COUNCIL REPORT

Meeting Date:	November 4, 2024
Department:	Engineering and Public Works
Report No.:	EPW-2024-74
Submitted by:	Mark Ortiz, Director of Engineering and Public Works
Approved by:	Trisha McKibbin, Chief Administrative Officer
SUBJECT:	Water, Wastewater and Stormwater Masterplan

RECOMMENDATION:
THAT: Council receive Report EPW-2024-74 "Water, Wastewater and Stormwater Masterplan" for information, and further;

THAT: Council endorse the 2024 Water, Wastewater and Stormwater Master Plan as the recommended servicing strategies to meet Strathroy-Caradoc's growth needs to 2046 as well as provide effective on-going continuity to existing serviced settlement areas, and further;

THAT: Council direct staff to file a Notice of Completion and commence the 45-day public review period as required under the Municipal Class Environmental Assessment (MCEA) process.

BACKGROUND:
The Water, Wastewater and Stormwater Servicing Masterplan (WWSMP or Masterplan) was developed as a strategic planning document to facilitate long term planning and identify key infrastructure required to accommodate population and employment growth in the Municipality through the year 2046. The Master Planning process is intended to establish the need and justification for projects and ensure the first two phases of the environmental assessment process is satisfied.

The primary goals of the Masterplan were to:

- Determine necessary water, wastewater and stormwater infrastructure projects required to service growth to 2046
- Address the first two phases of the Municipal Class EA including Identification of Problem/Opportunities and Alternative Solutions
- Ensure the recommendations are consistent with and conform to provincial policies and legislations and the Municipality's policies
- Identify options for optimizing the effectiveness of the existing infrastructure

The Masterplan was undertaken in accordance with the requirements of the Municipal Class Environmental Assessment (MCEA) March 2023. The MCEA process sets out the process that a proponent must follow to meet the requirements of the *Ontario Environmental Assessment Act* for a class or category of infrastructure projects.

The Masterplan Process provides the basis for developing a long-range plan that integrates infrastructure requirements for existing and future land use.

The Masterplan was developed following Approach #1 of the Municipal Class Environmental Assessment (Municipal Engineers Association) which involves a broad level of assessment, leading to further detailed investigation at a project-specific level for Schedule B or Schedule C projects identified in the Masterplan.

Accordingly, the Masterplan considered all reasonable water and wastewater servicing alternatives and developed a preferred alternative that offered the lowest potential impacts on the natural, cultural, social and economic environment of the community.

In addition to the social, cultural, economic and environmental considerations, focus was placed on sustainability, constructability, operability and service integration with other existing or future water, wastewater and stormwater infrastructure projects.

Water, wastewater and stormwater servicing strategies were assessed using the evaluation criteria shown in the table below.

Water, Wastewater and Stormwater Servicing Evaluation Criteria Category	
Category	**Criteria**
Technical	• Constructability • Improvement to operations • Infrastructure required • Approval requirements • Risk mitigation– regulatory, supply security, climate change, etc.
Social and Cultural	• Public acceptance • Impact to cultural heritage infrastructure and landscapes • Impact to archaeological infrastructure and resources
Environmental	• Impact to aquatic and terrestrial species and habitat • Impact to surface water quantity and quality • Impact on climate change
Economic	• Capital costs • Operation and maintenance costs • Allows for planned community growth

The Masterplan implemented population growth forecasts provided by the 2022 Residential Land Needs Assessment (Watson & Associates Economists LTD) and assumed that future development would be established within existing designated settlement areas.

The Masterplan also included the connection of existing, un-serviced homes in Mt. Brydges to the sanitary system as part of the study, as per Council direction.

Public Engagement
Two Public Information Centre's (PIC) were held to provide members of the public an opportunity to review the Masterplan alternatives and provide input on the process. Feedback from the information sessions was taken and included in the development of the Masterplan.

The first PIC was held in Mt. Brydges on January 10th, 2024 and 59 people completed the sign in sheet.

The second PIC was held in Strathroy on September 11th, 2024 and 8 people completed the sign in sheet.

Feedback was received via comment sheets and emails on various topics including but not limited to:

- Growth projections/population determination
- Servicing outside of current settlement boundaries
- Flooding in Campbellvale

Clarification was provided on the growth and servicing as part of the Masterplan. As flooding in Campbellvale is related to water drainage outside of the study area, the Municipality retained Spriet Associates Ltd to complete a field study and preliminary investigation of the existing Campbellvale drain watershed. Staff provided options to the concerned residents on possible solutions based on Spriet Associates Ltd findings.

COMMENTS:
Strathroy-Caradoc Drinking Water Supply

The Strathroy-Caradoc water distribution system is fed from the Lake Huron Water Supply System (LHPWSS). The LHPWSS has a current capacity to supply 340 million litres (ML) of drinking water per day while the maximum day flow (MDF) in 2023 was 198.5 ML.

Current agreements for both Mt. Brydges and Strathroy do not specify a maximum day limit on water supply. As water supply to Strathroy-Caradoc constitute a small portion of the LHPWSS's total available supply (less than 5% by 2046), and significant supply is currently available in the LHWSS (141.5 ML above 2023 MDF) water supply is not expected to be an issue through 2046.

It is recommended that the Municipality convey its future demand requirements to the LHPWSS and formalize a guaranteed minimum supply in a future update to the supply agreements.

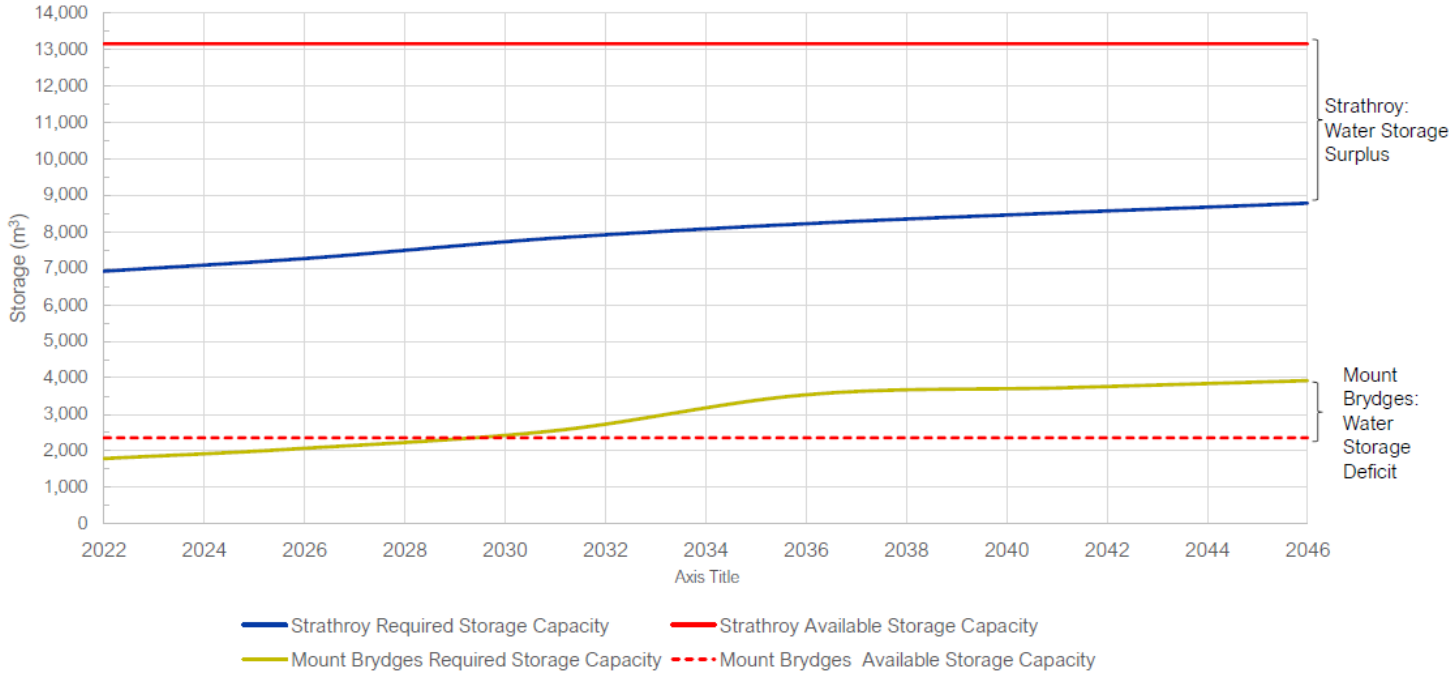
Strathroy Drinking Water System

Strathroy Drinking Water Distribution
The Masterplan assessed current and future water demands in Strathroy as well as current distribution and storage capacity in the Strathroy Drinking Water System. Peak Hour Demand is expected to increase from 156 L/s currently to 220 L/s by 2046. Several watermain replacement projects have been identified to improve fire flow through 2046.

Strathroy Drinking Water Storage

The current storage capacity of the Strathroy Drinking Water System is 13,150 m³. The future storage requirement in 2046 is 8,781 m³ (67% of available capacity). This is sufficiently below the 85% threshold typically used to start the planning/design process for upgrades. As such, there are no growth-related water storage projects identified through 2046. It is expected that future Masterplans will identify capacity needs beyond 2046.

The table below summarizes the Strathroy and Mt. Brydges Water Storage:



Strathroy Drinking Water System Recommendations

The Masterplan provided the Municipality with a list of watermains required to be replaced and increased in size to meet fire flow targets. The watermains recommended for replacement are:

- Centre Street Watermain Upgrades
- Concord Drive Watermain Upgrades
- Riverview Drive Watermain Upgrades
- Oak Avenue Watermain Upgrades
- North Street Watermain Upgrades
- Locke Heights Watermain Upgrades
- Lamore Crescent Watermain Upgrades
- Mill Pond Crescent Watermain Upgrades
- Head Street Watermain Upgrades

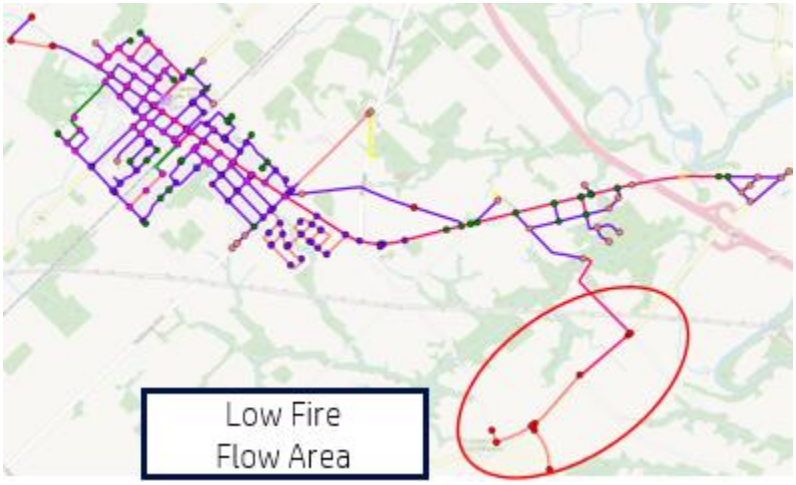
The total value of Strathroy Drinking Water System capital projects identified through 2046 is $12.5M.

Mt. Brydges Drinking Water System

Mt. Brydges Drinking Water Distribution

The Masterplan assessed current and future water demands in Mount Brydges as well as current distribution and storage capacity in the Mount Brydges Drinking Water System. Peak Hour Demand in Mount Brydges is expected to increase from 32 L/s currently to 73 L/s by 2046. The existing water distribution system was found to be capable of the increased distribution flows and no growth-related water distribution projects identified in Mount Brydges through 2046.

The Masterplan also identified low flow during fire conditions outside of the Mt. Brydges community. It was recommended that these areas be treated as rural areas for fire protection. It was also recommended, to continue regular updates to the hydraulic model.



Mt. Brydges Drinking Water Storage
The current drinking water storage capacity of the Mt. Brydges Drinking Water System is 2,350 m³. As total storage of 3,913 m³ is expected to be required in 2046, additional storage capacity will be needed. The required storage volume will reach 85% of available in late 2025, triggering the start of planning/design for increased capacity.

The total value of Mt. Brydges Drinking Water System capital projects identified through 2046 is $2.58M.

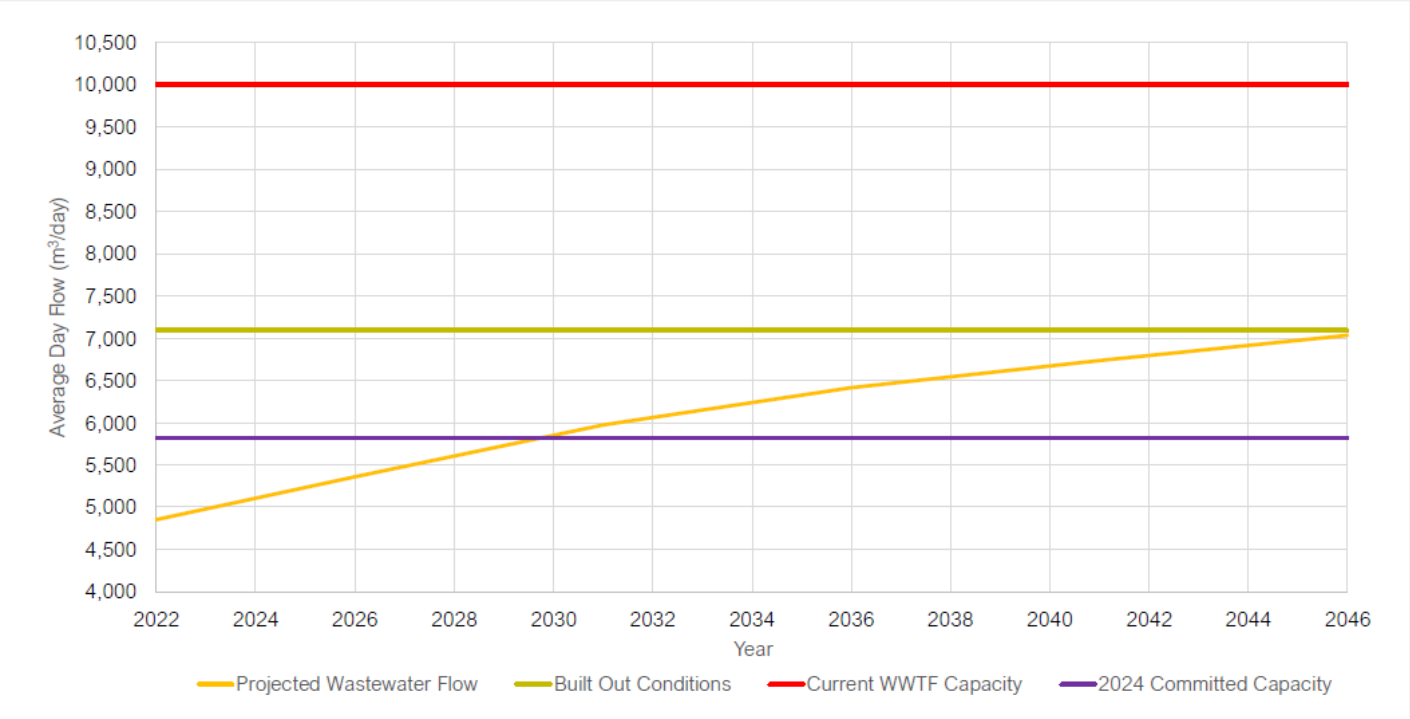
Strathroy Wastewater System
Strathroy Wastewater Collection
The current Strathroy Wastewater Collection System (WWCS) performance was evaluated using a calibrated hydraulic model. It was found that Strathroy' s existing WWCS is capable of conveying future estimated wet weather flows under the 2046 conditions. There are no growth-related wastewater collection projects identified through 2046. It is expected that future Masterplans will identify capacity needs beyond 2046.

Strathroy Wastewater Treatment Facility (WWTF)
The current Strathroy WWTF has a capacity of the Strathroy Wastewater Treatment Facility is System is 10,000 m³/day. The future treatment requirement of 7,034 m³ is projected in 2046. As such there are no growth-related wastewater treatment projects identified through 2046.

There are several capital upgrades currently underway at the Strathroy WWTF including a new aeration basin, headworks facility and blower upgrades which will improve plant operations and redundancy however will not increase capacity.

It is expected that future Masterplans will identify capacity needs beyond 2046.

The chart below summarizes the Strathroy Wastewater Flow Projections:



Strathroy Wastewater System Recommendations
The Masterplan recommends annual updating of the hydraulic model.

The total value of Strathroy Wastewater System masterplan capital projects (excluding on-going capital works) through 2046 is $0.6 M.

Mt. Brydges Wastewater System
Connection of Existing Un-serviced Residences
Based on direction from Council, the future serviced population for Mt. Brydges was based both on additional growth and the connection of existing un-serviced properties.

It was assumed that there would be a phasing of these connections and by year 2046, the entire un-serviced population will be fully connected. The approach of including the existing un-serviced population has a potentially significant impact on the wastewater treatment capacity and collection system upgrades.

Mt. Brydges Wastewater Collection
The current Mt. Brydges WWCS performance was evaluated using a calibrated hydraulic model. It was found that Mt. Brydges existing WWCS is capable of conveying future estimated wet weather flows

under the 2046 conditions. There are no growth-related wastewater collection projects identified through 2046.

The connection of existing, non-serviced residences comprises a significant, non-growth related capital project.

Mount Brydges Wastewater Treatment

Mount Brydges is currently serviced by a single wastewater treatment plant – the Mt. Brydges WWTF – with a rated capacity of 825 m^3/day.

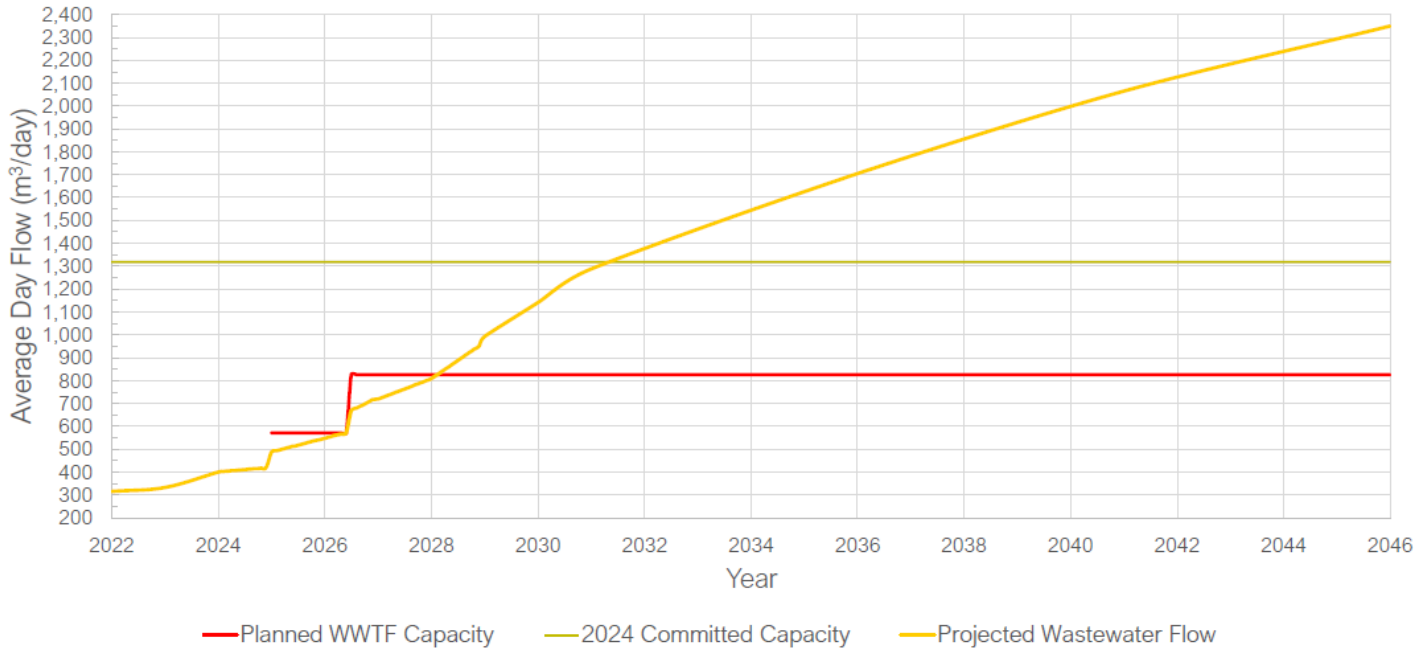
As future wastewater treatment requirements are projected to be 2,348 m^3 by 2046, Mount Brydges will require significant additional wastewater treatment capacity in order to service growth and connect existing un-serviced residences.

In addition to future treatment capacity needs, the Mt. Brydges WWTF currently struggles to meet effluent compliance limits with existing flows of approximately 400 m^3/day. Several initiatives are currently underway independent of the Masterplan to restore capacity at the Mt. Brydges WWTF to its full 825 m^3/day rated capacity, including process optimization and re-purposing of three (3) existing Rotating Bioreactor tanks to extended aeration.

For the purpose of the Masterplan, it was assumed that the Mt. Brydges WWTF will be capable of achieving its rated capacity and effectively treating 825 m^3/day.

In total there is approximately 900 m^3/day of flow expected from currently proposed developments in the Mt. Brydges area. There will be a further 625 m^3/day of additional flow required for the servicing of the existing non-serviced residents. These short to medium term flow increases are expected to put significant strain on wastewater treatment capacity in Mount Brydges.

Alternative Solutions for addressing wastewater servicing and increasing wastewater treatment capacity in Mount Brydges will be identified and evaluated in a detailed Class C Environmental Assessment, to be completed as high priority by the Municipality.



Mt. Brydges Wastewater System Recommendations
In order to meet the treatment capacity requirement of 2,348 m^3/day by 2046, the Masterplan recommends the undertaking of a Schedule C Class EA on a priority basis followed by the implementation of the proposed solution.

Option #1 (Expansion of the Mount Brydges WWTF) is used in the Masterplan for illustrative and high-level budgetary purposes, noting that the future wastewater servicing strategy is to be confirmed through the separate Schedule C Class EA.

The total estimated value of Mt. Brydges Wastewater System capital projects identified through 2046 is approximately $80M as follows:

- Expansion of Mount Brydges WWTF - $26M
- Connection of Existing Un-Serviced Residences - $54M

It should be noted that the cost for connecting existing un-serviced residences includes costs for completely upgrading the right-of-way to current municipal servicing standards including all road improvement and storm sewer construction. The sanitary sewer connection expenditure would make up approximately 27% of the total cost.

Strathroy-Caradoc Stormwater System
In the Masterplan process, Strathroy-Caradoc Stormwater Management (SWM) underwent a review of the following:

- Current condition of the existing facilities
- Current Stormwater standards
- Approval requirements for new facilities
- Operations and maintenance of the current Stormwater Facilities

The intent was to provide the Municipality with recommendations to improve the current SWM approval and management process to balance meeting regulatory requirements, safety, environmental protection/enhancement, lifecycle cost, liability, and an equitable apportionment between new and existing development.

Strathroy-Caradoc Stormwater System Recommendations
Findings from the Stormwater review provided the following recommendations:

- Stage 1: Develop Overall SWM Policy for Council Endorsement;
- Stage 2: Update Procedures Facility Assessment and Assumption; and
- Stage 3: Implement SWM Lifecycle Management Program.

KEY FINDINGS:
Strathroy Water

- Watermain Upgrades for improved fire flows
- Regular updating of modeling

Mt Brydges Water

- Increase water storage capacity
- Regular updating of modeling

Strathroy Wastewater

- Regular updating of modeling

Mt Brydges Wastewater

- Schedule C Class EA for wastewater capacity
- Wastewater capacity upgrades
- Servicing of non-serviced properties

Stormwater

- Stage 1 Develop overall Stormwater Management Policy
- Stage 2 Update procedures and facility assessments
- Stage 3 Implement Stormwater lifecycle management

The following table shows a breakdown of projects and costs from the findings from the Masterplan.

Project	Area	Cost Opinion	Project Complete Year
Water System			
Centre Street Watermain Upgrades	S	$840,000	2032
Concord Drive Watermain Upgrades	S	$760,000	2032
Riverview Drive Watermain Upgrades	S	$760,000	2032
Oak Avenue Watermain Upgrades	S	$1,830,000	2032
North Street Watermain Upgrades	S	$1,770,000	2033
Locke Heights Watermain Upgrades	S	$1,430,000	2033
Lamore Crescent Watermain Upgrades	S	$1,210,000	2034
Mill Pond Crescent Watermain Upgrades	S	$1,430,000	2034
Head Street Watermain Upgrades	S	$2,030,000	2035
Storage Upgrades	MB	$2,575,000	2032
Updating of Water Hydraulic Model	SC	$400,000	2032
Water Total		$15,035,000	
Wastewater System			
WWTF Schedule C Class EA	MB	$350,000	2026
WWTF Cost	MB	$25,768,000	2030
Existing Servicing Phase 1-10	MB	$54,000,000	2028-2046
Annual Updating of Wastewater Hydraulic Model	SC	$600,000	2029, 2039
Wastewater Total		$80,718,000	
Stormwater Management			
Stage 1 SWM Policy Initial Policy & 1 Update	SC	$200,000	2026
Stage 2 SWM	SC	$315,000	2029
Stage 3 SWM	SC	$5,640,000	2027-2044
Stormwater Total		$6,155,000	
Pollution Prevention Control Plan			
PPCP Data Collection to update WW Hydraulic Model	SC	$300,000	2029, 2039
PPCP Total		$300,000	
TOTAL		$102,208,000	

CONSULTATION:

- Director of Finance and IT
- Manager of Public Works
- Manager of Environmental Services
- Senior Development Coordinator
- Chief Administrative Officer

FINANCIAL IMPLICATIONS:

The costs for the recommended works in the table above will be included in the upcoming capital budget.

ALTERNATIVE(S) TO THE RECOMMENDATION:

1. Council to reject Masterplan and Alternative Solutions, provide alternate direction.

2. Council to provide alternate direction.

STRATEGIC PLAN ALIGNMENT:

This matter is in accord with the following strategic priorities:

- Local Infrastructure – Households and businesses in Strathroy-Caradoc are supported by reliable, financially responsible and well-maintained infrastructure networks

ATTACHMENTS: