (parallel stalls 7.5m long x 3.0m wide)	▲	●	●	—	●
	b. Loading Zones	—	—	▲	▲	▲
	c. Transit Stops	▲	●	●	●	●
	d. Alternative Use Parking Lanes (Parklets, Cafés, Food Trucks etc.)	—	—	▲	—	▲
5.0 Roadway / Vehicle	a. Traffic Lane Width (4.0m maximum, reduce to 3.7m where possible)	< 4.0	< 4.0	< 4.0	4.0	4.0
	b. Raised Speed Reducers	■	■	—	—	—
	c. Medians (6.0m maximum)	—	—	—	—	6.0
	d. Bus Route	▲	●	●	●	●
	e. Pedestrian Penninsulas / Curb Extensions	—	●	●	—	●
	f. Roundabout	—	—	■	■	■
	g. Dedicated Transit Corridor (Future)	—	—	—	—	●
6.0 Climate Resilient Features	a. Stormwater Street Tree Planting	—	—	■	□	●
	b. Stormwater Planter	—	—	■	—	■
	c. Rain Garden	■	●	■	●	●
	d. Bioswale	■	■	■	●	●

TRAFFIC STANDARDS AND COMPLETE STREETS GUIDELINES

CITY OF SELKIRK

CLIMATE RESILIENT FEATURES

Green infrastructure is a nature-based alternative to conventional grey infrastructure. It attempts to restore and replicate ecological systems and services to create human benefits. Street trees, bioswales, and rain gardens are all examples of green infrastructure that can be used as part of an integrated stormwater management strategy to help meet the City's climate change adaptation goals. Prior to implementation, underground utilities (Hydro, Gas, Water, Fibre Optic) must be considered as well as appropriate plant species type.





MAIN STREET RECONSTRUCTION: SELKIRK, MANITOBA



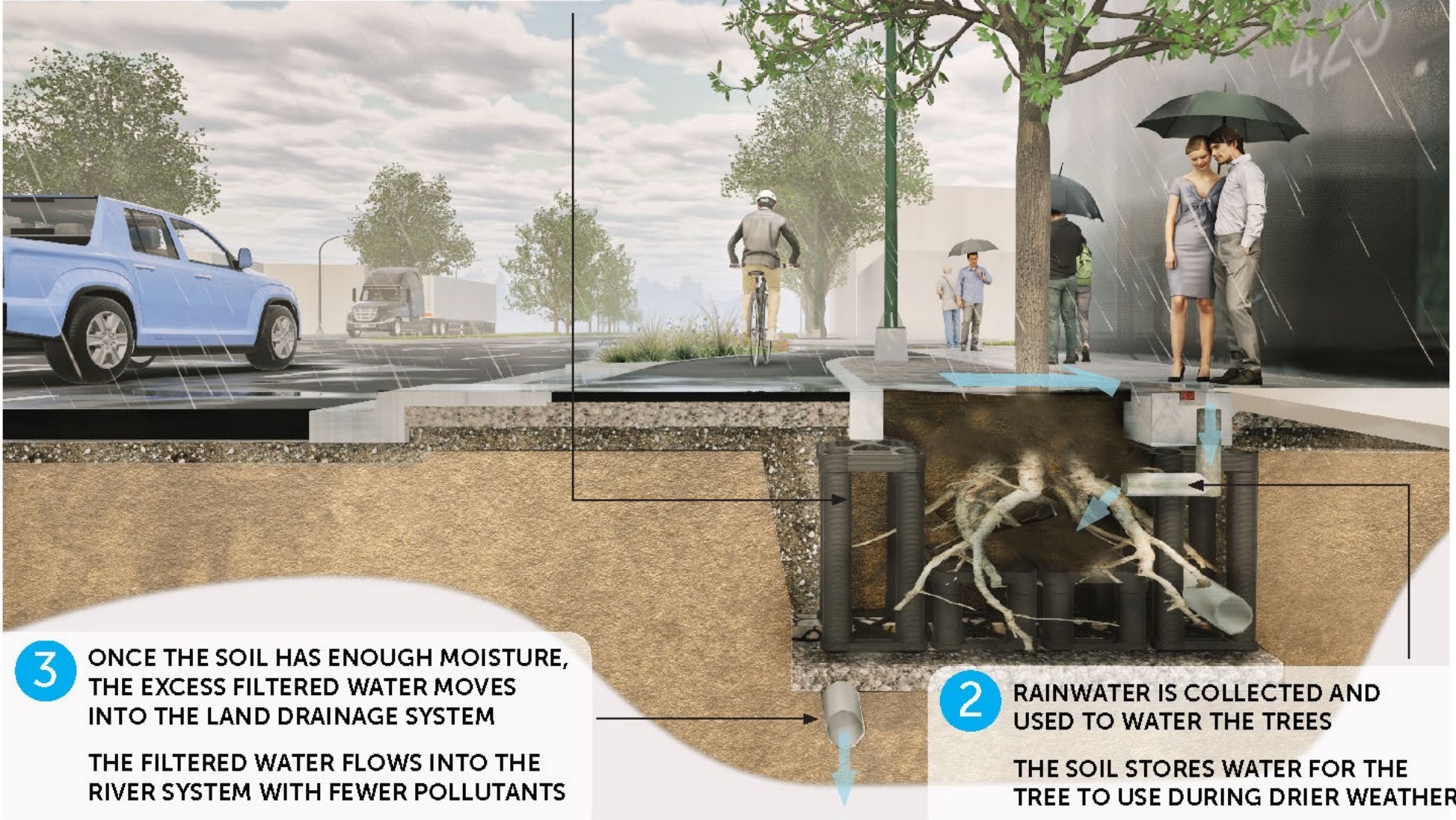


MAIN STREET MEDIAN - YEAR 5





1 SOIL CELLS SUPPORT THE PAVEMENT ABOVE WHILE GIVING TREE ROOTS OXYGEN AND ROOM TO GROW IN LOOSE SOIL



3 ONCE THE SOIL HAS ENOUGH MOISTURE, THE EXCESS FILTERED WATER MOVES INTO THE LAND DRAINAGE SYSTEM
THE FILTERED WATER FLOWS INTO THE RIVER SYSTEM WITH FEWER POLLUTANTS

2 RAINWATER IS COLLECTED AND USED TO WATER THE TREES
THE SOIL STORES WATER FOR THE TREE TO USE DURING DRIER WEATHER

MAIN STREET SOIL CELLS



1 RAINWATER FROM THE ROADWAY FLOWS INTO THE RAIN GARDEN

2 WATER-TOLERANT PLANTS AND SOIL FILTER AND CLEAN THE RAINWATER

3 ONCE THE SOIL HAS ENOUGH MOISTURE, THE EXCESS FILTERED WATER MOVES INTO THE LAND DRAINAGE SYSTEM, AND FINALLY INTO THE RIVER WITH FEWER POLLUTANTS

MAIN STREET RAIN GARDEN



MAIN STREET RAIN GARDEN



Mike Pratt Photography, 2025

Thank you.



500-115 Bannatyne Avenue
Winnipeg, Manitoba

204 944 9907

htfc.ca

Kaili Brown
kbrown@htfc.ca