Building a Resilient Future: Establishing a Stormwater Utility

Enhancing community infrastructure to manage stormwater effectively

MUNICIPALITY OF ARRAN-ELDERSLIE

Agenda

- Introductions
- Goals & Objectives
- Understanding Stormwater
- The State of the Infrastructure: Stormwater Needs Study's Overview
- Proposed Utility Funding Structure
- Questions and Feedback

Goals & Objectives of the Public Information Session

Goals

- **Educate** residents on stormwater infrastructure and challenges.
- **Introduce** the proposed stormwater utility and its benefits.
- **Explain** the funding model based on property type and area.
- **Collect** public feedback to inform Council's decision.

Objectives

- **Transparency**: Ensure residents understand how stormwater services are delivered and financed.
- **Resilience**: Promote long-term planning to reduce flooding and pollution risks.
- **Accountability**: Establish a clear and dedicated entity responsible for stormwater management.
- **Engagement**: Encourage active participation from residents in shaping infrastructure decisions

The Municipality understands that there may be individual stormwater concerns related to private property that have caused frustration for some residents. The Municipality is actively working on these issues and appreciates your patience and understanding.

We are unable to comment on specific properties in a public forum. Some details related to private property are confidential and not appropriate for open discussion. If you have concerns about a specific property, we invite you to contact the Municipal Office to arrange a one-on-one conversation. This will allow us to address your concerns directly and respectfully, while maintaining the necessary confidentiality.

Understanding Stormwater

Stormwater is the water that originates from rainfall, snowmelt, or other forms of precipitation and flows over land surfaces. In natural environments, most stormwater is absorbed into the ground. But in urban areas, where surfaces like roads, rooftops, and sidewalks are impermeable, stormwater runs off into drainage systems.

Storm Water Systems

Minor Stormwater Systems
In general, catch basins collect stormwater runoff and carry it through storm sewers to a dedicated outlet. Such runoff transportation network is termed as the "*minor stormwater system*". The minor stormwater system is generally intended to carry runoff from a 1:2-year or 1:5-year storm event.

Major Stormwater Systems
For larger storms, the excess stormwater runoff that cannot be conveyed by the minor system is carried overland, usually in road corridors and ditches, to a dedicated outlet. This is referred to as the "*major stormwater system*".

Why Stormwater Matters

Manages Rainfall and Runoff

Stormwater systems help handle large volumes of rain and snowmelt, preventing water from pooling on streets and properties.

Prevents Urban Flooding

Without proper stormwater management, heavy rains can overwhelm streets, homes, and businesses—leading to costly damage and disruptions.

Protects Water Quality

Stormwater can carry pollutants like oil, pesticides, and litter into rivers and lakes. Managing it properly helps reduce contamination and protect aquatic ecosystems.

Supports Green Infrastructure

Modern stormwater strategies often include rain gardens, permeable pavements, and bioswales, which enhance urban green space and biodiversity.

Builds Climate Resilience

As extreme weather events become more common, effective stormwater systems help communities adapt and reduce the impact of storms and flooding.

What are Storm Return Periods?

A storm return period is a statistical measure used to estimate how often a storm of a certain intensity is likely to occur. It's commonly used in engineering, urban planning, and flood risk management.

1:2 Year Storm → 50% chance per year

1:5 Year Storm → 20% chance per year

1:10 Year Storm → 10% chance per year

1:100 Year Storm → 1% chance per year

Important Notes

- It's a probability, not a prediction. A 100-year storm can happen more than once in 100 years.
- It's based on **historical data**, which may not reflect future conditions—especially with climate change.
- Used to design infrastructure like storm sewers, culverts, and flood defenses to withstand specific storm intensities.

Sewer Surcharging vs. Flooding

Storm sewer surcharging occurs when the stormwater system becomes overwhelmed and the water level inside the sewer pipes rises above the normal flow level, often reaching or exceeding the top of the pipe. This typically happens during heavy rainfall events when the volume of water entering the system exceeds its design capacity.

Key Characteristics of Surcharging:

- Water backs up in the pipes and may rise into connected catch basins or manholes.
- It does not necessarily cause surface flooding, but it indicates the system is under stress.
- If surcharging is severe or prolonged, it can lead to localized flooding, especially in low-lying areas.
- It's a sign that the system may need upgrades to improve capacity or flow efficiency.

Storm sewer flooding occurs when the stormwater system becomes overwhelmed and water escapes from the sewer network onto the surface. This is different from surcharging, where water rises within the system but hasn't yet escaped to the surface. Flooding is the next stage—when the system fails to contain the water entirely.

This typically happens during intense rainfall events when:

- The volume of water exceeds the system's capacity.
- Pipes and catch basins are blocked or undersized.
- Water cannot drain quickly enough, causing it to back up and overflow.

Effects of Storm Sewer Flooding:

- Water may pool on roads, sidewalks, and private properties.
- It can lead to property damage, traffic disruptions, and safety hazards.
- In severe cases, it may contribute to basement flooding or erosion.

The State of the Infrastructure

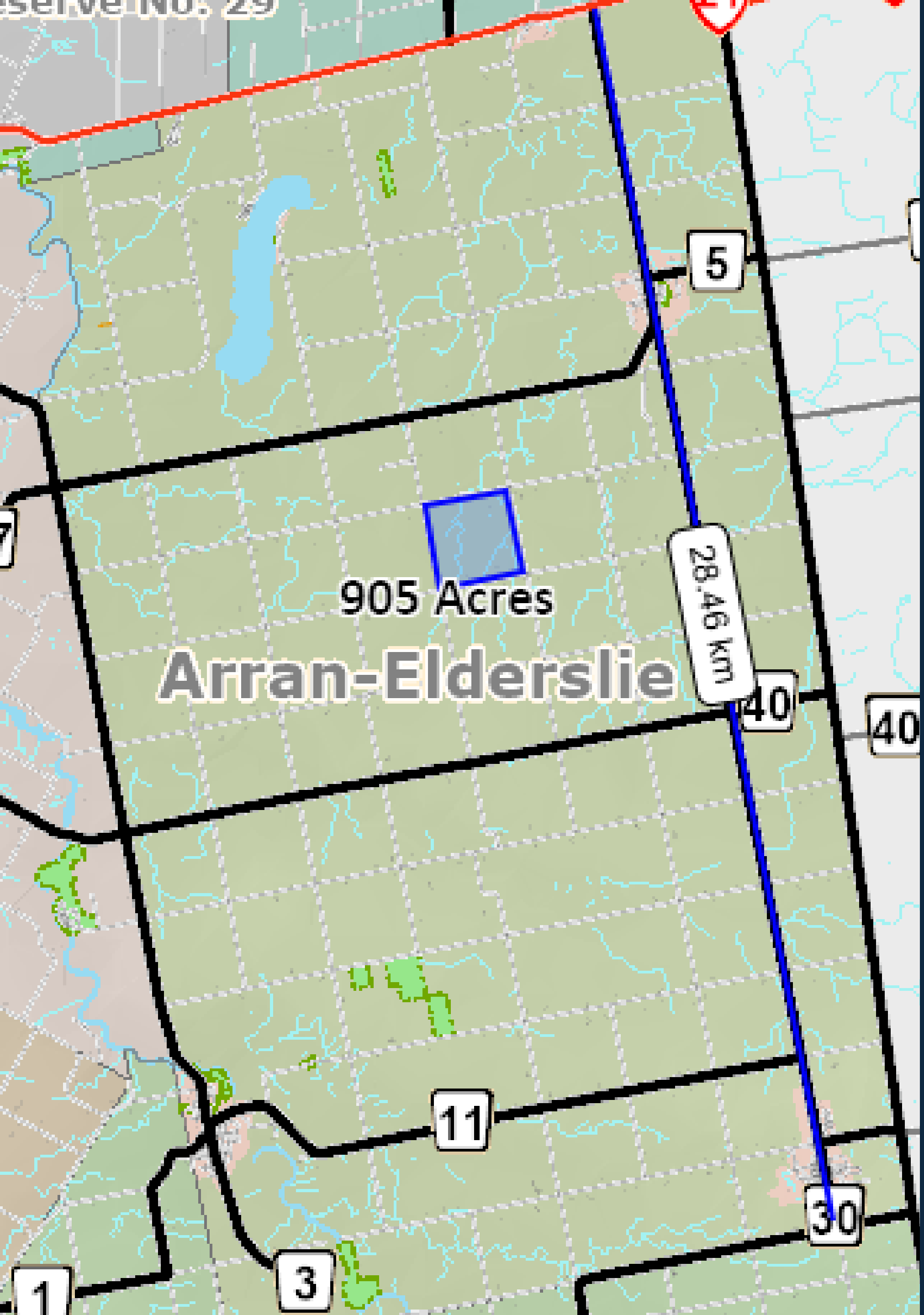
The Municipality hired GSS Engineering to conduct a Stormwater Needs Study for Chesley, Paisley, and Tara. The study evaluates current stormwater systems, identifies capacity deficiencies, and recommends targeted upgrades to reduce flooding during 1:5-year storm events, while acknowledging that eliminating all overloading may not be feasible or affordable. The report assesses infrastructure, prioritizes improvements, estimates costs, and aims to help Arran-Elderslie make informed decisions for effective and sustainable stormwater management.

The following slides highlight the unique stormwater challenges, infrastructure conditions, and priority needs for each of Arran-Elderslie's urban centres:

Chesley

Paisley

Tara



An overall Look at Arran-Elderslie Stormwater Infrastructure

- In total, there is approximately 30 km of storm sewer infrastructure
- Equivalent to the distance from the south end of Chesley to Highway 21 in Allenford
- Total drainage area of the three urban centres is equal to 900 acres
- Equivalent to a Country Block
- Total Storm Structures = 1053
- Total estimated replacement costs of the entire system, like for like with no enhancements = 31 million

Tara Stormwater System

Community Snapshot

Population: ~1,119

Dwellings: 476

Area: ~2.4 km^2

Sauble River: Flows south to north, exits southwest

Topography: Most of Tara slopes toward the river

(2021 Census)

Tara Stormwater System – Summary

Estimated Replacement Cost of Entire System: $5.6 million

Minor System

~5 km of sewers (100–675 mm); 61% ≤ 300 mm

208 structures; most common pipe size: 200 mm

Designed for 1:2 to 1:5-year storms

MECP minimum pipe size: 200 mm

Major System

Activated during larger storms

Relies on roads & ditches for overland flow

Many roads lack curb, gutter, or proper ditching

Stormwater Management Ponds

2 ponds serve Tower Hill Crescent subdivision

Limited coverage for broader urban area

Performance depends on maintenance & controlled orifice

Key Deficiencies

Reverse slope sewers, no outlets, small pipes

Assets on private land without easements

Shallow curbs, filled-in ditches, low-lying flood-prone areas

Tara Stormwater Modelling & Upgrade Summary

Existing Conditions

1:5-Year Storm:
22 flooded structures, 79 surcharged
3,654 m^3 flood volume
3 structures = 70% of flooding (John, Yonge, Union St.)

1:100-Year Storm:
52 flooded structures, 118 surcharged
16,544 m^3 flood volume
Same 3 structures = 54% of flooding

Upgrade Impact

1:5-Year Storm:
Flooded structures ↓ from 22 to 1 (CB 215 – County)
Surcharged ↓ from 79 to 36

1:100-Year Storm:
Flooded ↓ from 52 to 26
Surcharged ↓ from 118 to 89
Flood volume ↓ from 16,544 m^3 to 5,111 m^3
76% of remaining flooding at CB 215 (County)

Proposed Upgrades

7 municipal priority upgrades = **$1.85M**

Tara

Stormwater System

Priority Upgrade Summary

Priority	Location	Upgrade Description	Budget Project Cost
1	John St. & Heather Lynn Blvd.	Reconstruction of John St. (Hamilton St. to Heather Lynn Blvd.) and Heather Lynn Blvd. (John St. to Mill St.)	$578,650.00
2	Elgin St. & Matilda St.	Reconstruction of Elgin St. and Matilda St. (Elgin St. to Francis St.)	$339,780.00
3	River St. north of Market St.	Install outlet sewer from CB 357 to the Sauble River	$94,500.00
4	Main St. & Ann St.	Replace sewer from Junction to STM 1001 and from STM 1001 to Outlet	$144,985.00
5	Francis Street	Reconstruction of Francis ST (Brook ST W to Matilda ST) – Completed in 2024 – actual cost $522,000	$182,050.00
6	Yonge St. South & Main St.	Replace sewer from CB 237 to CB 236	$14,875.00
7	River St. west of Main St.	Replace sewer from CB 345 to CB 343	$129,125.00
		Total Construction Cost	$1,483,965.00
		Engineering & Contingencies @ 25%	$370,991.25
		Total Project Cost (Excl. HST)	$1,854,956.25

Stormwater System

Community Snapshot

Population: ~1,061

Dwellings: 526 (2021 Census)

Area: ~1.8 km^2

River Systems:

- **Saugeen River**: Enters from the south, flows north, then northwest
- **Teeswater River**: Southwest portion of town slopes toward this river

Topography:

- Majority of Paisley slopes toward the Saugeen River
- Southwest area slopes toward the Teeswater River

Paisley Stormwater System – Summary

Estimated Replacement Cost of Entire System: $13.4 million

Minor System

Designed for 1:2 to 1:5-year storms

~11.8 km of storm sewers; 380 structures

Sewer sizes: 100–900 mm; 67.4% ≤ 300 mm

MECP minimum: 200 mm diameter

Major System

Activated during larger storms

Uses roads & ditches for overland flow

Many roads lack curb & gutter or proper ditching

Natural Ditch System

Located in Environmental Protection Zone

Originates near Willow Creek → George St. → outlets north of North St.

Low flows via storm sewer; excess via surface ditch

Part of larger dyke system

Key Deficiencies

Reverse slope sewers → backups

Structures with no outlet → flooding

Assets on private property → no easements

Roads without curb/gutter → reduced overland flow

Filled-in ditches → obstruct stormwater conveyance

Paisley Stormwater Modelling & Upgrade Summary

Existing Conditions

1:5-Year Storm:
64 flooded structures, 177 surcharged
12,230 m^3 flood volume
4 structures = 69% of flooding (Inkerman/George, Inkerman/Albert, Queen/North)

1:100-Year Storm:
173 flooded structures, 231 surcharged
32,943 m^3 flood volume
Same 4 structures = 45% of flooding

Natural Ditch System
Conveys 6,680 m^3 (1:5) & 13,347 m^3(1:100)
Appears adequate with storm sewer support

Upgrade Impact

1:5-Year Storm:
Flooding eliminated except 8 ditch structures
Surcharged ↓ from 177 to 81

1:100-Year Storm:
Flooded ↓ from 173 to 105
Surcharged ↑ to 268 (due to more runoff stored)
Flood volume ↓ from 32,943 m^3 to 9,371 m^3

Proposed Upgrades

7 municipal priority upgrades = **$1.89 M**

Paisley

Stormwater System

Priority Upgrade Summary

Priority	Location	Upgrade Description	Budget Cost (CAD)
1	James Street and Inkerman St.	Reconstruction of James St. (Inkerman to Alma) & storm sewer on Inkerman St. (DICB-328 to DICB-330)	$292,256.50
2	Albert, Inkerman	Storm sewer replacement at Albert / Inkerman intersection	$35,000.00
3	Victoria North	Storm sewer replacement (CB-237 to DICB-507 and to outlet to river)	$148,940.75
4	Ross, Church	Reconstruction of Ross St. and Church St. (Cambridge St. to Church St.)	$239,504.50
5	Victoria South	Reconstruction of Victoria St. south (CB-494 to outlet to river)	$554,200.00
6	Victoria S/Balaklava	Storm sewer replacement (CB-395 to CB-417), (DI-375 to CB-374)	$80,840.00
7	Balaklava/Albert	Storm Sewer replacement (CB-917 to CB-304)	$93,500.00
8	George/Arnaud	Storm Sewer replacement (CB-314 to joint near CB-313)	$15,625.00
9	Angie Street	Storm Sewer replacement (CB-934 to joint near CB-282)	$5,000.00
10	River St. east of George St. N	Storm Sewer replacement (CB-521 to joint near CB-520)	$47,125.00
		Total Construction Cost	**$1,511,991.75**
		Engineering & Contingencies (25%)	**$377,997.94**
		Total Project Cost (Excl. HST)	**$1,889,989.69**

Chesley

Stormwater System

Community Snapshot

Population: ~1,879

Dwellings: 866 (2021 Census)

Area: ~1.91 km^2

River Systems:

The **North Saugeen River** flows east to west through Chesley, eventually joining the Saugeen River.

Topography:

Most of Chesley slopes toward the river, aiding natural drainage. However, stormwater networks in the northern and southernmost areas slope in the opposite direction.

Chesley Stormwater System – Summary

Estimated Replacement Cost of Entire System: $12.4 million (2024 Costs)

Minor System

~12.7 km of storm sewers; 465 structures

Sewer sizes: 100–1050 mm; 55.8% ≤ 300 mm

MECP minimum: 200 mm diameter

Major System

Handles excess runoff beyond minor system capacity

Uses overland flow via roads & ditches

Flooding risk when catch basins overflow

Roads need proper slope, curb & gutter, or ditches

Some areas lack curbs, reducing flow capacity

Key Deficiencies

Storm assets on private land without easements

Reverse slope sewers cause backups

Structures with no outlet or missing data

Undersized pipes limit peak flow capacity

Filled-in/inadequate ditches obstruct flow

Lack of defined outlets increases flood risk

Chesley Stormwater Modelling & Upgrade Summary

Existing Conditions

1:5-Year Storm Event
15 structures flood, 139 surcharge
Total flood volume: 403 m^3
4 structures = 62% of total flooding
High-risk streets: Tower Rd., Martha Ave., Centennial St., 1st Ave North

1:100-Year Storm Event
81 structures flood, 270 surcharge
Total flood volume: 5,503 m^3
Major flooding structures:
These 4 structures = 27% of total flooding
High-risk areas: Southern Tower Rd., 4th St. NE
Flood risk increases where curb & gutter or ditches are insufficient

Upgrade Impact

1:5-Year Storm Event
Flooding eliminated
Surcharged structures reduced:
From 139 → 112
System now meets design expectations for this storm level

1:100-Year Storm Event
Flooded structures reduced:
From 81 → 74
Surcharged structures increased:
From 270 → 274
Due to more runoff stored in large diameter sewers
Less flooding = more surcharging
Total flood volume reduced:
From 5,503 m^3 → 4,427 m^3
System not designed for 1:100-year storms, but upgrades significantly improve performance

Proposed Upgrades

5 municipal priority upgrades = **$747,000**

Chesley
Stormwater System

Priority Upgrade Summary

PRIORITY	LOCATION	UPGRADE DESCRIPTION	BUDGET COST
1	Tower Road	Road reconstruction and storm sewer replacement	$437,695
2	2nd St SW	Storm sewer replacement	$27,681
3	2nd St SE	Storm sewer replacement / Ditch rehabilitation	$28,000
4	2nd Ave SE	Storm sewer replacement	$36,330
5	4th Ave SE	Storm sewer replacement	$67,785
		Total Construction Cost	$597,491
		Engineering & Contingencies (25%)	$149,373
		Total Project Cost (Excl. HST)	$746,864

Current Stormwater Funding Model

- **Stormwater infrastructure costs** (operation, maintenance, construction, replacement) are funded through **general taxation**.
- **Urban and rural ratepayers** both contribute financially to stormwater infrastructure located within urban centres.
- **Stormwater costs** are not separated from other municipal services in the tax levy.
- **No dedicated reserve fund** for stormwater; funding is subject to annual budget constraints and competing priorities.
- **Water and Sanitary Sewer Infrastructure** projects are being delayed due to lack of funding to replace the stormwater infrastructure in the same road section.
- **Regulatory changes** (CLI-ECA, 2021) require increased monitoring, reporting, and maintenance, further increasing funding needs.

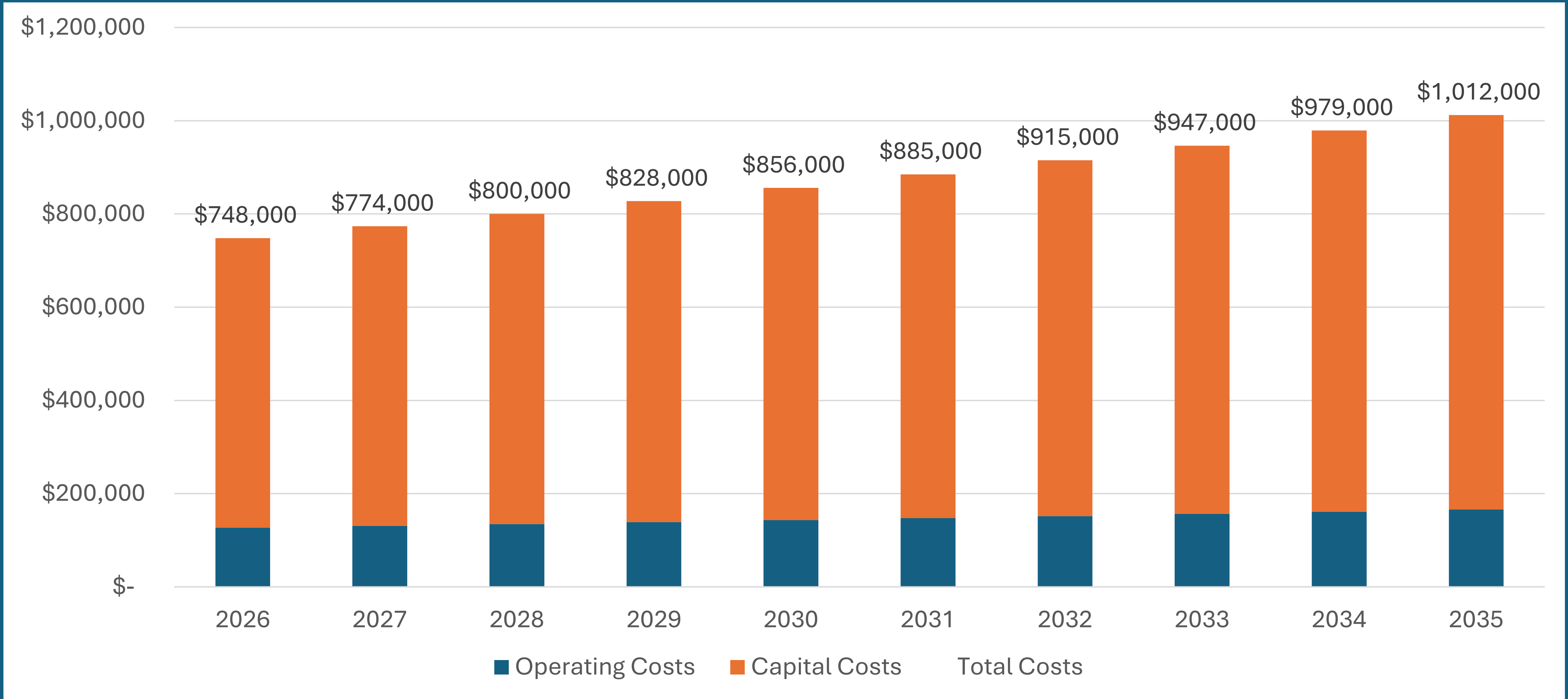
Stormwater Utility Model

- **What is it?**
- A stormwater utility model is a dedicated funding approach where the costs of operating, maintaining, and upgrading stormwater infrastructure are funded by users through a specific levy, rather than general taxation. This is the present model used for the Urban water and sanitary sewer systems.
- **How does it work?**
- **Levy System:** Properties serviced by municipal water and/or sanitary sewer systems pay a stormwater levy.
- **Levy Structure:** The levy is typically based on property land area and type (e.g., residential, commercial, institutional), reflecting the amount of runoff each property generates.
- **Dedicated Reserve Fund:** Levies collected go into a stormwater reserve fund, used only for stormwater-related expenses.
- **Why use it?**
- **Equity:** Only those who benefit from stormwater services pay for them, rather than all taxpayers.
- **Transparency:** Stormwater costs are separated from other municipal services, making budgeting clearer.
- **Sustainability:** Ensures a stable funding source for ongoing maintenance and future upgrades, meeting regulatory requirements.

Funding Mechanisms

Funding Mechanism	Structure	Considerations
Tax Revenue	• Current funding model • Tax-supported	• Inequitable approach • Easy to administrate
Flat Rate	• Flat rate based on property type • Non-residential properties pay more than residential	• Inequitable approach • Easy to administrate
Impervious Surface Area	• Based on impervious surface area (e.g. pavement, roofs, etc.) • Municipality does not have adequate data	• Equitable approach • Untenable administration
Property Land Area	• Based on land area and property type • Non-residential properties pay more per square metre than residential	• Equitable approach • More difficult administration

Net Rate Funding Need



Phase-in to Cost Recovery: Rate per Square Metre

User Group	2026 Rate	2027 Rate	2028 Rate	2029 Rate	2030 Rate	2031 Rate
Cost Recovery	25%	40%	55%	70%	85%	100%
Residential	$0.0279	$0.0457	$0.0643	$0.0837	$0.1040	$0.1252
Multi-Residential	$0.0355	$0.0582	$0.0818	$0.1065	$0.1324	$0.1594
Commercial	$0.0559	$0.0914	$0.1286	$0.1675	$0.2081	$0.2505

Median Bills

User Group	2026	2027	2028	2029	2030	2031
Cost Recovery	25%	40%	55%	70%	85%	100%
Single Detached	$26	$42	$60	$78	$96	$116
Semi Detached	$21	$34	$48	$63	$78	$94
Multi-residential Complex	$121	$198	$279	$363	$452	$544
Commercial	$15	$25	$34	$45	$56	$67
Business Park	$452	$741	$1,042	$1,356	$1,685	$2,029
Institutional	$531	$869	$1,222	$1,591	$1,977	$2,380

Benefits for Ratepayers

Dedicated Funding

Creates a stormwater reserve fund, ensuring money is available for maintenance, upgrades, and emergencies.

Reduces reliance on annual tax levy and budget constraints.

Improved Infrastructure

Stable funding supports regular upgrades, better flood protection, and compliance with regulatory requirements.

Enables proactive maintenance, reducing risk of system failures.

Enhanced Streetscapes

Supports curb & gutter installation, eliminating open ditches in residential areas. Improves neighbourhood aesthetics and property values.

Transparency & Accountability

Stormwater costs are separated from other municipal services.

Ratepayers can see exactly what their levies support.

Supports Growth & Resilience

Ensures infrastructure keeps pace with development and climate change impacts.

Meets environmental compliance standards (CLI-ECA).

Questions & Feedback

- Feedback Survey's are available for completion
- Feedback Survey available on our website at www.arran-elderslie.ca
- Written Feedback can be submitted directly by email to jfenton@arran-elderslie.ca
- Feedback will be collected until Friday, October 3, 2025
- Feedback will be compiled and presented to Council to help inform their decision at the October 14, 2025, Council Meeting.

Appendix: Cost Overview

Cost Centre	2026 Cost Projection
Operating Costs	$157,500
Capital Costs	$621,000
Tax Revenues needed for Stormwater Ditches	($30,300)
Net Rate Funding Need	**$748,200**

Appendix: Forecast of Parcel Area in Square Metres: Paisley, Tara, and Chesley

Property Type	2026	2030	2035
Residential – Single and Semi	2,964,000 m^2	3,094,000 m^2	3,258,000 m^2
Multi-Residential	855,000 m^2	893,000 m^2	940,000 m^2
Non-Residential	1,323,000 m^2	1,381,000 m^2	1,454,000 m^2

- Modest growth in-line with historical census data
- Source: Bruce County Mapping